

ABB INDUSTRIAL DRIVES

DCS880 drivesFirmware manual



DCS880 Drive Manuals

DCS880 Drive Manuals										
	Publication number	EN	DE	IT	ES	FR	PL	ZH	RU	JP
DCS880 Quick guide	3ADW000545	EN	DE	<u>IT</u>	<u>ES</u>	FR				
Safety instructions all languages	3ADW000481	<u>EN</u>	DE	<u>IT</u>	<u>ES</u>	FR	<u>PL</u>	<u>ZH</u>	RU	
DCS880 Manual set	-	EN								
DCS880 Units										
DCS880 Flyer	3ADW000475	EN	DE	IT	ES	FR		ZH	RU	
DCS880 Technical catalog	3ADW000465	EN	DE	IT	ES	FR	PL	ZH	RU	
DCS880 Hardware manual	3ADW000462	EN	DE	IT	ES	FR	PL		RU	JA
DCS880 Firmware manual	3ADW000402	EN	DE	IT	ES	FR	PL		RU	JA
DCS880 Service manual	3ADW000474	EN		 -		<u></u>			<u> </u>	571
DCS880 Hardparallel manual (on request only)	3ADW000530	EN								
DCS88012-pulse manual	3ADW000530	EN								
DCS880 Current measurement aid (SDCS-CMA-2) manual	3ADW000333	EN								
ACS-AP-x assistant control panels user's manual	3AUA0000085685	EN								
DCS Thyristor power converter – Technical guide	3ADW000163	EN								
DCS880 External DC voltage measurement H1 H5		1-								
<u> </u>	3ADW000601	<u>EN</u>								
Functional safety	24814000450	ENI			FC	-	Б		-	
Supplement for functional safety	3ADW000452	EN		<u>IT</u>	<u>ES</u>	FR	<u>PL</u>		<u>RU</u>	
FSPS-21 PROFIsafe safety functions module	3AXD50000158638	EN								
FSO-21 Safety functions module	3AXD50000015614	EN								
Functional safety for enclosed converter										
+Q957 Prevention of unexpected Start Up	3ADW000504	<u>EN</u>								
+Q951 Emergency stop, category 0 with MC opening	3ADW000505	EN								
+Q952 Emergency stop, category 1 with MC opening	3ADW000506	EN								
+Q963 Emergency stop, category 0 without MC opening	3ADW000507	EN								
+Q964 Emergency stop, category 1 without MC opening	3ADW000508	EN								
DCS880 FSO-21 safety functions modul supplement	3ADW000821	EN								
Enclosed converter										
DCS880-A Catalog	3ADW000531	EN								
DCS880-A Installation manual	3ADW000627	EN								
DCS880-A81 Hydrogen catalog	3ADW000824	EN								
DCS800-A +S880 Enclosed converters, flyer	3ADW000523	EN								
Rebuild and upgrade systems		_								
DCS880-R Rebuild manual	3ADW000599	EN								
DCS880-U Upgrade manual	3ADW000719	EN								
Door mounting kits	3,1211000113	_								
	241140000100140	EN								
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Safety instructions

What this chapter contains

This chapter contains the safety instructions you must follow when installing, operating, and servicing the drive.

If ignored, physical injury or death may follow, or damage may occur to the drive, the motor or driven equipment. Read the safety instructions before you work on the unit.

To which products this chapter applies

The information is valid for the entire range of the product DCS880, the converter modules DCS880-S0x size H1 ... H8, field exciter units DCF80x, etc. like the Rebuild Kit DCS880-R00.

Usage of warnings and notes

There are two types of safety instructions throughout this manual: warnings and notes. Warnings caution you about conditions which can result in severe injury or death and/or damage to the equipment, and advice on how to avoid the danger. Notes draw attention to a particular condition or fact or give information on a subject.

The warning symbols are used as follows:



Dangerous voltage warning warns of high voltage which can cause physical injury or death and/or damage to the equipment.



General danger warning warns about conditions, other than those caused by electricity, which can result in physical injury or death and/or damage to the equipment.



Electrostatic sensitive devices warning warns of electrostatic discharge which can damage the equipment.

Installation and maintenance work

These warnings are intended for all who work on the drive, motor cable or motor. Ignoring the instructions can cause physical injury or death and/or damage to the equipment.



WARNING

- Only qualified electricians are allowed to install and maintain the drive!
- Never work on the drive, motor cable or motor when main power is applied.
- Always ensure by measuring with a multimeter (impedance at least 1 M Ω) that:
 - 1. Voltage between drive input phases U1, V1 and W1 and the frame is close to 0 V.
 - 2. Voltage between terminals C+ and D- and the frame is close to 0 V.
- Do not work on the control cables when power is applied to the drive or to the external
 control circuits. Externally supplied control circuits may cause dangerous voltages
 inside the drive even when the main power on the drive is switched off.
- Do not make any insulation resistance or voltage withstand tests on the drive or drive modules.
- Isolate the motor cables from the drive when testing the insulation resistance or voltage withstand of the cables or the motor.
- When reconnecting the motor cable, always check that the C+ and D- cables are connected with the proper terminal.

Notes:

 The motor cable terminals on the drive are at a dangerously high voltage when the main power is on, regardless of whether the motor is running or not.

- Depending on the external wiring, dangerous voltages (115 V, 220 V or 230 V) may be present on the relay outputs of the drive system (e.g., XRO1 ... XRO3).
- DCS880 with enclosure extension: Before working on the drive, isolate the whole drive system from the supply.

Grounding

These instructions are intended for all who are responsible for the grounding of the drive. Incorrect grounding can cause physical injury, death and/or equipment malfunction and increase electromagnetic interference.



WARNING

- Ground the drive, motor, and adjoining equipment to ensure personnel safety in all circumstances, and to reduce electromagnetic emission and pick-up.
- Make sure that grounding conductors are adequately sized and marked as required by safety regulations.
- In a multiple-drive installation, connect each drive separately to protective earth (PE (1)).
- Minimize EMC emission and make a 360° high frequency grounding (e.g., conductive sleeves) of screened cable entries at the cabinet lead-through plate.
- Do not install a drive equipped with an EMC filter to an ungrounded power system or a high resistance-grounded (> 30 Ω) power system.

Notes:

- Power cable shields are suitable as equipment grounding conductors only when adequately sized to meet safety regulations.
- As the normal leakage current of the drive is higher than 3.5 mA_{AC} or 10 mA_{DC} a fixed protective earth connection is required.
- This product can cause a DC current in the protective earthing conductor. Where a
 residual current-operated protective (RCD) or monitoring (RCM) device is used for
 protection in case of direct or indirect contact, only an RCD or RCM of Type B is allowed
 on the supply side of this product.

Printed circuit boards and fiber optic cables

These instructions are intended for all who handle the circuit boards and fiber optic cables. Ignoring the following instructions can cause damage to the equipment.



WARNING

- The printed circuit boards contain components sensitive to electrostatic discharge.
 Wear a grounding wrist band when handling the boards. Do not touch the boards unnecessarily.
- Use grounding strip:

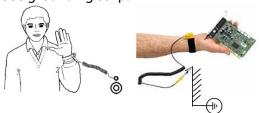


ABB order no.: 3ADV050035P0001



WARNING

- Handle the fiber optic cables with care.
- When unplugging optic cables, always grab the connector, not the cable itself.
- Do not touch the ends of the fibers with bare hands as the fiber is extremely sensitive to dirt.
- The minimum allowed bend radius is 35 mm (1.38 in.).

Mechanical installation

These notes are intended for all who install the drive. Handle the unit carefully to avoid damage and injury.



WARNING

- DCS880 sizes H4 ... H8:
 - The drive is heavy. Lift the drive by lifting lugs only.
 - The drive's center of gravity is high. Do not tilt the drive. The drive will overturn from a tilt of about 6 degrees. An overturning drive can cause physical injury.
 - Do not lift the drive by the front cover.
 - Place drives H4 ... H6 only on their back.
- Make sure that dust from drilling does not enter the drive when installing. Electrically conductive dust inside the unit may cause damage or lead to malfunction.
- Ensure sufficient cooling.
- Do not fasten the drive by riveting or welding.

Operation

These warnings are intended for all who plan the operation of the drive or operate the drive. Ignoring the instructions can cause physical injury or death and/or damage to the equipment.



WARNING

- Before adjusting the drive and putting it into service, make sure that the motor and all
 driven equipment are suitable for operation throughout the speed range provided by
 the drive. The drive can be adjusted to operate the motor at speeds above and below
 the base speed.
- Do not control the motor with the disconnecting device (disconnecting mains);
 instead, use the control panel keys and , or commands via the I/O board of the drive.
- Mains connection:
 - You can use a disconnect switch (with fuses) to disconnect the electrical components of the drive from the mains for installation and maintenance work. The type of disconnect switch used must be as per EN 60947-3, Class B, so as to comply with EU regulations, or a circuit-breaker type which switches off the load circuit by means of an auxiliary contact causing the breaker's main contacts to open. The mains disconnect must be locked in its "OPEN" position during any installation and maintenance work.
- EMERGENCY STOP buttons must be installed at each control desk and at all other control panels requiring an emergency stop function. Pressing the STOP button on the control panel of the drive will neither cause an emergency stop of the motor, nor will the drive be disconnected from any dangerous potential.
- To avoid unintentional operating states, or to shut the unit down in case of any imminent danger according to the standards in the safety instructions it is not sufficient to merely shut down the drive via signals "RUN", "drive OFF" or "Emergency Stop" respectively "control panel" or "PC tool".
- Intended use:
 - The operating instructions cannot take into consideration every possible case of configuration, operation, or maintenance. Thus, they mainly give such advice only, which is required by qualified personnel for normal operation of the machines and devices in industrial installations.
 - If in special cases the electrical machines and devices are intended for use in non-industrial installations which may require stricter safety regulations (e.g., protection against contact by children or similar) these additional safety measures for the installation must be provided by the customer during assembly.

Note: When the control location is not set to Local (Local not shown in the s the display), the stop key on the control panel will not stop the drive. To sto	
using the control panel, press the Loc/Rem key and then the stop key .	

Introduction to this manual

What this chapter contains

This chapter describes the purpose, contents, and the intended use of this manual.

Before You Start

The purpose of this manual is to provide you with the information necessary to control and program the drive.

Study carefully the <u>Safety instructions</u> at the beginning of this manual before attempting any work on or with the drive. Read this manual before starting-up the drive. The installation and commissioning instructions given in the <u>DCS880 Hardware manual (3ADW000462)</u> and <u>DCS880 Quick guide (3ADW000480)</u> must also be read before proceeding.

This manual describes the **standard** DCS880 firmware.

What this manual contains

The Safety instructions can be found at the beginning of this manual.

Introduction to this manual, the chapter you are currently reading, introduces you to this manual.

Start-up, this chapter describes the basic start-up procedure of the drive.

<u>Using the control panel</u>, this chapter describes the handling of the control panel.

<u>Firmware description</u>, this chapter describes how to control the drive with standard firmware. Including the I/O configuration of digital and analog inputs and outputs with different hardware possibilities.

Communication, this chapter describes the communication capabilities of the drive.

<u>Macros</u>, this chapter contains a brief description of each macro together with a connection diagram. Macros are pre-defined applications which will save the user time when configuring the drive.

Parameters, this chapter contains all signals and parameters.

<u>Fault Tracing</u>, this chapter describes the protections and fault tracing of the drive.

<u>Fieldbus control via embedded fieldbus (EFB)</u>, this chapter describes the communication to and from a fieldbus network using the embedded fieldbus of the drive.

<u>Fieldbus control via fieldbus adapter</u>, this chapter describes the communication to and from a fieldbus network using an optional fieldbus adapter.

Firmware structure diagram, this chapter shows the parameter structure within the firmware.

Related documents

A list of related manuals is shown on the inside of the front cover under <u>DCS880 Drive Manuals</u>.

Terms and abbreviations

AC 800M Type of programmable controller manufactured by ABB. ACS-AP-I Types of control panels. ACS-AP-W Attention: For the DCT880 the control panel is not part of the standard deliver needs to be added using either plus code +3404 ACS-AP-I or +3429 ACS-AP-W. Adaptive Program (Adaptive Program. See Adaptive programming, Application guide (3AXD5000028574) AI Analog input. Interface for analog input signals. AO Analog output. Interface for analog output signals. APplication program Program written by the Drive Application Builder. See Drive (IEC61131-3) application programming manual (3AUA0000127808). Control unit Contains the electronics and I/O connections. The control unit is connected to power unit. Converter Converter to control DC loads. DZD Drive-to-Drive/Device-to-Device. Is a communication link between ABB equipment. DCS580 A product family of ABB drives. DCS880 A product family of ABB drives. DCSLink Communication between the armature converter and the field exciters or 12-pc. communication. DCT880 A product family of ABB drives (thyristor power controller). DDCS Distributed Drives Communication System. A protocol used in communication between ABB equipment. DI Digital input. Interface for digital input signals. DIO Digital input. Interface for digital input signals. Drive Converter to control DC motors/loads. Drive Converter to control DC motors/loads. DriveAP Adaptive Programming. See Adaptive programming, Application guide (3AXD5000028574). Drive Application Tool to write application programs. See Drive (IEC61131-3) application programming manual (3AUA0000127808). Drive Composer PC tool for commissioning and maintenance of ABB equipment. EFB Embedded fieldbus. FAIO-01 Optional CANopen adapter. FCAN-01 Optional CANopen adapter. FCAN-01 Optional COntrolNet adapter. FCAN-01 Optional CANopen adapter. FCAN-01 Optional CANopen adapter. FCO-00 Optional DDCS communication module.	Term/Abbreviation	Definition
ACS-AP-I ACS-AP-W Attention: For the DCT880 the control panel is not part of the standard deliveneeds to be added using either plus code +1404 ACS-AP-I or +1429 ACS-AP-W. Adaptive Program (AP) Adaptive Program: Analog input. Interface for analog untput signals. AO Analog output. Interface for analog output signals. Application program written by the Drive Application Builder. See Drive (IEC61131-3) application program written by the Drive Application Builder. See Drive (IEC61131-3) application programming manual (3AUA0000127808). Control unit Contains the electronics and I/O connections. The control unit is connected to power unit. Converter Converter to control DC loads. DZD Drive-to-Drive/Device-to-Device. Is a communication link between ABB equipment. DCS580 A product family of ABB drives. DCS580 A product family of ABB drives. DCSLink Communication between the armature converter and the field exciters or 12-pc communication DCS Distributed Drives Communication System. A protocol used in communication between ABB equipment. DI Digital input. Interface for digital input signals. DIO Digital input. Interface for digital input signals. DIO Digital input. Interface for digital output signals. Drive Converter to control DC motors/loads. Drive Converter to control DC motors/loads. DriveAP Adaptive Programming. See Adaptive programming. Application quide (3AXD5000028574). Drive Application Builder Tool to write application programs. See Drive (IEC61131-3) application programming manual (3AUA0000127808). Drive Composer PC tool for commissioning and maintenance of ABB equipment. FBA Fieldbus adapter. FCAN-01 Optional CANopen adapter. FCAN-01 Optional CONTONE adapter. FDAO-01 Optional Optional CONTONE adapter. FDAO-01 Optional O	-	
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between ABB equipment. DI Digital input. Interface for digital input signals. DIO Digital input/output. Interface that can be used as a digital input or output. DO Digital output. Interface for digital output signals. Drive Converter to control DC motors/loads. DriveBus A communication link used between ABB equipment. DriveAP Adaptive Programming. See Adaptive programming, Application guide (3AXD50000028574). Drive Application Builder Tool to write application programs. See Drive (IEC61131-3) application programming manual (3AUA0000127808). Drive Composer PC tool for commissioning and maintenance of ABB equipment. EFB Embedded fieldbus. FAIO-01 Optional analog I/O extension module. FBA Fieldbus adapter. FCAN-01 Optional CANopen adapter. FCNA-01 Optional ControlNet adapter. FDCO-0x Optional DDCS communication module. FDIO-01 Optional digital I/O extension module.	DCT880	A product family of ABB drives (thyristor power controller).
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EFB Embedded fieldbus. FAIO-01 Optional analog I/O extension module. FBA Fieldbus adapter. FCAN-01 Optional CANopen adapter. FCNA-01 Optional ControlNet adapter. FDCO-0x Optional DDCS communication module. FDIO-01 Optional digital I/O extension module.		, , , ,
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FBA Fieldbus adapter. FCAN-01 Optional CANopen adapter. FCNA-01 Optional ControlNet adapter. FDCO-0x Optional DDCS communication module. FDIO-01 Optional digital I/O extension module.	EFB	Embedded fieldbus.
FCAN-01 Optional CANopen adapter. FCNA-01 Optional ControlNet adapter. FDCO-0x Optional DDCS communication module. FDIO-01 Optional digital I/O extension module.	FAIO-01	Optional analog I/O extension module.
FCNA-01 Optional ControlNet adapter. FDCO-0x Optional DDCS communication module. FDIO-01 Optional digital I/O extension module.	FBA	Fieldbus adapter.
FDCO-0x Optional DDCS communication module. FDIO-01 Optional digital I/O extension module.	FCAN-01	Optional CANopen adapter.
FDIO-01 Optional digital I/O extension module.	FCNA-01	Optional ControlNet adapter.
	FDCO-0x	Optional DDCS communication module.
EDNA-01 Optional DavicoNet adapter	FDIO-01	Optional digital I/O extension module.
Optional Devicement adapter.	FDNA-01	Optional DeviceNet adapter.
FEA-03 Optional I/O extension module.	FEA-03	Optional I/O extension module.
FECA-01 Optional EtherCAT® adapter.	FECA-01	Optional EtherCAT® adapter.
FEIP-21 Optional EtherNet/IP fieldbus adapter module.	FEIP-21	Optional EtherNet/IP fieldbus adapter module.
FEN-01 Optional TTL encoder interface module.	FEN-01	Optional TTL encoder interface module.

Term/Abbreviation	Definition
FEN-11	Optional absolute encoder interface module.
FEN-21	Optional resolver interface module.
FEN-31	Optional HTL encoder interface module.
FENA-11	Optional Ethernet/IP, Modbus/TCP and PROFINET IO adapter.
FENA-21	Optional dual-port Ethernet/IP, Modbus/TCP and PROFINET IO adapter.
FEPL-02	Optional POWERLINK adapter.
FIO-01	Optional digital I/O extension module.
FIO-11	Optional analog I/O extension module.
FMBT-21	Optional Modbus/TCP adapter module.
FPBA-01	Optional PROFIBUS DP adapter.
FPNO-21	Optional PROFINET fieldbus adapter module.
FSCA-01	Optional Modbus/RTU adapter.
FSE-31	Optional HTL safety encoder interface module.
FSO-21	Optional safety functions module.
FSPS-21	Optional PROFIsafe safety functions module.
HTL	High-threshold logic.
1/0	Input/Output.
ModuleBus	A communication link used between ABB equipment. Can be connected to the optical ModuleBus link.
Network control	With fieldbus protocols based on the Common Industrial Protocol (CIP TM), such as DeviceNet and Ethernet/IP, denotes the control of the connected equipment using the Net Ctrl and Net Ref objects of the ODVA AC/DC Drive Profile. For more information, see www.odva.org , and the following manuals: FDNA-01 DeviceNet adapter module User's manual (3AFE68573360) . FENA-11/-21 Ethernet adapter module User's manual (3AUA0000093568) .
Off3 (emergency stop)	Off3 (emergency stop) with configurable deceleration time according to cat. 1.
OPL	Optical power link. Protocol used in communication between the control unit and the power unit.
Parameter	User-adjustable operation instruction.
PID controller	Proportional-integral-derivative controller. E.g., the speed/voltage/temperature control is based on a PID algorithm.
PLC	Programmable logic controller.
Power unit	Contains the power electronics and power connections. The control unit is connected to the power unit.
PTC	Positive temperature coefficient.
PU	See power unit.
RFG	Ramp function generator.
RO	Relay output. Interface for a digital output signal. Implemented with a relay.
Signal	Value measured or calculated. It can also contain status information. Most signals are read-only, but some (especially counter-type signals) can be reset.
SS1	Safe stop 1.
SSI	Synchronous serial interface.
STO	Safe torque off.
TTL	Transistor-transistor logic.

Term/Abbreviation	Definition
	Uninterruptible power supply. Power supply equipment with battery to maintain output voltage during power failure.
Unit	Thyristor power controller to control heating loads.

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. The HTTP protocol, which is used between PC tool (Drive Composer) and product, is an unsecured protocol. For independent and continuous operation of the product such connection via network to a commissioning tool is not necessary. However, it is the customer's sole responsibility to provide and continuously ensure a secure connection between the product and the customer network or any other network (as the case may be). The customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, prevention of physical access, application of authentication measures, encryption of data, installation of anti-virus programs, etc.) to protect the product, the network, its system, and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information.

Notwithstanding any other provision to the contrary and regardless, whether the contract is terminated or not, ABB and its affiliates are under no circumstances liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

See also chapter **User lock**.

Start-up

What this chapter contains

This chapter describes the basic start-up procedure of the drive. A more detailed description of the signals and parameters involved in the procedure can be found in section Parameters.

General

The drive can be operated:

- In local via the Drive Composer or the control panel.
- In remote via local I/O or overriding control.

The following start-up procedure uses Drive Composer pro (for further information about Drive Composer pro, consult its online help). However, parameters can also be changed with Drive Composer entry or the control panel.

The start-up procedure includes actions that need only be taken when powering up the drive for the first time in a new installation (e.g., entering the motor data). After the start-up, the drive can be powered up without using these start-up functions again. The start-up procedure can be repeated later if the start-up data needs to be altered.

Refer to section <u>Fault tracing</u> in case problems should arise. In case of a major problem, disconnect mains and wait for 5 minutes before attempting any work on the drive, the motor, or the motor cables.

Start-up procedure



- The <u>Safety instructions</u> at the beginning of this manual must be observed with extreme care during the start-up procedure!
- The start-up procedure should only be carried out by a qualified electrician.
- Check the mechanical and electrical installation the drive according to the <u>DCS880</u> <u>Hardware manual (3ADW000462)</u>.

Tools

For drive commissioning following software tools are mandatory:

Drive Composer pro including commissioning wizard for fast drive signal monitoring.

For drive commissioning following tools are mandatory in addition to standard tools:

- An oscilloscope including memory function with either galvanically isolating transformer or isolating amplifier for safe measurements.
- A clamp on current probe. In case the scaling of the DC load current needs to be checked it must be a DC clamp on current probe.
- A voltmeter.

Make sure that all equipment in use is suitable for the voltage level applied to the power part!

Checking with the power switched off

Check the settings of:

- The mains breaker (e.g., overcurrent = $1.6 * I_n$, short circuit current = $10 * I_n$, time for thermal tripping = $10 * I_n$).
- Time, overcurrent, thermal and voltage relays.
- The earth fault protection (e.g., Bender relay).

Check the insulation of the mains voltage cables or busbars between the secondary side of the dedicated transformer and the drive:

- Disconnect the dedicated transformer from its incoming voltage.
- Check that all circuits between the mains and the drive (e.g., control/auxiliary voltage) are disconnected
- Measure the insulation resistance between L1 L2, L1 L3, L2 L3, L1 -PE, L2 PE, L3 PE. The result should be MΩs.

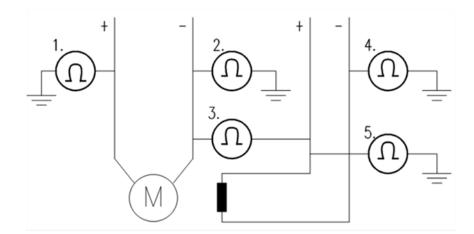
Check the installation:

- Crosscheck the wiring with the drawings.
- Check the mechanical mounting of the motor and pulse encoder and/or analog tacho.

- Make sure that the motor is connected in a correct way. This includes the armature cables, the
 external EMF feedback (especially the polarity), field cables, serial windings, and cable shields.
 Attention: A wrong polarity of the external EMF feedback will cause a running away motor. Ignoring
 this can cause physical injury or death and/or damage to the equipment.
- Check the connections of the motor fan, if existing.
- Make sure that the converter fan is connected correctly especially in modules size H7 and H8 were star or delta connection is possible.
- If a pulse encoder is used make sure that pulse encoder's auxiliary voltage connection corresponds to its voltage and that the channel connection corresponds to correct direction of rotation.
- Check that the shielding of the pulse encoder's cable is connected to the TE bar of the DCS880.
- If an analog tacho is used make sure that it is connected to the proper input at the SDCS-CON-H01 (AITAC:1 and 2).
- For all other cables make sure that both ends of the cables are connected and they do not cause any damage or danger when power is being switched on.

Measuring the insulation resistance of the motor cables and the motor:

Isolate the motor cables from the drive before testing the insulation resistance or voltage withstand
of the cables or the motor.



- Measure the insulation resistance between:
 - 1. Armature + cables and PE.
 - 2. Armature cables and PE.
 - 3. Armature cables and field cables.
 - 4. Field cable and PE.
 - 5. Field + cable and PE.
- The result should be MΩs.

Setting of Jumpers:

- The boards of the DCS880 include jumpers to adapt the boards to different applications. The
 position of the jumpers must be checked before connecting voltage.
- For specific jumper settings consult the DCS880 Hardware manual (3ADW000462).

Drive data, check following items for each drive and mark the differences in the delivery documents:

- Motor, analog tacho or pulse encoder and cooling fans rating plate data.
- Direction of motor rotation.
- Maximum and minimum speed and if fixed speeds are used.
- Speed scaling factors:
 - E.g., gear ratio, roll diameter.
- Acceleration and deceleration times.
- Operating modes:
 - E.g., stop mode, E-stop mode.
- The number of motors connected.

Checking with the power switched on



- The <u>Safety instructions</u> at the beginning of this manual must be observed with extreme care during the start-up procedure!
- The start-up procedure should only be carried out by a qualified electrician.

WARNING

There is dangerous voltage inside the cabinet!

Switching the power on:

- Prior to connecting the voltage proceed as follows:
 - 1. Ensure that all the cable connections are checked and that the connections cannot cause any danger.
 - 2. Close all doors of enclosed converter before switching power on.
 - 3. Be ready to trip the supply transformer if anything abnormal occurs.
 - 4. Switch the power on.

Measurements made with power on:

- Check the operation of the auxiliary equipment.
- Check the circuits for external interfaces on site:
 - 1. Safety circuits, like Safe Torque Off (STO), Off2 (emergency off/electrical disconnect/fast current off) and Off3 (emergency stop).
 - 2. Remote control of the mains breaker.
 - 3. Signals connected to the control system.
 - 4. Other signals which remain to be checked.

Connecting voltage to the drive:

- Check from the delivery diagrams the type of boards and converters which are used in the system.
- Check all time relay and breaker settings.
- Close the supply disconnecting device (check the connection from the delivery diagrams).
- Close all protection switches one at a time and measure for proper voltage.

First time motor spinning



- The <u>Safety instructions</u> at the beginning of this manual must be observed with extreme care during the start-up procedure!
- The start-up procedure should only be carried out by a qualified electrician.

WARNING

- There is dangerous voltage inside the cabinet!

Before spinning the motor for the first time make sure:

- That the area around the motor/mechanics is safe.
- That the safety circuits, like Safe Torque Off (STO), Off2 (emergency off/electrical disconnect/fast current off) and Off3 (emergency stop) work properly.
- That the safety circuits are in the immediate area from where the drive/motor is controlled.
- That the external EMF feedback (especially the polarity) is correct.
 - **Attention:** A wrong polarity of the external EMF feedback will cause a running away motor. Ignoring this can cause physical injury or death and/or damage to the equipment.
- That following parameters are set properly for the test:
 - That 90.41 M1 feedback selection = EMF.
 - That 30.34 M1 current limit bridge 2 is around -10 %.
 - That 30.35 M1 current limit bridge 1 is around 10 %.
 - That 24.01 Used speed reference = 0 rpm.

Start the drive e.g., from Drive Composer with a zero-speed reference.

Before giving a speed reference check:

- That 01.20 Mains voltage in V matches the measured mains voltage (use a voltmeter).
- That 01.29 M1 field current in A matches the measured field current (use a current clamp).

Give a speed reference and check:

- That 90.01 Motor speed for control matches the measured speed feedback (use a hand-held tacho).
- That 90.01 Motor speed for control matches 24.01 Used speed reference.
- That 01.21 Armature voltage in V matches the measured armature voltage (use a voltmeter).

Commissioning a DCS880

Nominal values of the converter can be found in group 07 System info, check following signals:

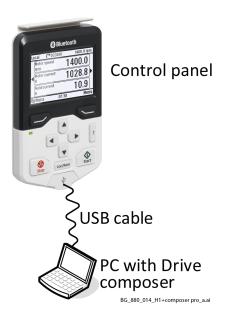
- 07.60 Drive size, recognized converter type read from 07.03 Drive rating ID set or 95.25 Set: Type code.
- 07.61 Drive block bridge 2 set, recognized converter quadrant type read from 07.03 Drive rating ID set or 95.26 Set: Drive block bridge 2.
- 07.62 Drive DC current scaling set, nominal converter DC current in A read from 07.03 Drive rating ID set or 95.27 Set: Drive DC current scaling.
- 07.64 Drive AC voltage scaling set, nominal AC converter voltage in V read from 07.03 Drive rating ID set or 95.28 Set: Drive AC voltage scaling.
- 07.65 Drive max bridge temperature set, maximum bridge temperature in degree centigrade read from 07.03 Drive rating ID set or 95.29 Set: Drive max bridge temperature.
- If signals are not correct adapt them, see group 95 HW configuration in this manual.

Connect a DCS880 and a PC running Drive Composer

Via control panel

To establish a connection between Drive Composer and drive, connect a USB type A (PC) type mini-B (control panel) cable to the USB port of the PC and the USB port of the control panel. The maximum length of the USB cable should be 3 m.

<u>Drive Composer Start-up and</u> <u>maintenance PC tool User's manual</u> (3AUA0000094606).



Via an Ethernet network (FENA-x1)

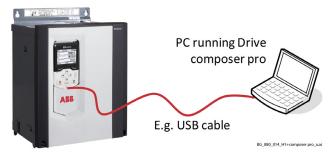
The Ethernet connection is made using FENA-x1 Ethernet adapter modules. For the installation of the adapter module, see <u>FENA-11/-21 Ethernet adapter module user's manual (3AUA0000093568)</u>. Additional information (e.g., parameter settings) can be found in the <u>Drive Composer Start-up and maintenance PC tool User's manual (3AUA0000094606)</u>.

Attention: Please consider the following, when connecting Drive Composer pro via an Ethernet network.

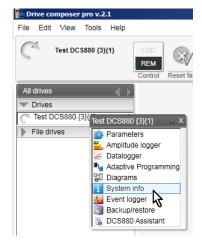
- The communication supervision is not made in group 50 Fieldbus adapter (FBA), but in group 49
 Panel port communication.
- To have communication supervision at all, 49.05 Communication loss action must **not** be set to No action.
- The timeout is set with 49.04 Communication loss time. Time outs of 2000 ms (default is 1000 ms)
 are sufficient.
- Any changed parameters must be validated by means of 49.06 Refresh settings = Refresh.

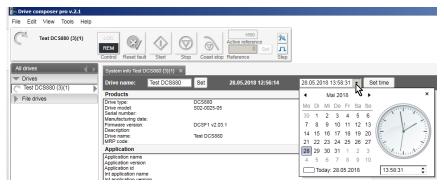
Commissioning a DCS880 using the DCS880 Assistant

The DCS880 Assistant works only in a single drive point-to-point connection.

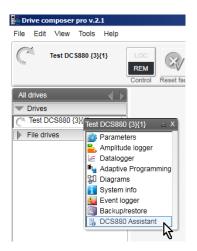


Start Drive Composer pro and choose System info and set date and time.





Then choose DCS880 Assistant.



For basic commissioning press the Start button or select a specific assistant and press Next.

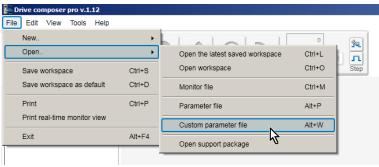


Commissioning a DCS880 using custom parameter files

Requirements

Before starting the commissioning, connect one drive (via control panel) with the Drive Composer. Make sure, that you have the custom parameter files available. The custom parameter files are available from your local ABB agent.

How to open a custom parameter file in Drive Composer pro:



01 Name plate data

Open the custom parameter set named:

- 01 Name plate data.dccustparams.
- Set all parameters to default by means of:
- 96.15 Parameter restore = Default.
- Check with 96.11 Macro active.

Enter the motor data, the mains (supply) data and the most important protections:

- 96.01 Language.
- 99.11 M1 nominal current.
- 99.12 M1 nominal voltage.
- 99.14 M1 nominal (base) speed.
- 30.11 M1 minimum speed.
- 30.12 M1 maximum speed.
- 99.13 M1 nominal field current.
- 31.30 M1 overspeed trip margin.
- 31.44 Armature overcurrent level.
- 99.10 Nominal mains voltage.

02 Standard I/O

Set the I/O according to need using parameters in groups 10 ... 13.

03 Field current controller

Open the custom parameter set named:

03 Field current controller.dccustparams.

Set the field exciter type by means of:

- 99.07 M1 used field exciter type.
- Check with 7.41 M1 field exciter type.

Enter the field circuit data:

- 99.13 M1 nominal field current.
- 28.17 M1 EMF/field control mode.

Switch the drive to local mode (Drive Composer or local I/O).

Start the autotuning by means of:

- 99.20 Tuning request = Field current autotuning.
- Set On within 20 s.

During the autotuning the mains or field contactor will be closed. The field circuit is measured by means of increasing the field current to nominal field current and the field current control parameters are set. The armature current is not released while the autotuning is active and thus the motor should not turn. When the autotuning is finished successfully, check the parameters set by the autotuning:

- 28.44 M1 field control voltage limit.
- 28.45 M1 field current proportional gain, typical values around 4.

28.46 M1 field current integration time, typical values around 66 ms.

Remove Run and On.

If the autotuning fails, warning AF90 Autotuning is generated. For more details check the AUX code of AF90 Autotuning and repeat the autotuning.

04 Armature current controller

Open the custom parameter set named:

04 Armature current controller.dccustparams.

Enter the motor nominal current and the basic current limitations:

- 99.11 M1 nominal current.
- 30.19 Minimum torque 1.
- 30.20 Maximum torque 1.
- 30.34 M1 current limit bridge 2.
- 30.35 M1 current limit bridge 1.

Attention: Do not manually change the default values of 27.32 M1 armature resistance and 27.33 M1 armature inductance. Changing them will falsify the results of the autotuning.

Switch the drive to local mode (Drive Composer or local I/O).

Start the autotuning by means of:

- 99.20 Tuning request = Armature current autotuning.
- Set On and Run within 20 s.

During the autotuning the mains contactor will be closed, the armature circuit is measured by means of armature current bursts and the armature current control parameters are set. The field current is not released while the autotuning is active and thus the motor should not turn, but due to remanence in the field circuit about 40 % of all motors will turn (create torque). These motors must be locked.

When the autotuning is finished successfully, check the parameters set by the autotuning:

- 27.29 M1 current proportional gain, typical values around 0.2.
- 27.30 M1 current integration time, typical values 25 ... 50 ms.
- 27.31 M1 discontinuous current limit, typical values 20 ... 60 %.
- 27.32 M1 armature resistance.
- 27.33 M1 armature inductance.

Remove Run and On.

If the autotuning fails, warning AF90 Autotuning is generated. For more details check the AUX code of AF90 Autotuning and repeat the autotuning.

05 First time motor turning

Open the custom parameter set named:

05 First time motor turning.dccustparams.

Make sure, the speed feedback is set to EMF and check minimum- and maximum speed:

- 90.41 M1 feedback selection = EMF.
- 30.11 M1 minimum speed.
- 30.12 M1 maximum speed.

Switch the drive to local mode (Drive Composer or local I/O). Set On, Run. Begin with a small speed reference from about 10 % of maximum speed. Then slowly increase to maximum speed.

The mains contactor and the field contactor, if existing, will be closed and the motor will run up to the requested speed reference.

Check following parameters if applicable:

- 01.21 Armature voltage in V.
- 01.29 M1 field current in A.
- 94.01 EMF speed.
- 94.03 Tacho speed.
- 94.04 OnBoard encoder speed.
- 25.02 Speed proportional gain 1.
- 25.03 Speed integration time 1.

To stop remove Run and On.

06 Speed feedback

Open the custom parameter set named:

06 Speed feedback.dccustparams.

Enter the EMF speed feedback parameters and, if applicable, the parameters for the OnBoard encoder or the analog tacho:

- 90.41 M1 feedback selection.
- 30.11 M1 minimum speed.
- 30.12 M1 maximum speed.
- 99.12 M1 nominal voltage.
- 99.14 M1 nominal (base) speed.
- 94.24 OnBoard encoder type.
- 94.25 OnBoard encoder speed calculation mode.
- 94.23 OnBoard encoder pulses/revolution.
- 94.08 M1 tacho voltage at 1000 rpm.

Switch the drive to local mode (Drive Composer or local I/O).

Start the autotuning by means of:

- 99.20 Tuning request = Speed feedback assistant.
- Set On and Run within 20 s.

The speed feedback assistant detects the kind of speed feedback - EMF, OnBoard encoder or analog tacho - the drive is using.

During the autotuning the mains contactor and the field contactor, if existing, will be closed and the motor might run up to base speed. See 99.14 M1 nominal (base) speed. During the whole procedure, the drive will be in EMF speed control despite the setting of 90.41 M1 feedback selection.

When the autotuning is finished successfully, check the parameter set by the autotuning:

90.41 M1 feedback selection.

Remove Run and On.

If the autotuning fails, warning AF90 Autotuning is generated. For more details check the AUX code of AF90 Autotuning and repeat the autotuning.

Analog tacho fine tune procedure

In case an analog tacho is detected, 90.41 M1 feedback selection = Tacho, it is recommended to fine tune the analog tacho.

Switch the drive to local mode (Drive Composer or local I/O).

Start the autotuning by means of:

- 99.20 Tuning request = Tacho fine-tuning.
- Set On and Run within 20 s.

Measure the motor speed with a handheld tacho and write the value into:

94.11 M1 tacho fine-tuning adjust.

Check for proper speed feedback by means of:

- 94.03 Tacho speed.
- 24.01 Used speed reference.

To stop remove Run and On.

07 Speed controller

Open the custom parameter set named:

07 Speed controller.dccustparams.

Enter the basic speed parameters, ramp times, torque and current limits and the speed filter times:

- 99.14 M1 nominal (base) speed.
- 30.11 M1 minimum speed.
- 30.12 M1 maximum speed.
- 23.12 Acceleration time 1.
- 23.13 Deceleration time 1.21.08 M1 zero speed level.
- 30.19 Minimum torque 1.
- 30.20 Maximum torque 1.
- 30.34 M1 current limit bridge 2.

- 30.35 M1 current limit bridge 1.
- 24.18 Speed error filter time 1.
- 24.19 Speed error filter time 2.
- 90.42 Motor speed filter time.

Attention: For better results set the filters, especially when using EMF speed feedback.

Switch the drive to local mode (Drive Composer or local I/O).

Start the autotuning by means of:

- 99.20 Tuning request = Speed controller autotuning.
- Set On and Run within 20 s.

During the autotuning the mains contactor and the field contactor, if existing, will be closed, the ramp is bypassed, and torque respectively current limits are valid. The speed controller is tuned by means of speed bursts up to base speed, see 99.14 M1 nominal (base) speed, and the speed controller parameters are set.

Attention: During the autotuning the torque and/or current limits will be reached.

When the autotuning is finished successfully, check the parameter set by the autotuning:

- 25.02 Speed proportional gain 1.
- 25.03 Speed integration time 1.

Remove Run and On.

If the autotuning fails, warning AF90 Autotuning is generated. For more details check the AUX code of AF90 Autotuning and repeat the autotuning.

Attention: The assistant is using the setting of 90.41 M1 feedback selection. If using setting OnBoard encoder, Encoder 1, Encoder 2, or Tacho make sure the speed feedback is working properly!

08 Field weakening

Open the custom parameter set named:

08 Field weakening.dccustparams.

Enter the motor data and the field circuit data:

- 99.12 M1 nominal voltage.
- 99.14 M1 nominal (base) speed.
- 30.11 M1 minimum speed.
- 30.12 M1 maximum speed.
- 99.13 M1 nominal field current.
- 31.58 M1 field current low level.
- 28.17 M1 EMF/field control mode.

Switch the drive to local mode (Drive Composer or local I/O).

Start the autotuning by means of:

- 99.20 Tuning request = Flux linearization autotuning.
- Set On and Run within 20 s.

During the autotuning the mains contactor and the field contactor, if existing, will be closed and the motor will run up to base speed. See 99.14 M1 nominal (base) speed. The flux linearization is tuned by means of a constant speed while decreasing the field current and the flux linearization parameters are

When the autotuning is finished successfully, check the parameter set by the autotuning:

- 28.31 Field current at 40 % flux.
- 28.32 Field current at 70 % flux.
- 28.33 Field current at 90 % flux.

Remove Run and On.

If the autotuning fails, warning AF90 Autotuning is generated. For more details check the AUX code of AF90 Autotuning and repeat the autotuning.

Commissioning a DCS880 manually

I/O configuration

To set the in- and outputs see chapter I/O configuration.

Field current controller

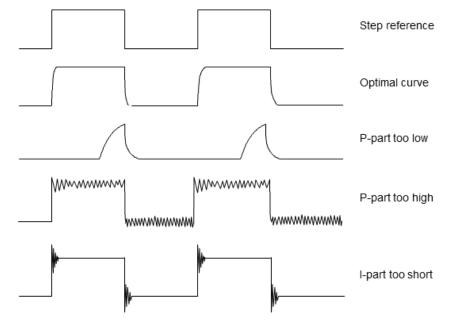
Drive Composer information:

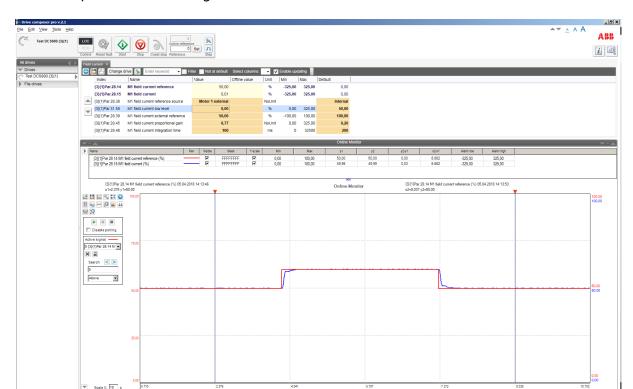


Manual tuning of the field current controller:

- Connect Drive Composer to the drive and choose local mode.
- Monitor 28.14 M1 field current reference and 28.15 M1 field current.
- Set 28.38 M1 field current reference source = Motor 1 external.
- Set 31.58 M1 field current low level = 0.00 %.
- Start the drive via Drive Composer.
- Use 28.39 M1 field current external reference to step the field current controller.
- Tune the field current controller by means of 28.45 M1 field current proportional gain and 28.46 M1 field current integration time.
 - Step size: about 2 % ... 5 % of nominal field current (do not hit any limits during stepping, e.g., maximum field current, α or supply voltage).
 - Step response time: 50 ms ... 60 ms (count only from 10 % ... 90 %).
 - Where to step: 30 %, 60 % and 80 % of nominal field current.

Field current controller step responses:





Drive Composer manual tuning of the field current controller:

- Set 28.39 M1 field current external reference = 0.00 %.
- Stop the drive via Drive Composer.
- Set 31.58 M1 field current low level and 28.38 M1 field current reference source back to their original settings.

Armature current controller

To keep a PI-controller as fast as possible idealistically the integral part should stay at zero. The worst case is that the integral part is running into the limits and thus needs a long time to recover. To prevent this and to achieve an integral part as small as possible three feed forwards are used for the current controller:

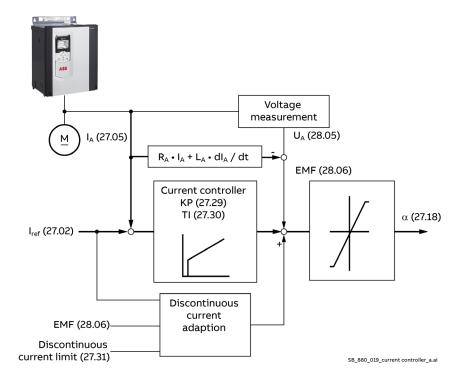
- 1. During discontinuous current the signal from the current controller is boosted by means of the discontinuous current adaptation, depending on discontinuous current limit, current reference, and EMF. The discontinuous current limit must be determined during the commissioning.
- 2. 28.06 EMF voltage is used as feed forward. Unfortunately, it is not possible to measure the EMF directly. It must be calculated by means of following formula:

$$EMF = U_A - R_A \times I_A - L_A \times \frac{dI_A}{dt}.$$

The value for the resistance (R_A) of the motor must be determined during the commissioning. The resistance is needed for the EMF controller and the speed calculated from the EMF.

3. 99.01 Mains voltage is used as feed forward.

Control principle armature current controller:



Manual tuning:

Thus, the manual tuning of the armature current controller is divided into three parts:

- 1. Determine the resistance of the motor.
- 2. Determine the discontinuous current limit of the motor.
- 3. Manual tuning of the armature current controller (p- and i-part).

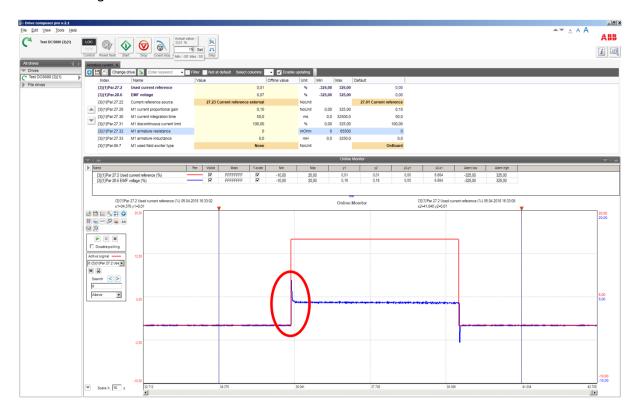
Drive Composer information:



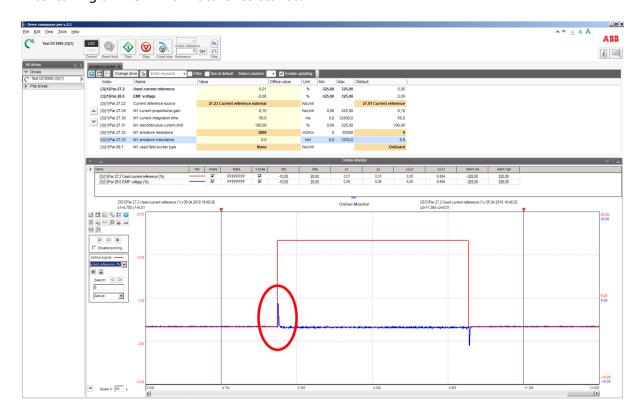
Part 1, determine the resistance of the motor:

- Connect Drive Composer to the drive and choose local mode.
- Monitor 27.02 Used current reference and 28.06 EMF voltage.
- Set 27.22 Current reference source = 27.23 Current reference external.
- Set 27.29 M1 current proportional gain, 27.30 M1 current integration time, 27.31 M1 discontinuous current limit, 27.32 M1 armature resistance and 27.33 M1 armature inductance to default.
- Set 99.07 M1 used field exciter type = None.
- Start the drive via Drive Composer.
- Use Drive Composer to set the current reference and step the armature current controller. See Drive
 Composer information above. The Step function of the Drive Composer is not working.
- Watch the EMF.
- Make sure the motor is not turning (Attention: let the drive run only for a brief time).

Before tuning of 27.32 M1 armature resistance:

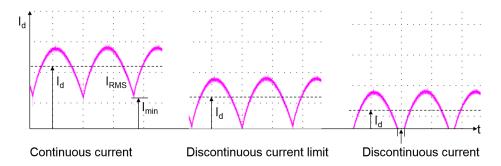


 In this example 27.32 M1 armature resistance is too low. Tune 27.32 M1 armature resistance until the EMF is as close as possible to zero and does not change its value during the current step.
 After tuning of 27.32 M1 armature resistance:



- It is not possible to tune 27.33 M1 armature inductance manually. Thus, leave 27.33 M1 armature inductance at default.
- Stop the drive via Drive Composer.
- $\quad \text{Set 27.22 Current reference source and 99.07 M1 used field exciter type back to their original settings}.$

Part 2, determine discontinuous current limit of the motor:

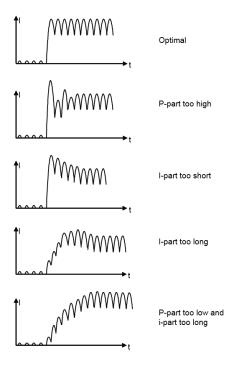


- Connect an oscilloscope at the fixed AO named IACT (XAO:4/5 on the SDCS-CON-H01).
- Connect Drive Composer to the drive and choose local mode.
- Set 27.22 Current reference source = 27.23 Current reference external.
- Set 27.31 M1 discontinuous current limit to default.
- Set 99.07 M1 used field exciter type = None.
- Start the drive via Drive Composer.
- Use Drive Composer to increase the armature current reference.
- Make sure the motor is not turning (Attention: let the drive run only for a brief time).
- Watch the current bubbles and increase the current reference until the current is continuous. See recordings above.
- Stop the drive via Drive Composer.
- Set 27.22 Current reference source and 99.07 M1 used field exciter type back to their original settings.
- Copy the current reference used in Drive Composer and paste it into 27.31 M1 discontinuous current limit.

Part 3, manual tuning of the armature current controller:

- Connect an oscilloscope at the fixed AO named IACT (XAO:4/5 on the SDCS-CON-H01).
- Connect Drive Composer to the drive and choose local mode.
- Set 27.22 Current reference source = 27.23 Current reference external.
- Set 99.07 M1 used field exciter type = None.
- Start the drive via Drive Composer.
- Use Drive Composer to set the current reference (must be higher than 27.31 M1 discontinuous current limit) and step the armature current controller.
- Make sure the motor is not turning (Attention: let the drive run only for a brief time).
- Tune the armature current controller by means of 27.29 M1 current proportional gain and 27.30 M1 current integration time.

Armature current controller step responses:



- Stop the drive via Drive Composer.
- Set 27.22 Current reference source and 99.07 M1 used field exciter type back to their original settings.

Analog tacho

In case an analog tacho is used for speed feedback it must be tuned. Drive Composer information:



Manual tuning of the analog tacho:

- Set speed and analog tacho parameters:
 - 30.11 M1 minimum speed.
 - 30.12 M1 maximum speed.
 - 31.30 M1 overspeed trip margin.
 - 94.08 M1 tacho voltage at 1000 rpm.
 - 99.14 M1 nominal (base) speed.
- The maximum tacho speed is calculated automatically and shown in 94.09 M1 tacho max displayable speed.

Analog tacho connections:

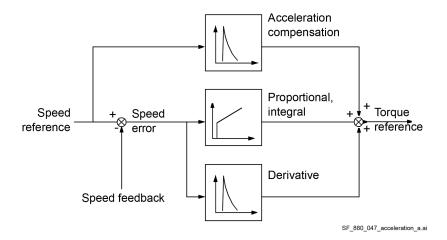
XTAC	Analog tach	10
1	AITACH+	±8 270 V _{DC}
2	AITACH-	

- Set 94.12 M1 tacho fine-tuning factor to default.
- Make sure that the drive is in EMF control, 90.41 M1 feedback selection = EMF.
- Start the drive via Drive Composer.
- Use Drive Composer to set a constant speed reference.
- Measure the speed feedback at the motor shaft using a handheld tacho.

- Rescale 94.12 M1 tacho fine-tuning factor in small steps, e.g., ± 0.01 until the measured speed feedback at the shaft and the measured speed feedback with the analog tacho match, see 94.03 Tacho speed.
- Stop the drive via Drive Composer.

Speed controller

The figure below shows a simplified block diagram of the speed controller. The controller output is a torque reference.



When tuning the drive, change one parameter at a time, then monitor the effect on the step response and possible oscillations. The effect of each parameter change must be checked over a wide speed range and not just at one point. The set speed controller values mainly depend on:

- The relationship between the motor power and the attached masses.
- Backlashes and natural frequencies of the attached mechanics (filtering).

The step response tests must be carried out at different speeds, from minimum up to maximum speed, at several different points. The whole speed range must also be tested carefully, e.g., at 25 % ... 30 % of maximum speed (step must be in base speed range) and 80 % of maximum speed (step must be in field weakening area) to find any oscillation points.

A suitable speed step is about 2 % of maximum speed. A too large step reference or incorrect values of the speed controller might force the drives into torque/current limits, damage the mechanical parts (e.g., gear boxes) or cause tripping of the drive.

Drive Composer information:

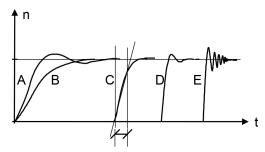


Manual tuning of the speed controller:

- Connect Drive Composer to the drive and choose local mode.
- Monitor 24.01 Used speed reference and 24.02 Used speed feedback.
- Start the drive via Drive Composer.
- Use Drive Composer to set a constant speed reference.
- The step must bypass the ramp. Thus, use 24.11 Speed correction to step the speed controller.
- Tune the speed controller by means of 25.02 Speed proportional gain 1 and 25.03 Speed integration time 1.
 - Step size: 2 % of maximum speed (do not hit any torque or current limits during stepping).
 - Disable the i-part by setting 25.03 Speed integration time 1 = 0 ms.
 - Increase 25.02 Speed proportional gain 1 until the step response shows an overshot.
 - Decrease 25.02 Speed proportional gain 1 by about 30 %.

- Adjust 25.03 Speed integration time 1 in such a way, that there is no overshot or only a slight overshot, depending on the application (the function of the i-part is to reduce the difference between speed reference and speed feedback as quickly as possible).
- Step response time: 100 ms (count only from 10 % ... 90 %) in cold mills and 60 ms in rod and bar mills.
- Where to step: 25 % ... 30 % of maximum speed (step must be in base speed range) and 80 % of maximum speed (step must be in field weakening area).
- Filter time Δn : Above 30 ms. See 24.18 Speed error filter time 1 and 24.19 Speed error filter time 2.
- Filter time speed feedback: E.g., 5 ms ... 10 ms. See 90.42 Motor speed filter time.

Speed controller step responses:



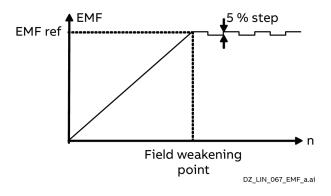
- A: Undercompensated, p-part too small and i-part too short
- B: Undercompensated, p-part too small
- C: Normal
- D: Normal, when a low impact speed drop is required
- E: Overcompensated, p-part too large and i-part too short
- Set 24.11 Speed correction = 0.00 rpm.
- Stop the drive via Drive Composer.

EMF controller

The EMF controller must be tuned in case the motor needs to be used in the field weakening area and the drive trips on F503 Armature overvoltage during acceleration. The EMF controller needs to have a quick response. Usually, 2 ... 3 times slower than the field current controller.

The tuning must be done in the field weakening area, because the EMF controller is blocked in the base speed range.

EMF reference for manual tuning EMF controller:



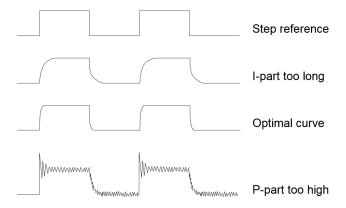
Drive Composer information:



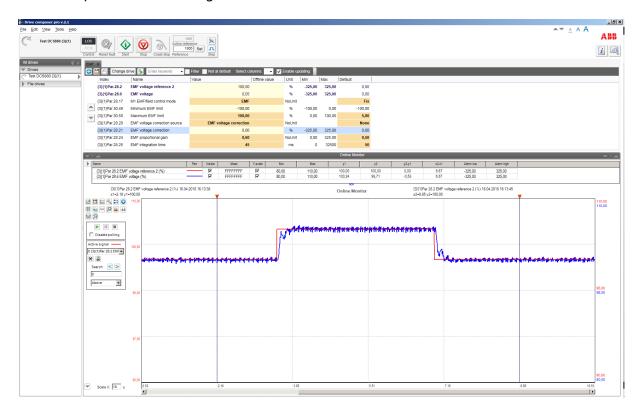
Manual tuning of the EMF controller:

- Connect Drive Composer to the drive and choose local mode.
- Monitor 28.02 EMF voltage reference and 28.06 EMF voltage.
- Set 28.17 M1 EMF/field control mode = EMF.
- Set 28.20 EMF voltage correction source = EMF voltage correction.
- Set 30.49 Minimum EMF limit = -100.00 %.
- Set 30.50 Maximum EMF limit = 100.00 %.
- Start the drive via Drive Composer.
- Use Drive Composer to set a constant speed reference in the field weakening area.
- Use 28.21 EMF voltage correction to step the EMF controller.
- Tune the EMF controller by means of 28.24 EMF proportional gain and 28.25 EMF integration time.
 - Step size: 2 % ... 5 % (do not hit any limits during stepping).
 - Step response time: 2 ... 3 times slower than the field current controller.
 - Where to step: In the field weakening area.

EMF controller step responses:



Drive Composer manual tuning of the EMF controller:



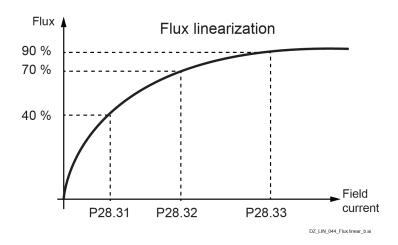
Set 28.20 EMF voltage correction source = Zero.

- Set 28.21 EMF voltage correction = 0.00 %,
- Stop the drive via Drive Composer.
- Set 28.17 M1 EMF/field control mode, 30.49 Minimum EMF limit and 30.50 Maximum EMF limit back to their original settings.

Flux linearization

In case the motor needs to be used in the field weakening area the flux linearization must be set. The flux linearization is needed because of the non-linear relation of flux and field current due to saturation effects of the field winding.

Flux of DC-motor versus field current:



The magnetization of the motor starts to saturate at a certain field current and thus the flux does not increase linearly. For this reason, the field current cannot be directly used to calculate the flux inside the motor.

In base speed area EMF and speed are directly proportional because the flux is kept constant:

$$n = \frac{k * EMF}{\Phi} \qquad k = constant \\ \Phi = Flux$$

Example: If the nominal armature voltage is 440 V_{DC} and the motor is running at half speed with full flux, then the armature voltage is about 220 V_{DC} . Now the flux is reduced to 50 % at constant speed, then the armature voltage drops to about 110 V_{DC} .

Since the EMF is directly proportional to the flux it is possible to define a relationship between the field current and the flux by means of measuring the armature voltage without load (= EMF).

Thus, the main idea of the flux linearization is to find field currents which produces desired EMF-voltage at a certain speed. The flux linearization is done by means of a function block defined by 3 values:

- 28.31 Field current at 40 % flux.
- 28.32 Field current at 70 % flux.
- 28.33 Field current at 90 % flux.

The intermediate values are interpolated. During commissioning all 3 parameters must be set if the flux linearization is needed.

Drive Composer information:

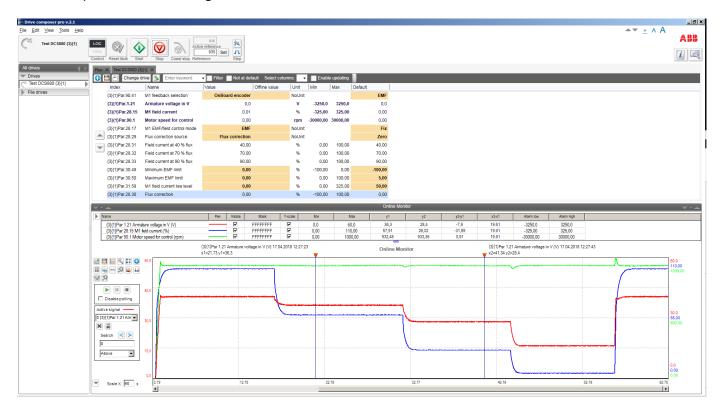


Manual tuning of the flux linearization:

Connect Drive Composer to the drive and choose local mode.

- Make sure the speed feedback is encoder or analog tacho, 90.41 M1 feedback selection = OnBoard encoder, Encoder 1, Encoder 2, or Tacho and not EMF or EMF voltage!
- Monitor 01.21 Armature voltage in V, 28.15 M1 field current and 90.01 Motor speed for control.
- Set 28.17 M1 EMF/field control mode = EMF.
- Set 28.29 Flux correction source = Flux correction.
- Set 28.31 Field current at 40 % flux, 28.32 Field current at 70 % flux and 28.33 Field current at 90 % flux to default.
- Set 30.49 Minimum EMF limit = 0.00 %.
- Set 30.50 Maximum EMF limit = 0.00 %.
- Set 31.58 M1 field current low level = 10.00 % or lower.
- Start the drive via Drive Composer.
- Use Drive Composer to run the motor at e.g., half base speed.
- Make sure, that the motor is running without load.
- Read 01.21 Armature voltage in V, e.g., the measured value is 220 V_{DC} (this is the 1st measurement).
- Reduce the flux with 28.30 Flux correction (negative value) until 01.21 Armature voltage in V reaches 90 % of the 1st measurement.
- Read the value of 28.15 M1 field current, keep it in mind and write it into 28.33 Field current at 90 % flux after this procedure is finished.
- Reduce the flux with 28.30 Flux correction (negative value) until 01.21 Armature voltage in V reaches 70 % of the 1st measurement.
- Read the value of 28.15 M1 field current, keep it in mind and write it into 28.32 Field current at 70 % flux after this procedure is finished.
- Reduce the flux with 28.30 Flux correction (negative value) until 01.21 Armature voltage in V reaches 40 % of the 1st measurement.
- Read the value of 28.15 M1 field current, keep it in mind and write it into 28.31 Field current at 40 % flux after this procedure is finished.

Drive Composer manual tuning of the flux linearization:



- Set 28.29 Flux correction source = Zero.
- Set 28.30 Flux correction = 0.00 %.
- Stop the drive via Drive Composer.

- Set 28.31 Field current at 40 % flux, 28.32 Field current at 70 % flux and 28.33 Field current at 90 % flux to the determined values.
- Set 28.17 M1 EMF/field control mode, 30.49 Minimum EMF limit, 30.50 Maximum EMF limit and 31.58
 M1 field current low level back to their original settings.

Thyristor test

Thyristor test provides two possibilities:

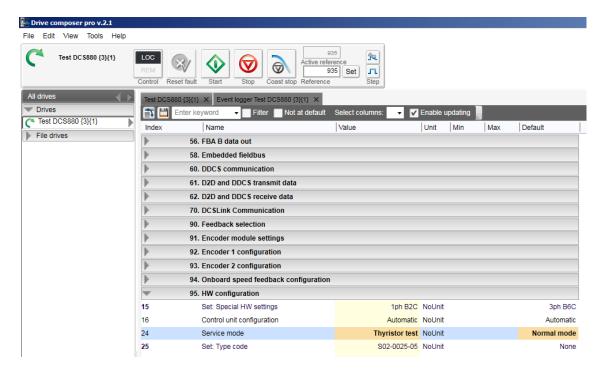
- Check all thyristors of the drive for proper function.
- Check individual firing pulses.

Drive Composer information:

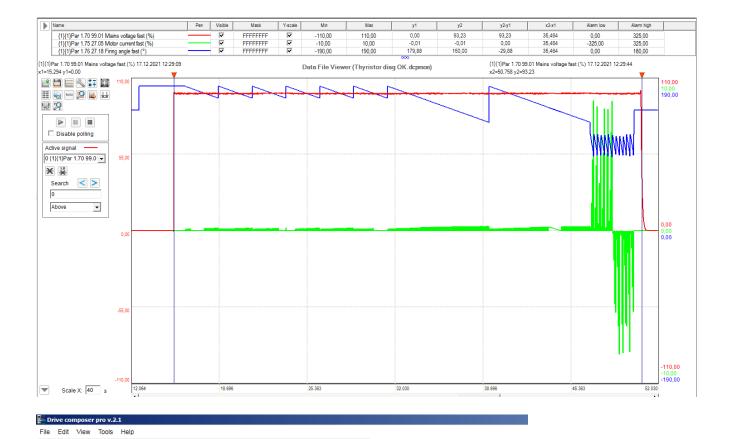


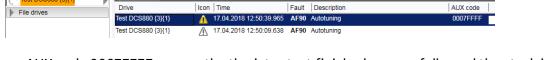
Check all thyristors of the drive for proper function:

- Connect Drive Composer to the drive and choose local mode.
- For drives size H5 ... H8 make sure, that 99.11 M1 nominal current is set to 50 A or higher.
- Set 95.24 Service mode = Thyristor test.
- Start the drive via Drive Composer.



- The mains contactor is closed, and the thyristor test is started.
- The result is written into the AUX code of warning AF90 Autotuning after the thyristor test is finished.
- Below is a monitoring of a successful test.





AUX code 0007FFFF means, the thyristor test finished successfully, and the stack is okay.

Active reference
935 Set Step

95.24 Service mode is automatically set back to Normal mode.

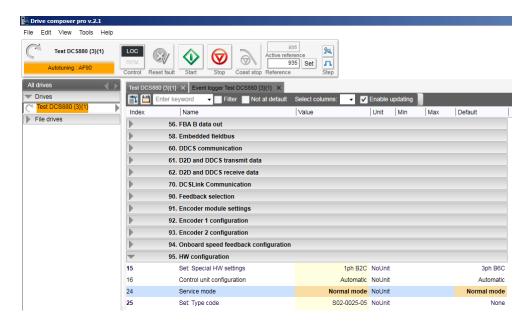
❖

Stop

The drive is automatically switched off.

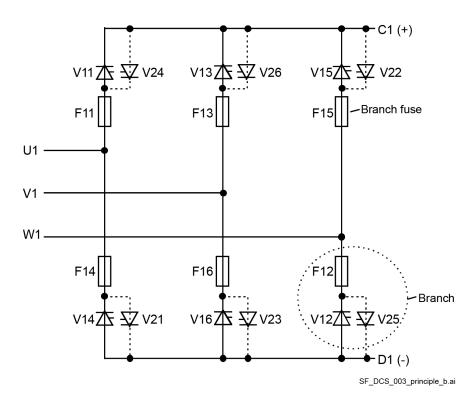
Refresh log

Test DC S880 {3}{1}



Check individual firing pulses:

- Make sure, that the mains contactor cannot close (e.g., disconnect the digital output controlling the mains contactor) or that the mains voltage is off (e.g., high voltage breaker is open).
- Connect a current clamp to one of the firing pulse cables. It is also possible to measure the firing pulses using a scope by connecting it over the gate and cathode of the thyristor.
- Connect Drive Composer to the drive and choose local mode.
- For drives size H5 ... H8 make sure, that 99.11 M1 nominal current is set to 50 A or higher.
- Set 95.24 Service mode = Firing pulses V11 ... Firing pulses V26 depending individual firing pulse to be checked.



- Make sure, that the mains voltage is zero.
- Check the firing pulse with the current clamp.
- Set 95.24 Service mode back to Normal mode.
- Cycle power, otherwise, the drive will not start after checking individual firing pulses.

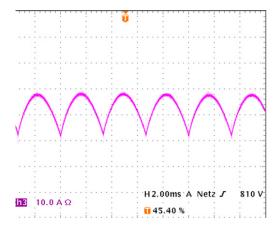
Checking current bubbles using 30.44 Minimum firing angle

Drive Composer information:



- Connect an oscilloscope to the fixed AO named IACT:
 - H1 ... H6: XAO:4/5 on the SDCS-CON-H01.
 - H7 ... H8: X4:1/4 on the SDCS-OPL-H01.
- Connect Drive Composer to the drive and choose local mode.
- Monitor 27.02 Used current reference, 27.05 Motor current and 27.18 Firing angle.
- Set 27.22 Current reference source = 27.23 Current reference external.
- Set 99.07 M1 used field exciter type = None.
- Set 30.44 Minimum firing angle = 120°.
- Start the drive via Drive Composer.

- Use Drive Composer to set the armature current reference to:
 - +50 % for positive current.
 - -50 % for negative current.
- Decrease the minimum firing angle degree by degree. At around 105° the current should start to flow.
 Now check the number of current bubbles. During a time of 20 ms (50 Hz mains)/16.66 ms (60 Hz mains) 6 bubble should be visible:



- Make sure the motor is not turning (Attention: let the drive run only for a brief time).
- Stop the drive via Drive Composer.
- Set 30.44 Minimum firing angle, 27.22 Current reference source and 99.07 M1 used field exciter type back to their original settings.

Using the control panel

Refer to the ACX-AP-x assistant control panel's user's manual (3AUA0000085685).

Firmware description

What this chapter contains

This chapter describes how to control the drive with standard firmware.

Identification of the firmware versions

The DCS880 is controlled by an electronic unit (3ADT220166R0002 or 3ADT220166R0012). This electronic unit includes the SCDS-CON-H01 or SDCS-CON-H01L. The firmware version details of the armature converter can be checked from:

- 07.02 Power unit set.
- 07.05 Firmware version.
- 07.04 Firmware name.
- 07.91 Control board type.

The firmware version details of the field exciters can be checked from:

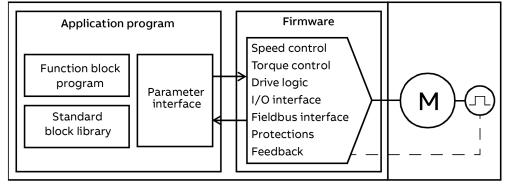
- 07.68 M1 field exciter type.
- 07.69 M1 field exciter firmware version.
- 07.72 M2 field exciter type.
- 07.73 M2 field exciter firmware version.

Drive configuration and programming

The drive control program is divided into two parts:

- Firmware.
- Application program.

Drive control program



SB_880_023_application_a.ai

The firmware performs the main control functions, including speed- and torque control, drive logic (start/stop), I/O- and fieldbus interface, protection, and feedback. Firmware functions are configured and programmed using parameters and can be extended by application programming.

Parameters

Parameters configure all standard drive operations and can be set via control panel, Drive Composer, or fieldbus interface.

All parameter settings are stored automatically to the flash memory of the drive.

Additionally, they can be manually saved using 96.16 Parameter save manually.

The default parameter values can be restored using 96.15 Parameter restore.

Adaptive Program

Conventionally, the user can control the operation of the drive by parameters. However, the standard parameters have a fixed set of choices or a setting range. To further customize the operation of the drive, an Adaptive Program can be constructed out of a set of function blocks.

Drive Composer includes the Adaptive Program using a graphical user interface for building the custom program. The function blocks include the usual arithmetic and logical functions, as well as e.g., selection, comparison, and timer blocks. The program can contain a up to 20 blocks. The Adaptive Program is executed on a 10 ms time level.

To connect inputs to the program, the user interface has pre-selections for the physical inputs, common actual values, and other status information of the drive. Parameter values as well as constants can be defined as inputs. The output of the program can be used e.g., as a start signal, external event, reference or connected to the drive outputs.

Note: Connecting an output of the Adaptive Program to a selection parameter will write-protect the parameter.

The status of the Adaptive Program is shown in 07.30 Adaptive program status. The Adaptive Program can be disabled by 96.70 Disable adaptive program.

For more information, see manual Adaptive programming application guide (3AXD50000028574).

Application program

The functions of the firmware can be extended with an application program. The memory unit for the application program is available as option using +S551.

Application programs can be built out of function blocks based on the IEC 61131-3 standard using a PC tool available separately.

For more information, see manual <u>Programming manual</u>: <u>Drive application programming (IEC 61131-3)</u> (3AUA0000127808).

Control locations and operating modes

Local control versus remote control

The DCS880 has two main control locations. They are remote control and local control. The control location is selected with the Loc/Rem key on the control panel or in the PC tool.



Local control

When the drive is set to local control the control commands are given from:

- The control panel, see groups 19 Operation mode and 49 Panel port communication.
- A PC equipped with Drive Composer, see chapter <u>Connect a DCS880 and a PC running Drive</u> <u>Composer</u>.

Speed and torque control modes are available for local control, see 19.16 Local control mode.

Local control is mainly used during commissioning and maintenance. The control panel always overrides the remote-control signal sources when used in local control. Changing the control location to local can be prevented by 96.08 Local control.

The user can select by 49.05 Communication loss action how the drive reacts to a control panel or Drive Composer communication break.

Note: 49.05 Communication loss action has no effect in remote control.

Remote control

When the drive is in remote control, control commands are given through:

- Hardware signals, see 20.01 Command location = Local I/O.
- Serial communication via the embedded fieldbus (EFB), chapter <u>Fieldbus control via embedded</u> fieldbus (EFB).
- Serial communication via fieldbus adapter A, see chapter Fieldbus control via a fieldbus adapter.
- Serial communication via fieldbus adapter B, see chapter Fieldbus control via a fieldbus adapter.
- Adaptive Program or application program, see chapter Drive configuration and programming.
- Master-follower link communication, see chapter <u>Master-follower link</u>.
- DDCS communication to e.g., AC 800M, see chapter <u>DDCS controller interface</u>.
- 12-pulse, see chapter <u>12-pulse</u>.

Two remote control locations, EXT1 and EXT2, are available. The operating mode can be selected separately for each location, see group 19 Operation mode, which enables quick switching between different operating modes, for example speed and torque control. Selection between EXT1 and EXT2 is done via a digital input, see 19.11 Ext1/Ext2 selection.

The control location selection is checked on a 2 ms time level.

Operating modes of the drive

The drive can operate in several operating modes with several types of reference. The mode is selectable for each control location individually, see group 19 Operation mode.

Speed control mode

The motor follows a speed reference given to the drive. This mode can be used either with EMF speed feedback or with analog tacho, encoder or resolver for better speed control accuracy. Speed control mode is available in both local- and remote control.

Torque control mode

Motor torque follows a torque reference given to the drive, e.g., as a follower in the Master-follower link. Torque control mode is available in both local- and remote control.

Current control mode

Motor current follows a current reference given to the drive, see 27.22 Current reference source. If current control mode is chosen by 27.22 Current reference source, it is available in both local- and remote control.

Start/Stop sequences

General

The drive is controlled by 06.09 Used main control word. 06.15 Main status word provides the handshake and interlocking for the overriding control.

To command the drive, the overriding control uses either hardware signals or serial communication. The drive provides several different control words for different serial communication. These control words are chosen by 06.08 Main control word source. The actual status of the drive is displayed in 06.15 Main status word.

The marks (e.g., ●) describe the order of the commands according to Profibus standard. The overriding control can be:

- Hardware signals, see 20.01 Command location = Local I/O.
- Serial communication via the embedded fieldbus (EFB), chapter <u>Fieldbus control via embedded</u> <u>fieldbus (EFB)</u>.
- Serial communication via fieldbus adapter A, see chapter Fieldbus control via a fieldbus adapter.
- Serial communication via fieldbus adapter B, see chapter Fieldbus control via a fieldbus adapter.
- Adaptive Program or application program, see chapter <u>Drive configuration and programming</u>.
- Master-follower link communication, see chapter <u>Master-follower link</u>.
- DDCS communication to e.g., AC 800M, see chapter DDCS controller interface.
- 12-pulse, see chapter 12-pulse.

Switch on sequence

Examples for 06.09 Used main control word:

06.09 Used main control bit:	15 11	D Remote command	09	O Inching 1	20 Reset	9 Ramp in zero	O Ramp halt	Ramp out zero	80 Run	Off3 control	Off2 control	On/Off1 control	Dec.	Hex.
Reset		1	х	х	1	х	х	x	х	х	х	x	1270	04F6
Stop (before Start)		1	х	0	0	х	x	x	0	1	1	0	1142	0476
Start (mains contactor on plus reference)		1	х	0	0	1	1	1	1	1	1	1	1151	047F
Emercency stop		1	x	х	x	1	1	1	1	0	1	1	1147	047B
Emercency off		1	х	х	х	x	х	x	x	х	0	х	1140	0474

TG_001_880_sequence_a.ai

Start the drive

The start sequence given below is only valid for 20.33 Mains contactor control mode = On. **Attention:** All signals must be maintained. On and Run commands are only taken over with their rising edges.

Overriding Control 06.09 Used main control word	Drive 06.15 Main status word
	When the drive is ready to close the mains contactor Ready on state is set.
0	Ready on = 1; (bit 0).
The overriding control gives an On command.	
On = 1; (bit 0) \Longrightarrow	
	The drive closes the mains contactor, the field contactor and the contactors for converter and motor fans. After the mains voltage and all acknowledges are checked and the field current is established, the drive sets state Ready run.
8	← Ready run = 1; (bit 1)
The overriding control gives a Run command.	
Run = 1; (bit 3) \Longrightarrow	
	The drive releases the ramp, all references, all controllers and sets state Ready reference.
⑤	Ready reference = 1; (bit 2)
Now the drive follows the speed or torque references.	

Note: To give On and Run commands at the same time set 20.02 On/Off1 source = 20.06 Run/Stop source.

Stop the drive

The drive can be stopped in two ways, either by taking away the On command directly which opens all contactors as fast as possible after stopping the drive according to 21.02 Off1 Mode or by means of the following sequence.

Overriding Control 06.09 Used main control word

Drive

06.15 Main status word

The overriding control removes the Run command.

Run = 0; (bit 3)
$$\Longrightarrow$$



In speed control mode, the drive stops according to 21.04 Stop mode.

In torque control mode, the torque reference is reduced to zero according to 26.19 Torque ramp down time.

When zero speed or zero torque is reached the state Ready reference is removed.



Ready reference = 0; (bit 2)

The overriding control can keep the On command if the drive must be started up again.

The overriding control removes On

On = 0; (bit 0)
$$\Longrightarrow$$

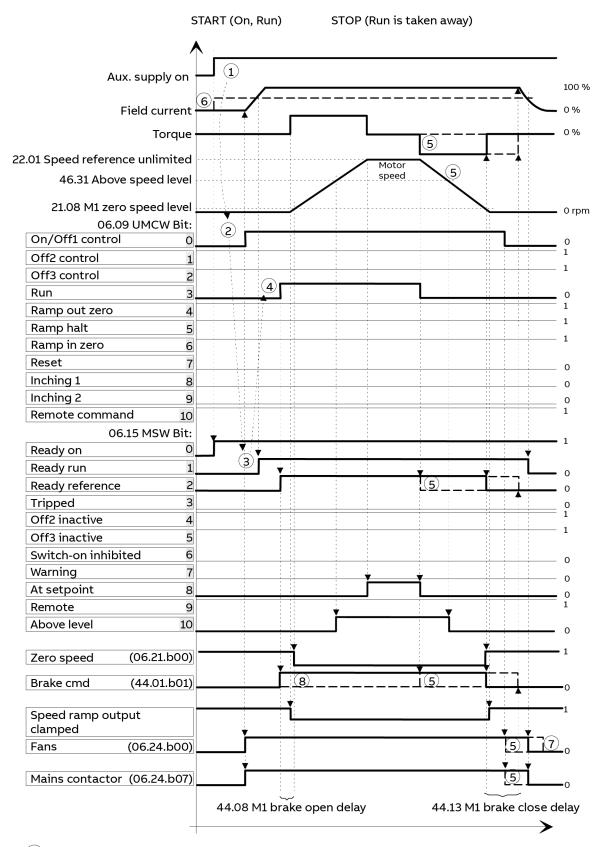


All contactors are opened, the fan contactors stay in according to 20.40 Drive/Motor fan delay time, and the state Ready run is removed.



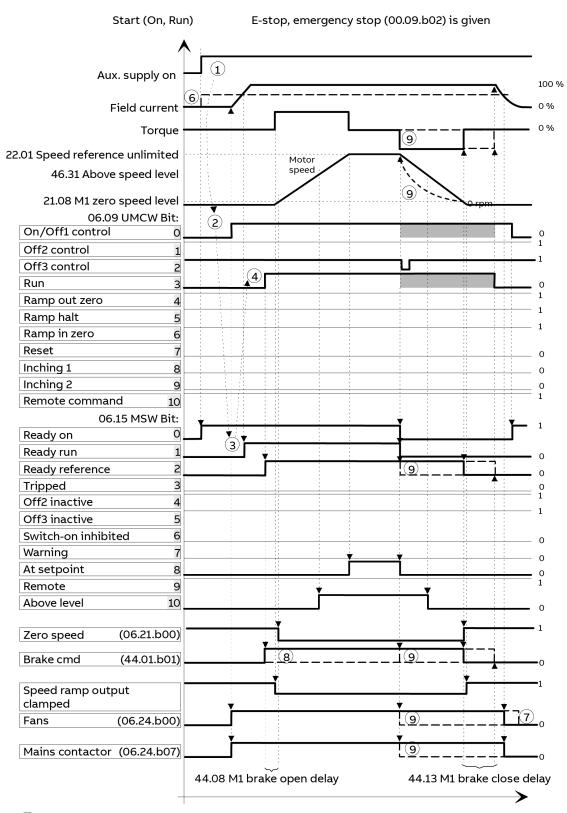
 \leftarrow Ready run = 0; (bit 1)

Besides in 06.15 Main status word, the drive's state is shown in 06.16 Drive status word 1, 06.17 Drive status word 2 and 06.18 Drive status word 3.



- (5) Behavior depends on 21.02 Off1 mode and 21.04 Stop mode.
- (6) Behavior depends on 28.36 M1 field heating source and 31.58 M1 field current low level.
- (7) Behavior depends on 20.40 Drive/Motor fan delay time.
- (8) Behavior depends on 44.06 M1 brake control enable.

DZ_LIN_66_start stop seq_b.ai



- (5) Behavior depends on 21.02 Off1 mode and 21.04 Stop mode.
- (6) Behavior depends on 28.36 M1 field heating source and 31.58 M1 field current low level.
- (7) Behavior depends on 20.40 Drive/Motor fan delay time.
- (8) Behavior depends on 44.12 M1 brake close request.
- (9) Behavior depends on 21.03 Emergency stop mode (e.g. coast stop, dynamic braking).
- Don't care.

DZ_LIN_66_start stop seq_b.ai

Field excitation

General

Depending on the application the DCS880 has the capability to use several kinds of field exciters or combinations of them. The differences of the field exciters and their functions are explained here. The field current controller is in the field exciters and the EMF controller resided in the armature converter.

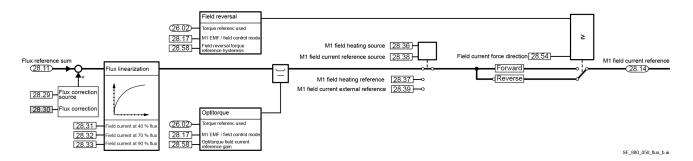
Field Reversal

Changing the field current direction and torque direction might be needed when the armature converter has only one bridge (2-Q). Field reversal is changing the field current direction and the torque direction. Also, the speed feedback monitoring functions are adapted. Thus, it is possible to regenerate energy back into the mains.

To initiate the field reversal the sign of 26.02 Torque reference used is taken and defines the desired direction of the field current. The change of the field current direction and torque direction is time consuming. It takes 0.5 ... 3 seconds. Thus, field reversal is too slow for high performance applications. It is typical used for propulsion, pumps, E-stop, or other low performance applications.

Armature converters with two anti-parallel bridges (4-Q) do not require field reversal.

Attention: Field reversal for motor 2 is possible using the field current reference of motor 1.



Note: See also 28.53 Field reversal status.

Field control

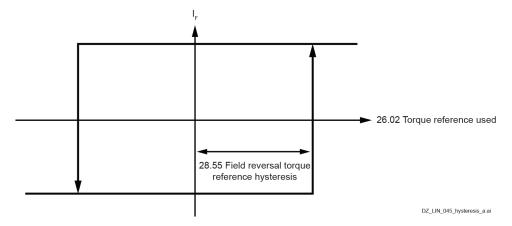
Field reversal is activated by means of 28.17 M1 EMF/field control mode:

Mode	Functionality	Armature converter	EMF speed feedback possible
0: Fix	Constant field (no field weakening), EMF controller blocked, field reversal blocked, optitorque blocked.	2-Q or 4-Q	Yes
1: EMF	Field weakening active, EMF controller released, field reversal blocked, optitorque blocked.	2-Q or 4-Q	No
2: Fix/reversal	Constant field (no field weakening), EMF controller blocked, field reversal active, optitorque blocked.	2-Q	Yes
3: EMF/reversal	Field weakening active, EMF controller released, field reversal active, optitorque blocked.	2-Q	No
4: Fix/optitorque	Constant field (no field weakening), EMF controller blocked, field reversal blocked, optitorque active.	2-Q or 4-Q	No

5: EMF/optitorque	Field weakening active, EMF controller released, field reversal blocked, optitorque active.	2-Q or 4-Q	No
6: Fix/reversal/optitorque	Constant field (no field weakening), EMF controller blocked, field reversal active, optitorque active.	2-Q	No
7: EMF/reversal/optitorque	Field weakening active, EMF controller released, field reversal active, optitorque active.	2-Q	No

Field reference hysteresis

To prevent field reversal from continuous toggling due to a too small torque reference, a torque reference hysteresis is available. The hysteresis is symmetrical and is set by 28.55 Field reversal torque reference hysteresis:



Force field current direction

With 28.54 Field current force direction it is possible to force and clamp the field current direction. This gives the user the possibility to control the field current direction or change it in case of need. Thus, unnecessary field current changes at low torque are prevented and it is also possible to release field reversal for certain occasions, e.g., jogging or E-stop.

Time for field reversal

The time for field reversal can be reduced by increasing the input voltage of the field exciter and/or using Optitorque.

Please note that the output voltage of the field exciter is limited by means of 28.44 M1 field control voltage limit or 42.59 M2 field control voltage limit (only valid for DCF804-0050/0060). This can also increase the time for field reversal.

Bump-less transition

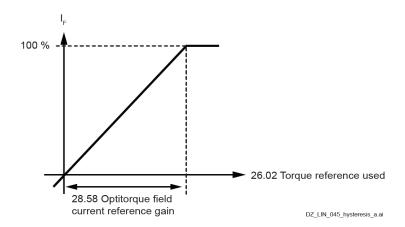
The output of the speed ramp is updated by means of the actual speed to ensure a bump-less transition (no speed steps), when 27.38 Reversal delay is longer than 25 ms and 27.41 Reversal mode = Soft.

Optitorque

Due to high inductances of motor fields, the field reversal takes a relatively long time. In certain cases, this time can be reduced by means of optitorque. See 28.17 M1 EMF/field control mode. In case the process requires only a small torque during field reversal, the field current is decreased, and the armature current is increased prior to the field current change. This quickens the field reversal. The rate of the field current reduction depends on the process. E.g., if the speed direction is changed rather slowly, the required torque may also be quite small. This allows the reduction of the field current. Thus, by means of optitorque it is possible to shorten the field reversal time.

Field current reference gain

In optitorque mode the field current will be reduced proportionally to 26.02 Torque reference used. The relation between 26.02 Torque reference used and field current is defined by 28.58 Optitorque field current reference gain:



For example, with 28.58 Optitorque field current reference gain = 20 %, 100 % field current is generated at 26.02 Torque reference used = 20 %.

Field current monitoring

Field minimum trip

During normal operation, the field current is compared with 31.58 M1 field current low level. The drive generates fault F541 M1 field exciter low current if the field current drops below this limit and is still undershot when 31.57 Minimum field current trip delay is elapsed.

During field reversal the situation is different. 31.58 M1 field current low level is disabled for 28.17 M1 EMF/field control mode = Fix/optitorque, EMF/optitorque, Fix/reversal/optitorque or EMF/reversal/optitorque. In this case the trip level is automatically set to 50 % of 28.14 M1 field current reference. The drive generates fault F541 M1 field exciter low current if 50 % of 28.14 M1 field current reference is still undershot when 31.57 Minimum field current trip delay is elapsed.

Flux reversal

If actual flux and armature voltage of the motor cannot follow the field current during field reversal it is necessary to delay the active field direction. 28.57 Field reversal flux monitoring delay is the maximum allowed time within 28.15 M1 field current and the internal motor flux do not correspond to each other during field reversal. During this time faults 7301 Motor speed feedback and 73A1 Load speed feedback are disabled.

Field reversal hysteresis

The sign of 28.15 M1 field current is used to generate the field reversal acknowledge. To avoid signal noise problems a small hysteresis, defined by means of 28.56 Field reversal field current hysteresis, is needed.

Field reversal active

While the field reversal is in progress, see 06.25.b11 Current controller status word 2, following is valid:

- The current controller is blocked.
- The i-part of the speed controller frozen.
- The output of the speed ramp is updated by means of the actual speed, when 27.38 Reversal delay is longer than 25 ms and 27.41 Reversal mode = Soft.

Field heating/reducing

Overview

Field heating/Field economy (also referred to as "field warming") is used for a couple of reasons.

- Keep moisture out of the motor. The moisture could reduce the isolation resistance.
- To reduce field losses. Decreasing the field current saves energy during no running operation. It can be applied for all motors where a field current ramp up is acceptable.
- To reduce the temperature, increase of the motor if the torque is not needed.
- For all motors with reduced cooling capacities and a short duty cycle (e.g., gantry motors without cooling fans).
- Is typically for shared motion.

During field heating the cooling fans are off. As soon as full field current is applied the cooling fans are switched on. Following parameters are used to turn on and control field heating:

- 28.36 M1 field heating source.
- 28.37 M1 field heating reference.

Modes of operation for field heating

There are basically three modes of operation. In all modes, the field current will be at a reduced level, determined by 28.37 M1 field heating reference.

28.36 M1 field heating source = Enable field heating

 Field heating is on, if On = 0, Off2 (emergency off/fast current off) is inactive and Off3 (emergency stop) is inactive.

In general, field heating will be on as long as no On command is given and no emergency off/fast current off or emergency stop is pending.

Condition	06.09.b00 Used main control word (On)	06.09.b01 Used main control word* (Off2)	Result
Power up	0	1	Reduced field current** (cooling fans are off).
Start drive, On command is given	1	1	Normal field current (cooling fans are on).
Normal stop, On command is removed	1 → 0	1	Normal field current, then reduced** after stop (cooling fans are off).
Emergency off/fast current off while running	1	1 → 0	Field is turned off as motor coasts to stop and cannot turned back on again as long as emergency off/fast current off is pending (cooling fans are off).

^{*}See 20.04 Off2 source 1 (emergency off).

28.36 M1 field heating source = Enable with On

Field heating is on as long as On = 1, Run = 0, Off2 (emergency off/fast current off) is inactive and
 Off3 (emergency stop) is inactive.

In general, field heating will be on as long as the On command is given, no Run command is given and no emergency off/fast current off or emergency stop is pending.

^{**}The field current will be at the level set by means of 28.37 M1 field heating reference while motor is stopped.

06.09.b00 Used main control word (On)	06.09.b03 Used main control word (Run)	06.09.b01 Used main control word* (Off2)	Result
0	d	d	Field is turned off (cooling fans are off).
1	0	1	Reduced field current** (cooling fans are on).
1	1	1	Normal field current (cooling fans are on).
1	1 → 0	1	Normal field current, then reduced** after stop (cooling fans are on).
1	d	1 → 0	Field is turned off as motor coasts to stop and cannot turned back on again as long as emergency off/fast current off is pending (cooling fans are off).

^{*}See 20.04 Off2 source 1 (emergency off).

28.36 M1 field heating source = Other [bit], DI1 ... DI6, DIO1, DIO2 or DIL

Field heating is on, if Other [bit], DI1 ... DI6, DIO1, DIO2 or DIL = 1, On = d and Run = 0.
 In general, field heating will be on as long as Other [bit], DI1 ... DI6, DIO1, DIO2 or DIL = 1, no Run command is given and no emergency off/fast current off or emergency stop is pending. The state of On has no influence.

Other [bit], DI1 DI6, DIO1, DIO2 or DIL	06.09.b03 Used main control word (Run)	06.09.b01 Used main control word* (Off2)	Result
0	d	d	Field is turned off (cooling fans are off).
1	0	1	Reduced field current** (cooling fans are on).
1	1	1	Normal field current (cooling fans are on).
1	1 → 0	1	Normal field current, then reduced** after stop (cooling fans are on).
1	d	1 → 0	Field is turned off as motor coasts to stop and cannot turned back on again as long as emergency off/fast current off is pending (cooling fans are off).

^{*}See 20.04 Off2 source 1 (emergency off).

Emergency stop

In the above modes of operation, the field will be turned off, if an emergency stop, see 20.05 Off3 source (emergency stop), is pending. It cannot be turned back on again as long as the emergency stop is

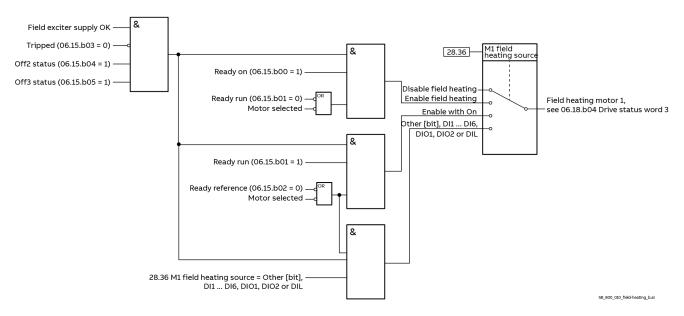
^{**}The field current will be at the level set by means of 28.37 M1 field heating reference while motor is stopped.

^{**}The field current will be at the level set by means of 28.37 M1 field heating reference while motor is stopped.

pending. If the emergency stop is cleared while the motor is in motion, the motor will be stopped according to 21.03 Emergency stop mode and then field and drive will be turned off.

Emergency off/Fast current off

In the above modes of operation, the field will be turned off, if an emergency off/fast current off, see 20.04 Off2 source 1 (emergency off), is pending. It cannot be turned back on again as long as the emergency off/fast current off is pending.



Mode of operation for field economy

Field economy is only available when 2 motors with 2 independent field exciters are connected to the drive. The field current will be at a reduced level, determined by 28.37 M1 field heating reference and 42.54 M2 field heating reference.

Following conditions apply for motor 1:

- Field economy for motor 1 is enabled, if:
 - 28.37 M1 field heating reference < 100 %.
 - 28.36 M1 field heating source = Disable field heating or Enable field heating.
- Field economy for motor 1 is activated, if:
 - The On command is given for longer than 10 s.
 - Motor 2 is selected via 42.01 Motor 1/2 selection.
 - Motor 2 is active. See 06.18.b05 Drive status word 3.
 - 28.38 M1 field current reference source = 42.55 M2 field current reference source = Internal.

Following conditions apply for motor 2:

- Field economy for motor 2 is enabled, if:
 - 42.54 M2 field heating reference < 100 %.
 - 28.36 M1 field heating source = Disable field heating or Enable field heating.
- Field economy for motor 2 is activated, if:
 - The On command is given for longer than 10 s.
 - Motor 1 is selected via 42.01 Motor 1/2 selection.
 - Motor 1 is active. See 06.18.b04 Drive status word 3.
 - 28.38 M1 field current reference source = 42.55 M2 field current reference source = Internal.

Field exciter mode (for large field exciters)

General

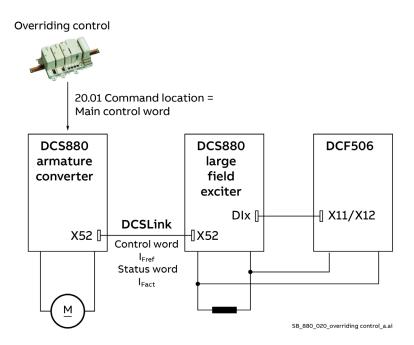
The standard DCS880-S0x module can be operated as large field exciter by simply setting parameters. It is either controlled by a DCS880 armature converter or can be configured as stand-alone field exciter.

Note: The module is selected according to the supply voltage and not according to the field voltage. The field exciter mode uses the standard armature current controller as field current controller. Thus, the current of the converter equals the field current of the motor. See 01.10 Motor current in A. For these configurations, an overvoltage protection (DCF505 or DCF506) is mandatory.

Attention: Connector XSTO including the Save Torque Off function is not to be used. Using this feature will seriously damage the large field exciter.

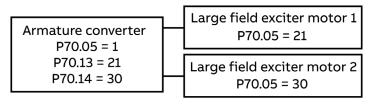
DCS880-S0b large field exciter controlled by a DCS880 armature converter

Communication in field exciter mode:



DCSLink

Armature converter with one or two large field exciters:



Parameter	Armature converter	Large field exciter	Comments
70.05 DCSLink node ID	1.	21, default. 30, default.	Large field exciter motor 1. Large field exciter motor 2.
70.12 Field exciter timeout	100 ms, default.	-	Generates either F516 M1 field exciter communication and/or F519 M2 field exciter communication.
70.13 M1 field exciter node ID	21, default.	-	Use the same node number as in 70.05
70.14 M2 field exciter node ID	30, default.	-	DCSLink node ID of the large field exciter.

Armature converter (DCS880)

Before starting with the commissioning set all parameters to default by means of 96.15 Parameter restore = Default. Check with 96.11 Macro active.

In the armature converter set:

Parameter	Armature converter	Comments
10.30 RO3 source	31: Field exciter on.	If the mains contactor of the field exciter is controlled by the armature converter.
28.17 M1 EMF/field control mode	1: EMF.	EMF controller released, field weakening active, depending on the application.
31.57 Minimum field current trip delay	2000 ms, default.	Delays fault F541 M1 field exciter low current.
31.58 M1 field current low level	xxx %.	Sets level for fault F541 M1 field exciter low current.
70.05 DCSLink node ID	1.	
70.12 Field exciter timeout	100 ms, default.	Generates F516 M1 field exciter communication.
70.13 M1 field exciter node ID	21, default.	Use the same node number as in 70.05 DCSLink node ID of the large field exciter.
99.07 M1 used field exciter type	10: DCS880-S01. 11: DCS880-S02.	
99.13 M1 nominal field current	xxx A.	I _{FN} = xxx A, rated field current.

Large field exciter (DCS880-S0b)

Before starting with the commissioning set all parameters to default by means of 96.15 Parameter restore = Default. Check with 96.11 Macro active.

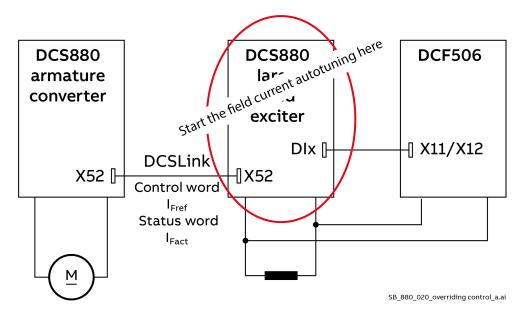
Attention: Connector XSTO including the Save Torque Off function is not to be used. Check before commissioning that 31.91.b02 STO status word = 31.91.b03 STO status word = 1. In the large field exciter set:

Parameter	Large field exciter	Comments
-	XSMC: 1/2.	Use one of the two relay outputs, if the
10.30 RO3 source	Other: 06.24.b07 Mains contactor.	mains contactor of the field exciter is controlled by the field converter itself.
20.01 Command location	4: Field exciter link.	Control from the armature converter. Source for the control word (On/Off1,
		Run/Stop and Reset). Activates the DCSLink.
20.47 Overvoltage protection trigger source	3: DI1 8: DI6. 11: DIO1. 12: DIO2. 19: DIL.	Depending on the hardware connection to the DCF506.
27.22 Current reference source	30: FieldRef via DCSLink.	Field current reference from the armature converter.

0.00 %.	
50.0 ms.	
500 ms.	To be set longer than 27.38 Reversal delay.
0: Fix, default.	
1000.0 %.	Disables the overvoltage supervision.
21.	Large field exciter motor 1. Use the same node number as in 70.05 DCSLink node ID of the armature unit.
20.00°.	More robust against F514 Mains synchronization lost.
1: Large field exciter.	
0: None.	
xxx V.	U_{NetN} = xxx V; nominal mains voltage (AC).
xxx A.	I _{FN} = xxx A, rated field current.
xxx V.	U _{FN} = xxx V, rated field voltage. Can be increased up to 150 % for faster dynamic response.
	50.0 ms. 50.0 ms. 0: Fix, default. 1000.0 %. 21. 20.00°. 1: Large field exciter. 0: None. xxx V. xxx A.

Use XSMC:1/2 to close the field contactor. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).

The field current autotuning **must** be started **directly** in the large field exciter:



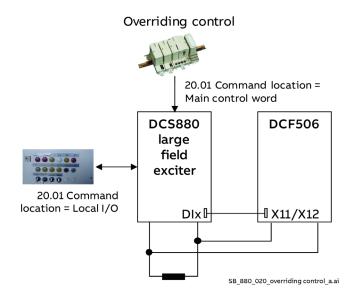
Parameter	Large field exciter	Comments
99.20 Tuning request	1: Field current autotuning.	Give On and Run commands within 20 s.
27.29 M1 current proportional gain	xxx	Is set by the field current autotuning. Typical p-part values are around 4.
27.30 M1 current integration time	xxx	Is set by the field current autotuning.
27.31 M1 discontinuous current limit		Is set to zero by the field current autotuning.

Note:

This autotuning does not work when started from the Drive Composer pro DCS880 Assistant.

DCS880-S0b as stand-alone field exciter

Communication in field exciter mode:



Note: Only field current control possible.

Large field exciter (DCS880-S0b)

Before starting with the commissioning set all parameters to default by means of 96.15 Parameter restore = Default. Check with 96.11 Macro active.

Attention: Connector XSTO including the Save Torque Off function is not to be used. Check before commissioning that 31.91.b02 STO status word = 31.91.b03 STO status word = 1. In the large field exciter set:

Parameter	Large field exciter	Comments Control from local I/O or overriding control system. Source for the control word (On/Off1, Run/Stop and Reset).			
20.01 Command location	0: Local I/O, default. 1: Main control word.				
20.47 Overvoltage protection trigger source	3: DI1 8: DI6. 11: DIO1. 12: DIO2. 19: DIL.	Depending on the hardware connectio to the DCF506.			
27.22 Current reference source	2: 27.23 Current reference external. 4: Al1 scaled. 5: Al2 scaled. 6: Al3 scaled.	Field current reference from overriding control system or local I/O.			
27.23 Current reference external	xxx %	E.g., written to by overriding control.			
27.31 M1 discontinuous current limit	0.00 %.				
27.38 Reversal delay	50.0 ms.				
27.40 Zero current timeout	500 ms.	To be set longer than 27.38 Reversal delay.			
28.17 M1 EMF/field control mode	0: Fix, default.				

31.50 Armature overvoltage level	1000.0 %.	Inactivates the overvoltage supervision. To suppress F514 Mains synchronization lost.		
95.44 PLL deviation level	20.00°.			
99.06 Operation mode	1: Large field exciter.			
99.07 M1 used field exciter type	0: None.			
99.10 Nominal mains voltage	xxx V.	U_{NetN} = xxx V; nominal supply voltage (AC).		
99.11 M1 nominal current	xxx A.	I_{FN} = xxx A, rated field current.		
99.12 M1 nominal voltage	xxx V.	U _{FN} = xxx V, rated field voltage. Can be increased up to 150 % for faster dynamic response.		

Use XSMC:1/2 to close the field contactor. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).

The field current autotuning **must** be started **directly** in the large field exciter:

Parameter	Large field exciter	Comments	
99.20 Tuning request	1: Field current autotuning.	Give On and Run commands within 20 s.	
27.29 M1 current proportional gain	xxx	Is set by the field current autotuning. Typical p-part values are around 4.	
27.30 M1 current integration time	xxx	Is set by the field current autotuning.	
27.31 M1 discontinuous current limit	0.00 %.	Is set to zero by the field current autotuning.	

Note:

This autotuning does not work when started from the Drive Composer pro DCS880 Assistant.

AC-breaker, DC-contactor

General

The DC-breaker is used to protect the DC-motor, not the DC drive. Thus, their use increases the availability of the whole installation. In case of an overcurrent, e.g., due to a commutation fault, the DC-breaker is forced open by its own tripping coil.

DC-breakers have different control inputs and trip devices.

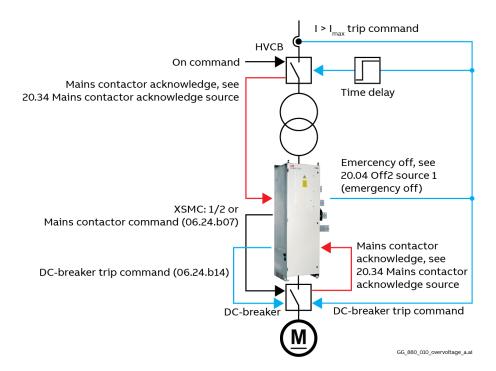
- An On/Off coil with a typical time delay of 100 ... 200 ms.
- A high-speed tripping coil (e.g., Secheron = CID) to trip the DC-breaker within 2 ms e.g., using a signal from the drive.
- An internal tripping coil which is released by overcurrent and set mechanically.

There are several ways how to control the DC-breaker depending on the available hardware and the customers on/off philosophy. Following are the most common examples.

Attention:

- If a DC-breaker is used and the DC voltage measurement is taken inside the converter module (H1 ...
 H8 modules in default configuration) do the following:
 - Set 20.33 Mains contactor control mode = DC-contactor.
 - Set 95.37 DC voltage measurement mode = DC-contactor.
 - Balance 01.21 Armature voltage in V by means of 95.35 DC voltage measurement offset.
 - Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).
- If a DC-breaker is used and the DC voltage measurement is located at the motor terminals (modified H6 ... H8 modules) do the following:
 - Set 20.33 Mains contactor control mode = On, default.
 - Set 95.37 DC voltage measurement mode = Manual, default.
 - Set 95.35 DC voltage measurement offset = 0, default.
 - Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).

HVCB controlled externally, DC-breaker controlled by the drive



In the above example the High Voltage Circuit Breaker (HVCB) is controlled externally, e.g., by the operator. The status is checked by means of 20.34 Mains contactor acknowledge source. In case the mains contactor acknowledge is missing fault F524 Mains contactor acknowledge is generated.

Usually, HVCBs are equipped with an overcurrent relay, which can trip the HVCB. To protect the drive a 50 ... 100 ms pre-triggered trip command must be connected to the Off2 command (emergency off/fast current off). Additionally, the trip command from the HVCB should also trip the DC-breaker.

Attention: Do not switch the HVCB if DC current is flowing.

The DC-breaker is controlled by the drive. The drive closes and opens the DC-breaker with the command Mains contactor. Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO). The status is checked by means of 20.34 Mains contactor acknowledge source. In case the mains contactor acknowledge is missing fault F524 Mains contactor acknowledge is generated.

The DC-breaker can be tripped actively by the DC-breaker trip command.

US style DC-contactor

The US style DC-contactor K1.1 is a special designed DC-contactor with one normally closed contact for the dynamic braking resistor R_B and two normally open contacts for C1 and D1.

Set all following parameters after macros are loaded but before the drive is commissioned.

General settings

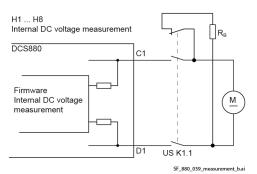
The US style DC-contactor is controlled by the drive.

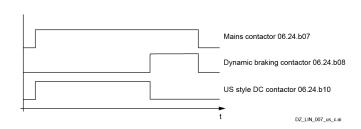
Set 20.33 Mains contactor control mode = DC-contactor.

The drive closes and opens the US style DC-breaker with the command US style DC-contactor. Thus, use either 06.24.b10 Current controller status word 1 via a relay output (RO) or one of the following settings:

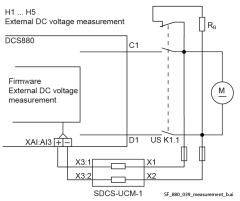
- 10.24 RO1 source = Close US style DC-contactor.
- 10.27 RO2 source = Close US style DC-contactor.
- 10.30 RO3 source = Close US style DC-contactor.

The status is checked by means of 20.34 Mains contactor acknowledge source or 20.35 DC breaker acknowledge source. In case the mains contactor acknowledge is missing fault F524 Mains contactor acknowledge or warning A103 DC-breaker acknowledge is generated.





Set 95.37 DC voltage measurement mode = DC-contactor.



	Internal DC voltage measurement	External DC voltage measurement
Without field weakening	20.44 Dynamic braking delay ≥ 0.1 s.	20.44 Dynamic braking delay ≤ -0.1 s.
With field weakening	Not allowed.	

Set 95.37 DC voltage measurement mode = AI3 scaled.

See also DCS880 External DC voltage measurement H1 ... H5 (3ADW000601).

Internal DC voltage measurement

For units H1 ... H8 in default configuration the DC voltage measurement is located inside the unit.

- Set 95.37 DC voltage measurement mode = DC-contactor.
- Balance 01.21 Armature voltage by means of 95.35 DC voltage measurement offset.

External DC voltage measurement (at the motor terminals)

In case field weakening is used, external DC voltage measurement at the motor terminals is mandatory. For units H1 ... H5 in default configuration and the DC voltage measurement is located at the motor terminals via SDCS-UCM-01 and Al3.

- Set 95.37 DC voltage measurement mode = AI3 scaled.
- Set 95.35 DC voltage measurement offset = 0, default.

For re-wired units H6 ... H8 and the DC voltage measurement is located at the motor terminals.

- Set 95.37 DC voltage measurement mode = Manual, default.
- Set 95.35 DC voltage measurement offset = 0, default.

Dynamic braking

If using dynamic braking, the drive allows you to select the stopping method under three different situations. 21.02 Off1 mode, 21.03 Emergency stop mode and 21.04 Stop mode select the stopping method for loss of the On command (On/Off), Off3 command (emergency stop) and Run command (Start/Stop, jogging, inching, etc.).

Each can be set to:

- Coast stop.
- Ramp stop.
- Torque limit.
- Dynamic braking.

To command the drive to perform a dynamic braking stop, one or more of these parameters must be set to Dynamic braking. Most users will want the drive to ramp stop when an On command (On/Off) or Run command (Start/Stop, jogging, inching, etc.) is cleared and use dynamic braking when the Off3 command (emergency stop) is cleared.

In that case, use the following settings:

- 21.02 Off1 mode = Ramp stop.
- 21.03 Emergency stop mode = Dynamic braking.
- 21.04 Stop mode = Ramp stop.

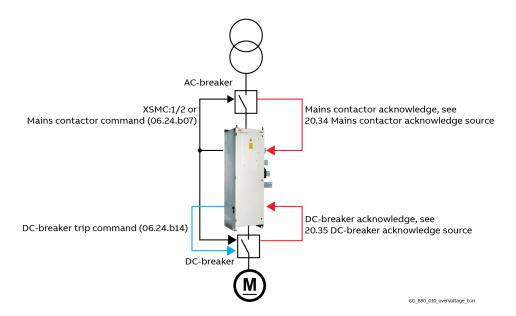
However, any case is allowed, and the final decision is left to the user.

Other parameters which control stops during faults are.

- 31.13 Fault stop mode communication.
- 31.14 Fault stop mode fault level 3.
- 31.15 Fault stop mode fault level 4.

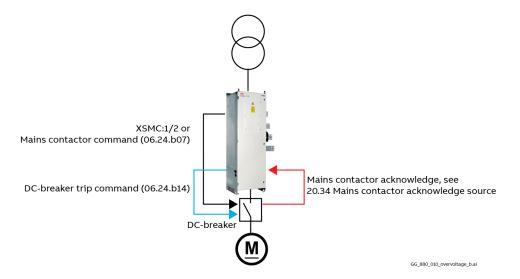
If using EMF feedback with dynamic braking, set 20.44 Dynamic braking delay = t. Thus, during dynamic braking, a zero-speed signal is generated after the programmed time t is elapsed. T is the time it normally takes the motor to stop during dynamic braking. Additional information see table above.

AC- and DC-breaker controlled by the drive



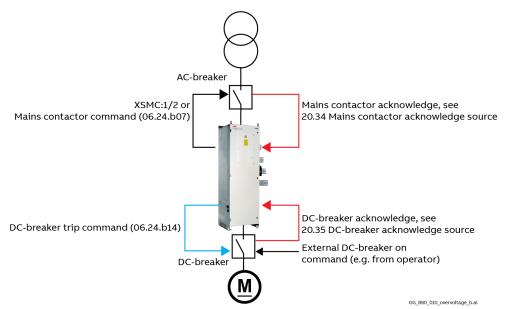
In the above example both, the AC- and the DC-breaker are controlled by the drive. The drive closes and opens both breakers with the command Mains contactor. Use XSMC:1/2 to close both breakers. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO). For the AC-breaker the status is checked by means of 20.34 Mains contactor acknowledge source. In case the AC-breaker acknowledge is missing fault F524 Mains contactor acknowledge is generated. For the DC-breaker the status is checked by means of 20.35 DC-breaker acknowledge source. In case the DC-breaker acknowledge is missing warning A103 DC-breaker acknowledge is generated. The DC-breaker can be tripped actively by the DC-breaker trip command.

No AC-breaker, DC-breaker controlled by the drive



In the above example no AC-breaker is used, and the DC-breaker is controlled by the drive. The drive closes and opens the DC-breaker with the command Mains contactor. Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO). The status is checked by means of 20.34 Mains contactor acknowledge source. In case the mains contactor acknowledge is missing fault F524 Mains contactor acknowledge is generated. The DC-breaker can be tripped actively by the DC-breaker trip command.

AC-breaker controlled by the drive, DC-breaker controlled externally

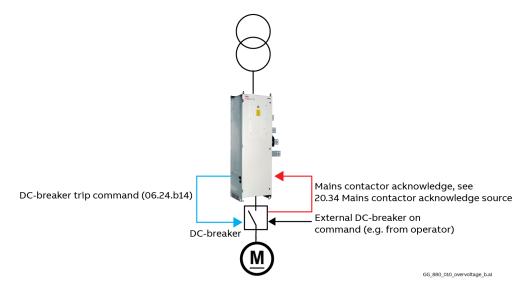


In the above example the AC-breaker is controlled by the drive. The drive closes and opens the AC-breaker with the command Mains contactor. Use XSMC:1/2 to close the AC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO). The status is checked by means of 20.34 Mains contactor acknowledge source. In case the mains contactor acknowledge is missing fault F524 Mains contactor acknowledge is generated.

The DC-breaker is controlled externally, e.g., by the operator. The status is checked by means of 20.35 DC-breaker acknowledge source. In case the DC-breaker acknowledge is missing warning A103 DC-breaker acknowledge is generated.

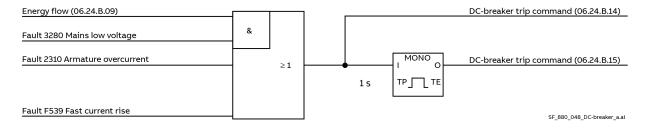
The DC-breaker can be tripped actively by the DC-breaker trip command.

No AC-breaker, DC-breaker controlled externally



In the above example no AC-breaker is used, and the DC-breaker is controlled externally, e.g., by the operator. The status is checked by means of 20.34 Mains contactor acknowledge source. In case the mains contactor acknowledge is missing fault F524 Mains contactor acknowledge is generated. The DC-breaker can be tripped actively by the DC-breaker trip command.

DC-breaker trip command



The firmware sets the:

- DC-breaker trip command (continuous signal) (06.24.b14).
- DC-breaker trip command (1 s pulse signal) (06.24.b15).

By means of:

- Fault 3280 Mains low voltage in regenerative mode.
- Fault 2310 Armature overcurrent.
- Fault F539 Fast current rise.

In case a digital output, see group 10 Standard DI, RO, is assigned to one of the two DC-breaker trip commands, it is updated immediately after detecting a fault and thus actively tripping the DC-breaker.

Dynamic braking

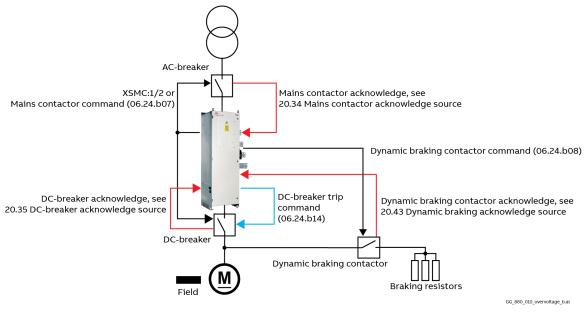
General

The drive can be stopped by dynamic braking. The principle is to transfer the rotary energy of the machine inertia into a braking resistor. Therefore, the armature circuit must be switched over from the drive to a braking resistor. Additionally, flux and field current must be maintained.

Activation

All stop modes can activate dynamic braking, in cases of a fault or due to communication breaks.

- 21.02 Off1 mode, when the On command (06.09.b00) is set to low.
- 21.03 Emergency stop mode, when the Off3 command (emergency stop) (06.09.b02) is set to low.
- 21.04 Stop mode, when the Run command (06.09.b03) is set to low.
- 31.13 Fault stop mode communication, when communication is lost.
- 31.14 Fault stop mode fault level 3, in case of a fault of fault level 3.
- 31.15 Fault stop mode fault level 4, in case of a fault of fault level 4.
- Dynamic braking can be forced by setting 06.11.b00 Auxiliary control word 2 to high. At the same time, the Run command (06.09.b03) must be set to low.

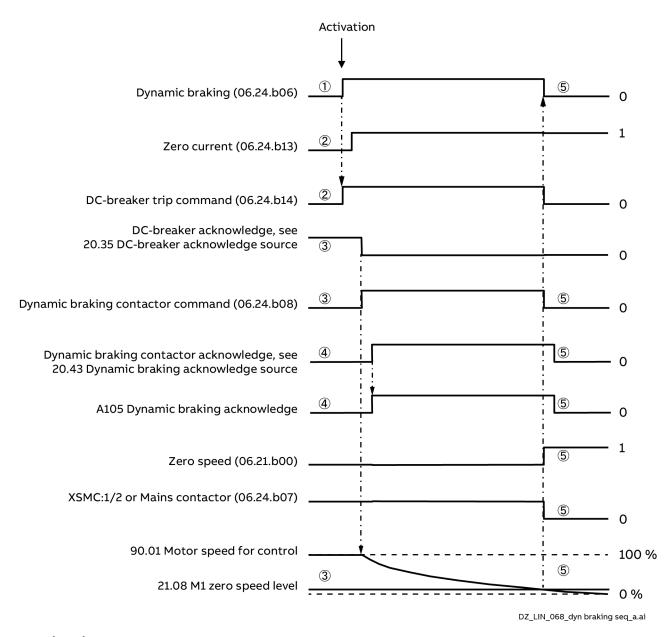


Function

During dynamic braking, the field current is maintained by keeping the field exciter activated. It is recommended to supply external/internal field exciters via an UPS to make sure that the field is maintained during mains failure. In case of field weakening external DC voltage measurement at the motor terminals is required. Additionally, the EMF controller must continue to operate.

OnBoard field exciters (H1 ... H4) will be supplied via the mains contactor, thus Mains contactor (XSMC: 1/2 or 06.24.b07) stays on/high until zero speed is reached.

- ① The activation of dynamic braking immediately sets Dynamic braking (06.24.b06) to high. Dynamic braking is active.
- ② Dynamic braking forces the armature current to zero and opens the DC-breaker by setting DC-breaker trip command (06.24.b14) to high. Thus, the DC-breaker is opened.
- ③ After the armature current is zero and the DC-breaker acknowledge is gone Dynamic braking contactor command (06.24.b08) is set to high. This signal is connected to a digital output, see group 10 Standard DI, RO, and used to close the dynamic braking contactor. As soon as the dynamic braking contactor is closed dynamic braking starts and decreases the speed.
- **(4)** With 20.43 Dynamic braking acknowledge source it is possible to select a digital input for the dynamic braking resistor acknowledge. This input sets warning A105 Dynamic braking acknowledge as long as the acknowledge is present. Thus, the drive cannot be started or re-started while dynamic braking is active, except 21.01 Start mode = Flying start dynamic braking.



Deactivation

⑤ Dynamic braking is deactivated as soon as zero-speed is reached and Zero speed (06.21.b00) is set to high.

In case of dynamic braking with EMF feedback there is no valid information about the motor speed and thus no zero-speed information. To prevent an interlocking of the drive after dynamic braking the speed is assumed zero after 20.44 Dynamic braking delay is elapsed.

For usage of US style DC-contactors see chapter <u>US style DC-contactor</u>.

I/O configuration

Analog inputs (AI)

The control board has 3 analog inputs.

Two of the inputs can be independently set as a voltage (0/2... 10 V, ±10 V) or current (0/4 ... 20 mA, ±20 mA) input using jumper J1 and J2. The 3rd input is a voltage (0/2 ... 10 V, ±10 V) input only. Each input can be filtered, inverted, and scaled. The analog inputs on the control board are read on a 0.5 ms time level. The number of analog inputs can be increased by installing FIO-11 or FAIO-01 I/O extensions, see I/O extensions below. The analog inputs on extension modules are read on a 2 ms time level. Delay times see table Switch on/off delays.

The drive can be set to perform an action, e.g., to generate a warning or fault, if the value of an analog input moves out of a predefined range.

Settings see group 12 Standard AI.

Analog outputs (AO)

The control board has 3 analog outputs.

The 1st output can be set as a voltage (0/2 ... 10 V, \pm 10 V) or current (0/4 ... 20 mA, \pm 20 mA) input using jumper J5. The 2nd output is a voltage (0//2 ... 10 V, \pm 10 V) output only. Each of the two outputs can be filtered, inverted, and scaled. The first 2 analog outputs on the control board are updated on a 0.5 ms time level.

Output IACT is used as a connection point for a scope to measure the current directly over the burden resistor (H1 ... H6 only). It is scaled automatically.

The number of analog outputs can be increased by installing FIO-11 or FAIO-01 I/O extensions, see I/O extensions below. The analog outputs on extension modules are updated on a 2 ms time level. Delay times see table Switch on/off delays.

Settings see group 13 Standard AO.

Digital inputs and outputs (DI, DIO)

The control board has 7 digital inputs and two digital input/outputs, DIOs can be set as either an input or an output. The digital inputs on the control board are read on a 0.5 ms time level.

One digital input (DI6) doubles as a PTC sensor input. See group 35 Motor thermal protection.

Digital input/output DIO1 can be used as a frequency input, DIO2 as a frequency output. The number of digital inputs/outputs can be increased by installing FIO-01, FIO-11 or FDIO-01 I/O extensions, see I/O extensions below. The digital inputs on extension modules are read on a 2 ms time level. Delay times see table Switch on/off delays.

Settings see groups 10 Standard DI, RO and 11 Standard DIO, FI, FO.

Relay outputs (RO)

The control board has 5 relay outputs. The signal to be indicated by the first 3 outputs can be selected by parameters. Additionally, there are 2 fixed outputs, see XSMC: 1 ... 4. One is for the mains contactor and the other is used for the safe torque off (STO) zero current monitor. The relay outputs on the control board are updated on a 0.5 ms time level.

The number of relay outputs can be increased by installing FIO-01 or FDIO-01 I/O extensions, see I/O extensions below. The relay outputs on extension modules are updated on a 2 ms time level. Delay times see table Switch on/off delays.

Settings see group 10 Standard DI, RO.

I/O extensions

Inputs and outputs can be added by using I/O extension modules. One to three modules can be mounted on the slots of the control board. Slots can be added by connecting an FEA-03 I/O extension adapter. The table below shows the number of I/O on the control board as well as optional I/O extension modules.

	_	Analog outputs (AO)	Digital inputs (DI)	Digital inputs/outputs (DIO)	Relay outputs (RO)
Control board	3	2 + IACT	7	2	3 + XSMC: 1 4
FAIO-01	2	2	-	-	-
FDIO-01	-	-	3	-	2
FIO-01	-	-	-	4	2
FIO-11	3	1	-	2	-

Attention: A maximum of 3 I/O extension modules of any combination can be activated and configured using parameter groups 14 ... 16.

Settings see groups 14 I/O extension module 1, 15 I/O extension module 2, 16 I/O extension module 3 and 60.41 Extension adapter com port.

Switch on/off delays (reaction times)

Via FEA-03	Hardware	Туре	Delay		DIP switch
-	SDCS-CON-H01	DI, DIO	Switch on delay	2 ms	-
			Switch off delay	1 ms	-
No	FDIO-01	DI	Switch on delay	15 ms	1 ms
				26 ms	10 ms
			Switch off delay	13 ms	1 ms
				21 ms	10 ms
	FIO-01	DIO	Switch on delay	3 ms	-
			Switch off delay	1 ms	-
	FIO-11	DIO	Switch on delay	5 ms	-
			Switch off delay	3 ms	-
Yes	FDIO-01	DI	Switch on delay	16 ms	1 ms
				26 ms	10 ms
			Switch off delay	15 ms	1 ms
				21 ms	10 ms
	FIO-01	DIO	Switch on delay	3 ms	-
			Switch off delay	1 ms	-
	FIO-11	DIO	Switch on delay	5 ms	-
			Switch off delay	3 ms	-

The given values are approximate values which were measured using a drive. Please consider, that for some operations e.g., starting and stopping, thyristor-based drives cannot react before a full mains cycle has passed (worst-case scenario).

FEA-03 I/O extension adapter

Attention:

- Not to be used for fieldbus adapters.
- A maximum of 3 I/O extension modules can be activated and configured using parameter groups 14 ... 16.

Hardware

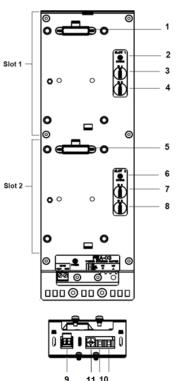
Following hardware is needed:

 FDCO-0x DDCS communication module. See <u>FDCO-01/02 DDCS communication modules</u> (3AUA0000114058):



Item	Description
1	Connector for Ch A.
2	Connector for Ch B.
3	Light intensity selector for Ch A.
4	Light intensity selector for Ch B.
5	Lock.
6	Mounting screw.
7	LEDs.

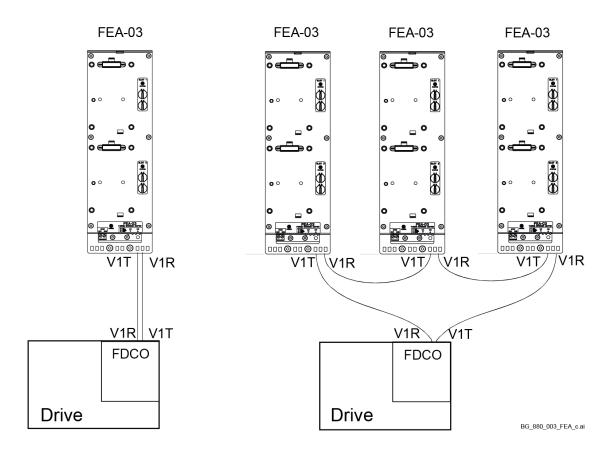
- A pair of fiber optic cables.
- FEA-03 I/O extension adapter. See <u>FEA-03 F series extension adapter (3AUA0000115811)</u>:



Item	Description
1	Module connector 1.
2	Status LED for Slot 1.
3	Node address switch A (digit 10).
4	Node address switch B (digit 0).
5	Module connector 2.
6	Status LED for Slot 2.
7	Node address switch C (digit 10).
8	Node address switch D (digit 0).
9	Power supply connector (XPOW: +24 V/GND, 100 mA plus current for option modules).
10	Transmitter V1T and receiver V1R.
11	Light intensity selector for V1T and V1R.

Electrical installation

This connection diagram shows how to connect the FEA-03 to the drive:



Attention: Do not mix 10 MBd and 5 MBd channels. Thus, allowed channels for interconnection of FDCO-0x and FEA-03 are:

Module type Channel A (Ch A)		Channel B (Ch B)
FDCO-01	OK (10 MBd)	OK (10 MBd)
FDCO-02	Not allowed (5 MBd)	OK (10 MBd)

Diagnostics

FDCO -0x LEDs:

Label	Color	Description
PWR OK	Green	Power/Internal 3.3 V OK.
Ch A Rx/Tx	Green/Red	DDCS channel A data activity.
Ch B Rx/Tx	Green/Red	DDCS channel B data activity.

FEA-03 LEDs:

Label	Color	Description
PWR OK	Green	Power 24 V OK.
SLOT 1 STATUS	Green	Initialization of the option module connected to Slot 1 OK.
SLOT 2 STATUS	Green	Initialization of the option module connected to Slot 2 OK.

Commissioning

 Set the light intensity selectors of FDCO-0x and FEA-03 according to the used fiber optic cable type and length:

	Cable length			
(light intensity selector)	POF, 1 mm	HCS, 200 μm		
0 – OFF	Disabled			
1 – SHORT	0.1 20 m	0.1 50 m		
2 – MEDIUM	20 25 m	50 100 m		
3 – LONG	25 30 m	100 200 m		

- The slot/channel number that is used for communication between FDCO-0x and FEA-03 must be set in 60.41 Extension adapter com port.
- For each slot on a FEA-03 a unique node ID must be defined. That node ID must be matched by the option module connected to it.
 - The node ID is a two-digit decimal number. It is possible to use node ID numbers from 04 ... 99. Values 00, 01, 02, and 03 are reserved.
- On a FEA-03 a node IDs are defined using switches A (digit 10), B (digit 1) for slot 1 and C (digit 10), D
 (digit 1) for slot 2.
- The node IDs of the option module must be set using following parameters.

For I/O extension modules:

- 14.02 Module 1 location.
- 15.02 Module 2 location.
- 16.02 Module 3 location.

For FEN-x1 encoder interface modules:

- 91.12 Module 1 location.
- 91.14 Module 2 location.
- Connect the 24 V_{DC} to XPOW at the base of the FEA-03.
- Check the diagnostics LEDs.
- For I/O extension modules check:
 - 14.03 Module 1 status.
 - 15.03 Module 2 status.
 - 16.03 Module 3 status.
- For FEN-x1 encoder interface modules check:
 - 91.02 Module 1 status.
 - 91.03 Module 2 status.

Reference ramps

Speed reference ramp

The acceleration/deceleration times for the speed reference can be defined separately. The ramps are defined as the time it takes the drive to accelerate or decelerate between zero speed and the value defined by 46.02 Speed scaling actual. The user can switch between two preset ramp sets using a binary source such as a digital input. Additionally, the shape of the ramp can be controlled.

The speed reference ramp times can be set using parameters 23.11 ... 23.19 and 46.01 M1 speed scaling.

Jogging ramp

The acceleration/deceleration times for jogging can be defined separately, see chapter <u>Jog function</u>. The jogging ramp times can be set using 23.20 Acceleration time jogging, 23.21 Deceleration time jogging and 46.01 M1 speed scaling.

Emergency stop ramp

A deceleration ramp for the Off3 (emergency stop) command can be defined. The ramp is defined as the time it takes the drive to decelerate between the value defined by 46.02 Speed scaling actual and zero speed.

The emergency stop ramp time can be set using 23.23 Emergency stop time and 46.01 M1 speed scaling.

Torque reference ramp

The acceleration/deceleration times for the torque reference can be defined separately. The ramps are defined as the time it takes the reference to change between zero and nominal motor torque. See 46.04 M1 torque scaling actual and 99.02 M1 nominal torque.

The torque reference ramp times can be set using, 26.18 Torque ramp up time, 26.19 Torque ramp down time and 46.03 M1 torque scaling.

Motor potentiometer ramp

The change rate of the motor potentiometer is adjustable. The same rate applies in both directions, see chapter <u>Motor potentiometer</u>.

The motor potentiometer ramp times can be set using 22.75 Motor potentiometer ramp time, 22.76 Motor potentiometer min value and 22.77 Motor potentiometer max value.

Constant speeds

Constant speeds, see group 22 Speed reference selection, are predefined references that can be quickly activated, for example, through digital inputs. It is possible to define up to 7 constant speeds. The constant speeds operate on a 2 ms time level.

Speed feedback devices

As standard the drive supports one OnBoard encoder, either differential or single ended, and one analog tacho. For further information consult the DCS880 Hardware manual (3ADW000462).

Additionally, the drive supports two more encoders/resolvers. The following optional interface modules are available:

- TTL encoder interface FEN-01 with two TTL inputs, one TTL output for encoder emulation with echo/splitter and two digital inputs.
- Absolute encoder interface FEN-11 with one absolute encoder input, one TTL input, one TTL output for encoder emulation with echo/splitter and two digital inputs. Not supported at the time of publication.
- Resolver interface FEN-21 with one resolver input, one TTL input, one TTL output for encoder emulation with echo/splitter and two digital inputs.
- HTL encoder interface FEN-31 with one HTL encoder input, one TTL output for encoder emulation with echo/splitter and two digital inputs.
- HTL encoder interface FSE-31 for use with an FSO-21 safety functions module with one HTL encoder input.

The interface modules are to be installed onto one of the option slots of the drive. All modules, except the FSE-31, can also be installed onto an FEA-03 I/O extension adapter.

Encoder echo/splitter and emulation

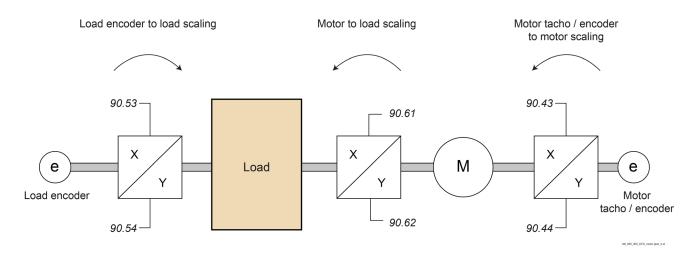
Both encoder echo/splitter and emulation are supported by the above-mentioned FEN-xx interfaces. Encoder echo/splitter is available with TTL, TTL+ and HTL encoders. The signal received from the encoder is relayed to the TTL output unchanged. This enables the connection of one encoder to several drives.

Encoder emulation also relays the encoder signal to the output, but the signal is either scaled, or position data converted to pulses. Emulation can be used when absolute encoder or resolver position needs to be converted to TTL pulses, or when the signal must be converted to a different pulse number than the original.

Motor and load feedback

Three sources can be used as speed and position feedback, the OnBoard encoder, encoder 1 or encoder 2. Any of these can be used for load position calculation or motor control. The load position calculation makes it possible, for example, to determine the position of a conveyor belt or the height of the load on a crane. The feedback sources are selected by 90.41 M1 feedback selection and 90.51 Load feedback selection.

For detailed parameter connections of the motor- and load feedback functions, see chapter <u>Firmware structure diagrams</u>. For more information on load position calculation, see chapter <u>Position counter</u>. Any mechanical gear ratios between the components like motor, motor encoder and load, load encoder is specified using the gear parameters shown in the diagram below.

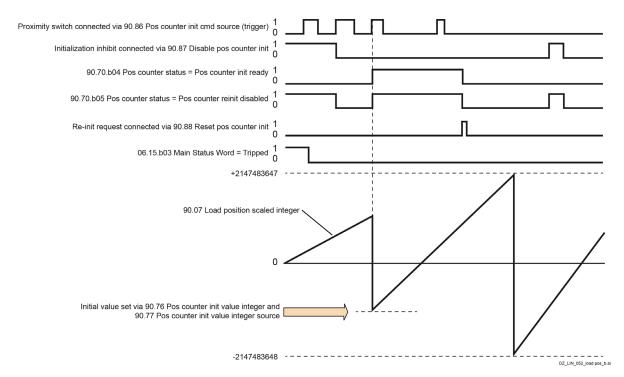


Any gear ratio between the load encoder and the load is defined by 90.53 Load gear numerator and 90.54 Load gear denominator. Any gear ratio between the motor encoder and the motor is defined by 90.43 Motor gear numerator and 90.44 Motor gear denominator. Any gear ratio between the motor and load can be defined by 90.61 Gear numerator and 90.62 Gear denominator. By default, all the ratios mentioned above are 1:1. The ratios can only be changed with the drive stopped.

Position counter

The firmware contains a position counter that can be used to indicate the position of the motor/load. The output of the position counter function, 90.07 Load position scaled integer, indicates the scaled number of revolutions read from the selected source, see chapter Motor and load feedback. The relation between revolutions of the motor shaft and the translatory movement of the load in any given unit of distance is defined in 90.63 Feed constant numerator and 90.64 Feed constant denominator. This gear function can be changed without the need of a parameter refresh or position counter reinitialization. However, the counter output is only updated after new position input data is received.

For detailed parameter connections see chapter Firmware structure diagrams.



The position counter is initialized by setting a known physical position of the motor/load into the Firmware. The initial position, for example the home/zero position or the distance from it, can be set in 90.76 Pos counter init value integer, or taken from another parameter. This position is set as the initial value of the position counter 90.07 Load position scaled integer when the source selected by 90.86 Pos counter init cmd source (trigger), such as a proximity switch connected to a digital input, is activated. A successful initialization is indicated by 90.70.b04 Pos counter status. Any subsequent initialization of the counter must first be enabled by 90.88 Reset pos counter init. To define a time window for initializations, 90.87 Disable pos counter init can be used to inhibit the signal from the proximity switch. An active fault in the drive will also prevent the counter initialization.

Encoder error handling

When an encoder is used for motor/load feedback, the action taken in case of an encoder error is specified in 31.35 Motor feedback fault/31.38 Load feedback fault. If either parameter is set to Encoder/Warning, the calculation will continue smoothly using the second encoder. If the first encoder recovers from the error, the calculation will smoothly switch back to it. The motor/load position signals 90.02, 90.04, 90.05,90.06 and 90.07 will continue to be updated all the time, but 90.70.b06 Pos counter status will be set to indicate potentially inaccurate position data. In addition, 90.70.b04 Pos counter status will be cleared upon the next stop as a recommendation to reinitialize the position counter. 90.73 Pos counter error and boot action defines whether position calculation resumes from the previous value over an encoder error or to reinitialize the position counter. By default, 90.70.b04 Pos counter status is cleared after an error, indicating that reinitialization is needed. With 90.73 Pos counter error and boot action set to Continue from previous value, the position values are retained over an error or reboot. However, 90.70.b06 Pos counter status is set to indicate that an error occurred.

Note: With a multiturn absolute encoder, 90.70.b06 Pos counter status is cleared at the next stop of the drive if the encoder has recovered from the error. 90.70.b04 Pos counter status is not cleared. The status of the position counter is retained over a drive reboot, after which position calculation resumes from the absolute position given by the encoder, considering the initial position specified by 90.76 Pos counter init value integer.

WARNING

If the drive is stopped when an encoder error occurs or if the drive is not powered, the motor/load position signals 90.02, 90.04, 90.05,90.06, 90.07 and 90.70 are not updated, because no movement of the motor/load can be detected. When using previous position values, 90.73 Pos counter error and boot action is set to Continue from previous value, be aware that the position data is unreliable if the motor/load can move.

Reading/writing position counter values via a fieldbus

The parameters of the position counter, such as 90.07 Load position scaled integer and 90.76 Pos counter init value integer, can be accessed from an overriding control system in the following formats:

- 16-bit integer, if 16 bits are sufficient for the application.
- 32-bit integer, can be accessed as two consecutive 16-bit words.

For example, to read 90.07 Load position scaled integer via a fieldbus, set the selection parameter of the desired data set in group 52 to Other – 90.07 and select the format. If you select a 32-bit format, the subsequent data word is automatically reserved.

Configuration of the OnBoard encoder feedback

- 1. Set the number of pulses according to encoder nameplate in 94.23 OnBoard encoder pulses/revolution.
- 2. Select the type in 94.24 OnBoard encoder type.
- 3. Select the speed calculation mode in 94.25 OnBoard encoder speed calculation mode.
- 4. If the encoder rotates at a different speed to the motor e.g., is not mounted directly on the motor shaft, enter the gear ratio in 90.43 Motor gear numerator and 90.44 Motor gear denominator.
- 5. Set 90.41 M1 feedback selection to EMF.
- 6. Start the motor with a reference of e.g., 400 rpm.
- 7. Compare 01.02 EMF speed filtered with 01.04 OnBoard encoder speed filtered. If the values are the same, set the encoder as the feedback source, 90.41 Motor feedback selection = OnBoard encoder.
- 8. Specify the action taken in case the feedback signal is lost, see 31.35 Motor feedback fault.

Example 1: Using the same encoder for both load and motor speed feedback

The drive controls a motor used for lifting a load in a crane. An encoder attached to the motor shaft is used as feedback. The same encoder is also used for calculating the height of the load in the desired unit. A gear exists between the motor shaft and the cable drum. Following settings are made.

- 90.51 Load feedback selection = OnBoard encoder.
- The encoder is mounted directly on the motor shaft.
 - 90.43 Motor gear numerator = 1.
 - 90.44 Motor gear denominator = 1.
- The cable drum turns one revolution per 50 revolutions of the motor shaft.
 - 90.53 Load gear numerator = 1.
 - 90.54 Load gear denominator = 50.
- The load moves 70 centimeters, this equals 7/10 of a meter, per one revolution of the cable drum.
 - 90.63 Feed constant numerator = 7.
 - 90.64 Feed constant denominator = 10.

Now the load height in meters can be read from 90.07 Load position scaled integer, while 90.03 Load speed displays the rotational speed of the cable drum and 90.01 Motor speed for control displays the rotational speed of the shaft.

Example 2: Using two encoders

One encoder, e.g., OnBoard encoder, is used as motor feedback. The encoder is connected to the motor shaft through a gear. Another encoder, e.g., Encoder 2, measures the line speed elsewhere in the machine. Following settings are made.

- 90.41 Motor feedback selection = OnBoard encoder.
- The encoder turns three revolutions per one revolution of the motor shaft.
 - 90.43 Motor gear numerator = 1.
 - 90.44 Motor gear denominator = 3.
- 90.51 Load feedback selection = Encoder 2.
 - The line speed measured by Encoder 2 can be read from 90.03 Load speed. This value is in rpm.
 It can be converted into another unit by 90.53 Load gear numerator and 90.54 Load gear denominator.

Note: The feed constant gear cannot be used in this conversion because it does not affect 90.03 Load speed.

Jog function

The jog function enables the use of a push button to briefly rotate the motor. The jog function is typically used during service or commissioning to control the machinery locally.

Two jog functions, jogging 1 and jogging 2, are available. Each has its own activation sources and references. The sources are selected by 20.26 Jogging 1 start source and 20.27 Jogging 2 start source. When jogging is activated, the drive starts and accelerates to the defined jogging speed, see 22.42 Jogging 1 ref or 22.43 Jogging 2 ref. The jogging acceleration ramp is set using 23.20 Acc time jogging. After the activation signal switches off, the drive decelerates to a stop. The jogging deceleration ramp is set using 23.21 Dec time jogging.

For more information see chapter Firmware structure diagrams.

Notes:

- The jogging operates on a 2 ms time level.
- Jogging is not available when the drive is in local control.
- Jogging cannot be enabled when the drive Start command is active. The drive cannot be started when jogging is enabled. Starting the drive after jog enable is switched off, requires a fresh start command.
- If both jogging functions are activated, the one that was activated first has priority.
- Jogging uses the speed control mode.
- Ramp shape times, parameters 23.16 ... 23.19, do not apply to the jogging acceleration/deceleration ramp.
- The inching functions activated via a fieldbus, see 06.09.b08/09 Used main control word, use the references and ramp times defined for jogging, but do not require the jog enable signal.

WARNING

If jogging is enabled and activated while the start command is active, jogging will activate as soon as the start command switches off.

Process PID control

See group 40.

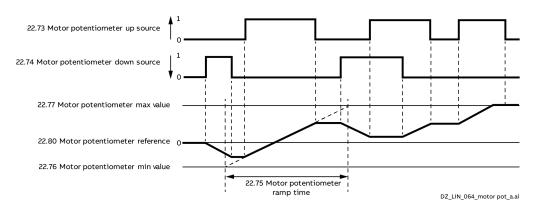
Motor potentiometer

The motor potentiometer is a counter whose value can be adjusted up and down using two digital signals selected by 22.73 Motor potentiometer up source and 22.74 Motor potentiometer down source. **Note:** These signals have no effect when the drive is stopped.

When enabled in 22.71 Motor potentiometer function, the motor potentiometer takes over the value set in 22.72 Motor potentiometer initial value. Depending on the mode selected in 22.71 Motor potentiometer function, the motor potentiometer value is either retained or reset over a stop or a power cycle.

The change rate is defined in 22.75 Motor potentiometer ramp time as the time it would take for the value to change from 22.76 Motor potentiometer min value to 22.77 Motor potentiometer max value or vice versa. If the up and down signals are simultaneously on, the motor potentiometer value does not change. The output of the function is shown in 22.80 Motor potentiometer reference, which can directly be set as the source of any selector parameter such as 22.11 Speed ref1 source.

The following example shows the behavior of the motor potentiometer value.



Mechanical brake control

See group 44.

User load curve

Not part of the firmware.

Diagnostics

Signal supervision

Not part of the firmware.

Maintenance timers and counters

Not part of the firmware.

Energy saving calculators

Not part of the firmware.

Load analyzer

Not part of the firmware.

Miscellaneous

User parameter sets

The drive supports four user parameter sets that can be saved to the flash memory and recalled using 96.22 User set save/load. It is also possible to use digital inputs to switch between user parameter sets, see 96.23 User set I/O mode in1 and 96.24 User set I/O mode in2. User parameter sets are typically used to change parameters to emergency configurations and only switched during standstill.

A user parameter set contains all editable values in parameter groups 10 ... 99 except:

- Forced I/O values such as 10.03 DI force selection and 10.04 DI force data.
- I/O extension module settings, see groups 14 ... 16.
- Fieldbus communication enable parameters, see 50.01 FBA A enable and 50.31 FBA B enable.
- Other fieldbus communication settings, see groups 51 ... 56 and 58.
- Encoder configuration settings, see groups 92 and 93.
- Some hardware settings in group 95 HW configuration.

As the motor settings are included in the user parameter sets, make sure the settings correspond to the motor used in the application before recalling a user set.

User lock

For improved cybersecurity, it is highly recommended to set a master pass code to prevent e.g., the changing of parameter values and/or the loading of firmware and other files.

With several drives, set a unique pass code for each drive.

WARNING

ABB will not be liable for damages or losses caused by the failure to activate the user lock using a new pass code. See chapter Cybersecurity disclaimer.

To activate the user lock for the first time:

- Set 96.07 Pass code = 10,000,000. This will make parameters 96.100 ... 96.102 visible.
- Enter a new pass code into 96.100 Change user pass code. Always use eight digits; if using Drive Composer, finish with Enter.
- Confirm the new pass code in 96.101 Confirm user pass code.

WARNING

Store the pass code in a safe place! The user lock cannot be opened, even by ABB, if the pass code is lost.

- In 96.102 User lock functionality, define the actions that you want to prevent. Our recommendation is to select all the actions unless otherwise required by the application.
- Enter an invalid (random) pass code into 96.07 Pass code.
- Use 96.27 Control board boot or cycle the auxiliary power.

 Check, that parameters 96.100 ... 96.102 are hidden. If they are not, enter another random pass code into 96.07 Pass code.

To reopen the lock, enter the pass code into 96.07 Pass code. This will again make parameters 96.100 ... 96.102 visible.

Data storage parameters

Twenty-four, sixteen 32-bit and eight 16-bit parameters, are reserved for data storage. These parameters are unconnected by default and can be used for e.g., linking, testing, and commissioning purposes. They can be written to and read from using other parameters' source or target selections.

Note: Only 32-bit floating point, type real32, parameters can be selected as the source of another parameter value. In other words, parameters 47.01 ... 47.08 can be used as value sources of other parameters while 47.11 ... 47.28 cannot.

To use a 16-bit integer, received in DDCS data sets, as the source of another parameter, write the value into one of the real32 type storage parameters 47.01 ... 47.08. Select the storage parameter as the source and define a suitable scaling method between the 16-bit and 32-bit values in parameters 47.31 ... 47.38.

Communication

What this chapter contains

This chapter describes the communication capabilities of the drive.

Commissioning and maintenance tools

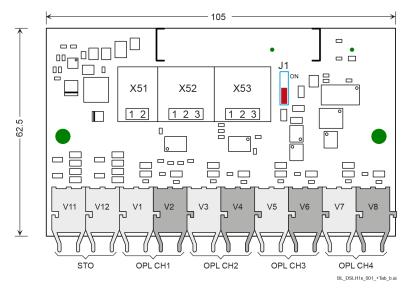
See chapter Connect a DCS880 and a PC running Drive Composer.

DCSLink using SDCS-DSL-H1x

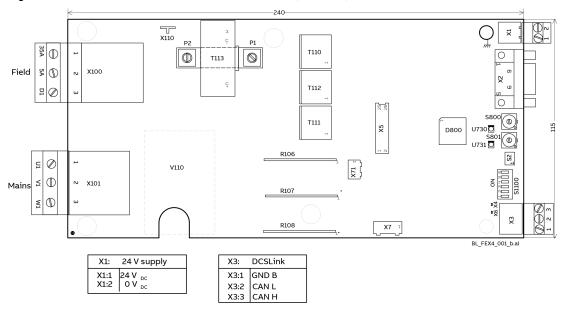
General

The DCSLink is a multi-purpose twisted pair bus for the DCS880. All functions using the same hardware and can be used at the same time. The DCSLink can be used for excitation and 12-pulse.

Layout of a SDCS-DSL-H1x

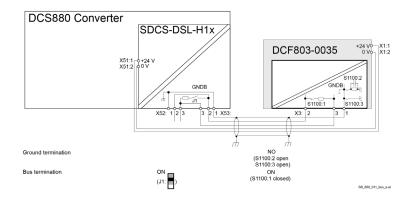


Excitation, commissioning a DCF803-0016, FEX-425-Int or DCF803-0035 Layout of the field exciter electronics (FEX-4)

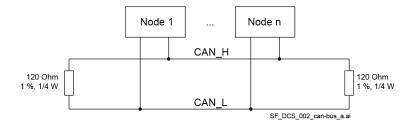


DCSLink cabling and jumper/switch settings

Example for a cable connection.



The DCSLink is a bus system using twisted pair cables. Therefore, bus termination is mandatory at the two physical ends of the bus.



Hardware (SDCS-DSL-H1x)	Hardware (FEX-4)	
Jumper J1 = ON if bus termination is needed.	Switch S1100:1 = ON if bus termination is needed.	
-	Switches S1100:2 and S1100:3 set the ground	
	termination.	

Set the field exciter type

The FEX-4 can be used for 4 different applications:

- DCF803-0016 (as external field exciter, up to 16 A).
- FEX-425-Int (as internal field exciter for a H5 and H6, up to 25 A).
- DCF803-0035 (as external field exciter, up to 35 A).
- DCF803 terminal 5 A (as internal or external field exciter, max. 5 A).

Attention: Make sure, that the hardware connection of the field circuit does fit to the setting of 99.07 M1 used field exciter type. If this is not the case, the actual field current is wrong. This leads to a wrong EMF and thus to a wrong EMF speed feedback. Thus, the motor might turn much faster as set in the speed reference.

Always check for correct field current, using a current clamp, before turning the motor with EMF speed feedback.

Firmware (armature converter)	Hardware (FEX-4)
99.07 M1 used field exciter type = DCF803-0016, FEX-425-Int or DCF803-0035.	X100: 5 A X100: 35 A X100: D1
99.07 M1 used field exciter type = DCF803 terminal 5 A.	X100: 5 A X100: 35 A VIOO: D1 X100: D1

Set the supply of the FEX-4

The FEX-4 can be either supplied by 1-phase or by 3-phases.

Firmware (armature converter)	Hardware (FEX-4)
28.63 M1 field exciter operation mode = 3-phase.	X100: 5 A X100: 35 A X101: V1 O X101: W1 O X100: D1
28.63 M1 field exciter operation mode = 1-phase.	X100: 5 A X100: 35 A X101: V1 O X101: W1 O X100: D1

Set the node numbers, transmission speed and the communication supervision

In all bus systems unique node ID numbers are required and must be set in the armature converter and the field exciter. Two stations with the same node ID number are not allowed.

For example, set the armature converter node ID number to 1 and the FEX-4 node ID number to 13.

The communication supervision is activated in the armature converter.

Also, the transmission speed of all units must match.

Firmware (armature converter)	Hardware (FEX-4)						
70.05 DCSLink node ID = 1.	-						
70.06 Baud rate = 500 kBit/s.	S1100:4	. 9	51100:5	S	1100:6	kBit/s	
	OFF	(OFF	0	N	500	
70.12 Field exciter timeout = 100	-						
ms.							
70.13 M1 field exciter node ID = 13.	S801			S80	00		
	1 \$80	1	0 / r2 / r	3	\$800	0 / 10 Cu	

Checking the FEX-4

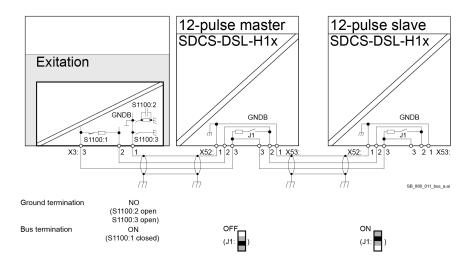
There are several signals to check the FEX-4 installation.

Firmware (armature converter)		Hardware (FEX-4)		
07.68 M1 field exciter type.	Shows the FEX-4 type as chosen with 99.07 M1 used field exciter type.	Yellow (U731) or green (U730) LED is blinking.	Waiting for DCSLink communication.	
70.01 DCSLink status 1, 70.02 DCSLink status 2.	Show the status of the field exciter node as chosen with 70.13 M1 field exciter node ID.	Yellow (U731) or green (U730) LED is steady.	DCSLink communication is OK.	

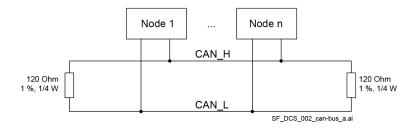
For further information consult the DCS880 Hardware manual (3ADW000462).

12-pulse

Example for a cable connection.



The DCSLink is a bus system using twisted pair cables. Therefore, bus termination is mandatory at the two physical ends of the bus.



Hardware (SDCS-DSL-H1x)	Hardware (FEX-4)
Jumper J1 = ON if bus termination is needed.	Switch S1100:1 = ON if bus termination is needed.
-	Switches S1100:2 and S1100:3 set the ground termination.

Set the node numbers, transmission speed and the communication supervision

In all bus systems unique node ID numbers are required and must be set in the 12-pulse master, 12-pulse slave, and the excitation. Two stations with the same node ID number are not allowed.

For example, set the 12-pulse master node ID number to 1, the 12-pulse slave node ID number to 31 and the excitation node ID number to 21.

The 12-pulse and excitation communication supervision are activated in the 12-pulse master. Also, the transmission speed of all converters must match.

Firmware 12-pulse master	Firmware 12-pulse slave	Firmware excitation
70.05 DCSLink node ID = 1.	70.05 DCSLink node ID = 31.	70.05 DCSLink node ID = 21.
70.06 Baud rate = 500 kBit/s.	70.06 Baud rate = 500 kBit/s.	70.06 Baud rate = 500 kBit/s.
70.08 12-pulse timeout = 100 ms.	-	-
70.09 12-pulse slave node ID = 31.	-	-
70.12 Field exciter timeout = 100 ms.	-	-
70.13 M1 field exciter node ID = 21.	-	-

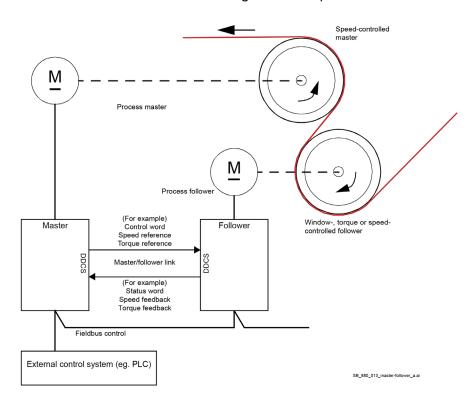
For further information consult the DCS880 12-pulse manual (3ADW000533).

Master-follower link

General

The master-follower link can be used to connect several drives, so that the load can be evenly distributed between the drives. This is ideal in applications where the motors are coupled to each other via gearing, chain, belt, etc.

The external control signals are typically connected to one drive only which acts as the master. The master controls up to 10 followers by sending broadcast messages over an electrical cable or fiber optic link. The master can read feedback signals from up to 3 selected followers.



The master is typically speed-controlled, and the followers follow its torque or speed reference. In general, a follower should be:

- Window- or torque-controlled when the motor shafts of the master and the followers are rigidly coupled by gearing, chain etc. so that no speed difference between the drives is possible.
- Window- or speed-controlled when the motor shafts of the master and the follower are flexibly coupled so that a slight speed difference is possible.
- To switch dynamically between speed control and torque control use 19.11 Ext1/Ext2 selection.

Communication

A master-follower link can be built by connecting the drives together with fiber optic cables (requires a FDCO-0x DDCS communication module per drive) or by wiring together the XD2D connectors of the drives. The medium is selected by 60.01 M/F communication port.

60.03 M/F mode defines whether the drive is the master or a follower on the master-follower link. Typically, the speed-controlled process master drive is also configured as the master in the link. The communication on the master-follower link is based on the DDCS protocol, which employs data sets (specifically, data set 41). One data set contains three 16-bit words. The contents of the data sets are freely configurable using parameters 61.01 ... 61.03. The data set broadcast by the master typically contains its control word, speed reference and torque reference, while the followers typically return their status word (06.15 Main status word) for monitor purposes.

The default setting of 61.01 M/F data 1 selection is 06.06 Follower CW. With this setting in the master, 06.06 Follower control word, is broadcasted to all followers.

However, bit 3 (Run command) of the follower control word is modified so that it becomes zero when the master trips.

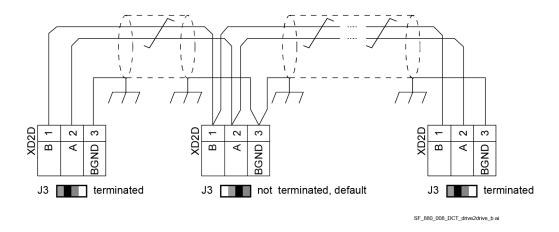
Three words of data can be read from followers with the node addresses 2, 3 and 4 (see 60.02 M/F node address). The followers from which data is read are selected by 60.14 M/F follower selection in the master. In each follower, the data to be sent are selected by parameters 61.01 ... 61.03. The data is transferred in integer format over the link and displayed by parameters 62.28 ... 62.36 in the master. The data can then be forwarded using parameters 62.04...62.12.

To indicate faults in the followers, each follower must be configured to transmit its status word (06.15 Main status word) in one of the above-mentioned data words. In the master, the corresponding target parameter must be set to Follower SW node x. The follower status words can be seen in parameters 06.122 ... 06.124. The action to be taken when a follower is faulted is selected by 60.17 Follower fault action. External events (see group 31 Fault functions and fault levels) can be used to indicate the status of other bits of any follower status word.

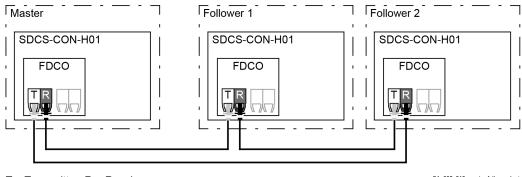
Configuration of the master-follower link

The master-follower link is formed by connecting the drives together using:

- Shielded twisted-pair cables between the XD2D terminals of the drives.
- Fiber optic cables. An additional FDCO-0x DDCS communication module per drive is needed. Connection examples are shown below.



Master-follower link wiring with electrical cables.



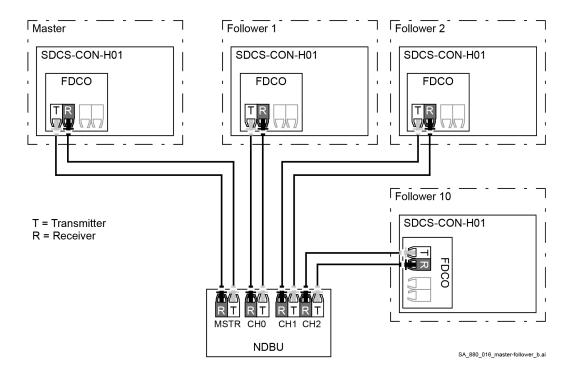
T = Transmitter; R = Receiver

SA_880_015_master-follower_b.a

Ring configuration with fiber optic cables.

Notes:

- Due to reliability, in ring configuration only a maximum of 2 followers is recommended.
- Both 5 MBd or 10 MBd channels are possible. Do not mix.



Star configuration with fiber optic cables.

Notes:

- A star configuration using fiber optic cables requires an NDBU-95C DDCS branching unit. See <u>DDCS</u> branching unit NDBU-95 user's manual (3BFE64285513).
- A maximum of 10 followers is possible.
- Both 5 MBd or 10 MBd channels are possible. Do not mix.

Example parameter settings

The following is a checklist of parameters that need to be set when configuring the master-follower link. In this example, the master broadcasts the follower control word, a speed reference, and a torque reference. The followers return their status words and two actual values (this is not compulsory but is shown for clarity).

Master settings

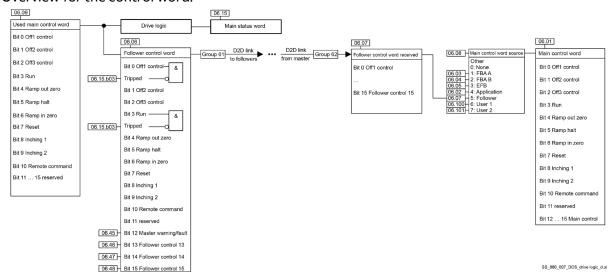
Master-follower link activation:

- 60.01 M/F communication port. The communication port setting depends on the used hardware and its location
- 60.02 M/F node address = 1. The allowable address for the master is 1.
- 60.03 M/F mode = FDCO-XD2D Master. For both fiber optic and wire connection.
- 60.05 M/F HW connection = Ring or Star for fiber optic. Always Star for wire.

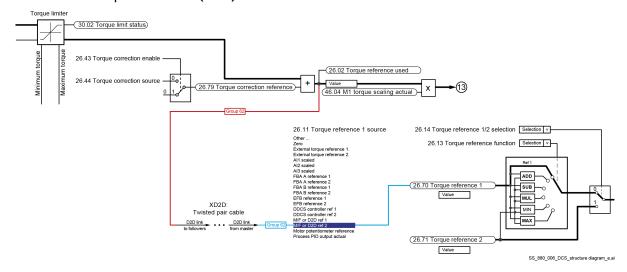
Time synchronization:

- 96.35 Time sync primary source = DDCS controller. The master needs the primary source for the time synchronization.
- 96.36 M/F and D2D clock synchronization = Active. The time synchronization must be activated in all units.

Overview for the control word:



Overview for torque reference (Ref2):



Data to be sent from the master to the followers:

- 61.01 M/F data 1 selection = 06.06 Follower control word.
- 61.02 M/F data 2 selection = 23.03 Speed reference 7.
- 61.03 M/F data 3 selection = 26.02 Torque reference used.

Data to be read by the master from followers with node addresses 2, 3 and 4 (optional):

- 60.14 M/F follower selection. The selection of followers that data is read from.
- 60.17 Follower fault action = Fault. Selects how the master reacts to a faulty follower. To indicate
 faults in the followers, each follower must be configured to transmit its status word. In the master,
 the corresponding target parameter must be set to Follower SW node x. Example:

Follower	Master
61.01 M/F data 1 selection = 06.15 Main status word	62.04 Follower node 2 data 1 sel = 06.122 Follower status word node 2

 62.04 Follower node 2 data 1 sel ... 62.12 Follower node 4 data 3 sel are used for mapping of data received from the followers.

Follower settings

Master-follower link activation:

- 60.01 M/F communication port. The communication port setting depends on the used hardware and its location.
- 60.02 M/F node address = 2 ... 254. Only followers with node addresses 2, 3 or 4 can be supervised by the master.
- 60.03 M/F mode = FDCO-XD2D Follower. For both fiber optic and wire connection.
- 60.05 M/F HW connection = Ring or Star for fiber optic. Always Star for wire.

Time synchronization:

- 96.35 Time sync primary source = D2D or M/F. All followers must be set to D2D or M/F.
- 96.36 M/F and D2D clock synchronization = Active. The time synchronization must be activated in all units.

Mapping of data received from the master:

- 62.01 M/F data 1 selection = CW 16bit.
- 62.02 M/F data 2 selection = Ref1 16bit.
- 62.03 M/F data 3 selection = Ref2 16bit.

Scaling of the references:

- 60.10 M/F ref1 type = Speed.
- 60.11 M/F ref2 type = Torque.

Selection of reference sources:

- 06.08 Main control word source = Follower.
- 22.11 Speed reference 1 source = M/F or D2D ref1.
- 26.11 Torque reference 1 source = M/F or D2D ref2.

Selection of operating mode:

- 19.12 Ext1 control mode = Add, Torque or Speed.
- 20.01 Command location = Main control word.

Data to be sent from the followers with node addresses 2, 3 and 4 to the master (optional):

- 61.01 M/F data 1 selection = 06.15 Main SW. For proper follower supervision in the master the main status word of each follower must be send to the master.
- 61.02 M/F data 2 selection = Other, freely chosen.
- 61.03 M/F data 3 selection = Other, freely chosen.

Additional settings

Field weakening

In case of field weakening all followers must have a speed feedback via encoder or tacho.

Note: When connecting the output of one encoder to two units a splitter must be used.

Connection to overriding control

In case followers are connected to an overriding control make sure, that the overriding control is not writing on the same signals (via groups 50 ... 58 and/or groups 60 ... 62) as the master (via the master-follower link). There is always a problem when two sources write on one sink. Be very carefully with e.g., 06.06 Follower control word, 23.03 Speed reference 7, 26.02 Torque reference used, ...

E-stop

In case of an E-stop the master must be in control of all followers. Thus, set in all followers:

- 20.05 Off3 source (emergency stop) = Off3 inactive.
- 19.20 Follower force ramp stop = Keep control mode.

Specifications of the master-follower link

Maximum cable length:

- FDCO-0x with POF (Plastic Optic Fiber): 30 m.
- FDCO-0x with HCS (Hard-Clad Silica Fiber): 200 m.
- Maximum shielded twisted-pair cable length: 50 m.

Transmission rate: 4 Mbit/s.

Total performance of the link: < 5 ms to transfer references between master and followers.

Protocol: DDCS (Distributed Drives Communication System).

Communication

Settings and diagnostics

Parameter groups 60 DDCS communication, 61 D2D and DDCS transmit data and 62 D2D and DDCS receive data.

DDCS controller interface

General

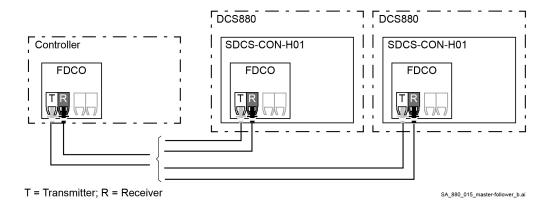
The drive can be connected to a DDCS controller, such as the ABB AC 800M, using fiber optics. The DCS880 is compatible with both the ModuleBus and DriveBus connections.

Note: The DriveBus feature BusManager is not supported.

Topology

An example connection using fiber optic cables is shown below.

The drives require an additional FDCO-0x DDCS communication module. Ring and star configurations are possible. See 60.55 DDCS controller HW connection and chapter Configuration of the master-follower link.



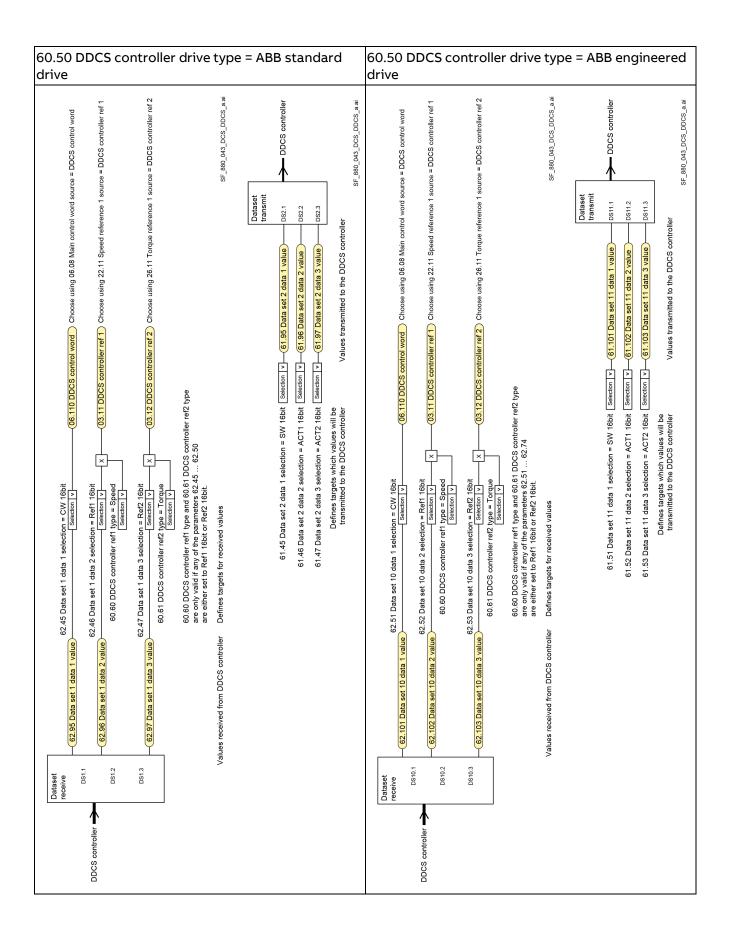
The selection of the connection is made by 60.51 DDCS controller comm port. The transfer rate can be selected by 60.56 DDCS controller baud rate.

Communication

The communication between the controller and the drive consists of data sets of three 16-bit words each. The controller sends a data set to the drive, which returns the next data set to the controller. The communication uses data sets 1 ... 4, 10 ... 25 and data sets 32, 33. The contents of the data sets are freely configurable, but data set 10 typically contains the control word and one or two references, while data set 11 returns the status word and selected actual values.

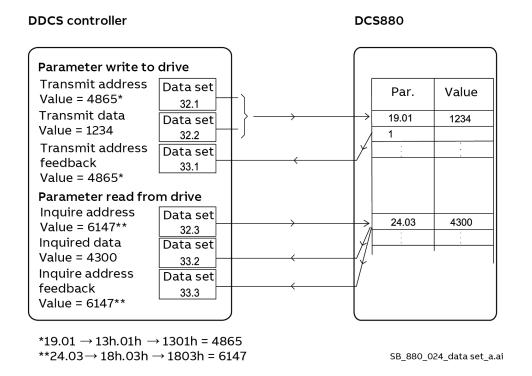
For ModuleBus communication, the DCS880 can be set up as an ABB standard drive or as an ABB engineered drive by 60.50 DDCS controller drive type. ModuleBus communication uses data sets 1 ... 4 with an ABB standard drive and data sets 10 ... 25 and data sets 32, 33 with an ABB engineered drive. The word from the controller that is defined as the control word, e.g., 62.51 Data set 10 data 1 selection = CW 16bit, is send to 06.110 DDCS control word. The coding of the bits is shown in 06.01 Main control word.

The word from the drive that is defined as the status word, e.g., 61.51 Data set 11 data 1 selection = SW 16bit, is send to the controller. The coding of the bits is shown in 06.15 Main status word.



Mailbox service

By default, data sets 32 and 33 are dedicated for the mailbox service, which enables the setting or inquiry of parameter values as follows:



By means of 60.64 Mailbox data set selection it is possible to select data sets 24 and 25 instead of data sets 32 and 33.

The update intervals of the data sets are as follows:

- Data sets 10 and 11: 2 ms.
- Data sets 12 and 13: 4 ms.
- Data sets 14 ... 17: 10 ms.
- Data sets 18 ... 25, 32 and 33: 100 ms.

Settings and diagnostics

Parameter groups 60 DDCS communication, 61 D2D and DDCS transmit data and 62 D2D and DDCS receive data.

User Macros

Refer to the DCS880 Quick guide.

Parameters

What this chapter contains

The chapter describes the parameters and signals of the firmware.

Terms and abbreviations

Term	Definition
Change running	y = Parameter can be changed while the drive is running. n = Parameter can only be changed while the drive is stopped.
Default (def.)	The default value of a parameter.
Index	Signal and parameter numbers consists of group number and a consecutive number (index).
Other	The value is taken from another parameter. Choosing "Other" displays a parameter list in which the user can specify the source parameter.
Other [bit]	The value is taken from a specific bit in another parameter. Choosing "Other" displays a parameter list in which the user can specify the source parameter and bit.
Parameter	A user-adjustable operating instruction for the drive.
p.u.	Per unit.
Range	Range of a signal or parameter.
Scale/FbEq16	16-bit fieldbus equivalent: The scaling between the value shown on the panel and the integer used in communication when a 16-bit value is selected for transmission to an external system. A dash (-) indicates that the parameter is not accessible in 16-bit format.
Signal	Value measured or calculated by the drive. It can also contain status information. Most signals are read-only, but some (especially counter-type signals) can be reset.
Туре	Either signal or parameter.
Unit	Shows the physical unit of a signal or parameter, if applicable. The unit is displayed in the control panel and Drive Composer.
Volatile	y = Values are NOT stored in the flash memory. They will be lost when the drive is deenergized. n = Values are stored in the flash memory. They will remain when the drive is deenergized.

Summary of parameter groups

Group	Contents
01 Actual values	Basic signals for monitoring the drive.
03 Input references	Values of references received from various sources.
04 Warnings and faults	Information on warnings and faults that occurred last.
05 Diagnostics	Various run-time-type counters and measurements related to drive maintenance.
06 Control and status words	Drive control, status, and event words.
07 System info	The drive's hardware and firmware information.
10 Standard DI, RO	Configuration of digital inputs and relay outputs.
11 Standard DIO, FI, FO	Configuration of digital input/outputs and frequency inputs/outputs.
12 Standard AI	Configuration of standard analog inputs.

13 Standard AO	Configuration of standard analog outputs.
14 I/O extension module 1	Configuration of I/O extension module 1.
15 I/O extension module 2	Configuration of I/O extension module 2.
16 I/O extension module 3	Configuration of I/O extension module 3.
19 Operation mode	Selection of local and remote-control locations and operating modes.
20 Start/Stop/Direction	Start/Stop/Direction and Run/Start/jog enable signal source selection. Positive/Negative reference enable source selection. Breaker and acknowledge source selection.
21 Start/Stop mode	Start and stop modes, emergency stop mode and zero speed.
22 Speed reference selection	Speed reference selection and motor potentiometer settings.
23 Speed reference ramp	Speed reference ramp settings (programming of the acceleration and deceleration rates for the drive).
24 Speed reference conditioning	Speed error calculation, speed error window control configuration and speed error (Δn) step.
25 Speed control	Speed controller settings.
26 Torque reference chain	Settings for the torque reference chain.
27 Armature current control	Settings for the armature current control chain.
28 EMF and field current control	Settings for the EMF and field current control chain.
29 12-pulse/Hardparallel	Settings for 12-pulse and hardparallel.
30 Control limits	Drive operation limits.
31 Fault functions and fault levels	Configuration of external events. Selection of the drive behavior in fault situations.
32 Supervision	Configuration of signal supervision functions 1 3. Three values can be monitored. A warning or fault is generated whenever predefined limits are exceeded.
33 Generic timer & counter	Configuration of maintenance timers/counters.
35 Motor thermal protection	Motor thermal protection settings such as temperature measurement configuration and load curve definition.
36 Load analyzer	Peak value and amplitude logger settings.
37 User load curve	Settings for user load curve.
40 Process PID	Parameter values for process PID controller.
42 Shared motion (2 nd motor)	Configuration of 2 nd motor.
44 Mechanical brake control	Configuration of mechanical brake.
45 Energy efficiency	Settings for the energy saving calculators.
46 Monitoring/Scaling settings	Speed supervision settings, signal filtering and general scaling settings.
47 Data storage	Data storage parameters that can be written to and read from using other parameters' source and target settings.
49 Panel port communication	Communication settings for the control panel port on the drive.
50 Fieldbus adapter (FBA)l	Fieldbus communication configuration.
51 FBA A settings	Fieldbus adapter A configuration.
52 FBA A data in	Selection of data sent by fieldbus adapter A to the fieldbus controller (e.g., PLC).
53 FBA A data out	Selection of data sent by the fieldbus controller (e.g., PLC) to fieldbus adapter A.
54 FBA B settings	Description see group 51 FBA A settings.

<u> </u>	
55 FBA B data in	Description see group 52 FBA A data in.
56 FBA B data out	Description see group 53 FBA A data out.
58 Embedded fieldbus	Embedded fieldbus (EFB) configuration.
60 DDCS Communication	DDCS communication configuration.
61 D2D and DDCS transmit data	Defines the data sent from the drive to the DDCS/D2D link.
62 D2D and DDCS receive data	Defines the data sent from the DDCS/D2D link to the drive.
70 DCSLink Communication	Defines the DCSLink communication.
74 89 Application specific	Groups used for application programming.
groups	
90 Feedback selection	Motor and load feedback configuration.
91 Encoder module settings	Configuration of the encoder interface modules.
92 Encoder 1 configuration	Settings for encoder 1.
93 Encoder 2 configuration	Settings for encoder 2.
94 OnBoard speed feedback	Settings for analog tacho and OnBoard encoder.
configuration	
95 HW configuration	Various hardware-related settings.
96 System	Language selection; access levels; macro selection; parameter save and restore; control board reboot; user parameter sets; unit selection; data logger triggering; user lock.
99 Motor data	Motor configuration settings.

Parameter listing

01 Actual Values

Basic signals for monitoring the drive.

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
01.01	Used motor speed filter	red									
	Measured or EMF motor Displays the measured of M1 feedback selection.	or EMF mo	e constan	t is defined by 46.	11 Filter tin		peed.				
	-30000.00 30000.00	-	rpm	See 46.02	у	n	Signal				
01.02	EMF speed filtered										
	Motor speed calculated Displays the motor speed Filter time motor speed -30000.00 30000.00	ed calculat		MF in rpm. A filter	time const	tant is defi	ned by 46.11				
01.03	Tacho speed filtered	-	Ιριιι	366 40.02	у	i i	Jigilai				
	OnBoard tacho speed. Displays the motor speed defined by 46.11 Filter ti			nBoard tacho in rp	m. A filter	time const	ant is				
01.04	OnBoard encoder speed	filtered	ТРП	300 40.0L	y	111	Jigilai				
01.05	Displays the motor speed defined by 46.11 Filter ti -30000.00 30000.00 Encoder 1 speed filtered	me motor -		See 46.02	rpm. A filt	er time cor	Signal				
01.03	Encoder 1 speed. Displays the motor speed 46.11 Filter time motor s	ed measure		·	T	Ţ					
	-30000.00 30000.00	<u> -</u>	rpm	See 46.02	у	n	Signal				
01.06	Encoder 2 speed filtered Encoder 2 speed. Displays the motor speed 46.11 Filter time motor standard st	ed measure	ed with er	see 46.02	filter time o	constant is	defined by				
01.07	Speed change rate	- I	1 -	'		I	<u> </u>				
	Rate of speed change. Displays the rate of motor speed change. Positive values indicate acceleration. Negative value indicate deceleration. See 31.31 Emergency ramp supervision, 31.32 Emergency ramp supervision delay, 31.33 Ramp stop supervision and 31.34 Ramp stop supervision delay. -15000 15000 - rpm/s 1 = 1 rpm/s y n Signal										
01.10	Motor current in A										
01.10	Motor current. Measured motor current in amperes.										
01.10	Measured motor curren	t in amper		1 = 1 Δ	V	In	Signal				
01.17		t in amper -	es. A	1 = 1 A	у	n	Signal				

Index	Name											
	Text											
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
	Displays the filtered mo	tor torque	in percent	of 99.02 M1 nom	inal torque	e. A filter ti	me constar					
	is defined by 46.13 Filter		•		•							
	forward.											
	-325.00 325.00	-	%	See 46.04	у	n	Signal					
01.18	Motor torque 100 ms fi	ltered		•								
	Motor torque filtered w	ith 100 ms	i .									
	Displays the motor torq	ue filterec	with 100 r	ns in percent of 9	9.02 M1 nc	minal torq	ue.					
	-325.00 325.00	-	%	See 46.04	у	n	Signal					
01.20	Mains voltage in V											
	Mains voltage.											
	Measured mains voltage	e in volt. Fi	iltered with	10 ms.								
	0.0 3250.0	-	٧	10 = 1 V	у	n	Signal					
01.21	Armature voltage in V			•								
	Armature voltage.											
	Measured armature volt	_										
	This value is also influer	ced by 95	.34 DC volta	age measuremen	t adjust ar	d 95.35 DC	voltage					
	measurement offset.	1	1		1	T	1					
	-3250.0 3250.0	-	V	10 = 1 V	У	n	Signal					
01.24	Output power in kW											
	Output power.											
	Measured output power				nit selectio	on. A filter t	ime					
	constant is defined by 4	6.14 Filter	1		1	T	1					
	-32500 32500	-	kW or hp	1 = 1 kW or hp	у	n	Signal					
01.25	Output power											
	Output power.											
	Measured output power	in percen	1	1	1		1					
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal					
01.26	Reactive power											
	Reactive power.											
	Measured reactive power	er in perce			er.	T	1					
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal					
01.29	M1 field current in A											
	Motor 1 field current.											
	Motor 1 measured field	current in			1	T	1					
	-3250.0 3250.0	-	Α	10 = 1 A	у	n	Signal					
01.30	M2 field current in A											
	Motor 2 field current.											
	Motor 2 measured field	current in	amps. Filte		1	•	1					
	-3250.0 3250.0	-	Α	10 = 1 A	у	n	Signal					
01.40	Drive current			Drive current.								
01.40												
01.40		in percent	of 07.62 D	rive DC current sc	aling set.							
01.40	Drive current.	in percent	of 07.62 D	rive DC current so	aling set.	n	Signal					
01.40	Drive current. Measured drive current	in percent	1	_	1	n	Signal					

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16 \	Volatile	Change running	Туре			
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
01.50	Current ripple	•	•		•	1	1			
	Armature current ripple	output.								
	Displays the armature cu	rrent ripp	ole monitor	output in percen	t of 99.11 N	M1 nomina	l current c			
	42.08 M2 nominal curren	t.								
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
01.51	Current ripple filtered									
	Filtered armature curren	t ripple o	utput.							
	Displays the filtered arm			nonitor output ir	n percent c	of 99.11 M1	nominal			
	current. The filter time co	onstant is	200 ms.							
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
01.60	12-pulse serial armature	voltage s	sum in V							
	Calculated armature volt	-				-	· <u> </u>			
	Calculated armature volt	_	-pulse serial	l/serial sequentia	al master p	olus 12-puls	se			
	serial/serial sequential s	lave.			1					
	-3250.0 3250.0	-	V	10 = 1 V	У	n	Signal			
01.61	12-pulse parallel current	sum in A								
	Summed motor current in amperes (12-pulse parallel master only).									
	Summed measured motor	or current	of 12-pulse	parallel master	olus 12-pul	se parallel	slave.			
	-32500.0 32500.0	-	Α	1 = 1 A	у	n	Signal			
01.62	12-pulse parallel slave current in A									
	Slave motor current in ar	nperes (1	2-pulse para	allel master only)						
	Measured motor current	of the 12-	-pulse paral	lel slave.						
	-32500.0 32500.0	-	Α	1 = 1 A	у	n	Signal			
01.70	99.01 Mains voltage fast	:								
	Fast signal mirrored, 99.	01 Mains	voltage.							
	Measured mains voltage in percent of 99.10 Nominal mains voltage.									
	0.00 325.00	-	%	100 = 1 %	у	n	Signal			
01.71	28.05 Armature voltage	fast	•	•		•	1			
	Fast signal mirrored, 28.05 Armature voltage.									
	Measured armature voltage in percent of 99.12 M1 nominal voltage.									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
1.72	24.01 Used speed refere	nce fast	1	1	1-					
	Fast signal mirrored, 24.01 Used speed reference.									
	Speed reference for spee		•		ed by 96.03	3 Unit for s	peed			
	control.									
	-30000.00 30000.00	-	rpm, % or	See 46.02	у	n	Signal			
			v							
1.73	24.02 Used speed feedb	ack fast	•		•	•	1			
	Fast signal mirrored, 24.	02 used s	peed feedba	ack.						
	Speed feedback for spee									
	-30000.00 30000.00	-	rpm	See 46.02	у	n	Signal			
01.74	27.02 Used current refer	ence fast	1 -		1-	1	1 -			
	Fast signal mirrored, 27.0			ence.						
	Displays the armature cu				nominal c	urrent afte	er current			
					nominal c	urrent afte	er cu			

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
1.75	27.05 Motor current fa	st								
	Fast signal mirrored, 27 Measured motor currer			M1 nominal currer	nt.					
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
1.76	27.18 Firing angle fast		·	•		1				
	Fast signal mirrored, 27 Displays the firing ange	_	_							
	0.00 180.00	-	0	100 = 1°	у	n	Signal			
01.77	28.14 M1 field current r	eference f	ast							
	Fast signal mirrored, 28.14 M1 field current reference. Displays motor 1 field current reference in percent of 99.13 M1 nominal field current.									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
1.78	28.15 M1 field current fast									
	Fast signal mirrored, 28.15 M1 field current. Motor 1 measured field current in percent of 99.13 M1 nominal field current.									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
1.79	42.45 M2 field current reference fast									
	Fast signal mirrored, 42.45 M2 field current reference.									
	Displays motor 2 field current reference in percent of 42.10 M2 nominal field current.									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
1.80	42.46 M2 field current fast									
	Fast signal mirrored, 42.46 M2 field current. Motor 2 measured field current in percent of 42.10 M2 nominal field current.									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
01.81	Motor current 500 μs	•								
	Superfast motor currer bubbles when recorded	_	•	•	•	e to see th	e current			
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
	-L		·	1	1-	1				

03 Input referencesValues of references received from various sources.

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Type				
03.01	Panel reference 1										
	Panel reference 1. Displays the local reference given from the control panel or PC tool.										
	-100000.00 100000.0	0 -	-	1 = 10	у	n	Signal				
03.05	FBA A reference 1										
	Fieldbus adapter A reference 1. Displays reference 1 received via fieldbus adapter A.										
	-100000.00 100000.0	0 -	-	1 = 10	у	n	Signal				
03.06	FBA A reference 2	FBA A reference 2									
	Fieldbus adapter A reference 2.										

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	Displays reference 2 receive	ved via field	dbus ada	pter A.						
	-100000.00 100000.00	-	-	1 = 10	у	n	Signal			
3.07	FBA B reference 1									
	Fieldbus adapter B refere	nce 1.								
	Displays reference 1 receiv	ved via field	dbus ada	pter B.						
	-100000.00 100000.00	-	-	1 = 10	у	n	Signal			
3.08	FBA B reference 2									
	Fieldbus adapter B refere	nce 2.								
	Displays reference 2 recei	ved via field	dbus ada	pter B.						
	-100000.00 100000.00	-	-	1 = 10	у	n	Signal			
3.09	EFB reference 1									
	Embedded fieldbus refere	ence 1.								
	Displays scaled reference	1 received	via the er	mbedded fieldbus	. The scal	ing is defir	ned by 58.2			
	EFB ref1 type.									
	-30000.00 30000.00	-	-	1 = 10	у	n	Signal			
3.10	EFB reference 2									
	Embedded fieldbus reference 2.									
		Displays scaled reference 2 received via the embedded fieldbus. The scaling is defined by 58.27								
	EFB ref2 type.	T	T	T	ı	1	1			
	-30000.00 30000.00	-	-	1 = 10	у	n	Signal			
3.11	DDCS controller ref1									
	DDCS controller reference 1.									
	Displays scaled reference 1 received via a DDCS communication option module (FDCO-0x). The									
	scaling is defined by 60.60		itroller re		ı	1	1			
	-30000.00 30000.00	-	-	1 = 10	у	n	Signal			
3.12	DDCS controller ref2									
	DDCS controller reference 2.									
	Displays scaled reference 2 received via a DDCS communication option module (FDCO-0x). The scaling is defined by 60.61 DDCS controller ref2 type.									
		T DDCS con					C: 1			
	-30000.00 30000.00	-	-	1 = 10	у	n	Signal			
3.13	M/F or D2D ref1									
	Master-follower link refere			- ·			· • .			
	Displays scaled master-fo		reterence	e 1 received from	tne maste	er. The scar	ing is			
	defined by 60.10 M/F ref1	туре. Т		1 - 10	l.,	T.,	Cianal			
2011	-30000.00 30000.00	-	-	1 = 10	у	n	Signal			
3.14	M/F or D2D ref2									
	Master reference 2 (follow			2 ma a a b c = -1 f ::-	٠ ماله	T la !	: : <u>.</u>			
	Displays scaled master-fo		reterence	e ∠ received from	tne maste	er. The scal	ing is			
	defined by 60.11 M/F ref2	type.		1 - 10	l.,	1_	Ciana - I			
	-30000.00 30000.00	-	-	1 = 10	У	n	Signal			

04 Warnings and faults

Information on warnings and faults that occurred last. For explanations of individual warning and fault codes. See chapter Fault tracing.

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
04.01	Tripping fault									
	1 st active fault.									
	Code of the 1 st active fa	ult (the fault	that caus	sed the current tri	p).					
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
04.02	Active fault 2									
	2 nd active fault.									
	Code of the 2 nd active fa	ault.								
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
04.03	Active fault 3									
	3 rd active fault.									
	Code of the 3 rd active fa	1					1			
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
04.04	Active fault 4									
	4 th active fault.									
	Code of the 4 th active fa		1	1		T	1			
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
04.05	Active fault 5									
	5 th active fault.									
	Code of the 5 th active fa	1	1			T	1			
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
04.06	Active warning 1									
	1 st active warning.									
	Code of the 1 st active w		1				T			
	0000h FFFFh		-	1 = 1	У	n	Signal			
04.07	Active warning 2									
	2 nd active warning.									
	Code of the 2 nd active w	varning.	1	1			T			
	0000h FFFFh		-	1 = 1	У	n	Signal			
04.08	Active warning 3									
	3 rd active warning.									
	Code of the 3 rd active w	arning.	1				la: 1			
	0000h FFFFh	-	-	1 = 1	У	n	Signal			
04.09	Active warning 4									
	4 th active warning.									
	Code of the 4 th active w	rarning.		1 - 1		1_	C: I			
0410	0000h FFFFh	-	-	1 = 1	У	n	Signal			
04.10	Active warning 5									
	5 th active warning.									
	Code of the 5 th active w	rarning.		4 _ 4		T	C: I			
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
04.11	Latest fault									
	1 st stored fault. Code of the 1 st stored (non-active) fault.									

Index	Name										
	Text										
	Range	1	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	0000h FFFFh	-		-	1 = 1	у	n	Signal			
04.12	2 nd latest fault										
	2 nd stored fault.										
	Code of the 2 nd stored (non-active) fault.										
	0000h FFFFh	-	•	-	1 = 1	у	n	Signal			
04.13	3 rd latest fault	Į		·		1-					
	3 rd stored fault.										
	Code of the 3 rd stored (non-active) fault.										
	0000h FFFFh	-	•	-	1 = 1	у	n	Signal			
)4.14	4 th latest fault	1		W.	•	, -					
	4 th stored fault.										
	Code of the 4 th st	tored (non-	active) fa	ault.							
	0000h FFFFh	-	•	-	1 = 1	у	n	Signal			
04.15	5 th latest fault	Į		·		1-					
	5 th stored fault.										
	Code of the 5 th st	ored (non-	active) fa	ault.							
	0000h FFFFh	-		-	1 = 1	у	n	Signal			
04.16	Latest warning	L		I		1-	I				
	1 st stored warning.										
	Code of the 1 st st	_	active) wa	arning.							
	0000h FFFFh	-		-	1 = 1	у	n	Signal			
04.17	2 nd latest warning	g		W.	•	, -					
	2 nd stored warning.										
	Code of the 2 nd stored (non-active) warning.										
	0000h FFFFh	-	•	-	1 = 1	у	n	Signal			
04.18	3 rd latest warning										
	3 rd stored warning.										
	Code of the 3 rd stored (non-active) warning.										
	0000h FFFFh	-		-	1 = 1	у	n	Signal			
04.19	4 th latest warning	g		*			•				
	4 th stored warning.										
	Code of the 4 th st	tored (non-	-active) w	arning.							
	0000h FFFFh	-	•	-	1 = 1	у	n	Signal			
04.20	5 th latest warning	g									
	5 th stored warning.										
	Code of the 5 th st	ored (non-	active) w	arning.							
	0000h FFFFh	-	•	-	1 = 1	у	n	Signal			
)4.21	Fault word 1										
	DCS800 compatible fault word 1.										
	The bit assignments of this word correspond to FaultWord1 (9.01) in the DCS800. Each bit can										
	indicate several DCS880 events as listed below.										
	Note: Only used when a DCS800 is modernized by a DCS880.										
	Bit assignment:										
	Bit DCS880 events correspond to following DCS800 events										
	1		-	tollowin							
	0 F501 Auxili	iary underv	oltage		F501 Au	xUnderVo	lt				

ndex	Name										
	Range		Default	Unit	Scale	/FbEq16	Volatile	Change running	Туре		
	1	1 2310 Armature overcurrent					F502 ArmOverCur				
	2	F503 Armature over	<u> </u>			F503 ArmOverVolt					
	3	4310 Bridge temper				F504 ConvOverTemp					
	4 2330 Residual current detected					F505 Re	sCurDetec	t			
	5	4981 Motor tempera measured/estimate		le 2)		F506 M1OverTemp					
	6	4981 Motor tempera measured/estimate				F507 M1OverLoad					
	7	7082 Ext I/O comm loss				F508 I/OboardLoss					
	8	4982 Motor temper measured/estimate		le 2)		F509 M2	2OverTemp)			
	9	4982 Motor temper measured/estimate		le 1)		F510 M2	OverLoad				
	10	-	ltage			F511 ConvFanCur F512 MainsLowVolt					
	11	3280 Mains low volt									
	12 F513 Mains overvoltage			ige F5			F513 MainsOvrVolt				
	13 F514 Mains synchronization lost					F514 MainsNotSync					
	14	14 F515 M1 field exciter overcurrent 15 F516 M1 field exciter communication				F515 M1FexOverCur F516 M1FexCom					
	15										
	0000	h FFFFh	-	-	1 = 1		у	n	Signal		

04.22 Fault word 2

DCS800 compatible fault word 2.

The bit assignments of this word correspond to *FaultWord2 (9.02)* in the DCS800. Each bit can indicate several DCS880 events as listed below.

Note: Only used when a DCS800 is modernized by a DCS880.

Bit assignment:

Bit	DCS880 events correspond to following	DCS800 events
0	F517 Armature current ripple	F517 ArmCurRipple
1	F518 M2 field exciter overcurrent	F518 M2FexOverCur
2	F519 M2 field exciter communication	F519 M2FexCom
3	-	reserved
4	F521 Field acknowledge missing	F521 FieldAck
5	7301 Motor speed feedback, 7381 Speed feedback device, 73A1 Load speed feedback	F522 SpeedFb
6	71B1 Motor fan acknowledge	F523 ExtFanAck
7	F524 Mains contactor acknowledge	F524 MainContAck
8	50FE Type code	F525 TypeCode
9	9081 External fault 1 9085 External fault 5	F526 ExternalDI
10	5080 Drive fan acknowledge	F527 ConvFanAck

Index	Name Text										
	11	6681 EFB communication, 7510 FBA A communication, 7520 FBA B communication				F528 FieldBusCom					
		12	F529 M1 field e	xciter not OK			F529 M1Fe	xNotOK			
	13	F530 M2 field e	xciter not OK			F530 M2F6	exNotOK				
	14	7121 Motor stal	I			F531 Moto	rStalled				
	15	7310 Overspeed	d			F532 MotC	OverSpeed				
		•						_	_		
	0000	Oh FFFFh	-	-	1 = 1	•	у	n	Signal		
04 23	+	t word 3	-	-	1 = 1	•	У	n			

04.23 | Fault word 3

DCS800 compatible fault word 3.

The bit assignments of this word correspond to *FaultWord3 (9.03)* in the DCS800. Each bit can indicate several DCS880 events as listed below.

Note: Only used when a DCS800 is modernized by a DCS880.

Bit assignment:

Bit	DCS880 events correspond to following	DCS800 events				
0	F533 12-pulse reversal timeout	F533 12PrevTime				
1	F534 12-pulse current difference	F534 12PcurDiff				
2	F535 12-pulse communication	F535 12PulseCom				
3	F536 12-pulse slave	F536 12PslaveFail				
4	F537 M1 field exciter ready lost	F537 M1FexRdyLost				
5	F538 M2 field exciter ready lost	F538 M2FexRdyLost				
6	F539 Fast current rise	F539 FastCurRise				
7	-	F540 COM8Faulty				
8	F541 M1 field exciter low current	F541 M1FexLowCur				
9	F542 M2 field exciter low current	F542 M2FexLowCur				
10	7581 DDCS controller communication, 7582 Master-follower link communication	F543 COM8Com				
11	-	reserved				
12	64A3 Application loading	F545 ApplLoadFail				
13	7081 Control panel/PC tool link communication	F546 LocalCmdLoss				
14	F547 Drive hardware	F547 HwFailure				
15	6000 Internal firmware	F548 FwFailure				

04.24 Fault word 4

DCS800 compatible fault word 4.

The bit assignments of this word correspond to *FaultWord4 (9.04)* in the DCS800. Each bit can indicate several DCS880 events as listed below.

1 = 1

Signal

n

Note: Only used when a DCS800 is modernized by a DCS880.

Bit assignment:

0000h ... FFFFh

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile		Туре
						running	

Bit	DCS880 events correspond to following	DCS800 events
0	-	F549 ParComp
1	64B2 User set fault	F550 ParMemRead
2	80A0 Al supervision	F551 AlRange
3	71A2 Mechanical brake closing failed, 71A3 Mechanical brake opening failed, 71A5 Mechanical brake opening not allowed	F552 MechBrake
4	7381 Speed feedback device	F553 TachPolarity
5	7381 Speed feedback device	F554 TachoRange
6	-	reserved
7	F556 Torque proving	F556 TorqProving
8	F557 Reversal time	F557 ReversalTime
9	-	reserved
10	-	reserved
11	-	F601 APFault1
12	-	F602 APFault2
13	-	F603 APFault3
14	-	F604 APFault4
15	-	F605 APFault5

04.25 User fault word

DCS800 compatible user fault word.

The bit assignments of this word correspond to *UserFaultWord* (9.05) in the DCS800. Each bit can indicate several DCS880 events as listed below.

1 = 1

n

У

Signal

Notes:

- Only used when a DCS800 is modernized by a DCS880.
- User faults can be created by the application program.

Bit assignment:

0000h ... FFFFh

Bit	DCS880 events correspond to following	DCS800 events
0	5610	F610 UserFault1
1	5611	F611 UserFault2
2	5612	F612 UserFault3
3	5613	F613 UserFault4
4	5614	F614 UserFault5
5	5615	F615 UserFault6
6	5616	F616 UserFault7
7	5617	F617 UserFault8
8	5618	F618 UserFault9
9	5619	F619 UserFault10
,	3013	1 013 03cm adicto

	Name Text											
	Range		Default	Default Unit S			Scale/FbEq16 Volatile Change Type running					
	10	561A				F620 UserFa	ıult11					
	11	561B				F621 UserFault12						
	12	561C				F622 UserFault13						
	13	561D				F623 UserFault14						
	14	561E				F624 UserFault15						
	15	561F		F625 UserFault16								

04.26 M1 field exciter fault word

DCS800 compatible motor 1 field exciter fault word.

The bit assignments of this DCS880 word and the DCS800 word *M1FexFaultWord (9.18)* are the same.

Note: Only used when a DCS800 is modernized by a DCS880.

Bit assignment:

DCS880/DCS800 fault name
DCSLink communication
Supply voltage synchronization
Overcurrent
Fast supply voltage rise
AC supply voltage < 30 V _{AC}
AC supply voltage > 650 V _{AC}
reserved
reserved
Temperature heatsink
Parameter flash memory read
Compatibility
Auxiliary voltage
reserved
General hardware
General firmware
reserved

0000h FFFFh -	-	1 = 1	y	n	Signal
----------------	---	-------	---	---	--------

04.27 M2 field exciter fault word

DCS800 compatible motor 2 field exciter fault word.

The bit assignments of this DCS880 word and the DCS800 word *M2FexFaultWord (9.20)* are the same.

Note: Only used when a DCS800 is modernized by a DCS880.

Bit	DCS880/DCS800 fault name
0	DCS880/DCS800 fault name DCSLink communication

Index	Name											
	Text											
	Range		Default Unit		Scale/FbEq16	Volatile	Change running	Туре				
	1	Supply voltage syn	chronizatio	n								
	2	Overcurrent										
	3	Fast supply voltage										
	4	AC supply voltage	< 30 V _{AC}									
	5	AC supply voltage	> 650 V _{AC}									
	6	reserved										
	7	reserved										
	8	Temperature heats										
	9	Parameter flash me	memory read									
	10	Compatibility										
	11	Auxiliary voltage										
	12	reserved										
	13	General hardware										
	14	General firmware										
	15	reserved										
		•										
	0000	h FFFFh	-	-	1 = 1	у	n	Signal				

04.31 Warning word 1

DCS800 compatible warning word 1.

The bit assignments of this word correspond to *AlarmWord1 (9.06)* in the DCS800. Each bit can indicate several DCS880 events as listed below.

Note: Only used when a DCS800 is modernized by a DCS880.

Bit	DCS880 events correspond to following	DCS800 events
0	AFE1 Off 2 (emergency off)	A101 Off2ViaDI
1	AFE2 Off 3 (emergency stop)	A102 Off3ViaDI
2	A103 DC-breaker acknowledge	A103 DC BreakAck
3	A4B0 Bridge temperature measured, A581 Drive fan acknowledge	A104 ConvOverTemp
4	A105 Dynamic braking acknowledge	A105 DynBrakeAck
5	A491 Motor temperature 1 measured/estimated (AUX code 2)	A106 M1OverTemp
6	A491 Motor temperature 1 measured/estimated (AUX code 1)	A107 M1OverLoad
7	-	reserved
8	A492 Motor temperature 2 measured/estimated (AUX code 2)	A109 M2OverTemp
9	A492 Motor temperature 2 measured/estimated (AUX code 1)	A110 M2OverLoad
10	A111 Mains low voltage	A111 MainsLowVolt
11	-	reserved

Index	Name										
	Text										
	Range		Default	Unit	Scale	/FbEq16	Volatile	Change running	Type		
	12	A7CA DDCS controller communication, A7CB Master-follower link communication					COM8Com				
	13	A114 Armature curr	ent deviati	on		A114 Arr	mCurDev				
	14	A7E1 Speed feedba	ck device			A115 Ta	choRange				
	15	A116 Brake long fal	ling			A116 Bra	akeLongFa	alling			
	0000	h FFFFh	-	-	1 = 1		у	n	Signal		
4.32	Warr	ing word 2	1				, -	1			
	DCS800 compatible warning word 2. The bit assignments of this word correspond to <i>AlarmWord2 (9.07)</i> in the DCS800. Each bit coindicate several DCS880 events as listed below. Note: Only used when a DCS800 is modernized by a DCS880. Bit assignment:										
	Bit	DCS880 events co	respond to	followi	ng	D	CS800 ev	ents			
	0	A117 Armature current ripple					A117 ArmCurRipple				
	1	A118 Application					A118 FoundNewAppl				
	2	A118 Application					119 ApplD				
	3	A120 Overvoltage protection active					.120 Over\				
	4	AF90 Autotuning					121 Autot	uneFail			
	5	A7A1 Mechanical brake closing failed, A7A2 Mechanical brake opening failed, A7A5 Mechanical brake opening not allowed					A122 MechBrake				
	6	-				А	A123 FaultSuppres				
	7	A124 Speed scaling				А	A124 SpeedScale				
	8	A7B0 Motor speed feedback, A7B1 Load speed feedback					A125 SpeedFb				
	9	A981 A985 Exteri	nal warning	1 Exte	ernal War	ning 5 A	5 A126 ExternalDI				
	10	A8A0 AI supervisio	n			А	A127 AIRange				
	11	A7C1 FBA A communication, A7C2 FBA B communication, A7CE EFB communication					A128 FieldBusCom				
	12	-				А	129 ParRe	stored			
	13	A7EE Control panel	/PC tool lin	ık commı	unication	n A	130 Local	CmdLoss			
	14	-				А	131 ParAd	ded			
	15	A132 Parameter set	ting conflic	ct		А	.132 ParCo	nflict			
	0000	h FFFFh	-	-	1 = 1		у	n	Signal		
04.33	+	ing word 3	ı	1			1 -	1	1 - 3		
	DCS	300 compatible warn									
	can i	oit assignments of th ndicate several DCS8 : Only used when a D	80 events a	as listed l	oelow.		<i>9.08)</i> in th	e DCS800.	Each bit		

Index	Name										
	Text Rang	e	Default	Unit	Scale/FbEq16	Volatile	Change	Туре			
	Bit 0	DCS880 events o	A133 Retain A134 ParCo	DCS800 events A133 RetainInv A134 ParComp							
	3 4	- - A137 Start condit	ion conflict		A136 NoAPT	A135 ParUpDwnLoad A136 NoAPTaskTime A137 SpeedNotZero					
	5 6 7	AFE1 Off 2 (emer AFE2 Off 3 (emer A6D1 FBA A parai	gency stop)	t,	A138 Off2Fi A139 Off3Fi A140 IllgFiel	eldBus					
	8	A6D2 FBA B para - FB11 Memory uni		t	A141 COM8I A142 MemC						
	10 FB12 Memory unit incompatible, FB13 Memory unit, firmware incom FB14 Memory unit, firmware load f					A143 MemCardFail					
	11 12 13	-			A302 APWar	A301 APWarning1 A302 APWarning2 A303 APWarning3					
	14 15	-			A304 APWai	A304 APWarning4 A305 APWarning5					
	0000	h FFFFh	-	-	1 = 1	у	n Signa				
04.34	Warn DCS8 Note Bit as	ing word 4 ing word 4. 880 warning word. Conly used when a	DCS800 is m	odernized	by a DCS880.		ow.				
	Bit	DCS880 events	correspond	to followir							
	0	- -			reserved reserved						
	2	-			reserved						
	3 -				i esei veu	reserved					
	-	_			reserved						
	4	-			reserved reserved						
	4 5				reserved						
	4	- - -									
	4 5 6	- - - -			reserved reserved						
	4 5 6 7	- - - -			reserved reserved reserved						
	4 5 6 7 8	- - - - -			reserved reserved reserved reserved						

Index	Name Text											
	Range	е	Default	Unit	Sca	le/FbEq16	Volatile	Change running	Туре			
	12 -			r			reserved					
	13	-				reserved						
	14	-				reserved						
	15	-				reserved						
		•										
	0000	h FFFFh	-	1 =	1	у	n	Signal				
04.25	Haans		•	•	•		•	•	•			

04.35 User warning word

DCS800 compatible user warning word.

The bit assignments of this word correspond to *UserAlarmWord* (9.09) in the DCS800. Each bit can indicate several DCS880 events as listed below.

Notes:

- Only used when a DCS800 is modernized by a DCS880.
- User warnings can be created by the application program.

Bit assignment:

Bit	DCS880 events correspond to following	DCS800 events
0	1310	F310 UserWarning1
1	1311	F311 UserWarning2
2	1312	F312 UserWarning3
3	1313	F313 UserWarning4
4	1314	F314 UserWarning5
5	1315	F315 UserWarning6
6	1316	F316 UserWarning7
7	1317	F317 UserWarning8
8	1318	F318 UserWarning9
9	1319	F319 UserWarning10
10	131A	F320 UserWarning11
11	131B	F321 UserWarning12
12	131C	F322 UserWarning13
13	131D	F323 UserWarning14
14	131E	F324 UserWarning15
15	131F	F325 UserWarning16

04.36 M1 field exciter warning word

0000h ... FFFFh

DCS800 compatible motor 1 field exciter warning word.

The bit assignments of this DCS880 word and the DCS800 word *M1FexAlarmWord (9.17)* are the same.

1 = 1

n

Signal

Note: Only used when a DCS800 is modernized by a DCS880.

Bit	DCS880/DCS800 warning name
0	Phase missing

Index	Name												
	Text												
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
	1	Temperature he	atsink										
	2	reserved											
	3	reserved											
	4	reserved											
	5	Parameters add	led										
	6	Parameter up- c	or download fa	iled									
	7	Compatibility											
	8	Parameters rest	ored										
	9	reserved											
	10	reserved											
	11	reserved											
	12	reserved											
	13	reserved											
	14	reserved											
	15	reserved											
		•											
	0000	Dh FFFFh	-	-	1 = 1	у	n	Signal					

04.37 M2 field exciter warning word

DCS800 compatible motor 2 field exciter warning word.

The bit assignments of this DCS880 word and the DCS800 word *M2FexAlarmWord* (9.19) are the same.

Note: Only used when a DCS800 is modernized by a DCS880.

Bit	DCS880/DCS800 warning name
0	Phase missing
1	Temperature heatsink
2	reserved
3	reserved
4	reserved
5	Parameters added
6	Parameter up- or download failed
7	Compatibility
8	Parameters restored
9	reserved
10	reserved
11	reserved
12	reserved
13	reserved
14	reserved
15	Reserved

Index	Name										
	Text										
	Range	Default		Unit Scale/FbEq16		Volatile Change Ty		Туре			
	0000h FFFFh	-		-		1 = 1	у	n	Signal		

05 Diagnostics

Various run-time-type counters and measurements related to drive maintenance.

Index	Name												
	Text												
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре						
05.01	On-time counter												
	On-time counter.												
	The counter runs when	the drive is	powered.	1	1		1						
	0 65535	-	days	1 = 1 day	у	n	Signal						
05.02	Run-time counter												
	Motor run-time counter The counter runs when Word.		s in state re	eady for reference	e. See 06.15	5.b02 Main	Status						
	0 65535	-	days	1 = 1 day	у	n	Signal						
05.04	Fan on-time counter												
	Drive fan cooling run-time counter. Displays the running time of the drives cooling fan. Can be reset from the control panel by keeping Reset depressed for over 3 seconds.												
	0 65535 Control board tempera	-	days	1 = 1 day	у	n	Signal						
	Control board temperature. Measured temperature of the control board. Warning A4A0 Control board temperature measured is generated, if the measured control board temperature exceeds 75°C or 167°F. The used hysteresis is 1°. The unit is selected by 96.02 Unit selection.												
	-80.0 1000.0	-	°C or °F	1 = 1°C or °F	у	n	Signal						
05.11	Ch1 bridge temperatur	 e	I		1,3		<u>, , , , , , , , , , , , , , , , , , , </u>						
	Bridge temperature or channel1 bridge temperature. Measured bridge temperature or measured bridge temperature of the power unit connected to channel1 of the SDCS-DSL-H1x. The unit of the temperature is selected by 96.02 Unit selection. See also warning A4B0 Bridge temperature measured and fault 4310 Bridge temperature measured. -80.0 1000.0 - °C or °F 1 = 1°C or °F y n Signal												
05.12	Ch2 bridge temperatur	 e	1	1	17	1	10.3						
-	Channel2 bridge temper Measured bridge temper unit of the temperature temperature measured	Channel2 bridge temperature. Measured bridge temperature of power unit connected to channel2 of the SDCS-DSL-H1x. The unit of the temperature is selected by 96.02 Unit selection. See also warning A4B0 Bridge temperature measured and fault 4310 Bridge temperature measured.											
	-80.0 1000.0	-	°C or °F	1 = 1°C or °F	у	n	Signal						
05.13	Ch3 bridge temperatur												
	Channel3 bridge tempe	rature.											

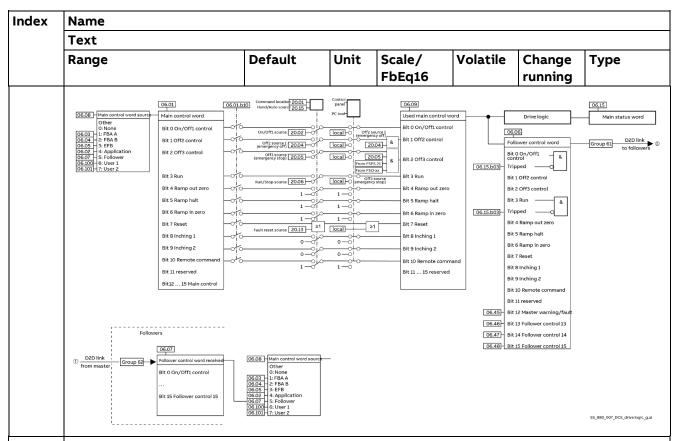
Index	Name											
	Text											
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	Measured	bridge temper	ature of t	he power	unit connected to	channel3	of the SDC	S-DSL-H1x.				
			ture is selected by 96.02 Unit selection. See also warning A4B0 Bridge and fault 4310 Bridge temperature measured.									
	-80.0 10											
05.14	Ch4 bridge temperature											
	Channel4 bridge temperature. Measured bridge temperature of the power unit connected to channel4 of the SDCS-DSL-H1x The unit of the temperature is selected by 96.02 Unit selection. See also warning A4B0 Bridge temperature measured and fault 4310 Bridge temperature measured.											
05.22	-80.0 10		-	°C or °F	1 = 1°C or °F	у	n	Signal				
00.	Diagnostic Attention: 05.22 Diagnostic is set to zero by means of Reset. Displays the diagnostics messages: Thyristor test											
		For drives size H5 H8 make sure, that 99.11 M1 nominal current is set to 50 A or higher.										
	70002	 The drive was stopped before the autotuning finished. The Run command (06.09.b03) was prematurely removed. Autotuning aborted by a fault. Repeat autotuning until successful. 										
	70003	Autotuning timeout, Run command (06.09.b03) was not set in time or is missing.										
	70004	Field current not zero.										
	70005	Armature current not zero.										
	70006	Motor is turning. No speed zero indication.										
	70007	Thyristor block test failed.										
	70008	Motor connected to ground (near terminal C).										
	70009				ar terminal D).							
	70010	Armature w	inding is r	not connec	ted (terminals C a	ınd D are c	pen).					
	70011	V11 short cir	cuit.									
	70012	V12 short cir	cuit.									
	70013	V13 short cir	cuit.									
	70014	V14 short ci	cuit.									
	70015	V15 short ci	cuit.									
	70016	V16 short ci	cuit.									
	70C11	V11 not cond	ducting.									
	70C12	V12 not cond	ducting.									
	70C13	V13 not cond										
	70C14	V14 not conducting.										
	70C15	V15 not con										
	70C16	V16 not conducting.										
	70C21	V21 not cond										
	70C22	V22 not con										

Index	Name												
	Text												
	Range		Default Unit Scale		Scale/FbEq16	Volatile	Change running	Туре					
	70C23	V23 not conducting.											
	70C24	C24 V24 not conducting.											
	70C25	V25 not cond	V25 not conducting.										
	70C26	V26 not conducting.											
	71124 V11 or V24 short circuit. 71225 V12 or V25 short circuit.												
71326 V13 or V26 short circuit.													
	71421	V14 or V21 short circuit.											
	71522	V15 or V22 short circuit.											
	71623	V16 or V23 s	hort circu	it.									
	72000	Armature wi	nding is s	hort-circuit	ed (short circuit	between t	erminals C	and D).					
	7FFFF	Thyristor tes	st finishes	successful	, power unit oka	y							
	0 65535		-	-	1 = 1	у	n	Signal					
05.41		rvice counter	•										
	Main coolin												
					percentage of its								
					ditions, and othe								
					g A8C0 Fan servio		-						
		t from the co	ntrol pan	el by keepin	g Reset depress	ed for over	3 seconds	•					
	0 150		-	%	1 = 1 %	у	n	Signal					

06 Control and status words

Drive control, status, and event words.

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Drive logic:											



06.01 Main control word

Main control word.

Displays the main control word of the drive. This signal shows the control signals as received from the selected sources, such as digital inputs, the fieldbus interfaces, and the application program. See 06.08 Main control word source.

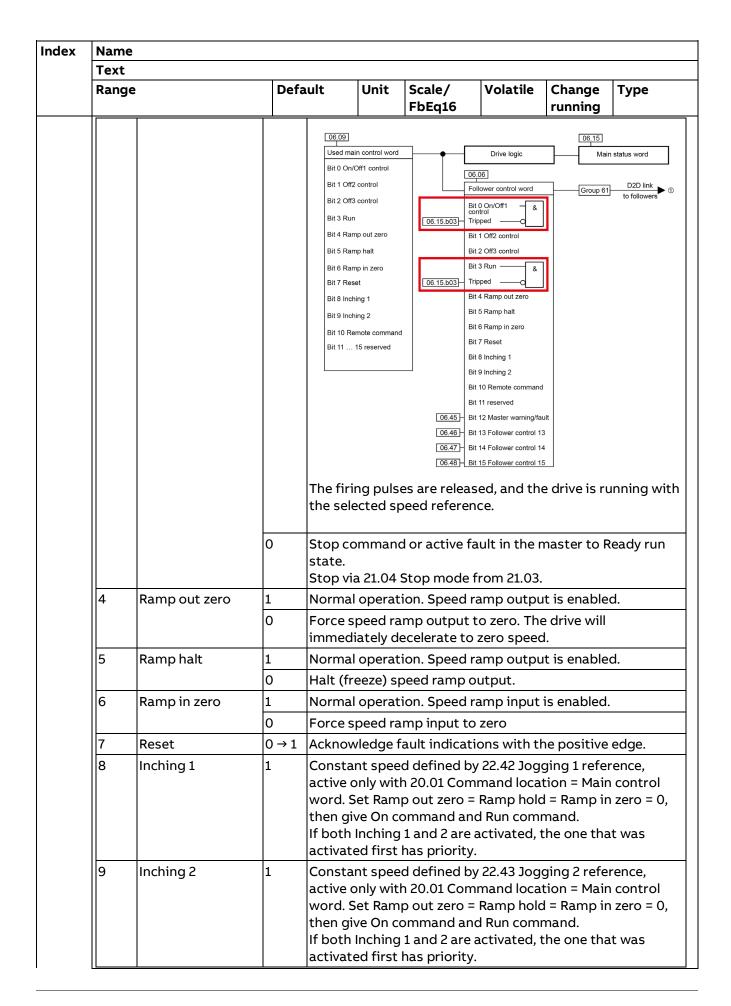
Attention: Do not write on this signal.

Bit	Name	Value	Remarks
0	On/Off1 control	0 → 1	On command to Ready run state. The On command is edgetriggered. With 20.33 Mains contactor control mode = On or DC-contactor: Contactors are closed, field exciter and fans are started. With 20.33 Mains contactor control mode = On and run: Ready run flag in 06.15 Main Status Word is forced to 1.
		0	Off1 command to Ready on state, unless other interlocks (Off2, Off3) are active. Stopping via 21.02 Off1 mode.
1	Off2 control	1	Normal operation (Off2 inactive).
		0	Off2 (emergency off/electrical disconnect/fast current off) command to Switch-on inhibited state. Stop by coasting. The firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked, the contactors are opened, field exciter and fans are stopped. Off2 control has priority over Off3 control and On/Off1 control.
2	Off3 control	1	Normal operation (Off3 inactive).
		0	Off3 (emergency stop) command to Switch-on inhibited state.

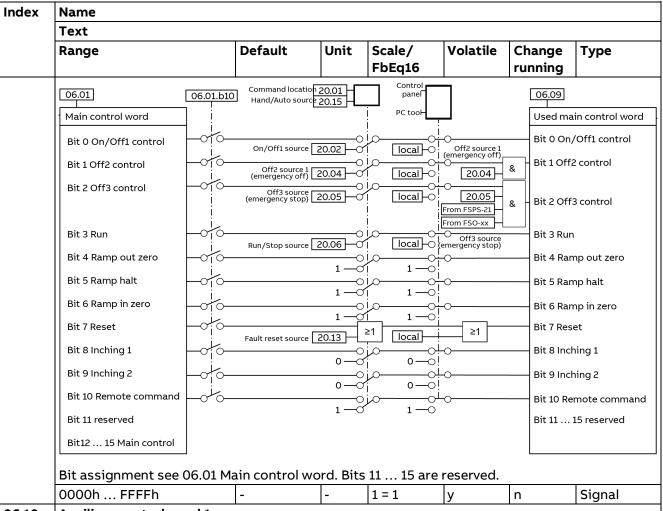
Name												
<u> </u>	ext			T								
F	Range	1		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
						Emergency iority over (•					
3	3	Run	0 → 1	Run comm	nand to R ggered. pulses a	eady for ref	erence stat	te. The Run				
			0	Stop comr Stop via 21		Ready run s mode.	tate.					
2	1	Ramp out	1	Normal op	eration.	Speed ramp	output is	enabled.				
		zero	0	Force spee		output to ze	ero. The dri	ve will imm	ediately			
Ę	5	Ramp halt	1	Normal op	eration.	Speed ramp	output is	enabled.				
			0	Halt (freeze) speed ramp output.								
6	5	Ramp in	1	Normal operation. Speed ramp input is enabled.								
		zero	0	Force spec	ed ramp	input to zer	put to zero.					
7	7	Reset	0 → 1	Acknowledge fault indications with the positive edge.								
				only with 20.01 Command location = Main control word. Se Ramp out zero = Ramp hold = Ramp in zero = 0, then give 0 command and Run command. If both Inching 1 and 2 are activated, the one that was activities that priority.								
	e e e e e e e e e e e e e e e e e e e	Inching 2	1	Constant speed defined by 22.43 Jogging 2 reference, active only with 20.01 Command location = Main control word. Set Ramp out zero = Ramp hold = Ramp in zero = 0, then give Or command and Run command. If both Inching 1 and 2 are activated, the one that was activativated first has priority.					ord. Set give On			
1	LO	Remote command	1	Enable cor Overriding to 1).		enabled (ov	erriding co	ntrol must	set this b			
			0		ol word	and referen 2 and the m						
1	l 1	reserved										
1	12	Main control	1	_	•	rogram, ap		-	_			
		12	0	control as	signal so	ource for bir	nary-source	selector p	arameters			
	L3	Main control 13	1 0									
	L4	Main control 14	1 0									
	L5	Main control	1									
Ш		1-2	0									

Index	Name											
	Text											
	Rang	е	Defa	ult	Jnit	Scale/ FbEq16	Volatile	Change running	Туре			
		12 15 can be used t ce selector paramete	-			_		source for	binary-			
	0000	h FFFFh	-	-		1 = 1	у	n	Signal			
06.02	Appli	ication control word										
		cation program cont drive control word re			pplica	tion progra	m.					
	0000	h FFFFh	0000	0h -	•	1 = 1	у	у	Parameter			
06.03	FBA A	A transparent contro	ol word									
	Displays the control word received from the PLC via fieldbus adapter A after being modified by 50.29 FBA A profile.											
	0000	h FFFFh	-	-		1 = 1	у	n	Signal			
06.04	FBA B transparent control word											
	Displays the control word received from the PLC via fieldbus adapter B after being modified by 50.59 FBA B profile.											
	0000	h FFFFh	-	-		1 = 1	у	n	Signal			
06.05	EFB transparent control word											
	Displays the unaltered control word received from the PLC via the embedded fieldbus when a											
	trans	parent communicati	ion prof	ile is selec	ted ir	58.25 Cont	rol profile.					
	0000	h FFFFh	-	-		1 = 1	у	n	Signal			
06.06	Follo	Follower control word										
	Displ contr	Follower control word to followers (master only). Displays 06.06 Follower control word send by the master, using D2D link, to 06.07 Follower control word received in all followers. Bit assignment:										
	Bit	Name	Value	Remarks								
	0	On/Off1 control	1	On comm	nand	and no activ	e fault in th	ne master t	o Ready run			

x N	Name										
T	Гext										
F	Range	Defa	ault	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
			Bit 0 On/C Bit 1 Off2 Bit 2 Off3 Bit 3 Run Bit 4 Ram Bit 5 Ram Bit 6 Ram Bit 7 Ress Bit 8 Inch Bit 9 Inch	control p out zero p halt p in zero et ing 1	06.15.b03 Tr Bi Bi 06.15.b03 Tr Bi Bi Bi Bi Bi Bi	Drive logic .06 .06 .07 .08 .09 .09 .00 .00 .00 .00 .00	06.15	D2D link to followers			
		0	Contact With 20 Ready r	tors are .33 Mair un flag i	06.45 Bi 06.46 Bi 06.47 Bi	d exciter ar r control m n Status W	node = On: nod fans are node= On a dord is forc	nd run: ed to 1.			
			state, u Stoppir	nless ot ng via 21	her interloo .02 Off1 mo	cks (Off2, O ode.		-			
	1 Off2 control	0	Off2 (er on inhik Stop by 30.45 M current are bloc fans are	mergeno pited sta coastir laximum . When t cked, the e stoppe ntrol ha	ate. ng. The firin n firing angl he armatur e contactor	current off) g angle is f le to decrea e current is s are opene	orced to the see the arm see the arm see the feed, field ex	nature iring pulses citer and			
2	2 Off3 control	1 0	Off3 (er state. Stoppir	nergend ng via 21	on (Off3 inact) stop) cor .03 Emerge s priority o	nmand to S	ode.	nhibited			
3	Run and master not tripped	1	+	nmand	and no activ			to Ready			



Index	Name											
	Text											
	Rang	je	Defa	ault	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	10	Remote command	1		_	nd: trol enabled	d (overridin	g control r	nust set			
			0	Main co		ord and ref		_	ng through bits 12 15			
	11	reserved										
	12	Master warning/fault	1			wer CW bit active in th		n.				
			0	Warnin	g/Fault	inactive in	the master	•				
	13	Follower control 13	1	See 06.	46 Follo	wer CW bit	13 selectio	n.				
			0									
	14	Follower control 14	1	See 06.	47 Follo	wer CW bit	14 selectio	n.				
			0									
	15	Follower control 15	1	See 06.	48 Follo	wer CW bit	15 selectio	n.				
			0									
	0000)h FFFFh	_		_	1 = 1	у	n	Signal			
6.07	Follo	wer control word rec	eived		_ !	· ·		· ·				
	Displ cont Bit as	wer control word recellays 06.06 Follower corol word received in alssignment see 06.06 F	ntrol v I follov	vord sen vers.	d by the	e master, us	sing D2D lin	T	T			
		Oh FFFFh	-		-	1 = 1	у	n	Signal			
06.08	Main control word source Selects the source for 06.01 Main control word. Other: source selection											
	0: No 1: FB	Other; source selection. 0: None; inactive. All bits are forced to zero. 1: FBA A; 06.03 FBA A transparent control word.										
	3: EF 4: Ap	2: FBA B ; 06.04 FBA B transparent control word. 3: EFB ; 06.05 EFB transparent control word. 4: Application ; 06.02 Application control word. 5: Follower ; 06.07 Follower control word received (follower only).										
	6: Us 7: Us	ser 1; 06.100 User cont er 2; 06.101 User cont OCS control word; 06.1	rol wo	rd 1. rd 2.								
	08		Non		-	1 = 1	n	у	Parameter			
06.09	+	l main control word			1	I	1	17				
	Disp	I main control word. lays the main control v drives local/remote co										



06.10 Auxiliary control word 1

Auxiliary control word 1.

The auxiliary control word 1 can be written to by Adaptive Program, application program or overriding control.

Bit	Name	Value	Remarks
0	Direct speed reference	1	The speed ramp output is overwritten and forced to the selection in 23.32 Direct speed reference.
		0	Speed ramp is active.
1	Drive direction	1	Drive direction reverse (see note 1), changes the signs of 24.02 Used speed feedback and 27.01 Current reference.
		0	Drive direction forward (see note 1).
2	Limit used speed reference	1	24.01 Used speed reference is limited by 30.11 M1 minimum speed, 30.12 M1 maximum speed or by 42.19 M2 minimum speed, 42.20 M2 maximum speed.
		0	24.01 Used speed reference is not limited.
3	reserved		
4	Bypass speed ramp	1	Bypass speed ramp (speed ramp output is forced to value of speed ramp input).
5	reserved		

to the							
ime.							
que n to the							
to the							
to the							
rque n to the 30.14 Speed							
Back calculation of the speed controller torque limitation. The speed controller integration time is limited by torque or current limits. See 30.02 Torque limit status.							
current and							
ım or							
source							
hanging the direction is burce for Paramete							
Tr dramete							
program or							
.03 ode stop keep the							

Index	Name											
	Text											
	Range	е		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	2	Synchroni command	_	1	OnBoar	n overriding control for or encoder 2. See 90.86 trigger) and 90.51 Load						
	3	reserved										
	4	Torque pr	oving O	K 1	Selected motor torque proving is OK. This bit set by Adaptive Program, application program overriding control. See 44.25 M1 brake torque time.							
				0		. This bit is n program						
	5	Reset tord memory	que	1		•	ory. Valid on e = 44.02 M1	-	M1 brake que memory.			
	6	reserved										
	7	Suppress current de		e 1	04.31.B		word 1. Usua	deviation is blocked. See d 1. Usually used for non-				
				0		mature cur 13 Warning	rent deviatio word 1.	on is releas	ed. See			
	8 1	.5 reserved										
		h FFFFh		0000h	-	1 = 1	у	у	Parameter			
06.14	Selection of the select	ted motor ted (currently t tor 1; motor 1 tor 2; motor 2	selected	l .	-2.01 Moto	or 1/2 selec	tion.					
	0 1			-	-	1 = 1	у	n	Signal			
06.15	Main Displa	status word status word. ays the main si signment:	tatus wo	ord of the o	drive.							
	Bit	Name	Value	Remarks	;							
	0	Ready on	1		be switc							
			0	Not read	ly to be sv	vitched on.						
	1	Ready run	1		operate.							
			0			ate e.g., Off						
	2	Ready	1			d (drive is ru	unning).					
		reference	0	Operation	on inhibite	ed.						
	3	Tripped	1	Fault.								
			0	No fault.								
	4	Off2 inactive	1	Off2 inac	ctive.							

Index	Name	•											
	Text			1			r			_			
	Rang	e		Defa	Default Unit Scale/ Volatile Change Type running								
			0		2 (emerg	-	ncy off/fast current off) active, Switch-on						
	5	Off3 inactive	1	Off	Off3 inactive.								
			0	Off3	Off3 (emergency stop) active, Switch-on inhibited state.								
	6	Switch-on inhibited	1	- ! - !	Fault. Off2 (em Off3 (em Switch-c (emerge	nergenc nergenc on inhib ncy off	I state is act y off/fast c y stop) activ ited via digi), 20.08 Off2 ce (emerger	urrent off) ve. tal input 20 ! source 2 (0.04 Off2 s				
			0	Swi	Switch-on inhibited state inactive.								
	7	Warning	1	War	ning.								
			0	No۱	warning.								
	8	At setpoint	1	with	nin the to	oleranc	oack value e e limits. See teresis feec	46.21 At sp					
			0	it is	Setpoint: The feedback value differs from the reference. Means it is outside the tolerance limits. See 46.21 At speed hysteresis and 46.23 At torque hysteresis feedback.								
	9	Remote	Driv	e contro	l locati	on: Remote.							
			0	Drive control location: Local.									
	10	Above level	1	Spe 46.3 bot	1 Above n rotatio	rque fee speed on direc	edback equa level or 46.3 tions.						
			0	Within speed or torque levels.									
	11	Status control 11	0	See	06.30 M	SW bit	11 sel.						
	12	Status control 12	1 0	See	06.31 M	SW bit :	l2 sel.						
	13	Status control 13	1 0	1 See 06.32 MSW bit 13 sel.									
	14	Status control 14	1 0	See	06.33 M	SW bit	14 sel.						
	15	reserved											
	0000	h FFFFh		- -		_	1 = 1	у	n	Signal			
06.16		status word 1		1		1	<u> - </u>	17	1:-	12.9			
-	Drive Displ	status word 1. ays the drive st ssignment:	atus w	ord 1.									
	Bit	Name	Va	lue	Remark	(S							

ndex	Name												
	Text												
	Rang	е		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0	Tripped	1	Drive is	tripped	l. A fault is a	ctive.						
	1	Inhibited	1	06.20 R	Start inhibited. See 06.19 Drive inhibit status word 2 and 06.20 Run inhibit status word for the source of the inhibiting signal.								
	2	Enabled	1	inactive	20.08 Off2 source 2 (emergency off) is set to 1 = Off2 inactive. This bit is not affected by the presence of a fault.								
	3	Ready on	1	Drive is	ready t	o receive an	On comm	and.					
	4	Ready run	1	Drive is	ready t	o receive a I	Run comm	and.					
	5	Ready reference	1	Drive is	ready t	o receive a r	eference (drive is run	ning).				
	6	Stopping	1	Drive is	stoppi	ng.							
	7	Off	1	Drive is	off.								
	8	Off2	1	Off2 (er inhibite	_	•	f/fast current off) active, Switch-on						
	9	Off3	Off3 (er	mergen	cy stop) act	ive, Switch	on inhibit	ed state.					
	10	On requested	1	An On c	ommar	nd was giver	١.						
	11	Run requested	A Run command was given.										
	12	Limiting	1	-	_	limit (speed nd 30.02 Tor	•		e. See 30.01				
	13	Field current	1	Drive is	genera	ting field cu	rrent.						
	14	Local control	1	Drive is	Drive is in local control.								
	15 Network control 1			on the C DeviceN using th Drive Pr the follo - FDN (3AI - FEN	Drive is in network control. With fieldbus protocols based on the Common Industrial Protocol (CIPTM), such as DeviceNet and Ethernet/IP, denotes the control of the drive using the Net Ctrl and Net Ref objects of the ODVA AC/DC Drive Profile. For more information, see www.odva.org , and the following manuals: - FDNA-01 DeviceNet adapter module User's manual (3AFE68573360). - FENA-01/-11 Ethernet adapter module User's manual (3AUA0000093568).								
			1	107.1		<u> </u>							
	0000	h FFFFh		-	_	1 = 1	у	n	Signal				
5.17	Drive	status word 2											
	Displ	status word 2. ays the drive status ssignment:	s wo	rd 2.									

Bit	Name	Value	Remarks
0	Autotuning	1	The requested autotuning has been finished.
1	reserved		
2	Torque control	1	Torque control mode active. See 19.01 Actual operation mode.

ndex	Name	e										
	Text											
	Rang	e	Default	t	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	3	Speed control	1	Spee		rol mode a	ctive. See 19	.01 Actual	operation			
	4	Current control	1		ent con	trol mode	active. See 1	19.01 Actua	l operation			
	5	Safe reference	1	A saf	e spee ence sa munica	afe and fun	e is active. S ctions such ction and 50	as 49.05				
	6	Last speed	1	A last speed reference is active. See functions such 49.05 Communication loss action and 50.02 FBA A comm loss func.								
	7	Loss of reference	1	Refer	ence s	ignal lost.						
	8	Emergency stop failed	1	Emergency stop failed. See 31.31 Emergency ram supervision and 31.32 Emergency ramp supervisidelay. Jogging is enabled. See 20.25 Jogging enable.								
	9	Jogging	1	Jogg	ing is e	enabled. Se	e 20.25 Jog	ogging enable.				
	10	Above level	1	Speed or torque feedback equals or exceeds level defined by 46.31 Above speed level or 46.33 Above torque level. Valid in both rotation directions. An emergency stop command signal is active or drive is stopping after receiving an emergency stop command.					3 Above			
	11	Emergency stop	1									
	12	reserved										
	13	reserved										
	14	Ramp stop failed	1	-	-		31.33 Ramp vision delay		vision and			
	15	reserved										
			-			1	1	1	1			
		h FFFFh	-		-	1 = 1	у	n	Signal			
6.18	Drive Displ	status word 3 status word 3. ays the drive status v ssignment:	vord 3.									
	Bit	Name	Value	Rema	arks							
	0	M1 field exciter	1	Moto	r 1 field	d exciter ac	knowledge	d.				
	1	M2 field exciter	1	Motor 2 field exciter acknowledged.								
	2	M1 field heating	1	Motor 1 field heating is active. See 28.36 Field heating source.								
				sourc	ce.							
	3	M2 field heating	1		r 2 fiel	d heating is	s active. See	e 42.53 Field	d heating			
	3	_	1	Moto	or 2 fiel ce.		s active. See er 1 are acti		d heating			

Name												
1	Гext											
F	Range		Default	:	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	6	User set 1	1	User parameter set 1 active. See 96.22 User set save/load.								
•	7	User set 2	1	User save/	-	eter set 2 a	active. See 9	6.22 User s	et			
1	8	User set 3	1	User parameter set 3 active. See 96.22 User set save/load.								
9	9	User set 4	1		param ′load.	eter set 4 a	active. See 9	6.22 User s	et			
	10	Auto-reclosing	1	Auto-reclosing logic is active. See 31.51 Mains loss mode.								
	11	Drive direction reverse	1			ve directior ntrol word	n active. Cor 1.	ntrolled by	06.10.b01			
	12	Tripped/Warning	1	Fault	or war	ning active	ning active.					
	13	Change current direction	1			-	he directior eover is acti		nature			
	14	Zero current	1	Arma	ture cu	urrent is ze	ro.					
			0	Arma	ture cu	urrent not a	zero.					
	15	reserved										

06.19 Drive inhibit status word 2

Drive inhibit status word 2.

The drive inhibit status word 2 specifies the source of the inhibiting signal that is preventing the drive from starting. See 06.16.b01 Drive status word 1 and 06.20 Run inhibit status word. Bit assignment:

Bit	Name	Value	Remarks
0	Follower	1	A follower is preventing the master from starting (master only).
1	Application	1	The application program is preventing the drive from starting.
2	Auxiliary power failure	1	Auxiliary power failure is preventing the drive from starting.
3	Encoder feedback	1	The encoder feedback configuration is preventing the drive from starting.
4	Reference source parametrization	1	A reference source parametrization conflict is preventing the drive from starting. See warning A6DA Reference source parametrization.
5	Speed not zero	1	Re-start of the drive is not possible, see also A137 Start condition conflict. Speed zero has not been reached. See 21.08 M1 zero speed level. Set On = Run = 0 (this includes jogging and inching) and check if the actual speed is within the zero-speed level. This warning is valid:

Index	Name												
	Text												
	Rang	e	Default	t Uni	t Scale/ FbEq16	Volatile	Change running	Туре					
	6	Re-start not possible	1	Stai - For off) - For com - Evel Check: - The Stai - The	 For a normal stop. Off1 command in case of 21.01 Start mode = Start from zero. For a coast stop. Off2 (emergency off/fast current off) command. For an emergency stop. Off3 (emergency stop) command. Even if the drive power is cycled. Check: The settings of 21.08 M1 zero speed level, 21.01 Start mode and 90.41 M1 feedback selection. The function of the used speed feedback devices (tacho/encoder). Re-start of the drive is not possible, see also A137 Star 								
				inch Use In co the inclu timi E.g. Afte still	 Either On and/or Run (this includes jogging and inching) command has been set wrong. See 06.09 Used main control word. In case of a wrong setting of either the On and/or the Run command, make sure, On = Run = 0 (this includes jogging and inching). Additionally, the timing of the commands must be checked. E.g.: After a fault reset and On and/or Run command is still high. A warning of warning level 1 is pending. 								
	7 1	.5 reserved											
	0000	h FFFFh	-	-	1 = 1	у	n	Signal					
06.20	Run i	nhibit status wor	d		•	•	•	•					
	The R drive cycle See 0	nhibit status word dun inhibit status from starting. Th d. In all other insta 6.16.b01 Drive sta ssignment:	word specifie e conditions I ances, the inh	marked wi ibiting co	th an asteris ndition must	k (*) require be removed	that the Oil first.	_					
	Bit	Name	Value	Remarks									
	0	Not ready run	1	Drive parar	ng is enable has not bee neters in gro r data.	n parametriz	ed correctl	y. Check the					
	1	Control location changed	1 *1	1 Control location has changed.									
	2	Firmware inhibi	t 1		orogram is ke ernal firmwar		in inhibited	state. See					
	3	Fault reset	*1	A fault has been reset.									

···	•										
Ran	ge	Defaul	t	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
4	Off2 from source 2	1			ource 2 (em emergency c			0 = Off2			
5	reserved			Operation prevented by FSO-21 safety functions module.							
6	FSO inhibit	1									
7	STO	1	Safe torque off active.								
8	8 Off2 from source 1				ource 1 (ememergency o			0 = Off2			
9	Autotuning finished	1 1	The r	equest	ed autotuni	ng has bee	n finished.				
10	Off3 stop mode 0	1			emergency ency stop m		g coast sto	p. See			
11	Off3 stop mode 1	1			emergency stop mode.	stop) using	g ramp sto	p. See 21.0			
12	Off3 stop mode 2	1			emergency 03 Emerger		-	cy ramp			
13	Off3 stop mode 3	1			emergency ency stop m		g torque lir	nit. See			
14	Off3 stop mode 4	1	Off3 active (emergency stop) using dynamic braking. See 21.03 Emergency stop mode.								
15	15 Jogging active		The jogging enable signal is inhibiting the operation. See 20.25 Jogging enable.								
000	Oh FFFFh	-		-	1 = 1	у	n	Signal			
Spe	ed control status word	k									
Disp	ed control status word plays the speed control assignment:	status w	ord of	the dri							
0	Name Zara speed	1	aiut	_	s running in	+ho =======	nood lavel	araa Tha			
	Zero speed			absolution absolution absolution as researched 42.21 Fixeros Since	ite value of s mained belo M2 zero spec peed delay, : is bit is not ntrol is enak	90.01 Moto bw 21.08 M ed level for 42.22 M2 zo updated w bled by 44.0	or speed fo 1 zero speed longer that ero speed of then mecha 06 M1 brak	r control ed level, in 21.09 M1 delay. inical brake			

Index

Name Text

Word.

< 21.08 or 42.21.

(-1) • 21.08 or (-1) • 42.21.

During a ramp stop when the drive is running forward, the delay count runs whenever 90.01

During a ramp stop when the drive is running reverse, the delay count runs whenever 90.01 >

F	Text Range		ı							
	Range	1						1	1	
			Defa	ult	Unit	Scale/ FbEq16	Volatile	Change running	Туре	
	1	Forward		1			42.21, thus t ero speed le		running	
	2 Reverse		1		90.01 < (-1) • 21.08 or (-1) • 42.21, thus the drive running reverse below zero speed level.					
	3 Out of window			1	Speed error window control is active, and the speed error is out of the window. See 24.41 Speed error window control enable.					
	4	EMF speed feedb	oack	1	EMF speed feedback active. See 90.41 M1 feedback selection, 42.20 M2 feedback selection or 31.35 Motor feedback fault in case the selecte OnBoard tacho/encoder has faulted.					
	5 OnBoard tacho speed feedback			0	OnBo feedb		Encoder is ι	ised for sp	eed	
				1		edback sel	speed feedb ection, 42.20			
			0	OnBoard tacho faulted or not selected as source of speed feedback. See 90.41 M1 feedback selection, 42.20 M2 feedback selection or 31.35 Motor feedback fault.						
	6	OnBoard encode speed feedback	r	1	OnBoard encoder speed feedback active. See 90.41 M1 feedback selection, 42.20 M2 feedback selection.					
				0	OnBoard encoder faulted or not selected as source of speed feedback. See 90.41 M1 feedba selection, 42.20 M2 feedback selection or 31.35 Motor feedback fault.					
-	7	Encoder 1 speed feedback		1	Encoder 1 speed feedback active. See 90.41 M1 feedback selection, 42.20 M2 feedback selection					
				0	Encoder 1 faulted or not selected as source of speed feedback. See 90.41 M1 feedback selection 42.20 M2 feedback selection or 31.35 Motor feedback fault.					
	8	Encoder 2 speed feedback		1			l feedback a ion, 42.20 Mi			
	recasaek			0	speed 42.20	l feedback	d or not sele . See 90.41 N .ck selection	11 feedbacl	k selection	
	9	Any constant spe	eed	1			d has been s		ee 06.22	
	10	reserved		1		<u>-</u>				
−I⊢	11	reserved		1						
I I E	 12 15	reserved								

Index Name Text Range Default Unit Scale/ Volatile Change running Type

06.22 Constant speed status word

Constant speed status word.

Indicates which constant speed is active, if any. See 06.21.b09 Speed control status word. Bit assignment:

Bit	Name	Value	Remarks
0	Constant speed 1	1	Constant speed 1 active.
1	Constant speed 2	1	Constant speed 2 active.
2	Constant speed 3	1	Constant speed 3 active.
3	Constant speed 4	1	Constant speed 4 active.
4	Constant speed 5	1	Constant speed 5 active.
5	Constant speed 6	1	Constant speed 6 active.
6	Constant speed 7	1	Constant speed 7 active.
7 15	reserved		

0000h ... FFFFh - 1 = 1 y n Signal

06.24 Current controller status word 1

Current controller status word 1.

Displays the current controller status word 1 of the drive.

Bit	Name	Value	Remarks
0	Fans	1	Fans On command for drive and motor fans.
		0	Fans Off command for drive and motor fans.
1	reserved		
2	reserved		
3	Field heating	1	Active.
		0	Inactive.
4	Field current	1	Reverse (negative field current).
	direction	0	Forward (positive field current).
5	Field exciter	1	Field exciter On command.
		0	Field exciter Off command.
6	Dynamic braking	1	Dynamic braking active/started.
		0	Dynamic braking inactive.
7	Mains contactor	1	Mains contactor Close command (see note).
		0	Mains contactor Open command (see note).
8	Dynamic braking contactor	1	Dynamic braking contactor close command. Close the contactor for the dynamic braking resistor. Armature current must be zero.
		0	Dynamic braking contactor open command. Open the contactor for the dynamic braking resistor.
9	Energy flow	1	Drive is generating.

Index	Name											
	Text											
	Rang	ge	Def	fault	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
			0	Drive	is moto	oring.						
	10	US style DC-	1	US st	tyle char	ngeover DC-	contactor o	close comm	nand. Close			
		contactor		the D	C-conta	actor and op	en the resi	stor contac	ctor.			
			0	the D	C-conta	ngeover DC- actor and clo troller status word 1 troller status word 1	ose the resi	•	ctor.			
	11	Firing pulses	1	Firin	g pulses	active (on).						
			0	Firin	g pulses	inactive (bl	ocked).					
	12	Continuous	1	Cont	inuous a	armature cu	rrent.					
		current	0	Disco	ontinuou	ıs armature	current.					
	13	Zero current+ reversal delay	1			detection p						
			0			rent not ze			,			
	14	DC-breaker trip (continuous)	1	DC-b	reaker t	rip commar	nd (continu	ous signal).				
	15	DC-breaker trip (pulse)	1	DC-b	reaker t	rip commar	nd (1 s pulse	2).				
06.25	Curr Disp is Of The	ent controller status ent controller status clays the current cont <. firing angle is forced ssignment:	word 2 roller s	tatus wo								
	Bit	Name	Value	Remark	(S							
	0	Armature overcurrent	1	2310 Ar	mature	overcurrent	· ·					
	1	Mains overvoltage	1	F513 M	ains ove	rvoltage.						
	2	Mains undervoltage	1			voltage. voltage.						
	3	EMF reduction	1	3280 Mains low voltage. A104 Reversal volt function or F504 Revers See 31.60 Reversal volt function. Waiting for the reduction of the EMF to may voltage. See 27.42 Reversal volt margin.								
	4	Bridge reversal	1	F533 12 F534 12 F557 Re								
	5	12-pulse partner blocked/OVP active	1	Operat 1 = Bloc - 12-p	ion mod ked by p oulse par	protection e = Large fi partner, who rallel master rallel slave.	eld exciter. en 99.06 Op		, when 99.06 ode =			

(N	ame										
Te	ext										
Ra	ange		Default	Unit	nit Scale/ FbEq16	Volatile	Change running	Type			
			12-pt6-pu6-puSeria	ulse ser Ise seria Ise seria Il seque Il seque	ial master. ial slave. al master. al slave. ntial master ntial slave.						
6	M1 field exciter self-test	0			citer not OK citer self-tes						
7	M1 field exciter ready	1			citer ready lo	ost.					
8	M2 field exciter self-test	1	F530 M2	2 field exciter not OK. 2 field exciter self-test OK.							
9	M2 field exciter ready	1 0	F538 M2	field ex	citer ready l						
10) Waiting for zero current	1									
11	. Field reversal	1	Field rev	ersal ac	tive.						
		0	Field rev	Field reversal inactive.							
12											
13	PLL deviation leve	1 1	PLL devi	ation le							
		0	Below PI	_L devia	tion level. Se	ee 95.44 PL	L deviatio	n level.			
14		1			chronization	lost.					
	synchronization	0	Mains sy								
15	Current controller	1	Disabled, the current controller is disabled and 27.02 Used current reference is forced to zero. Is set, if any of the bits in 06.25 Current controller status word 2 or 27.90 Current control fault word is set.								
		0	Enabled	•							
					1	1	T	T			
00	000h FFFFh	1.	-	-	1 = 1	У	n	Signal			

06.26 M1 field exciter status word

Motor 1 field exciter status word.

Displays motor 1 field exciter status word of the drive.

Bit	Name	Value	Remarks
0	None	1	No field exciter connected.
1	ОК	1	Field exciter and communication to armature drive OK.
2	Communication failed	1	F516 M1 field exciter communication. See 04.21.b15 Fault word 1.

Index	Name														
	Text														
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре							
			0	Commu	nication to a	armature dr	rive OK.								
	3	Field exciter self- test failed	1	word 2.	field excite		ee 04.22.b1	2 Fault							
			0		citer self-tes										
	4	Field exciter ready lost	1	word 3.	field excite		. See 04.23	.b04 Fault							
			0	Motor 1	field exciter	ready.									
	5	Field exciter undercurrent	1	F541 M1 word 3.	field exciter	r low currer	nt. See 04.2	3.b08 Fault							
	6	Field exciter overcurrent	1	F515 M1 word 1.	field exciter	overcurrer	nt. See 04.2	21.b14 Fault							
	7	Wrong setting	1		etting of 99. 2 used field			er type and							
	8 15	reserved													
	0000h .	FFFFh	-	-	1 = 1	у	n	Signal							
	M2 field	exciter status word													
06.27	Motor 2	field exciter status v motor 1 field excite	word.	ord of the	drive.										
06.27	Motor 2 Displays	field exciter status v motor 1 field excite	word.	vord of the											
06.27	Motor 2 Displays Bit assig	field exciter status v motor 1 field excite gnment:	word. r status w	Remarks		nected.									
06.27	Motor 2 Displays Bit assig	field exciter status v s motor 1 field excite gnment:	vord. r status w Value	Remarks No field	5		on to armat	ture drive							
06.27	Motor 2 Displays Bit assig	field exciter status von motor 1 field excite gnment: Name None	vord. r status w Value	Remarks No field Field exc OK.	exciter conr citer and cor field excite	mmunicatio									
06.27	Motor 2 Displays Bit assig Bit 0	field exciter status voice motor 1 field excite gament: Name None OK Communication	vord. r status w Value 1 1	Remarks No field Field exc OK. F519 M2 Fault wc	exciter conr citer and cor field excite	mmunication	cation. See								
06.27	Motor 2 Displays Bit assig Bit 0	field exciter status voice motor 1 field excite gament: Name None OK Communication	vord. r status w Value 1 1	Remarks No field Field exc OK. F519 M2 Fault wo	exciter conr citer and cor field exciter ord 2.	mmunication r communion armature dr	cation. See rive OK.	04.22.b02							
06.27	Motor 2 Displays Bit assig Bit 0	field exciter status vs motor 1 field excite gament: Name None OK Communication failed Field exciter self-	vord. r status w Value 1 1 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2.	exciter conr citer and cor field exciter ord 2. nication to a	mmunication r communion armature dr r not OK. So	cation. See rive OK.	04.22.b02							
06.27	Motor 2 Displays Bit assig Bit 0	field exciter status vs motor 1 field excite gament: Name None OK Communication failed Field exciter self-	Value 1 1 0 1	Remarks No field Field exc OK. F519 M2 Fault wc Commun F530 M2 word 2. Field exc	exciter conr citer and cor field exciter ord 2. nication to a	r communication r communication armature drawn of OK. See to OK.	cation. See rive OK. ee 04.22.b1	04.22.b02 3 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1	field exciter status variation failed Field exciter status variation failed Field exciter selftest failed Field exciter ready	Value 1 1 0 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3.	exciter conr citer and cor field exciter ord 2. nication to a field excite	r communication r communication armature drawn of OK. So st OK.	cation. See rive OK. ee 04.22.b1	04.22.b02 3 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1	field exciter status variation failed Field exciter status variation failed Field exciter selftest failed Field exciter ready	Value 1 1 0 1 0 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3. Motor 2	exciter conrecter and corrected exciter and corrected exciter and corrected exciter and exciter self-test field exciter field exciter field exciter and exciter field exciter	r communication r communication r communication r not OK. See to OK. r ready lost ready.	cation. See rive OK. ee 04.22.b1	04.22.b02 3 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1 2	field exciter status variation failed Field exciter selftest failed Field exciter ready lost Field exciter	Value 1 1 0 1 0 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3. Motor 2 F542 M2 word 3.	exciter conrecter and corrected exciter and corrected exciter or d 2. Inication to a refield excite exciter self-test field exciter	r communication r communication r not OK. So st OK. r ready lost ready. r low currer	cation. See rive OK. ee 04.22.b1 c. See 04.23 nt. See 04.2	04.22.b02 3 Fault 5.b05 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1 2 3	field exciter status various motor 1 field exciter griment: Name None OK Communication failed Field exciter selftest failed Field exciter ready lost Field exciter undercurrent Field exciter	Value 1 1 0 1 0 1 1 0 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3. Motor 2 F542 M2 word 3. F518 M2 word 2. Check se	exciter conrecter and corrected exciter and corrected exciter or d 2. Inication to a refield excite exciter self-test field exciter	r communication r communication r communication r not OK. So st OK. r ready lost r ready. r low currer r overcurrer	cation. See rive OK. ee 04.22.b1 c. See 04.23 nt. See 04.2	04.22.b02 3 Fault 3.b05 Fault 23.b09 Fault 22.b01 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1 2 3	Field exciter self- test failed Field exciter self- test failed Field exciter ready lost Field exciter undercurrent Field exciter overcurrent	Value 1 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3. Motor 2 F542 M2 word 3. F518 M2 word 2. Check se	exciter conrecter and corrected exciter and corrected exciter or d 2. Inication to a effect exciter self-test field exciter field exciter field exciter exciter field exciter exciter exciter field ex	r communication r communication r communication r not OK. So st OK. r ready lost r ready. r low currer r overcurrer	cation. See rive OK. ee 04.22.b1 c. See 04.23 nt. See 04.2	04.22.b02 3 Fault 3.b05 Fault 23.b09 Fault 22.b01 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1 2 3 4 5 6 7	Field exciter self- test failed Field exciter self- test failed Field exciter ready lost Field exciter undercurrent Field exciter overcurrent Wrong setting	Value 1 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3. Motor 2 F542 M2 word 3. F518 M2 word 2. Check se	exciter conrecter and corrected exciter and corrected exciter or d 2. Inication to a effect exciter self-test field exciter field exciter field exciter exciter field exciter exciter exciter field ex	r communication r communication r communication r not OK. So st OK. r ready lost r ready. r low currer r overcurrer	cation. See rive OK. ee 04.22.b1 c. See 04.23 nt. See 04.2	04.22.b02 3 Fault 3.b05 Fault 23.b09 Fault 22.b01 Fault							
06.27	Motor 2 Displays Bit assig Bit 0 1 2 3 4 5 6 7 8 15	Field exciter self- test failed Field exciter self- test failed Field exciter ready lost Field exciter undercurrent Field exciter overcurrent Wrong setting	Value 1 1 0 1 0 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Remarks No field Field exc OK. F519 M2 Fault wo Commun F530 M2 word 2. Field exc F538 M2 word 3. Motor 2 F542 M2 word 3. F518 M2 word 2. Check se	exciter conrecter and corrected exciter and corrected exciter or d 2. Inication to a effect exciter self-test field exciter field exciter field exciter exciter field exciter exciter exciter field ex	r communication r communication r communication r not OK. So st OK. r ready lost r ready. r low currer r overcurrer	cation. See rive OK. ee 04.22.b1 c. See 04.23 nt. See 04.2	04.22.b02 3 Fault 3.b05 Fault 23.b09 Fault 22.b01 Fault							

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Binary source for m	ain status word bit 1	0 (Above	e level).	•	•					
	Selects a binary sou	ırce whose status is t	ransmit	ted as 06.15	5.b10 Main s	status wor	d.				
	Other [bit]; source	selection.									
	0: False ;										
	1: True;										
		06.17.b10 Drive status					Т				
	0 2	Above level	-	1 = 1	n	У	Parameter				
06.30	MSW bit 11 sel										
	_	ain status word bit 1									
	_	ırce whose status is t	ransmit	tted as 06.15	5.b11 Main s	status word	d.				
	Other [bit]; source	selection.									
	0: False ;										
	1: True ; 0 1	Falar		Ta _ a	1		D				
		False	<u></u> -	1 = 1	n	У	Parameter				
06.31	MSW bit 12 sel										
	_	ain status word bit 1									
	_	ırce whose status is t	ransmit	tted as 06.15	b.b12 Main s	status word	d.				
	Other [bit]; source	selection.									
	0: False; 1: True;										
	· · · · · · · · · · · · · · · · · · ·	False		1 = 1	1	1	D				
06.00	01	Faise	-	1 = 1	n	у	Parameter				
06.32	MSW bit 13 sel										
	_	ain status word bit 1									
	Selects a binary source whose status is transmitted as 06.15.b13 Main status word. Other [bit] ; source selection.										
	0: False;	selection.									
	1: True;										
	0 1	False	T_	1 = 1	n	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Parameter				
06.33	MSW bit 14 sel	raise		1-1		У	Parameter				
06.33			4 (6)	. 1-1-4							
	_	ain status word bit 1					_1				
	Other [bit]; source	irce whose status is t	ransiiii	ited as 06.13	o.D14 Main s	status word	J.				
	0: False;	selection.									
	1: True;										
	0 1	False	1_	1 = 1	n	у	Parameter				
06.45	Follower CW bit 12			1	' '	J	rarameter				
00.43		ollower control word I	ni+ 12 /M	lactor warni	na /fault) (n	nactor only	<u> </u>				
		irce whose status is t									
	followers.	irce whose status is t	.1 α11311110	1100 03 00.0	O.DIL I OIIOV	ver control	word to an				
	Other [bit]; source	selection.									
	0: False;										
	1: True;										
	2: Follower control	12 ; see 06.06.b12 Fol	lower co	ontrol word.							
	2: Follower control 12 ; see 06.06.b12 Follower control word. 3: Follower control 13 : see 06.06.b13 Follower control word.										
	3: Follower control 13 ; see 06.06.b13 Follower control word. 4: Follower control 14 ; see 06.06.b14 Follower control word.										
		•									
	4: Follower control 5: Follower control	•	lower co	ontrol word. ontrol word.							

06.46	Selects a binary source followers. Other [bit]; source select 0: False; 1: True;	er control word l whose status is t	oit 13 (M		Volatile	Change running	Type Parameter									
06.46	Follower CW bit 13 sele Binary source for follow Selects a binary source followers. Other [bit]; source select 0: False; 1: True;	Master warning/fa ult ction er control word l whose status is t	- pit 13 (M	FbEq16 1 = 1 ain control		running										
06.46	Follower CW bit 13 sele Binary source for follow Selects a binary source followers. Other [bit]; source select 0: False; 1: True;	warning/fa ult ction er control word l whose status is t	oit 13 (M	ain control	n	У	Parameter									
	Binary source for follow Selects a binary source followers. Other [bit]; source select 0: False; 1: True;	er control word l whose status is t														
	Selects a binary source followers. Other [bit]; source select 0: False; 1: True;	whose status is t														
	c: Follower Control 12: S	ee 06.06.b12 Fol	lower co		Binary source for follower control word bit 13 (Main control 13) (master only). Selects a binary source whose status is transmitted as 06.06.b13 Follower control word to all followers. Other [bit]; source selection. 0: False; 1: True;											
	-															
	3: Follower control 13 ; see 06.06.b13 Follower control word. 4: Follower control 14 ; see 06.06.b14 Follower control word.															
	5: Follower control 15; s															
	0 5	Follower control 13	-	1 = 1	n	У	Parameter									
06.47	Follower CW bit 14 sele	ction		- !	- 1		•									
	1: True; 2: Follower control 12; see 06.06.b12 Follower control word. 3: Follower control 13; see 06.06.b13 Follower control word. 4: Follower control 14; see 06.06.b14 Follower control word. 5: Follower control 15; see 06.06.b15 Follower control word.															
	0 5	Follower control 14	-	1 = 1	n	У	Parameter									
06.48	Follower CW bit 15 sele	ction		·	-	•	4									
	Binary source for follow Selects a binary source of followers. Other [bit]; source select 0: False; 1: True; 2: Follower control 12; s 3: Follower control 13; s 4: Follower control 14; s 5: Follower control 15; s	whose status is to etion. ee 06.06.b12 Fol ee 06.06.b13 Fol ee 06.06.b14 Fo	lower co lower co	entrol word. ontrol word. ontrol word.	6.b15 Follov		word to all									
-	0 5	Follower control 15	-	1 = 1	n	у	Parameter									
06.50	User status word 1	2011110113				1	1									
	User defined status wor This word displays the s Bit assignment:		ary sour	ces selected	d by parame	ters 06.60	06.75.									
1	Bit Name	Remarks														

Index													
	Text												
	Rang	je	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	0	User status bit 0	Status of so	urce sel	lected by 06	.60 User st	atus word	1 bit 0 sel.					
	1	User status bit 1	Status of so	urce sel	lected by 06	.61 User sta	atus word :	1 bit 1 sel.					
	2	User status bit 2	Status of so	Status of source selected by 06.62 User status word 1 bit 2 sel.									
	3	User status bit 3	Status of so	Status of source selected by 06.63 User status word 1 bit 3 sel.									
	4	User status bit 4	Status of so	urce sel	lected by 06	.64 User st	atus word	1 bit 4 sel.					
	5	User status bit 5	Status of so	urce sel	lected by 06	.65 User st	atus word	1 bit 5 sel.					
	6	User status bit 6	Status of so	urce sel	lected by 06	.66 User st	atus word	1 bit 6 sel.					
	7	User status bit 7	Status of so	urce sel	ected by 06	.67 User st	atus word	1 bit 7 sel.					
	8	User status bit 8	Status of so	urce se	lected by 06	.68 User st	atus word	1 bit 8 sel.					
	9	User status bit 9	Status of so	urce se	lected by 06	.69 User st	atus word	1 bit 9 sel.					
	10												
	11												
	12	User status bit 12	Status of so										
	13	User status bit 13	Status of so										
	14	User status bit 14	Status of so										
	User status bit 15 Status of source selected by 06.75 User status word 1 bit 15 sel.												
	0000	Oh FFFFh	-	-	1 = 1	у	n	Signal					
6.60	0000n FFFF												
	Binary source for bit 0. Selects a binary source whose status is shown as 06.50.b00 User Status Word 1.												
				nown as	6 06.50.b00	User Statu	s Word 1.						
	Othe 0: Fa	er [bit]; source selection	on.										
	1: Tr	•											
	0	· ·	False	-	1 = 1	n	у	Paramete					
6.61	+	status word 1 bit 1 se				1)	- aramete					
	Bina	ry source for bit 1.											
		cts a binary source wh		nown as	s 06.50.b01	User Status	s Word 1.						
		e r [bit] ; source selectio	on.										
	0: Fa												
	0		False	Ī-	1 = 1	n	у	Paramete					
06.62		status word 1 bit 2 se			1	1)	Tr di di lice					
		ry source for bit 2.	<u>- </u>										
	Sele	cts a binary source wh	ose status is sl	nown as	s 06.50.b02	User Statu	s Word 1.						
		er [bit]; source selectio	on.										
	0: False; 1: True;												
	0		False	1-	1 = 1	n	l _v	Paramete					
	_			-	1-1	111	У	Paramete					
)6 63	User status word 1 bit 3 sel												
06.63		Binary source for bit 3. Selects a binary source whose status is shown as 06.50.b03 User Status Word 1.											
06.63	Bina	-	ose status is sl	nown as	s 06.50.b03	User Statu	s Word 1.						
06.63	Bina Selec	-		nown as	s 06.50.b03	User Statu	s Word 1.						

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	1: True;				•		
	01	False	-	1 = 1	n	у	Parameter
06.64	User status word 1 bit 4 s	el					
	Binary source for bit 4. Selects a binary source wh Other [bit]; source selection 0: False; 1: True;	on.	1		User Statu		
	0 1	False	-	1 = 1	n	у	Parameter
06.65	User status word 1 bit 5 se	el					
	Binary source for bit 5. Selects a binary source wh Other [bit]; source selection 0: False; 1: True; 0 1		shown a	s 06.50.b05	User Statu	s Word 1.	Parameter
06.66	User status word 1 bit 6 se				1	17	
06.67	Selects a binary source whoold ther [bit]; source selection 0: False; 1: True; 0 1 User status word 1 bit 7 source for bit 7. Selects a binary source whoold ther [bit]; source selection 0: False;	False	-	1 = 1	n	у	Parameter
	1: True;						
	01	False	-	1 = 1	n	у	Parameter
06.68	User status word 1 bit 8 se				'''	13	. arameter
	Binary source for bit 8. Selects a binary source wh Other [bit]; source selection 0: False; 1: True; 0 1	ose status is	shown a	s 06.50.b08	3 User Statu	s Word 1.	Parameter
06.69	User status word 1 bit 9 se			11-1	111	У	1 diameter
80.00	Binary source for bit 9. Selects a binary source wh Other [bit]; source selection 0: False; 1: True; 0 1	ose status is	shown a	s 06.50.b09	User Statu		Parameter
06.70				1-1	11	У	raiaiiietei
06.70	User status word 1 bit 10 : Binary source for bit 10. Selects a binary source wh Other [bit]; source selection	ose status is	shown a	s 06.50.b10	User Statu	s Word 1.	

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0: False;	•	•	•	1	•	<u>'</u>			
	1: True;									
	0 1	False	-	1 = 1	n	у	Parameter			
06.71	User status word 1	bit 11 sel								
	Binary source for bit 11. Selects a binary source whose status is shown as 06.50.b11 User Status Word 1. Other [bit]; source selection. 0: False; 1: True;									
	0 1	False	-	1 = 1	n	у	Parameter			
06.72	User status word 1	bit 12 sel		•						
	Selects a binary source whose status is shown as 06.50.b12 User Status Word 1. Other [bit]; source selection. 0: False; 1: True; 0 1 False - 1 = 1 n y Parameter									
06.73	User status word 1				1	17				
	0: False; 1: True; 0 1 User status word 1 Binary source for bit Selects a binary sou Other [bit]; source s	: 14. rce whose status is	- shown a	1 = 1 s 06.50.b14	n User Status	y s Word 1.	Parameter			
	0: False;									
	1: True;									
	0 1	False	-	1 = 1	n	у	Parameter			
06.75	User status word 1 bit 15 sel									
	Binary source for bit 15. Selects a binary source whose status is shown as 06.50.b15 User Status Word 1. Other [bit]; source selection. 0: False; 1: True; 01 False - 1 = 1 n y Paramete									
06.81	Drive logic status word									
	reserved									
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
06.82	Drive logic auxiliary status word									
	reserved									
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
06.86	FBA A generic contr	ol word			J	1	12.5			
	Displays the unaltered control word received from the PLC via fieldbus adapter A. Se FBA A settings.									

Index	Name									
	Text									
	Range		Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре	
	00001	n FFFFh	-		-	1 = 1	у	n	Signal	
06.87	FBA B generic control word			ı	<u> </u>	<u>, </u>	-	-		
	Displays the unaltered control word received from the PLC via fieldbus adapter B. See group 54									
	FBA B settings.							-		
	0000h FFFFh		-		-	1 = 1	у	n	Signal	
06.88	FBA A profile status word									
	Displays the status word from the drive to the fieldbus controller (e.g., PLC) via fieldbus									
	adapter A after being modified by 50.29 FBA A profile. Only valid if 50.29 FBA A profile = ABB									
	Drives profile.				_	1 = 1		1	C: our ol	
06.00			-		-	1=1	у	n	Signal	
06.89	FBA B profile status word Displays the status word from the drive to the fieldbus controller (e.g., DLC) via fieldbus									
	Displays the status word from the drive to the fieldbus controller (e.g., PLC) via fieldbus adapter B after being modified by 50.59 FBA B profile. Only valid if 50.59 FBA B profile = ABB									
		s profile.			5, (5 p	. or ii.e. or ii.y	vana n sols	.s. 5, 5, 6	7.55	
		Oh FFFFh -			-	1 = 1	у	n	Signal	
06.100	User control word 1				I	- I	1-			
	User defined control word 1.									
	Bit as	signment:								
		1		_						
	Bit	Name		Rem	arks					
	0	User control word 1	bit 0	User	define	ed bits.				
	1	User control word 1 bit 1								
	2	User control word 1 bit 2								
	3	User control word 1 bit 3								
	4	User control word 1 bit 4								
	5	User control word 1 bit 5								
	6	User control word 1 bit 6								
	7	User control word 1 bit 7								
	8	User control word 1 bit 8								
	9	User control word 1 bit 9								
	10	User control word 1 bit 10								
	11									
	I 									
	12	User control word 1 bit 12								
	13	User control word 1 bit 13								
	14	User control word 1 bit 14								
	15	15 User control word 1 bit 15								
	0000h FFFFh 0000h				-	1 = 1	n	у	Parameter	
06.101	User	control word 2								
	User defined control word 2. Bit assignment:									
					<u></u>					
	Bit	it Name			Remarks					

Index	Name)							
	Text								
	Rang	e	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0	User control word 2	bit 0	User	define	d bits.	•	•	
	1	User control word 2	bit 1						
	2	User control word 2	bit 2						
	3	User control word 2	bit 3						
	4	User control word 2	bit 4						
	5	User control word 2	bit 5						
	6	User control word 2	bit 6						
	7	User control word 2	bit 7						
	8	User control word 2	bit 8						
	9	User control word 2	bit 9						
	10	User control word 2	bit 10						
	11	User control word 2	bit 11						
	12	User control word 2	bit 12						
	13	User control word 2	bit 13						
	14	User control word 2	bit 14						
	15	User control word 2	bit 15						
	0000	h FFFFh	0000h		_	1 = 1	n	у	Parameter
06.110	DDCS	control word			I	1			1
	Displa	ays the unaltered cont	rol word r	eceiv	ved fro	m a DDCS co	ontroller vi	a a DDCS	
		nunication option mod	dule (FDC	O-0x)).	T		1	T
20122	1	h FFFFh	-		-	1 = 1	у	n	Signal
06.122		wer status word node							Balaka
		er-follower link, 06.15 N aster (master onlv).	Main Stati	JS WC	ora troi	n follower n	iode 2 via m	iaster-rollo	ower link to
		Main status word can	be transf	erre	d from	follower nod	de 2 to the	master. Se	e group 62.
		signment see 06.15 M	ain status	wor	d.				_
	+	h FFFFh	-		-	1 = 1	у	n	Signal
06.123		wer status word node							
		er-follower link, 06.15 N aster (master only).	Main statı	JS WC	ord fror	n follower n	ode 3 via m	naster-follo	ower link to
		Main status word can	be transf	erre	d from	follower no	de 3 to the	master. Se	e aroup 62.
		signment see 06.15 M							- 9 p
	0000	h FFFFh	-		-	1 = 1	у	n	Signal
06.124	Follo	wer status word node	4						
		er-follower link, 06.15 N	Main statı	us wo	ord fror	n follower n	ode 4 via n	naster-follo	ower link to
		aster (master only).	ho transf	orra	d from	followerse	do 1 to the	mastar Sa	o group 62
	00.15	Main status word can	De transt	errec	a iroiii i	iollower 1100	16 4 10 ITIE	master. Se	e group 62.
	Bit as	signment see 06.15 M	ain status	wor	d.				

07 System info

The drive's hardware and firmware information.

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
07.02	Power unit set	•			•					
	Type of power unit. The value is read from 9 0: DCS converter; the u 20: DCT controller; the 40: TSU supply unit; the 50: DCS H2 converter; t	nit is a DCS8 unit is a DC ^T e unit is a TS he converte	380. 1880. 5U880. r is a DC	S880 H₂.		·				
	100: Unsupported power unit type ; mismatch between 95.14 Set: Power unit read from SDCS									
	CON-H01 and 95.14 Set: Power unit read from the plugged-in memory unit. This event generates fault 50FE Type code and shows 95.14 Set: Power unit. Either adapt the SDCS-CON-H01 using 95.14 Set: Power unit and 95.25 Set: Type code or use a memory unit with an appropriate firmware.									
07.03	0 100 Drive rating ID set	-	-	1 = 1	у	n	Signal			
	Type of the drive. The value is read from 9 Example: DCS880-S02-	_	1		1	1	Simul			
07.04	0 520	-	-	1 = 1	у	n	Signal			
	Firmware identification Example: DCSF1 = DCS8		re.	I_	у	n	Signal			
07.05	Firmware version				у	' '	Jigilai			
31.03	Version number of the 1 Example: 1.05.0.0 = Firm 0.000.0.0		on 1.05.	1 = 1	у	n	Signal			
	255.255.255									
07.08	Version number of the final Example: 2.12.0.0 = Boo									
	0.000.0.0 255.255.255	-	-	1 = 1	у	n	Signal			
07.11	CPU usage									
	Microprocessor load in	percent.	Ţ	T			1			
	0 100	-	%	1 = 1 %	У	n	Signal			
07.13	Control unit logic versi									
	Version number of the of Example: 10.18.0.0 = Fire		-		SDCS-CO	N-H01.				
	0.000.0.0 255.255.255	-	-	1 = 1	у	n	Signal			
07.14	Ch1 power unit logic ve	ersion								
	Version number of the p channel1 of the SDCS-D Example: 10.18.0.0 = Fir	SL-H1x.			OCS-OPL-F	l01 connec	ted to			

Index	Name	Name										
	Text											
	Range	e	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
).0.0 55.255.255	-	-	1 = 1	У	n	Signal				
07.15	Ch2 p	ower unit logic vers	sion	•		•	· ·	•				
	chanr Exam	on number of the ponel2 of the SDCS-DS ple: 10.18.0.0 = Firm	L-H1x.		8.	T	l01 connec					
		0.0.0 55.255.255	-	-	1 = 1	У	n	Signal				
07.16	Ch3 p	ower unit logic vers	sion									
	chanr Exam	on number of the ponel3 of the SDCS-DS ple: 10.18.0.0 = Firm	L-H1x.		8.	T						
		.0.0 55.255.255	-	-	1 = 1	У	n	Signal				
07.17	Ch4 p	ower unit logic ver	sion									
	chann	on number of the ponel4 of the SDCS-DS ple: 10.18.0.0 = Firm	L-H1x.			OCS-OPL-H	I01 connec	ted to				
		.0.0 55.255.255	-	-	1 = 1	у	n	Signal				
07.19	Appli	cation system libra	ry version		<u>.</u>							
		on number of the ap ple: 1.01.0.0 = Applic		-	•							
).0.0 55.255.255	-	-	1 = 1	У	n	Signal				
07.20	Appli	cation license infor	mation									
	Inforr	cation license inforn nation about the ap	plication l									
	1: No 3: Ap	license; the memory application; the me olication: see 07.23	mory unit	contain	s a license. No app	olication lo	aded.					
	is load		oe found ir	n 07.23 <i>A</i>	·							
	is load 0 3	ded. The name can k	oe found ir	n 07.23 <i>F</i> -	·		n	Signal				
07.21	0 3	ded. The name can k	-	n 07.23 <i>F</i> -	Application name.	1	T					
07.21	O 3 Applie Applie Show progr	ded. The name can b	status 1 status. e applicati	on prog	Application name.	у	n	Signal				
07.21	O 3 Applie Applie Show progr	cation environment cation program task s, which tasks of the amming manual 3A	status 1 status. e applicati	on prog	Application name. 1 = 1 ram are running.	у	n	Signal				
07.21	O 3 Applie Applie Show progr Bit as	cation environment cation program task s, which tasks of the amming manual 3Al signment:	status 1 status. e applicati UA000012	on prog 7808.	Application name. 1 = 1 ram are running.	у	n	Signal				
07.21	O 3 Applie Applie Show program Bit as	cation environment cation program task s, which tasks of the amming manual 3A signment:	status 1 status 1 status. e applicati UA000012	on prog 7808.	Application name. 1 = 1 Iram are running.	у	n	Signal				
07.21	O 3 Applie Applie Show program Bit as Bit 0	cation environment cation program task s, which tasks of the amming manual 3Al signment: Name Pre-task	status 1 status. e applicati UA000012 Value	on prog 7808. Rem Pre-	arks task running.	у	n	Signal				
07.21	O 3 Applie Applie Show program Bit as Bit 0	cation environment cation program task s, which tasks of the amming manual 3A signment: Name Pre-task Application task 1	status 1 status.e applicati UA000012 Value 1 1	on prog 7808. Rem Pre-t Task	arks task running.	у	n	Signal				
07.21	O 3 Applie Applie Show progr Bit as Bit 0 1 2	cation environment cation program task s, which tasks of the amming manual 3Al signment: Name Pre-task Application task 1 Application task 2	status 1 status 1 status 2 status 2 status 3 status 4 status 4 status 1 sta	on prog 7808. Rem Pre-t Task	arks task running. 1 running.	у	n	Signal				

ndex	Name									
	Text									
	Rang	e	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре		
	6	reserved				•	•	•		
	7	reserved								
	8	reserved								
	9	reserved								
	10	reserved								
	11	reserved								
	12	reserved								
	13	reserved								
	14	reserved								
	15	Task monitoring	1	Task	monitoring enab	led.				
	0000	h FFFFh	0000h	I_	1 = 1	T _V	n	Signal		
7.22		cation environmen		-	1-1	У	ŢŢ	Signal		
	Bit	Name	Value	Rem	arks					
	Bit	Name	Value	Rem	arks					
	0	Opening 1	1	Stati	us of opening 1 in	the applic	ation prog	ram.		
	1	Opening 2	1	Stati	us of opening 2 in	the applic	ation prog	ram.		
	2	Opening 3	1	Stati	us of opening 3 in	the applic	ation prog	ram.		
	3	Opening 4	1	Stati	us of opening 4 in	the applic	ation prog	ram.		
	4	Opening 5	1		us of opening 5 in					
	5	Opening 6	1		us of opening 6 in					
	6	Opening 7	1		us of opening 7 in		<u> </u>			
	7	Opening 8	1		us of opening 8 in					
	8	Opening 9	1		us of opening 9 in					
	9	Opening 10	1		us of opening 10 i					
	10	Opening 11	1		us of opening 11 i	• • • • • • • • • • • • • • • • • • • •				
	11	Opening 12	1		us of opening 12 i			_		
	12	Opening 13	1		us of opening 13 i			_		
	13	Opening 14	1		us of opening 14 i					
	14	Opening 15	1		us of opening 15 i					
	15	Opening 16	1	Stati	us of opening 16 i	n the appli	cation pro	gram.		
	0000	h FFFFh	0000h	-	1 = 1	у	n	Signal		
7.23	Appli	cation name								
	Displais visi	ol Builder applications ays the first five AS ble under System in .: No name ;	CII signs of	the nar			orogram. T	he full name		

ndex	Name	2						
	Text				_ _			T
	Rang	e	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
			-	-	-	у	n	Signal
7.24	Appli	cation version						
		rol Builder application						
		ays the version num			oplication progra	m. Also vis	ible under	System info
		e control panel or in p le : 1.04.0.0 = Appli			arsion 1			
).0.0	-	-	1 = 1	у	n	Signal
		55.255.255						0.9
'.30	Adap	tive program statu	S					
	Displ	tive program status ays the status of the ssignment:		prograr	n.			
	Bit	Name	Value	Rem	arks			
	0	Initialized	1	Adap	otive program init	ialized.		
	1	Editing	1	Adap	otive program is b	eing edite	d.	
	2	Edit done	1	Editi	ng of adaptive pr	ogram fini	shed.	
	3	Running	1	Adap	otive program run	ning.		
	4	reserved						
	5	reserved						
	6	reserved						
	7	reserved						
	8	reserved						
	9	reserved						
	10	reserved						
	11	reserved						
	12	reserved						
	13	reserved						
	14	State changing	1	State engi	e change in progr ne.	ess in adar	otive progr	amming
	15	Faulted	1	Erro	r in adaptive prog	ıram.		
	2222		1	T		1	1	Te: 1
7.40	_	h FFFFh pplication CPU usag	re post	<u> </u> -	1 = 1	У	n	Signal
.40		microprocessor load		w the ar	onlication program	n		
		ays the peak load of					n program.	07.40 IEC
	appli	cation Cpu usage pe		•	_		. •	
		PU load.						
		alue is in percent of se reset from the co				sed for ov	ar 3 sacono	de .
		. 100.0	-	%	10 = 1 %	y	n	Signal
7.41	_	pplication CPU load	l average	1 , ,	1.0	اع ا	1	10.9.101
_		ge microprocessor		ed by the	e application prod	gram.		
		ays the average load		-			+:	

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	The value is in percent o	f an interna	l microp	processor quota.			
	0.0 100.0	-	%	10 = 1 %	у	n	Signal
07.50	Progress signal			•	<u> </u>	.	
	Reserved for function D	CS880 Assi	stant in	Drive Composer p	oro.		
	0 100	-	%	1 = 1 %	у	n	Signal
07.51	Slot 1 option module		1,0	1 1 / 0] 3	1	10.9.14.
,,,,,	Slot 1 option module.						
	Displays the option mod	hule plugge	d into sl	ot 1			
	0: No option ; no option						
	1: No communication; no	•			duaged int	o slot 1	
	2: Unknown ; option mod						id
	8: FPBA-01 ;	adic plagge	a 11100 51	oc 1 15 driki 10 vvii, v	mong type	or not van	· G.
	10: FCAN-01 ;						
	11: FDNA-01 ;						
	13: FENA-11 ;						
	19: FB COMMON;						
	22: FSCA-01 ;						
	23: FSEA-21 ;						
	25: FECA-01 ;						
	26: FENA-21 ;						
	28: FMAC-01 ;						
	29: FCNA-01 ;						
	27: FEPL-02 ;						
	1015: FIO-01 ;						
	1016: FEN-01 ;						
	1017: FEN-11 ;						
	1018: FEN-21 ;						
	1020: FIO-11 ;						
	1021: FEN-31 ;						
	1024: FAIO-01 ;						
	1025: FDIO-01 ;						
	1026: FSE-31 ;		1	1	1		T
	0 65535	-	-	1 = 1	У	n	Signal
7.52	Slot 2 option module						
	Slot 2 option module.						
	Displays the option mod			ot 2.			
	For values, see 07.51 Slo	t 1 option n	nodule.		1	1	
	0 65535	-	-	1 = 1	у	n	Signal
7.53	Slot 3 option module						
	Slot 3 option module.						
	Displays the option mod	dule plugge	d into sl	ot 3.			
	For values, see 07.51 Slo	t 1 option n	nodule.				
	0 65535	-	-	1 = 1	у	n	Signal
7.60	Drive size	1			<u>1 - </u>	1	<u>, -</u>
-	Recognized drive size.						
	Read from 95.25 Set: Typ	oe code.					
	TIVEAU II OIII 33.6.7 361. TVI						
	0: None ; when 95.25 Set		= None				

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	2: H2 ; drive size H2.	•	•	•	•	•	•
	3: H3 ; drive size H3.						
	4: H4 ; drive size H4.						
	5: H5 ; drive size H5.						
	6: H6 ; drive size H6.						
	7: H7 ; drive size H7.						
	8: H8 ; drive size H8.						
	9: Manual set ; set by us				and/or 95	5.28 Set: Dr	ive AC
	voltage scaling have be	en changed	for e.g.,	rebuild kits.			
	0 9	-	-	1 = 1	у	n	Signal
07.61	Drive block bridge 2 se	et					
	Recognized drive quad	rant type.					
	Displays the quadrant		lrive (1 o	r 2 bridges). Read	from 95.2	5 Set: Type	code or set
	with 95.26 Set: Drive bl						
	- Read from 95.25 Se	t: Type code	, if 95.26	Set: Drive block I	bridge 2 =	0.	
	 Read from 95.26 Se 	t: Drive bloc	k bridge	2, if 95.26 Set: Dr	ive block b	ridge 2 ≠ 0	
	1: Block bridge 2; (reve	rse) bridge 2	blocked	$d \equiv 2-Q$ operation.			
	2: Release bridge 2; (re	verse) bridge	e 2 relea	sed ≡ 4-Q operati	on.		
	0 2	-	-	1 = 1	у	n	Signal
07.62	Drive DC current scalin	ng set			.		1
	Recognized drive nomi		nt.				
	Displays the drive nom			surement circuit.	Adiustmen	t of DC cur	rent
	measuring channels (SI				•		
	with 95.27 Set: Drive Do			, ,		, , , , , , , , , , , , , , , , , , ,	
	 Read from 95.25 Se 		-	Set: Drive DC cur	rent scalin	q = 0.	
	 Read from 95.27 Se 					-	aling ≠ 0.
	0 32500	-	Α	1 = 1 A	у	n	Signal
07.63	Drive DC overcurrent le	evel]/-)	1	10.9
01.03	Drive DC overcurrent le						
	Displays the drive curre		loval Th	ic cianal ic cat du	daa initiali	zation of t	ha driva Nav
	values are shown after			_	_	zation or ti	ne drive. New
	- 2.3 • 95.25 Set: Type						
	- 2.3 • 95.25 Set: Type - 2.3 • 95.27 Set: Drive				•	st coaling t	0
		DC current					
	0 32500	<u> -</u>	Α	1 = 1 A	у	n	Signal
07.64	Drive AC voltage scalir						
	Recognized drive nomi						
	Displays the drive nom		_		•		_
	measuring channels (SI			S-PIN-H51). Read	from 95.25	Set: Type	code or set
	with 95.28 Set: Drive AC	_	_				
	Read from 95.25 Se				-	-	
	Read from 95.28 Se	t: Drive AC v	oltage s	caling, if 95.28 Se	t: Drive AC	voltage sc	aling ≠ 0.
	0.0 3250.0	-	٧	10 = 1 V	у	n	Signal
07.65	Drive max bridge temp	erature set					
	Recognized drive maxir		tempera	ature.			
	Displays the drive maxi				95.25 Set:	Type code	or set with
	95.29 Set: Drive max br					J1	- *
	 Read from 95.25 Se 	•		Set: Drive max b	ridae temr	perature = (0.
		7,5 5 55 46	,		- 5 5 - 1		

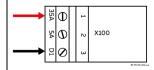
Index	Name Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	 Read from 95.29 Set temperature ≠ 0. The event generates factom temperature set is reactowhen the measured brid temperature set. The unit is selected by 9 	ult 4310 Brid hed. The ev dge temper	dge temp ent gener ature is a	erature measure ates warning A4	d when 07. B0 Bridge	.65 Drive m temperatu	nax bridge re measured,			
	-80.0 1000.0	-	°C or °F	1 = 1°C or °F	У	n	Signal			
07.68	M1 field exciter type									

Motor 1 field exciter type.

Read from 99.07 M1 used field exciter type.

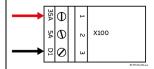
- 0: None; no or third-party field exciter connected.
- 1: OnBoard; integrated 1-Q field exciter (for sizes H1 ... H4 only).
- 2: DCF803-0016; external 1-Q 16 A field exciter used for field currents from 0.3 A ... 16 A.

Note: Use 35 A terminals:

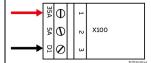


3: FEX-425-Int; internal 1-Q 25 A field exciter (for size H5 and H6 only) used for field currents from 0.3 A ... 25 A.

Note: Use 35 A terminals:



4: DCF803-0035; external 1-Q 35 A field exciter used for field currents from 0.3 A ... 35 A. Note: Use 35 A terminals:



5: DCF803 terminal 5 A; external 1-Q 16 A field exciter (DCF803-0016), internal 1-Q 25 A field exciter (FEX-425-Int) or external 1-Q 35 A field exciter (DCF803-0035) used for field currents from 0.3 A ... 5 A.

Note: Use 5 A terminals.



- 6: DCF803-0050; external 1-Q 50 A field exciter.
- 7: DCF804-0050; external 4-Q 50 A field exciter.
- 8: DCF803-0060; external 1-Q 60 A field exciter.

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	9: DCF804-0060 ; external 4-Q 60 A field exciter.									
	10: DCS880-S01; external 2-Q standard DCS880 module. 11: DCS880-S02; external 4-Q standard DCS880 module.									
	16: External field exciter via Al1; third party field exciter, acknowledge via Al1.									
	17: External field exciter via AI2; third party field exciter, acknowledge via AI2.									
	18: External field exciter via AI3; third party field exciter, acknowledge via AI3.									
	19: Multiple field exciters; reserved.									
	0 19 1 = 1 y n Signal									
07.69	M1 field exciter firmw	are version								
	Version number of Motor 1 field exciter firmware.									
	Example : 1.02.0.0 = Fir	rmware versio	on 1.02.							
	0.000.0.0	-	-	1 = 1	у	n	Signal			
	255.255.255									
77.70	MO Galal access and access									

07.72 M2 field exciter type

Motor 2 field exciter type.

Read from 42.49 M2 used field exciter type.

- 0: None; no or third-party field exciter connected.
- 1: OnBoard; integrated 1-Q field exciter (for sizes H1 ... H4 only).
- 2: DCF803-0016; external 1-Q 16 A field exciter used for field currents from 0.3 A ... 16 A.

Note: Use 35 A terminals:

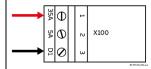


3: **FEX-425-Int**; internal 1-Q 25 A field exciter (for size H5 and H6 only) used for field currents from 0.3 A ... 25 A.

Note: Use 35 A terminals:



4: **DCF803-0035**; external 1-Q 35 A field exciter used for field currents from 0.3 A ... 35 A. **Note:** Use 35 A terminals:



5: **DCF803 terminal 5 A**; external 1-Q 16 A field exciter (DCF803-0016), internal 1-Q 25 A field exciter (FEX-425-Int) or external 1-Q 35 A field exciter (DCF803-0035) used for field currents from 0.3 A ... 5 A.

Note: Use 5 A terminals.

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change	Туре			
						running				
	∑ X100									
	6: DCF803-0050 ; external	1-Q 50 A	field exci	ter.						
	7: DCF804-0050 ; external	•								
	8: DCF803-0060; external	1-Q 60 A	field exc	iter.						
	9: DCF804-0060 ; externa	l 4-Q 60 A	field exc	iter.						
	10: DCS880-S01 ; external									
	11: DCS880-S02 ; external									
	16: External field exciter				_					
	17: External field exciter v				_					
	18: External field exciter via AI3 ; third party field exciter, acknowledge via AI3. 19: Multiple field exciters ; reserved.									
	0 19	-	-	1 = 1	у	n	Signal			
07.73	M2 field exciter firmware	version	•		•	•	•			
	Version number of Motor			ware.						
	Example : 1.01.0.0 = Firmw	are version	JII 1,U1.	1 _ 1	1.,	T_	Ci ava a l			
	0.000.0.0 255.255.255	-	-	1 = 1	У	n	Signal			
07.80	FPGA logic version numb	er								
07.80	Version number of the co		d logic ir	the EDCA on the	SDCS CO	N HO1				
	Example: 0x1018 = Firmw		_	i the FPGA on the	3003-00	IN-HUI.				
	0x0000 0x9999	_	_	1 = 1	у	n	Signal			
07.81	FPGA logic version name] 9	1	Jignai			
	Used FPGA type.									
	0: VIFO; SDCS-CON-H01.									
	1: VLFO ; SDCS-CON-H01L									
	01	<u> </u>	_	1 = 1	у	n	Signal			
07.91	Control board type	I	I	_L	12		1 3			
01101	Used Control board type.									
	0: CON-H01 ; SDCS-CON-H	101.								
	2: CON-H01L ; SDCS-CON-									
	02	-	_	1 = 1	у	n	Signal			
1		1	1		17	1	1			

10 Standard DI, RO

Configuration of digital inputs and relay outputs.

Index	Name	Name										
	Text											
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
10.01	DI status											
	inputs (if any a Bits 0 5 refl	lectrical status of are specified) are lect the status of I	ignored. A DI1 DI6. I	and DIL. The active filtering time is de Bit 15 reflects the s DI2 and DI1 are on,	efined by 10 status of th	0.51 DI filte ne DIL inpu	r time. t.					

Index Name Text Range Default Unit Scale/FbEq16 Volatile Change running

Bit assignment:

Bit	Name	Value	Remarks
0	DI1	1	On.
1	DI2	1	On.
2	DI3	1	On.
3	DI4	1	On.
4	DI5	1	On.
5	DI6	1	On.
6	reserved		
7	reserved		
8	reserved		
9	reserved		
10	reserved		
11	reserved		
12	reserved		
13	reserved		
14	reserved		
15	DIL	1	On.

0000h ... FFFFh - - | 1 = 1 | y | n | Signal

10.02 DI delayed status

Delayed status of digital inputs.

Displays the delayed status of DI1 ... DI6 and DIL. This word is updated only after activation/deactivation delays (if any are specified).

Bits 0 \dots 5 reflect the delayed status of DI1 \dots DI6. Bit 15 reflects the delayed status of the DIL input.

Example: 100000000010011b = DIL, DI5, DI2 and DI1 are on, DI3, DI4 and DI6 are off. Bit assignment:

Bit	Name	Value	Remarks
0	DI1	1	On.
1	DI2	1	On.
2	DI3	1	On.
3	DI4	1	On.
4	DI5	1	On.
5	DI6	1	On.
6	reserved		
7	reserved		
8	reserved		
9	reserved		
10	reserved		
11	reserved		
12	reserved		
13	reserved		

Index	Name												
	Text	Text											
	Range		Def	fault	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	14	reserved											
	15	DIL	1	On.									
	0000)h FFFFh	-		-	1 = 1	v	n	Signal				

10.03 DI force selection

Override selection for digital inputs.

The electrical status of DI1 ... DI6 and DIL can be overridden for e.g., testing purposes. A bit in 10.04 DI force data is provided for each digital input and its value is applied whenever the corresponding bit in 10.03 DI force selection is 1.

Bit assignment:

Bit	Name	Value	Remarks
0	DI1	1	Force DI1 to value of bit 0 of 10.04 DI force data.
1	DI2	1	Force DI2 to value of bit 1 of 10.04 DI force data.
2	DI3	1	Force DI3 to value of bit 2 of 10.04 DI force data.
3	DI4	1	Force DI4 to value of bit 3 of 10.04 DI force data.
4	DI5	1	Force DI5 to value of bit 4 of 10.04 DI force data.
5	DI6	1	Force DI6 to value of bit 5 of 10.04 DI force data.
6	reserved		
7	reserved		
8	reserved		
9	reserved		
10	reserved		
11	reserved		
12	reserved		
13	reserved		
14	reserved		
15	DIL	1	Force DIL to value of bit 15 of 10.04 DI force data.

10.04 DI force data

0000h ... FFFFh

Forced values of digital inputs.

0000h

Allows the data value of a forced DI1 ... DI6 and DIL to be changed from 0 to 1. It is only possible to force an input that has been selected in 10.03 DI force selection.

1 = 1

Parameter

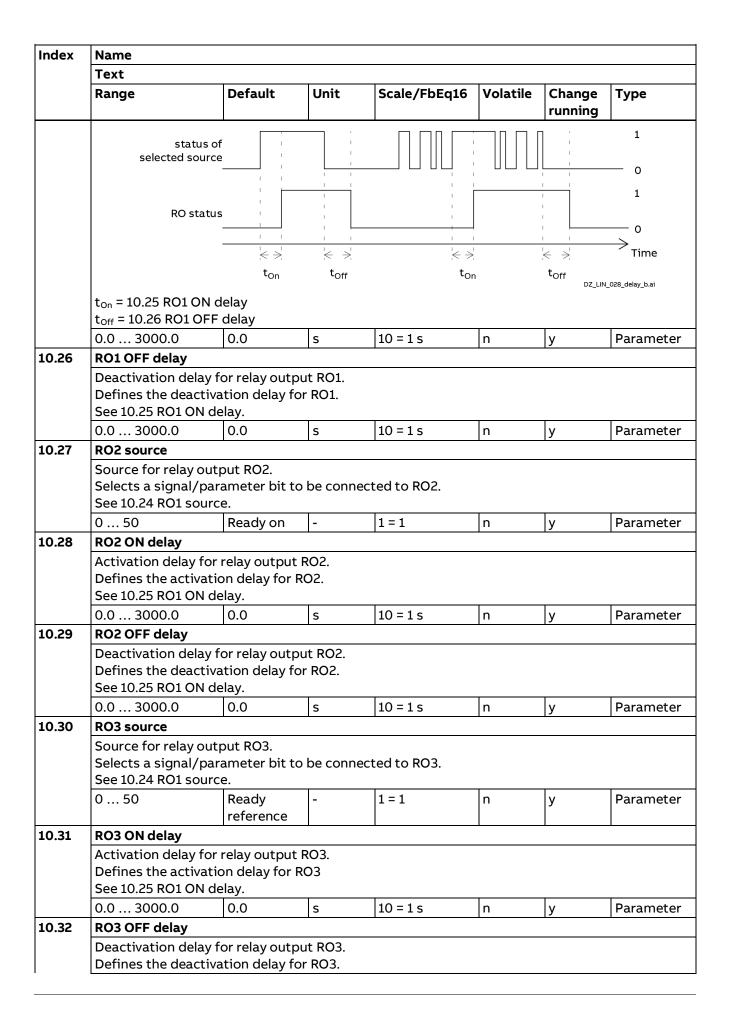
Bits $0 \dots 5$ are the forced values for DI1 \dots DI6. Bit 15 is the forced value for the DIL input. Bit assignment:

Bit	Name	Value	Remarks
0	DI1	1	Force DI1 to on.
1	DI2	1	Force DI2 to on.
2	DI3	1	Force DI3 to on.
3	DI4	1	Force DI4 to on.
4	DI5	1	Force DI5 to on.
5	DI6	1	Force DI6 to on.
6	reserved		

Index	Name												
	Text												
	Rang	е	Defau	lt	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	7	reserved			•		•	<u>'</u>					
	8	reserved											
	9	reserved											
	10	reserved											
	11	reserved											
	12	reserved											
	13	reserved											
	14	reserved											
	15	DIL	1	Forc	e DIL to or	١.							
	0000	h FFFFh	0000h	<u> </u>	-	1 = 1	у	у	Parameter				
10.05	DI1 C	N delay	•			•	•	•					
	Activation delay for digital input DI1. Defines the activation delay for DI1.												
	*DI status			1	l 1				1				
				l I	1 1		' UU U		— о				
			1		1	1	1		1				
	*	*Delayed DI sta	tus		1	1		1					
			<u></u>			1]		o				
				->	← >	<u> </u>	I •	< >	Time				
				On	t_{Off}	t _{Or}	า	t _{Off}	_028_delay_b.ai				
	ton =	10.05 DI1 ON	delav										
	t _{Off} = 10.06 DI1 OFF delay												
	*Electrical status of digital input. Indicated by 10.01 DI status.												
	**Indicated by 10.02 DI delayed status.												
	0.0	. 3000.0	0.0		S	10 = 1 s	n	у	Parameter				
10.06	DI1 C	FF delay											
	Deactivation delay for digital input DI1. Defines the deactivation delay for DI1.												
				lay fo	or DI1.								
		0.05 DI1 ON 0				10 - 1 -	T	1	D				
10.07		. 3000.0	0.0		S	10 = 1 s	n	У	Parameter				
10.07		N delay	ا عند المس	m	DIS								
		ation delay for nes the activa											
		0.05 DI1 ON (-	, 101 1	J1 C .								
		. 3000.0	0.0		s	10 = 1 s	n	у	Parameter				
10.08		FF delay	1 2.3			1	L	1,5	1 2				
		tivation delay	for digit	al inn	ut DI2.								
		es the deacti	_	-									
		0.05 DI1 ON d											
		. 3000.0	0.0		s	10 = 1 s	n	у	Parameter				
10.09	DI3 C	N delay			•	•	•		•				
		ation delay fo	or digital i	input	DI3.								
			tion delay										

Index	Name											
	Text											
	Range	D	efault	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	See 10.05 DI	1 ON delay	•									
	0.0 3000.	0 0	.0	S	10 = 1 s	n	у	Parameter				
10.10	DI3 OFF delay											
	Deactivation Defines the See 10.05 DI 0.0 3000.	deactivation 1 ON delay	on delay f		10 = 1 s	n	V	Parameter				
10.11	0.0 3000.0 0.0 s 10 = 1 s n y Parameter DI4 ON delay											
	Activation delay for digital input DI4. Defines the activation delay for DI4. See 10.05 DI1 ON delay. 0.0 3000.0 0.0 s 10 = 1 s n y Paramet											
10.12	DI4 OFF dela				10 13		J	. arameter				
	Deactivation Defines the See 10.05 DI 0.0 3000.	deactivation 1 ON delay	on delay f		10 = 1 s	n	у	Parameter				
10.13	DI5 ON delay		· ·			1	<u> </u>					
	Activation do Defines the See 10.05 DI	activation 1 ON delay	delay for	DI5.	10-1-	T.,	T	In				
10.14	0.0 3000.		.0	S	10 = 1 s	n	у	Parameter				
10.14	DIS OFF delay Deactivation delay for digital input DI5. Defines the deactivation delay for DI5. See 10.05 DI1 ON delay. 0.0 3000.0 0.0 s 10 = 1 s n y Parameter											
10.15			.0	S	10 = 1 s	n	у	Parameter				
10.15	Activation d Defines the See 10.05 DI 0.0 3000.	elay for diq activation 1 ON delay	delay for		10 = 1 s	n	у	Parameter				
10.16	DI6 OFF delay											
	Defines the See 10.05 DI	Deactivation delay for digital input DI6. Defines the deactivation delay for DI6. See 10.05 DI1 ON delay.										
100:	0.0 3000.	υ 0	.0	S	10 = 1 s	n	у	Parameter				
10.21		status of 00000000000000000000000000000000000	RO1 RC		output for the mainergized, RO2 R							
			1	ı								
	Bit N	ame	Value	Remarks	5			l				
		ame O1	Value 1	Remarks Energize								

Index	Name												
	Text												
	Range De		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
	2	RO3	1	Energized	i.	•	•						
	3 14	reserved											
	15	XSMC:1/2	1	On.									
		•		Į.									
	0000h	FFFFh	_	_	1 = 1	у	n	Signal					
l0.24	RO1 source												
	Source fo	or relay out	out RO1.										
		Source for relay output RO1. Selects a signal/parameter bit to be connected to RO1.											
		t] ; source s											
	_	ergized ; ou		energized.									
	1: Energiz	zed; output	is energize	d.									
	2: Ready	run ; 06.15.b	01 Main sta	atus word.									
	_	on ; 06.15.b0											
		d ; 06.16.b0											
	_			lain status v									
	9: At setpoint ; 06.15.b08 Main status word.												
	10: Reverse ; 06.21.b02 Speed control status word.												
	11: Zero speed ; 06.21.b00 Speed control status word. 12: Above limit ; 06.17.b10 Drive status word 2.												
					12.								
	13: Warning ; 06.15.b07 Main status word. 14: Tripped ; 06.15.b03 Main status word.												
		-			المائية								
				status word		a chanical	امادها						
		22: Brake open command ; 44.01.b00 Brake control status (mechanical brake).											
	24: Remote ; 06.15.b09 Main status word. 25: Tripped or warning ; 06.18.b12 Drive status word 3.												
			_		atus word 1.								
					roller status word	- 11							
		-			l.b08 Current cor		tus word 1						
		-	-		Current controlle								
		•		•	ent controller sta								
			••		O/DIO control w		•						
	_		-) D/DIO control wo								
	_				O/DIO control wo								
	1				O/DIO control wo								
	44: RO/D	IO control	word bit 9;	10.99.b09 R	O/DIO control we	ord.							
	50: STO r	eset indica	tion; 31.91.l	o07 STO sta	tus word. Reset o	of safety re	lay permitt	ted.					
	0 50		STO reset	-	1 = 1	n	у	Parameter					
			indication]						
LO.25	RO1 ON d	lelay		•			•	•					
	_	n delay for	relay outpu	t RO1.									
		-	on delay for										



Index	Name												
	Text												
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре						
	See 10.25 RO1 ON c	lelay.	•		•		•						
	0.0 3000.0	0.0	s	10 = 1 s	n	у	Parameter						
10.51	DI filter time												
	Filter time constan	t for 10.01 D	status.										
	Defines a filter time	e constant fo	or 10.01 DI	status.									
	0.3 100.0	5.0	ms	10 = 1 ms	n	у	Parameter						
10.61	DI1 inversion												
	Inverts digital input DI1. Inversion selection for digital input DI1.												
	XDI Delay												
	DI2 —	10.62	DI2 inversion	\vdash	status								
		status			ed s								
					delayed								
	DI6 —	10.66	016 inversion	\vdash	P□								
	XD24 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0												
	DIL —	10.67	OIL inversion	10.16	10								
	SB_880_028_DIO delay_a.ai												
	0: Direct ; digital input DI1 is not inverted.												
	1: Inverted; digital input DI1 is not inverted.												
	0 1	Direct	-	1 = 1	n	у	Parameter						
10.62	DI2 inversion	7 666				13	, arameter						
	Inverts digital input DI2.												
	Inversion selection for digital input DI2.												
	See 10.61 DI1 inversion.												
	0 1	Direct	-	1 = 1	n	у	Parameter						
10.63	DI3 inversion												
	Inverts digital input DI3.												
	Inversion selection for digital input DI3.												
	See 10.61 DI1 invers				1	1	1_						
	01	Direct	-	1 = 1	n	У	Parameter						
10.64	DI4 inversion												
	Inverts digital inpu		nut DI4										
	Inversion selection See 10.61 DI1 invers		put DI4.										
	0 1	Direct		1 = 1	n	T _V	Parameter						
10.65	DI5 inversion	חוופננ		11-1	111	у	i arailletel						
10.05	Inverts digital inpu	t DI5											
	Inversion selection		put DI5.										
	See 10.61 DI1 invers	-	,										
	01	Direct	-	1 = 1	n	у	Parameter						
			<u> </u>	I	1	17							
10.66	DI6 inversion												
10.66		DI6 inversion Inverts digital input DI6.											

Index	Name												
	Text												
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
	See 10.61	DI1 inversion	٦.										
	0 1		Direct	-	1 = 1	n	у	Parameter					
10.67	DIL invers	sion											
	Inversion	gital input D selection for DI1 inversion	digital ir	nput DIL.		_	_						
	0 1	0 1 Direct - 1 = 1 n y Parameter											
10.99	RO/DIO d	ontrol word											
	58.124 Da Example 1	ta I/O 24). for relay outr ta I/O 1 = RC	out RO1:	_	., as Modbus I/O d .nd 10.24 RO1 sour								
	Bit	Name	Value	Remarks									
	0	RO1	1	Energized	d. Bit for relay outp	ut RO1. Se	e 10.24 RO	1 source.					
	1	RO2	1	Energized	d. Bit for relay outp	ut RO2. Se	e 10.27 RO	2 source.					
	2	RO3	1	Energized	d. Bit for relay outp	ut RO3. Se	e 10.30 RO	3 source.					
	3	reserved											
	4	reserved											
	5	reserved											
	6	reserved											
	7	reserved											
	8	DIO1	1	Energized output so	d. Bit for digital inp ource.	ut/output	DIO1. See	11.06 DIO1					
	9	DIO2	1	Energized output so	d. Bit for digital inp ource.	ut/output	DIO2. See	11.10 DIO2					
	10 15	reserved											
	0000h	FFFFh ()000h	-	1 = 1	n	у	Parameter					

11 Standard DIO, FI, FO

Configuration of digital input/outputs and frequency inputs/outputs.

Index	Name	Name										
	Text											
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
11.01	DIO status											
	Displays the s are ignored. A Bits 0 1 refl	filtering time (for ect the status of I 0000000000010b	IO2. The a input mod DIO1 DIC		-		specified)					

Index	Name										
	Text										
	Range	D	efault	Unit	Scale/FbEq16	Volatile	Change running	Туре			
		T.,		T							
	Bit	Name	Value	Remarks							
	0	DIO1	1	On.							
	1	DIO2	1	On.							
	2 15	reserved									
	0000h	FFFFh -		-	1 = 1	у	n	Signal			
11.02	DIO delay	ed status									
	Displays the delayed status of DIO1 DIO2. This word is updated only after activation/deactivation delays (if any are specified). Bits 0 1 reflect the status of DIO1 DIO2. Example: 00000000000010b = DIO2 is on, DIO1 is off. Bit assignment:										
	Bit	Name	Value	Remarks							
	0	DIO1	1	On.							
	1	DIO2	1	On.							
	2 15	reserved	1	011.							
	2 15	reserved									
	0000h	FFFFh -		1_	1 = 1	y	n	Signal			
11.05	DIO1 fund				1 - 1	<u> </u>	111	Jaighan			
	Function of digital input/output DIO1. Selects whether DIO1 is used as a digital output or input, or a frequency input. 0: Output; DIO1 is used as a digital output. 1: Input; DIO1 is used as a digital input. 2: Frequency; DIO1 is used as a frequency input.										
	0 2	С	utput	-	1 = 1	n	у	Parameter			
11.06	DIO1 outp	out source									
	Selects a Other [bit 0: Not end 1: Energiz 2: Ready r 3: Ready r 4: Enabled 8: Ready r 9: At setp 10: Revers 11: Zero s 12: Above 13: Warnin	t]; source selections of the series of the s	neter bit ection. out is not energize 1 Main sta Drive sta 0.15.b02 N 08 Main s Speed co 000 Speed o10 Drive	energized. ed. atus word. atus word 1. Main status status word ontrol statu d control st. status word	l. s word. atus word.	n 11.05 DIC	1 function	= Output.			
		e d ; 06.15.b03 e d (-1) ; 06.15.			d inverted						
					control status (m	echanical	brake).				
	24: Remo	te ; 06.11.b09	Main sta	tus word.	·		,				
	25: Trippe	ed or warning	j ; 06.18.b	12 Drive sta	itus word 3.						

Index	Name													
	Text													
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре							
	30: Fans on ; 06.24.k	000 Current c	ontroller st	tatus word 1.										
	31: Field exciter on;													
	32: Close dynamic braking contactor; 06.24.b08 Current controller status word 1.													
	33: Close US style DC-contactor; 06.24.b10 Current controller status word 1. 34: Trip DC-breaker (pulse); 06.24.b15 Current controller status word 1.													
	40: RO/DIO control word bit 0 ; 10.99.b00 RO/DIO control word.													
	41: RO/DIO control word bit 1 ; 10.99.b01 RO/DIO control word.													
	42: RO/DIO control word bit 2 ; 10.99.b02 RO/DIO control word.													
	43: RO/DIO control word bit 2 ; 10.99.b08 RO/DIO control word.													
	44: RO/DIO control word bit 9; 10.99.b09 RO/DIO control word.													
	50: STO reset indication ; 31.91.b07 STO status word. Reset of safety relay permitted.													
	0 50	Tripped (-1)	-	1 = 1	n	у	Parameter							
11.07	DIO1 ON delay													
	Activation delay for digital input/output DIO1. Defines the activation delay for DIO1 (when used as a digital output or digital input).													
	Defines the activati	ion delay for D	DIO1 (when	used as a digital	output or	digital inpu	ıt).							
	*DIO statu	ıs				П	1							
	Dio state	1			:	1								
			1		,		— о							
			1	1		1	1							
	**Delayed DIO statu	us	I I	1		1								
				1	1		<u> </u>							
		< >	< >	<u> </u>	>	< >	→ Time							
		t _{On}	t _{Off}	t_O	n	t _{Off}								
	11.07.01.01					DZ_LII	N_028_delay_b.ai							
	t _{on} = 11.07 DIO1 ON delay t _{off} = 11.08 DIO1 OFF delay													
	*Electrical status of DIO1 (in input mode) or status of selected source (in output mode).													
	Indicated by 11.01 DIO status.													
	**Indicated by 11.02		status.											
	0.0 3000.0	0.0	s	10 = 1 s	n	у	Parameter							
11.08	DIO1 OFF delay													
	Deactivation delay for digital input/output DIO1.													
	Defines the deactivation delay for DIO1 (when used as a digital output or digital input).													
	See 11.07 DIO1 ON 0			1	1									
	0.0 3000.0	0.0	S	10 = 1 s	n	у	Parameter							
11.09	DIO2 function													
	Function of digital			_	_									
	Selects whether DIO		-	itput or input, or a	a frequenc	y output.								
	0: Output; DIO2 is used as a digital output. 1: Input; DIO2 is used as a digital input.													
	2: Frequency ; DIO2	_	•	utnut										
	0 2	Output	_	1 = 1	n	у	Parameter							
11 10	_	<u> </u>			1	J	1. di di liccol							
11.10	DIO2 output source													
)IO2											
	Source for digital in	nput/output [cted to DIO2 whe	n 11 09 DIC)2 function	= Output							
	Source for digital in Selects a signal/pa	nput/output [rameter bit to		cted to DIO2 wher	n 11.09 DIC	2 function	= Output.							
	Source for digital in	nput/output [rameter bit to		cted to DIO2 wher	n 11.09 DIC	2 function	= Output.							

Index	Name															
	Text															
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре									
11.11	DIO2 ON delay		•		•	•	•									
	See 11.07 DIO1 O	ation delay for N delay.	DIO2 (whe	n used as a digital	output or	· ·	· -									
	0.0 3000.0	0.0	S	10 = 1 s	n	у	Parameter									
l1.12	See 11.07 DIO1 O	tivation delay f N delay.	or DIO2 (w	hen used as a digi	- -	_										
11.21	0.0 3000.0 DIO1 inversion	0.0	S	10 = 1 s	n	у	Parameter									
	DIO1 — DIO2 —	11.01 DIO status	11.21 DI	d as digital input O1 inversion =2 inversion	Delay 11.07 11.08 11.11 11.12	11.02 DIO delayed status										
			ed as digit	·	atus	XDIC	.									
			IO1 invers	11.08 11.11	11.02 DIO delayed st		DIO1									
	0: Direct ; digital 1: Inverted ; digital 0 1				ln		028_DIO delay_a.ai									
1.22	DIO2 inversion	1		<u> </u>		<u> </u>										
·	Inverts digital inp Inversion selection See 11.21 DIO1 inv	on for digital in		t DIO2.												
	0 1	Direct	-	1 = 1	n	у	Parameter									
l1.38	Freq in 1 actual v	alue														
	Unscaled value o	£ £	4													

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	Displays the value before scaling. See 11.42 Freq in 1		input 1 in I	Hz (via DIO1 when i	t is used a	s a frequer	cy input)				
	0 16000	-	Hz	1 = 1 Hz	у	n	Signal				
11.39	Freq in 1 scaled										
	Scaled value of free Displays the value scaling. See 11.42 Freq in 1-32768.000	of frequency		a DIO1 when it is us $1 = 1$	sed as a fre	equency inp	out) after				
	32767.000										
11.42	Freq in 1 min	1	II.	-	1		1				
	frequency input). Parameters 11.42	and 11.43 set t	the low and	frequency input 1 i	requency i	nput signa	l in Hz.				
	0 16000	0	Hz	1 = 1 Hz	n	у	Parameter				
11.43	Freq in 1 max Maximum frequer Defines the maxir frequency input). See 11.42 Freq in 1 0 16000	num input fre		(DIO1). frequency input 1	in Hz (via C	DIO1 when i	t is used as a				
11.44	Freg in 1 at scaled					1,2					
	Internal value corresponding to the minimum value of frequency input 1 (DIO1). Defines the value that corresponds internally to the minimum input frequency defined by 11.42 Freq in 1 min (via DIO1 when it is used as a frequency input). See 11.42 Freq in 1 min.										
		1		1 - 1	n	1/	Darameter				
	-32768.000 32767.000	0.000	-	1 = 1	n	У	Parameter				
11.45	-32768.000 32767.000 Freq in 1 at scaled	0.000 d max	-				Parameter				
11.45	-32768.000 32767.000 Freq in 1 at scaled Internal value corn Defines the value	0.000 d max responding to that correspo DIO1 when it i	nds intern	num value of freque ally to the maximula a frequency input).	ency input	1 (DIO1).					

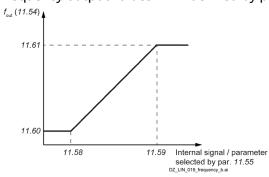
Index	Name	Name										
	Text											
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
11.54	Freq out 1 actual value											
	Value of frequency output 1 (DIO2).											
	Displays the value	of frequency	output 1 afte	er scaling in Hz (v	ria DIO2 wh	en it is use	ed as a					
	frequency output).											
	See 11.58 Freq out	1 src min.										
	0 16000	-	Hz	1 = 1 Hz	у	n	Signal					
11.55	Freq out 1 source			•	•							
	Source for frequen	Source for frequency output 1 (DIO2).										
	Selects a signal/parameter to be connected to frequency output 1 (via DIO2 when it is used as											
	a frequency output).											
	Other; source selection.											
	0: Zero ; not in use.											
	1: Used motor speed ; 01.01 Used motor speed filtered.											
	4: Motor current; 01.10 Motor current in A.											
	6: Motor torque; 01.17 Motor torque filtered.											
	8: Output power ; 01.24 Output power in kW.											
	10: Speed reference ramp input; 23.01 Speed reference ramp input.											
	11: Speed reference ramp output ; 23.02 Speed reference ramp output.											
	•	12: Used speed reference ; 24.01 Used speed reference.										
	13: Torque referen	•	•									
	16: Process PID ou	•		•								
	17: Process PID fee		•									
	18: Process PID set	•		•								
	19: Process PID de	viation actua	l; 40.04 Proc	1	n actual.							
	0 19	Zero	-	1 = 1	n	у	Parameter					

11.58 Freq out 1 src min

Internal value corresponding to minimum value of frequency output 1 (DIO2).

Defines the internal value that corresponds to the minimum frequency of frequency output 1 (via DIO2 when it is used as a frequency output).

Scaling parameters 11.58 and 11.59 set the low and high internal limits that corresponds to the frequency output values in Hz defined by parameters 11.60 and 11.61:



Setting parameter 11.58 as maximum value and parameter 11.59 as minimum value inverts the output:

Index	Name														
	Text														
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре								
	11.60 11.59 11.58 Internal signal / parameter selected by par. 11.55 DZ_LIN_019_frequency_b_ai														
	-32768.000 32767.000	0.000	-	1 = 1	n	у	Parameter								
11.59	Freq out 1 src ma	ax													
	Defines the inter (via DIO2 when it See 11.58 Freq ou -32768.000 32767.000	is used as a fre		to the maximum tput).	frequency	y	Parameter								
11.60	Freq out 1 at src	min					1								
	Minimum value of frequency output 1 (DIO2). Defines the minimum frequency of frequency output 1 in Hz (via DIO2 when it is used as a frequency output). See 11.58 Freq out 1 src min.														
			-		,										
	0 16000	0	Hz	1 = 1 Hz	n	у	Parameter								
11.61	Freq out 1 at src	0 max			n	у	Parameter								
11.61	Freq out 1 at src Maximum value of Defines the maxifrequency output See 11.58 Freq ou	0 max of frequency out mum frequency t). ut 1 src min.	put 1 (DIO of freque	2). ncy output 1 in Hz	(via DIO2 v	vhen it is u	sed as a								
	Freq out 1 at src Maximum value of Defines the maxifrequency output See 11.58 Freq out 0 16000	of frequency out mum frequency t).	put 1 (DIO	2).											
11.61	Freq out 1 at src Maximum value of Defines the maxifrequency output See 11.58 Freq out 0 16000 DIO filter time	max of frequency out mum frequency t). ut 1 src min. 16000	put 1 (DIO of freque	2). ncy output 1 in Hz	(via DIO2 v	vhen it is u	sed as a								
	Freq out 1 at src Maximum value of Defines the maxifrequency output See 11.58 Freq out 0 16000	max of frequency out frequency t). ut 1 src min. 16000	put 1 (DIO of freque	2). ncy output 1 in Hz 1 = 1 Hz	(via DIO2 v	vhen it is u	sed as a								

12 Standard Al

Configuration of standard analog inputs.

Index	Name											
	Text											
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
12.03	Al supervision function											
	Selects how th maximum limi	ts specified for an	en Al1 A input.	al3 signals move ou are selected by 12.0								

Index Name Text Range Default Unit Scale/FbEq16 Volatile Change running

The analog input signal supervision is activated when an analog input is used. E.g., set 22.11 Speed reference 1 = Al1 scaled, Al2 scaled or Al3 scaled.

- 0: No action; none, disable AI supervision function.
- 1: **Fault**; the event generates fault 80A0 AI supervision.
- 2: Warning; the event generates warning A8A0 AI supervision.

WARNING

Make sure that it is safe to continue operation in case of a communication break.

3: **Last speed**; the evet generates warning A8A0 Al supervision and freezes the speed to the level the drive was operating at. The last speed is determined based on the speed feedback using an 850 ms low-pass filter.

WARNING

Make sure that it is safe to continue operation in case of a communication break.

4: **Speed reference safe**; the event generates warning A8A0 AI supervision and sets the speed to the value defined in 22.46 Speed reference safe.

WARNING

Make sure that it is safe to continue operation in case of a communication break.

0 4	No action	-	1 = 1	n	у	Parameter
-----	-----------	---	-------	---	---	-----------

12.04 Al supervision selection

Activation of analog input supervision.

Specifies which limits of Al1 ... Al3 are supervised by12.03 Al supervision function. Bit assignment:

Bit	Name	Value	Remarks
0	AI1 < MIN	1	Minimum limit supervision of Al1 active. See 12.17 Al1 min.
1	AI1 > MAX	1	Maximum limit supervision of Al1 active. See 12.18 Al1 max.
2	AI2 < MIN	1	Minimum limit supervision of AI2 active. See12.27 AI2 min.
3	AI2 > MAX	1	Maximum limit supervision of AI2 active. See 12.28 AI2 max.
4	AI3 < MIN	1	Minimum limit supervision of AI3 active. See 12.37 AI3 min.
5	AI3 > MAX	1	Maximum limit supervision of AI3 active. See 12.38 AI3 max.
6 15	reserved		

The supervision applies a margin of 0.5 V or 1.0 mA, see 12.15 Al1 unit selection, to the limits. **Examples**:

- 12.17 Al1 min = 4.000 V. The minimum limit supervision activates at values lower than 3.500
 V. The limit supervision clears at values greater than 4.000 V.
- 12.18 Al1 max = 7.000 V. The maximum limit supervision activates at values greater than
 7.500 V. The limit supervision clears at values lower than 7.000 V.
- 12.17 Al1 min = 4.000 mA. The minimum limit supervision activates at values lower than
 3.000 mA. The limit supervision clears at values greater than 4.000 mA.
- 12.18 Al1 max = 7.000 mA. The maximum limit supervision activates at values greater than
 8.000 mA. The limit supervision clears at values lower than 7.000 mA.

	0000h FFFFh	0000h	-	1 = 1	n	у	Parameter
--	-------------	-------	---	-------	---	---	-----------

12.11 All actual value

Value of analog input Al1.

Displays the value of Al1 in mA or V corresponding to the setting of jumper J1 (see chapter I/O configuration of this manual).

	-22.000 22.000 or	-	mA or V	1000 = 1 mA	У	n	Signal
--	-------------------	---	---------	-------------	---	---	--------

Index	Name											
	Text											
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре					
	-11.000 11.000			or V								
2.12	Al1 scaled value											
	Scaled value of analog input Al1.											
	Displays the value	Scaled value of analog input Al1. Displays the value of Al1 after scaling.										
	Displays the value of AI1 after scaling. See 12.19 AI1 scaled at AI1 min and 12.20 AI1 scaled at AI1 max.											
	-32768.000	-	-	1 = 1	у	n	Signal					
	32767.000											
2.14	Al1 offset											
	Offset for analog i	nput Al1.										
	Adds an offset to I	l2.11 Al1 actua	l value.									
	-0.100 0.100	0.000	mA or V	1000 = 1 mA	n	у	Parameter					
				or V								
2.15	Al1 unit selection											
	Unit selection of a	nalog input Al	1.									
	Selects the unit fo	_	_				esponding t					
	the setting of jum	per J1 (see cha	apter <u>I/O co</u>	nfiguration of th	is manual)	•						
	2: V ; volts.											
	10: mA ; milliamps.				1		1					
	2 10	V	-	1 = 1	n	У	Parameter					
2.16	Al1 filter time											
	Filter time constar	nt of analog in	put Al1.									
	Defines the filter time constant for AI1.											
	¹ % ↑ 1	Jnfiltered signa	ı									
		ormitor ou orgina	.•									
	100											
	62											
	63 Filtered signal											
	\downarrow \downarrow \downarrow											
	Ť											
	$O = I \times (1 - e^{t/T})$											
	$O = I \times (1 - e^{-t/T})$											
	L = filter input (step)											
	I = filter input (step)											
	O = filter outpu	ι										
	t = time T = filter time constant											
	T = filter time constant											
	The signal is also f	SF_880_024_DCS_filler_aai The signal is also filtered due to the analog input hardware (approximately 0.25 ms time										
	constant). This car	nnot be chang	ed by any p	arameter.								
	0.000 30.000	0.100	s	1000 = 1 s	n	у	Parameter					
2.17	Al1 min	•		•			•					
	Minimum value of	analog input A	\l1.									
	Defines the minim			nA or V.								
	Parameters 12.17 a	.nd 12.18 set tr	ne low and h	nigh limit of the a	nalog inpu	ıt signal in	mA or V.					
	Parameters 12.17 a Scaling parameter			nigh limit of the a ne internal values								

	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	Al _{scaled} (12	12)									
	12.20 Al _{scaled} (12.12) 12.20										
	12.										
	-22.000 22.000 o			1000 = 1 mA	n	у	Parameter				
	-11.000 11.000	-10.000		or V							
12.18	Maximum value of a Defines the maximu See 12.17 Al1 min.	ım input value	e for Al1 in	_	I	1	Dawa wa atau				
	-22.000 22.000 o	20.000 or 10.000	mA or V	1000 = 1 mA	n	У	Parameter				
12.19	Al1 scaled at Al1 mi	n	ninimum a	or V	alue.						
12.19	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polar See 12.17 Al1 min. -32768.000	n sponding to n value that co	rresponds f 12.19 and	nalog input Al1 va	Al1 value d	-					
	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polari See 12.17 Al1 min. -32768.000 32767.000	sponding to n value that co ity settings of -1500.000	rresponds f 12.19 and	nalog input Al1 va to the minimum 12.20 can effectiv	AI1 value d ely invert t	the analog	input.				
	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polar See 12.17 Al1 min. -32768.000	sponding to n value that co ity settings of -1500.000 ax sponding to n	f 12.19 and	nalog input Al1 va to the minimum 12.20 can effective 1 = 1	AI1 value d vely invert t n alue.	the analog	Parameter				
12.20	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polari See 12.17 Al1 min32768.000 32767.000 Al1 scaled at Al1 ma Internal value corres Defines the internal See 12.17 Al1 min32768.000	sponding to n value that co ity settings of -1500.000 ax sponding to n value that co	f 12.19 and	nalog input Al1 va to the minimum 12.20 can effective 1 = 1	AI1 value d vely invert t n alue. AI1 value d	y defined by	Parameter 12.18 AI1 max.				
12.20	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polari See 12.17 Al1 min32768.000 32767.000 Al1 scaled at Al1 ma Internal value corres Defines the internal See 12.17 Al1 min32768.000 32767.000 Al2 actual value Value of analog input Displays the value of configuration of thi -22.000 22.000 of	sponding to not value that could be settings of the settings o	rresponds f 12.19 and - naximum a prresponds	nalog input Al1 valto the minimum 12.20 can effective 1 = 1 analog input Al1 valto the maximum 1 = 1 onding to the set 1000 = 1 mA	Al1 value dively invert to n alue. Al1 value di n	y defined by	Parameter 12.18 Al1 max. Parameter				
12.20	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polari See 12.17 Al1 min32768.000 32767.000 Al1 scaled at Al1 ma Internal value corres Defines the internal See 12.17 Al1 min32768.000 32767.000 Al2 actual value Value of analog input Displays the value of configuration of thit -22.000 22.000 of configuration of thit	sponding to not value that could be settings of the settings o	naximum a	nalog input Al1 va to the minimum 12.20 can effective 1 = 1 analog input Al1 va to the maximum 1 = 1	Al1 value devely invertified in alue. Al1 value of in n	defined by	Parameter 12.18 Al1 max. Parameter c chapter I/O				
12.20	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polari See 12.17 Al1 min32768.000 32767.000 Al1 scaled at Al1 ma Internal value corres Defines the internal See 12.17 Al1 min32768.000 32767.000 Al2 actual value Value of analog input Displays the value of configuration of thi -22.000 22.000 of -11,000 11,000 Al2 scaled value Scaled value of analog Displays the value of See 12.29 Al2 scaled	ponding to not value that control ity settings of the relation	rresponds f 12.19 and - naximum a presponds - V corresponds mA or V	nalog input Al1 va to the minimum 12.20 can effective 1 = 1 analog input Al1 va to the maximum 1 = 1 onding to the set 1000 = 1 mA or V scaling.	All value devely inverted in alue. All value of inverted in alue. All value of jumps y	the analog y defined by 1	Parameter 12.18 Al1 max. Parameter chapter I/O Signal				
12.20	Al1 scaled at Al1 mi Internal value corres Defines the internal Changing the polari See 12.17 Al1 min32768.000 32767.000 Al1 scaled at Al1 ma Internal value corres Defines the internal See 12.17 Al1 min32768.000 32767.000 Al2 actual value Value of analog input Displays the value of configuration of thi -22.000 22.000 of -11,000 11,000 Al2 scaled value Scaled value of analogisplays the value of	ponding to not value that control ity settings of the relation	rresponds f 12.19 and - naximum a presponds - V corresponds mA or V	nalog input Al1 valto the minimum 12.20 can effective 1 = 1 analog input Al1 valto the maximum 1 = 1 onding to the set 1000 = 1 mA or V scaling.	Al1 value dively invertified in alue. Al1 value dively invertified in alue. Al1 value dively invertified in alue.	defined by	Parameter 12.18 Al1 max. Parameter c chapter I/O				

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	Adds an offset to 12	.21 AI2 actual	value.	•	•	•	•				
	-0.100 0.100	0.000	mA or V	1000 = 1 mA or V	n	у	Parameter				
2.25	AI2 unit selection										
	Unit selection of and Selects the unit for rathe setting of jumpe 2: V ; volts. 10: mA ; milliamps.	eadings and	settings re				responding t				
	2 10	V	_	1 = 1	n	у	Parameter				
12.26	AI2 filter time				1	13	1				
	Filter time constant Defines the filter tim See 12.16 Al1 filter tim 0.000 30.000	ne constant f		1000 = 1 s	ln .	У	Parameter				
12.27	Al2 min	0.100	3	1000-13	111	у	Farameter				
	as follows: Al _{scaled} (12.22 12.30	12.28 DZ_LIN_018_analog_a 4									
	-22.000 22.000 or	-20.000 or	mA or V	1000 = 1 mA	n	у	Parameter				
	-11.000 11.000	-10.000		or V							
2.28	AI2 max										
	Maximum value of analog input Al2. Defines the maximum input value for Al2 in mA or V. See 12.27 Al2 min.										
	-22.000 22.000 or -11.000 11.000	20.000 or 10.000	mA or V	1000 = 1 mA or V	n	у	Parameter				
2.29	AI2 scaled at AI2 mi	l .	1	1	I.	1	1				
	Internal value corres Defines the internal Changing the polarit See 12.27 Al2 min.	value that co	rresponds	to the minimum	AI2 value c	-					

Text Range -32768.000 32767.000 Al2 scaled at Al2 ma	Default	Unit	Scale/FbEq16	Volatile	Τ								
-32768.000 32767.000		Unit	Scale/FbEq16	Volatilo									
32767.000	<u> </u>		334.37.22423	Volatile	Change running	Туре							
AI2 scaled at AI2 ma	-100.000	-	1 = 1	n	у	Parameter							
ALL Scaled at ALL IIIa	x												
Internal value corres Defines the internal max. See 12.27 AI2 min. -32768.000	-		• .		defined by	12.28 AI2							
		1,,	1000 111	1		Te: 1							
	-	V	1000 = 1 V	У	n	Signal							
	AIO												
Displays the value of	AI3 after sca		N3 scaled at AI3 ma	ıx.									
-32768.000 32767.000	-	-	1 = 1	у	n	Signal							
Al3 offset													
Offset for analog input Al3. Adds an offset to 12.31 Al3 actual value.													
-0.100 0.100	0.000	V	1000 = 1 V	n	у	Parameter							
AI3 filter time													
Defines the filter tim	e constant f		j input AI3.										
0.000 30.000	0.100	s	1000 = 1 s	n	у	Parameter							
AI3 min													
Defines the minimum Parameters 12.37 and parameters 12.39 and follows: Al _{scaled} (12.40	n input value d 12.38 set th d 12.40 defin	e for AI3 in the low and the interest of the i	d high limit of the a	• .	-	_							
	-32768.000 32767.000 Al3 actual value Value of analog input Displays the value of -11.000 11.000 Al3 scaled value Scaled value of analog Displays the value of See 12.39 Al3 scaled a -32768.000 32767.000 Al3 offset Offset for analog input Adds an offset to 120.100 0.100 Al3 filter time Filter time constant of Defines the filter time See 12.16 Al1 filter time See 12.16 Al1 filter time Defines the minimum Parameters 12.37 and parameters 12.39 and follows: Al scaled (12.40 - 12.40	-32768.000 32767.000 AI3 actual value Value of analog input AI3. Displays the value of AI3 in V11.000 11.000 - AI3 scaled value Scaled value of analog input AI3. Displays the value of AI3 after scaled value of analog input AI3. Displays the value of AI3 after scaled value of AI3 scaled at AI3 min and respective and resp	-32768.000 32767.000 Al3 actual value Value of analog input Al3. Displays the value of Al3 in V11.000 11.000 - V Al3 scaled value Scaled value of analog input Al3. Displays the value of Al3 after scaling. See 12.39 Al3 scaled at Al3 min and 12.40 Albertal and 12.4	-32768.000 100.000 - 1 = 1 32767.000 Al3 actual value Value of analog input Al3. Displays the value of Al3 in V. -11.000 11.000 - V 1000 = 1 V Al3 scaled value Scaled value of analog input Al3. Displays the value of Al3 after scaling. See 12.39 Al3 scaled at Al3 min and 12.40 Al3 scaled at Al3 ma -32768.000 - - 1 = 1 32767.000 Al3 offset Offset for analog input Al3. Adds an offset to 12.31 Al3 actual value. -0.100 0.100 0.000 V 1000 = 1 V Al3 filter time Filter time constant of analog input Al3. Defines the filter time constant for analog input Al3. See 12.16 Al1 filter time. 0.000 30.000 0.100 s 1000 = 1 s Al3 min Minimum value of analog input Al3. Defines the minimum input value for Al3 in V. Parameters 12.37 and 12.38 set the low and high limit of the aparameters 12.39 and 12.40 define the internal values that co follows:	-32768.000 100.000 - 1 = 1 n n 32767.000 Al3 actual value Value of analog input Al3. Displays the value of Al3 in V. -11.000 11.000 - V 1000 = 1 V y Al3 scaled value Scaled value of analog input Al3. Displays the value of Al3 after scaling. See 12.39 Al3 scaled at Al3 min and 12.40 Al3 scaled at Al3 max. -32768.000 - - 1 = 1 y 32767.000 Al3 offset	-32768.000 100.000 - 1 = 1 n y 32767.000 AI3 actual value Value of analog input AI3. Displays the value of AI3 in V11.000 11.000 - V 1000 = 1 V y n AI3 scaled value Scaled value of analog input AI3. Displays the value of AI3 after scaling. See 12.39 AI3 scaled at AI3 min and 12.40 AI3 scaled at AI3 max32768.000 - 1 = 1 y n AI3 offset Offset for analog input AI3. Adds an offset to 12.31 AI3 actual value0.100 0.100 0.000 V 1000 = 1 V n y AI3 filter time Filter time constant of analog input AI3. Defines the filter time constant for analog input AI3. See 12.16 AII filter time. 0.000 30.000 0.100 s 1000 = 1 s n y AI3 min Minimum value of analog input AI3. Defines the minimum input value for AI3 in V. Parameters 12.37 and 12.38 set the low and high limit of the analog input signal in parameters 12.39 and 12.40 define the internal values that correspond to these lin follows: AI							

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	-11.000 11.000	-10.000	V	1000 = 1 V	n	у	Parameter			
12.38	AI3 max									
	Maximum value of an Defines the maximum See 12.37 Al3 min.			V.						
	-11.000 11.000	10.000	٧	1000 = 1 V	n	у	Parameter			
12.39	AI3 scaled at AI3 min									
	Internal value corresponding to minimum analog input Al3 value. Defines the internal value that corresponds to the minimum Al3 value defined by 12.37 Al3 min. Changing the polarity settings of 12.39 and 12.40 can effectively invert the analog input. See 12.37 Al3 min.									
	-32768.000 32767.000	-100.000	-	1 = 1	n	у	Parameter			
12.40	AI3 scaled at AI3 max									
	Internal value corres Defines the internal			• .		defined by	12.38 AI3			
	max.									
	See 12.37 AI3 min.				_	_	_			
	-32768.000 32767.000	100.000	-	1 = 1	n	У	Parameter			

13 Standard AO

Configuration of standard analog outputs.

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
13.11	AO1 actual value									
	Value of analog output AO1. Displays the value of AO1 in mA or V corresponding to the setting of jumper J5 (see chapter I/O configuration of this manual).									
	0.000 22.000 or -10.000 10.000	-	mA or V	1000 = 1 mA or V	У	n	Signal			
13.12	AO1 source									
	Source for analog of Selects a signal/par mode to feed a conso Other; source select 0: Zero; not in use. 1: Used motor speed 4: Motor current; 01 6: Motor torque; 01. 7: Armature voltage 8: Output power; 01 10: Speed reference 11: Speed reference 12: Used speed reference 13: Torque reference	ameter to be stant current to ion. d; 01.01 Used .10 Motor cur 17 Motor torq; 28.05 Armat .24 Output po ramp input; 2 ramp output; rence; 24.01 U	motor spe rent in A. que filtered ure voltago ower in kW 23.01 Speed ; 23.02 Speed Jsed speed	erature sensor. ed filtered. e. d reference ramped reference.	o input.	the output	to excitation			

	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change	Туре			
	<u> </u>				1.	running				
	16: Process PID output actual ; 40.01 Process PID output actual. 17: Process PID feedback actual ; 40.02 Process PID feedback actual.									
		•								
		setpoint actual; deviation actual		•						
			•			1 2 DT1	00 concorc			
	20: Force PT100 excitation ; AO1 is used to feed an excitation current to 1 3 PT100 sensors See chapter Motor thermal protection of this manual.									
	See chapter Motor thermal protection of this manual. 21: Force KTY84 excitation; AO1 is used to feed an excitation current to a KTY84 sensor. See									
		thermal protection								
	-	excitation; AO1 is			urrent to 1	3 PTC se	ensors. See			
		thermal protectio								
		00 excitation; AO			on current	to 1 3 PT	1000			
	sensors. See ch	napter <u>Motor ther</u>	mal protec	<mark>tion</mark> of this manu	al.					
	37: AO1 data st	: orage ; see 13.91 <i>A</i>	AO1 data st	orage.						
	38: AO2 data s t	torage ; see 13.92 <i>i</i>	4O2 data s	torage.						
	0 38	Used motor	r -	1 = 1	n	у	Parameter			
		speed								
3.15	AO1 unit select									
	Unit selection of analog output AO1.									
	Selects the unit for readings and settings related to AO1. Set to either mA or V corresponding									
	to the setting of jumper J5 (see chapter <u>I/O configuration</u> of this manual).									
	2: V ; volts.									
	10: mA ; milliam	·				1				
	2 10	V	-	1 = 1	n	у	Parameter			
.3.16	AO1 filter time									
13.16	Filter time cons	stant of analog ou	•							
.3.16	Filter time cons Defines the filt		•							
.3.16	Filter time cons	stant of analog ou er time constant f	or AO1.							
3.16	Filter time cons Defines the filt	stant of analog ou	or AO1.							
13.16	Filter time cons Defines the filt	stant of analog ou er time constant f	or AO1.							
13.16	Filter time cons Defines the filte %	stant of analog ou er time constant f	or AO1.							
13.16	Filter time cons Defines the filt	stant of analog ou er time constant f	or AO1.							
.3.16	Filter time cons Defines the filte %	stant of analog ou er time constant f Unfiltered signa	or AO1.							
3.16	Filter time cons Defines the filte %	stant of analog ou er time constant f Unfiltered signa	or AO1.							
.3.16	Filter time cons Defines the filte %	stant of analog ou er time constant f Unfiltered signa	or AO1.							
13.16	Filter time cons Defines the filte %	stant of analog ou er time constant f Unfiltered signa	For AO1.							
13.16	Filter time cons Defines the filte % 100 63	er time constant f Unfiltered signa Filtered signal	For AO1.							
13.16	Filter time cons Defines the filte %	er time constant f Unfiltered signa Filtered signal	For AO1.							
.3.16	Filter time cons Defines the filte % 100 63 T O = I × (1 -	er time constant f Unfiltered signa Filtered signal	For AO1.							
3.16	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo	er time constant for Unfiltered signal Filtered signal e ^{-t/T}) ut (step)	For AO1.							
3.16	Filter time cons Defines the filte % 100 63 T O = I × (1 -	er time constant for Unfiltered signal Filtered signal e ^{-t/T}) ut (step)	For AO1.							
13.16	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo O = filter ou	er time constant f Unfiltered signa Filtered signal e ^{-t/T}) ut (step) utput	For AO1.							
3.16	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo O = filter ou t = time T = filter time	er time constant f Unfiltered signa Filtered signal e ^{-t/T}) ut (step) utput ne constant	t	1000 = 1 c	n	Tv.	Darameta			
	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo O = filter ou t = time T = filter tim 0.000 30.000	er time constant f Unfiltered signa Filtered signal e ^{t/T}) ut (step) utput ne constant 0 0.100	Tor AO1.	1000 = 1 s	n	у	Paramete			
	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo O = filter out t = time T = filter time O.000 30.000 AO1 source min	er time constant f Unfiltered signa Filtered signal e ^{-t/T}) ut (step) utput ne constant 0 0.100 n	t So 024_DCS_filter_a.ai S	1		у	Parameter			
13.16	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo O = filter out t = time T = filter time O.000 30.000 AO1 source minus	er time constant f Unfiltered signal Filtered signal e ^{-t/T}) ut (step) utput ne constant 0 0.100 n orresponding to r	For AO1.	nalog output AO1	L value.	1-	Parameter			
	Filter time cons Defines the filte % 100 63 T O = I × (1 - I = filter inpo O = filter ou t = time T = filter tim 0.000 30.000 AO1 source minus Internal value of Defines the internal	er time constant f Unfiltered signa Filtered signal e ^{-t/T}) ut (step) utput ne constant 0 0.100 n	t Social Section A01. t t s minimum a prresponds	nalog output AOI	l value. required A	O1 value.	1			

Index	Name								
	Text								
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре		
	13.19 13.17 Setting parameter 1 output: U _{AO1} (W) I _{AO1} (MA) 13.20 13.17	DZ_LIN_016_scal	d by 13.12 num value a	and parameter 1:	3.18 as min	imum valu	e inverts the		
	-32768.0 32767.0		ed by 13.12	1 = 1	n	у	Parameter		
13.18	AO1 source max	-1300.0		1-1	111	у	raiametei		
	Internal value corres Defines the internal See 13.17 AO1 sourc	value that co e min.	rresponds	to the maximum	required A	1	In		
10.10	-32768.0 32767.0	1500.0	-	1 = 1	n	У	Parameter		
13.19	Minimum analog ou Defines the minimu See 13.17 AO1 sourc 0.000 22.000 or -10.000 10.000	tput AO1 valu m output valu		n mA or V. 1000 = 1 mA or V	n	у	Parameter		
13.20	AO1 out at AO1 src		1	1	I	1	1		
	Maximum analog or Defines the maximu See 13.17 AO1 sourc 0.000 22.000 or -10.000 10.000	ım output val		in mA or V. 1000 = 1 mA or V	n	У	Parameter		
13.21	AO2 actual value	10.000		O1 V			1		
13.21	Value of analog out Displays the value o		T.,	1000 111		T	Ta:		
	-10.000 10.000	-	V	1000 = 1 V	у	n	Signal		
13.22	AO2 source Source for analog o Selects a signal/par mode to feed a con	ameter to be			tively, sets	the output	to excitation		

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	See 13.12 AO1 sour	ce.			•	•	•			
	0 38	Armature voltage	-	1 = 1	n	у	Parameter			
3.26	AO2 filter time									
	Filter time constant of analog output AO2.									
	Defines the filter time constant for AO2.									
	See 13.16 AO1 filte	r time.								
	0.000 30.000	0.100	s	1000 = 1 s	n	у	Paramete			
.27	AO2 source min	•								
				low and high interneters 13,29 and 13		that corres	ponds to tr			
	13.29 13.27 Setting parameter U _{AO2} (V) 13.30 13.29 1 1 13.28	13.28 r 13.27 as maxii	— Internal valu	y 13.22 e and 13.28 as mini	imum value	e inverts th	e output:			
	13.27 Setting parameter U _{AO2} (V) 13.30 13.29	r 13.27 as maxi	selected b DZ_LIN_016_scaling_t mum valu	y 13.22 e and 13.28 as mini e 13.28 as mini	imum value	e inverts th	e output:			
	13.27 Setting parameter U _{AO2} (V) 13.30 13.29	r 13.27 as maxi	selected b DZ_LIN_016_scaling_t mum valu Internal valu selected by	y 13.22 e and 13.28 as mini e 13.28 as mini	imum value		·			
3.28	13.27 Setting parameter U _{AO2} (V) 13.30 13.29 13.28	r 13.27 as maxi	selected b DZ_LIN_016_scaling_t mum valu Internal valu selected by DZ_LIN_016_scaling_b.ai	y 13.22 e and 13.28 as mini		e inverts th	e output:			
3.28	13.27 Setting parameter U _{AO2} (V) 13.29 -32768.0 32767. AO2 source max	13.27 as maxii	selected b DZ_LIN_016_scaling_t mum valu Internal valu selected by DZ_LIN_016_scaling_b.ai	y 13.22 e and 13.28 as mini 18.22 1 = 1	n		·			
3.28	13.27 Setting parameter U _{AO2} (V) 13.30 13.29 -32768.0 32767. AO2 source max Internal value corr	13.27 as maximum 13.27	selected b DZ_LIN_016_scaling_ts mum valu Internal valu selected by DZ_LIN_016_scaling_b.ai - maximum	y 13.22 e and 13.28 as mini 18.22 1 = 1 analog output AO	n 2 value.	у	·			
3.28	13.27 Setting parameter U _{AO2} (V) 13.30 13.29 -32768.0 32767. AO2 source max Internal value corr	13.27 as maximum 13.27	selected b DZ_LIN_016_scaling_ts mum valu Internal valu selected by DZ_LIN_016_scaling_b.ai - maximum	y 13.22 e and 13.28 as mini 18.22 1 = 1	n 2 value.	у	·			
3.28	Setting parameter U _{AO2} (V) 13.29 -32768.0 32767. AO2 source max Internal value corr Defines the intern See 13.27 AO2 sou	13.27 as maximum 13.27 13.27 0 -100.0 esponding to ral value that corce min.	selected b DZ_LIN_016_scaling_ts mum valu Internal valu selected by DZ_LIN_016_scaling_b.ai - maximum	y 13.22 e and 13.28 as mini 18.22 1 = 1 analog output AO ls to the maximum	n 2 value.	y AO2 value.	·			
3.28	Setting parameter U _{AO2} (V) 13.29 -32768.0 32767. AO2 source max Internal value corr Defines the intern	13.27 as maximum 13.27 13.27 13.27 0 -100.0 esponding to ral value that corce min. 0 100.0	selected by DZ_LIN_016_scaling_ts mum valu Internal valu selected by DZ_LIN_016_scaling_b.ai - maximum prrespond	y 13.22 e and 13.28 as mini 18.22 1 = 1 analog output AO	n 2 value. required A	у	Paramete			

Index	Name								
	Text								
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре		
	See 13.27 AO2 sourc	e min.							
	-10.000 10.000	-10.000	V	1000 = 1 V	n	у	Parameter		
13.30	AO2 out at AO2 src	max							
	Maximum analog ou Defines the maximu See 13.27 AO2 sourc	m output valu		in V.					
	-10.000 10.000	10.000	٧	1000 = 1 V	n	у	Parameter		
13.80	Scaling of fixed cur	rent output	•	1	•		•		
13.91	Displays the scaling voltage. This output terminals SDCS-COI X4:4 for units' size H-32500 32500 AO1 data storage Storage parameter	is used to me N-H01 XAO:4 a H7 and H8.	easure the and XAO:51	armature curren	t using an	oscilloscop	e. See		
	Storage parameter to analog output AO1: Storage parameter to set analog output AO1 via e.g., a fieldbus. To set analog output AO1 send a value e.g., via embedded fieldbus (see 58.101 Data I/O 1 58.124 Data I/O 24). Example: Set 58.101 Data I/O 1 = AO1 data storage and 13.12 AO1 source = AO1 data storage.								
	-327.68 327.67	0.00	-	100 = 1	n	у	Parameter		
13.92	AO2 data storage		•		•	•			
	Storage parameter Storage parameter To set analog output 58.124 Data I/O 24). Example: Set 58.101	to set analog of t AO2 send a $^{\circ}$	output AO value e.g., v	via embedded fie torage and 13.22	AO2 sourc	e = AO2 da	ta storage.		
	-327.68 327.67	0.00	-	100 = 1	n	у	Param		

14 I/O extension module 1

Configuration of I/O extension module 1.

The contents of the parameter group vary according to the selected I/O extension module type.

Attention: A maximum of 3 I/O extension modules of any combination can be activated and configured using parameter groups 14 ... 16.

Index	Name Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
14.01	Module 1 type									
	0: None ; inacti 1: FIO-01 ; adds 2: FIO-11 ; adds 3: FDIO-01 ; ad	specifies the type		xtension module 1.						
	0 4	None	-	1 = 1	n	n	Parameter			
14.02	Module 1 location									

Index Name Text Range Default Unit Scale/FbEq16 Volatile Change running

First I/O extension module location.

Activates and specifies the slot $(1 \dots 3)$ on the drive's control board into which the I/O extension module 1 is installed. Alternatively, specifies the node ID of the slot on a FEA-03 I/O extension module.

- 1: Slot 1; I/O extension module 1 is in slot 1.
- 2: Slot 2; I/O extension module 1 is in slot 2.
- 3: Slot 3; I/O extension module 1 is in slot 3.
- **04** ... **254**: Node ID of the slot on a FEA-03 I/O extension module.

Note: The node ID of the slot on a FEA-03 I/O extension module can be typed in using Drive Composer or set using the control panel.

1 ... 254 | Slot 1 | - | 1 = 1 | n | n | Parameter

14.03 Module 1 status

First I/O extension module status.

- 0: No option; no module detected in the specified slot.
- 1: No communication; a module has been detected but cannot be communicated with.
- 2: **Unknown**; the module type is unknown.
- 15: **FIO-01**; a FIO-01 has been detected and is active.
- 20: FIO-11; a FIO-11 has been detected and is active.
- 24: FAIO-01; a FAIO-01 has been detected and is active.
- 25: FDIO-01; a FDIO-01 has been detected and is active.

0 ... 24 - | 1 = 1 | y | n | Signal

14.05 DI status

Status of digital inputs.

(Visible when 14.01 Module 1 type = FDIO-01)

Displays the electrical status of DI1 ... DI3. The activation/deactivation delays of the inputs (if any are specified) are ignored. A filtering time is defined by 14.08 DI filter time.

Bits 0 ... 2 reflect the status of DI1 ... DI3.

Example: 0000000000000011b = DI2 and DI1 are on, DI3 is off.

Bit assignment:

Bit	Name	Value	Remarks
0	DI1	1	On.
1	DI2	1	On.
2	DI3	1	On.
3 15	reserved		

ı							
	0000h FFFFh	-	-	1 = 1	у	n	Signal

14.05 DIO status

Status of digital input/outputs.

(Visible when 14.01 Module 1 type = FIO-01 or FIO-11)

Displays the status of DIO1 ... DIO2/DIO4 on the extension module. The

activation/deactivation delays (if any are specified) are ignored. A filtering time (for input mode) is defined by 14.08 DIO filter time.

Bit 0 ... 3 reflect the status of DIO1 ... DIO4.

The number of active bits in this parameter depends on the number of digital input/outputs on the extension module.

Example: 000000000001001b = DIO1 and DIO4 are on, remainder are off.

Bit assignment:

	Name									
	Text					_	_			
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре		
	Bit	Name	Value	Remarks						
	0	DIO1	1	On.						
	1	DIO2	1	On.						
	2	DIO3	1	On.						
	3	DIO4	1	On.						
	4 15	reserved								
	0000h	FFFFh	-		1 = 1	у	n	Signal		
1.06	DI delaye					17	111	10.3		
	activation Bits 0	n/deactivati 2 reflect the 000000000	on delays status of	(if any are s DI1 DI3.	his word is update pecified). DI1 are on, DI3 is o	-	er			
	Bit	Name	Value	Remarks						
	0	DI1	1	On.						
	1	DI2	1	On.						
	2	DI3	1	On.						
	3 15	3 15 reserved								
			0000h	-	1 = 1	у	n	Signal		
	0000h	FFFFII					•	•		
1.06	DIO delay	ed status	ital input	/outputs.						
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod	odule 1 ty status of ctivation/o status of I bits in th dule.	pe = FIO-01 DIO1 DIO deactivation DIO1 DIO4 is paramete	2/DIO4 on the ext n delays (if any are	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example:	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod	odule 1 ty status of ctivation/o status of I bits in th dule.	pe = FIO-01 DIO1 DIO deactivation DIO1 DIO4 is paramete	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example: Bit assign	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod 000000000	odule 1 ty status of ctivation/o status of I bits in th dule.	rpe = FIO-01 DIO1 DIO deactivation DIO1 DIO4 is paramete 01b = DIO4	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example: Bit assign	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod 000000000 mment: Name	status of citivation/ostatus of E bits in the dule.	rpe = FIO-01 DIO1 DIO3 deactivation DIO1 DIO4 is paramete 01b = DIO4 a	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example: Bit assign	yed status status of dig yhen 14.01 M the delayed only after ac reflect the s per of active tension mod 000000000 nment: Name DIO1	status of ctivation/ostatus of E bits in the dule. Value 1	rpe = FIO-01 DIO1 DIO2 deactivation DIO1 DIO4 is paramete 01b = DIO4 a Remarks On.	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example: Bit assign	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod 000000000 mment: Name DIO1 DIO2	status of ctivation/otatus of E bits in the dule. Value 1 1	rpe = FIO-01 DIO1 DIO3 deactivation DIO1 DIO4 is paramete 01b = DIO4 a Remarks On. On.	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example: Bit assign Bit 0 1 2	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod 00000000 mment: Name DIO1 DIO2 DIO3	odule 1 ty status of ctivation/o status of E bits in th dule. 0000010 Value 1 1 1	rpe = FIO-01 DIO1 DIO2 deactivation DIO1 DIO4 is paramete 01b = DIO4 a Remarks On. On. On.	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			
1.06	DIO delay Delayed s (Visible w Displays updated Bit 0 3 The numl on the ex Example: Bit assign Bit 0 1 2 3	yed status status of dig when 14.01 M the delayed only after ac reflect the s per of active tension mod 000000000 nment: Name DIO1 DIO2 DIO3 DIO4 reserved	odule 1 ty status of ctivation/o status of E bits in th dule. 0000010 Value 1 1 1	rpe = FIO-01 DIO1 DIO2 deactivation DIO1 DIO4 is paramete 01b = DIO4 a Remarks On. On. On.	2/DIO4 on the ext n delays (if any are l. r depends on the I	specified) number of	digital inp			

	Text Range Default Unit Scale/FbEq16 Volatile Change running									
	Range	Default	Unit	Scale/FbEq16	Volatile	_	Туре			
	(Visible when 14.0									
	Defines a filter tin	ne constant for	· 14.05 DI s	status.	_					
	0.8 100.0	10.0	ms	10 = 1 ms	n	у	Parameter			
14.08	DIO filter time									
	Filter time consta									
	(Visible when 14.0									
	Defines a filter tin		14.05 DIC							
	0.8 100.0	10.0	ms	10 = 1 ms	n	У	Parameter			
14.09	DIO1 function									
	Function of digital (Visible when 14.0 Selects whether DO: Output ; DIO1 is 1: Input ; DIO1 is us	1 Module 1 type IO1 of the exte used as a digit	e = FIO-01 nsion mo tal output	dule is used as a d	igital input	or output				
	0 1	Input	Прис.	1 = 1	n	.,	Parameter			
14.11	DIO1 output sour		-	1 - 1	111	У	Parameter			
	(Visible when 14.0 Selects a signal/p parameter 14.09 I Other [bit]; sourc 0: Not energized; 1: Energized; outp 2: Ready run; 06.1 3: Ready on; 06.15 4: Enabled; 06.16. 8: Ready reference	arameter bit to DIO1 function = e selection. output is not e out is energized 5.b01 Main stat b00 Main stat	o be conne Output. nergized. l. cus word. us word.	ected to DIO1 of th	e extensio	n module v	when			

	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	0 50	Not energized	-	1 = 1	n	у	Parameter
4.12	DI1 ON delay		I	l	1		
	Activation delay for d (Visible when 14.01 M Defines the activation	odule 1 type	= FDIO-03	1)			
	*DI status	1	1 1			1 1	1 o
		1 1	1 1	1 1		1 1	
	**Delayed DI status	1	1 1 1	1		1	o
	_	1 1	1 1	1 1		1 1	\rightarrow
		< >	< >	\(\left\)		 ← >	[*] Time
		t_{On}	t_{Off}	t _{On}		t _{Off}	I_028_delay_b.ai
	t _{Off} = 14.13 DI1 OFF de *Electrical status of d **Indicated by 14.06 [ligital input.		by 14.05 DI statu	S.		
	0.00 3000.00	0.00	S	10 = 1 s	n	у	Parameter
	Defines the activation			or FIO-11)			
				or FIO-11)			1
	Defines the activation			or FIO-11)			1 — 0 1
	Defines the activation *DIO status	n delay for D					— о
	Defines the activation *DIO status	n delay for D		or FIO-11)			o
	Defines the activation *DIO status	n delay for D	IO1.			t _{Off}	$\begin{array}{c} \longrightarrow \\ 0 \\ 1 \\ \longrightarrow \\ \text{Time} \end{array}$
	*DIO status *DIO status **Delayed DIO status ton = 14.12 DIO1 ON detoff = 14.13 DIO1 OFF of *Electrical status of DIOI Indicated by 14.05 DIO	ton delay for D ton elay delay DIO (in input D status.	io1.	t_{0}	n	t _{Off}	0 0 Time N_028_delay_b.ai
	Delayed DIO status **Delayed DIO status ton = 14.12 DIO1 ON detoff = 14.13 DIO1 OFF of the telectrical status of DIO1 Indicated by 14.05 DIO1Indicated by 14.06 Indicated by 14.06	ton delay for D ton elay delay DIO (in input D status. DIO delayed	IO1.	t _O	d source (ir	t _{Off} _{DZ_LI}	0 1 0 → Time N_028_delay_b.ai ode).
L 12	**Delayed DIO status **Delayed DIO status ton = 14.12 DIO1 ON detoff = 14.13 DIO1 OFF cetal status of DIO1 and to	ton delay for D ton elay delay DIO (in input D status.	io1.	t_{0}	n	t _{Off}	0 0 Time N_028_delay_b.ai
l.13	**Delayed DIO status **Delayed DIO status ton = 14.12 DIO1 ON detoff = 14.13 DIO1 OFF of the telectrical status of DIO1 Indicated by 14.05 DIO1**Indicated by 14.06 Indicated by 14.06	ton elay delay delay lo (in input 0 status. DIO delayed 0.00 r digital inpu odule 1 type ion delay for	mode) or status. s ut DI1. = FDIO-03	status of selected	d source (ir	t _{Off} _{DZ_LI}	0 1 0 Time N_028_delay_b.ai ode).

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	Deactivation delay fo				•	•	
	(Visible when 14.01 N			or FIO-11)			
	Defines the deactiva	•	r DIO1.				
	See 14.12 DIO1 ON de		1	T.2 .	1	1	1_
	0.00 3000.00	0.00	S	10 = 1 s	n	У	Parameter
14.14	DIO2 function						
	Function of digital in			o :: EIO 11)			
	(Visible when 14.01 N Selects whether DIO				igital input	t or output	
	0: Output ; DIO2 is us				igitai ilipui	t or output	•
	1: Input; DIO2 is used	_	•	•			
	01	Input	T-	1 = 1	n	у	Parameter
14.16	DIO2 output source	1	<u> </u>				
	Source for digital inp	out/output D	0102.				
	(Visible when 14.01 N			or FIO-11)			
	Selects a signal/para				n paramet	er 14.14 DIO	D2 function =
	Output.						
	See 14.11 DIO1 outpu	it source.	•		•		
	0 50	Not	-	1 = 1	n	у	Parameter
		energized					
14.17	DI2 ON delay						
	Activation delay for	•					
	(Visible when 14.01 N			01)			
	Defines the activation	_)12.				
	See 14.12 DI1 ON dela	0.00	T_	10 = 1 s	In	1,,	Davamenter
14.17	+	0.00	S	10 - 1 5	n	У	Parameter
14.17	DIO2 ON delay	طنمندما نصميد	/a+ D	VO2			
	Activation delay for (Visible when 14.01 N	-	-				
	Defines the activation			OI FIO-11)			
	See 14.12 DIO1 ON de	-	JOL.				
	0.00 3000.00	0.00	s	10 = 1 s	n	у	Parameter
14.18	DI2 OFF delay	1 - 1 - 1			1	17	
	Deactivation delay for	or digital inp	ut DI2				
	(Visible when 14.01 N	•		01)			
	Defines the deactiva			•			
	See 14.12 DI1 ON dela	ay.					
	0.00 3000.00	0.00	S	10 = 1 s	n	у	Parameter
14.18	DIO2 OFF delay						
	Deactivation delay for	or digital inp	ut/outpu	t DIO2.			
	(Visible when 14.01 N			or FIO-11)			
	Defines the deactiva	-	r DIO2.				
	See 14.12 DIO1 ON de		1		1	<u> </u>	1
	0.00 3000.00	0.00	S	10 = 1 s	n	У	Parameter
14.19	DIO3 function						
	Function of digital in						
	(Visible when 14.01 N			•	المناجعة المستوا	h au airkii 1	
	Selects whether DIO	उ or the exte	nsion mo	dule is used as a d	igital input	or output	•

	Name Text										
	Text										
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	_	t ; DIO3 is us DIO3 is used	_	•							
	0 1		Input	-	1 = 1	n	у	Parameter			
4.19	Al superv	ision functi	ion	•	•	•		•			
	(Visible was Selects have maximum The input selection The analo Speed reform to the analog a	n limits spects and the line. og input signiference 1 = A ion; none, d the event ge ig; the event G e that it is s beed; the event drive was op 850 ms low-	reacts wher cified for the mits to be o hal supervisional supervisional scaled, A isable AI superates fault generates afe to continent generates berating at. pass filter.	e = FIO-11 n AI1 AI2 e input. bserved and ion is active in act	2/AI3 signals move re selected by para vated when the an or AI3 scaled.	ameter 14.7 alog input n. ommunicat ion and fre d based on	20 AI super is used. E. cion break. eezes the s the speed	rvision g., set 22.11 peed to the I feedback			
	to the va	lue defined i G	afe ; the ever in 22.46 Spe	nt generat ed referen	es warning A8A0 <i>i</i> nce safe.	Al supervis	ion and se	ts the speed			
	to the val WARNING Make sur	lue defined i G	afe ; the ever in 22.46 Spe afe to conti	nt generat ed referen nue opera	es warning A8A0 and the safe.	Al supervis	ion and se	ts the speed			
.4.20	to the val WARNING Make sur 0 4	lue defined i G	afe; the ever in 22.46 Spe afe to conti No action	nt generat ed referen nue opera	es warning A8A0 <i>i</i> nce safe.	Al supervis	ion and se	ts the speed			
4.20	warning Make sur 0 4 Al superv Activatio (Visible w	lue defined i G e that it is s vision select n of analog when 14.01 M which limit	afe; the ever in 22.46 Spe afe to conti No action tion input super flodule 1 type	nt generat ed referen nue opera - vision. e = FIO-11	tion in case of a co	Al supervis ommunicat n	ion and se	ts the speed			
4.20	WARNING Make sur 0 4 Al superv Activatio (Visible w Specifies	lue defined i G e that it is s vision select n of analog when 14.01 M which limit	afe; the ever in 22.46 Spe afe to conti No action tion input super flodule 1 type	nt generat ed referen nue opera - vision. e = FIO-11	tion in case of a co 1 = 1 or FAIO-01) supervised by 14.1	Al supervis ommunicat n	ion and se	ts the speed			
4.20	Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign	lue defined i G Te that it is s Vision select The of analog When 14.01 M The which limits The original of the select The origin	afe; the ever in 22.46 Spe afe to conti No action input super lodule 1 types s of Al1 A	nt generated reference operated and reference	tion in case of a co 1 = 1 or FAIO-01) supervised by 14.1	ommunicat n	ion and se	Parameter			
4.20	Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0	lue defined i G e that it is s vision select n of analog when 14.01 M s which limit nment: Name	afe; the ever in 22.46 Spe afe to conti No action input super fodule 1 type s of Al1 A	nt generated reference of reference operated refere	tes warning A8A0 Ance safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1	ommunicat n 9 Al super	ion and settion break. y vision function	Parameter			
4.20	Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1	lue defined i G re that it is s vision select n of analog when 14.01 M s which limit nment: Name Al1 < MIN Al1 > MAX	afe; the ever in 22.46 Spe afe to continuous No action input super sof Al1 A Value 1 1	nt generated reference operated	tes warning A8A0 Ance safe. tion in case of a column limit supervision in limit supervision	of All activ	ion and settion break. y vision functive. See 14.3 ve. See 14.3	Parameter stion. 33 Al1 min. 34 Al1 max.			
4.20	Make sur O 4 Al superv Activatio (Visible w Specifies Bit assign Bit O 1 2	lue defined i G e that it is s vision select n of analog when 14.01 M s which limit nment: Name AI1 < MIN AI1 > MAX AI2 < MIN	afe; the ever in 22.46 Spe afe to continuous No action input superflodule 1 types of Al1 A	nt generated reference on the operation of the operation	tes warning A8A0 Ance safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1 n limit supervision in limit supervision in limit supervision	of Al1 action	ion and settion break. y vision function ve. See 14.3 ve. See 14.4	Parameter Table 1 Parameter Table 2 Parameter Table 3 Al1 min. Table 3 Al1 max. Table 4 Al2 min.			
4.20	Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3	lue defined i G e that it is s vision select n of analog when 14.01 M which limit nment: Name Al1 < MIN Al1 > MAX Al2 < MIN Al2 > MAX	afe; the ever in 22.46 Spe afe to continuous No action input superflodule 1 types of Al1 A Value 1 1 1 1	nt generated reference operated	tion in case of a control of the safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1 In limit supervision	of All action of Al2 action of Al2 action	ve. See 14.3 ve. See 14.4 ve. See 14.4 ve. See 14.4 ve. See 14.4	Parameter Thion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max.			
4.20	warning Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3 4	lue defined i G e that it is s vision select n of analog when 14.01 M s which limit nment: Name Al1 < MIN Al2 < MIN Al2 > MAX Al3 < MIN	afe; the ever in 22.46 Spe afe to continuous No action input superflodule 1 types of Al1 A Value 1 1 1 1 1 1	nt generated reference operated	tion in case of a control of the safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1 in limit supervision in limit supervi	of All activof Al2 activof Al3 activ	ve. See 14.3 ve. See 14.4 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Thion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min.			
.4.20	Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3 4 5	lue defined i get hat it is s vision select n of analog when 14.01 M which limit nment: Name Al1 < MIN Al1 > MAX Al2 < MIN Al2 > MAX Al3 < MIN Al3 > MAX	afe; the ever in 22.46 Spe afe to continuous No action input superflodule 1 types of Al1 A Value 1 1 1 1 1 1	nt generated reference operated	tion in case of a control of the safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1 In limit supervision	of All activof Al2 activof Al3 activ	ve. See 14.3 ve. See 14.4 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Thion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min.			
.4.20	warning Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3 4	lue defined i G e that it is s vision select n of analog when 14.01 M s which limit nment: Name Al1 < MIN Al2 < MIN Al2 > MAX Al3 < MIN	afe; the ever in 22.46 Spe afe to continuous No action input superflodule 1 types of Al1 A Value 1 1 1 1 1 1	nt generated reference operated	tion in case of a control of the safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1 in limit supervision in limit supervi	of All activof Al2 activof Al3 activ	ve. See 14.3 ve. See 14.4 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Thion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min.			
4.20	WARNING Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3 4 5 6 15	lue defined i G re that it is s vision select n of analog when 14.01 M which limit nment: Name Al1 < MIN Al1 > MAX Al2 < MIN Al2 > MAX Al3 < MIN Al3 > MAX reserved	afe; the ever in 22.46 Spe afe to continuous input superfocule 1 types of Al1 A Value 1 1 1 1 1 1	nt generated reference operated	tion in case of a control of the con	of All action of Al2 action of Al3 action of Al3 action	ve. See 14.3 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Thion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min. 64 Al3 max.			
	warning Make sur O 4 Al supery Activatio (Visible w Specifies Bit assign Bit O 1 2 3 4 5 6 15	lue defined i G e that it is s vision select n of analog when 14.01 M which limit nment: Name AI1 < MIN AI2 < MIN AI2 > MAX AI3 < MIN AI3 > MAX reserved FFFFh	afe; the ever in 22.46 Spe afe to continuous No action input superflodule 1 types of Al1 A Value 1 1 1 1 1 1	nt generated reference operated	tion in case of a control of the safe. tion in case of a control of the safe. 1 = 1 or FAIO-01) supervised by 14.1 in limit supervision in limit supervi	of All activof Al2 activof Al3 activ	ve. See 14.3 ve. See 14.4 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Trion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min.			
4.20	WARNING Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3 4 5 6 15 0000h DIO3 out	lue defined i G re that it is s vision select n of analog when 14.01 M which limit nment: Name AI1 < MIN AI2 > MAX AI2 < MIN AI3 > MAX reserved FFFFh put source	afe; the ever in 22.46 Spe afe to contile No action input super dodule 1 types of Al1 A Value 1 1 1 1 1 1 1 1 1 1 1 1 1	nt generated reference operation. e = FIO-11 reference operation. e = FIO-11 reference operation. e = FIO-11 reference operation. Maximum Maxi	tion in case of a control of the con	of All action of Al2 action of Al3 action of Al3 action	ve. See 14.3 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Trion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min. 64 Al3 max.			
	WARNING Make sur 0 4 Al superv Activatio (Visible w Specifies Bit assign Bit 0 1 2 3 4 5 6 15 DIO3 out Source for	lue defined i G e that it is s vision select n of analog when 14.01 M which limit nment: Name AI1 < MIN AI2 < MIN AI2 > MAX AI3 < MIN AI3 > MAX reserved FFFFh	afe; the ever in 22.46 Spe afe to continuous input superflocide 1 types of Al1 A Value 1 1 1 1 1 1 1 1 1 1 1 1 1	nt generated reference operation. e = FIO-11 reference operation. e = FIO-11 reference operation. Remarks Minimum Maximum M	tion in case of a color of the safe. tion in case of a color of the safe. 1 = 1 or FAIO-01) supervised by 14.1 In limit supervision	of All action of Al2 action of Al3 action of Al3 action	ve. See 14.3 ve. See 14.4 ve. See 14.6 ve. See 14.6 ve. See 14.6 ve. See 14.6	Parameter Trion. 33 Al1 min. 34 Al1 max. 48 Al2 min. 49 Al2 max. 63 Al3 min. 64 Al3 max.			

Index	Name								
	Text								
	Range	C	efault	Unit	Scale/FbEq16	Volatile	Change running	Туре	
	See 14.11 DIO	1 output so	ource.	•		•		•	
	0 50		lot nergized	-	1 = 1	n	У	Parameter	
14.21	Al tune	<u>'</u>			-	•	· ·	•	
	and maximur Apply the mir function. See drawing a 0: No action; automatically 1: Al1 min tun 2: Al1 max tun max. 3: Al2 min tur min. 4: Al2 max tu max. 5: Al3 min tur min. (Visible of	14.01 Mode analog inport in input valid imum or not at 14.33 All tuning act reverts to re; the meane; the meane; the meane; the meane when 14.01 ne; the meane; the meane; the meane	dule 1 type ut tuning f ues instea naximum : I min. ion compl o this value asured value	= FIO-11 function, d of pote signal to eted, or r e after an ue at AI1 i ue at AI2 ue at AI2 type = FI lue at AI3	or FAIO-01) which uses the acception to action has been y tuning action. It written as mining is written as maximis which was accepted to the acceptance of the acceptanc	estimated and select to requested num value mum value mum value mum value mum value	values. the appropriate of Al1 into of Al2 into of Al2 into of Al2 into of Al3 into	riate tuning meter 14.33 Al1 min 14.34 Al1 14.48 Al2 0 14.49 Al2 14.63 Al3	
	0 6	N	lo action	-	1 = 1	у	у	Parameter	
14.22	DI3 ON delay								
	Activation de (Visible when Defines the a See 14.12 DI1	14.01 Mod ctivation d ON delay.	lule 1 type lelay for D	= FDIO-0 l3.		T	T	In .	
1100	0.00 3000.		0.00	S	10 = 1 s	n	У	Parameter	
14.22	Activation de (Visible when Defines the a See 14.12 DIO 0.00 3000.	lay for digi 14.01 Mod ctivation d 1 ON delay	lule 1 type lelay for D	= FIO-01		n	у	Parameter	
14.22	Al force selec			15	1-0 -0	1	Į J	1. d. diffictel	
14.22	Forced values selector for analog inputs. (Visible when 14.01 Module 1 type = FIO-11 or FAIO-01) The true readings of AI1 AI2/AI3 can be overridden for e.g., testing purposes. A forced value parameter (see table below) is provided for each analog input and its value is applied whenever the corresponding bit in 14.22 AI force selection is 1. Bit assignment:								
	_								
	Bit N	ame	Value	Remarks					

Force mode: Force Al1 to value of 14.28 Al1 force data.

Force mode: Force Al2 to value of 14.43 Al2 force data.

Al1

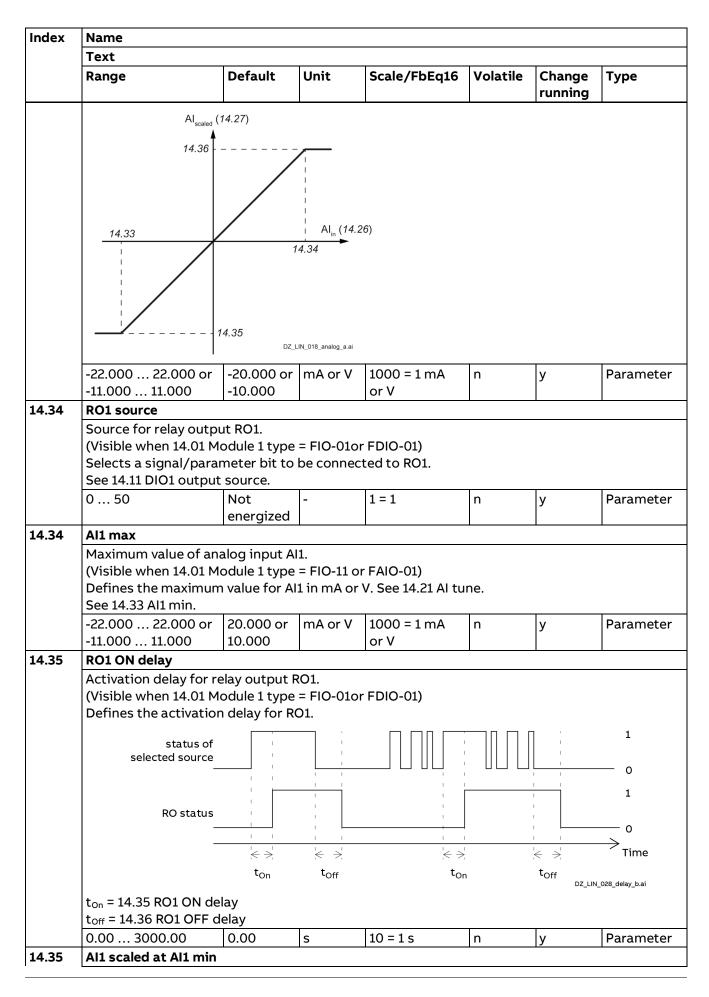
AI2

1

Index	Name							
	Text							
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	2	AI3	1	Force mo 11 only).	ode: Force Al3 to v	alue of 14.	58 AI3 forc	e data (FIO-
	3 15	reserved						
	0000h I		0000h	-	1 = 1	у	у	Parameter
4.23	DI3 OFF de							
	(Visible wh Defines th	on delay fo nen 14.01 M e deactivat DI1 ON dela	odule 1 typ ion delay fo	e = FDIO-0	1)			
	0.00 30	00.00	0.00	S	10 = 1 s	n	у	Parameter
4.23	DIO3 OFF	delay	•	•		•	1	
	Defines th	nen 14.01 M e deactivat DIO1 ON de 00 00	ion delay fo		10 = 1 s	n	у	Parameter
4.24	DIO4 func		10.00		10 - 13	1	У	T drameter
	0: Output;	DIO4 is used	ed as a digi	tal output.	put or output. 1 = 1	n	у	Parameter
4.26	DIO4 outp	ut source	1 '			<u> </u>	12	
	Source for (Visible wh Selects a s	digital inponen 14.01 M	odule 1 typ meter bit to	e = FIO-01)	cted to DIO4 whe	n 14.24 DIC	04 function	n = Output.
	0 50		Not	-	1 = 1	n	у	Parameter
			energized					
4.26	(Visible wh	nalog input nen 14.01 M	Al1. odule 1 typ	e = FIO-11 d	or FAIO-01) ling on whether tl	ne input is	set to curr	ent or
	-22.000 -11.000		-	mA or V	1000 = 1 mA or V	у	n	Signal
4.27	DIO4 ON c	lelay						
	(Visible wh Defines th See 14.12 [delay for d nen 14.01 M e activation DIO1 ON de	odule 1 typ n delay for I lay.	e = FIO-01) DIO4.			l.,	Darameter
4.07	0.00 30		0.00	S	10 = 1 s	n	У	Parameter
L4.27		value ue of analog nen 14.01 M		e = FIO-11 (or FAIO-01)			

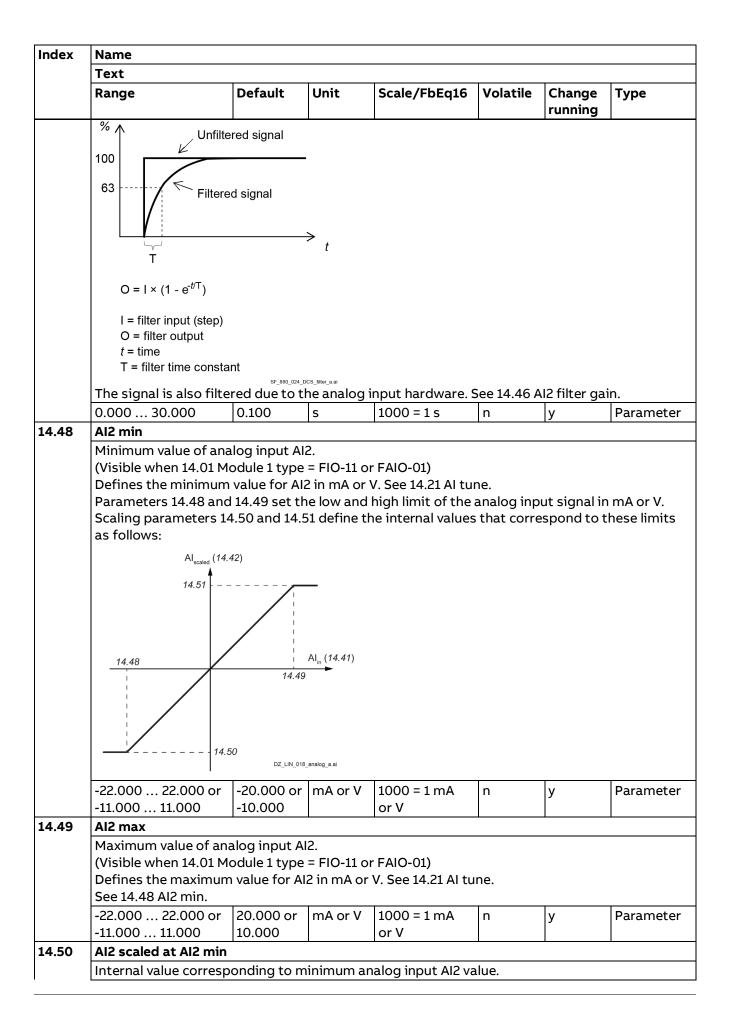
	Name							
	Text							
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	Displays the							
	See 14.35 AI	1 scaled a	t Al1 min an	d 14.36 Al1	scaled at AI1 ma	х.		
	-32768.000 32767.000		-	-	1 = 1	у	n	Signal
14.28	DIO4 OFF d	elay						
	Deactivation (Visible whe Defines the See 14.12 DI	en 14.01 Mo deactivat O1 ON del	odule 1 type ion delay fo ay.	e = FIO-01) or DIO4.				1-
	0.00 3000		0.00	S	10 = 1 s	n	у	Parameter
14.28		e of analog en 14.01 Mo e that can	odule 1 type be used ins		r FAIO-01) e true input value			
	See 14.22 AI		ction.	1	<u></u>			1
	-22.000 2 -11.000 11		0.000	mA or V	1000 = 1 mA or V	У	У	Parameter
14.29	Al1 HW swit	tch positio	on					
	unit selection		rent/voltag	ge selector i	must match the i	unit selecti	on made ir	n 14.30 AI1
	2: V; volts. 10: mA; milli	iamps.						
	10: mA; milli 2 10	·	-	-	1 = 1	у	n	Signal
14.30	10: mA; milli 2 10 Al1 unit selection (Visible when selects the setting of hardware see 2: V; volts.	ection on of anaken 14.01 Me unit for re of the I/O etting is al	odule 1 type adings and extension r	e = FIO-11 o settings re module (se	1	to either m	nA or V corr	responding to
14.30	10: mA; milli 2 10 All unit selection (Visible when selects the setting of hardware see	ection on of anaken 14.01 Me unit for re of the I/O etting is al	odule 1 type adings and extension r	e = FIO-11 o settings re module (se	r FAIO-01) lated to AI1. Set e manual of the I,	to either m	nA or V corr on module	responding to
	10: mA; milli 2 10 Al1 unit selection (Visible where Selects the entire setting of hardware setting o	ection on of anaken 14.01 Me unit for re of the I/O etting is al	odule 1 type adings and extension r so shown ir	e = FIO-11 o settings re module (se	r FAIO-01) lated to AI1. Set e manual of the I HW switch positi	to either m /O extensi	nA or V corr	esponding to). The
	10: mA; milli 2 10 Al1 unit selection (Visible where selects the extra the setting of hardware selects.) 10: mA; milli 2 10 RO status Status of recommendation (Visible where Displays the	ection on of analogen 14.01 Mounit for re of the I/O etting is all iamps. lay outputen 14.01 Moe e status of	mA S. Dodule 1 type adings and extension r so shown in	e = FIO-11 o settings re module (see n 14.29 AI1 I - e = FIO-01oi 2 on the I/O	r FAIO-01) clated to AI1. Set is manual of the I, is manual of th	to either m /O extension.	nA or V corr on module	esponding to). The
	10: mA; milli 2 10 Al1 unit selection (Visible where selects the extring of hardware section of the setting of the settin	ection on of analogen 14.01 Mounit for re of the I/O etting is all samps. lay output en 14.01 Mo e status of 00000000	mA S. Ddule 1 type adings and extension r so shown in mA S. Ddule 1 type RO1 RO2 0000001b	e = FIO-11 o settings re module (see n 14.29 AI1 I - e = FIO-01oi 2 on the I/O = RO1 is end	r FAIO-01) Plated to AII. Set to manual of the I, HW switch position of the I and the	to either m /O extension.	nA or V corr on module	esponding to). The
	10: mA; milli 2 10 Al1 unit selection (Visible where Selects the extra the setting of hardware setting of hardware setting) hardware setting of hardware setting	ection on of analogen 14.01 Mounit for re of the I/O etting is all iamps. lay outputen 14.01 Moe e status of	mA S. Dodule 1 type adings and extension r so shown in	e = FIO-11 o settings re module (see n 14.29 AI1 I - e = FIO-01oi 2 on the I/O	r FAIO-01) clated to AI1. Set to AII. Set	to either m /O extension.	nA or V corr on module	esponding to). The
14.30	10: mA; milli 2 10 Al1 unit selection (Visible where selects the extra the setting of hardware selects) 10: mA; milli 2 10 RO status Status of retermination (Visible where Displays the Example: 00 Bit assignment) Bit	ection on of analogen 14.01 Mounit for re of the I/O etting is all samps. lay output en 14.01 Mo e status of 00000000 ent: Name	mA ss. pdule 1 type adings and extension r so shown ir mA ss. pdule 1 type RO1 RO2 0000001b	e = FIO-11 o settings re module (see n 14.29 Al1 I - e = FIO-01o 2 on the I/C = RO1 is end	r FAIO-01) elated to AI1. Set to manual of the I, HW switch position of the I, and the I	to either m /O extension.	nA or V corr on module	esponding to). The

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	0000h FFFFh	-	-	1 = 1	у	n	Signal
14.31	Al1 filter gain						
	Hardware filter time of (Visible when 14.01 Mo Selects a hardware filt See 14.32 Al1 filter tim 0: No filtering ; no filte 1: 125 μs ; 125 microse 2: 250 μs ; 250 microse 3: 500 μs ; 500 microse 4: 1 ms ; 1 millisecond. 5: 2 ms ; 2 milliseconds 6: 4 ms ; 4 millisecond 7: 7.9375 ms ; 7.9375 m 0 7	odule 1 type ter time con le. ering. conds. econds. econds.	= FIO-11 or	r FAIO-01)	Ī _n	Tv.	Parameter
14.32	Al1 filter time	1 ms	-	1=1	n	у	Parameter
	100	e constant for red signal d signal	or Al1. - → t	FAIO-01)			
	The signal is also filte			1			
44.00	0.000 30.000	0.100	S	1000 = 1 s	n	у	Parameter
14.33	Al1 min Minimum value of ana (Visible when 14.01 Mo Defines the minimum Parameters 14.33 and Scaling parameters 14 as follows:	odule 1 type value for Al 14.34 set th	= FIO-11 or 1 1 in mA or 1 ne low and 1	V. See 14.21 AI tur nigh limit of the a	analog inp	-	



Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	Internal value corre (Visible when 14.03 Defines the interna See 14.33 Al1 min. -32768.000	1 Module 1 type	= FIO-11 o	r FAIO-01)		lefined by 1	.4.33 Al1 min
	32767.000	100.000			''	y	T drameter
4.36	RO1 OFF delay	I		_1			
	Deactivation delay (Visible when 14.0) Defines the deacti See 14.35 RO1 ON 0	1 Module 1 type vation delay fo	= FIO-01o	r FDIO-01)	n	у	Parameter
4.36	Al1 scaled at Al1 m	nax	•	•	•	•	•
	Internal value corre (Visible when 14.0) Defines the internal See 14.33 Al1 min. -32768.000	1 Module 1 type	= FIO-11 o	r FAIO-01)		defined by	14.34 Al1 ma
	32767.000	100.000				9	rarameter
4.37	RO2 source						
	(Visible when 14.03 Selects a signal/pa See 14.11 DIO1 out 0 50	arameter bit to			n	у	Parameter
		energized					
4.38	Activation delay for (Visible when 14.0) Defines the activation See 14.35 RO1 ON (0.00 3000.00)	1 Module 1 type tion delay for R	= FIO-01o	r FDIO-01)	ln	у	Parameter
4.39	RO2 OFF delay	10.00	1.5		1	را	1
	Deactivation delay (Visible when 14.0) Defines the deacti See 14.35 RO1 ON 0	1 Module 1 type vation delay fo	= FIO-01o	r FDIO-01)	n	У	Parameter
4.41	AI2 actual value	1	1	<u> </u>	_1	, J	1
	Value of analog ing (Visible when 14.0) Displays the value voltage. -22.000 22.000	1 Module 1 type of AI2 in mA or			he input is	set to curr	ent or Signal
	-11.000 11.000			or V			
4.42	AI2 scaled value						
	Scaled value of and (Visible when 14.0)		= FIO-11 o	r FAIO-01)			

	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	Displays the value of						
	See 14.50 AI2 scaled	d at AI2 min a	nd 14.51 Ala	2 scaled at AI2 ma	ıX.		
	-32768.000	-	-	1 = 1	у	n	Signal
	32767.000						
14.43	AI2 force data						
	Forced value of ana	•					
	(Visible when 14.01						
	Forced value that c		stead of th	e true input value	!.		
	See 14.22 Al force s	1		T	1		1
	-22.000 22.000 o	r 0.000	mA or V	1000 = 1 mA	У	У	Parameter
	-11.000 11.000			or V			
14.44	AI2 HW switch posi	ition					
	Unit selection swite	_	•				
	(Visible when 14.01						
	Displays the position			. •		•	
	The setting of the o	current/volta	ge selector	must match the	unit selecti	on made ir	n 14.45 AI2
	unit selection.						
	2: V; volts.						
	10: mA; milliamps.				1	T	1
	2 10	-	-	1 = 1	У	n	Signal
	A10 '. I .'						
14.45	Al2 unit selection Unit selection of an	• .					
14.45	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I	Module 1 typ readings and O extension	e = FIO-11 c I settings ro module (se	elated to AI2. Set ee the manual of t	he I/O exte		
14.45	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is	Module 1 typ readings and O extension	e = FIO-11 c I settings ro module (se	elated to AI2. Set ee the manual of t	he I/O exte		
14.45	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V ; volts.	Module 1 typ readings and O extension	e = FIO-11 c I settings ro module (se	elated to AI2. Set ee the manual of t	he I/O exte		
14.45	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V ; volts. 10: mA ; milliamps.	Module 1 typ readings and O extension also shown i	e = FIO-11 c I settings ro module (se	elated to AI2. Set ee the manual of t HW switch positi	he I/O exte	ension mod	dule). The
14.45	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10	Module 1 typ readings and O extension	e = FIO-11 c I settings ro module (se	elated to AI2. Set ee the manual of t	he I/O exte		
14.45	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain	Module 1 typ readings and O extension also shown i	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set ee the manual of t HW switch positi	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim	Module 1 typ readings and O extension also shown i mA	e = FIO-11 of settings romodule (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position in the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01	Module 1 typ readings and O extension also shown i mA e constant of Module 1 typ	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware	Module 1 typ readings and O extension also shown i mA e constant of Module 1 typ filter time co	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to	Module 1 typ readings and O extension also shown i mA e constant of Module 1 typ filter time co-	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/h hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no filtering; no filtering the selects and	Module 1 typ readings and O extension also shown i mA e constant of Module 1 typ filter time co time. iltering.	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to 0: No filtering; no for 1: 125 µs; 125 micro	Module 1 typ readings and O extension also shown in mA mA e constant of Module 1 typ filter time continue. Siltering. Seconds.	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no fil: 125 µs; 125 micro 2: 250 µs; 250 micro	Module 1 typ readings and O extension also shown in mA mA e constant of Module 1 typ filter time cotime. iltering. seconds. oseconds.	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to 0: No filtering; no for 1: 125 µs; 125 micro	Module 1 typ readings and O extension also shown i mA e constant of Module 1 typ filter time co- time. iltering. seconds. oseconds. oseconds.	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no for 1: 125 µs; 125 micro 2: 250 µs; 250 micro 3: 500 µs; 500 micro 4.01 Selects a hardware See 14.47 Al2 filter to 50 No filtering; no for 1: 125 µs; 125 micro 1: 125 µs; 125 micro 1: 125 µs; 250 micro 1: 500 µs; 500 µs; 500 micro 1: 500 µs; 500	mA e constant of Module 1 typ filter time cotime. iltering. seconds. oseconds. oseconds.	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/h hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no f 1: 125 µs; 125 micro 2: 250 µs; 250 micro 3: 500 µs; 500 micro 4: 1 ms; 1 millisecor	Module 1 typ readings and O extension also shown is also shown if mA mA e constant of Module 1 typ filter time codime. also shown if max extension also shown if max also shown if max extension also shown if max also shown if	e = FIO-11 c I settings ro module (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/h hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no fil: 125 µs; 125 micro 2: 250 µs; 250 micro 3: 500 µs; 500 micro 4: 1 ms; 1 millisecor 5: 2 ms; 2 millisecor	Module 1 typ readings and O extension also shown is also shown if mA max e constant of Module 1 typ filter time codime. also shown if max iltering. seconds. also seconds. also seconds. and. ands. ands.	e = FIO-11 of I settings romodule (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no for 1: 125 µs; 125 micro 2: 250 µs; 250 micro 4: 1 ms; 1 millisecor 5: 2 ms; 2 millisecor 6: 4 ms; 4 millisecor	Module 1 typ readings and O extension also shown is also shown if mA max e constant of Module 1 typ filter time codime. also shown if max iltering. seconds. also seconds. also seconds. and. ands. ands.	e = FIO-11 of I settings romodule (se n 14.44 AI2	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	ension mod	dule). The
14.46	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no four 1: 125 µs; 125 micro 2: 250 µs; 250 micro 3: 500 µs; 500 micro 4: 1 ms; 1 millisecor 5: 2 ms; 2 millisecor 6: 4 ms; 4 millisecor 7: 7.9375 ms; 7.9375	module 1 typ readings and O extension also shown is ma ma e constant of Module 1 typ filter time co- cime. iltering. seconds. oseconds. oseconds. od. nds. omilliseconds.	e = FIO-11 of settings romodule (set n 14.44 AI2)	elated to AI2. Set the the manual of t HW switch positi 1 = 1 out AI2. or FAIO-01) AI2.	he I/O exte	y	Parameter
	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no for 1: 125 µs; 125 micro 2: 250 µs; 250 micro 2: 250 µs; 250 micro 3: 500 µs; 500 micro 4: 1 ms; 1 millisecor 5: 2 ms; 2 millisecor 6: 4 ms; 4 millisecor 7: 7.9375 ms; 7.9375 0 7 Al2 filter time	module 1 typ readings and O extension also shown is also shown if mA e constant of Module 1 typ filter time codime. Seconds. Sec	e = FIO-11 of I settings romodule (se n 14.44 AI2	elated to AI2. Set the the manual of t HW switch positi 1 = 1 out AI2. or FAIO-01) AI2.	he I/O exte	y	Parameter
14.46	Unit selection of an (Visible when 14.01 Selects the unit for the setting of the I/h hardware setting is 2: V; volts. 10: mA; milliamps. 2 10 Al2 filter gain Hardware filter tim (Visible when 14.01 Selects a hardware See 14.47 Al2 filter to: No filtering; no fil: 125 µs; 125 micro 2: 250 µs; 250 micro 3: 500 µs; 500 micro 4: 1 ms; 1 millisecor 5: 2 ms; 2 millisecor 6: 4 ms; 4 millisecor 7: 7.9375 ms; 7.9375 0 7	module 1 typ readings and O extension also shown is ma ma e constant of Module 1 typ filter time coding. identified in the coding. identified in the coding in the codin	e = FIO-11 of I settings romodule (settings romodule (set n 14.44 AI2)	elated to AI2. Set the the manual of the HW switch position of the HW	he I/O exte	y	Parameter



Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	(Visible when 14.01						
	Defines the internal See 14.48 AI2 min.	value that co	rresponds	to the minimum	AI2 value c	defined by 1	14.48 AI2 min
	-32768.000 32767.000	-100.000	-	1 = 1	n	у	Parameter
14.51	Al2 scaled at Al2 ma	ax					
	Internal value corres (Visible when 14.01 Defines the internal max. See 14.48 AI2 min. -32768.000	Module 1 type	e = FIO-11 c	or FAIO-01)		defined by	14.49 AI2
	32767.000	100.000			''	y	arameter
14.56	AI3 actual value	ı		•	•		
	Value of analog input (Visible when 14.01 Displays the value of voltage. -22.000 22.000 of	Module 1 type f Al3 in mA oi		ling on whether t	he input is	set to curr	ent or
	-11.000 11.000			or V			
14.57	AI3 scaled value			•			•
	Scaled value of anal (Visible when 14.01 Displays the value of See 14.65 Al3 scaled -32768.000	Module 1 type f AI3 after sc	aling.	3 scaled at AI3 ma 1 = 1	ax.	n	Signal
14.58	AI3 force data						
	Forced value of ana (Visible when 14.01 Forced value that ca See 14.22 Al force se	Module 1 type an be used inselection.	stead of th	-		1	
	-22.000 22.000 o -11.000 11.000	r 0.000	mA or V	1000 = 1 mA or V	У	У	Parameter
14.59	AI3 HW switch posi						
	Unit selection switch (Visible when 14.01 Displays the position The setting of the cunit selection. 2: V; volts. 10: mA; milliamps.	Module 1 type on of the hard	e = FIO-11) ware curre				
	2 10	-	-	1 = 1	у	n	Signal
14.60	AI3 unit selection						
	Unit selection of an (Visible when 14.01						

X	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	Selects the unit fo	or readings and	settings	related to AI3. Set	to either m	nA or V cori	responding
	_			e (see manual of th		nsion mod	ule). The
	_	is also shown i	in 14.59 Al	3 HW switch positi	on.		
L	2: V ; volts.						
	10: mA ; milliamps		1		1		1
	2 10	mA	-	1 = 1	n	у	Paramete
L	AI3 filter gain						
	Hardware filter ti		_	-			
	(Visible when 14.0						
	Selects a hardwar		nstant for	⁻ AI3.			
	See 14.62 Al3 filte						
	0: No filtering ; no	_					
	1: 125 μs ; 125 mic 2: 250 μs ; 250 mic						
	3: 500 μs ; 500 mi						
	4: 1 ms ; 1 millisec						
	5: 2 ms ; 2 millisec						
	6: 4 ms ; 4 millised						
	7: 7.9375 ms ; 7.93		5 .				
	07	1 ms	<u></u>	1 = 1	n	у	Paramete
2	AI3 filter time	11113			1	y	Taramete
-	-	nt of analog in	nut AI2				
	Filter time consta (Visible when 14.0	_	•	\			
	Defines the filter)			
	% 🛦		ioi Ais.				
		Infiltered signal					
	100		_				
	63 F	iltered signal					
	/						
			\rightarrow				
	—		t				
	I						
	$O = I \times (1 - e^{-t/T})$)					
		,					
	I = filter input (s	tep)					
	O = filter output						
	t = time						
	T = filter time co						
	The signal is also		4_DCS_filter_a.ai the analog	g input hardware. S	See 14.61 A	J3 filter ga	in.
	0.000 30.000	0.100	s	1000 = 1 s	n	у	Paramete
3	Al3 min	0.100		1000 13	1	J	Taramete
,		fanalog innut /	/13				
	Minimum value or	• .		١			
	1/\/1c1bla \\\ban 1 ^ /	T MOGNIE T LAD	e – LIO-TT	,			
	(Visible when 14.0		13 m / ~~ /	/ Coo 1/ 21 Al +u			
	Defines the minin	num value for A	_	/. See 14.21 Al tune		ut cianal i	m A or V
	Defines the minin Parameters 14.63	num value for A and 14.64 set t	he low an	/. See 14.21 AI tune d high limit of the the internal value:	analog inp		

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	Al _{scaled} (14.57)								
	14.63	14.64	, (14.56)							
	14.65	DZ_LIN_018_anal	og_a.ai							
	-22.000 22.000 or -11.000 11.000	-20.000 or -10.000	mA or V	1000 = 1 mA or V	n	У	Parameter			
14.64	AI3 max			_L	1					
	(Visible when 14.01 M Defines the maximum See 14.63 Al3 min. -22.000 22.000 or -11.000 11.000	<i>-</i> ,	•	V. See 14.21 Al tu 1000 = 1 mA or V	n	у	Parameter			
14.65	AI3 scaled at AI3 min	120.000		10. 1						
	Internal value corresp (Visible when 14.01 M Defines the internal v See 14.63 Al3 min. -32768.000 32767.000	odule 1 type	e = FIO-11)			lefined by I	14.63 AI3 min. Parameter			
14.66	AI3 scaled at AI3 max	<u> </u>	I	1						
	Internal value corresponding to maximum analog input Al3 value. (Visible when 14.01 Module 1 type = FIO-11) Defines the internal value that corresponds to the maximum Al3 value defined by 14.64 Al3 max. See 14.63 Al3 min. -32768.000 100.000 - 1 = 1 n y Parameter									
	32767.000									
14.71	AO force selection Forced values selector (Visible when 14.01 M The value of AO1 A parameter (see table whenever the corresp Bit assignment:	odule 1 type 01/AO2 can below) is pr	e = FIO-11 o be overrid ovided for	den for e.g., test each analog out	out and its					

Bit	Name	Value	Remarks
0	AO1	1	Force mode: Force AO1 to value of 14.78 AO1 force data.

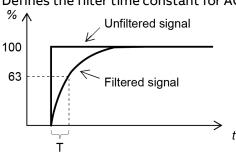
Index	Name							
шех	Text							
	Range		Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	1	AO2	1	Force m (FAIO-01	ode: Force AO2 to Lonly).	value of 14	rce data	
	2 15	reserved						
	0000h	FFFFh	0000h	-	1 = 1	у	у	Parameter
14.76	AO1 actua	l value	I			1,2	12	1
	(Visible wl Displays t	he value of			or FAIO-01)		T	T2
	0.000 2		-	mA	1000 = 1 mA	у	n	Signal
14.77	AO1 source	analog ou						
	Other; sould on Zero; not also designed and the sould be	orce selection in use. otor speed current; 01 orque; 01 re voltage; power; 01 reference reference reference reference s PID outpoints PID deviate PT100 exciter Motor the CTY84 excitotor thermort1000 exception of the cotor t	on. ; 01.01 Used 10 Motor cu 7 Motor tor 28.05 Arma 24 Output pr amp input; amp outpu ence; 24.01 used; 26.02 ut actual; 4 back actual tation; AO1 ermal protection; AO1 al protection; AO1 is al protection; AO1 Motor ther	I motor spurrent in A. que filtere ture volta ower in klassed speed to 23.01 Speed speed 27.02 Procedured to 40.02 Procedured to 40.03 Procedured to feed of this rused to feed	ed. ge. N. ed reference ramp eed reference ram ed reference. eference used. ess PID output actu ecss PID feedback cess PID deviation feed an excitation his manual. ed an excitation cananual. ed an excitation comanual. ed an excitation comanual. o feed an excitation comanual.	ual. c actual. n actual. n current to urrent to 1 on current	o a KTY84 s	sensor. See ensors. See
14.78	38: AO2 da 0 38 AO1 force Forced val	data lue of analo	z; see 13.92 Zero og output A	AO2 data s	storage. 1 = 1	n	у	Parameter
14.78	38: AO2 da 0 38 AO1 force Forced val (Visible wl Forced val	data lue of analo	ze; see 13.92 Zero og output Allodule 1 type be used in	AO2 data : - -	storage.		у	Parameter
14.78	38: AO2 da 0 38 AO1 force Forced val (Visible wl Forced val	data lue of analo nen 14.01 M lue that car AO force se	ze; see 13.92 Zero og output Allodule 1 type be used in	AO2 data : - -	or FAIO-01)		у	Parameter

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре

Filter time constant of analog output AO1.

(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01)

Defines the filter time constant for AO1.



$$O = I \times (1 - e^{-t/T})$$

I = filter input (step)

O = filter output

t = time

T = filter time constant

	SF_880_024_D0	CS_filter_a.ai				
0.000 30.000	0.100	S	1000 = 1 s	n	у	Parameter

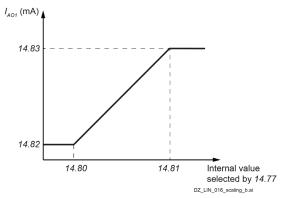
14.80 AO1 source min

Internal value corresponding to minimum analog output AO1 value.

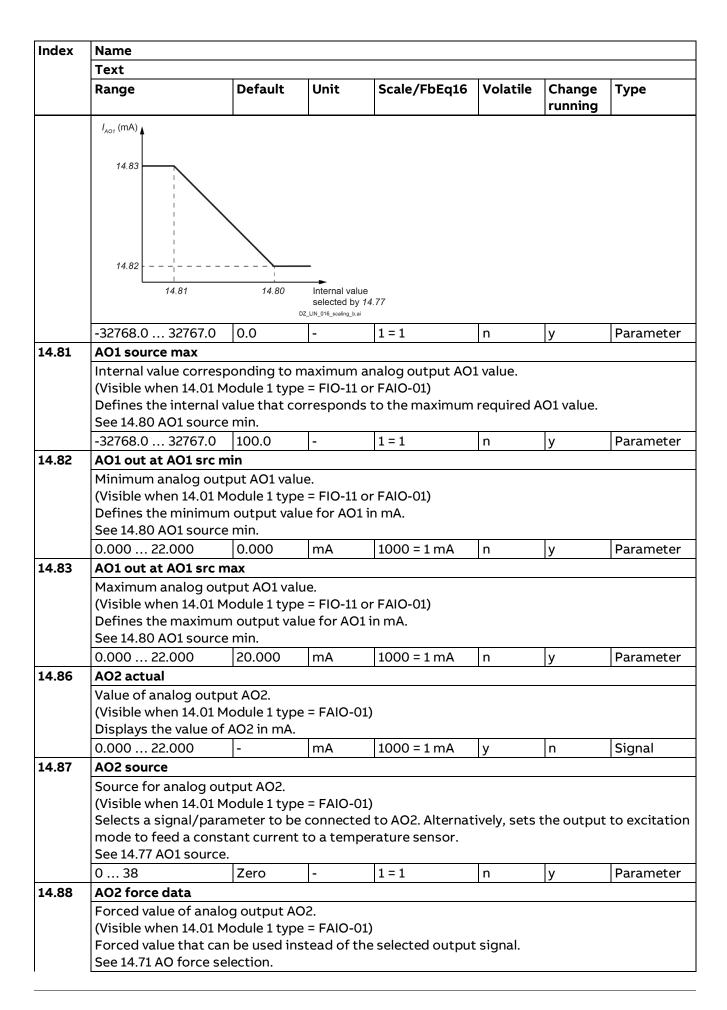
(Visible when 14.01 Module 1 type = FIO-11 or FAIO-01)

Defines the internal value that corresponds to the minimum required AO1 value.

Scaling parameters 14.80 and 14.81 set the low and high internal limits that corresponds to the analog output values in mA defined by parameters 14.82 and 14.83:



Setting parameter 14.82 as maximum value and 14.83 as minimum value inverts the output:



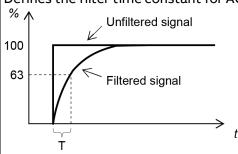
Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	0.000 22.000	0.000	mA	1000 = 1 mA	у	у	Parameter

14.89 AO2 filter time

Filter time constant of analog output AO2.

(Visible when 14.01 Module 1 type = FAIO-01)

Defines the filter time constant for AO2.



$$O = I \times (1 - e^{-t/T})$$

I = filter input (step)

O = filter output

t = time

T = filter time constant

	SF_880_024_D0	S_filter_a.ai				
0.000 30.000	0.100	s	1000 = 1 s	n	У	Parameter

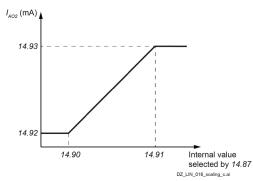
14.90 AO2 source min

Internal signal value corresponding to minimum analog output AO2 value.

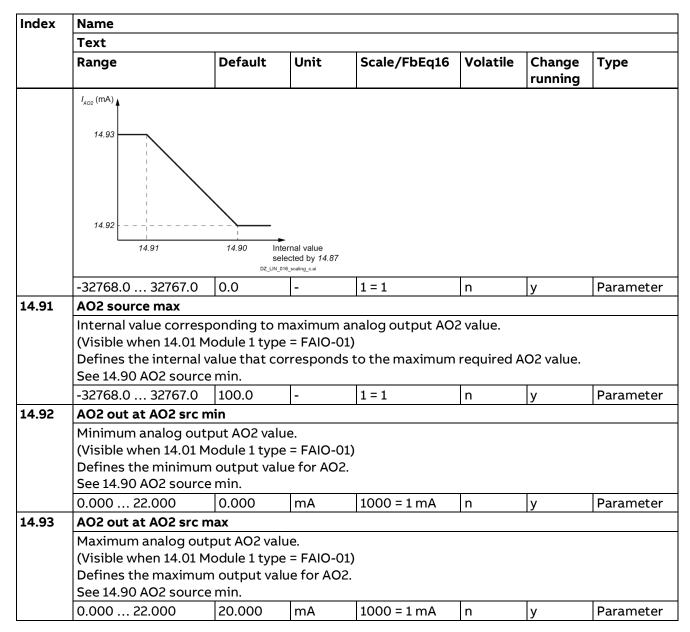
(Visible when 14.01 Module 1 type = FAIO-01)

Defines the internal value that corresponds to the minimum required AO2 value.

Scaling parameters 14.90 and 14.91 set the low and high internal limits that corresponds to the analog output values in mA defined by parameters 14.92 and 14.93:



Setting parameter 14.92 as maximum value and 14.93 as minimum value inverts the output:



15 I/O extension module 2

Description see group 14 I/O extension module 1.

Configuration of I/O extension module 2.

The contents of the parameter group vary according to the selected I/O extension module type.

Attention: A maximum of 3 I/O extension modules of any combination can be activated and configured using parameter groups 14 ... 16.

16 I/O extension module 3

Description see group 14 I/O extension module 1.

Configuration of I/O extension module 3.

The contents of the parameter group vary according to the selected I/O extension module type.

Attention: A maximum of 3 I/O extension modules of any combination can be activated and configured using parameter groups 14 ... 16.

19 Operation mode

Selection of local and remote-control locations and operating modes.

	Name												
	Text												
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Type						
0.01	Actual ope	eration mode			•	•	•						
	Actual use	d operating mod	le.										
	Displays the operating mode actual used.												
	See parameters 19.11 19.14.												
	Note: The setting of 19.01 Actual operation mode is also depending on 27.22 Current reference												
	source.												
		tput of the torqu											
	-	•	•	taken from 25.01 T	•	•							
		•	•	e taken from 26.74	•								
				e speed control and	d 26.74 To	rque refere	nce ramp						
	•	e smaller of the t			100747	•							
			•	e speed control ar	10 26.74 10	orque reter	ence ramp						
	•	e greater of the t		ad control and 26 -	74 Torque	roforonco r	amp outpu						
	is used.	11 01 25.01 101que	e reference spe	ed control and 26.7	74 Torque	reference i	amp outpu						
		on limitation co	ntral 26.74 Tar	que reference ram	n qutnut li	mitc 25 01	Torquo						
		speed control.	1101, 20.74 1010	que rererence rann	p output ii	111105 23.01	Torque						
		•	ference ramn o	utput = 50 %, ther	25 01 Tor	alla rafarai	nce speed						
	•	imited to ±50 %.	•	70, the	123.01 101	que rererei	ice speed						
				nce taken from 27.	22 Current	reference	source						
	110	_	-	1 = 1	у	n	Signal						
9.11	Ext1/Ext2			11-1	У	111	Jigilai						
		of control locatio											
				. Thus, a change of	the eners	tina mada	is possible						
		ee 19.12 Ext1 con		. Trius, a criarige or	the opera	iting mode	is possible.						
	-	ee 19.14 Ext2 cor											
	Other [bit]; source selection.												
	0: EXT1 ; 0, select EXT1. Normal operation. 1: EXT2 ; 1, select EXT2.												
	3: DI1 ; 10.02.b00 DI delayed status.												
	4: DI2 ; 10.02.b01 DI delayed status. 5: DI3 ; 10.02.b02 DI delayed status.												
	6: DI4 ; 10.02.b03 DI delayed status.												
		2.b04 DI delayed											
		02.b05 DI delayed											
		L.02.b00 DIO dela											
		1.02.b01 DIO dela	•										
	-	02.b15 DI delaye	•										
	0 19	EXT1	_	1 = 1	n	у	Paramete						
9.12	Ext1 contr		<u> </u>		1	17							
		mode of control	location FXT1										
		e operating mode		ation FXT1									
		-											
	1: Zero ; set the output of the torque selector to zero.												
		•	•	nce to 25.01 Torque	2: Speed ; speed control, set torque reference to 25.01 Torque reference speed control. 3: Torque ; torque control, set torque reference to 26.74 Torque reference ramp output.								
	2: Speed ; s	peed control, se	t torque referer										
	2: Speed ; s 3: Torque ;	speed control, se torque control, s	t torque referer set torque refer		ue referen	ce ramp ou	ıtput.						

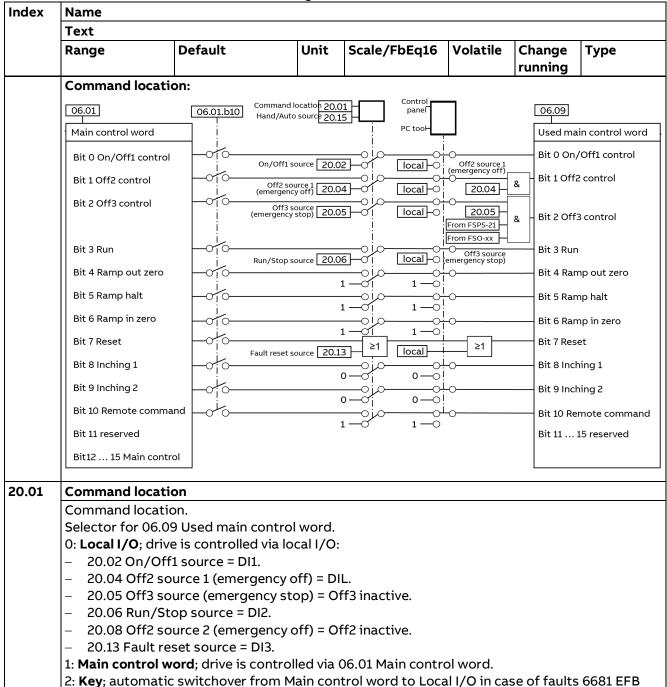
Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	If the speed	d error becomes nega	ative, the dr	rive follows the sp	eed contro		until the				
	speed error	becomes positive a	gain. This p	revents the drive	from accel	erating und	controllably if				
	the load is l	ost in torque control	.								
	5: Max ; com	nbination of selection	ns Speed an	nd Torque. Use the	e maximum	n of 25.01 T	orque				
		peed control and 26.	•	•	•						
		l error becomes posi		•		•					
	-	becomes negative a	-	prevents the drive	from acce	lerating un	controllably				
		s lost in torque contr									
		bination of selection			e sum of 25	5.01 Torque	reference				
	1 -	rol and 26.74 Torque									
		n ; limitation control,	26.74 Torq	ue reference ramp	o output lir	mits 25.01	Torque				
		peed control.									
	•	26.74 Torque referer	nce ramp ou	utput = 50 %, ther	1 25.01 Tor	que referer	ice speed				
		mited to ±50 %.		1	1	1	T				
	1 7	Speed	-	1 = 1	n	У	Parameter				
19.14	Ext2 contro	ol mode									
		mode of control locat									
		operating mode for	control loca	ation EXT2.							
	See 19.12 Ex	kt1 control mode.									
	1 7	Speed	-	1 = 1	n	у	Parameter				
19.16	Local contr	ol mode									
	Operating r	mode of local control									
		operating mode for		ol from the contro	l panel or D	Orive Comp	oser.				
	0: Speed ; sp	peed control, the tor	que referen	ce is taken from 2	25.01 Torqu	ie referenc	e speed				
	control (out	tput of the speed co	ntroller). Th	us, the control pa	nel or Drive	e Compose	er give the				
	speed refer	ence.									
		orque control, the to									
		put of the torque ref	ference sele	ection). Thus, the	control par	nel or Drive	Composer				
	give the torque reference.										
	2: Current ; current control, the current reference taken from 27.22 Current reference source.										
		ontrol panel or Drive	Composer	_	eference.						
	0 2	Speed	-	1 = 1	n	У	Parameter				
19.20	Follower fo	rce ramp stop									
	Force follow	ver to speed control	(follower or	nly).							
	Force follower to speed control (follower only). Forces or selects a source that forces a torque-controlled follower drive to switch to speed										
	control upon a ramp stop by an Off1- or Off3 (emergency stop) command. This is required for										
		an independent ramp stop of the follower.									
	0 = Keep co	ntrol mode.									
	1 = Force sp	eed control.									
	Other [bit];	source selection.									
	0: Keep con	itrol mode ; 0, keep tl	he actual co	ntrol mode. Norm	nal operati	on.					
	_	eed control ; 1, ramp s	•	speed control.							
		2.b00 DI delayed stat									
		2.b01 DI delayed stat									
		2.b02 DI delayed stat									
		2.b03 DI delayed stat									
	7: DI5 ; 10.02	2.b04 DI delayed stat	us.								
	7: DI5 ; 10.02.b04 DI delayed status. 8: DI6 ; 10.02.b05 DI delayed status.										
		-									
	11: DIO1 ; 11.	2.b05 DI delayed stat 02.b00 DIO delayed : .02.b01 DIO delayed :	status.								

Index	Name	Name									
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	19: DIL ; 10.	.02.b15 DI delayed statı	ıs.								
	0 19	Keep control mode	-	1 = 1	n	у	Parameter				

20 Start/Stop/Direction

speed 7.

Start/Stop/Direction and run/start/jog enable signal source selection. Positive/Negative reference enable source selection. Breaker and acknowledge source selection.



communication, 7510 FBA A communication or 7520 FBA B communication. It is still possible to control the drive via Local I/O. The used speed reference is set by means of 22.32 Constant

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	Run and Rese serial slave, 6 4: Field excit Off2 control, Notes: - Local con location. - Comman and 20.13	hk; the drive is controllet. Only available where is pulse serial slave, Somer link; The field excitation and Reset. Only trol mode has higher ds from 20.04 Off2 some Fault reset source and location setting.	n 99.06 Operial seque ter is contravailable ver priority tl	peration mode = ential slave 30° or rolled by the armovhen 99.06 Opera man the selection mergency off), 20	12-pulse pa Serial sequature conviction mode made with	f1 control, arallel slave uential slave erter, On/o e = Field ex n 20.01 Cor	e, 12-pulse ve 0°. Off1 control, citer. mmand rgency stop)
20.02	On/Off1 sou		I	1	I.	1 2	
20.04	Binary signal is edge-trigg 0 = Off1 com 0 → 1 = On co Note: To give Run/Stop so Other [bit]; so: Off1 comn 1: On comma 2: None; inac 3: DI1; 10.02.1 4: DI2; 10.02.1 5: DI3; 10.02.1 6: DI4; 10.02. 7: DI5; 10.02.1 1: DIO1; 11.0 12: DIO2; 11.0 12: DIO2; 11.0 19: DIL; 10.02 20: DI1 and D — On- and F — Stop- and F — Stop- and F — Following — See 20.28 Note: DI2 = 0 0 20	mand. mmand, edge trigge On- and Run comma urce. ource selection. nand; 0.	red. and at the s forced. s. s. s. s. atus. atus. atus. atus. g edge (0 alling edge 2 On/Off1 elay time.	same time set 20 \Rightarrow 1) of DI1. DI2 m e (1 \Rightarrow 0) of DI2. Se source = 20.06 R	nust be hig etting of D un/Stop s	f1 source = Jh. I1 does not ource = DII	: 20.06 : matter. I and DI2.
	1st Off2 comm 1st binary sign control word 0 = Off2 comm 1 = Off2 inact Other [bit]; so 0: Off2 comm 1: Off2 inacti	nand source. nal for Off2 control (e . Via an AND with 20. mand.	08 Off2 so off/fast cu on.	ource 2 (emergend		06.09.b01 L	Jsed main

	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	4: DI2 ; 10.02.	b01 DI delayed status	5.		ı		
	5: DI3 ; 10.02.	b02 DI delayed status	5.				
	6: DI4 ; 10.02.	b03 DI delayed statu	s.				
	7: DI5 ; 10.02.	b04 DI delayed status	s.				
	8: DI6 ; 10.02.	b05 DI delayed statu	S.				
	11: DIO1 ; 11.0	2.b00 DIO delayed st	atus.				
	12: DIO2 ; 11.0	02.b01 DIO delayed st	atus.				
	19: DIL ; 10.02	2.b15 DI delayed statu	ıs.				
	0 19	DIL	-	1 = 1	n	n	Parameter
20.05	Off3 source	(emergency stop)					
	Off3 (emerge	ency stop) command	source.				
	Binary signa	l for Off3 control (em	ergency st	op). See 06.09.b0	02 Used m	ain control	word. The
		s selected by 21.03 En	nergency s	stop mode.			
	0 = Off3 com	nmand.					
	1 = Off3 inac	tive.					
	Other [bit];	source selection.					
		nand ; 0, emergency s	•				
		ive ; 1, normal operati					
		b00 DI delayed statu:					
		b01 DI delayed status					
		b02 DI delayed status					
		.b03 DI delayed statu					
	-	b04 DI delayed statu:					
		b05 DI delayed statu					
		2.b00 DIO delayed st					
		02.b01 DIO delayed st					
		2.b15 DI delayed statu	IS.		1	1	1_
	0 19	Off3 inactive	-	1 = 1	n	n	Parameter
20.06	Run/Stop so	ource	•				
20.06	Run/Stop so	mmand source.					
20.06	Run/Stop so Run/Stop co Binary signal	ource	03 Used m	nain control word	. The state	transition	is edge-
20.06	Run/Stop so Run/Stop co Binary signal triggered.	mmand source. I for Run. See 06.09.b	03 Used m	nain control word	. The state	e transition	is edge-
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com	ource mmand source. I for Run. See 06.09.b nmand.		nain control word	. The state	transition	is edge-
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co	ource Immand source. I for Run. See 06.09.b Immand. Immand. Immand. Immand, edge trigg	ered.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give	ource ommand source. I for Run. See 06.09.b ommand. command, edge trigg e On- and Run comma	ered.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so	nmand source. I for Run. See 06.09.b nmand. command, edge trigge e On- and Run comma	ered.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so Other [bit]; s	mmand source. I for Run. See 06.09.b mmand. command, edge trigge e On- and Run comma	ered.				-
0.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run o Note: To give Run/Stop so Other [bit]; s 0: Stop com	mmand source. I for Run. See 06.09.b mand. command, edge trigge e On- and Run comma ource. source selection. mand; 0.	ered.				-
0.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run o Note: To give Run/Stop so Other [bit]; s 0: Stop com 1: Run comm	mmand source. I for Run. See 06.09.b mmand. command, edge trigge e On- and Run comma curce. source selection. mand; 0. land; 1.	ered. and at the				J
0.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac	mmand source. I for Run. See 06.09.b mmand. command, edge trigge e On- and Run command. cource. source selection. mand; 0. land; 1. ctive. Stop command	ered. and at the is forced.				J
0.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02.	mmand source. I for Run. See 06.09.b mmand. command, edge trigge e On- and Run comma curce. source selection. mand; 0. land; 1. ctive. Stop command b00 DI delayed status	ered. and at the is forced. s.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02. 4: DI2; 10.02.	mmand source. I for Run. See 06.09.b mand. command, edge trigge e On- and Run command. cource. cource selection. mand; 0. land; 1. litive. Stop command b00 DI delayed status b01 DI delayed status	ered. and at the is forced. s. s.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run o Note: To give Run/Stop so Other [bit]; s 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02. 4: DI2; 10.02. 5: DI3; 10.02.	mmand source. I for Run. See 06.09.b mand. command, edge trigge e On- and Run comma ource. source selection. mand; 0. land; 1. ctive. Stop command b00 DI delayed status b01 DI delayed status	ered. and at the is forced. s. s.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run o Note: To give Run/Stop so Other [bit]; s 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02. 4: DI2; 10.02. 5: DI3; 10.02. 6: DI4; 10.02.	mmand source. I for Run. See 06.09.b mmand. command, edge trigge e On- and Run command; cource. source selection. mand; 0. land; 1. ctive. Stop command; b00 DI delayed status b01 DI delayed status b02 DI delayed status	ered. and at the is forced. s. s. s.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02. 4: DI2; 10.02. 5: DI3; 10.02. 6: DI4; 10.02. 7: DI5; 10.02.	mmand source. I for Run. See 06.09.b mmand. command, edge trigge e On- and Run command. cource. source selection. mand; 0. land; 1. ctive. Stop command b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status b04 DI delayed status	ered. and at the is forced. s. s. s. s.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run co Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac 3: Di1; 10.02. 4: Di2; 10.02. 5: Di3; 10.02. 6: Di4; 10.02. 7: Di5; 10.02. 8: Di6; 10.02.	mmand source. I for Run. See 06.09.b mand. command, edge trigge e On- and Run command; cource selection. mand; 0. land; 1. litive. Stop command; b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status b04 DI delayed status b04 DI delayed status	ered. and at the is forced. s. s. s. s.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run o Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02. 4: DI2; 10.02. 5: DI3; 10.02. 6: DI4; 10.02. 7: DI5; 10.02. 8: DI6; 10.02. 11: DIO1; 11.0	mmand source. I for Run. See 06.09.b mand. command, edge trigge e On- and Run command, cource. source selection. mand; 0. land; 1. litive. Stop command; b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status b04 DI delayed status b04 DI delayed status b04 DI delayed status b05 DI delayed status b05 DI delayed status	ered. and at the is forced. s. s. s. s. s. s. atus.				J
20.06	Run/Stop so Run/Stop co Binary signal triggered. 0 = Stop com 0 → 1 = Run o Note: To give Run/Stop so Other [bit]; so 0: Stop com 1: Run comm 2: None; inac 3: DI1; 10.02. 4: DI2; 10.02. 5: DI3; 10.02. 6: DI4; 10.02. 7: DI5; 10.02. 8: DI6; 10.02. 11: DIO1; 11.0 12: DIO2; 11.0	mmand source. I for Run. See 06.09.b mand. command, edge trigge e On- and Run command; cource selection. mand; 0. land; 1. litive. Stop command; b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status b04 DI delayed status b04 DI delayed status	ered. and at the is forced. s. s. s. s. s. atus. atus.				J

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	– On- and Run command by rising edge (0 \rightarrow 1) of DI1. DI2 must be high.									
		d Off1 command by t			_		matter.			
	 Following 	settings apply: 20.0	02 On/Off1	source = 20.06 R	Run/Stop s	ource = DI1	and DI2.			
	- See 20.28	3 wire jogging off o	delay time.							
	Notes:									
	DI2 = 0 st	ops the drive. Addit	ionally, it o	verrides the On-	and Run co	mmand of	DI1.			
		STO it is mandatory	_		nmand and	l to give an	On- and Run			
	command	d. Thus, both DI1 and	d DI2 need t	o be toggled.						
	0 20	DI2	-	1 = 1	n	n	Parameter			
20.08	Off2 source 2	2 (emergency off)								
	2 nd Off2 com	mand source.								
	2 nd binary sig	nal for Off2 control	(emergenc	y off/fast curren	t off). See	06.09.b01 เ	Jsed main			
		. Via an AND with 20	.04 Off2 so	urce 1 (emergend	cy off).					
	0 = Off2 com									
	1 = Off2 inact									
		ource selection.								
		nand; 0, emergency		rrent off.						
		ve ; 1, normal operat								
		000 DI delayed statu								
		b01 DI delayed statu								
		002 DI delayed statu								
		b03 DI delayed statu								
		004 DI delayed statu								
		b05 DI delayed statu								
		2.b00 DIO delayed s								
		2.b01 DIO delayed s .b15 DI delayed stat								
	0 19	Off2 inactive	<u>us.</u>	1 - 1	l n	n	Parameter			
20.13			-	1 = 1	n	n	Parameter			
20.13	Fault reset se									
	Reset source) h07 Haad	main control way	ud The sign		ha duiva aftau			
		for Reset. See 06.09 the cause of the fau			_					
	0 = Not selec		iit no longe	exists. The state	e transitioi	i is euge-ti	iggerea.			
	$0 \rightarrow 1 = Reset$									
		ource selection.								
	0: No Reset;									
	1: Reset; 1.	0.								
	•	tive. No Reset is for	-ed							
	-	000 DI delayed statu								
		b01 DI delayed statu								
		o02 DI delayed statu								
		b03 DI delayed statı								
		004 DI delayed statu								
		b05 DI delayed statu								
		2.b00 DIO delayed s								
		2.b01 DIO delayed s								
		.b15 DI delayed stat								
		: W bit 7 ; 06.03.b07 F		parent control we	ord.					
	31: FDA D MC	W DIL 1; 00.04.001 F	BA B transi	parent control wo	ora.					

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16		Change running	Туре
	0 32	DI3	-	1 = 1	n	у	Parameter

20.14 Direction of rotation source

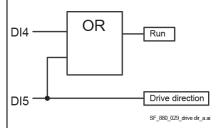
Direction source.

Binary signal for Direction. 20.14 Direction of rotation source allows changing the direction of rotation by negating the speed reference in remote operation.

Example 1: Typically used for a standard interface. 20.02 On/Off1 source = DI1, 20.06 Run/Stop source = DI4 and 20.14 Direction of rotation source = DI5:

DI1	DI4	DI5	06.09.b03 Used main control word = Run	Direction of rotation
0	d	d	0 = Stop command	-
1	0	0	0 = Stop command	-
1	0	1	0 = Stop command	-
1	1	0	1 = Run command	Forward
1	1	1	1 = Run command	Reverse

Example 2: Typically used for a joystick interface. 20.02 On/Off1 source = DI1, 20.06 Run/Stop source = DI4 and 20.14 Direction of rotation source = DI5 set Run:



DI1	DI4	DI5	06.09.b03 Used main control word = Run	Direction of rotation
0	d	d	0 = Stop command	-
1	0	0	0 = Stop command	-
1	0	1	1 = Run command	Reverse
1	1	0	1 = Run command	Forward
1	1	1	Not used by joystick (1 = Run command)	Not used by joystick (reverse)

0 = Forward.

1 = Reverse.

Other [bit]; source selection.

- 0: Forward; 0, normal operation.
- 1: Reverse; 1.
- 3: **DI1**; 10.02.b00 DI delayed status.
- 4: **DI2**; 10.02.b01 DI delayed status.
- 5: **DI3**; 10.02.b02 DI delayed status.
- 6: DI4; 10.02.b03 DI delayed status.
- 7: **DI5**; 10.02.b04 DI delayed status.
- 8: **DI6**; 10.02.b05 DI delayed status.
- 11: **DIO1**; 11.02.b00 DIO delayed status.
- 12: **DIO2**; 11.02.b01 DIO delayed status.
- 19: **DIL**; 10.02.b15 DI delayed status.

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	40: DI1 set R	un ; 10.02.b00 DI dela	yed status	s. DI1 = 1: Direction	n reverse a	ınd set Run	command.
		nal operation, see 20		•			
		un ; 10.02.b01 DI dela	-		n reverse a	nd set Run	command.
		nal operation, see 20		•			
		un ; 10.02.b02 DI dela	•		n reverse a	nd set Run	command.
		nal operation, see 20	-	•			
		un ; 10.02.b03 DI dela	-		n reverse a	and set Rur	command.
		nal operation, see 20		•			
		un; 10.02.b04 DI dela	-		n reverse a	and set Rur	n command.
		nal operation, see 20		•			
		un; 10.02.b05 DI dela	-		n reverse a	and set Rur	command.
		nal operation, see 20	•	•	. •		_
		Run ; 11.02.b00 DIO o	-			rse and set	Run
		101 = 0: normal oper		· ·			Dive
		Run ; 11.02.b01 DIO d	-			rse and set	Run
		102 = 0: normal oper		•		nd cat Dun	
		l un ; 10.02.b15 DI dela nal operation, see 20			i reverse a	na set kun	command.
	0 48	Forward	.00 Kuii/ 30	1 = 1	T.,	1.,	Davamatav
				1-1	n	у	Parameter
0.15	Hand/Auto						
	Hand/Auto s			1.76			
		I to switch between I			Main contr	ol word) co	ntrol. The
		de by 20.01 Commar	nd location	is overwritten.			
	0 = Hand.						
	1 = Auto.	source colection					
	0: Hand ; 0.	source selection.					
	1: Auto ; 1.						
		tive. 20.01 Command	d location i	s valid			
		b00 DI delayed statu		s valid.			
		b00 Di delayed statu b01 DI delayed statu					
		b02 DI delayed statu					
		.b03 DI delayed statu					
		b04 DI delayed statu					
		.b05 DI delayed statu					
		2.b00 DIO delayed s					
	· ·	2.b01 DIO delayed s					
		_					
	113. DIL . 10.00	2.015 Di delaved stati			1	1	
		2.b15 DI delayed stat	_	1 = 1	n	V	Parameter
0.23	0 19	None	-	1 = 1	n	У	Parameter
0.23	0 19 Positive spe	None ed enable	<u> </u> -	1 = 1	n	У	Parameter
0.23	0 19 Positive spe Enable posit	None ed enable ive speed source.	I	1=1	n	у	Parameter
0.23	0 19 Positive spe Enable posit Binary signa	None ed enable ive speed source. I to enable positive s	I	1=1	n	У	Parameter
0.23	0 19 Positive spe Enable posit Binary signa 0 = Disable p	None ed enable ive speed source. I to enable positive speed.	I	1=1	n	У	Parameter
20.23	0 19 Positive spe Enable posit Binary signa 0 = Disable p 1 = Enable posit	None ed enable ive speed source. I to enable positive speed. ositive speed.	peed.				Parameter
0.23	0 19 Positive spe Enable posit Binary signa 0 = Disable pool 1 = Enable pool In the figure	None ed enable ive speed source. I to enable positive sositive speed. District speed. District speed. District speed. District speed. District speed.	peed. ed referenc				
0.23	0 19 Positive spe Enable posit Binary signa 0 = Disable p 1 = Enable po In the figure signal has be	None ed enable ive speed source. I to enable positive speed. ositive speed. below, positive speeden cleared. Actions:	peed. ed referenc	e is set to zero af	ter the pos	sitive speed	d enable
0.23	O 19 Positive spe Enable posit Binary signa O = Disable pool In the figure signal has be If in speed cool	None ed enable ive speed source. I to enable positive sositive speed. District speed. District speed. District speed. District speed. District speed.	peed. ed referenc erence is so	e is set to zero af	ter the pos	sitive speed	d enable

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
				1	1		1				
		1									
	20.23 Pos	itive speed enable			1 1	 →					
		 	<u> </u>	<u> </u>	 						
	20.24 Nega	ative speed enable	<u> i </u>	i							
	22.01 Speed res	forance romp input		<u> </u>	<u> </u>	_					
	23.01 Speed rei	ference ramp input	l I								
	04.04	Material	<u> </u>		į						
	01.01	Motor speed used	<u> </u>			<u> </u>					
				_		<u> </u>					
					D7 LII	N_035_speed_a.ai					
	-	motor is rotating in			stop the m	otor, the p	ositive speed				
		is cleared by a hardw			•	•					
		speed enable signal			the negativ	/e speed er	nable signal is				
	active, only reverse rotation of the motor is allowed.										
	Other [bit]; source selection.										
	0: Disable positive speed ; 0; positive speed reference is set to zero. 1: Enable positive speed ; 1; normal operation.										
	_	00 DI delayed status	•	л.							
		01 DI delayed status									
		02 DI delayed status									
		03 DI delayed status									
	7: DI5 ; 10.02.b	04 DI delayed status	i.								
	8: DI6 ; 10.02.b	05 DI delayed status	5.								
		.b00 DIO delayed sta									
		2.b01 DIO delayed sta									
		b15 DI delayed statu	s		T		1				
	0 19	Enable positive speed	-	1 = 1	n	У	Parameter				
0.24	Negative spec	·	I.		· I						
		ve speed source.									
		o enable negative sp	peed.								
	0 = Disable ne	•									
	1 = Enable neg										
		itive speed enable.		15 5	1		1				
	0 19	Enable negative	-	1 = 1	n	У	Parameter				
0.25	7	speed									
0.25	Jog function										
	Enable jog fur		7	radfia actuate II	20. 20. 3						
		for the jog function.	Jogging i	tseif is selected b	y 20.26 Jo	gging 1 sta	rt source or				
		2 start source.									
	0 = Disable jog 1 = Enable jog										
	LT - Eliable jog	TUTICLIOTI.									

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change	Туре
	Note: If a start co	l ommand is active, 20).25 J og	 function enable	 is ignored.	running If 20.25 Jo	l og function
		all start commands a Main control word.	are igno	red, apart from j	ogging and	d inching. S	See
	Other [bit]; sour	ce selection.					
	0: Disable jog fu	nction ; 0, normal op	eration.				
	1: Enable jog fun	ction ; 1. This suppre	sses the	e run command g	jiven from	remote or	local I/O.
	Thus, the drive c	an only be run from l	ocal, jo	gging and inchin	g.		
		commands ; jog func					ogging 2
		logging 1 start sourc	e and 2	0.27 Jogging 2 st	art source		
	3: DI1 ; 10.02.b00	DI delayed status.					
	4: DI2 ; 10.02.b01	DI delayed status.					
		DI delayed status.					
	6: DI4 ; 10.02.b03	DI delayed status.					
	7: DI5 ; 10.02.b04	DI delayed status.					
	8: DI6 ; 10.02.b05	DI delayed status.					
	11: DIO1 ; 11.02.b0	00 DIO delayed statu	s.				
	12: DIO2 ; 11.02.b0	01 DIO delayed statu	s.				
	19: DIL ; 10.02.b15	DI delayed status.					
	0 19	Disable jog	-	1 = 1	n	у	Parameter

20.26 Jogging 1 start source

Enable jogging 1 start source.

Binary signal for jogging 1 start. If enabled by 20.25 Jog function enable, selects the source for the activation of jogging 1.

0 = Disable jogging 1.

1 = Enable jogging 1.

Notes:

20.01 Command location = Local I/O:

function

- The drive must be in state Ready run. Mark, that only the On command has been given. When jogging 1 start is given the drives automatically sets the Run command.
 The motor accelerates to the speed set in 22.42 Jogging 1 reference.
- Acceleration and deceleration time for jogging is selected by 23.20 Acceleration time jogging and 23.21 Deceleration time jogging.
- If both jogging 1 and 2 are activated, the one that was activated first has priority.
- Inching is not possible.
- 20.01 Command location = Main control word:
 - Set Ramp out zero = Ramp hold = Ramp in zero = 0, then give On command, Run command and Inching 1. See 06.01.b08 Main control word. The motor accelerates to the speed set in 22.42 Jogging 1 reference.
 - Acceleration and deceleration time for jogging is selected by 23.20 Acceleration time jogging and 23.21 Deceleration time jogging.
 - If both inching 1 and 2 are activated, the one that was activated first has priority.
 - Jogging is not possible.

Other [bit]; source selection.

- 0: Disable jogging 1; 0, normal operation.
- 1: Enable jogging 1; 1.
- 3: **DI1**; 10.02.b00 DI delayed status.
- 4: **DI2**; 10.02.b01 DI delayed status.
- 5: **DI3**; 10.02.b02 DI delayed status.
- 6: **DI4**; 10.02.b03 DI delayed status.

Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	7: DI5 ; 10.02	.b04 DI delayed stat	tus.			ı ug	
	8: DI6 ; 10.02	2.b05 DI delayed sta	tus.				
	11: DIO1 ; 11.0	02.b00 DIO delayed	status.				
	12: DIO2 ; 11.	02.b01 DIO delayed	status.				
	19: DIL ; 10.0	2.b15 DI delayed sta	tus.				
		direction; 10.02.b0	O DI delayed	status. 20.14 Dire	ection of r	otation sou	urce is
	considered.						
	41: DI2 plus	direction; 10.02.b01	DI delayed	status. 20.14 Dire	ection of ro	tation sou	rce is
	considered.						
	42: DI3 plus	direction; 10.02.b02	2 DI delayed	status. 20.14 Dire	ection of ro	otation sou	ırce is
	considered.						
	43: DI4 plus considered.	direction; 10.02.b0	3 DI delayed	status. 20.14 Dire	ection of re	otation sou	ırce is
	44: DI5 plus considered.	direction; 10.02.b0	4 DI delayed	status. 20.14 Dire	ection of r	otation sou	urce is
	00.10.00.00	direction; 10.02.b0	E DI dalawad	ctatus 20 14 Dire	action of r	atation cou	urco ic
	considered.		o Di delayed	Status. 20.14 Dire	ection or re	Jiation Sol	ii ce is
	00.10.00.00	s direction; 11.02.b0		ed status 20 14 I	Direction o	of rotation	sourca is
	considered.	is direction, 11.02.b	oo bio delay	rea status. 20.14 i	Direction C	or rotation	Jource 13
		s direction; 11.02.b0	01 DIO delav	ed status 20 14 F	Direction o	f rotation s	source is
	considered.		or Dio delay	CG 5 (GCG). E0.17 L			, ca, cc 13
	constact ca.						
	48: DIL plus	direction; 10.02.b15	DI delayed	status, 20,14 Dire	ection of ro	tation sou	rce is

20.27 Jogging 2 start source

0 ... 48

Enable jogging 2 start source.

Binary signal for jogging 2 start. If enabled by 20.25 Jog function enable, selects the source for the activation of jogging 2.

1 = 1

n

У

0 = Disable jogging 2.

1 = Enable jogging 2.

Notes:

- 20.01 Command location = Local I/O:
 - The drive must be in state Ready run. Mark, that only the On command has been given. When jogging 2 start is given the drives automatically sets the Run command.
 The motor accelerates to the speed set in 22.43 Jogging 2 reference.
 - Acceleration and deceleration time for jogging is selected by 23.20 Acceleration time jogging and 23.21 Deceleration time jogging.
 - If both jogging 1 and 2 are activated, the one that was activated first has priority.
 - Inching is not possible.
- 20.01 Command location = Main control word:

Disable jogging 1

- Set Ramp out zero = Ramp hold = Ramp in zero = 0, then give On command, Run command and Inching 2. See 06.01.b09 Main control word. The motor accelerates to the speed set in 22.43 Jogging 2 reference.
- Acceleration and deceleration time for jogging is selected by 23.20 Acceleration time jogging and 23.21 Deceleration time jogging.
- If both inching 1 and 2 are activated, the one that was activated first has priority.
- Jogging is not possible.

Other [bit]; source selection.

0: **Disable jogging 2**; 0, normal operation.

1: Enable jogging 2; 1.

Parameter

Name						
Text						
Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
3: DI1 ; 10.02.b00) DI delayed status.					
· ·	_					
	-					
The state of the s	-					
	-					
· ·	-					
	-	IS.				
19: DIL ; 10.02.b1	5 DI delayed status.					
-	ection; 10.02.b00 DI c	delayed	status. 20.14 Dire	ection of ro	otation sou	ırce is
considered.						
•	ction ; 10.02.b01 DI d	elayed s	status. 20.14 Dire	ction of ro	tation sou	rce is
	ection: 10.02.b02 DI d	lelaved s	status, 20.14 Dire	ection of ro	tation sou	rce is
•		,				
	ection: 10.02.b03 DLc	delayed	status. 20.14 Dire	ection of ro	otation sou	ırce is
<u>-</u>						
44: DI5 plus dire	ection; 10.02.b04 DI c	delayed	status. 20.14 Dire	ection of ro	otation sou	ırce is
-	ection; 10.02.b05 DI c	delayed	status. 20.14 Dire	ection of ro	otation sou	irce is
				.		
-	rection; 11.02.b00 DI	O delay	ed status. 20.14 [Direction o	f rotation	source is
	rection: 11 02 h01 DI	O delave	ad status 20 14 F	Direction o	frotations	cource is
-	rection, 11.02.001 Div	o delaye	50 3tatus. 20.14 L	on eccion o	rotations	source is
	action: 10 02 b15 DLd	اماءيمط ه	status 20 14 Dire	action of ro	station cou	rcais
<u>-</u>	ECCION , 10.02.013 DI G	lelayeu s	status. 20.14 Dire	ection of ic	reaction sou	10015
	Disable iogging 2	-	1 = 1	n	v	Parameter
		1	1	1		1
_		2 On/O	ff1 source = 20.00	6 Run/Stoi	o source =	DI1 and DI2
	-					
		-1-				<i>3 - 3</i>
0.0 3250.0	5.0	s	10 = 1 s	n	у	Parameter
			110 - 13	111	l y	Parameter
-	Text Range 3: DI1; 10.02.b00 4: DI2; 10.02.b00 5: DI3; 10.02.b00 6: DI4; 10.02.b00 7: DI5; 10.02.b00 11: DIO1; 11.02.b 12: DIO2; 11.02.b 19: DIL; 10.02.b1 40: DI1 plus direconsidered. 41: DI2 plus direconsidered. 42: DI3 plus direconsidered. 43: DI4 plus direconsidered. 44: DI5 plus direconsidered. 45: DI6 plus direconsidered. 45: DI6 plus direconsidered. 46: DIO1 plus direconsidered. 47: DIO2 plus direconsidered. 48: DIL plus direconsidered. 50 48 51 wire jogging of the plus director direc	Range 3: DI1; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 7: DI5; 10.02.b04 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DIO1; 11.02.b00 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 40: DI1 plus direction; 10.02.b00 DI delayed status. 40: DI1 plus direction; 10.02.b00 DI delayed status. 40: DI2 plus direction; 10.02.b01 DI delayed status. 40: DI3 plus direction; 10.02.b01 DI delayed status. 41: DI2 plus direction; 10.02.b01 DI delayed status. 42: DI3 plus direction; 10.02.b01 DI delayed status. 43: DI4 plus direction; 10.02.b02 DI delayed status. 44: DI5 plus direction; 10.02.b03 DI delayed status. 45: DI6 plus direction; 10.02.b05 DI delayed status. 46: DIO1 plus direction; 10.02.b04 DI delayed status. 46: DIO1 plus direction; 10.02.b05 DI delayed status. 47: DIO2 plus direction; 11.02.b00 DI delayed status. 48: DIL plus direction; 11.02.b01 DIdensidered. 48: DIL plus direction; 10.02.b15 DI delayed status. Disable jogging 2 3 wire jogging off delay time Delay time for 3 wire jogging. Mains contactor off delay when 20.0 and jogging is used. After jogging is by 20.28 3 wire jogging off delay timi jogging.	Text Range Default Unit 3: DI1; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 7: DI5; 10.02.b04 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DIO1; 11.02.b00 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 19: DIL; 10.02.b15 DI delayed status. 19: DIL plus direction; 10.02.b00 DI delayed considered. 41: DI2 plus direction; 10.02.b01 DI delayed status. 42: DI3 plus direction; 10.02.b01 DI delayed status. 43: DI4 plus direction; 10.02.b02 DI delayed status. 44: DI5 plus direction; 10.02.b03 DI delayed status. 45: DI6 plus direction; 10.02.b04 DI delayed status. 46: DI01 plus direction; 10.02.b05 DI delayed status. 47: DI02 plus direction; 11.02.b00 DIO delayed considered. 48: DIL plus direction; 11.02.b01 DIO delayed considered. 48: DIL plus direction; 11.02.b01 DIO delayed status. 48: DIL plus direction; 10.02.b15 DI delayed status. 49: DI2 plus direction; 10.02.b15 DI delayed status. 40: DI3 plus directio	Text Range Default Unit Scale/FbEq16 3: DI1; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 7: DI5; 10.02.b03 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DI01; 11.02.b00 DIO delayed status. 12: DI02; 11.02.b01 DIO delayed status. 19: DIL; 10.02.b15 DI delayed status. 19: DI1 plus direction; 10.02.b00 DI delayed status. 20: DI2 plus direction; 10.02.b01 DI delayed status. 20: DI3 plus direction; 10.02.b01 DI delayed status. 20: L1 DI2 plus direction; 10.02.b02 DI delayed status. 20: L4 Directions dered. 42: DI3 plus direction; 10.02.b03 DI delayed status. 20: L4 Directions dered. 43: DI4 plus direction; 10.02.b03 DI delayed status. 20: L4 Directions dered. 44: DI5 plus direction; 10.02.b04 DI delayed status. 20: L4 Directions dered. 45: DI6 plus direction; 10.02.b05 DI delayed status. 20: L4 Directions dered. 46: DI01 plus direction; 11.02.b00 DIO delayed status. 20: L4 Directions dered. 47: DI02 plus direction; 11.02.b01 DIO delayed status. 20: L4 Directions dered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20: L4 Directions dered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20: L4 Directions dered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20: L4 Directions dered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20: L4 Directions dered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20: L4 Directions dered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20: L4 Directions dered. 20: L48 Disable jogging 2 Delay time for 3 wire jogging. Aains contactor off delay when 20: 02 On/Off1 source = 20: 00 and jogging is used. After jogging is taken away the opening by 20: 28: 3 wire jogging off delay time. That means the mains jogging.	Text Range Default Unit Scale/FbEq16 Volatile 3: DI1; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 7: DI5; 10.02.b03 DI delayed status. 7: DI5; 10.02.b05 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DIO1; 11.02.b00 DIO delayed status. 12: DIO2; 11.02.b15 DI delayed status. 19: DIL; 10.02.b15 DI delayed status. 19: DIL; 10.02.b15 DI delayed status. 40: DI1 plus direction; 10.02.b00 DI delayed status. 20: DI2 plus direction; 10.02.b01 DI delayed status. 20.14 Direction of reconsidered. 41: DI2 plus direction; 10.02.b02 DI delayed status. 20.14 Direction of reconsidered. 42: DI3 plus direction; 10.02.b03 DI delayed status. 20.14 Direction of reconsidered. 43: DI4 plus direction; 10.02.b04 DI delayed status. 20.14 Direction of reconsidered. 44: DI5 plus direction; 10.02.b05 DI delayed status. 20.14 Direction of reconsidered. 45: DI6 plus direction; 11.02.b05 DI delayed status. 20.14 Direction of reconsidered. 46: DI01 plus direction; 11.02.b01 DIO delayed status. 20.14 Direction of reconsidered. 47: DIO2 plus direction; 11.02.b01 DIO delayed status. 20.14 Direction of reconsidered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 49: DIA plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 49: DIA plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 40: DIA plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 41: DIA plus direction; 10.02.b15 DI delayed status. 20.14 Direction of reconsidered. 42: DIA plus direction; 10.02.b15 DI delayed status.	Range Default Unit Scale/FbEq16 Volatile Change running 3: DII; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 6: DI4; 10.02.b05 DI delayed status. 7: DI5; 10.02.b05 DI delayed status. 11: DIO1; 11.02.b00 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 19: DIL; 10.02.b15 DI delayed status. 19: DIL; 10.02.b15 DI delayed status. 19: DI2 plus direction; 10.02.b00 DI delayed status. 20.14 Direction of rotation sou considered. 41: DI2 plus direction; 10.02.b01 DI delayed status. 20.14 Direction of rotation sou considered. 42: DI3 plus direction; 10.02.b02 DI delayed status. 20.14 Direction of rotation sou considered. 43: DI4 plus direction; 10.02.b03 DI delayed status. 20.14 Direction of rotation sou considered. 44: DI5 plus direction; 10.02.b04 DI delayed status. 20.14 Direction of rotation sou considered. 45: DI6 plus direction; 10.02.b05 DI delayed status. 20.14 Direction of rotation sou considered. 46: DI01 plus direction; 11.02.b00 DIO delayed status. 20.14 Direction of rotation sou considered. 47: DIO2 plus direction; 11.02.b01 DIO delayed status. 20.14 Direction of rotation sou considered. 48: DIL plus direction; 11.02.b01 DIO delayed status. 20.14 Direction of rotation sou considered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20.14 Direction of rotation sou considered. 48: DIL plus direction; 10.02.b15 DI delayed status. 20.14 Direction of rotation sou considered. 49: Disable jogging 2

Index Name Text Range Default Unit Scale/FbEq16 Volatile Change running Type

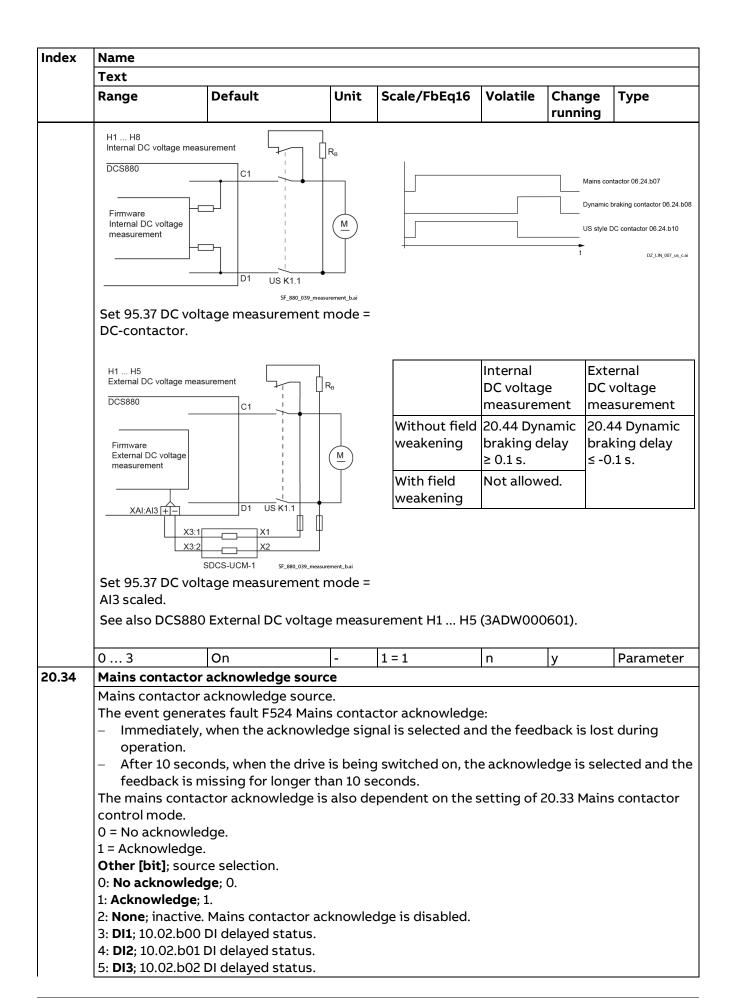
Control mode for mains contactor or DC-breaker.

20.33 Mains contactor control mode determines the reaction to On- and Run command. See 06.09.b03 Used main control word.

Notes:

- If a DC-breaker is used and the DC voltage measurement is taken inside the converter module (H1 ... H8 modules in default configuration) do the following:
 - Set 20.33 Mains contactor control mode = DC-contactor.
 - Set 95.37 DC voltage measurement mode = DC-contactor.
 - Balance 01.21 Armature voltage by means of 95.35 DC voltage measurement offset.
 - Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).
- If a DC-breaker is used and the DC voltage measurement is located at the motor terminals via SDCS-UCM-01 and AI3 (H1 ... H5 modules in default configuration) do the following:
 - Set 20.33 Mains contactor control mode = On, default.
 - Set 95.37 DC voltage measurement mode = AI3 scaled.
 - Set 95.35 DC voltage measurement offset = 0, default.
 - Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).
- If a DC-breaker is used and the DC voltage measurement is located at the motor terminals (re-wired H6 ... H8 modules) do the following:
 - Set 20.33 Mains contactor control mode = On, default.
 - Set 95.37 DC voltage measurement mode = Manual, default.
 - Set 95.35 DC voltage measurement offset = 0, default.
 - Use XSMC:1/2 to close the DC-breaker. Alternatively, it is also possible to use 06.24.b07 Current controller status word 1 via a relay output (RO).
- 0: On; mains contactor or DC-breaker closes with the On command.
- 1: On and Run; mains contactor or DC-breaker closes with On- and Run command.
- 3: **DC-contactor**; if a DC-breaker or a DC-contactor (US style) is used as a mains contactor, it will be closed with the On command:
- Use manual voltage balancing. Thus, set 95.37 DC voltage measurement mode = DCcontactor and balance 01.21 Armature voltage by means of 95.35 DC voltage measurement offset.
- The armature voltage measurements are adapted to an open DC-breaker by clamping 01.21 Armature voltage in V, 28.05 Armature voltage, 28.06 EMF voltage and 94.01 EMF speed to zero when the drive is Off. The clamping is released either 100 ms after an On command is given in case 20.35 DC-breaker acknowledge source = None or when using the DC-breaker acknowledge with 20.35 DC-breaker acknowledge source = DIx until the acknowledge signal indicates that the DC-breaker is closed.

Note: The DC-contactor (US style) K1.1 is a special designed DC-contactor with one normally closed contact for the dynamic braking resistor R_B and two normally open contacts for C1 and D1. The DC-contactor should be controlled by 06.24.b10 Current controller status word 1. The acknowledge signal can be connected to either 20.34 Mains contactor acknowledge source, or 20.35 DC-breaker acknowledge source. Use 20.33 Mains contactor control mode = DC-contactor.



Index	Name						
	Text						
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре
	7: DI5 ; 10.02.b0-8: DI6 ; 10.02.b0 11: DIO1 ; 11.02.b 12: DIO2 ; 11.02.b	3 DI delayed status. 4 DI delayed status. 5 DI delayed status. 500 DIO delayed status. 501 DIO delayed status. 15 DI delayed status.					
	0 19	None	Ī-	1 = 1	n	у	Parameter
20.35		nowledge source		1		J	rarameter
	selected and th The motor will of The DC-breaker control mode. 0 = No acknowled 1 = Acknowledg Other [bit]; sou 0: No acknowled 1: Acknowledge 2: None; inactiv 3: DI1; 10.02.b0 4: DI2; 10.02.b0 6: DI4; 10.02.b0 7: DI5; 10.02.b0 8: DI6; 10.02.b0 11: DIO1; 11.02.b 12: DIO2; 11.02.b	e. rce selection. dge ; 0.	g. s set. o depend wledge i	dent on the settir			_
	0 19	None	1_	1 = 1	n	v	Parameter
20.38	Drive fan ackno			ı- -	1	J	. a. a. i i ceci
	 At start the acknowledg During runn the drive far The warning 31.41 Drive fan far At start the acknowledg If the feedb fan acknowledg During runn the drive far If the feedb fan acknowledg 	fault function = Warn event generates war e is selected and the ing the event immed a acknowledge is sele g is reset if the drive fault function = Fault event generates war e is selected and the ack is missing for lor ledge. ing the event immed a acknowledge is sele ack is missing for lor ledge. g is reset automatical e elapsed.	ning A5 feedba liately geted ar fan ackr the feedba nger tha liately geted ar nger tha	ck is missing for enerates warning and the feedback is nowledge is coming the feedback is missing for a 10 seconds the enerates warning and the feedback is a 10 seconds the feedback is a 10 second the	longer that a A581 Drives missing. In a back. owledge, it longer that event general g	n 6 second e fan ackno f the drive n 6 second erates faul e fan ackno erates faul	fan ls. t 5080 Drive owledge, if t 5080 Drive

	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	1 = Acknowle	edge.			•	•				
	Other [bit];	source selection.								
	0: No acknow	wledge; 0.								
	1: Acknowled	dge; 1.								
		tive. Drive fan acknov	_	disabled.						
		b00 DI delayed status								
		b01 DI delayed status								
		b02 DI delayed status								
		.b03 DI delayed statu:								
		b04 DI delayed status								
		.b05 DI delayed statu:								
		2.b00 DIO delayed st								
	•	02.b01 DIO delayed st								
	19: DIL ; 10.02	2.b15 DI delayed statu	ıs.							
	0 19	None	-	1 = 1	n	у	Parameter			
20.39	Motor fan ac	knowledge source								
	Motor/Exter	nal fan acknowledge	source.							
		he event generates w		81 Motor fan acki	nowledge.	if the moto	or/external			
		owledge is selected a	_		_					
		dback is missing for l		-	_					
		_	ionger tha	iii 10 seconds the	event gen	erates raur	C 7 IBI MOCO			
	fan acknowledge.									
	– During running the event immediately generates warning A781 Motor fan acknowledge, if									
	_	_		_			owledge, if			
	the moto	or/external fan ackno	wledge is	selected and the	feedback i	s missing.				
	the moto	or/external fan ackno dback is missing for l	wledge is	selected and the	feedback i	s missing.				
	the moto If the fee fan ackno	or/external fan ackno dback is missing for l owledge.	wledge is a longer tha	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the moto If the fee fan ackno – The warn	or/external fan ackno dback is missing for l owledge. ning is reset automati	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the moto If the fee fan ackno – The warn before 10	or/external fan acknor dback is missing for l owledge. ning is reset automati O seconds are elapsec	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the moto If the fee fan ackno — The warn before 10 0 = No ackno	or/external fan acknor dback is missing for l owledge. ning is reset automati d seconds are elapsed owledge.	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowledge fan ackn	or/external fan acknor dback is missing for l owledge. ning is reset automati o seconds are elapsed owledge. edge.	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknown of the warm before 10 0 = No acknown of the feet factor	or/external fan acknor dback is missing for l owledge. ning is reset automati o seconds are elapsed owledge. edge. source selection.	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknown fan acknown fan acknown fan fan fan fan fan fan fan fan fan fa	or/external fan acknowdback is missing for lowledge. Sing is reset automation seconds are elapsed owledge. Sedge. Source selection. Wledge; 0.	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknown of the warm before 10 0 = No acknown of the feet factor	or/external fan acknowdback is missing for lowledge. Sing is reset automation seconds are elapsed owledge. Sedge. Source selection. Wledge; 0.	wledge is a longer that ically if the	selected and the n 10 seconds the	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled for the feet fan acknowled for the feet fan acknowled fan acknow	or/external fan acknowdback is missing for lowledge. Sing is reset automation seconds are elapsed owledge. Sedge. Source selection. Wledge; 0.	wledge is a longer that ically if the d.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled fan ackn	or/external fan acknor dback is missing for l owledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1.	wledge is a longer that is cally if the d.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for l owledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1.	wledge is a longer that ically if the d.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for lowledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. etive. Motor fan acknor b00 DI delayed status	wledge is a longer that ically if the d. by which is a longer that ically if the d. by which is a longer that is a longer than it is a lo	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for lowledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status	wledge is a longer that is cally if the d. bwledge is s. s. s.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled the feet fan acknowled	or/external fan acknor dback is missing for lowledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. tive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status	wledge is a longer that ically if the d. bowledge is s. s. s.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled fan ackn	or/external fan acknor dback is missing for lowledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. tive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status	wledge is a longer that ically if the d. bwledge is s. s. s. s.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for lowledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status b03 DI delayed status b04 DI delayed status b04 DI delayed status	wledge is a longer that ically if the d. bwledge is s. c. s. s. s. s.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled the feet fan acknowled for the feet fan acknowled fan	or/external fan acknor dback is missing for lowledge. ning is reset automation disconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status b04 DI delayed status b04 DI delayed status b05 DI delayed status	wledge is a longer that it cally if the d. bwledge is s.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled the feet fan acknowled for the feet fan acknowled fan ack	or/external fan acknor dback is missing for lowledge. ning is reset automation seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b03 DI delayed status b04 DI delayed status b05 DI delayed status b05 DI delayed status b05 DI delayed status b05 DI delayed status	wledge is a longer that ically if the d. bowledge is s. s. s. s. s. s. s. atus.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for lowledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b04 DI delayed status b05 DI delayed status b05 DI delayed status cb05 DI delayed status cb05 DI delayed status cc.b00 DIO delayed status cc.b01 DIO delayed status cc.b15 DI delayed status	wledge is a longer that ically if the d. bwledge is s. bwledge is s. s. s. s. s. s. atus. atus.	selected and the in 10 seconds the motor/external disabled.	feedback i event gen fan acknov	s missing. erates faul wledge is co	t 71B1 Motor			
0.40	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for owledge. ning is reset automati d seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b04 DI delayed status b05 DI delayed status b05 DI delayed status b05 DI delayed status cb05 DI delayed status b2.b00 DIO delayed status b2.b01 DIO delayed status b2.b01 DIO delayed status b2.b01 DIO delayed status	wledge is a longer that ically if the d. bowledge is s. s. s. s. s. s. s. atus.	selected and the and the and the and the emotor/external	feedback i event gen	s missing. erates faul [,]	t 71B1 Motor			
<u>?</u> 0.40	the motor of the feet fan acknowled the feet fan acknowled for 10 or No acknowled for the figure of the field for	or/external fan acknor dback is missing for bowledge. hing is reset automation seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b04 DI delayed status b04 DI delayed status b05 DI delayed status b	wledge is a longer that ically if the d. bwledge is s. bwledge is s. s. s. s. s. s. atus. atus.	selected and the in 10 seconds the motor/external disabled.	feedback i event gen fan acknov	s missing. erates faul wledge is co	t 71B1 Motor			
20.40	the motor of the feet fan acknowled the feet fan acknowled of the feet fan acknowled fan acknowl	or/external fan acknor dback is missing for bowledge. hing is reset automation seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. etive. Motor fan acknor b00 DI delayed status b01 DI delayed status b02 DI delayed status b04 DI delayed status b05 DI delayed status b	wledge is a longer that ically if the d. by wledge is s. s. s. s. s. s. atus. atus. is.	selected and the in 10 seconds the motor/external disabled.	feedback i event gen fan acknov	s missing. erates faul wledge is co	t 71B1 Motor oming back			
20.40	the motor of the feet fan acknowled to the f	or/external fan acknor dback is missing for bowledge. ning is reset automation seconds are elapsed owledge. edge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor bood DI delayed status bood DI	wledge is a longer that ically if the d. bwledge is s. bwledge is s. s. s. s. s. s. atus. atus. -	selected and the in 10 seconds the motor/external disabled. 1 = 1	feedback i event gen fan acknov n motor, co	s missing. erates fault wledge is co	Parameter			
20.40	the motor of the feet fan acknowled of the feet fan of the feet fan acknowled of the feet fan of the feet fan acknowled of the feet fan of the f	or/external fan acknor dback is missing for bowledge. ning is reset automation seconds are elapsed owledge. source selection. wledge; 0. dge; 1. ctive. Motor fan acknor bood DI delayed status bood DI d	wledge is a longer that ically if the d. bwledge is s. bwledge is s. s. s. s. s. s. atus. atus. atus. is	selected and the in 10 seconds the motor/external disabled. 1 = 1 Il fans, drive, and or motor overter	n motor, conperature	s missing. erates fault wledge is co	Parameter			
<u>?</u> 0.40	the motor of the feet fan acknowled fan ackn	or/external fan acknor dback is missing for bowledge. ling is reset automation seconds are elapsed owledge. Is ource selection. In the selection of the selection of the selection. In the selection of the select	wledge is a longer that ically if the d. bwledge is s. bwledge is s. s. s. s. s. s. atus. atus. atus. is	selected and the in 10 seconds the motor/external disabled. I = 1 Il fans, drive, and or motor overter elow the overter	n motor, conperature	s missing. erates fault wledge is co	Parameter un until 20.40, the delay			
?0.40	the motor of the feet fan acknowled of the feet fan of the feet fan acknowled of the feet fan of the feet fan acknowled of the feet fan of the f	or/external fan acknor dback is missing for bowledge. ling is reset automation seconds are elapsed owledge. Is ource selection. In the selection of the selection of the selection. In the selection of the select	wledge is a longer that ically if the d. bwledge is s. bwledge is s. s. s. s. s. s. atus. atus. atus. is	selected and the in 10 seconds the motor/external disabled. 1 = 1 Il fans, drive, and or motor overter	n motor, conperature	s missing. erates fault wledge is co	Parameter			

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change	Туре			
						running				
	_ =	ng acknowledge so								
	_	erates warning A10	-	_	•		-			
	_	s selected and the		,		•				
	_	iven. This prevents	the drive f	rom starting, whi	ile dynami	c braking is	active.			
		raking inactive.								
	1 = Dynamic bi	_								
		urce selection.								
	_	aking inactive ; 0, no	ormal ope	ration.						
	1: Dynamic braking active ; 1. 3: DI1 ; 10.02.b00 DI delayed status. 4: DI2 ; 10.02.b01 DI delayed status.									
		02 DI delayed statu								
	· ·	03 DI delayed statu								
	•	04 DI delayed statu								
	· ·	05 DI delayed statu								
		b00 DIO delayed st								
	,	.b01 DIO delayed st								
		o15 DI delayed statu			1	1				
	0 19	Dynamic brakin	g -	1 = 1	n	У	Parameter			
		inactive								
20.44	Dynamic braking delay									
	Delay time for Dynamic braking.									
	In case of dynamic braking with EMF speed feedback , see 90.41 M1 feedback selection, or a									
	speed feedback fault and the motor voltage is not measured directly at the motor terminals,									
	e.g., due to a DC-contactor (US style), there is no valid information about the motor speed and									
	no zero-speed information. Thus, dynamic braking and excitation is active until 20.44 Dynamic									
	braking delay is elapsed.									
	≤ -0.1 s; the motor voltage is measured directly at the motor terminals and is valid during									
	dynamic braking.									
	= 0.0 s ; during dynamic braking, no zero-speed signal is generated.									
	≥ 0.1 s; during dynamic braking, a zero-speed signal is generated after the programmed time is									
	elapsed.									
	Note: Only val	id for 90.41 M1 feed	back selec	ction = EMF.						
				10 - 1 -	n	у	Parameter			
	-1.0 3250.0	0.0	S	10 = 1 s	1					
20.47		0.0 rotection trigger s		10 = 1 S	1	1,5				
20.47	Overvoltage p	rotection trigger s	ource	10 = 1 \$	1	12				
20.47	Overvoltage p	rotection trigger so	ource.							
20.47	Overvoltage p Overvoltage p The event gen	protection trigger so rotection trigger so erates warning A120	ource ource. O Overvolt	age protection ac	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th	rotection trigger so	ource ource. O Overvolt ection trig	age protection ag	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope	ource ource. O Overvolt ection trig	age protection ac ger is selected an de.	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 mus	ource ource. O Overvolt ection trig	age protection ac ger is selected an de.	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 mus	ource ource. O Overvolt ection trig	age protection ac ger is selected an de.	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger 1 = Trigger.	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 mus command.	ource ource. O Overvolt ection trig	age protection ac ger is selected an de.	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger 1 = Trigger. Other [bit]; so	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 musi command.	ource ource. O Overvolt ection trig eration mo t be conne	age protection ac ger is selected an de. ected to a DI of th	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger 1 = Trigger. Other [bit]; so	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 must command. urce selection.	ource ource. O Overvolt ection trig eration mo t be conne	age protection ac ger is selected an de. ected to a DI of th	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger 1 = Trigger. Other [bit]; so 0: No trigger of	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 mus- command. urce selection. command; 0, normal	ource. Dource. O Overvolt ection trigoration month be connected to the connected transfer of transfer of the connected transfer of transfer	age protection ac ger is selected an de. ected to a DI of th	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger 1 = Trigger. Other [bit]; so 0: No trigger of 1: Trigger com 3: DI1; 10.02.60	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 mus command. urce selection. command; 0, norma imand; 1.	ource ource. O Overvolt ection trig eration mo t be conne	age protection ac ger is selected an de. ected to a DI of th	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO 0 = No trigger 1 = Trigger. Other [bit]; so 0: No trigger of 1: Trigger com 3: DI1; 10.02.b0 4: DI2; 10.02.b0	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 mus- command. urce selection. command; 0, normal	ource ource. O Overvolt ection trig eration mo t be conne	age protection ac ger is selected an de. ected to a DI of th	ctive and b	locks the c	urrent			
20.47	Overvoltage p Overvoltage p The event gen controller if th field exciter m Note: The DO o = No trigger 1 = Trigger. Other [bit]; so 0: No trigger of 1: Trigger com 3: DI1; 10.02.bo 4: DI2; 10.02.bo 5: DI3; 10.02.bo	rotection trigger so rotection trigger so erates warning A120 e overvoltage prote ode. See 99.06 Ope of the DCF506 musi command. urce selection. command; 0, normal mand; 1. 00 DI delayed status 01 DI delayed status	ource Durce. O Overvolt Durction trig Duration mo Dura	age protection ac ger is selected an de. ected to a DI of th	ctive and b	locks the c	urrent			

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
	8: DI6 ; 10.02.b05 DI delayed status. 11: DIO1 ; 11.02.b00 DIO delayed status. 12: DIO2 ; 11.02.b01 DIO delayed status. 19: DIL ; 10.02.b15 DI delayed status.										
	0 19	No trigger command	-	1 = 1	n	У	Parameter				

21 Start/Stop mode

Start and stop modes, emergency stop mode and zero speed.

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре				
21.01	Start mode		•	•	•		•				
	Start mode of the	drive.									
	Selects the motor control word.	start function in re	esponse to	a Run command.	See 06.0	9.b03 Use	d main				
	0: Start from zero:	wait until the mot	or has read	ched zero speed.	then rest	tart. For th	nis first set				
	On = Run = 0. See 21.08 M1 zero speed level.										
	Notes:										
	 In case a restart command (a new Run command) is given before 21.08 M1 zero speed level 										
	is reached and 21.09 M1 zero speed delay is elapsed, A137 Start condition conflict is generated.										
	– Any Run command re-starts 21.09 M1 zero speed delay.										
	1: Flying start ; start the drive into a rotating motor, when stopping via Coast stop, Ramp stop										
	or Torque limit. Stop via Dynamic braking, Off2 (emergency off/electrical disconnect/fast										
	current off) or Off3 (emergency stop) is not interrupted. Wait until zero speed is reached.										
	2: Flying start dynamic braking ; start the drive into a rotating motor, when stopping via Coast										
	stop, Ramp stop, Torque limit or Dynamic braking. Dynamic braking is interrupted.										
	Make sure, that the hardware, e.g., the switch disconnecting the braking resistor, can										
	disconnect the current.										
	0 2	Flying start	-	1 = 1	n	у	Parameter				
21.02	Off1 mode	, , ,	I			12	L				
	Mode for On/Off1	control.									
	Selects the way the		d when an 0	Off1 command is	given. Se	e 06.09.b0	00 Used				
	main control word				J						
	In case Off1 comm	and and Stop com	mand are g	given at the same	time or	nearly con	temporary				
			-			•					
	21.02 Off1 mode and 21.04 Stop mode must have the same setting. Priority list:										
	Highest priority: (Highest priority: 06.09.b01 Off2 control.									
	21.03 Emergency stop mode.										
		21.03 Emergency s 21.02 Off1 mode.	top mode.								
			top mode.								
	Lowes priority:	21.02 Off1 mode. 21.04 Stop mode.	·	iring angle is for	ced to th	e value of	30.45				
	Lowes priority: 7	21.02 Off1 mode. 21.04 Stop mode. motor coasts to a	stop. The f								
	Lowes priority:	21.02 Off1 mode. 21.04 Stop mode. motor coasts to a agle to decrease th	stop. The f	current as fast a	as possib	le. When tl	he armature				
	Lowes priority: 2 0: Coast stop ; the Maximum firing ar	21.02 Off1 mode. 21.04 Stop mode. motor coasts to a agle to decrease th	stop. The f	current as fast a	as possib	le. When tl	he armature				
	Lowes priority: 2 0: Coast stop ; the Maximum firing ar current is zero the	21.02 Off1 mode. 21.04 Stop mode. motor coasts to a agle to decrease th firing pulses are b	stop. The f e armature locked. The amp is set	current as fast a breakers are op to zero. Thus, the	as possib ened. Fie e motor s	le. When the le	he armature and fans g the active				

Index Name Text Default Unit Scale/FbEq16 Volatile Change Range Type running current. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control. 3: **Torque limit**; the output of the drive ramp is set to zero. Thus, the motor stops at the active torque limit. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control. 4: **Dynamic braking**; the motor stops by means of dynamic braking. After dynamic braking is finished the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. 0 ... 4 1 = 1 Ramp stop n Parameter 21.03 **Emergency stop mode** Mode for Off3 control (emergency stop).

Selects the way the motor is stopped when an Off3 (emergency stop) command is given. See 06.09.b02 Used main control word.

Priority list:

Highest priority: 06.09.b01 Off2 control.

21.03 Emergency stop mode.

21.02 Off1 mode. 21.04 Stop mode.

Lowes priority:

Attention:

- An emergency stop request (SS1) by a fieldbus safety module (FSPS-21/FSO-21) automatically forces 21.03 Emergency stop mode = Emergency ramp stop if option 0 ... 4 is
- An emergency stop request (SS1) by a fieldbus safety module (FSPS-21/FSO-21) automatically forces 21.03 Emergency stop mode = Emergency ramp stop MC on if option 6 ... 10 is set.

Otherwise, the function is executed as described below.

0: Coast stop; the motor coasts to a stop. The firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current as fast as possible. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped.

See Off3 stop mode 0 in 06.20.b10 Run inhibit status word.

1: Ramp stop; the input of the drive ramp is set to zero. Thus, the motor stops along the active deceleration ramp. See 23.11 Ramp set selection. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. See Off3 stop mode 1 in 06.20.b11 Run inhibit status word.

In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control.

2: **Emergency ramp stop**; the input of the drive ramp is set to zero. Thus, the motor stops along the emergency stop ramp. See 23.23 Emergency stop time. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. See Off3 stop mode 2 in 06.20.b12 Run inhibit status word.

Index	Name										
	Text										
	Range	Default	Unit	Scale/FbEq16	Volatile	Change	Туре				
						running					
	In case 19.20 Follower for			eed control the	torque s	selector is k	ypassed,				
	and the drive is forced t	•			<u> </u>		*				
	3: Torque limit; the out		•			•					
	torque limit. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is										
	_	ro the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped.									
	See Off3 stop mode 3 ir			•	a exciter	and rans ar	e stopped.				
	In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypasse and the drive is forced to speed control.										
	4: Dynamic braking ; the	•		f dynamic braki	ing. See C	Off3 stop m	ode 4 in				
	06.20.b14 Run inhibit st			-	-	•					
	blocked. The breakers a		-	-		31					
	6: Coast stop MC on; th	ne motor coasts t	o a stop.	The firing angle	e is force	d to the va	lue of				
	30.45 Maximum firing a	ingle to decrease	the arma	ature current as	fast as p	ossible. W	hen the				
	armature current is zero	~ .			-						
	and fans continue to ru	•		•	06.01.b03	B Main cont	rol word).				
	See Off3 stop mode 0 in										
	7: Ramp stop MC on; th		-			-	_				
	active deceleration ram level the firing angle is t	•	•		_		•				
	armature current. When										
	breakers stay closed. Fi			• .							
	command (06.01.b03 M				_						
	word.		,. 3	3 3 top ddc 2 .	00.20	, , , , , , , , , , , , , , , , , , ,	Die Status				
	In case 19.20 Follower f	orce ramp stop =	Force sp	eed control the	torque s	selector is k	oypassed,				
	and the drive is forced t		-		·						
	8: Emergency ramp sto	p MC on ; the inp	ut of the	drive ramp is se	et to zero	. Thus, the	motor				
	stops along the emerge				•		_				
	M1 zero speed level the					_	_				
	decrease the armature										
	blocked. The breakers s	-					_				
	Run command (06.01.b)	03 Main control v	vord). See	e Off3 stop mod	de 2 in 06	5.20.b12 Rui	ınhıbit				
	status word.										
	In case 19.20 Follower for and the drive is forced to			eed control the	torque s	selector is t	ypassed,				
	9: Torque limit MC on ; t	•		nn is set to zero	Thus t	he motor st	tons at the				
	active torque limit. Whe	•		•			•				
	value of 30.45 Maximun	_		•		-					
	current is zero the firing										
	continue to run. To re-s	tart give a new R	un comm	and (06.01.b03	Main cor	ntrol word)	. See Off3				
	stop mode 3 in 06.20.b	13 Run inhibit sta	tus word								
	In case 19.20 Follower fo	orce ramp stop =	Force sp	eed control the	torque s	selector is k	ypassed,				
	and the drive is forced t	•									
	10: Dynamic braking Mo			-		-					
	mode 4 in 06.20.b14 Ru			-	-		• .				
	are blocked. The breake				tinue to r	un. To re-s	tart give a				
	new Run command (06.	ı	troi word				D				
	0 10	Emergency	-	1 = 1	n	У	Parameter				
21.04	Stan made	ramp stop									
£1.U4	Stop mode										

Index	Name									
	Text									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	Mode for Stop.	the motor is stopped	l when a St	on command is	riven Se	n6 09 b0	3 Head			
	main control wo	rd.								
	In case Off1 command and Stop command are given at the same time or nearly conte 21.02 Off1 mode and 21.04 Stop mode must have the same setting. Priority list:									
	Highest priority:	06.09.b01 Off2 con								
	21.03 Emergency stop mode. 21.02 Off1 mode. Lowes priority: 21.04 Stop mode.									
	0: Coast stop ; the motor coasts to a stop. The firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current as fast as possible. When the armature current is zero the firing pulses are blocked.									
	1: Ramp stop ; the deceleration ran	e input of the drive range. See 23.11 Ramp se	amp is set et selectior	n. When reaching	21.08 M1	zero spee	d level the			
	firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked. In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed,									
	and the drive is forced to speed control. 3: Torque limit ; the output of the drive ramp is set to zero. Thus, the motor stops at the active									
	torque limit. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of									
	30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked.									
	In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control.									
	4: Dynamic braking ; the motor stops by means of dynamic braking. After dynamic braking is									
	finished the firir	ng pulses are blocked		1 = 1		I	Down wo ot ou			
21.06	Used zero speed	Ramp stop	-	11-1	n	у	Parameter			
ı	Used zero speed									
	Shows the used zero speed level depending on the setting of 42.01 Motor 1/2 selection, 21.08 M1 zero speed level and 42.21 M2 zero speed level.									
		feedback a minimum	•		mended	. At a maxi	mum speed			
	of 1500 rpm 21.06 Used zero speed level ≥ 15 rpm. - For analog tacho feedback a minimum zero speed of 2 % is recommended. At a maximum									
	 speed of 1500 rpm 21.06 Used zero speed level ≥ 30 rpm. For EMF feedback a minimum zero speed of 5 % is recommended. At a maximum speed of 1500 rpm 21.06 Used zero speed level ≥ 75 rpm. 									
	– E.g., used for	r the mechanical brak S-21/FSO-21).			ınction w	ith a fieldl	ous safety			
	-30000.00 30000.00	-	rpm	See 46.02	У	n	Signal			
21.07	Used zero speed	delay	<u> </u>				1			
	Used zero speed	l delay.								
	M1 zero speed d	zero speed delay der elay and 42.22 M2 zer			2.01 Moto	or 1/2 seled	ction, 21.09			
	Note: E.g., used for the mechanical brake control and for the SS1 function with a fieldbus safety module (FSPS-21/FSO-21).									

Index	Name									
	Range	Default	Unit	Scale/FbEq16	Volatile	Change running	Туре			
	0.0 3250.0	-	S	10 = 1 s	n	у	Signal			

21.08 M1 zero speed level

Motor 1 zero speed level.

Depending on the situation, the following is happening:

- When a Stop command is given, the motor decelerates along a speed ramp or at torque limit until the zero-speed level is reached and 21.09 M1 zero speed delay is elapsed. See 21.04 Stop mode. Afterwards the motor will coast. At that moment, existing brakes are closed (applied).
- When an emergency stop request (SS1) is given by a fieldbus safety module (FSPS-21/FSO-21), the motor decelerates according to 23.23 Emergency stop time until the zero-speed level is reached, and 21.09 M1 zero speed delay is elapsed. At that moment, existing brakes are closed (applied) and the STO command is applied by the safety fieldbus module (FSPS-21/FSO-21). See 21.03 Emergency stop mode.

While the speed feedback is in the level, Zero speed is set high. See 06.21.b00 Speed control status word.

Notes:

- If 21.01 Start mode = Start from zero and a restart command (a new Run command) is given before 21.08 M1 zero speed level is reached and 21.09 M1 zero speed delay is elapsed, warning A137 Start condition conflict is generated.
- Any Run command re-starts 21.09 M1 zero speed delay.
- Setting 21.08 M1 zero speed level = 30000.00 rpm disables the zero-speed supervision.

0.00 30000.00	75.00	rpm	See 46.02	n	У	Parameter
---------------	-------	-----	-----------	---	---	-----------

21.09 M1 zero speed delay

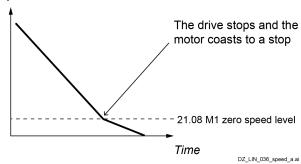
Motor 1 zero speed delay.

The zero-speed delay compensates for the time the motor needs to decelerate from 21.08.M1 zero speed level to standstill. Until 21.09 M1 zero speed delay elapses the drive remains active, and the brake is kept open (lifted).

Without zero speed delay:

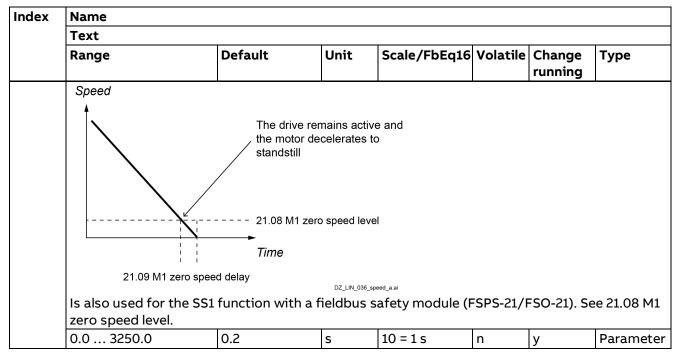
The drive receives a Stop command and decelerates along a speed ramp or at torque limit. When the motor speed feedback falls below 21.08 M1 zero speed level, the drive stops and the motor coasts to standstill.

Speed



With zero speed delay:

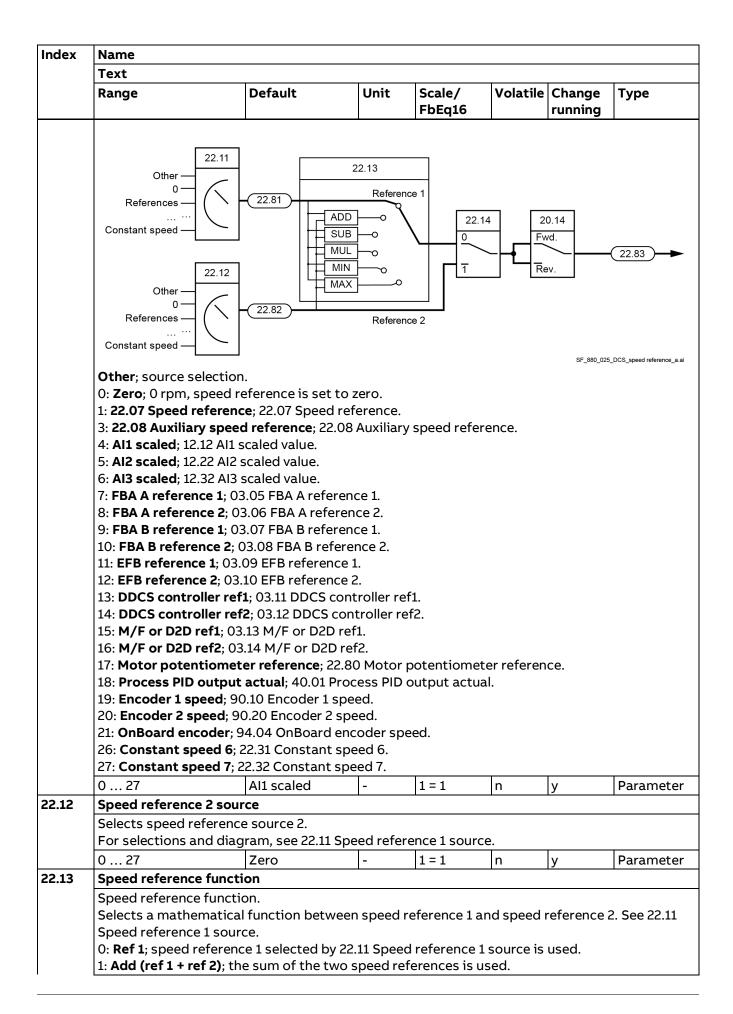
The drive receives a Stop command and decelerates along a speed ramp or at torque limit. When the motor speed feedback falls below 21.08 M1 zero speed level the zero-speed delay is activated. Until the zero speed delay elapses, the drive keeps on working and thus the motor can decelerate to standstill.



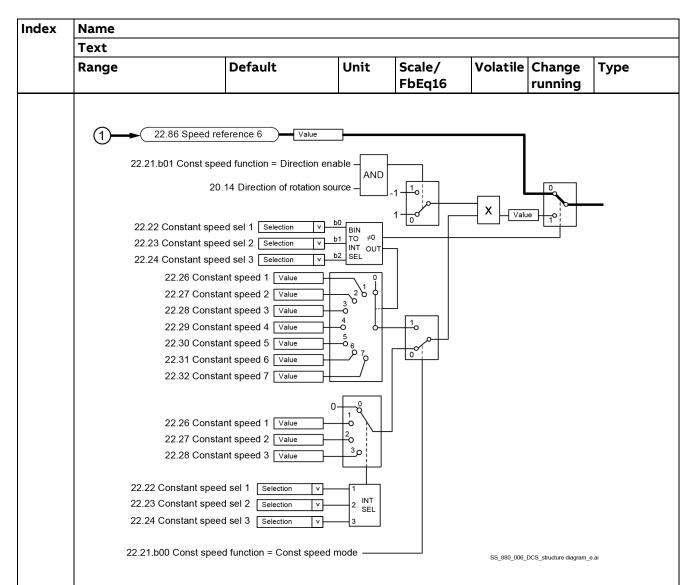
22 Speed reference selection

Speed reference selection and motor potentiometer settings.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
22.01	Speed reference ur	nlimited								
	Speed reference af Displays the speed	reference after se		•		_				
	control panel and s	afe speed. The un	it is selected l	oy 96.03 Uni	t for spec	d control.				
	-30000.00 30000.00	-	rpm, % or V	See 46.02	У	n	Signal			
22.07	Speed reference									
	Main speed referent Main speed referent and/or 22.12 Speed -30000.00	ice input of the dr		selected by						
	30000.00		or V							
22.08	Auxiliary speed ref	Auxiliary speed reference								
	Auxiliary speed reference input. Auxiliary speed reference input of the drive. Can be connected via 22.11 Speed reference 1 source and/or 22.12 Speed reference 2 source. The unit is selected by 96.03 Unit for speed control.									
	-30000.00 30000.00	0.00	rpm, % or V	See 46.02	n	у	Parameter			
22.11	Speed reference 1	source								
	Selects speed reference source 1. Two signal sources can be defined. See 22.11 Speed reference 1 source and 22.12 Speed reference 2 source. 22.14 Speed reference 1/2 selection switches between the two sources or a mathematical function. The mathematical function depends on 22.13 Speed reference function Direction on rotation depends on 20.14 Direction of rotation source.									



	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	•	2) ; the result of spee 2) ; the multiplication		•			ed.				
) ; the maller of the t		•		ieu.					
		?) ; the greater of the	•								
	05	Ref 1	-	1 = 1	n	у	Parameter				
2.14	Speed reference 1				1	3	. arameter				
	-	n speed reference 1 a	and speed r	eference 2							
		-	•		d referenc	e 2 See 2	2 11 Speed				
	Configures the selection between speed reference 1 and speed reference 2. See 22.11 Speed reference 1 source.										
	0 = Speed reference 1.										
	1 = Speed reference 2.										
	Other [bit]; source selection.										
	0: Speed reference 1 ; 0, normal operation.										
	1: Speed reference 2; 1.										
	3: DI1 ; 10.02.b00 DI delayed status.										
	4: DI2 ; 10.02.b01 DI delayed status.										
	5: DI3 ; 10.02.b02 DI delayed status.										
	6: DI4 ; 10.02.b03 DI delayed status.										
	7: DI5 ; 10.02.b04 DI delayed status.										
	8: DI6 ; 10.02.b05 DI delayed status.										
	11: DIO1 ; 11.02.b00 DIO delayed status.										
	12: DIO2 ; 11.02.b01 DIO delayed status.										
		DI delayed status.				T	1				
	0 19	Speed referen	ice -	1 = 1	n	У	Parameter				
2.15	Speed additive 1	source									
	1st additive speed	reference.									
	Defines a speed reference to be added to 22.83 Speed reference 3. See 22.11 Speed reference 1										
	Defines a speed re	ererence to be added	1 10 22.03 3	peca referen		-					
	Defines a speed re source.	eterence to be added	1 (0 22.03 3	pecarerer							
	•	Zero	-	·	n	у	Parameter				
 2.16	source. 0 27		-	1 = 1	1	у	Parameter				
2.16	source. 0 27 Speed share	Zero	-	·	1	у	Parameter				
2.16	source. 0 27 Speed share Speed reference s	Zero scaling factor.	-	1 = 1	n	1-					
2.16	source. 0 27 Speed share Speed reference s Defines a scaling	Zero scaling factor. factor between 22.84	-	1 = 1 erence 4 and	n 22.85 Spe	ed referen	nce 5.				
	source. 0 27 Speed share Speed reference s Defines a scaling -8.000 8.000	Zero scaling factor. factor between 22.84	-	1 = 1	n	1-	nce 5.				
	source. 0 27 Speed share Speed reference s Defines a scaling -8.000 8.000 Speed additive 2	Zero scaling factor. factor between 22.84 1.000 source	-	1 = 1 erence 4 and	n 22.85 Spe	ed referen	nce 5.				
	source. 0 27 Speed share Speed reference s Defines a scaling -8.000 8.000 Speed additive 2 2 nd additive speed	Zero scaling factor. factor between 22.84 1.000 source	- 4 Speed ref -	1 = 1 erence 4 and 1000 = 1	22.85 Spe	ed referer	nce 5. Parameter				
	source. 0 27 Speed share Speed reference s Defines a scaling -8.000 8.000 Speed additive 2 2 nd additive speed Defines a speed reference s	Zero scaling factor. factor between 22.84 1.000 source	- 4 Speed ref -	1 = 1 erence 4 and 1000 = 1	22.85 Spe	ed referer	nce 5. Parameter				
	source. 0 27 Speed share Speed reference s Defines a scaling -8.000 8.000 Speed additive 2 2 nd additive speed Defines a speed re source.	Zero scaling factor. factor between 22.84 1.000 source d reference. eference to be added	- 4 Speed ref -	1 = 1 erence 4 and 1000 = 1 peed referen	n 22.85 Spe n ace 5. See 2	y 22.11 Spee	Parameter				
2.17	source. 0 27 Speed share Speed reference s Defines a scaling -8.000 8.000 Speed additive 2 2 nd additive speed Defines a speed re source. 0 27	Zero scaling factor. factor between 22.84 1.000 source d reference. eference to be added Zero	- 4 Speed ref -	1 = 1 erence 4 and 1000 = 1	22.85 Spe	ed referer	Parameter				
2.17	source. 0 27 Speed share Speed reference some source. 2nd additive speed perines a speed reference source. 0 27 Constant speed for source.	Zero scaling factor. factor between 22.84 1.000 source d reference. eference to be added Zero function	- 4 Speed ref -	1 = 1 erence 4 and 1000 = 1 peed referen	n 22.85 Spe n ace 5. See 2	y 22.11 Spee	Parameter				
2.17	source. 0 27 Speed share Speed reference so Defines a scaling solution and seed additive 2 2nd additive speed Defines a speed resource. 0 27 Constant speed of Constant speed of the speed	Zero scaling factor. factor between 22.84 1.000 source d reference. eference to be added Zero function onfiguration word.	- 4 Speed ref - d to 22.85 S	1 = 1 erence 4 and 1000 = 1 peed referen	n 22.85 Spe n n ace 5. See 2	eed referer y 22.11 Spee	Parameter d reference :				
22.16	source. 0 27 Speed share Speed reference so Defines a scaling selection -8.000 Speed additive 2 2nd additive speed perines a speed resource. 0 27 Constant speed constant s	Zero scaling factor. factor between 22.84 1.000 source d reference. eference to be added Zero function	4 Speed ref - d to 22.85 S -	1 = 1 erence 4 and 1000 = 1 peed referen 1 = 1	n 22.85 Spe n n ace 5. See 2	eed referer y 22.11 Spee	Parame d referen				



Bit assignment:

Bit	Name	Value	Remarks
0	Constant speed mode	1	Packed: 7 constant speeds are selectable using the three sources defined by 22.22 Constant speed sel 1, 22.23 Constant speed sel 2 and 22.24 Constant speed sel 3.
		0	Separate: Constant speeds 1, 2 and 3 are separately activated by the sources defined by 22.22 Constant speed sel 1, 22.23 Constant speed sel 2 and 22.24 Constant speed sel 3. In case of conflict, the constant speed with the smaller number takes priority.
1	Direction enable	1	Depending on 20.14 Direction of rotation source: To determine the direction of rotation for a constant speed, the sign of the constant speed setting is multiplied by 20.14 Direction of rotation source. This effectively allows the drive to have 14 (7 forward and 7 reverse) constant speeds. WARNING

Index	Name	Name										
	Text											
	Range		Default	Default		Scale/ FbEq16	Volatile	Change running	Туре			
				If the direction signal is reverse and the active constar speed is negative, the drive will run in the forward direction.								
			0	constar	nt speed i	rameter: The is determine arameters.	_					
	2 15	reserved										
							_					
	0000h	FFFFh	0000h		-	1 = 1	n	у	Parameter			

22.22 Constant speed sel 1

Constant speed selector 1.

22.21.b00 Constant speed function = 0 (separate) activates the source that selects constant speed 1.

0 = Always off.

1 = Always on.

22.21.b00 Constant speed function = 1 (packed) activates the constant speeds according to the following table.

Source defined by 22.22 Constant speed sel 1	Source defined by 22.23 Constant speed sel 2	Source defined by 22.24 Constant speed sel 3	Active constant speed
0	0	0	None
1	0	0	Constant speed 1
0	1	0	Constant speed 2
1	1	0	Constant speed 3
0	0	1	Constant speed 4
1	0	1	Constant speed 5
0	1	1	Constant speed 6
1	1	1	Constant speed 7

Other [bit]; source selection.

0: Not selected; 0, normal operation.

1: Selected; 1.

3: **DI1**; 10.02.b00 DI delayed status.

4: **DI2**; 10.02.b01 DI delayed status.

5: **DI3**; 10.02.b02 DI delayed status.

6: **DI4**; 10.02.b03 DI delayed status.

7: **DI5**; 10.02.b04 DI delayed status.

8: DI6; 10.02.b05 DI delayed status.

11: **DIO1**; 11.02.b00 DIO delayed status.

12: **DIO2**; 11.02.b01 DIO delayed status.

19: **DIL**; 10.02.b15 DI delayed status

Note: 22.22 Constant speed sel 1 overrides 22.23 Constant speed sel 2 and 22.24 Constant speed sel 3.

0 19 or	Not selected or	-	1 = 1	n	у	Parameter
0000h FFFFh	0000h					

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
22.23	Constant speed sel	2	•	•	•	•					
	Constant speed sele										
	See 22.22 Constant speed sel 1.										
		t speed sel 2 overrid	es 22.24 C		ed sel 3.		T				
	0 19 or	Not selected or	-	1 = 1	n	У	Parameter				
	0000h FFFFh	0000h									
22.24	Constant speed sel										
	Constant speed sele										
	See 22.22 Constant	<u> </u>		Т	1		T_				
	0 19 or	Not selected or	-	1 = 1	n	У	Parameter				
22.26	0000h FFFFh	0000h									
22.26	Constant speed 1										
1	Constant speed 1.	لداد طباله مو	ma a t = ····· *1	المساورة المساورة		ana - d 4 !					
ı		eed 1, the speed the									
ĺ	-30000.00	0.00	rpm	See 46.02	n	У	Parameter				
22.27	30000.00										
22.27	Constant speed 2										
	Constant speed 2.	12.1									
		eed 2, the speed the	1	1		1	1				
	-30000.00 30000.00	0.00	rpm	See 46.02	n	У	Parameter				
22.28	Constant speed 3										
	Constant speed 3.										
	Defines constant sp	eed 3, the speed the	motor wi	ll turn when	constant	speed 3 is	selected.				
	-30000.00	0.00	rpm	See 46.02	n	У	Parameter				
	30000.00										
22.29	Constant speed 4										
	Constant speed 4.										
		eed 4, the speed the			ı						
	-30000.00	0.00	rpm	See 46.02	n	У	Parameter				
-	30000.00										
22.30	Constant speed 5										
	Constant speed 5.		_								
		eed 5, the speed the			1	1	1				
	-30000.00	0.00	rpm	See 46.02	n	У	Parameter				
	30000.00										
22.31	Constant speed 6										
	Constant speed 6.		_								
		eed 6, the speed the			constant	speed 6 is	selected.				
		by 96.03 Unit for spe			1		T_				
	-30000.00	0.00	rpm, %	See 46.02	n	У	Parameter				
	30000.00		or V		1	<u> </u>					
22.32	Constant speed 7										
	Constant speed 7.	1-1			_						
1	-	eed 7, the speed the			constant	speed 7 is	selected.				
	The unit is selected	by 96.03 Unit for spe	ed contro	ol.							

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	-30000.00	0.00	rpm, %	See 46.02	n	у	Parameter
	30000.00		or V				
22.42	Jogging 1 reference	-	•	•	'	•	•
	Speed reference for jo	gging function 1.					
	Defines the speed refe		l. See 20.7	26 Jogging 1	start sou	ırce.	
	-30000.00	0.00	rpm	See 46.02	n	у	Parameter
	30000.00		'				
22.43	Jogging 2 reference	1			I		
	Speed reference for jo	aging function 2.					
	Defines the speed refe		2. See 20.	27 Joaaina 2	start sou	ırce.	
	-30000.00	0.00	rpm	See 46.02	n	у	Parameter
	30000.00					,	
22.46	Speed reference safe		1	1		l	
	Defines a safe speed r	eference value that	· is used v	with supervi	sion funct	ions such	as·
	- 12.03 Al supervisio		. is asca i	with supervi	oron rance	.ioiis sacii	u 5.
	- 14.19 Al supervisio						
	- 15.19 Al supervisio						
	 16.19 Al supervisio 						
	 49.05 Communicat 						
	- 50.02 FBA A comm	loss func.					
	 50.32 FBA B comm 	loss func.					
	- 58.14 Communicat	ion loss action.					
	- 60.59 DDCS contro	oller comm loss fun	ction.				
	-30000.00	0.00	rpm	See 46.02	n	у	Parameter
	30000.00		-				
22.71	Motor potentiometer	function	•	•		•	•
	Motor potentiometer						
	Activates and selects t	the mode of the mo	otor pote	ntiometer.			
	0: Disable; disable the	motor potentiome	eter and s	et its value t	ю 0.		
	1: Enable (initialization	n at stop/power-u	p) ; the m	otor potenti	ometer fi	rst adopts	the value
	defined by 22.72 Moto	•				•	
	adjusted from the up a			y 22.73 Moto	r potenti	ometer up	source and
	22.74 Motor potention						
	A stop or a power cycl		or poten	tiometer to	the value	22.72 Moto	or
	potentiometer initial v						
	2: Enable (resume always						
	cycle. The value can be						
	potentiometer up sou drive status.	rce and 22.74 Moto	r potenti	ometer dow	n source,	ınaepena	ent of the
		ln: 11		1			In .
	02	Disable	-	1 = 1	n	у	Parameter
22.72	Motor potentiometer						
	Initial value for motor	•		_			
	Defines an initial value	• • • • • • • • • • • • • • • • • • • •	r the mot	tor potentio	meter. Se	e 22.71 Mo	tor
	potentiometer function		1	Τ.		1	Т
	-30000.00	0.00	-	1 = 1	n	У	Parameter
	30000.00						
22.73	Motor potentiometer	•					
Ī	Source for motor pote	ntiometer un					

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Selects the source for	motor potentiome	eter up si	gnal.			
	0 = No change.						
	1 = Increase.						
	Other [bit]; source se						
	0: No change ; 0, hold	•					
	1: Increase ; 1, increase			alue. If both	the up an	d down so	urces are on,
	the potentiometer va						
	2: None ; inactive. Mot		p is disal	oled. Norma	I operatioi	٦.	
	3: DI1 ; 10.02.b00 DI de						
	4: DI2 ; 10.02.b01 DI de	-					
	5: DI3 ; 10.02.b02 DI de						
	6: DI4 ; 10.02.b03 DI de	=					
	7: DI5 ; 10.02.b04 DI de	•					
	8: DI6 ; 10.02.b05 DI de						
	11: DIO1 ; 11.02.b00 DIO 12: DIO2 ; 11.02.b01 DIO						
	19: DIL ; 10.02.b15 DI d						
	0 19	None		1 = 1	T_n	.,	Parameter
22.74				1-1	n	у	Parameter
22.14	Motor potentiometer						_
	Source for motor pot		+	a ai a a a l			
	Selects the source for	motor potentiome	eter dowr	i signai.			
	0 = No change.						
	1 = Decrease. Other [bit]; source se	loction					
	0: No change ; 0, hold		meter va	مبا			
	1: Decrease ; 1, decrea	-			th the un a	nd down s	COURCES ARE
	on, the potentiomete			value. II bol	til tile up o	ina aowin s	ources are
	2: None ; inactive. Mot		_	isabled Nor	mal onera	tion	
	3: DI1 ; 10.02.b00 DI de		OWII IS G	isabica. Non	mai opcia	cion.	
	4: DI2 ; 10.02.b01 DI de	•					
	5: DI3 ; 10.02.b02 DI de						
	6: DI4 ; 10.02.b03 DI de	-					
	7: DI5 ; 10.02.b04 DI de	,					
	8: DI6 ; 10.02.b05 DI de	-					
	11: DIO1 ; 11.02.b00 DI	•					
	12: DIO2 ; 11.02.b01 DIG	•					
	19: DIL ; 10.02.b15 DI d	-					
	40: DI1 or stop; 10.02	_	tus plus s	stop. DI1 = 1	or stop co	mmand ac	tive → the
	motor potentiometer	_	-		-		
	41: DI2 or stop ; 10.02.						
	motor potentiometer		•	•	•		
	42: DI3 or stop ; 10.02.	b02 DI delayed stat	tus plus s	top. DI3 = 1	or stop co	mmand ac	tive → the
	motor potentiometer	value is decreased	, DI3 = 0:	the motor p	otentiome	eter value i	s held.
	43: DI4 or stop ; 10.02	.b03 DI delayed sta	tus plus s	stop. DI4 = 1	or stop co	mmand a	ctive → the
	motor potentiometer	value is decreased	, DI4 = 0:	the motor p	otentiom	eter value i	s held.
	44: DI5 or stop ; 10.02			•			
	motor potentiometer			•	•		
	45: DI6 or stop ; 10.02	.b05 DI delayed sta	tus plus s	stop. DI6 = 1	or stop co	mmand a	ctive → the
	motor potentiometer	value is decreased	, DI6 = 0:	the motor p	otentiome	eter value i	s held.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
22.75	the motor potentio 47: DIO2 or stop; 11 the motor potentio 48: DIL or stop; 10.0 motor potentiomet 0 48 Motor potentiomet Defines the change potentiometer to c potentiometer max	er change time. rate of the motor po hange from 22.76 Mo value. The same cha	ased, DIO1 status plu ased, DIO2 tus plus s d, DIL = 0:	is stop. DIO1 = 0: the mo s stop. DIO2 = 0: the mo top. DIL = 1 o the motor po 1 = 1 ter. This is the tiometer min	tor poten = 1 or sto tor poten or stop co otentiome n	p command tiometer was the command acter value in the command acter value i	alue is held. Ind active → Value is held. Itive → the Is held. Parameter The motor or of down).
	0.0 3250.0	10.0	S	10 = 1 s	n	у	Parameter
22.76	Motor potentiomer Motor potentiomer Defines the minimu -30000.00 30000.00		r potentio	meter. 1 = 1	n	у	Parameter
22.77	Motor potentiomer		r potentic	meter.	n	У	Parameter
	30000.00					,	
22.80					an directly	be set as	the source of
22.81	source.	rence 1 source. reference after speed	d referenc	se 1 source. S	ee 22.11 S	peed refer	ence 1
	30000.00						
22.82	Value of speed refe Displays the speed source. -30000.00 30000.00	rence 2 source. reference after speed	d referenc	e 2 source. S	see 22.12 S	peed refe	rence 2
22.83	Speed reference 3 Speed reference aff Displays the speed	ter source selection. reference after the mion. See 22.13 Speed of rotation source.					

Index	Name	Name								
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
22.84	Speed reference 4									
	Speed reference aft	er additive 1.								
	Displays the speed	reference after 1 st	additive sp	eed. See 22.1	5 Speed a	dditive 1 s	ource.			
	-30000.00	-	rpm	See 46.02	у	n	Signal			
	30000.00									
22.85	Speed reference 5									
	Speed reference after speed share.									
	Displays the speed reference after scaling by means of speed share. See 22.16 Speed share.									
	-30000.00	-	rpm	See 46.02	у	n	Signal			
	30000.00									
22.86	Speed reference 6									
	Speed reference after additive 2.									
	Displays the speed reference after 2 nd additive speed. See 22.17 Speed additive 2 source.									
	-30000.00 30000.00	-	rpm	See 46.02	у	n	Signal			

23 Speed reference ramp Speed reference ramp settings (programming of the acceleration and deceleration rates for the drive).

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
23.01	Speed reference ramp input									
	Speed reference a Displays the speed minimum speed a control.	d reference after li								
	-30000.00 30000.00	-	rpm, % or V	See 46.02	У	n	Signal			
23.02	Speed reference r	amp output	·							
	control. Attention: In case and zero speed, see Motor speed for control of the c	ee 21.08 M1 zero sp	peed level, is	reached, the	e ramp out	put is forc	ed to 90.01			
	-30000.00 30000.00	-	rpm, % or V	See 46.02	У	n	Signal			
23.03	Speed reference 7									
	Speed reference after direct speed reference. Displays the speed reference after direct speed reference. See 23.32 Direct speed reference. The unit is selected by 96.03 Unit for speed control.									
	-30000.00 30000.00	-	rpm, % or V	See 46.02	у	n	Signal			
23.04	dv/dt									
	Deviation of the speed reference. Displays the acceleration/deceleration (speed reference change) at the output of the speed reference ramp.									

23.11 Ramp set selection Select active ramp parameters. Selects the source that switches between the two sets of acceleration/deceleration times. See 23.12 Acceleration time 1, 23.13 Deceleration time 1, 23.14 Acceleration time 2. 0 = Acc/Dec time 1. 1 = Acc/Dec time 1. 1 = Acc/Dec time 2. Other [bit]; source selection. 0: Acc Dec time 2: 1, acceleration time 1 and deceleration time 1 are active. Normal 1: Acc/Dec time 2: 1, acceleration time 2 and deceleration time 2 are active. 2: Speed level; [123.03 Speed reference 7] s 46.31 Above speed level], then Acc/Dec active. If 23.03 Speed reference 7] s 46.31 Above speed level], then Acc/Dec time 2 and total status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b01 DI delayed status. 7: DI5; 10.02.b05 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DI01; 11.02.b00 DIO delayed status. 12: DI02; 11.02.b01 DIO delayed status. 12: DI02; 11.02.b01 DIO delayed status. 12: DI02; 11.02.b01 DIO delayed status. 12: DI03; 11.02.b01 DIO delayed status. 12: DI04; 11.02.b01 DIO delayed status. 12: DI05; 11.02.b01 DIO delayed status. 12: DI06; 11.02.b01 DIO delayed status. 13: DI01; 11.02.b01 DIO delayed status. 14: DI01; 11.02.b01 DIO delayed status. 15: DI02; 11.02.b01 DIO delayed status. 16: DI04; 11.02.b01 DIO delayed status. 17: DI05; 11.02.b01 DIO delayed status. 18: DI06; 11.02.b01 DIO delayed status. 19: DIL; 10.02.b15 DI delayed status. 10: DI01; 11.02.b01 DIO delayed status. 11: DI01; 11.02.b01 DIO delayed status. 12: MotorI/Motor2; used acceleration/deceleration time depends on setting of 42. 1/2 selection. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor selection = Motor 2 use Acc/Dec time 2. 0 21 Acceleration time 1 The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling if the speed reference increases faster than the set acceleration time, the motor speed will follow the reference. If the speed reference decreas	Name Text									
23.11 Ramp set selection Select active ramp parameters. Selects the source that switches between the two sets of acceleration/deceleration times. See 23.12 Acceleration time 1, 23.13 Deceleration time 1, 23.14 Acceleration time 2. 0 = Acc/Dec time 1. 1 = Acc/Dec time 2. Other [bit]; source selection. 0. Acc/Dec time 1; 0, acceleration time 1 and deceleration time 1 are active. Normal 1: Acc/Dec time 2. 2. Speed level, if [23.03 Speed reference 7] > [46.31 Above speed level], then Acc/Dec time 2. 3. D11; 10.02.b01 DI delayed status. 4: D12; 10.02.b01 DI delayed status. 5: D13; 10.02.b02 DI delayed status. 6: D14; 10.02.b01 DI delayed status. 7: D15; 10.02.b04 DI delayed status. 8: D16; 10.02.b05 DI delayed status. 11: D101; 11.02.b00 DIO delayed status. 12: D102; 11.02.b01 DIO delayed status. 12: D103; 11.02.b05 DI delayed status. 12: D104; 11.02.b01 DIO delayed status. 12: D105; 11.02.b01 DIO delayed status. 13: D16; 10.02.b15 DI delayed status. 14: D104; 11.02.b01 DIO delayed status. 15: D105; 11.02.b01 DIO delayed status. 16: D104; 11.02.b01 DIO delayed status. 17/2 selection. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If 42.01 Motor 1/2 selection = Motor 1 use Acc/Dec time 1. If							Text			
23.11 Ramp set selection Selects the source that switches between the two sets of acceleration/deceleration times. See 23.12 Acceleration time 1, 23.13 Deceleration time 1, 23.14 Acceleration times. See 23.12 Acceleration time 1, 23.13 Deceleration time 1, 23.14 Acceleration time 2. 0 = Acc/Dec time 1. 1 = Acc/Dec time 1. 1 = Acc/Dec time 2. Other [bit]; source selection. 0: Acc/Dec time 2, 1, acceleration time 1 and deceleration time 1 are active. Normal 1: Acc/Dec time 2; 1, acceleration time 2 and deceleration time 2 are active. 2: Speed level; if [23.03 Speed reference 7] < 46.31 Above speed level], then Acc/Dec active. If [23.03 Speed reference 7] < 46.31 Above speed level], then Acc/Dec time 2 3: DII; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 7: DI5; 10.02.b04 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DIO1; 11.02.b00 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 13: DIO2; 11.02.b01 DIO delayed status. 21: Motor1/Motor2; used acceleration/deceleration time depends on setting of 42. 1/2 selection = Motor 2 use Acc/Dec time 2. 0 21 Acceleration time 1. The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling If the speed reference increases faster than the set acceleration time, the motor speed will follow the reference. If the set acceleration time is set too short, the drive will accelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.13 Deceleration time 1. The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero if the speed reference decreases faster than the set deceleration time, the motor speed will follow the reference decreases slower than the set time, the motor speed will follow the reference decreases slower than the set of time, the motor speed will follow the reference decreases slower than the set of time, the motor speed will follow the reference. If	Туре	_	Volatile	_	Unit	Default	Range			
Selects active ramp parameters. Selects the source that switches between the two sets of acceleration/deceleration times. See 23.12 Acceleration time 1, 23.13 Deceleration time 1, 23.14 Acceleration times. See 23.12 Acceleration time 2. 0 = Acc/Dec time 1. 1 = Acc/Dec time 2. Other [bit]: source selection. 0: Acc/Dec time 1; 0, acceleration time 1 and deceleration time 1 are active. Normal 1: Acc/Dec time 2; 1, acceleration time 2 and deceleration time 2 are active. 2: Speed level; if [23.03 Speed reference 7] > 46.31 Above speed level , then Acc/Dec time 2 and 1: Acc/Dec time 1	Signal	n	у	See 46.02	rpm/s	-				
Selects the source that switches between the two sets of acceleration/deceleration times. See 23.12 Acceleration time 1, 23.13 Deceleration time 1, 23.14 Acceleration time 2. 0 = Acc/Dec time 1. 1 = Acc/Dec time 2. Other [bit]; source selection. 0: Acc/Dec time 1, 0, acceleration time 1 and deceleration time 1 are active. Normal 1: Acc/Dec time 2, 1, acceleration time 2 and deceleration time 2 are active. 2: Speed level; if [23.03 Speed reference 7] > 46.31 Above speed level], then Acc/Dec time 2 3: DII; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: DI3; 10.02.b02 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 6: DI4; 10.02.b03 DI delayed status. 7: DI5; 10.02.b04 DI delayed status. 8: DI6; 10.02.b05 DI delayed status. 11: DIO1; 11.02.b01 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 12: DIO2; 11.02.b05 DI delayed status. 21: Motor1/Motor2; used acceleration/deceleration time depends on setting of 42. 1/2 selection = Motor 2 use Acc/Dec time 2. 0 21 Acc/Dec time 2. 1 Acceleration time 1. Acceleration time 1. Acceleration time 1. The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling If the speed reference increases faster than the set acceleration time, the motor speed will follow the reference. If the set acceleration time is set too short, the drive will accelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.13 Deceleration time 1 The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero If the speed reference decreases faster than the set deceleration time, the motor speed will follow the reference. If the set acceleration time is set too short, the drive will accelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.13 Acceleration time 1 See 23.12 Acceleration time 1. See 23.12 Acceleration time 1.		<u>.l</u>			1	1	Ramp set selection	23.11		
Acceleration time 1 Acceleration time 1. The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling If the speed reference increases faster than the set acceleration time, the motor speed will follow the set acceleration time. If the speed reference increases slower than the set acceleration time, the motor speed will follow the reference. If the set acceleration time is set too short, the drive will accelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.13 Deceleration time 1 Deceleration time 1. The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero If the speed reference decreases faster than the set deceleration time, the motor speed will follow the reference decreases slower than the set of time, the motor speed will follow the reference. If the set deceleration time is set too short, the drive will decelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.14 Acceleration time 1. See 23.12 Acceleration time 1.	I operation. c time 1 is is active.	tive. Norma ive. nen Acc/De /Dec time 2	ne 1 are act ne 2 are act ed levell, th l, then Acc,	eleration tine in eleration time in Above speed level	13 Decele 1 and dece 2 and dece 7 ≤ 46.3 .31 Above deceleration = Moto	ection. eccleration time 1, 23. ection. eccleration time 2 espeed reference reference 7 > 46 layed status. ayed status. layed status. layed status. layed status. layed status. elayed status. delayed status. elayed status.	Selects the source that times. See 23.12 Accele 23.15 Deceleration time 0 = Acc/Dec time 1. 1 = Acc/Dec time 2. Other [bit]; source sele 0: Acc/Dec time 1; 0, a 1: Acc/Dec time 2; 1, ac 2: Speed level; if 23.03 active. If 23.03 Speed 13: DI1; 10.02.b00 DI del 4: DI2; 10.02.b01 DI del 5: DI3; 10.02.b02 DI del 6: DI4; 10.02.b03 DI del 7: DI5; 10.02.b04 DI del 8: DI6; 10.02.b05 DI del 11: DIO1; 11.02.b00 DIO 12: DIO2; 11.02.b01 DIO 19: DIL; 10.02.b15 DI del 21: Motor1/Motor2; us 1/2 selection. If 42.01 N			
Acceleration time 1 Acceleration time 1. The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling lf the speed reference increases faster than the set acceleration time, the motor speed follow the set acceleration time. If the speed reference increases slower than the set acceleration time, the motor speed will follow the reference. If the set acceleration time is set too short, the drive will accelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.13 Deceleration time 1 Deceleration time 1. The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero If the speed reference decreases faster than the set deceleration time, the motor speed will follow the reference decreases slower than the set of time, the motor speed will follow the reference. If the set deceleration time is set too short, the drive will decelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.14 Acceleration time 2 Acceleration time 1. See 23.12 Acceleration time 1.	Parameter	У	n	1 = 1	-	Acc/Dec time 1	0 21			
The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling If the speed reference increases faster than the set acceleration time, the motor speollow the set acceleration time. If the speed reference increases slower than the set acceleration time, the motor speed will follow the reference. If the set acceleration time is set too short, the drive will accelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.13 Deceleration time 1 Deceleration time 1. The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero If the speed reference decreases faster than the set deceleration time, the motor speed will follow the reference decreases slower than the set of time, the motor speed will follow the reference. If the set deceleration time is set too short, the drive will decelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.14 Acceleration time 2 Acceleration time 1. See 23.12 Acceleration time 1.		17	1				Acceleration time 1	23.12		
23.13 Deceleration time 1 Deceleration time 1. The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero If the speed reference decreases faster than the set deceleration time, the motor spellow the deceleration time. If the speed reference decreases slower than the set of time, the motor speed will follow the reference. If the set deceleration time is set too short, the drive will decelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.14 Acceleration time 2 Acceleration time 1. See 23.12 Acceleration time 1.	oeed will et	he motor s r than the s he active to	ion time, the session time, the ses slower	et acceleraterence increa e reference. Irive will acce	than the speed reference follow the ort, the d	increases faster to tion time. If the s motor speed will time is set too sh	The time within the dri If the speed reference follow the set accelera acceleration time, the If the set acceleration			
Deceleration time 1. The time within the drive will decelerate from 46.02 M1 speed scaling actual to zero If the speed reference decreases faster than the set deceleration time, the motor speed will follow the reference decreases slower than the set of time, the motor speed will follow the reference. If the set deceleration time is set too short, the drive will decelerate at the active to 0.000 3250.000 20.000 s 10 = 1 s n y 23.14 Acceleration time 2 Acceleration time 1. See 23.12 Acceleration time 1.		13	1	1-0 -0	10	1=0.000		23 13		
23.14 Acceleration time 2 Acceleration time 1. See 23.12 Acceleration time 1.	speed will deceleration	the motor s nan the set the active t	tion time, to s slower the elerate at t	set decelera ce decrease drive will dec	than the ed referent ference.	decreases faster n time. If the spee will follow the re time is set too sh	Deceleration time 1. The time within the dri If the speed reference follow the deceleration time, the motor speed If the set deceleration			
Acceleration time 1. See 23.12 Acceleration time 1.	1	<u>1</u>	1	1	1	1		23.14		
						time 1.	Acceleration time 1.			
0.000 3250.000 60.000 s 10 = 1 s n y	Parameter	у	n	10 = 1 s	s	60.000	0.000 3250.000			
23.15 Deceleration time 2		<u> </u>	1	1				23.15		

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	See 23.13 Decelerat	ion time 1.	•	•		•	•			
	0.000 3250.000	60.000	S	10 = 1 s	n	у	Paramete			
3.16	Shape time acceler	ation 1		•		•				
	Ramp shape at acc Defines the shape of 0.0 s: Linear ramp. 0.1 3250.0 s: S-cc consists of curves at Note: For safety read Acceleration:	of the acceleratio Suitable for stead urve ramp. S-curv at both ends of th	dy accelerate e ramps are ne ramp and	tion or decel tideal for lift d a linear par	eration and ting applica t in betwee	for slow rations. The	•			
	Linear ramp: 23.18 = 0 s		mp:							
	23.19 = 0 :	7/6	→ me on_a.ai							
	0.000 3250.000	0.000	S	10 = 1 s	n	у	Paramete			
3.17	Ramp shape at acc Defines the shape	Shape time acceleration 2 Ramp shape at acceleration end. Defines the shape of the acceleration ramp at the end of the acceleration. See 23.16 Shape time acceleration 1.								
3.18		0.000	S	10 = 1 s	n	У	Paramete			
5.18	Ramp shape at dec Defines the shape of time acceleration 1	eleration start. of the deceleratio								
2 1 2	0.000 3250.000	0.000	S	10 = 1 s	n	У	Paramete			
23.19	Ramp shape at dec Defines the shape of time acceleration 1	eleration end. of the deceleratio	n ramp at t	he end of th	e decelerat	ion. See 23	.16 Shape			

	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0.000 3250.000	0.000	s	10 = 1 s	n	у	Parameter			
23.20	Acceleration time jos	gging	•		•	'	•			
	Acceleration time for jogging. The time within the drive will accelerate from zero speed to 46.02 M1 speed scaling actual in case of jogging or inching. 0.000 3250.000 60.000 s 10 = 1 s n y Parameter									
23.21	Deceleration time jo	l .		10 - 13		<u> </u>	rarameter			
	Deceleration time for The time within the decase of jogging or incommon 0.000 3250.000	rive will decelera	s s	6.02 M1 spee	ed scaling a	ctual to zer	ro speed in			
23.23	Emergency stop time	2	•		•	•				
	With an Off3 (emergency stop) command and 21.03 Emergency stop mode = Ramp stop/Emergency ramp stop or as reaction to a fault of fault level 4 and 31.15 Fault stop mode fault level 4 = Ramp stop. This applies also to torque control, because the drive automatically switches to speed control with an Off3 (emergency stop) command. For followers see 19.20 Follower force ramp stop.									
	This applies also to to with an Off3 (emerge	orque control, be ncy stop) comm	and. For f	ollowers see	19.20 Follo	wer force r	amp stop.			
23.24	This applies also to to	orque control, be ncy stop) comm 10.000			_					
23.24	This applies also to to with an Off3 (emerge 0.000 3250.000	election. e speed ramp inpelayed status. elayed status.	and. For f	ollowers see 10 = 1 s out to zero. V	19.20 Follo n	wer force r	amp stop. Parameter			
23.24	This applies also to to with an Off3 (emerge 0.000 3250.000 Speed ramp in zero selects a source that control word. 0 = Zero input. 1 = Enable input. Other [bit]; source selects input; 0, force 1: Enable input; 1, ena 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de 5: DI3; 10.02.b02 DI de 6: DI4; 10.02.b03 DI de 7: DI5; 10.02.b04 DI de 8: DI6; 10.02.b05 DI de 11: DIO1; 11.02.b00 DI 12: DIO2; 11.02.b01 DI 12: DIO2; 11.02.b01 DI	election. e speed ramp inpelayed status. elayed status.	and. For f	ollowers see 10 = 1 s out to zero. V	19.20 Follo n	wer force r	amp stop. Parameter			

Force speed ramp output to 23.27 Ramp out balancing reference.

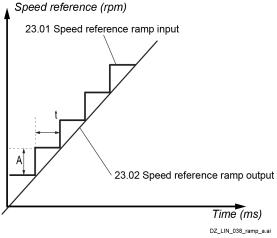
Selects the source to force the speed ramp output balancing.

This function is used to generate a smooth, bump-less transfer from a torque- or tension-controlled motor back to being speed controlled. The balancing output is tracking the present (line) speed of the application. When a transfer is required, the speed reference can then be quickly set to the needed (line) speed. Balancing is also possible in the speed controller. See 25.09 Speed balancing enable.

0 = Enable output.

1 = Balance output.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Other [bit]; source selection.									
		, enable speed ramp		•						
		I, force speed ramp	output to	23.27 Ramp	out balanc	ing refere	nce.			
	3: DI1 ; 10.02.b00 DI	_								
	4: DI2 ; 10.02.b01 DI	-								
	5: DI3 ; 10.02.b02 DI	-								
	6: DI4 ; 10.02.b03 DI	•								
	7: DI5 ; 10.02.b04 DI	-								
	8: DI6 ; 10.02.b05 DI	-								
		DIO delayed status.								
		DIO delayed status.								
	19: DIL ; 10.02.b15 D			T	1	1	Т_			
	0 19	Enable output	-	1 = 1	n	У	Parameter			
23.27	Ramp out balancin	g reference								
	balancing enable. T	when speed ramp of the unit is selected by 0.00	y 96.03 U rpm, %			23.26 Ram	Parameter			
	30000.00		or V							
23.28	Variable slope enal									
	speed reference ch Variable slope rate acceleration and de (usually the ramp ti Note: The internal of 23.29 Variable slope (rpm).	ole slope function, wange from the overrand the internal driveceleration times muime in the overriding drive ramp for an Office rate defines the sp	iding con re ramp a ust be fas ucontrol s f3 (emerg	trol system. re connected ter than the system). gency stop) c	d in series. complete v	Thus, the r variable slo	ramp ope rate time			
	23.01 Speed reference	e ramp input								



t (ms) = cycle time of the speed reference from the overriding control system.

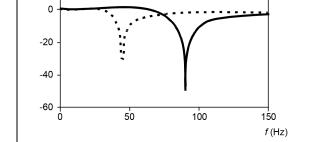
A (rpm) = speed reference change during cycle time t (ms).

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Note: If the cycle time t (ms) of the speed reference from the overriding control system and 23.29 Variable slope rate are equal, the shape of 23.02 Speed reference ramp output is a straight line. Other [bit]; source selection. O: Disable; disable variable slope. 1: Enable; enable variable slope (not available in local control).									
	0 1	Disable	-	1 = 1	n	У	Parameter			
23.29		e. f the speed referend ble. For the best re	sults, use	the speed ref	erence cyc	le time.	1			
23.32	Direct speed refe	0	ms	1 = 1 ms	n	У	Parameter			
	Auxiliary control w Other; source sele 0: Zero; 0 rpm, spe 1: 22.07 Speed ref 2: 23.02 Speed ref 3: 22.08 Auxiliary : 4: Al1 scaled; 12.12 5: Al2 scaled; 12.22 6: Al3 scaled; 12.32 7: FBA A reference 8: FBA A reference 10: FBA B reference 11: EFB reference 12: EFB reference 13: DDCS controlle 14: DDCS controlle 15: M/F or D2D ref 16: M/F or D2D ref 17: Motor potentic 18: Process PID ou 19: Encoder 1 spee 20: Encoder 2 spee 21: OnBoard encode 26: Constant spee	eference direct into yord 1 = 1. ection. eed reference is set erence; 22.07 Speed erence ramp outpu speed reference; 22 2 Al1 scaled value. 2 Al2 scaled value.	erence 1. erence 2. erence 1. ference 2. erence 1. ference 2. controller cont	e. Deed reference ory speed reference oref1. ref2. Or potentiom of the potention of the potention of the potention of the potentiom of the potentiom of the potention of the potentiom of the potentiom of the potentiom of the potention of the pot	e ramp out erence. eter referer	put.	.10.b00			
	0 27	23.02 Speed reference ramp output	-	1 = 1	n	У	Parameter			

24 Speed reference conditioning Speed error calculation, speed error window control configuration and speed error (Δn) step.

Index	Name											
	Text											
24.01	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
24.01	Used speed referen	ce	•		•	•						
	Speed reference aft Displays the speed correction, 30.11 M1 scaling. Used for speed erro	reference after s minimum speed	l, 30.12 M1 m	aximum spe	ed and 24.	14 Speed r	eference					
	-30000.00 30000.00	-	rpm, % or V	_	у	n	Signal					
24.02	Used speed feedba	ck					<u> </u>					
	Speed feedback aft Displays the speed Used for speed erro -30000.00	feedback after so	rpm	4.15 Speed f	eedback so	caling.	Signal					
	30000.00		Pill	Jee 40.02	У	''	Signal					
24.03	Speed error filtered	 I		<u> </u>	1	1	1					
	Filtered speed error Displays the speed and 24.19 Speed err Δn = 24.01 Used speed -30000.00	error after filters or filter time 2.			·	eed error fi	Signal					
24.04	30000.00 Speed error inverte											
	Inverted speed erro Displays the inverte $\Delta n = 24.01$ Used speed Unit for speed cont -30000.00 30000.00	d speed error (ur ed reference - 24		see 46.02	k. The unit	is selected	d by 96.03 Signal					
24 11	Speed correction		10. 1	1								
	Speed reference co	rection										
	The speed reference limitation. This is us sections of a paper Note : Due to safety functions are active -30000.00	e correction is ad seful to trim the s machine. The un reasons, the spe	speed, if nec it is selected ed correctio rpm, %	essary, for e by 96.03 Ur	example to nit for spec	adjust dra d control.	w between					
	limitation. This is us sections of a paper Note : Due to safety functions are active -30000.00 30000.00	e correction is ad seful to trim the s machine. The un reasons, the spe 	speed, if nec it is selected ed correctio	essary, for e by 96.03 Ur n is not app	example to nit for spec lied when a	adjust dra ed control. any of the s	w between stop					
24.14	limitation. This is us sections of a paper Note: Due to safety functions are active -30000.00 30000.00 Speed reference scan Defines a scaling fa	e correction is adseful to trim the smachine. The universal reasons, the spectrum of the second of t	speed, if nec it is selected ed correctio rpm, % or V	essary, for e by 96.03 Ur n is not app See 46.02	n 24.01 Use	adjust dra ed control. any of the s y	Parameter eference.					
24.14	limitation. This is us sections of a paper Note: Due to safety functions are active -30000.00 30000.00 Speed reference scan Speed reference scan Defines a scaling fa -325.00 325.00	e correction is adseful to trim the smachine. The universal of the specific of	speed, if nec it is selected ed correctio rpm, % or V	essary, for e by 96.03 Ur n is not app See 46.02	example to nit for spee lied when a	adjust dra ed control. any of the s	w between stop Parameter					
	limitation. This is us sections of a paper Note: Due to safety functions are active -30000.00 30000.00 Speed reference scan Defines a scaling fa	e correction is ad seful to trim the seful treasons, the special of the seful treasons, the special of the seful triangle sefu	rpm, % or V 03 Speed ref	essary, for e by 96.03 Ur n is not app See 46.02 erence 7 and	n 24.01 Use	adjust draved control. any of the set of th	Parameter eference. Parameter					

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
24.18	Speed error filter time 1								
	Defines the filter to this filter may caus acceleration times unstable control.	ter time constant 1 me constant of the se speed controller contradict one ano	speed er tuning pro ther. An e	oblems. A lor exceptionally	ng filter tim long filter f	e constant time consta	and fast		
	 90.42 Motor sp time constants 24.18 Speed err error and shou filter time 1 = 2 	eed filter time is fil smaller than 30 ms or filter time 1 and d be used for filter 4.19 Speed error filt	tering the s. 24.19 Spe time cons	speed feedled ed error filtestants greate	oack and sher time 2 are	ould be us e filtering t	ne speed		
	0 32500 Speed error filter to	0	ms	1 = 1 ms	n	у	Parameter		
24.20	See 24.18 Speed er 0 32500 RFE speed filter Source to enable the Enables/Disables to The speed error vale elimination filter to Note: Tuning the refilters. Incorrect the driven machinery.	ne RFE filter (Reson the RFE filter. lue send to the spec o eliminate the amp esonance frequency ning can amplify th To ensure the stabil	ms ance FrEct ed control lification filter rect e mechan lity of the	ller is filtered of mechanic uires a basid ical oscillation speed contr	d by a comr al resonanc understan ons and dar	e frequence ding of fre mage the d	ies. quency rive and the		
		er. er; 0, normal operat ; 1, enable RFE filter Disable RFE		1 = 1	n	у	Parameter		
		filter				<u> </u>			
24.21	RFE filter zero frequency RFE filter zero frequency. Defines the zero frequency of the RFE filter. The value must be set near the resonance frequency, which is filtered out before the speed controller. The drawing shows the frequency response: $\frac{20 og_{10} H(\omega) }{20}$								

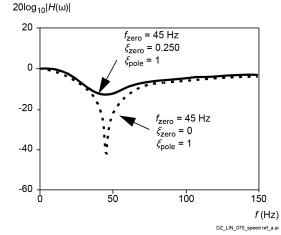


Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16		Change running	Type		
	0.50 500.00	45.00	Hz	1 = 1 Hz	n	у	Parameter		

24.22 RFE filter zero damping

RFE filter zero damping coefficient.

Defines the damping coefficient for 24.21 RFE filter zero frequency. A value of 0 corresponds to the maximum elimination of the resonance frequency:



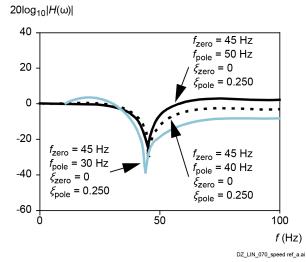
Note: To ensure, that the resonance frequency band is filtered rather than amplified, the value in 24.22 RFE filter zero damping must be smaller than the value in 24.24 RFE filter pole damping.

|-1.000 ... 1.000 | 0.000 | - | 100 = 1 | n | y | Parameter

24.23 RFE filter pole frequency

RFE filter pole frequency.

Defines the pole frequency of the RFE filter:



Note: If the value in 24.23 RFE filter pole frequency is quite different from the value in 24.21 RFE filter zero frequency, the frequencies near the pole frequency are amplified. This can damage the driven machinery.

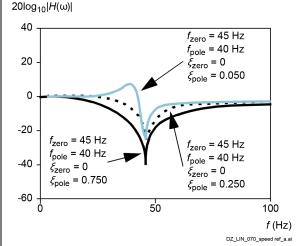
0.50 ... 500.00 40.00 Hz 1 = 1 Hz n y Parameter

24.24 RFE filter pole damping

RFE filter pole damping coefficient.

Index Name Text Range Default Unit Scale/ Volatile Change Type running

Defines the damping coefficient for 24.23 RFE filter pole frequency. The coefficient shapes the frequency response of the RFE filter. A narrower bandwidth results in better dynamic properties. By setting 24.24 RFE filter pole damping = 1, the effect of the pole is eliminated.



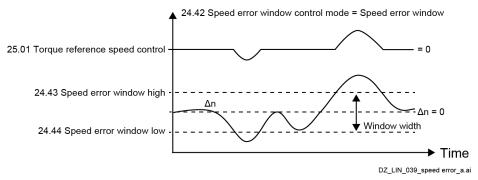
Note: To ensure, that the resonance frequency band is filtered rather than amplified, the value in 24.22 RFE filter zero damping must be smaller than the value in 24.24 RFE filter pole damping.

-1.000 ... 1.000 0.000 - 100 = 1 n y Parameter

Concept of window control:

The concept of window control is to block the speed controller if the speed error (Δn) or the speed feedback remains within the window set by 24.43 Speed error window high and 24.44 Speed error window low. This allows the external torque reference to affect the process directly. See 26.74 Torque reference ramp output.

If the speed error or the speed feedback exceeds the programmed window, the speed controller becomes active and influences the process by means of 25.01 Torque reference speed control. The activation is indicated by 06.21.b03 Speed control status word. To release window control, use 24.41 Speed error window control enable and choose the desired window control mode using 24.42 Speed error window control mode. Additionally, set the drive to Add operating mode. See 19.12 Ext1 control mode and 19.14 Ext2 control mode. This function is sometimes also called dead band control or strip break protection. It forms a speed supervision function for a torque-controlled drive, preventing the motor from running away if the material, which is under tension, breaks.



Note: To open a window with a width of 100 rpm set 24.43 Speed error window high = 50 rpm and 24.44 Speed error window low = -50 rpm.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	25.01 Torque reference 24.43 Speed erro	r window high	d feedback	control mode = Spo	eed feedback wir	dow				
	24.44 Speed erro	or window low	<u> </u>	-		Γime error_a.ai				
24.41	Speed error wind	low control enable								
24.41	1: Enable window 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b0 12: DIO2; 11.02.b0	s window control. ow control. w control.	peed error		itrol.					
	0 19	Disable window control	-	1 = 1	n	у	Parameter			
24.42	Mode for window Determines the u controller can be 0: Speed error wi window set by 24 integration time	low control mode control. sed type of window enabled/disabled. ndow + TI = on; sta .43 Speed error win (T _I) of the speed condow + TI = off; sta	ndard wind Idow high a Introller is e	low control. and 24.44 Sp nabled wher	The speed of eed error w	error (Δn) r indow low ontrol is rel	nust be in a . The eased.			

- 1: **Speed error window + TI = off**; standard window control. The speed error must be in a window set by 24.43 Speed error window high and 24.44 Speed error window low. The integration time (T_i) of the speed controller is disabled when window control is released. Typically used for torque followers to limit differential speed.
- 10: **Speed feedback window**; the speed feedback must be in a window set by 24.43 Speed error window high and 24.44 Speed error window low. The integration time (T_I) of the speed controller is disabled when window control is released.

Typically used for torque-controlled test rigs to limit the no load speed or winders.

Example 1: To get a window of 10 rpm width around the speed error set:

24.42 Speed error window control mode = Speed error window + TI = off.

24.43 Speed error window high = 5 rpm.

24.44 Speed error window low = -5 rpm.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Example 2 : To get a window of 500 1000 rpm around the speed feedback set:										
	24.42 Speed error window control mode = Speed feedback window.										
	24.43 Speed error v	•	•								
	24.44 Speed error v		•								
	Example 3 : To get a		•			ack set:					
	24.42 Speed error v		•	d feedback w	vindow.						
	24.43 Speed error v	_	•								
	24.44 Speed error v		-								
	0 10	Speed error		1 = 1	n	У	Parameter				
		window + TI	=								
		off									
24.43	Speed error window high										
	Upper boundary of										
	Upper boundary for the window control, when the speed error ($\Delta n = 24.01$ Used speed										
	reference - 24.02 Used speed feedback) is positive.										
	-30000.00	50.00	rpm	See 46.02	n	У	Parameter				
	30000.00										
24.44	Speed error window low										
	Lower boundary of the speed error window.										
	Lower boundary for the window control, when the speed error ($\Delta n = 24.01$ Used speed										
	reference - 24.02 U	sed speed feedba	ick) is nega	tive.							
	-30000.00	-50.00	rpm	See 46.02	n	у	Parameter				
	30000.00										
24.46	Speed error step										
	Speed error (Δn) st	ep.									
	Defines an addition	nal speed error st	ep given to	the input of	the speed	controller.	The given				
	min/max values are	e limited by 30.11	M1 minimu	m speed and	30.12 M1 m	naximum s	peed.				
	Note: Make sure th			d when a sto	p comman	d is given.	The unit is				
	selected by 96.03 L	Init for speed cor	ntrol.								
	-30000.00	0.00	rpm, %	See 46.02	у	у	Parameter				
	30000.00	0.00	, p, ,	J 300 10.0L	3	y	i arameter				

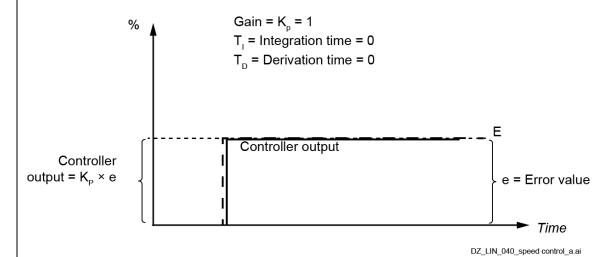
25 Speed control

Speed controller settings.

Index	Name									
	Text									
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
25.01	Torque referenc	spee	d control	·						
	Limited speed controller output torque.									
	Ellinica speca co	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	ci output toi	que.						
	Displays the tord		•	•)2 M1 nominal	torque af	ter limitati	on. See 30.1		
	· ·	jue ref	erence in per	cent of 99.0		•	ter limitati	on. See 30.1		
	Displays the tord	ue ref n torc	erence in per	cent of 99.0		•	ter limitati n	on. See 30.1		
25.02	Displays the toro	ue ref n torc	erence in per ue and 30.14	cent of 99.0 Speed cont	trol max torqu	•				
25.02	Displays the tord Speed control m -325.00 325.00	ue ref n tord) nal ga	erence in per que and 30.14 - in 1	Speed cont	See 46.04	•				
25.02	Displays the tord Speed control m -325.00 325.00 Speed proportion	n tord n tord nal ga	erence in per lue and 30.14 - in 1) of the speed	cent of 99.0 Speed cont %	See 46.04	y	n	Signal		

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре

Too high a gain may cause speed oscillation. The figure below shows a controller output after an error step when the error remains constant:



Example: The speed controller generates 15 % of motor nominal torque with 25.02 Speed proportional gain 1 = 3 if the speed error (Δn) is 5 % of 46.02 M1 speed scaling actual.

0.00 ... 325.00 | 5.00 | - | 100 = 1 | n | y | Parameter

25.03 Speed integration time 1

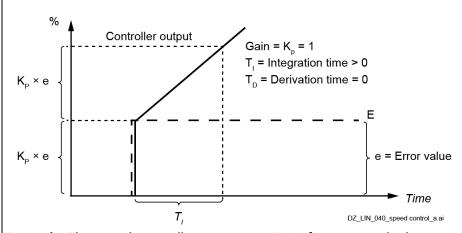
Integration time 1 (T_I) of the speed controller.

The integration time of the speed controller can be released by means of 25.13 Speed controller set selection. Setting the integration time to zero disables the integral part of the speed controller and resets the integrator.

The integration time defines the time within the integral part of the speed controller achieves the same value as the proportional part when the error value is constant.

The integrator has anti-windup control for operation at torque or current limit.

The figure below shows a controller output after an error step when the error remains constant:



Example: The speed controller generates 15 % of motor nominal torque with 25.02 Speed proportional gain 1 = 3 if the speed error (Δn) is 5 % of 46.02 M1 speed scaling actual. On that condition and with 25.03 Speed integration time 1 = 300 ms follows:

Index	Name Text									
	 The speed controller generates 30 % of motor nominal torque, if the speed error is constant, after 300 ms are elapsed. 15 % derive from the proportional part and 15 % derive from the integral part. 									
		0 32500	2500	ms	1 = 1 ms	n	у	Parameter		
		. •								

25.04 Speed derivation time

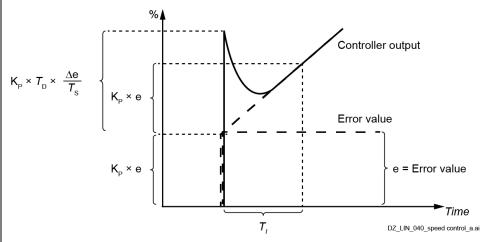
Derivation time (T_D) of the speed controller.

Speed controller derivation time. If the derivation time is set to zero, the controller works as a PI controller, otherwise as a PID controller.

For normal applications, derivation time should be left at zero.

Derivative action boosts the controller output if the error value changes. The longer the derivation time, the more the speed controller output is boosted during the change. The derivation makes the control more responsive for disturbances. The speed error derivative must be filtered with a low pass filter to eliminate external disturbances. See 25.05 Derivation filter time.

The figure below shows a controller output after an error step when the error remains constant:



Gain = $K_P = 1$

 T_1 = integration time > 0

 T_D = derivation time > 0

 T_S = sample time period = 500 μ s

 Δe = error value change between two samples

0 32500	0	ms	1 = 1 ms	n	У	Parameter
---------	---	----	----------	---	---	-----------

25.05 Derivation filter time

Derivation filter time constant.

Derivation filter time constant for 25.04 Speed derivation time.

0 32500	8	ms	1 = 1 ms	n	У	Parameter
---------	---	----	----------	---	---	-----------

25.06 Acceleration compensation derivation time

Acceleration compensation derivation time.

Derivation time for the acceleration compensation. Setting the acceleration compensation to zero disables it.

To compensate for high inertia loads during acceleration/deceleration, a derivative of 23.03 Speed reference 7 is added to the output of the speed controller.

Note: As a rule, use a value between $50 \dots 100 \%$ of the sum of the mechanical time constants of the motor and the driven machinery.

Index Name Text Range Default Unit Scale/ Volatile Change Type FbEq16 running The figures below show the speed responses when a high inertia load is accelerated along a Without acceleration compensation: % Speed reference Speed feedback ► Time DZ LIN 040 speed control a.ai With acceleration compensation: % Speed reference Speed feedback Time DZ_LIN_040_speed control_a.ai 0.0 0.0 ... 3250.0 s 10 = 1 sParameter 25.07 Acceleration compensation filter time Acceleration compensation filter time constant. Acceleration compensation filter time constant for 25.06 Acceleration compensation derivation time. 0.0 ... 32500.0 8.0 ms $1 = 1 \, \text{ms}$ Parameter 25.08 **Drooping rate** Droop rate. Droop rate in percent of 46.02 M1 speed scaling actual. Drooping decreases the drive speed slightly as the drive load increases. The amount of speed drop caused by the load is determined by 25.08 Drooping rate. Drooping may become necessary for proper load sharing between drives that are linked via material (e.g., paper, steel, foil) and running with a common speed reference. The correct droop rate for a process must be found out case by case in practice. **Example**: Following formula is valid:

Index Name Text Default Unit Scale/ Volatile Change Range Type FbEq16 running Speed decrease = Speed controller output • Drooping • Speed scaling With: Speed controller output = 25.57 Torque reference unbalanced = 50 %. Drooping = 25.08 Drooping rate = 1%. Speed scaling = 46.02 M1 speed scaling actual = 1500 rpm. Speed decrease = 0.5 • 0.01 • 150 rpm = 7.5 rpm. Motor speed in % of 46.02 M1 speed scaling actual No drooping 100 % 25.08 Drooping rate Drooping Speed controller output / Drive load 100 % DZ_LIN_040_speed control_a.ai 0.00 ... 100.00 % 0.00 100 = 1 % Parameter 25.09 Speed control balancing enable Force speed controller output and speed controller integral part. Forces both, the speed controller output, and the speed controller integral part, to 25.10 Speed control balancing reference. Selects the source to force the speed controller balancing. This function is used to generate a smooth, bump-less transfer from a torque- or tensioncontrolled motor back to being speed controlled. Balancing is also possible in the speed ramp. See 23.26 Ramp out balancing enable. 0 = Enable output. 1 = Balance output. Other [bit]; source selection. 0: Enable output; 0, enable speed controller output. Normal operation. 1: Balance output; 1, force speed controller to 25.10 Speed control balancing reference. 3: **DI1**; 10.02.b00 DI delayed status. 4: DI2; 10.02.b01 DI delayed status. 5: **DI3**; 10.02.b02 DI delayed status. 6: **DI4**; 10.02.b03 DI delayed status. 7: **DI5**; 10.02.b04 DI delayed status. 8: DI6: 10.02.b05 DI delayed status. 11: **DIO1**; 11.02.b00 DIO delayed status. 12: **DIO2**; 11.02.b01 DIO delayed status. 19: **DIL**; 10.02.b15 DI delayed status. Enable output 1 = 1 n Parameter 25.10 Speed control balancing reference Speed controller balancing reference. Defines the reference for speed controller balancing in percent of 99.02 M1 nominal torque. Both, the output of the speed controller, see 25.01 Torque reference speed control, and the

Index	Name												
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	I -	tegral part, see 25.5	•	_									
		ntroller balancing is			peed contro	ol balancing	1						
	-325.00 325.00	0.00	%	See 46.04	n	У	Parameter						
25.11	Emergency stop p												
	Proportional gain (K_P) upon an Off3 (emergency stop) command. Proportional gain of the speed controller when an Off3 (emergency stop) command is active and 25.11 Proportional gain emergency stop is \neq zero. Otherwise, the value of either 25.02 Speed proportional gain 1 or 25.14 Speed proportional gain 2 is taken.												
	0.00 325.00	0.00	-	100 = 1	n	у	Parameter						
25.13	Speed controller s	et selection		•									
2E 14	Speed proportional 25.15 Speed integral 0 = Speed controlled 1 = Speed controlled Other [bit]; source 0: Speed controlled operation. 1: Speed controlled operation. 1: Speed controlled controller set 1 is a speed controller set 3: DI1; 10.02.b00 DI4: DI2; 10.02.b01 DI5: DI3; 10.02.b02 DI6: DI4; 10.02.b03 DI7: DI5; 10.02.b04 DI8: DI6; 10.02.b05 DI1: DIO1; 11.02.b00 12: DIO2; 11.02.b01 19: DIL; 10.02.b15 DI02; 11.02.b01 19: DIL; 10.02.b15 DI02: Speed error; if controller set 1 is a controller set 2 is a 21: Motor1/Motor2	er set 1. er set 2. selection. r set 1; 0, proportion 0.01 Motor speed for set 2; 1, proportion 0.01 Motor speed for 2 is active. I delayed status.	nal gain 1 nal gain 2 a or control or speed for	and integration and integration integration integration in tegration	ion time 1 a on time 2 a ve speed le l46.31 Above e speed lev 31 Above s	proportion are active. I are active. evell, then S ve speed levell eed levell	nal gain 2 and Normal Speed vel , then Deed , then Speed						
25.14	Proportional gain 2 (K _P) of the speed controller.												
25.14	Proportional gain 2 (K _P) of the speed controller. See 25.02 Speed proportional gain 1.												
25.14													
25.14			-	100 = 1	n	у	Parameter						
25.14	See 25.02 Speed pr	oportional gain 1.	-	100 = 1	n	у	Parameter						
	See 25.02 Speed pr 0.00 325.00 Speed integration Integration time 2 See 25.03 Speed in	5.00 time 2 (Ti) of the speed co tegration time 1.	-	100 = 1	n	у	Parameter						
	See 25.02 Speed pr 0.00 325.00 Speed integration Integration time 2	5.00 time 2 (T ₁) of the speed co	-	100 = 1 1 = 1 ms	n	у	Parameter Parameter						

Index Name Text Range Default Unit Scale/ Volatile Change running Type

In certain applications, it is useful to increase/decrease proportional gain and decrease/increase integration time of the speed controller at low speeds to improve the performance of the speed controller. Thus, it is possible to adapt proportional gain and integration time according to the speed feedback. See 25.02 Speed proportional gain 1, 25.03 Speed integration time 1 and 24.02 Used speed feedback.

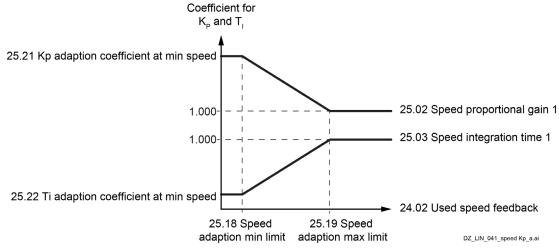
This is done by adapting proportional gain and integration time by coefficients at certain speeds. The coefficients are defined individually for both proportional gain and integration time.

When the speed feedback is below or equal to 25.18 Speed adaption min limit, proportional gain is multiplied by 25.21 Kp adaption coefficient at min speed and integration time is divided by 25.22 Ti adaption coefficient at min speed.

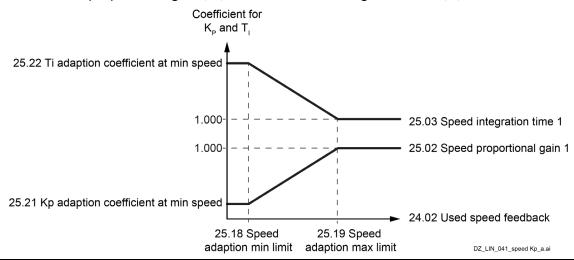
When the speed feedback is between 25.18 Speed adaption min limit and 25.19 Speed adaption max limit, the coefficients for proportional gain and integration time are calculated linearly. When the speed feedback is equal to or above 25.19 Speed adaption max limit, no adaptation takes place. Thus, the coefficient is 1.

The speed adaptation is valid for positive and negative speeds.

Increase the proportional gain (K_P) and decrease the integration time (T_I) :



Decrease the proportional gain (K_P) and increase the integration time (T_I) :



25.18 Speed adaption min limit

Minimum speed feedback for the speed controller adaptation.

The speed feedback limit below that the proportional gain is defined by 25.21 Kp adapt coefficient at min speed and the integration time is defined 25.22 Ti adaption coefficient in speed. The speed feedback is 24.02 Used speed feedback. 0 see 25.19	ndex	Name						
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Proportional gain (K _P) coefficient at minimum speed feedback. Determines the proportional gain coefficient at the speed feedback defined by 25.18 S adaption min limit. 0.000 10.000 1.000 - 1000 = 1 n y Par 25.22 Ti adaption coefficient at min speed Integration time (T ₁) coefficient at minimum speed feedback. Determines the integration time coefficient at the speed feedback defined by 25.18 Sp adaption min limit. 0.000 10.000 1.000 - 1000 = 1 n y Par Torque adaptive proportional gain: It is possible to adapt the proportional gain of the speed controller according to the treference. See 25.02 Speed proportional gain 1 and 25.01 Torque reference speed cont can be used to smooth out disturbances caused by small loads and backlashes and is multiplying proportional gain by a coefficient within a certain torque range. When the torque reference is 0 %, proportional gain is multiplied by 25.27 Kp adaption coefficient at min torque. When the torque reference is between 0 % and 25.25 Torque adaption max limit, the coefficient for proportional gain is calculated linearly. When the torque reference is equal to or above 25.25 Torque adaption max limit, no actakes place. Thus, the coefficient is 1. Filtering can be applied on the torque reference using 25.26 Torque adaption filter tim The load adaptation is valid for positive and negative torque. Coefficient for K ₂ 25.02 Speed proportional 25.02 Speed proportional 25.02 Speed proportional					See 46.02	n	У	Parameter
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Torque adaptive proportional gain: It is possible to adapt the proportional gain of the speed controller according to the treference. See 25.02 Speed proportional gain 1 and 25.01 Torque reference speed controller according to the treference. See 25.02 Speed proportional gain 1 and 25.01 Torque reference speed controller according to the treference. See 25.02 Speed proportional gain 1 and 25.01 Torque reference speed controller according to the treference is 0 % according to the treference is multiplying proportional gain by a coefficient within a certain torque range. When the torque reference is between 0 % and 25.25 Torque adaption max limit, the coefficient for proportional gain is calculated linearly. When the torque reference is equal to or above 25.25 Torque adaption max limit, no actakes place. Thus, the coefficient is 1. Filtering can be applied on the torque reference using 25.26 Torque adaption filter time. Coefficient for Kp. 25.02 Speed proportional filter time.		Determines the inte adaption min limit.	gration time coef	•	the speed fee	edback def	<u>-</u>	· -
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25.27 Kp adaption coefficient at min torque 25.25 Torque adaption 25.02 Speed proportional 25.27 Kp adaption coefficient at min torque 25.25 Torque adaption max limit 25.21 Torque reference speed adaption max limit		can be used to smormultiplying proport When the torque ref coefficient at min to When the torque ref coefficient for prop When the torque ref takes place. Thus, th Filtering can be app	oth out disturband ional gain by a coeference is 0 %, properture. Ference is between ortional gain is caference is equal to be coefficient is 1. I lied on the torque is valid for positi	ces caused efficient we portional n 0 % and lculated lin or above e reference ve and neg	d by small loa ithin a certai gain is multi 25.25 Torque nearly. 25.25 Torque using 25.26	nds and bac n torque ra plied by 25 adaption of adaption of Torque ada	cklashes ar ange. .27 Kp adar max limit, t max limit, r	nd is done by otion the no adaptation
·		25.27 Kp adaption coeffic	ient at min torque	25.25 To	filter time ·	aption		nce speed control
				adaption m	nax iimit			DZ_LIN_041_speed Kp_a.a
25.25 Torque adaption max limit Maximum torque reference for the speed controller adaptation.	5.25							

	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	The torque reference	ce limit in percent	of 99.02 M	1 nominal to	que above	which the	proportional		
	gain is defined by 2		rtional gair	า 1. The torqu	ie referenc	e is 25.01 T	orque		
	reference speed co	ntrol.				•			
	0.00 325.00	0.00	%	See 46.04	n	у	Parameter		
25.26	Torque adaption fil	lter time							
	Filter time constant for the speed controller adaptation.								
	Filter time constant	t to soften the pro	portional o	gain rate of c	hange.				
	0 32500	100	ms	1 = 1 ms	n	у	Parameter		
25.27	Kp adaption coeffic	cient at min torqu	ie						
	Proportional gain (F	⟨P⟩ coefficient at C	% torque	reference.					
	Determines the pro	portional gain coe	efficient at	0 % torque r	eference.				
	0.000 10.000	1.000	-	1000 = 1	n	у	Parameter		
25.30	Speed control i-par	t force					-		
	Force the speed cor		art.						
	Forces the speed co	• .		1 Speed cont	rol i-part r	eference.			
	Selects the source t			•	•				
	0 = Automatic.	•							
	1 = Initial reference.								
	Other [bit]; source	selection.							
	0: Automatic ; 0, the speed controller integral part is forced to 25.31 Speed control i-part								
	reference as soon a					Word, or if	19.01 Actual		
	operation mode cha	-	•	•					
	1: Initial reference; 1, force the speed controller integral part to 25.31 Speed control i-part								
	reference.								
	3: DI1 ; 10.02.b00 DI	•							
	4: DI2 ; 10.02.b01 DI delayed status.								
	5: DI3 ; 10.02.b02 DI delayed status.								
	6: DI4 ; 10.02.b03 DI delayed status.								
	7: DI5 ; 10.02.b04 DI delayed status. 8: DI6 ; 10.02.b05 DI delayed status.								
	18. DIG . 10 02 b05 DI								
		delayed status.	e						
	11: DIO1 ; 11.02.b00 I	delayed status. DIO delayed status							
	11: DIO1 ; 11.02.b00 I 12: DIO2 ; 11.02.b01 I	delayed status. DIO delayed status DIO delayed status							
	11: DIO1 ; 11.02.b00 I 12: DIO2 ; 11.02.b01 I 19: DIL ; 10.02.b15 DI	delayed status. DIO delayed status DIO delayed status I delayed status.		1=1	ln	Tv.	Parameter		
25 21	11: DIO1 ; 11.02.b00 I 12: DIO2 ; 11.02.b01 I 19: DIL ; 10.02.b15 DI 0 19	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic		1 = 1	n	у	Parameter		
25.31	11: DIO1 ; 11.02.b00 I 12: DIO2 ; 11.02.b01 I 19: DIL ; 10.02.b15 DI 0 19 Speed control i-par	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic T reference	S. -	L	n	у	Parameter		
25.31	11: DIO1 ; 11.02.b00 I 12: DIO2 ; 11.02.b01 I 19: DIL ; 10.02.b15 DI 0 19 Speed control i-par Initial torque refere	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Tt reference	- controller i	ntegral part.	-	1-			
25.31	11: DIO1 ; 11.02.b00 I 12: DIO2 ; 11.02.b01 I 19: DIL ; 10.02.b15 DI 0 19 Speed control i-par Initial torque refere Initial torque value	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Treference Ince of the speed control	- controller i	ntegral part.	-	1-			
25.31	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DI 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of	delayed status. DIO delayed status I delayed status. Automatic Treference Ince of the speed controlline is set:	controller integ	ntegral part. ral part in pe	rcent of 99).02 M1 nor			
25.31	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DI 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as Reac	delayed status. DIO delayed status. I delayed status. Automatic rt reference ence of the speed controllue is set: dy reference is set.	controller in roller integ	ntegral part. ral part in pe .b02 Main Sta	rcent of 99).02 M1 nor			
25.31	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DI 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as Read If 19.01 Actual o	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Treference Ince of the speed control alue is set: By reference is set. peration mode characters	controller in roller integ	ntegral part. ral part in pe .b02 Main Sta n Torque to S	rcent of 99 atus Word. peed.).02 M1 nor			
25.31	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DIO 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as Read If 19.01 Actual of If 25.30 Speed c	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Treference Ince of the speed control alue is set: dy reference is set. peration mode chaontrol i-part force	controller in roller integ	ntegral part. ral part in pe .b02 Main Sta n Torque to S nitial reference	rcent of 99 atus Word. peed.).02 M1 nor	1		
25.31	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DIO 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as Reach If 19.01 Actual of If 25.30 Speed of The result can be seen	delayed status. DIO delayed status I delayed status. Automatic Treference Ince of the speed control I delayed status. Automatic Treference Ince of the speed control I delayed status. Automatic Treference Ince of the speed control I speed	controller in roller integral from the set to Ir e integral remarks.	ntegral part. ral part in pe .b02 Main Sta n Torque to S nitial reference reference.	rcent of 99 atus Word. peed. ce.).02 M1 nor	minal torque.		
	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DIO 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as Read If 19.01 Actual of If 25.30 Speed of The result can be seen	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Treference Ince of the speed control I alue is set: I y reference is set. I peration mode characteristic in the speed control in the spee	controller in roller integ	ntegral part. ral part in pe .b02 Main Sta n Torque to S nitial reference	rcent of 99 atus Word. peed.).02 M1 nor			
25.31 25.53	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DIO 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as React If 19.01 Actual of If 25.30 Speed of The result can be seen -325.00 325.00	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Treference Ince of the speed control I due is set: By reference is set. I peration mode character in 25.54 Torque I 0.00 I part ference	controller in roller in teg . See 06.15. anges from is set to Ir e integral r	ntegral part. ral part in pe b02 Main Sta n Torque to S nitial reference eference. See 46.04	rcent of 99 atus Word. peed. ce.).02 M1 nor	minal torque.		
	11: DIO1; 11.02.b00 II 12: DIO2; 11.02.b01 II 19: DIL; 10.02.b15 DIO 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value As soon as React If 19.01 Actual of If 25.30 Speed of The result can be seed -325.00 325.00 Torque proportional Proportional gain (F	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Interference Ince of the speed control I reference is set. I dy reference is set. I peration mode che I control i-part force	controller in roller integral from the set to Ir e integral reduced controller.	ntegral part. ral part in pe b02 Main Sta n Torque to S nitial reference eference. See 46.04	rcent of 99 atus Word. peed. ce.).02 M1 nor	ninal torque.		
	11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DIO 0 19 Speed control i-par Initial torque refere Initial torque value of The Initial torque value of As soon as React If 19.01 Actual of If 25.30 Speed of The result can be seen -325.00 325.00	delayed status. DIO delayed status DIO delayed status I delayed status. Automatic Interference Ince of the speed control I reference is set. I dy reference is set. I peration mode che I control i-part force	controller in roller integral from the set to Ir e integral reduced controller.	ntegral part. ral part in pe b02 Main Sta n Torque to S nitial reference eference. See 46.04	rcent of 99 atus Word. peed. ce.).02 M1 nor	ninal torque.		

Index	Name Text								
	25.54	Torque integral reference							
Integration time (T _I) part of the speed controller.									
Displays the integration time (T ₁) part of the speed controller in percent of 99.02 M1 nominal									
torque.						_			
-325.00 325.00		-	%	See 46.04	у	n	Signal		
25.55	Torque derivative reference								
	Derivation time (T _D) part of the speed controller.								
	Displays the derivation time (T _D) part of the speed controller in percent of 99.02 M1 nominal								
	torque.								
	-325.00 325.00	-	%	See 46.04	у	n	Signal		
25.56	Torque acceleration compensation								
	Output of the acceleration compensation function.								
	Displays the output of the acceleration compensation function in percent of 99.02 M1 nominal								
	torque. -325.00 325.00	-	%	See 46.04	V	n	Signal		
25.57	Torque reference unbalanced								
	Unlimited speed controller output torque.								
	Displays the unlimited speed controller output torque after acceleration compensation in								
	percent of 99.02 M1 no	•	-	=					
	-325.00 325.00	-	%	See 46.04	V	n	Signal		

26 Torque reference chainSettings for the torque reference chain.

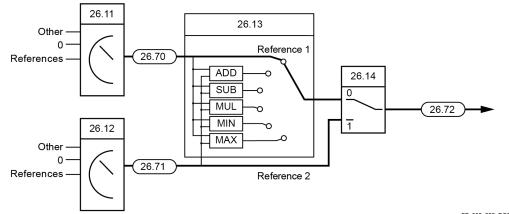
Index	Name Text									
										Range
	26.01	Torque reference to limitation								
Torque reference after gear backlash compensation. Displays the torque reference in percent of 99.02 M1 nominal torque after gear backlash compensation and before limitation.										
-325.00 325.00		-	%	See 46.04	у	n	Signal			
26.02	Torque reference	Torque reference used								
	Displays the final torque reference in percent of 99.02 M1 nominal torque after torque correction and before current control. -325.00 - % See 46.04 y n Signal									
26.05	Motor torque unfiltered									
	Unfiltered motor torque.									
	Displays the unfiltered motor torque in percent of 99.02 M1 nominal torque.									
	-325.00 325.00	-	%	See 46.04	у	n	Signal			
26.07	External torque reference 1									
	1 st external torque reference.									
	External torque reference 1 in percent of 99.02 M1 nominal torque.									
	-325.00 325.00	0.00	%	See 46.04	n	у	Parameter			
26.08	External torque re	External torque reference 2								
	2 nd external torque reference.									

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	External torque ref	erence 2 in percent o	f 99.02	M1 nominal to	rque.	•					
	-325.00 325.00	0.00	%	See 46.04	n	у	Parameter				

26.11 Torque reference 1 source

Selects torque reference source 1.

Two signal sources can be defined. See 26.11 Torque reference 1 source and 26.12 Torque reference 2 source. 26.14 Torque reference 1/2 selection switches between the two sources or a mathematical function. The mathematical function depends on 26.13 Torque reference function.



SF 880 025 DCS speed reference a.ai

Other; source selection.

- 0: **Zero**; 0 %, torque reference is set to zero.
- 1: External torque ref 1; 26.07 External torque reference 1.
- 2: External torque ref 2; 26.08 External torque reference 2.
- 4: All scaled; 12.12 All scaled value.
- 5: AI2 scaled; 12.22 AI2 scaled value.
- 6: AI3 scaled; 12.32 AI3 scaled value.
- 7: FBA A reference 1; 03.05 FBA A reference 1.
- 8: **FBA A reference 2**; 03.06 FBA A reference 2.
- 9: **FBA B reference 1**; 03.07 FBA B reference 1.
- 10: **FBA B reference 2**; 03.08 FBA B reference 2.
- 11: **EFB reference 1**; 03.09 EFB reference 1.
- 12: EFB reference 2; 03.10 EFB reference 2.
- 13: DDCS controller ref1; 03.11 DDCS controller ref1.
- 14: DDCS controller ref2; 03.12 DDCS controller ref2.
- 15: **M/F or D2D ref1**; 03.13 M/F or D2D ref1.
- 16: M/F or D2D ref2; 03.14 M/F or D2D ref2.

Torque reference function.

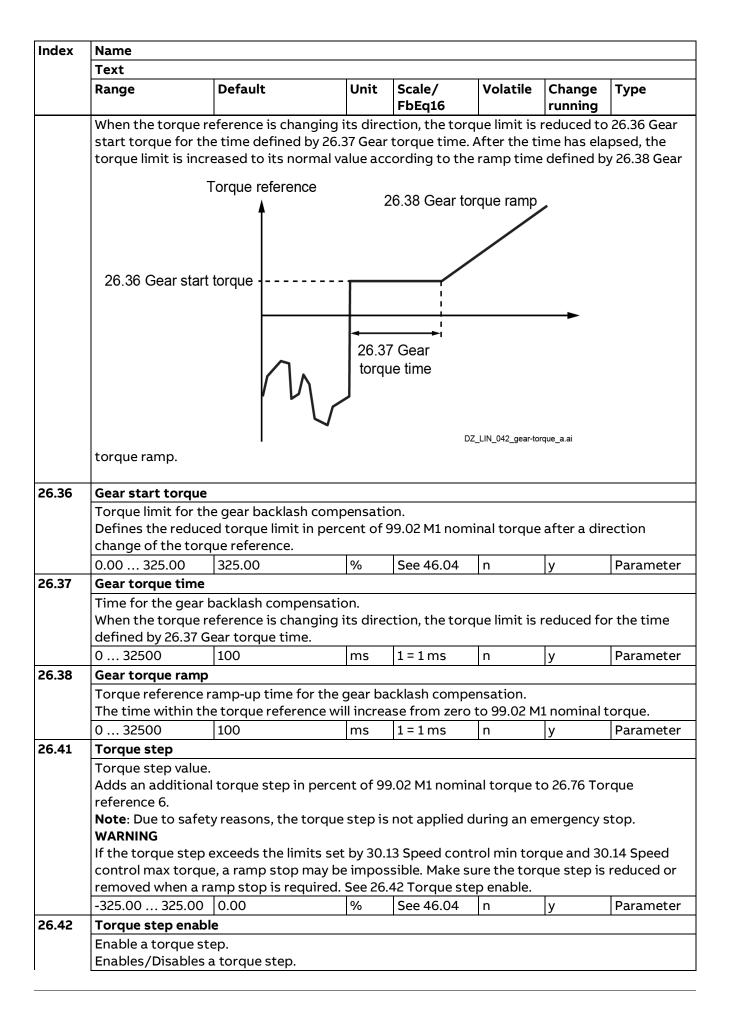
- 17: Motor potentiometer reference; 22.80 Motor potentiometer reference.
- 18: Process PID output actual; 40.01 Process PID output actual.

	0 18	Zero	-	1 = 1	n	У	Parameter				
26.12	Torque refe	Torque reference 2 source									
	Selects torqu	ue reference source 2	2.								
	For selection	ns and diagram, see 2	26.11 Torque	e reference 1	source.						
	0 18	Zero	-	1 = 1	n	у	Parameter				
26.13	Torque refe	rence function									

Parameters

Index	Name											
Index	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Selects a math	ematical function betwe	en torq	ue reference	1 and torqu	e reference	e 2. See 26.11					
	Torque referer	nce 1 source.										
	0: Ref 1 ; torque reference 1 selected by 26.11 Torque reference 1 source is used.											
	1: Add (ref 1 + ref 2); the sum of the two torque references is used.											
	2: Sub (ref 1 - ref 2) ; the result of torque reference 1 minus torque reference 2 is used.											
	3: Mul (ref 1 • ref 2); the multiplication of the two torque references is used. 4: Min (ref 1, ref 2); the smaller of the two torque references is used.											
		ef 2) ; the smaller of the the t										
	0 5	Ref 1	T TOTAL	1 = 1		\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	Darameter					
26.14			-	1-1	n	У	Parameter					
26.14		nce 1/2 selection			<u> </u>							
		veen torque reference 1 a e selection between torqu				nco 2 Soo	26 11 Torquo					
	reference 1.	: selection between torqu	ue rerer	ence I and to	rque rerere	iice 2. 3ee i	20.11 Torque					
	0 = Torque refe	erence 1										
	1 = Torque refe											
	Other [bit]; so											
		rence 1; 0, normal operat	ion.									
	1: Torque refer											
	3: DI1 ; 10.02.b0	00 DI delayed status.										
	The state of the s	01 DI delayed status.										
		02 DI delayed status.										
		03 DI delayed status.										
		04 DI delayed status.										
		05 DI delayed status.										
	· ·	b00 DIO delayed status. .b01 DIO delayed status.										
		o15 DI delayed status.										
	0 19	Torque reference 1	_	1 = 1	n	у	Parameter					
26.15	Load share	Torque reference 1		11-1	''	У	rarameter					
.0.15		nce scaling factor.										
	•	ng factor between 26.72	Torque	reference 3 a	nd 26 73 To	raua rafar	ance 1 This					
		haring the load of two m										
		orrect amount each. But i										
	-8.000 8.000		-	1000 = 1	n	у	Parameter					
26.16	Torque additiv	L L		12000 1	' '	13	, araineter					
.0.20	1 st additive tor											
		ue reference to be added	l to the	torque refere	nce after lo	ad sharing	See 26 11					
	Torque referer			torque rerere	ince areer to	aa snamg	. 300 20.11					
	•	afety reasons, the additi	ve torqi	ue reference i	s not applie	ed during a	n emergency					
	stop.	,				J .	J J					
	0 18	Zero	_	1 = 1	n	у	Parameter					
		nce filter time										
26.17	I DI QUE I ELEI EL		rence									
26.17	<u> </u>	stant for the torque refe										
26.17	Filter time con	stant for the torque refe		eference.								
26.17	Filter time con Low-pass filter	r time constant for the to	orque re		n	v	Parameter					
26.17	Filter time con Low-pass filter 0 32500	r time constant for the to		eference. 1 = 1 ms	n	у	Parameter					
	Filter time con Low-pass filter 0 32500 Torque ramp u	r time constant for the to 0 up time	orque re		n	у	Parameter					
26.17 26.18	Filter time con Low-pass filter 0 32500 Torque ramp u	r time constant for the to	ms	1 = 1 ms								

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0 32500	0	ms	1 = 1 ms	n	у	Parameter
26.19	Torque ramp d	lown time	•	•	•	•	
	Torque referen	ce ramp-down time.	•				
	The time within	n the torque referen	ce will decre	ease from 99	.02 M1 nomi	nal torque	to zero. See
	also 46.04 M1 t	orque scaling actual	l.				
	0 32500	0	ms	1 = 1 ms	n	у	Parameter
26.24	Torque additiv	re 2 enable					•
	Enable 2 nd addi	itive torque (load co	mpensatior	n).			
	Source to enab	le torque additive 2.					
	0 = Disable tor	que additive 2.					
	1 = Enable torq	ue additive 2.					
	Other [bit]; sou	urce selection.					
	0: Disable torq	ue additive 2 ; 0, nor	mal operati	on.			
	1: Enable torqu						
	· ·	0 DI delayed status.					
	-	1 DI delayed status.					
		2 DI delayed status.					
		3 DI delayed status.					
		04 DI delayed status.					
)5 DI delayed status.					
		b00 DIO delayed sta					
		b01 DIO delayed stat					
		15 DI delayed status	i.	T	<u> </u>	1	1= .
	0 19	Disable torque	-	1 = 1	n	У	Parameter
		additive 2					
26.25	Torque additiv						
		que reference (load					_
	•	ue reference to be ac	dded to 26.7	'5 Torque ref	erence 5. Se	e 26.11 Tor	que reference
	1 source.	_		_			
		afety reasons, the ac	dditive torq	ue reference	is not applie	ed during a	n emergency
	stop.						
	WARNING			20126			10044
		torque 2 exceeds the		•		•	
	•	max torque, a ramp :		•			•
		noved when a ramp s	stop is requ				1
	0 18	Zero	-	1 = 1	n	у	Parameter
•		compensation:					
		compensation is use		-		•	ible to make
	torque referen	ce direction changes	s faster with	nout damagir	ng the geark	oox.	



Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0: Disable ; disa 1: Enable ; enabl	ble torque step. e torque step.	•				
	0 1	Disable	_	1 = 1	n	у	Parameter
26.43	Torque correct	ion enable	l .	.		12	1
20.43	Enable torque of Source to enable torque of a Disable torque of ther [bit]; sour or Disable torque or Dis; 10.02.b00 or Dis; 11.02.b00 or	correction. le torque correction. que correction. ue correction. rce selection. ue correction; 0, norm e correction; 1. 0 DI delayed status. 1 DI delayed status. 2 DI delayed status. 3 DI delayed status. 4 DI delayed status. 5 DI delayed status. 5 DI delayed status. 600 DIO delayed status. 601 DIO delayed status.	s.			l.	Daramatar
	0 19	Disable torque correction	-	1 = 1	n	У	Parameter
26.44	Torque correct	ion source					
	Torque reference Note: Due to sa stop. WARNING If the torque co Maximum torque reduced or rem	e correction to be add	itive torqu imits set op may be	ue reference i by 30.03 Mini e impossible. ired. See 26.1	s not applie mum torqu Make sure t	ed during a e all limits torque cori	n emergency and 30.04 rection is
	0 18	Zero	-	1 = 1	n	у	Parameter
26.70	Displays the torsource. See 26.	reference 1 source. que reference in perc L1 Torque reference 1 s	source.	1	al torque af	ter torque	
	-325.00 325.0	00 -	%	See 46.04	у	n	Signal
26.71	Displays the to	reference 2 source. que reference in perc L2 Torque reference 2		02 M1 nomina	al torque af	ter torque	reference 2
26.72	Torque referen		1	1222.5.5.	17	1	1 9
	Torque reference Displays the tor function and to	ce after source selecti que reference in perc rque reference 1/2 sel ce 1/2 selection.	ent of 99.		•		

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	-325.00 325.00	-	%	See 46.04	у	n	Signal
26.73	Torque reference 4	1					
	and after the torqu	fter additive 1. e reference in percent le reference from the	contro	l panel. See 20	•		source.
	-325.00 325.00	-	%	See 46.04	y	n	Signal
26.74	Torque reference r	amp output					
		t the ramp output. d, filtered, and rampe Minimum torque all lir			•		
26.75	Torque reference 5	5	1			1	10.9
	Displays the torque	fter the torque select e reference in percent I Actual operation mo	t of 99.	02 M1 nomina See 46.04	l torque af	ter control	mode Signal
26.76	Torque reference 6	<u> </u>	1 70	300 10.01] 3	1	3 191141
	Displays the torque	fter additive 2 (load of a reference in percent dditive 2 enable and	t of 99.	02 M1 nomina			itive torque.
26.77	Torque reference a	dditive A	1			1	10.9
	Torque reference a	fter additive 2 (load o		02 M1 nomina	l torque af	ter additiv	_
26.70		- -	90	See 46.04	У	n	Signal
26.78		fter additive 2 (load o				ter additiv	e 2 enable.
26.79	Torque correction	reference	70	1300 40.04	у	1.1	Joighan
20.13	Torque correction Displays the torque	reference reference after source correction reference le. See 26.43 Torque	e in per	cent of 99.02	M1 nomina	•	
	1 525.00 525.00	<u> </u>	1,0		J	1	2.9.14.

27 Armature current control

Settings for the armature current control chain.

Index	Name Text										
	27.01	Current refere	ence								
		Armature current reference after flux adaption. Displays the armature current reference in percent of 99.11 M1 nominal current after flux adaption.									
	-325.00 325	.00 -		%	100 = 1 %	у	n	Signal			

Index	Name						
ilidex	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
7.02	Used current re	ference	•		•	•	
	Armature currer	t reference after	limitation.				
	Displays the arm	nature current ref	erence in p	ercent of 99.1	l M1 nominal	current af	ter current
	limitation. See 3	0.34 M1 current li	mit bridge	2, 30.35 M1 cu	rrent limit br	idge 1 and	30.37
	30.41 Current lin	nit at speed 1 5					
	-325.00 325.0	0 -	%	100 = 1 %	у	n	Signal
7.05	Motor current	<u>.</u>				•	
	Motor current.						
	Measured moto	r current in perce	nt of 99.11	M1 nominal cu	rrent.		
	-325.00 325.0	0 -	%	100 = 1 %	у	n	Signal
7.06	Motor peak curi	rent	•			•	
	Motor peak curr						
	Measured moto	r peak current in p	percent of 9	99.11 M1 nomir	nal current.		
	-325.00 325.0	-	%	100 = 1 %	У	n	Signal
7.09	Current control	ler i-part					
		(T _I) part of the a	rmature cu	rrent controlle	ır.		
	_	egration time (T _I)				er in percer	nt of 99.11 M
	nominal current		•			•	
	-325.00 325.0	0 -	%	100 = 1 %	у	n	Signal
7.18	Firing angle					I	1 3
	Firing angle.						
		ng angel in degre	es.				
	0.00 180.00		0	100 = 1°	у	n	Signal
7.19	Selected bridge			1200 -	1 9	1	To a gradu
		t conducting) bri	dae.				
		bridge selected.	age.				
	1: Bridge 1 ; bridge	•					
	2: Bridge 2 ; brid						
	02	<u> </u>	-	1 = 1	У	n	Signal
7.22	Current referen	ce source					1 3
		ent reference sou	rce				
		ce for the current		either as arma	ture drive or	as field ex	citer.
	Other; source se						
	Setting of 19.01	Actual operation	mode see g	group 19 Opera	ation mode.		
	0: Zero ; 0, force	s single firing pul	ses to supp	ress the DC cu	irrent and se	ets 27.01 Cu	ırrent
		o. Setting of 19.01	•		• .	•	
		reference; 27.01 (reference.	
	•	Actual operation					
		reference extern	al ; 27.23 Cu	rrent referenc	e external as	armature	current
	reference.			10.0			
	_	Actual operation					
	_	reference used; 2		e reference us	ea is airectly	used as al	rmature
		e (torque = curre		aroup 10 Oper	ation mode		
	_	Actual operation daption in field w				nandant a	rmature
	current reference	•	careiling is	mactive (inea	iis iio iiux ue	pendent a	i i i iatul E
		.e). 12 AI1 scaled valu	e as armati	ure current ref	erence		
		ual operation mo			C. C. ICC.		

K	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	5: AI2 scaled ; 12	.22 AI2 scaled value	as armat	ure current ref	erence.		<u>.</u>
	-	tual operation mod					
		.32 AI3 scaled value			erence.		
	Forces 19.01 Act	tual operation mod	le = Curre	nt.			
	7: FBA A referen	ce 1 ; 03.05 FBA A r	eference :	l as armature c	urrent refer	ence.	
	Forces 19.01 Act	ual operation mod	le = Curre	nt.			
	8: FBA A referer	nce 2; 03.06 FBA A r	reference	2 as armature o	current refer	ence.	
	Forces 19.01 Act	tual operation mod	le = Curre	nt.			
	9: FBA B referer	ice 1 ; 03.07 FBA B r	eference :	Las armature c	urrent refer	ence.	
		tual operation mod					
		nce 2; 03.08 FBA B			current refe	erence.	
		tual operation mod					
		e 1 ; 03.09 EFB refe			ent referenc	e.	
		ual operation mod			_		
		e 2 ; 03.10 EFB refe			ent referenc	e.	
		tual operation mod					
		oller ref1; 03.11 DD0			ature curren	t reference	•
		tual operation mod				+ ==f=====	
		oller ref2; 03.12 DD			ature currer	it reference	2.
		tual operation mod r ef1 ; 03.13 M/F or I			ront roforon	~~	
		tual operation mod			rent referen	ce.	
		r ef2 ; 03.14 M/F or I			ront roforon		
	_	ual operation mod			rent referen	CC.	
		DCSLink ; from the			ink Depend	ling on the	node numk
		p 70 either 28.14 M			•	-	
		urrent reference (if			•		•
		99.06 Operation m			,		
		tual operation mod					
		DCSLink + CurRef			rive via DCSI	Link. Deper	nding on th
		ettings in group 70	-			•	•
	exciter) or 42.45	M2 field current re	eference (if it is motor 2	field exciter)	plus 27.23	Current
	reference extern	nal as field current	reference	•			
	Only available if	99.06 Operation m	node = Fie	ld exciter.			
	Forces 19.01 Act	tual operation mod	le = Curre	nt.			
		r EMF control; 28.0		erence after El	MF control fr	om the arr	nature driv
		ield current refere					
		99.06 Operation m					
		ual operation mod		nt.		1	1
	0 34	27.01 Current	: -	1 = 1	n	у	Paramete
		reference					
3	Current referen	ce external					
	External armatu	re current reference	ce.				
		re current referenc					
	Note : 27.23 Curr	ent reference exte	rnal is onl	y valid, if 27.22	Current refe	rence sour	ce = 27.23
	Current referen	ce external.					
	-325.00 325.0	0.00	%	100 = 1 %	у	у	Paramete
				•	•		
	Current referen	ce slope					

Index	Name Text										
inaex	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Armature current	reference slope	in percent	of 99.11 M1 no	minal curren	t per 1 ms.	The di/dt				
	limitation is locat										
	Example: For 200	% nominal moto	or current i	n 100 ms set 2	7.24 Current	reference	slope = 2.0				
	%/ms.										
	0.2 120.0	10.0	%/ms	100 = 1 %/n	ns n	у	Paramete				
7.27	Current control n	node			<u>.</u>		•				
	Armature current	control mode.									
	Armature current	controller mode	selection.								
	0: Standard ; PI-co	ontroller with fee	ed forward	from 28.06 EM	IF voltage (w	ith RL com	pensation				
	based on 27.05 M	otor current) and	d feed forw	ard from 99.0	1 Mains volta	age.					
	1: Feed forward +	reference; PI-co	ntroller wit	h feed forwar	d from 28.06	EMF volta	ge (with RL				
	compensation ba	sed on current re	eference, s	ee 27.22 Curre	nt reference	source) an	d feed				
	forward from 99.	01 Mains voltage	. More stak	ole since a curr	ent referenc	e is used.					
	2: No feed forwar	r d ; PI-controller v	without fee	d forward fror	n 28.06 EMF	voltage bu	t feed				
	forward from 99.			•	•						
	5: Feed forward										
	and stability, thus	s faster current c	control (hig	her p-part and	l lower i-part	in current	controller				
	possible).			T.							
	0 5	Standard	-	1 = 1	n	у	Paramete				
7.28	Current control f	eedback mode									
	Proportional gain	ı (K _P) feedback m	node.								
	Proportional gain Chooses the arma			for the propo	ortional gain	of the arm	ature curre				
	Proportional gain Chooses the arma controller.			for the propo	ortional gain	of the arm	ature curre				
	Chooses the arm	ature current fee	edback type		ortional gain	of the arm	ature curre				
	Chooses the armocontroller.	ature current fee beak current mea	edback type asurement i	s used.	ortional gain	of the arm	ature curre				
	Chooses the armocontroller. 0: Peak current ; p	ature current fee beak current mea	edback type surement i nt measure	s used.	rtional gain	of the arm					
· ?7.29	Chooses the arms controller. 0: Peak current; p 1: Average current	eature current fee beak current mea lt; average currer Peak current	edback type surement i nt measure	s used. ment is used.			ature curre				
27.29	Chooses the arms controller. 0: Peak current; p 1: Average curren 0 1 M1 current propo	ature current fee beak current mea ot; average curren Peak current ortional gain	edback type asurement i nt measure : -	s used. ment is used. 1 = 1							
27.29	Chooses the arms controller. 0: Peak current; p 1: Average curren 0 1	peak current fee t; average current Peak current Prtional gain (K _P) of the arma	edback type asurement i nt measure : -	s used. ment is used. 1 = 1	n	у	Paramete				
27.29	Chooses the arms controller. 0: Peak current; proposed in the current propose	peak current fee t; average current Peak current prtional gain (K _P) of the armantroller generates	edback type asurement in nt measure : - ature currer s 15 % of m	s used. ment is used. 1 = 1 It controller. otor nominal	n current with	у 27.29 М1 сı	Paramete				
:7.29	Chooses the arms controller. 0: Peak current; propertion of the current propertion of the corproportion of the corproportion of the corproportion of the current propertion of the corproportion of the current propertion of the current properties of the	peak current fee peak current mea peak current Peak current prtional gain of (K _P) of the arma of the armaton and the services of the armaton	edback type asurement in nt measure : - ature currer s 15 % of m	s used. ment is used. 1 = 1 at controller. otor nominal error is 5 % o	n current with f 99.11 M1 no	y 27.29 M1 cu minal curre	Paramete urrent ent.				
	Chooses the arms controller. 0: Peak current; proposed in the current propose	peak current fee peak current mea at; average current Peak current prtional gain a (K _P) of the arma atroller generates a = 3 if the armatu	edback type asurement in nt measure : - ature currer s 15 % of m	s used. ment is used. 1 = 1 It controller. otor nominal	n current with	у 27.29 М1 сı	Paramete urrent ent.				
	Chooses the arms controller. 0: Peak current; proposed in the current proposed in the corporational gain proportional gain proportional gain proportional gain proportional gain proposed in the current integral in the current integral in the corporation in the current integral in the current in the	peak current fee peak current mea peak current Peak current prtional gain (K _P) of the armant ntroller generates n = 3 if the armature 0.10 ration time	edback type asurement in nt measure - - ature currer s 15 % of m ure current -	s used. ment is used. 1 = 1 at controller. otor nominal error is 5 % o 100 = 1	n current with f 99.11 M1 no	y 27.29 M1 cu minal curre	Paramete urrent ent.				
	Chooses the arms controller. 0: Peak current; p. 1: Average current 0 1 M1 current proportional gain Example: The corproportional gain 0.00 325.00 M1 current integral lintegration time	peak current meant; average current Peak current Peak current Ortional gain Ortional g	edback type asurement int measure	s used. ment is used. 1 = 1 It controller. otor nominal error is 5 % o 100 = 1 controller.	n current with f 99.11 M1 no	y 27.29 M1 cuminal curre	Paramete urrent ent. Paramete				
	Chooses the arms controller. 0: Peak current; p. 1: Average current 0 1 M1 current proportional gain Example: The corproportional gain 0.00 325.00 M1 current integration time of Setting the integration	peak current meant; average current Peak current Peak current prtional gain On (K _P) of the armant of the armatic On 10 Tration time (T _I) of the armatic Tration time to zero	edback type asurement int measure	s used. ment is used. 1 = 1 It controller. otor nominal error is 5 % o 100 = 1 controller.	n current with f 99.11 M1 no	y 27.29 M1 cuminal curre	Paramete urrent ent. Paramete				
	Chooses the arms controller. 0: Peak current; p. 1: Average current 0 1 M1 current proportional gain Example: The comproportional gain 0.00 325.00 M1 current integration time of Setting the integration of the controller and reservables.	peak current meant; average current Peak current Peak current Peak current Official gain Official (Kp) of the armatical penerates Official time Official time Official time Official time to zero sets the integrator	edback type asurement in int measure ture currers s 15 % of m ure current - ure current ro disables or.	s used. ment is used. 1 = 1 It controller. otor nominal error is 5 % o 100 = 1 controller. the integral p	n current with f 99.11 M1 no n art of the ari	y 27.29 M1 cuminal curre y mature cur	Paramete urrent ent. Paramete				
	Chooses the arms controller. 0: Peak current; p. 1: Average current 0 1 M1 current proportional gain Example: The comproportional gain 0.00 325.00 M1 current integration time of Setting the integration time of	peak current mean peak current mean peak current mean peak current pea	edback type asurement int measure	s used. ment is used. 1 = 1 It controller. otor nominal error is 5 % o 100 = 1 controller. the integral p	n current with f 99.11 M1 no n art of the arr	y 27.29 M1 cuminal curre y mature cur	Paramete urrent ent. Paramete rent				
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	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
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7.32	M1 armature resi	stance			•		
	Motor 1 armature Resistance of the $EMF = U_A - R_A > 0$	armature circuit	t in mΩ. Us	ed for the EMF	calculation,	/compensa	ition:
	27 22 M1 aumantuu	ictance can	bo obtoino	d by manne of		555 00 30	Tunina
	27.32 M1 armatur			d by means of	autotuning,	see 99.20	runing
	request, or from to Note: Do not char			22 M1 armatu	o rocistance	and 27 22	M1 armature
	inductance befor	•					MI alliacule
	0 65500	0	mOhm	1	n	Ĭ	Parameter
7.33	M1 armature indu		IIIOIIII	1-1111011111		У	raiametei
1.33	Motor 1 armature						
	Inductance of the		t in m⊔				
	27.33 M1 armatur			ed by means of	fautotunino	. caa 00 20	Tuning
	request, or from			ed by means of	autotuming	i, see 33.20	runnig
	Note: Do not char			.32 M1 armatui	e resistance	e and 27.33	M1 armature
	inductance befor						
	Attention: 27.33						nensation
	ALLEHLIOH. L1.33	VII allilatule illut	actance is i	iot asca for the	c Li'ii Caicai		periouri.
			mH		n caicai		1
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7.34	0.0 3250.0 Mains compensat Mains compensat Mains voltage con	0.0 tion time tion filter time compensation filte ntroller output.	mH onstant. r time cons	10 = 1 mH stant. Is used for	n or the mains	y voltage co	Parameter
7.34	0.0 3250.0 Mains compensate Mains compensate Mains voltage contact the current correct	0.0 tion time tion filter time compensation filte ntroller output.	mH onstant. r time cons	10 = 1 mH stant. Is used for	n or the mains	y voltage co	Parameter
7.34	0.0 3250.0 Mains compensate Mains compensate Mains voltage contact the current core Setting the mains	0.0 tion time tion filter time compensation filte ntroller output.	mH onstant. r time cons	10 = 1 mH stant. Is used for	n or the mains	y voltage co	Parameter
	0.0 3250.0 Mains compensate Mains compensate Mains voltage contact the current corn Setting the mains compensation. 0 32500	0.0 tion time tion filter time compensation filter ntroller output. s compensation	mH onstant. r time cons filter time o	tant. Is used for	n or the mains	y voltage co	Parameter empensation ains voltage
7.34	0.0 3250.0 Mains compensations voltage contact the current corning the mains compensation. 0 32500 Block bridge 1 so	0.0 tion time tion filter time compensation filter ntroller output. s compensation	mH onstant. r time cons filter time o	tant. Is used for	n or the mains	y voltage co	Parameter empensation ains voltage
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	0.0 3250.0 Mains compensations voltage contact the current cornsetting the mains compensation. 0 32500 Block bridge 1 some Block bridge 1	0.0 tion time tion filter time compensation filter ntroller output. s compensation 10 ource urce. block bridge 1. See e 1 te selection.	mH onstant. r time cons filter time of ms e 27.19 Sele	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
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	Mains compensations voltage correcting the mains compensation. 0 32500 Block bridge 1 sorrections bridge 1 sorrections bridge 1 sorrections or Release bridge 1 Sorrections bridge 1 Block bridge 1 Block bridge 1; Block bridge 1; 3: Dl1; 10.02.b00 14: Dl2; 10.02.b01 I	0.0 tion time tion filter time compensation filter ntroller output. s compensation 10 ource urce. block bridge 1. Serve 1. ce selection. e 1; 0, release brid 1, block bridge 1 DI delayed status DI delayed status	mH onstant. r time cons filter time of ms e 27.19 Selected dge 1. Norm s. s.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
	Mains compensations voltage correcting the mains compensation. O 32500 Block bridge 1 so Block bridge 1 so Binary signal to b O = Release bridge 1 Solten Block bridge 1 Other [bit]; source O: Release bridge 1: Block bridge 1; 3: DI1; 10.02.b00 Id 4: DI2; 10.02.b01 Id 5: DI3; 10.02.b02 Id 5: DI3; 10.02.b02 Id	tion time tion filter time compensation filter troller output. s compensation 10 ource urce. block bridge 1. Seie 1 te selection. 21; 0, release brid 1, block bridge 1 DI delayed status DI delayed status DI delayed status	mH constant. r time cons filter time cons ms e 27.19 Selected dge 1. Norm s. s. s.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
	Mains compensations of the relation of the relations of t	10 burce urce. block bridge 1. Se e 1. ce selection. 1, block bridge 1	mH constant. r time cons filter time cons ms e 27.19 Selection cs. s. s. s.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
	Mains compensations voltage correcting the mains compensation. O 32500 Block bridge 1 sorrections believed bridge 1 sorrections bridge 1 sorrections. O = Release bridge 1 sorrections bridge 1 Other [bit]; source 0: Release bridge 1: Block bridge 1; 3: DI1; 10.02.b00 14: DI2; 10.02.b01 15: DI3; 10.02.b02 16: DI4; 10.02.b03 7: DI5; 10.02.b04	tion time tion filter time compensation filter throller output. s compensation 10 ource urce. block bridge 1. See 1 te selection. this is 1; 0, release brider 1, block bridge 1 DI delayed status	mH constant. r time cons filter time cons ms e 27.19 Selected dge 1. Norm s. s. s. s. s. s.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
	Mains compensate Mains voltage correcting the mains compensation. O 32500 Block bridge 1 so Block bridge 1 so Binary signal to bo 0 = Release bridge 1 solutions Block bridge 1 Solutions (Colored Block bridge 1) (Colo	tion time tion filter time compensation filter throller output. s compensation 10 ource urce. block bridge 1. See 1. te selection. the 1; 0, release bride 1, block bridge 1 DI delayed status	mH constant. r time cons filter time cons ms e 27.19 Select dge 1. Norm s. s. s. s. s. s.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
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	Mains compensations with the current correcting the mains compensation. O 32500 Block bridge 1 so Block bridge 1 so Binary signal to b O = Release bridge 1 solenter [bit]; source 0: Release bridge 1: Block bridge 1; 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 16: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b0 12: DIO2; 11.02.b00 12: DIO2; 11.02.b00 12: DIO2; 11.02.b00 12: DIO2; 11.02.b00	tion time tion filter time compensation filter throller output. s compensation 10 turce turce. block bridge 1. Se e 1. te selection. the 1; 0, release brid 1, block bridge 1 DI delayed status	mH constant. r time cons filter time of ms dge 1. Norm s. atus.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage
	Mains compensations with the current corner setting the mains compensation. O 32500 Block bridge 1 so Block bridge 1 so Binary signal to bo 0 = Release bridge 1 = Block bridge 1 Other [bit]; source 0: Release bridge 1: Block bridge 1; 3: DI1; 10.02.b00 4: DI2; 10.02.b01 15: DI3; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b00 12: DIO2; 11.02.b00 19: DIL; 10.02.b15	tion time tion filter time compensation filter throller output. s compensation 10 ource urce. block bridge 1. See 1. te selection. this is 1; 0, release brider 1, block bridge 1 DI delayed status	mH constant. r time cons filter time cons ms e 27.19 Selection s. s. s. s. s. s. s. s. atus. atus. us.	10 = 1 mH stant. Is used for constant to 325 1 = 1 ms ected bridge.	n or the mains 500 ms disal	y voltage co ples the ma	Parameter ompensation ains voltage Parameter
	Mains compensations with the current correcting the mains compensation. O 32500 Block bridge 1 so Block bridge 1 so Binary signal to b O = Release bridge 1 solenter [bit]; source 0: Release bridge 1: Block bridge 1; 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 16: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b0 12: DIO2; 11.02.b00 12: DIO2; 11.02.b00 12: DIO2; 11.02.b00 12: DIO2; 11.02.b00	tion time tion filter time compensation filter throller output. s compensation 10 turce turce. block bridge 1. Se e 1. te selection. the 1; 0, release brid 1, block bridge 1 DI delayed status	mH constant. r time cons filter time cons ms e 27.19 Selection s. s. s. s. s. s. s. s. atus. atus. us.	tant. Is used for constant to 325	n or the mains	y voltage co	Parameter empensation ains voltage

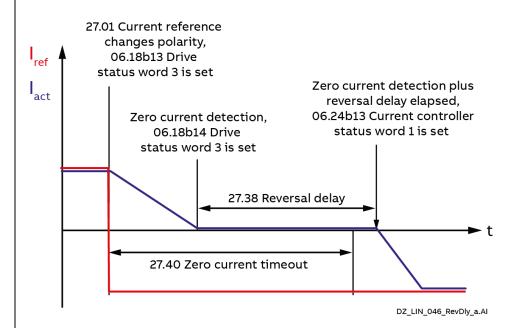
ndex	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Block bridge 2	2 source.	•		•		•				
	Binary signal	to block bridge 2. See	27.19 Sel	ected bridge.							
	0 = Release bi	ridge 2.									
	1 = Block brid	ge 2.									
	Other [bit]; so	ource selection.									
	0: Release bridge 2 ; 0, release bridge 2. Normal operation.										
	1: Block bridge 2; 1, block bridge 2.										
	3: DI1 ; 10.02.b	000 DI delayed status.									
	4: DI2 ; 10.02.b	001 DI delayed status.	•								
	5: DI3 ; 10.02.b	002 DI delayed status.	•								
	6: DI4 ; 10.02.b	003 DI delayed status									
	7: DI5 ; 10.02.b	004 DI delayed status	•								
	8: DI6 ; 10.02.k	005 DI delayed status									
	11: DIO1 ; 11.02	2.b00 DIO delayed sta	itus.								
	12: DIO2 ; 11.02	2.b01 DIO delayed sta	tus.								
	19: DIL ; 10.02.	b15 DI delayed status	5.								
	0 19	Release bridg	ie -	1 = 1	n	у	Paramete				

27.38 Reversal delay

Reversal delay during a bridge reversal (bridge changeover/change armature current direction).

The reversal delay defines the delay time during a bridge reversal.

2



The reversal delay starts after a bridge reversal command has been given and zero current has been detected. See 27.01 Current reference, 06.18.b14 Drive status word 3 and 06.24.b13 Current controller status word 1.

After a bridge reversal command, zero current must be reached before 27.40 Zero current timeout elapses otherwise the event generates fault F557 Reversal time.

The setting of the reversal delay depends on the discontinuous current limit:

Index	Name										
	Text										
	Range	Default		Unit		ale/ Eq16		Volatile	Change running	Туре	
	27.31 M1 discontinu	uous	27.38 R delay	Reversal		Delta	27.	40 Zero c	urrent tim	timeout	
	≤ 50.00 %		5.0 ms			15 ms	20	ms			
	≤ 35.00 %		10.0 m			25 ms	_	ms			
	≤ 20.00 %		15.0 m			35 ms		ms			
							_				
	≤ 10.00 %		20.0 m	S		50 ms	70	ms			
	Notes: - 29.06 12-pulse roward zero current times 27.38 Reversal done exception of the 12-pulse seriof the 12-pulse roward.	neout mus elay mus nly: rent mea ial slave t	st be lor t have th sureme o 0 ms.	nger thar ne same s nt in the Then, the	127. sett 12-p e 12-	38 Rever ing in 12 [.] oulse ser pulse se	sal o -pul: ial s rial	delay. se master lave, set 2 slave uses	and 12-pul 7.38 Revers	se slave wit sal delay in al command	
	0.0 32500.0	5.0		ms	1 =	: 1 ms		n	у	Parameter	
7.39	Zero current detect			1				1	_	1	
	1 = Zero current det Other [bit]; source so 0: Current; based on 1: Voltage; based on isolation is used. Note: Zero load curr Mains voltage. 2: Current and volta utilized when galvan 3: DI1; 10.02.b00 DI 4: DI2; 10.02.b01 DI 5: DI3; 10.02.b02 DI 6: DI4; 10.02.b03 DI 7: DI5; 10.02.b04 DI 8: DI6; 10.02.b05 DI 11: DIO1; 11.02.b00 I 12: DIO2; 11.02.b01 I 19: DIL; 10.02.b15 DI Note: With 27.39 Ze 06.18.b14 Converter	selection. In the driven the driven the driven tis de age; base nic isolati delayed selayed roload cur status w	e's own e's own tected i d on dis on is us tatus. tatus. tatus. status. etatus. ed statu status. urrent de yord 3, is	thyristor f the thyr continuo ed. is. is. estection s set in ca	· vol risto ous (tages. N or voltage current a	ot to	o be utilize either ≤ 10 hyristor v	ed when ga OV or ≤ 10 to oltages. No	alvanic % of 99.01 ot to be	
	synchronization to			rupted.	Τ.				1	T_	
	0 19	Current		-	1 =	: 1		n	у	Parameter	
7.40	Zero current timeo		- اعشاء		/L-	.da!-					
	Zero current timeou direction). The zero-current tin reached. Otherwise	neout def	fines the	e time du	ring	a bridg	e re	versal, whi	ile zero cur	rent must b	

Index	Name						
	Text						
	Range	Default	Unit	Scale/	Volatile	Change	Туре
				FbEq16		running	
	Notes:						
	 29.06 12-pulse r 	eversal timeout m	nust be lo	nger than 27.40) Zero curr	ent timeou	t and 27.40
	Zero current tin	neout must be lon	ger than	27.38 Reversal	delay.		
	 27.40 Zero curre 	ent timeout must	have the	same setting ir	12-pulse r	naster and	12-pulse
	slave.						
	0 32500	20	ms	1 = 1 ms	n	у	Parameter
27.41	Reversal mode						
	Reversal mode for a	a bridge reversal (bridge ch	angeover/char	ige armatu	re current	direction).
	Reversal mode defi	nes the behavior o	of the spe	ed ramp and s	oeed contr	oller during	g a bridge
	reversal or a field re	eversal (torque rev	/ersal).				
	Note: 27.41 Reversa	l mode is automa	tically se	t to Hard when	27.38 Reve	rsal delay s	≤ 25 ms.
	0: Soft ; the speed r	amp and speed co	ontroller a	are frozen durin	ig reversal.	Leading to	o a bump-
	less reversal (no sp	• •					
	Attention: Do not u						
	1: Hard ; the speed r	amp and speed c	ontroller	are released du	ring revers	al. Thus, th	ne drive
	follows the ramp.			T		1	
	0 1	Hard	<u> -</u>	1 = 1	n	у	Parameter

27.42 Reversal volt margin

Reversal volt safety margin. Note: Typically left at default.

The reversal volt margin in percent of 99.10 Nominal mains voltage is a safety margin for the motor voltage during regenerative mode. Setting the reversal volt margin to zero removes the protection against commutation faults (shooting through).

The margin for the reversal volt function is doing the following:

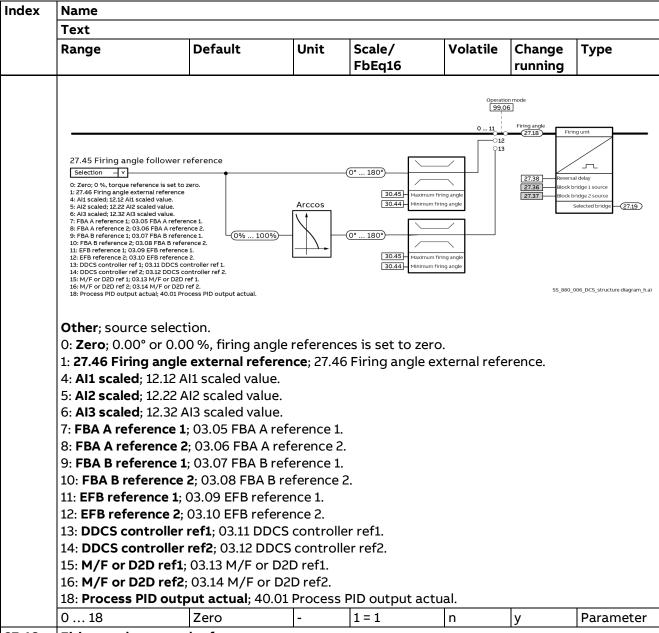
To prevent the drive from blowing fuses when going from motoring to generating the armature voltage must be lower than the corresponding mains voltage, because thyristors are line commutated. This is automatically checked by the drive and the reverse bridge is blocked if the armature voltage is too high. To lower the armature voltage two ways are possible:

- Lowering the motor speed by idling.
- Adapting the flux by lowering the field current. For this option set 28.17 M1 EMF/field control mode = EMF.

Both options take time and thus delaying the current/torque reversal. For faster adapting of the armature voltage, activate the field weakening function.

This can be supervised with 06.25.b03 Current controller status word 2 and 31.60 Reversal volt function.

Index	Name						
	Text						
	Range	Default	Unit	Scale/	Volatile	Change	Туре
				FbEq16		running	
				U_{dilpha}			
			generatir	ng motoring			
	U _{genMa}	.x: max regenerative	90		U _{motMax} : ma	x motoring	g
		voltage (α = 150°)		- 1 -	voltage (α	= 15°)	
				27.42 Re	eversal volt	margin	
	3	regenerative motor		 - ¥ -			
	voitage	with safety margin					
				+		→ i	
					U _{genMotor} : re	generative	motor
			-	<u> </u>	- genmotor voltage wi		
		27.42 Reversal vo	lt margin	11	_	-	
	U	notMax: max motoring	_	.	_ U _{genMax} : ma		tive
	, m	voltage (α = 15°)		- ng generating	voltage (α	= 150°)	
			motorn	ig generating			
	For regenerati	ve mode is valid:			I	DZ_LIN_047_RevVo	ltMargin_b.ai
	l or regenerati	ve mode is valid.					
	$U_{genMotor} = U_g$	$_{enMax} \mid -U_{Safety}$					
	_	$\alpha_{\rm ex} = 1.35 \bullet \cos \alpha_{\rm max} \bullet$	P01.20				
				20			
		$_{xx} = 1.35 \bullet \cos P30.4$	i3 ● P01.2	.0			
	and U_{Safety}	= P27.42					
	follows:						
	$U_{genMotor} = 1.3$	$5 \bullet \cos P30.45 \bullet P0$	01.20 - F	P27.42 • P01.2	0.		
	8						
	•	30.45 Maximum firi	ng angle =	: 150° and 27.42	Reversal vo	olt margin =	= 10 %
	follows:						
	$ _{II} = 1.3$	55 • cos150° • <i>P</i> 01.	20)1 = 0.1	I • P01 20			
	9						
	$U_{genMotor} = -1 $.16 • <i>P</i> 01.20 − 0.1	• <i>P</i> 01.20)			
	follows:						
	$U_{genMotor} = 1.0$	6 • <i>P</i> 01.20					
	9						
	Thus, the brid	ge reversal is only po	ossible if 0	1.21 Armature v	oltage in V	< 01.06 • 0	1.20 Mains
	voltage in V.	Ta	12.	Transition		<u> </u>	1_
27.45	0.00 20.00	6.00	%	100 = 1 %	n	у	Parameter
27.45		ollower reference	f ours:= = =				
		ing angle follower re al/parameter to be o		directly to the	firing angle	path of a f	ollower The
	_	ference is either in d		-		•	
		percent (99.06 Opera	_	•			



27.46 Firing angle external reference

External firing angle reference.

External firing angle reference in degrees (99.06 Operation mode = Firing angle follower degree) or in percent (99.06 Operation mode = Firing angle follower scaled).

Notes:

- For 99.06 Operation mode = Firing angle follower degree is valid:
 - 0.00° ≡ maximum possible DC voltage.
 - 90.00° ≡ zero DC voltage.
 - 180.00° ≡ minimum possible DC voltage.
- For 99.06 Operation mode = Firing angle follower scaled is valid:
 - 0.00 % ≡ minimum possible DC voltage.
 - 50.00 % ≡ zero DC voltage.
 - 100.00 % ≡ maximum possible DC voltage.
- The percent values are adapted to the firing angle using arccos.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	- Parameters 30.	44 Minimum fi	ring angle a	.nd 30.45 Maxiı	mum firing	angle are a	ctive.
	00.00 180.00 or	0.00	° or %	100 = 1° or %	n	у	Parameter
	0.00 100.00	1					1

27.48 MG control word

MG-set control word.

The MG-set control word can be written to by Adaptive Program, application program or overriding control.

Bit assignment:

Bit	Name	Value	Remarks
0	Large exciter mode 2	1	Reduce voltage spikes. Only for magnets.
		0	Standard mode.
1	Block fault 7310 Overspeed	1	Block fault 7310 Overspeed. Only for magnets.
		0	Release fault 7310 Overspeed. Standard mode.
2	Block fault F503 Armature	1	Block fault F503 Armature overvoltage.
	overvoltage	0	Release fault F503 Armature overvoltage. Standard mode.
3	Block fault 7301 Motor	1	Block fault 7301 Motor speed feedback.
	speed feedback	0	Release fault 7301 Motor speed feedback. Standard mode.
4	reserved		
5	F503 Armature overvoltage via 28.06 EMF	1	Generate fault F503 Armature overvoltage with the help of 28.06 EMF voltage.
		0	Generate fault F503 Armature overvoltage with the help of 28.05 Armature voltage. Standard mode.
6	7301 Motor speed feedback via 28.06 EMF	1	Generate fault 7301 Motor speed feedback among others with the help of 28.06 EMF voltage.
		0	Generate fault 7301 Motor speed feedback among others with the help of 28.05 Armature voltage. Standard mode.
7	No feed forward flux control	1	Disable feed forward for flux control. Note: 30.50 Maximum EMF limit may need to be adapted.
		0	Enable feed forward for flux control. Standard mode.
8	No firing angle ramp	1	reserved
		0	Standard mode.

e Type
g
ſ
ırrent
aximum firing
g pulses sed for small ent < 10 A). Large field
Parameter
Farameter
pensation) of
Parameter
e bits is set.
ge supervision.

Index	Nam	ne								
	Text	t								
	Range		Default	U	Jnit	Scale/ FbEq16	Volatile	Change running	Туре	
	9	Peak armature overcurrent			2310 Armature overcurrent from peak supervi Overcurrent in 27.06 Motor peak current.					
	10	reserved								
	11	reserved								
	12	reserved								
	13	reserved								
	14	reserved								
	15	Undervoltage		1		Auxiliary under Power unit, po		failure.		
	000	Oh FFFFh	-	-		1 = 1	у	n	Signal	

28 EMF and field current control

Settings for the EMF and field current control chain.

Index	Name											
	Text											
	Range	Default	Unit	Scale/	Volatile	Change	Туре					
				FbEq16		running						
28.01	EMF voltage refere	ence 1										
	EMF voltage refere											
	Displays the EMF v			nt of 99.12 M1 n	ominal volta	age after E	MF reference					
	source. See 28.18 E	MF reference s	1	1			1					
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal					
28.02	EMF voltage refere	ence 2										
	EMF voltage refere											
	Displays the EMF v											
	correction and ram				ntroller. See	28.21 EMF	voltage					
	correction and 28.2	22 EMF voltage	1				1					
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal					
28.05	Armature voltage											
	Armature voltage.											
	Measured armatur											
	This value is also in	•	.34 DC volt	age measurem	ent adjust a	ind 95.35 D	C voltage					
	measurement offs	et.	101	100 100			Te: 1					
	-325.00 325.00	-	%	100 = 1 %	У	n	Signal					
28.06	EMF voltage											
	EMF voltage.				ı. c							
		Displays the EMF voltage in percent of 99.12 M1 nominal voltage after the EMF calculation. A filter time constant is defined by 28.23 EMF voltage filter time. This is an input for the EMF										
	controller.	t is defined by	28.23 EMF	voitage fiiter tii	me. This is a	in input for	tne EMF					
	-325.00 325.00	1	%	100 = 1 %		l n	Cianal					
20.00			90	100 - 1 %	у	n	Signal					
28.09	Flux reference after											
	Flux reference afte											
	Displays the EMF p			n percent of no	minai flux. N	iominai fiu:	X 1S					
	Note: 28.09 Flux re			lic cot to zoro i	f 20 17 M1 E	ME /field c	ontrol modo					
	= Fix.	referice after E	IMIT COITE	113 561 10 2610, 1	ı ∠0.11 MIT E	MF/Heid C	ontrormode					
	- FIX.											

Index	Name						
	Text		·			·	·
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal
28.10	Flux reference field	d weakening	 	l e			
	Flux reference from Displays the field w is generated with 1 Note : 28.10 Flux refix.	veakening pa .00 % field c	art of the fl urrent.				
	-325.00 325.00	_	%	100 = 1 %	у	n	Signal
8.11	Flux reference sum	<u> </u>					1- 5
	Flux reference sum Displays the sum o with 100 % field cu 28.10 Flux reference -325.00 325.00	of the flux ref errent. 28.11 I	lux referer				
8.14	M1 field current re	ference	<u> </u>	.	1.5		
	Motor 1 field currer Displays motor 1 fi -325.00 325.00			percent of 99.13	3 M1 nominal	field curre	nt. Signal
28.15	M1 field current		173	120 270		1	10.9
	Motor 1 field current Motor 1 measured -325.00 325.00		in percent	of 99.13 M1 nom	ninal field cur	rent.	Signal
8.17	M1 EMF/field cont	rol mode	70	100 - 1 70	l y	11	Jigilai
	Motor 1 EMF/field Motor 1 EMF/field Note: It is not poss Fix. 0: Fix; constant fie optitorque blocked 1: EMF; field weake blocked. 2: Fix/reversal; cor active, optitorque 3: EMF/reversal; fie optitorque blocked 4: Fix/optitorque; blocked, optitorque 5: EMF/optitorque optitorque active. 6: Fix/reversal/op reversal active, opt 7: EMF/reversal/op active, optitorque	control mod sible to go in Id (no field w d. ning active, nstant field (blocked. eld weakenir d. constant fie e active. e; field weake titorque; co citorque acti ptitorque; fi	e selection to field we weakening), EMF control fino field we agactive, Eald (no field ening active instant field we.	akening range was EMF controller of the controller of the controller related weakening), EMF controller related to the controller of the c	blocked, field eld reversal block ontroller block leased, field r F controller b released, fie ning), EMF co	reversal booked, opto ked, field reversal actolocked, field reversal booked, field reversal booked, field reversal booked booked.	locked, itorque eversal ive, ld reversal blocked, ocked, field
	07	Fix	-	1 = 1	n	у	Parameter
28.18	EMF reference sou	rce					
	Selects the EMF vo	ltage referei	nce source.				

	Text Range 0: Zero; 0, not in	Default	Unit	Seele /	N. 1 . 11	T									
	0: Zero ; 0, not in	Default	Unit												
				FbEq16	Volatile	Change running	Туре								
		use.		•											
		ally calculated	_												
	2: EMF voltage e		-	MF voltage exte	rnal referenc	e.									
	4: Al1 scaled ; 12.														
	5: AI2 scaled ; 12.7														
	6: AI3 scaled ; 12.32 AI3 scaled value. 7: FBA A reference 1 ; 03.05 FBA A reference 1.														
		•													
	8: FBA A reference 2 ; 03.06 FBA A reference 2. 9: FBA B reference 1 ; 03.07 FBA B reference 1.														
	9: FBA B reference 1 ; 03.07 FBA B reference 1.														
		•		ce 2.											
	10: FBA B reference 2 ; 03.08 FBA B reference 2. 11: EFB reference 1 ; 03.09 EFB reference 1. 12: EFB reference 2 ; 03.10 EFB reference 2.														
	13: DDCS contro	•													
	14: DDCS contro	•													
	15: M/F or D2D r	•													
	16: M/F or D2D r														
H	016	Internal		1 = 1	n	у	Parameter								
	EMF voltage ext			1-1		У	T di di liccei								
-	External EMF vol														
l I		-	•	o drivo in porce	ont of 99 12 M	1 nominals	oltago Can								
	External EMF voltage reference input of the drive, in percent of 99.12 M1 nominal voltage. Can be connected via 28.18 EMF reference source.														
_	-325.00 325.00		%	100 = 1 %	n	1,,	Parameter								
		L	70	100 - 1 70		У	Parameter								
H-	EMF voltage cor														
	Selects the EMF														
	Selects the source se		voitage cor	rection.											
	0: Zero ; 0, not in														
	1: EMF voltage c		I FMF volta	ge correction											
	4: Al1 scaled; 12			ge correction.											
	5: Al2 scaled ; 12.3														
	6: AI3 scaled ; 12.														
	7: FBA A reference			e 1.											
	8: FBA A referen	-													
	9: FBA B referen	ce 1; 03.07 FBA	B reference	e 1.											
	9: FBA B reference 1 ; 03.07 FBA B reference 1. 10: FBA B reference 2 ; 03.08 FBA B reference 2.														
	11: EFB reference 1 ; 03.09 EFB reference 1.														
	12: EFB reference	2 ; 03.10 EFB r	eference 2.												
	13: DDCS contro	•													
	14: DDCS contro	•													
	15: M/F or D2D r														
<u> </u>	16: M/F or D2D r	ef2 ; 03.14 M/F	or D2D ref2) 											
	0 16	Zero	-	1 = 1	n	у	Parameter								
-	EMF voltage cor														
	EMF voltage corr	•													
	EMF voltage corr	•		•	.12 M1 nomin	al voltage.	Can be								
	connected via 28	.20 EMF voltag	e correctio	n source.											
	-325.00 325.00	0.00	%	100 = 1 %	n	у	Parameter								
	EMF voltage refe	erence slope	·												

Index	Name														
	Text														
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре								
	EMF voltage refe	•	•		al voltage per	1 ms. The	dv/dt								
	limitation is loca	· ·		1		T	1								
	0.01 100.00	30.00	%/ms	100 = 1 %/m	s n	у	Parameter								
28.23	EMF voltage filte														
	EMF voltage filte														
	EMF voltage filte		nt for 28.06												
	0 32500	10	ms	1 = 1 ms	n	У	Parameter								
28.24	EMF proportional gain														
	Proportional gain (KP) of the EMF controller.														
	Example : The controller generates 15 % of motor nominal EMF with 28.24 EMF proportional gain = 3 if the EMF error is 5 % of 99.12 M1 nominal voltage.														
20 25			of 99.12 M1		1		1								
	0.00 325.00	0.50		100 = 1	n	у	Parameter								
28.25	EMF integration														
	Integration time	• •				45	!								
	Setting the integ	gration time to	zero disabi	es the integral p	art of the EN	4F controll	er and resets								
	the integrator. The integration t	imo dofinos th	o timo with	in the integral r	art of the EN	1E controll	or achieves								
	_						er acmeves								
			•				poortional								
	-	the same value as the proportional part when the error value is constant. Example : The controller generates 15 % of motor nominal EMF with 28.24 EMF proportional													
	Example : The controller generates 15 % of motor nominal EMF with 28.24 EMF proportional gain = 3 if the EMF error is 5 % of 99.12 M1 nominal voltage. On that condition and with 28.25														
	_			nominal voltage	e. On that cor	ndition and	1 WITN 28.25								
	EMF integration	time = 50 ms f	ollows:	r nominal EMF,											
	EMF integration – The controlle	time = 50 ms f r generates 30	ollows: % of moto		f the EMF err	or is const	ant, after 50								
	EMF integration – The controlle	time = 50 ms f r generates 30	ollows: % of moto	r nominal EMF, i	f the EMF err	or is const	ant, after 50								
	EMF integration - The controlle ms are elapse	time = 50 ms f r generates 30	ollows: % of moto	r nominal EMF, i	f the EMF err	or is const	ant, after 50								
28.28	EMF integration - The controlle ms are elapse part.	time = 50 ms f r generates 30 ed. 15 % derive	follows: 0 % of moto e from the p	r nominal EMF, i	f the EMF err	ror is const rive from t	ant, after 50 he integral								
28.28	EMF integration The controlle ms are elapse part. 0 32500	time = 50 ms f er generates 30 ed. 15 % derive 50 eakening	follows: 0 % of moto e from the p	r nominal EMF, i	f the EMF err	ror is const rive from t	ant, after 50 he integral								
28.28	EMF integration The controlle ms are elapse part. 0 32500 Dynamic field we If the motor spee	time = 50 ms for generates 30 ded. 15 % derive 50 deakening eakening.	ollows: of moto from the p ms base speed	r nominal EMF, i roportional part 1 = 1 ms (field weakening	f the EMF end and 15 % de n	ror is const rive from t y kly, armatu	eant, after 50 he integral Parameter								
28.28	EMF integration The controlle ms are elapse part. 0 32500 Dynamic field we Dynamic field we If the motor speed overshot may oc	time = 50 ms for generates 30 ded. 15 % derives 50 deakening eakening. The solve the cur. To solve the sol	ollows: of moto from the p ms base speed his problem	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapsed part. O 32500 Dynamic field wells the motor speed overshot may ocoof dynamic field	time = 50 ms for generates 30 ded. 15 % derives 50 deakening eakening. Ed passes the locur. To solve the weakening. 28	ollows: of moto from the p ms base speed his problem	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controlle ms are elapse part. 0 32500 Dynamic field we Dynamic field we If the motor speed overshot may oc	time = 50 ms for generates 30 ded. 15 % derives 50 deakening eakening. Ed passes the locur. To solve the weakening. 28	ollows: of moto from the p ms base speed his problem	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening eakening. Ed passes the locur. To solve the weakening. 28	ollows: of moto from the p ms base speed his problem	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapsed part. O 32500 Dynamic field wells the motor speed overshot may ocoof dynamic field	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ms base speed his problem .28 Dynamic	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake c field weakenin	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake c field weakenin	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake c field weakenin	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake c field weakenin	f the EMF end and 15 % de n n g point) quick	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, i roportional part 1 = 1 ms (field weakening the field weake c field weakenin	f the EMF end and 15 % de n n g point) quick ning point ca	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, iroportional part 1 = 1 ms (field weakening the field weakening field weakeni	f the EMF end and 15 % de n n g point) quick ning point ca	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, iroportional part 1 = 1 ms (field weakening the field weakening field weakeni	f the EMF end and 15 % de n n g point) quick ning point ca	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, iroportional part 1 = 1 ms (field weakening the field weakening field weakeni	f the EMF end and 15 % de n n g point) quick ning point ca	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, iroportional part 1 = 1 ms (field weakening the field weakening field weakeni	f the EMF end and 15 % de n n g point) quick ning point ca	ror is const rive from t y kly, armatu an be lower	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem 28 Dynamic	r nominal EMF, iroportional part 1 = 1 ms (field weakening the field weakening field weakeni	f the EMF end and 15 % decorated in the second in the seco	ror is const rive from t y kly, armatu an be lower rcent of 99	Parameter re voltage red by means								
28.28	EMF integration The controller ms are elapse part. O 32500 Dynamic field we lifthe motor speed overshot may occord dynamic field nominal (base) s	time = 50 ms for generates 30 ded. 15 % derives 50 deakening. The sakening of the cur. To solve the weakening. 28 peed.	ollows: of moto from the p ms base speed his problem .28 Dynamic	r nominal EMF, iroportional part 1 = 1 ms (field weakening the field weakening) I weakening	f the EMF end and 15 % de n n g point) quick ning point ca	ror is const rive from t y kly, armatu an be lower rcent of 99	Parameter re voltage red by means								

ndex	Name												
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	Note: The lower	ed field weaker	ning point is	compensated l	y the EMF c	ontroller in	case of						
	constant speed	or slow speed	change. 30.	50 Maximum EM	IF limit must	be set high	n enough to						
	allow the EMF co	ontroller to com	npensate.										
	80.00 100.00	100.00	%	100 = 1 %	n	у	Parameter						
8.29	Flux correction	source				•							
	Selects the flux	correction sour	ce.										
	Selects the source for the flux correction.												
	Other; source selection.												
	0: Zero ; 0, not in use.												
	1: Flux correction; 28.29 Flux correction.												
	4: Al1 scaled; 12.12 Al1 scaled value.												
	5: AI2 scaled ; 12.												
	6: AI3 scaled ; 12.												
	7: FBA A referen	•											
	8: FBA A referen	•											
	9: FBA B referen												
		•		ce 2.									
		10: FBA B reference 2 ; 03.08 FBA B reference 2. 11: EFB reference 1 ; 03.09 EFB reference 1. 12: EFB reference 2 ; 03.10 EFB reference 2.											
	13: DDCS contro	•											
	14: DDCS contro	•											
	15: M/F or D2D r	•											
	16: M/F or D2D i												
	0 16	Zero		1 = 1	n	у	Parameter						
8.30	Flux correction					<u> </u>	rararreter						
5.50		innut											
		Flux correction input. Flux correction input of the drive, in percent of nominal flux. Nominal flux is generated with											
	100 % field curre	•	•			_	acea with						
	-100.00 100.0		%	100 = 1 %	n	у	Parameter						
8.31			70	100 - 1 70	111	У	Farameter						
5.51	Field current at												
	Field current at	40 % flux.											
	Flux ▲	Flux	k lineariza	ation									
	000/	1 107	· IIIIOGI120										
	90 %			i									
	70 %												
				! !									
				į									
	40 %			1									
				1									
				i									
		i i											
				1 1 1									
					Field								
	P2	28.31 P28.3	32	P28.33	Field								
	P2	28.31 P28.3	32		-								
	P2 Field current in p			DZ_LIN_044	current	nerate 40 %	6 of nominal						
		percent of 99.13	3 M1 nomin	DZ_LIN_044 al field current n	current Flux linear_b.ai eeded to gel		6 of nominal						

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
28.32	Field current a	Field current at 70 % flux									
	Field current at 70 % flux. Field current in percent of 99.13 M1 nominal field current needed to generate 70 % of nominal flux. It is used to compensate the non-linearity between flux and field current.										
	0.00 100.00	70.00	%	100 = 1 %	n	у	Parameter				
28.33	Field current at 90 % flux										
	Field current at 90 % flux. Field current in percent of 99.13 M1 nominal field current needed to generate 90 % of nominal flux. It is used to compensate the non-linearity between flux and field current. 0.00 100.00 90.00 % 100 = 1 % n y Parameter										
28 36	M1 field heatin			100 - 170		13	T aranicter				

28.36 M1 field heating source

Motor 1 and motor 2 (motor 1/2) field heating source.

Selects the source of motor 1/2 field heating On/Off command.

0 = Disable field heating.

1 = Enable with On.

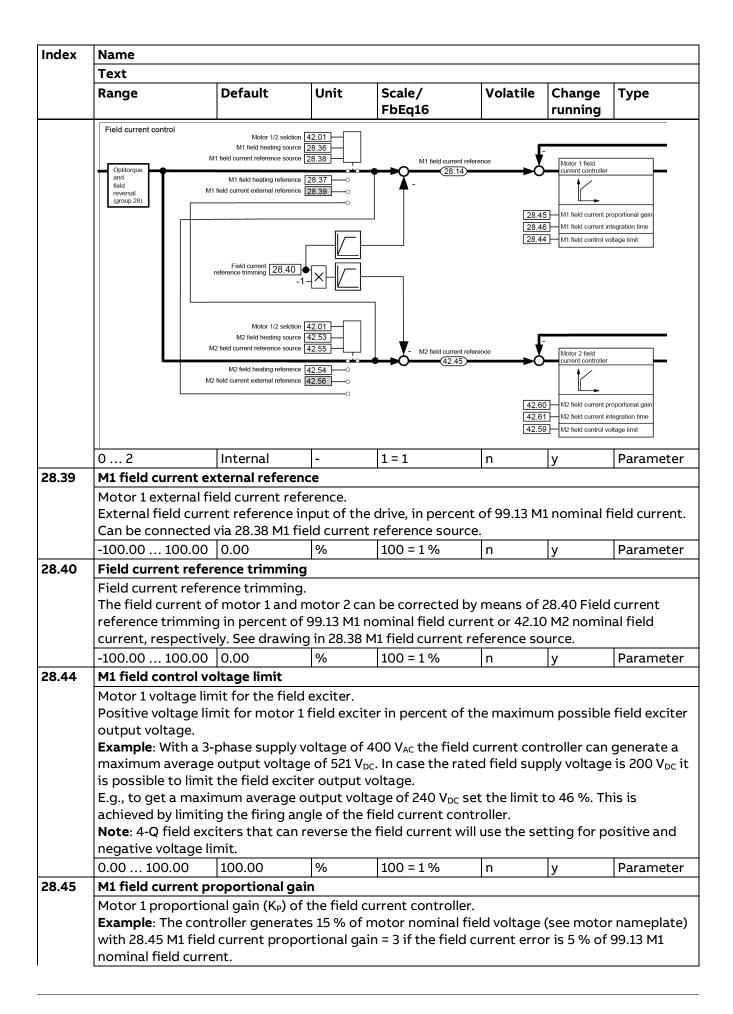
Notes:

- Field heating is disabled if:
 - Switch-on inhibited is active.
 - A fault is active. Not valid for 28.36 M1 field heating source = Other [bit], DI1 ... DI6,
 DIO1, DIO2 or DIL.
 - Off2 (emergency off/fast current off) is active. Not valid for 28.36 M1 field heating source = Other [bit], DI1 ... DI6, DIO1, DIO2 or DIL.
 - Off3 (emergency stop) is active. Not valid for 28.36 M1 field heating source = Other [bit], DI1 ... DI6, DIO1, DIO2 or DIL.
 - When the drive is in state Ready reference (Run command).
- Motor 1 field heating reference is set with 28.37 M1 field heating reference. Motor 1 field heating can be disabled, when the reference is set to zero. Motor 1 field nominal current is set with 99.13 M1 nominal field current.
- Motor 2 field heating reference is set with 42.54 M2 field heating reference. Motor 2 field heating can be disabled, when the reference is set to zero. Motor 2 field nominal current is set with 42.10 M2 nominal field current.
- In case motor 1/2 field exciter is not connected via a separate field contactor following settings apply for motor 1/2 field heating:
 - 20.33 Mains contactor control mode = On.
 - 28.36 M1 field heating source = Enable with On.
- When two motors in shared motion are used and field economy is needed for motor 1/2, set 28.36 M1 field heating source = Disable field heating or Enable field heating. See also 28.37 M1 field heating reference and 42.54 M2 field heating reference.
- When 28.36 M1 field heating source = Enable with On, 100 % field current for motor 1/2 is kept, while the procedure to close the brake is active.

Other [bit]; source selection.

- 0: Disable field heating; 0, motor 1/2 field heating is off. Normal operation.
- 1: Enable with On; 1, enable motor 1/2 field heating with On/Off1 control = 1 and Run = 0.
- 2: Enable field heating; enable motor 1/2 field heating if On/Off1 control = 0 and Run = 0.
- 3: DI1; 10.02.b00 DI delayed status. Enable motor 1/2 field heating with DI1 = 1 and Run = 0.
- 4: DI2; 10.02.b01 DI delayed status. Enable motor 1/2 field heating with DI2 = 1 and Run = 0.
- 5: **DI3**; 10.02.b02 DI delayed status. Enable motor 1/2 field heating with DI3 = 1 and Run = 0.
- 6: DI4; 10.02.b03 DI delayed status. Enable motor 1/2 field heating with DI4 = 1 and Run = 0.
- 7: DI5; 10.02.b04 DI delayed status. Enable motor 1/2 field heating with DI5 = 1 and Run = 0.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	11: DIO1 ; 11.02.1 12: DIO2 ; 11.02.	D5 DI delayed stat 2000 DIO delayed 2001 DIO delayed 215 DI delayed sta	status. Ena status. Ena	able motor 1/2 fi able motor 1/2 fi	eld heating v eld heating v	with DIO1 = with DO2 =	1 and Run = 0 1 and Run = 0			
	0 19	Disable field heating	-	1 = 1	n	У	Parameter			
28.37	M1 field heatin	-	oronco							
	Motor 1 field heating current reference. Field current reference in percent of 99.13 M1 nominal field current for field heating and field economy. Field heating: Field heating is enabled according to 28.36 M1 field heating source. Field heating is disabled when 28.37 M1 field heating reference = 0. Field economy: Field economy is only available when 2 motors with 2 independent field exciters are connected to the drive. Field economy for motor 1 is enabled, if: 28.37 M1 field heating reference < 100 %. 28.36 M1 field heating source = Disable field heating or Enable field heating. Field economy for motor 1 is activated, if: The On command is given for longer than 10 s. Motor 2 is selected via 42.01 Motor 1/2 selection. Motor 2 is active. See 06.18.b05 Drive status word 3. 28.38 M1 field current reference source = 42.55 M2 field current reference source =									
	0.00 100.00	0.00	%	100 = 1 %	n	у	Parameter			
28.38	Motor 1 field current reference source. Selector for motor 1 field current reference. O: Internal; motor 1 field current reference according to field heating or shared motion. See 28.36 M1 Field heating source and 42.01 Motor 1/2 selection. 1: Motor 2 reference; motor 2 field current reference is taken. 2: Motor 1 external; 28.39 M1 field current external reference.									



Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0.00 325.00	0.20	-	100 = 1	n	у	Parameter			

28.46 M1 field current integration time

Motor 1 integration time (T₁) of the field current controller.

Setting the integration time to zero disables the integral part of the filed current controller and resets the integrator.

The integration time defines the time within the integral part of the field current controller achieves the same value as the proportional part when the error value is constant.

Example: The controller generates 15 % of motor nominal field voltage (see motor nameplate) with 28.45 M1 field current proportional gain = 3 if the field current error is 5 % of 99.13 M1 nominal field current. On that condition and with 28.46 M1 field current integration time = 200 ms follows:

 The controller generates 30 % of motor nominal field voltage, if the field current error is constant, after 200 ms are elapsed. 15 % derive from the proportional part and 15 % derive from the integral part.

0 ... 32500 | 200 | ms | 1 = 1 ms | n | y | Parameter

28.53 Field reversal status

Field reversal status word.

The field reversal status word shows the status of the field reversal.

Bit assignment:

Bit	Name	Value	Remarks
0	Field forced forward	d forced forward 1 Field current direction is forced to See 28.54 Field current force direc	
		0	Field current direction is not forced.
1	Field forced reverse	1	Field current direction is forced to reverse direction. See 28.54 Field current force direction.
		0	Field current direction is not forced.
2	Field reversal 1 requested		Field reversal is requested. To initiate the field reversal the sign of 26.02 Torque reference used is taken.
		0	Field reversal is not requested.
3	External field reversal	1	External field reversal is requested. See 28.54 Field current force direction.
		0	Field current direction is not forced.
4	Field reversed	1	Field current direction is in reverse direction.
		0	Field current direction is in forward direction.
5 15	reserved		

1 = 1

Signal

n

28.54 Field current force direction

0000h ... FFFFh

Force field current direction.

Selects the field current direction.

- 0: Forward; field current direction is forced to forward direction.
- 1: **Reverse**: field current direction is forced to reverse direction.
- 2: None; inactive. Field current force direction is disabled. Normal operation.

Index Name Text Default Unit Scale/ Volatile Change Range Type FbEq16 running 10: Force smart; the field current direction is depending on the sign of 23.01 Speed reference ramp input: 23.01 Speed reference ramp input \geq 0 rpm = Forward. 23.01 Speed reference ramp input < 0 rpm = Reverse. In case of an Off1 command, Stop command or Off3 (emergency stop) command = None (field forcing disabled). 20: External reverse; in case an external contactor in the field current loop is used to change the field direction, 28.54 Field current force direction must be switched between Forward and External reverse. External reverse adapts the armature voltage and speed supervision. The external contactor interlocking, and the control of 28.54 Field current force direction must be done by means of Adaptive Program, application program or overriding control, not implemented. 0 ... 20 None 1 = 1 n Parameter 28.55 Field reversal torque reference hysteresis Torque reference hysteresis for field reversal. To prevent the field reversal from continuous toggling at a small 26.02 Torque reference used, a hysteresis in percent of 99.02 M1 nominal torque is available. The hysteresis is symmetrical and is set by 28.55 Field reversal torque reference hysteresis. The field reversal itself is controlled by the sign of 26.02 Torque reference used. 26.02 Torque reference used 28 55 Field reversal torque reference hysteresis Note: The hysteresis is only effective for 28.17 M1 EMF/field control mode = Fix/reversal or EMF/reversal. 0.00 ... 325.00 2.00 See 46.04 n Parameter 28.56 Field reversal field current hysteresis Field current hysteresis for field reversal. The sign of 28.15 M1 field current is used to generate the acknowledge signal for the field reversal. To avoid signal noise problems a small hysteresis in percent of 99.13 M1 nominal field current is needed. Note: The hysteresis is only effective for 28.17 M1 EMF/field control mode = Fix/reversal, EMF/reversal, Fix/reversal/optitorque or EMF/reversal/optitorque. 0.00 ... 100.00 2.00 100 = 1 % Parameter 28.57 Field reversal flux monitoring delay Flux monitoring delay for field reversal. Maximum allowed time within the sign of 28.15 M1 field current and the internal motor flux do not correspond to each other during field reversal. During this time, faults 7301 Motor speed

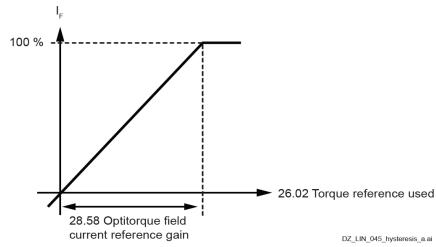
feedback and 73A1 Load speed feedback are disabled.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
		Note : The delay is only effective for 28.17 M1 EMF/field control mode = Fix/reversal, EMF/reversal, Fix/reversal/optitorque or EMF/reversal/optitorque.									
	0 32500	500	ms	1 = 1 ms	n	у	Parameter				
28.58	Optitorque fie	Optitorque field current reference gain									
	Cialal accompany	-f									

Field current reference gain for optitorque.

Optitorque calculates the field current reference depending on the torque reference. See 26.02 Torque reference used. The field current is reduced to a smaller value in case of low torque references. Thus, for low torque references the field reversal is faster. Optitorque is activated by means of 28.17 M1 EMF/field control mode.

The relation between 26.02 Torque reference used and 28.14 M1 field current reference is linear and without offset. The gradient is defined by means of 28.58 Optitorque field current reference gain.



Example: With 28.58 Optitorque field current reference gain = 20 %, 100 % field current is generated at 26.02 Torque reference used = 20 %.

Note: The gain is only effective for 28.17 M1 EMF/field control mode = Fix/optitorque, EMF/optitorque, Fix/reversal/optitorque or EMF/reversal/optitorque.

0.0	00 100.00	50.00	%	100 = 1 %	n	V	Parameter
-----	-----------	-------	---	-----------	---	---	-----------

28.59 Voltage residual magnetism

Series wound motor, armature voltage caused by the residual magnetism.

Armature voltage caused by the residual magnetism of a series-wound motor in percent of 99.12 M1 nominal voltage.

0.00 100.00 0.00 % 100 = 1 % n y Paramete

28.61 Set: M1 field exciter current scaling

Set: Motor 1 field exciter scaling factor.

If the scaling is changed, the new value is taken over immediately.

To use 28.61 Set: M1 field exciter current scaling following inequation must be valid:

- 99.13 M1 nominal field current ≤ 28.61 Set: M1 field exciter current scaling ≤ maximum field current of the used field exciter.

Notes:

- For 28.61 Set: M1 field exciter current scaling > maximum field current of the used field exciter warning A132 Parameter setting conflict is generated.
- For 99.13 M1 nominal field current > 28.61 Set: M1 field exciter current scaling the scaling is set automatically.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	_			M1 nominal field d field exciter typ							
	0.00 60.00	0.00	Α	100 = 1 A	n	у	Parameter				
28.62	M1 field exciter f	M1 field exciter freewheeling level									
	voltage. If 2 successive AC-voltage measurements differ more than 28.62 M1 field exciter freewheeling level, the freewheeling function is activated. Note: The freewheeling level is only valid, for 99.07 M1 used field exciter type = DCF804-0050 DCF804-0060.										
	0.00 100.00	20.00	%/ms	100 = 1 %/ms	n	у	Parameter				
28.63	M1 field exciter operation mode										
	Motor 1 operatio	Motor 1 operation mode for certain field exciters.									
	The field exciters	•		and DCF803-003	35 can be c	onnected t	o either a 3-				
		phase supply or a single-phase supply.									
	0: 1-phase ; single										
	1: 3-phase ; 3-pha		tield supp	ĭ .	1						
	0 1	3-phase	-	1 = 1	n	у	Parameter				

Name Text

Index

29 12-pulse/HardparallelSettings for 12-pulse and hardparallel.

	Rang	Defa	ult	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
29.01	12-pı	ulse master status	word								
	Displ	ulse master status v ays the 12-pulse ma	aster stati			ulse maste	er to the 12-	pulse slave,			
	Note	n 20.01 Command lo : The status word is ssignment:									
	Bit	Name	Value	e Remarks							
	0	On/Off1 control	1	On comi	On command for the 12-pulse slave.						
			0	Off1 command for the 12-pulse slave.							
	1	Off2 control	1	Normal	operation (Off2 i	nactive) fo	the 12-pul	se slave.			
			0	Off2 (emergency off/fast current off) command for the 12-pulse slave.							
	2	Field heating	1	Field heating active.							
			0	Field heating inactive.							
	3	Run	1	Run com	nmand for the 12-	pulse slave	<u>)</u> .				
			0	Stop co	mmand for the 12	2-pulse slav	e.				
	4	Field exciter	1	Field exc	citer On comman	d for the 12	2-pulse slav	ve.			
			0	Field exc	citer Off comman	nand for the 12-pulse slave.					
	5	Dynamic braking	1	Dynamic braking active/started.							
			0	Dynamic	c braking inactive	<u>.</u>					

ndex	Name									
	Text									
	Rang	Range Defau 6 12-pulse type		ilt	Unit	Scale/ FbEq16	Volatile	Change running	Туре	
	6			1	12-pulse serial operation in the 12-pulse master. See 99.0 Operation mode.					
				0	12-pulse parallel operation in the 12-pulse master. See 99.06 Operation mode.					
	7	Reset		0 → 1		ledge fault ind itive edge.	ications in th	e 12-pulse	slave with	
	8	reserved								
	9	reserved								
	10	reduction		1	_	for reduction 12 Reversal volt		tch the ma	ins voltage	
	11			1	Autotuning armature current controller active.					
	12	Zero currer reversal del		1	Zero current detection plus reversal delay elapsed. See 06.18.b14 Drive status word 3 and 27.38 Reversal delay.					
	13	Change cur direction	rent	1		nd to change t Bridge change			ature	
	14	controller 15 Current direction 1		1		urrent controllere current cont			ıs, the	
	15			1	27.02 U	sed current ref	erence is neg	ative.		
				0	27.02 U	sed current ref	erence is pos	itive.		
					T	Т	1		T	
	0000	h FFFFh	-		-	1 = 1	У	n	Signal	

29.02 12-pulse slave status word

12-pulse slave status word.

Displays the 12-pulse slave status word send from the 12-pulse slave to the 12-pulse master, when 20.01 Command location = 12-pulse link.

Note: The status word is valid in 12-pulse master and slave.

Bit assignment:

Bit	Name	Value	Remarks
0	reserved		
1	reserved		
2	reserved		
3	12-pulse slave tripped	1	12-pulse slave is tripped.
4	12-pulse slave blocked	1	The 12-pulse slave is preventing the 12-pulse master from starting. See warning A596 12-pulse slave blocked.
5	reserved		
6	12-pulse type	1	12-pulse serial operation in the 12-pulse slave. See 99.06 Operation mode.
		0	12-pulse parallel operation in the 12-pulse slave. See 99.06 Operation mode.
7	reserved		
8	reserved		

Name										
Text										
Range Defa		Defau	lt	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
9	reserved									
10	reserved									
11	reserved									
12	reserved									
13 Change current direction 14 Blocked current controller 15 Current direction			1	Command to change the direction of the armature current. Bridge changeover is active.						
			1	06.25 Current controller status word 2 > 0. Thus, the armature current controller is blocked.						
			1	27.02 Used current reference is negative.						
			0	27.02 Used current reference is positive.						
0000	h FFFFh	-		-	1 = 1	у	n	Signal		
12-pı	ılse slave firir	ng angl	е							
12-рі	ılse slave firin	g angle	·.							
Displ	ays the firing	angle r	eferenc	e send fro	m the 12-pulse	master to the	e 12-pulse :	slave in		
degr	degrees.									
Note	: Valid in the 1	L2-pulse	master	only.						
0.00 180.00 -				0	100 = 1°	у	n	Signal		
12-pulse mode										
_	9 10 11 12 13 14 15 0000 12-pt Displ degre Note	Text Range 9 reserved 10 reserved 11 reserved 12 reserved 13 Change curdirection 14 Blocked curcontroller 15 Current direction 14 Poulse slave firing degrees. Note: Valid in the 1	Text Range Perserved 10 reserved 11 reserved 12 reserved 13 Change current direction 14 Blocked current controller 15 Current direction O000h FFFFh 12-pulse slave firing angle plisplays the firing angle regrees. Note: Valid in the 12-pulse	Text Range Default 9 reserved 10 reserved 11 reserved 12 reserved 13 Change current direction 14 Blocked current controller 15 Current direction 1 0 0000h FFFFh 1- 12-pulse slave firing angle 12-pulse slave firing angle reference degrees. Note: Valid in the 12-pulse master	Text Range Default Unit 9 reserved 10 reserved 11 reserved 12 reserved 13 Change current of direction 14 Blocked current controller 15 Current direction 1 27.02 Using the firing angle 12-pulse slave firing angle reference send froodegrees. Note: Valid in the 12-pulse master only.	Text Range Default Unit Scale/ FbEq16 9 reserved 10 reserved 11 reserved 12 reserved 13 Change current direction 14 Blocked current controller 15 Current direction 1 27.02 Used current refunction 16 27.02 Used current refunction 17 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	Text Range Default Unit Scale/ FbEq16 9 reserved 10 reserved 11 reserved 12 reserved 13 Change current direction current. Bridge changeover is active armature current controller is block 14 Blocked current controller is block 15 Current direction 1 27.02 Used current reference is negroup 27.02 Used current reference is positive armature space is positive armature. 15 Current direction 1 27.02 Used current reference is positive armature. 16 Displays the firing angle. 17 Displays the firing angle reference send from the 12-pulse master to the degrees. 18 Note: Valid in the 12-pulse master only.	Text Range Default Unit Scale/ FbEq16 Change running 9 reserved 10 reserved 11 reserved 12 reserved 13 Change current of direction of the armound direction current. Bridge changeover is active. 14 Blocked current of armature current controller status word 2 > 0. The armature current controller is blocked. 15 Current direction 1 27.02 Used current reference is negative. 0 27.02 Used current reference is positive. 12-pulse slave firing angle 12-pulse slave firing angle reference send from the 12-pulse master to the 12-pulse degrees. Note: Valid in the 12-pulse master only.		

12-pulse mode.

The setting of 99.06 Operation mode determines the reaction of 29.05 12-pulse mode. 29.05 12-pulse mode must have the same setting in both master and slave.

Note: The setting Diode bridge is only valid in the master.

	29.05 12-pulse mode					
99.06 Operation mode	Normal	Difference	Diode bridge			
12-pulse parallel master/slave	Valid	Valid	-			
12-pulse serial master/slave	Valid	-	Valid			
6-pulse serial master/slave	Valid	-	Valid			
All other	Valid	-	-			

12-pulse parallel

99.06 Operation mode = 12-pulse parallel master or 12-pulse parallel slave:

- 0: **Normal**; 12-pulse parallel master and 12-pulse parallel slave use their own current controller independently.
- 1: **Difference**; the 12-pulse parallel slave calculates the difference between the 12-pulse parallel master actual current and its own actual current and controls this difference to zero by means of its current controller, **not implemented**.
- 2: Diode bridge; only used for 12-pulse serial/6-pulse serial mode.

12-pulse serial

- 99.06 Operation mode = 12-pulse serial master/6-pulse serial master or 12-pulse serial slave/6-pulse serial slave:
- 0: **Normal**; Both 12-pulse serial master/6-pulse serial master and 12-pulse serial slave/6-pulse serial slave are controlled by the same firing angle.
- 1: Difference; only used for 12-pulse parallel mode.

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	3: Diode brid	lge; the 12-pulse se	erial slave/6	5-pulse serial slav	e unit is a di		, not					
	0 2	Normal	-	1 = 1	n	n	Parameter					
9.06	12-pulse reversal timeout											
	12-pulse reve	ersal timeout.										
		Less than 29.06 12-pulse Less than 29.06 12-pulse reversal timeout reversal timeout										
						•						
		ent direction 12-pulse r		-								
	06.24.009 Cur	rent controller status v	word 1									
		rent direction 12-pulse										
	06.24.b09 Cur	rrent controller status v	word 1									
						DZ LIN 059	9 master-slave b.ai					
	In 12-pulse m	node the current di	raction of k	ooth - master an	d clavo - unit	 c ic monito	rod Fault					
	•											
		F533 12-pulse reversal timeout is generated, if the 2 units have different bridges fired for										
	longer than 29.06 12-pulse reversal timeout.											
	_	29.06 12-pulse reve	rsai timeot									
	Notes:	·			12 pulso ro	vorsal timov	out is set to					
	Notes: - Fault F53	33 12-pulse reversal			12-pulse rev	ersal timed	out is set to					
	Notes: - Fault F53 1000 ms.	33 12-pulse reversal	timeout is	inactive, if 29.06	·							
	Notes: - Fault F53 1000 ms 29.06 12-	33 12-pulse reversal pulse reversal time	timeout is	inactive, if 29.06 be longer than 27	.40 Zero curi							
	Notes: - Fault F53 1000 ms 29.06 12- Zero curr	33 12-pulse reversal pulse reversal time rent timeout must	timeout is eout must b be longer t	inactive, if 29.06 be longer than 27	.40 Zero curi							
	Notes: - Fault F53 1000 ms 29.06 12- Zero curr - Valid in tl	33 12-pulse reversal pulse reversal time ent timeout must he 12-pulse master	timeout is eout must be be longer to only.	inactive, if 29.06 be longer than 27 han 27.38 Revers	.40 Zero curi al delay.	rent timeou	ut and 27.40					
	Notes: - Fault F53 1000 ms 29.06 12- Zero curr - Valid in tl 0 1000	33 12-pulse reversal pulse reversal time rent timeout must he 12-pulse master 100	timeout is eout must k be longer t only. ms	inactive, if 29.06 be longer than 27	.40 Zero curi							
).07	Notes: - Fault F53 1000 ms 29.06 12- Zero curr - Valid in tl 0 1000 12-pulse par	33 12-pulse reversal pulse reversal time rent timeout must he 12-pulse master 100	eout must k be longer t only. ms ence level	inactive, if 29.06 be longer than 27 han 27.38 Revers	.40 Zero curi al delay.	rent timeou	ut and 27.40					
) .07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in tl 0 1000 12-pulse para 12-pulse para	33 12-pulse reversal pulse reversal time rent timeout must he 12-pulse master 100 allel current differe	eout must be longer to only. ms ence level nce level.	inactive, if 29.06 be longer than 27 han 27.38 Revers	.40 Zero curi al delay.	rent timeou	Parameter					
).07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	33 12-pulse reversal pulse reversal time rent timeout must he 12-pulse master 100 callel current differe allel current differe	eout must be longer to only. ms ence level nce level.	inactive, if 29.06 be longer than 27 han 27.38 Revers	.40 Zero curi al delay.	rent timeou	Parameter					
).07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	33 12-pulse reversal pulse reversal time rent timeout must he 12-pulse master 100 allel current differe allel current differe urrent difference be ninal current.	eout must be longer to only. ms ence level nce level. etween the	inactive, if 29.06 De longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse	.40 Zero curi al delay. n parallel con	y figuration i	Parameter n percent of					
).07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference beininal current.	eout must be longer to only. ms ence level nce level. etween the	inactive, if 29.06 be longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current	.40 Zero curi al delay. n parallel con	y figuration i	Parameter n percent of					
9.07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the second of the seco	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference beginnal current. on the setting of 29 perence is generated	eout must be longer to only. ms ence level nce level. etween the .09 12-puls l, if 29.07 12	inactive, if 29.06 be longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current	n parallel control difference turrent difference	y figuration i	Parameter n percent of					
9.07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	pulse reversal time rent timeout must he 12-pulse master 100 rallel current different difference being allel current. On the setting of 29 trence is generated inen 29.08 12-pulse in the setting of 29 trence is generated inen 29.08 12-pulse in the setting of 29 trence is generated inen 29.08 12-pulse in the setting of 29 trence is generated in the setting of 29 tr	eout must be longer to only. ms ence level nce level. etween the .09 12-puls l, if 29.07 12	inactive, if 29.06 be longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current	n parallel control difference turrent difference	y figuration i	Parameter n percent of					
.07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the second of the seco	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference beginnal current. on the setting of 29 arence is generated then 29.08 12-pulse in the 12-pulse massing the setting of and the setting of the set	eout must be longer to only. ms ence level nce level. etween the .09 12-puls l, if 29.07 12 parallel currently.	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current rent difference comment	n parallel conditions difference to the lay is elaps.	figuration i sype event 1 ence level is	Parameter n percent of					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the series of the seri	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference be ninal current. on the setting of 29 arence is generated nen 29.08 12-pulse in the 12-pulse master 10	eout must be longer to only. ms ence level nce level. etween the 1.09 12-puls j, if 29.07 12 parallel curiter only. %	inactive, if 29.06 be longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current	n parallel control difference turrent difference	y figuration i	Parameter n percent of					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference being allel current. On the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference being of 29 rence is generated in the 12-pulse master 10 rallel current difference in the 12-pulse master 10 rallel current difference in the 12-pulse master 10 rallel current difference in the 14-pulse master 10 rallel current difference in the 15-pulse master 10 rallel current differ	eout must be longer to only. ms ence level nce level. etween the .09 12-puls l, if 29.07 12 parallel curter only. % ence delay	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current rent difference comment	n parallel conditions difference to the lay is elaps.	figuration i sype event 1 ence level is	Parameter n percent of					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference ded when the current dif	pulse reversal time rent timeout must he 12-pulse master 100 rallel current different	eout must be longer to only. ms ence level nce level. etween the .09 12-puls , if 29.07 12 parallel currence only. % ence delay nce delay.	inactive, if 29.06 be longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current rent difference co	n parallel conditions difference to the lay is elaps.	figuration in the sype event is ed.	Parameter n percent of 12-pulse still Parameter					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the second of the seco	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference beninal current. on the setting of 29 persone is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse master 10 mallel current difference is generated in the 12-pulse	eout must be longer to only. ms ence level nce level. etween the 1.09 12-puls ly, if 29.07 12 parallel currer only. % ence delay nce delay. difference collected	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current rent difference content di	n parallel conditions of the c	figuration is expected by y	Parameter n percent of 2-pulse still Parameter					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference of the current diffe	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference being allel current. In the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference being allel current difference is generated in the 12-pulse master 10 rallel current difference parallel current difference parallel current difference becomes smaller current difference becomes difference becomes smaller current difference becomes difference bec	eout must be longer to only. ms ence level nce level. etween the 1.09 12-puls l, if 29.07 12 parallel curre only. ms ence delay nce delay. difference coaller than 2	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current c-pulse parallel current difference current 1 = 1 delay delays ever	n parallel con difference to the content of the con	figuration is expected.	Parameter n percent of 2-pulse still Parameter rence. If the level before					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference of the current diffe	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference beininal current. On the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference beininal current difference is generated in the 12-pulse master 10 rallel current difference becomes smelapsed event 12-pulse metallel current difference becomes smelapsed event 12-pulsed in the 12-pulse master 10 rallel current difference becomes smelapsed event 12-pulsed in the 12-pulse master 12-pulsed in the 12-pu	timeout is cout must be longer to only. ms ence level. etween the .09 12-puls difference delay. difference delay. difference delay. disse current	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current c-pulse parallel current difference current 1 = 1 delay delays ever	n parallel con difference to the content of the con	figuration is expected.	Parameter n percent of 2-pulse still Parameter rence. If the level before					
9.07	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference of the current diffe	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference being allel current. On the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference being allel current difference becomes smelapsed event 12-pulse master 10 rence becomes smelapsed event 12-pulse master 12-pulse master 13-pulse parallel current difference becomes smelapsed event 12-pulse material current difference becomes smelapsed event 12-pulse material current difference becomes smelapsed event 12-pulse material current difference type.	timeout is cout must be longer to only. ms ence level nce level. etween the .09 12-puls , if 29.07 12 parallel current ter only. % ence delay nce delay. difference couller than 2 ulse current	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current c-pulse parallel current difference current 1 = 1 delay delays ever	n parallel con difference to the content of the con	figuration is expected.	Parameter n percent of 2-pulse still Parameter rence. If the level before					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference of the current diffe	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference beininal current. On the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference beininal current difference is generated in the 12-pulse master 10 rallel current difference becomes smelapsed event 12-pulse metallel current difference becomes smelapsed event 12-pulsed in the 12-pulse master 10 rallel current difference becomes smelapsed event 12-pulsed in the 12-pulse master 12-pulsed in the 12-pu	timeout is cout must be longer to only. ms ence level nce level. etween the .09 12-puls , if 29.07 12 parallel current ter only. % ence delay nce delay. difference couller than 2 ulse current	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current c-pulse parallel current difference current 1 = 1 delay delays ever	n parallel con difference to the content of the con	figuration is expected.	Parameter n percent of 2-pulse still Parameter rence. If the level before					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference of the current diffe	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference being allel current. On the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference being allel current difference becomes smelapsed event 12-pulse master 10 rence becomes smelapsed event 12-pulse master 12-pulse master 13-pulse parallel current difference becomes smelapsed event 12-pulse material current difference becomes smelapsed event 12-pulse material current difference becomes smelapsed event 12-pulse material current difference type.	timeout is cout must be longer to only. ms ence level nce level. etween the .09 12-puls , if 29.07 12 parallel current ter only. % ence delay nce delay. difference couller than 2 ulse current	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current c-pulse parallel current difference current 1 = 1 delay delays ever	n parallel con difference to the content of the con	figuration is expected.	Parameter n percent of 2-pulse still Parameter rence. If the level before					
0.08	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference where the current difference with the delay is exparallel current difference the	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference be ninal current. on the setting of 29 mence is generated nen 29.08 12-pulse master 10 allel current difference be nen 29.08 12-pulse master 10 allel current difference be nen 29.08 12-pulse master 10 allel current difference be parallel current difference becomes smelapsed event 12-pulse nt the 12-pulse master 12-pulse ma	timeout is cout must be longer to only. ms ence level. etween the .09 12-puls difference delay nce delay nce delay difference delay disse current ter only. ms	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current c-pulse parallel current difference current 1 = 1 delay delays ever 29.07 12-pulse parallel current control difference will be	n parallel con difference to the content of the con	figuration is eype event is ed. y grrent difference ed. See 29.0	Parameter n percent of 2-pulse still Parameter rence. If the level before 09 12-pulse					
9.08	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of the current difference of the current diffe	pulse reversal time rent timeout must he 12-pulse master 100 rallel current difference beininal current. On the setting of 29 rence is generated in the 12-pulse master 10 rallel current difference beininal current difference is generated in the 12-pulse master 10 rallel current difference becomes smelapsed event 12-pulse in the 12-pulse master 12-pulse in the 12-pulse master 12-pulse master 13-pulse in the 12-pulse master 13-pulse in the 13-pulse master 13-p	timeout is cout must be longer to only. ms conce level. conce delay. conce delay.	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current e-pulse parallel current e-pulse parallel current delay delays even e-9.07 12-pulse par e-difference will be 1 = 1	n parallel con difference to the content of the con	figuration is eype event is ed. y grrent difference ed. See 29.0	Parameter n percent of 2-pulse still Parameter rence. If the level before 09 12-pulse					
9.08	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	pulse reversal time rent timeout must he 12-pulse master 100 allel current difference be ninal current. on the setting of 29 arence is generated nen 29.08 12-pulse master 10 allel current differe ce parallel current difference is generated nen 29.08 12-pulse master 10 allel current difference becomes smelalel current difference becomes smelalel current current ce parallel current difference becomes smelalel current difference type in the 12-pulse master 12-pulse master 12-pulse master 12-pulse master 12-pulse current difference type in the 12-pulse in the 1	timeout is cout must be longer to only. ms ence level nce level. etween the .09 12-puls l, if 29.07 12 parallel current ter only. % ence delay. difference coaller than 2 ulse current ter only. ms ence type difference.	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current 2-pulse parallel current difference current 1 = 1 delay delays even 29.07 12-pulse parallel current difference will be	n parallel con difference to the constant difference to the constant difference to the constant difference to the constant difference disregarded to the constant disregarded to the	figuration is eype event is ed. y grrent difference ed. See 29.0	Parameter n percent of 2-pulse still Parameter rence. If the level before 99 12-pulse					
	Notes: - Fault F53 1000 ms. - 29.06 12- Zero curr - Valid in the control of th	pulse reversal time rent timeout must he 12-pulse master allel current difference beininal current. On the setting of 29 rence is generated in the 12-pulse master allel current differe allel current difference beininal current difference is generated in the 12-pulse master allel current difference becomes smelapsed event 12-pulse in the 12-pulse master allel current difference becomes smelapsed event 12-pulse master allel current difference type in the	timeout is cout must be longer to only. ms ence level nce level. etween the .09 12-puls l, if 29.07 12 parallel current ter only. difference could be current ter only. ms ence type difference. se current	inactive, if 29.06 pe longer than 27 han 27.38 Revers 1 = 1 units in 12-pulse e parallel current 2-pulse parallel current difference current 2-pulse parallel current delay delays ever 29.07 12-pulse parallel current current difference will be 1 = 1	n parallel con difference to the constant difference to the constant difference to the constant difference to the constant difference disregarded to the constant disregarded to the	figuration is eype event is ed. y grrent difference ed. See 29.0	Parameter n percent of 2-pulse still Parameter rence. If the level before 09 12-pulse					

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	2: Warning ; the eve	ent generates v	varning A5	34 12-pulse curr	ent differer	ice.					
	Note: Valid in the 12-pulse master only.										
	0 2	Fault	-	1 = 1	n	у	Parameter				
9.10	Ch1 power unit cu	rrent calculate	d								
	Calculated total cu	Channel1 power unit calculated current. Calculated total current of the power unit connected to channel1 of the SDCS-OPL-H01 in percent of 99.11 M1 nominal current. The used formula is: 29.10 = (29.11 + 29.12) / 2									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal				
9.11	Ch1 power unit current terminal C1										
	Channel1 power unit current flowing through terminal C1. Measured current flowing through terminal C1 of the power unit connected to channel1 of the SDCS-OPL-H01 in percent of 99.11 M1 nominal current. This signal is used to monitor the current balance between the hardparallel connected power units.										
	-325.00 325.00	_	%	100 = 1 %	у	n	Signal				
29.12	Ch1 power unit current terminal D1										
	Channel1 power unit current flowing through terminal D1. Measured current flowing through terminal D1 of the power unit connected to channel1 of the SDCS-OPL-H01 in percent of 99.11 M1 nominal current. This signal is used to monitor the current balance between the hardparallel connected power units.										
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal				
29.17	Ch1 power unit un	balanced curre	nt word	L	1-	ı	<u>, , , , , , , , , , , , , , , , , , , </u>				
	Ch1 power unit unbalanced current word Channel1 power unit unbalanced current word. Displays the thyristors of the power unit connected to channel1 which are affected by										

unbalanced current, if 29.65 Power unit unbalanced current level is exceeded.

Any high bit means, that all thyristors of the power unit are in operation, but one or more thyristors do not conduct the full current.

Note: The bits are not latched in case of 29.63 Power unit unbalanced current function = Warning.

Bit assignment:

Bit	Name	Value	Remarks
0	reserved		
1	Thyristor V11	1	Current is unbalanced, this thyristor is not conducting the full current.
2	Thyristor V12	1	Current is unbalanced, this thyristor is not conducting the full current.
3	Thyristor V13	1	Current is unbalanced, this thyristor is not conducting the full current.
4	Thyristor V14	1	Current is unbalanced, this thyristor is not conducting the full current.
5	Thyristor V15	1	Current is unbalanced, this thyristor is not conducting the full current.
6	Thyristor V16	1	Current is unbalanced, this thyristor is not conducting the full current.

Index	Name									
	Text	1								
	Range D		Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре	
	7	reserved								
	8	reserved	red ed							
	9 Thyristor V21			1	Current is unbalanced, this thyristor is not conducting the full current.					
	10	Thyristor V22		1	Current is unbalanced, this thyristor is not conducting th full current.					
	11 Thyristor V23		23	1	Curren full cur	t is unbalanced rent.	, this thyristo	r is not con	ducting the	
	12	Thyristor V2	24	1	Curren full cur	t is unbalanced rent.	, this thyristo	r is not con	ducting the	
	13 Thyristor V25			1	Curren full cur	t is unbalanced rent.	, this thyristo	r is not con	ducting the	
	14	Thyristor V26 1			Current is unbalanced, this thyristor is not conducting the full current.					
	15 reserved									
	0000h FFFFh -				-	1 = 1	у	n	Signal	

29.18 Ch1 power unit thyristor loss word

Channel1 power unit thyristor/branch fuse loss word.

Displays the thyristors/branch fuses of the power unit connected to channel1 which are lost, in other words not conducting any current. See 29.68 Power unit thyristor loss function. Any high bit means, that at least one thyristor/branch fuse of the power unit is out of operation.

Note: The bits are not latched in case of 29.68 Power unit thyristor loss function = Warning. Bit assignment:

Bit	Name	Value	Remarks
0	reserved		
1	Thyristor V11	1	This thyristor/branch fuse is not conducting current.
2	Thyristor V12	1	This thyristor/branch fuse is not conducting current.
3	Thyristor V13	1	This thyristor/branch fuse is not conducting current.
4	Thyristor V14	1	This thyristor/branch fuse is not conducting current.
5	Thyristor V15	1	This thyristor/branch fuse is not conducting current.
6	Thyristor V16	1	This thyristor/branch fuse is not conducting current.
7	reserved		
8	reserved		
9	Thyristor V21	1	This thyristor/branch fuse is not conducting current.
10	Thyristor V22	1	This thyristor/branch fuse is not conducting current.
11	Thyristor V23	1	This thyristor/branch fuse is not conducting current.
12	Thyristor V24	1	This thyristor/branch fuse is not conducting current.
13	Thyristor V25	1	This thyristor/branch fuse is not conducting current.
14	Thyristor V26	1	This thyristor/branch fuse is not conducting current.
15	reserved		

	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0000h FFFFh	_	-	1 = 1	у	n	Signal			
29.20	Ch2 power unit cu	rrent calcula	ted							
	Channel2 power u Calculated total co percent of 99.11 M 29.20 = (29.21 + 29	urrent of the I1 nominal cu	power unit		nannel2 of the	SDCS-OP	H01 in			
	-325.00 325.00	-	%	100 = 1 %	У	n	Signal			
29.21	Ch2 power unit cu	ırrent termin	al C1							
	Channel2 power u Measured current SDCS-OPL-H01 in This signal is used units.	flowing thro percent of 99 I to monitor t	ugh termin .11 M1 nom	al C1 of the pow ninal current.	er unit conne	rallel conne	cted power			
29.22				100 = 1 %	у	n	Signal			
29.22	Channel2 power u									
29.27	SDCS-OPL-H01 in This signal is used units325.00 325.00	to monitor t	he current	balance betwee	n the hardpai	rallel conne	scted power			
29.27	Channel2 power u									
	Displays the thyris unbalanced currer Any high bit mean thyristors do not o Note : The bits are Warning. See 29.17 Ch1 pow	stors of the p nt, if 29.65 Po s, that all thy conduct the f not latched i	ower unit ower unit ower unit urristors of tull current. n case of 2	connected to chan balanced currer he power unit ar 9.63 Power unit ent word.	nt level is exce e in operatio	eeded. n, but one	or more			
	0000h FFFFh	_								
		<u> </u>		1 = 1	у	n	Signal			
29.28	Ch2 power unit the Channel2 power unit the Displays the thyris other words not contained and pight bit mean operation. Note: The bits are See 29.18 Ch1 power.	nit thyristor/ stors/branch onducting an s, that at leas not latched i	branch fus fuses of th y current. S at one thyri n case of 2	e loss word. le power unit co See 29.68 Power stor/branch fus 9.68 Power unit ord.	nnected to ch unit thyriston e of the powe thyristor loss	nannel2 wh r loss funct er unit is ou s function =	ich are lost, i ion. it of Warning.			
	Ch2 power unit the Channel2 power unit the Channel2 power unit the Displays the thyrist other words not contain the Any high bit mean operation. Note: The bits are See 29.18 Ch1 power than 10000h FFFFh	nit thyristor/stors/branch onducting an s, that at leas not latched iver unit thyris	branch fus fuses of th y current. S st one thyri n case of 2 tor loss wo	e loss word. le power unit co See 29.68 Power stor/branch fus 9.68 Power unit	nnected to ch unit thyristor e of the powe	nannel2 wh r loss funct er unit is ou	ich are lost, i ion. it of			
29.28	Ch2 power unit the Channel2 power unit the Displays the thyris other words not contained and pight bit mean operation. Note: The bits are See 29.18 Ch1 power.	nit thyristor/ stors/branch onducting an s, that at leas not latched i ver unit thyris - urrent calcula nit calculated urrent of the li nominal cul	branch fus fuses of th y current. S it one thyri n case of 2 tor loss wo - ted current. power unit	e loss word. le power unit co See 29.68 Power stor/branch fus 9.68 Power unit ord. 1 = 1 connected to ch	nnected to ch unit thyriston e of the powe thyristor loss y	nannel2 wh r loss funct er unit is ou function =	ich are lost, i ion. it of Warning.			

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Channel3 power up Measured current SDCS-OPL-H01 in p This signal is used units.	flowing throug percent of 99.11	h terminal I M1 nomin	C1 of the power al current.	he hardpar	rallel conne	cted power			
29.32		<u> </u>		100 = 1 %	у	n	Signal			
23.32	Channel3 power unit cu Channel3 power un Measured current SDCS-OPL-H01 in p This signal is used units.	nit current flow flowing throug percent of 99.11	ing throug h terminal I M1 nomin	D1 of the power al current.	he hardpar		cted power			
29.37	-325.00 325.00 Ch3 power unit un			100 = 1 %	у	<u>I</u> n	Signal			
	Displays the thyris unbalanced current Any high bit means thyristors do not control Note: The bits are Warning.	at, if 29.65 Powers, that all thyris conduct the full not latched in c	er unit unba tors of the current. case of 29.6	alanced current l power unit are i 53 Power unit un	evel is exce n operatio	eeded. n, but one (or more			
	See 29.17 Ch1 pow	er unit unbaian 	cea curren	1 = 1	T.,		Cional			
29.38	Ch3 power unit th	- vristor loss wo	rd	11-1	У	n	Signal			
	Channel3 power upon Displays the thyrist other words not contain the Any high bit means operation. Note: The bits are See 29.18 Ch1 pow 0000h FFFFh	tors/branch fu onducting any c s, that at least c not latched in c	ses of the current. Secone thyrist	power unit conn e 29.68 Power ur or/branch fuse o 68 Power unit th	nit thyriston of the power	r loss funct er unit is ou function =	ion. ut of : Warning.			
20.40		- 	- -	1 = 1	у	n	Signal			
29.40	Channel4 power unit calculated Channel4 power unit calculated current. Calculated total current of the power unit connected to channel4 of the SDCS-OPL-H01 i percent of 99.11 M1 nominal current. The used formula is: 29.40 = (29.41 + 29.42) / 2. -325.00 325.00 - % 100 = 1 % y n Signal									
29.41	Ch4 power unit current terminal C1 Channel4 power unit current flowing through terminal C1. Measured current flowing through terminal C1 of the power unit connected to channel4 of the SDCS-OPL-H01 in percent of 99.11 M1 nominal current. This signal is used to monitor the current balance between the hardparallel connected power units.									
29.42	Ch4 power unit cu	rrent terminal		120 - 170	у	1.,	12.3.101			
E	Channel4 power un			h terminal D1.						

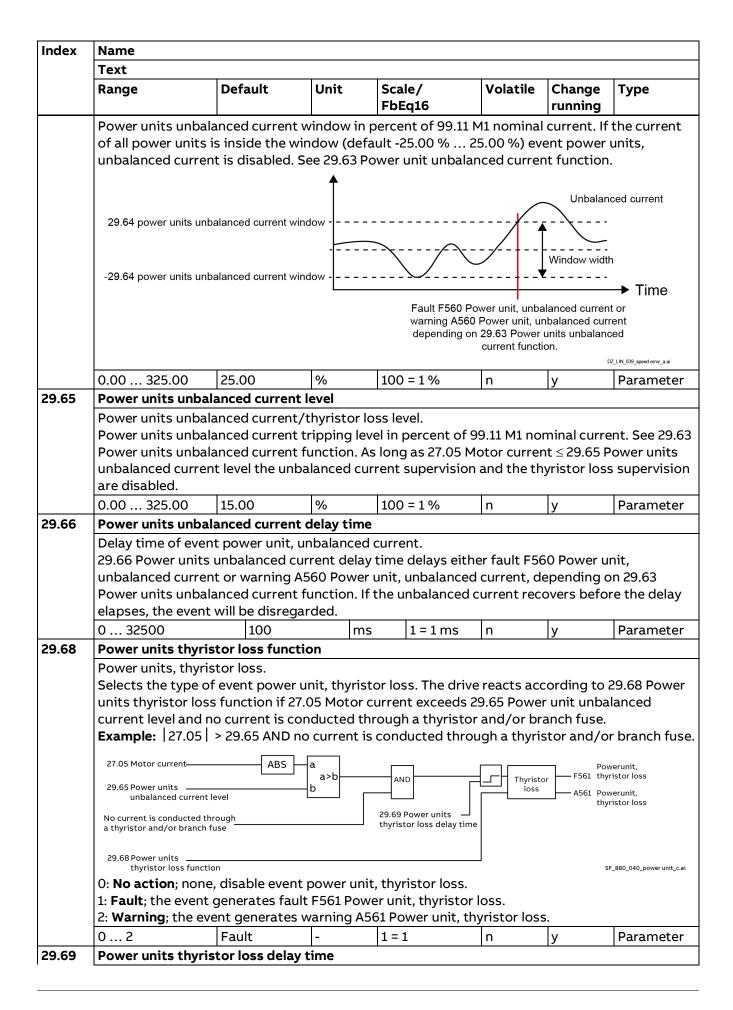
Index	Name									
ınaex	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Measured current	percent of 99.1	1 M1 nomir	al current.						
	This signal is used to monitor the current balance between the hardparallel connected power units.									
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal			
29.47	Ch4 power unit un	balanced curre	ent word							
	unbalanced curren Any high bit means thyristors do not c Note : The bits are Warning. See 29.17 Ch1 power	e, that all thyris onduct the full not latched in a er unit unbalan	stors of the I current. case of 29. aced curren	power unit are i	n operatio	n, but one				
29.48	Ch4 power unit th	yristor loss wo	ord							
	Channel4 power unit thyristor/branch fuse loss word. Displays the thyristors/branch fuses of the power unit connected to channel4 which are lost, in other words not conducting any current. See 29.68 Power units thyristor loss function. Any high bit means, that at least one thyristor/branch fuse of the power unit is out of operation. Note: The bits are not latched in case of 29.68 Power units thyristor loss function = Warning. See 29.18 Ch1 power unit thyristor loss word. 0000h FFFFh - 1 = 1 y n Signal									
29.60	Power units status	word			y	111	Joignai			
19.6U										
	Power units status			atad navvar vnita						

Displays the status of all hardparallel connected power units.

Note: The bits are latched in case of 29.68 Power unit thyristor loss function = Warning. Bit assignment:

Bit	Name	Value	Remarks
0	reserved		
1	Ch1 power unit unbalanced current	1	All thyristors of the power unit connected to channel1 are in operation, but one or more thyristors do not conduct the full current.
2	Ch2 power unit unbalanced current	1	All thyristors of the power unit connected to channel2 are in operation, but one or more thyristors do not conduct the full current.
3	Ch3 power unit unbalanced current	1	All thyristors of the power unit connected to channel3 are in operation, but one or more thyristors do not conduct the full current.
4	Ch4 power unit unbalanced current	1	All thyristors of the power unit connected to channel4 are in operation, but one or more thyristors do not conduct the full current.
5	reserved		
6	reserved		
7	reserved		

	Nam	e							
	Text	1							
	Rang	ge	Defau	ılt	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	8	reserved							•
	9	Ch1 power u	ınit	1	At least	one thyristor/b	ranch fuse o	f the powe	er unit
		thyristor los	S		connect	ted to channel1	s out of ope	ration.	
	10	Ch2 power ι		1		one thyristor/b			er unit
		thyristor los	S		connect	ted to channel2	is out of ope	ration.	
	11	Ch3 power ι		1		one thyristor/b		-	er unit
		thyristor los	S		connect	ted to channel3	is out of ope	ration.	
	12	Ch4 power of thyristor los		1		one thyristor/b ted to channel4		•	er unit
	13	reserved			COTTICC	ted to charmer-	13 001 01 000	Tacion.	
	14	reserved							
	15	reserved							
		1. 656. 1 66.							
	0000	Oh FFFFh	_		-	1 = 1	у	n	Signal
29.62	Alte	rnate firing				II.			<u>, , , , , , , , , , , , , , , , , , , </u>
	rese	rved			_			_	
	0			nuous	-	1 = 1	n	у	Parameter
9.63	Pow	er units unbal	anced	current f	function				
	unba	alanced curren	t level	irrent fu and the u	nction if a	27.05 Motor curred curred curred current is out	ent exceeds	29.65 Pow	
	unba Pow Exar	alanced curren er unit unbalaı nple: 27.05	t level nced cu > 29.65	urrent ful and the u urrent wi AND cu	nction if a unbalance indow. rrent out	27.05 Motor curi	ent exceeds side the win 29.64 (e.g., fo	29.65 Pow dow define or channel1	er unit ed by 29.64 l: 29.11 Ch1
	enba Pow Exar pow	alanced curren er unit unbala nple: 27.05 er unit current	t level nced cu > 29.65	urrent ful and the u urrent wi AND cu	nction if a unbalance indow. rrent out 9.12 Ch1 p	27.05 Motor curred curred current is out side window of bower unit curre	ent exceeds side the win 29.64 (e.g., fo	29.65 Pow dow define or channel1	er unit ed by 29.64 l: 29.11 Ch1
	enba Pow Exar pow	alanced curren er unit unbala n ple: 27.05 er unit current	t level a nced cu > 29.65 termin	urrent fur and the u urrent wi AND cu nal C1 - 2	nction if a unbalance indow. rrent out 9.12 Ch1 p	27.05 Motor curred curred current is out side window of bower unit curre	ent exceeds side the win 29.64 (e.g., font terminal I	29.65 Pow dow define or channel 01 > 29.64	er unit ed by 29.64 l: 29.11 Ch1
	unba Pow Exar pow 27.05 29.65	alanced currener unit unbalarener unit unbalarener 27.05 er unit current 6 Motor current 6 Power units	t level a nced cu > 29.65 termin	urrent fur and the u urrent wi AND cu nal C1 - 2	nction if a unbalance indow. Irrent out: 9.12 Ch1 p a a>b b	27.05 Motor curred current is out side window of bower unit curred AND 29.66 Power un unbalanced cur	rent exceeds side the win 29.64 (e.g., font terminal I	29.65 Pow dow define or channel 01 > 29.64	er unit ed by 29.64 l: 29.11 Ch1 l). Power unit unbalanced or current
	unba Pow Exar pow 27.05 29.65	alanced currenter unit unbalarer unit unbalarer unit currenter unit currenter unit currenter unbalanced currenter unbalanced currenter unit current terminal C1 2 Ch1 power unit currenter unit unit unit unit unit unit unit unit	t level onced cue > 29.65 termin	urrent fur and the urrent wi 5 AND cu hal C1 - 2	nction if a unbalance indow. rrent out: 9.12 Ch1 p	27.05 Motor curred current is out side window of bower unit curred AND 29.66 Power un unbalanced cur	rent exceeds side the win 29.64 (e.g., font terminal I	29.65 Pow dow define or channel 01 > 29.64	er unit ed by 29.64 L: 29.11 Ch1 L). Power unit unbalanced current O Power unit unbalanced
	unba Pow Exar pow 27.05 29.65 29.11 29.12	alanced curren er unit unbalar nple: 27.05 er unit current 6 Motor current 6 Power units unbalanced current current terminal C1 2 Ch1 power unit current terminal D1 4 Power units	t level conced cue > 29.65 termin	urrent fur and the urrent wi 5 AND cu hal C1 - 2	nction if a unbalance indow. Irrent out: 9.12 Ch1 p a a>b	27.05 Motor curred current is out side window of bower unit curred AND 29.66 Power un unbalanced cur	rent exceeds side the win 29.64 (e.g., font terminal I	29.65 Pow dow define or channell D1 > 29.64	er unit ed by 29.64 L: 29.11 Ch1 L). Power unit unbalanced current O Power unit unbalanced
	unba Pow Exar pow 27.05 29.65 29.11 29.12 29.64 29.63 Note O: Note 1: Fa	alanced current er unit unbalar mple: 27.05 er unit current	t level conced cue > 29.65 termin	urrent full and the urrent wis AND curnal C1 - 2 ABS ABS	on in chair power unit F560 Po	27.05 Motor curred current is out side window of power unit curred AND 29.66 Power un unbalanced curdelay time annel2, channel3 ait, unbalanced cwer unit, unbala	ent exceeds side the win 29.64 (e.g., font terminal I	29.65 Pow dow define or channel o	er unit ed by 29.64 L: 29.11 Ch1 L). Power unit unbalanced current Power unit unbalanced current
	unba Pow Exar pow 27.05 29.65 29.11 29.12 29.64 29.63 Note O: Note 1: Fa	alanced current er unit unbalan nple: 27.05 er unit current	t level conced cue > 29.65 termin	urrent ful and the u urrent wi AND cu hal C1 - 2 ABS ABS	on in chair power unit F560 Po	27.05 Motor curred current is out side window of bower unit curred AND 29.66 Power un unbalanced curdelay time	ent exceeds side the win 29.64 (e.g., font terminal I	29.65 Pow dow define or channel o	er unit ed by 29.64 L: 29.11 Ch1 L). Power unit unbalanced current Power unit unbalanced current
29.64	unba Pow Exar pow 27.05 29.65 29.12 29.63 Note 0: No 1: Fa 2: Wi	alanced current er unit unbalan nple: 27.05 er unit current	t level conced cue > 29.65 termin	upervisice event perates wing	on in charpower unit F560 Powerung A	27.05 Motor curred current is out side window of cower unit curred and a sit, unbalanced curdelay time and a sit, unbalanced cower unit, unbala 560 Power unit,	ent exceeds side the win 29.64 (e.g., for terminal I	29.65 Pow dow define or channell D1 > 29.64 alanced F566 alanced A56 4 if applical current.	er unit ed by 29.64 L: 29.11 Ch1 L). Power unit unbalanced current Power unit unbalanced current power unit unbalanced current



Index	Name	Name								
	Text									
	Range	Default	Unit	Sc	ale/	Volatile	Change	Туре		
	FbEq16 running									
	Delay time of event power unit, thyristor loss.									
	29.69 Power units	thyristor loss d	lelay tir	ne dela	s either fault	: F561 Powe	er unit, thy	ristor loss or		
	warning A561 Pow	er unit, thyristo	or loss,	depend	ing on 29.68	Power unit	s thyristor	loss		
	function. If the thy	ristor loss reco	vers be	efore th	e delay elapse	es, the ever	nt will be di	sregarded.		
0 32500 10 ms 1 = 1 ms n y Parai						Parameter				
29.70	Power units test									
	Power units test.									
	29.69 Power units	test is used to	simula	te even	s power units	s unbalance	ed current	and power		
	units thyristor loss	units thyristor loss. This is executed by removing firing pulses from thyristors V11 and V21.								
	Note: Motor should not rotate during test.									
	0: Normal mode ; normal operating mode.									
	1: Ch1 power unit;	remove channe	el1 pow	er unit	iring pulses f	rom thyris	tors V11 an	d V21.		
	2: Ch2 power unit; remove channel2 power unit firing pulses from thyristors V11 and V21.									
	3: Ch3 power unit;				• .	-				
	4: Ch4 power unit;	remove channe	el4 pov	ver unit	firing pulses	from thyris	tors V11 a	nd V21.		
	0 4	Normal mode	-	1 =	1	n	n	Parameter		

30 Control limits

Drive operation limits.

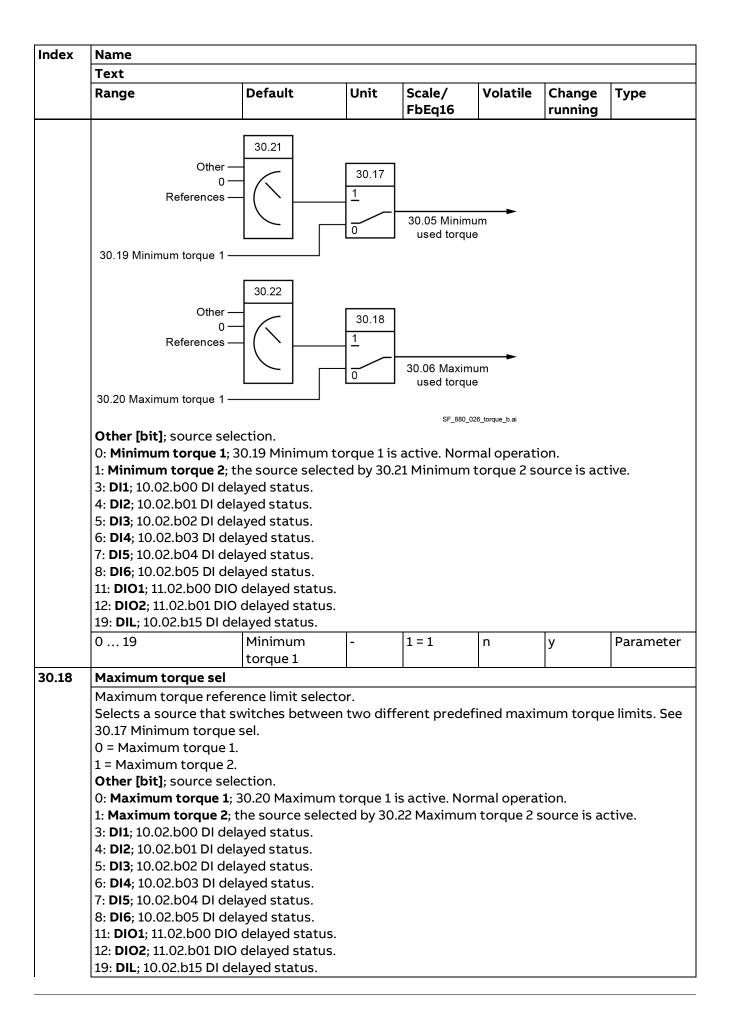
Index Name

		-										
	Text											
	Rang	je	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре			
30.01	Limit	t word 1										
	Displ	e limit word 1. lays the limit word ssignment:	1 of the o	drive.								
	Bit	Name	Value	Rema	Remarks							
	0	Negative speed	1	Speed reference is limited by 20.24 Negative speed enable.								
	1	Positive speed	1	Speed	referen	ice is limited	by 20.23 P	ositive spe	ed enable.			
	2	Min speed	1	Speed	referen	ice is limited	by 30.11 M	1 minimum	speed.			
	3	Max speed	1	Speed	Speed reference is limited by 30.12 M1 maximum speed.							
	4	Bridge 2 current	1	Armature current reference is limited by 30.34 M1 current limit bridge 2.								
	5	Bridge 1 current	1	Armature current reference is limited by 30.35 M1 current limit bridge 1.								
	6	Speed 1 current	1	Armature current reference is limited by 30.37 Current limat speed 1.								
	7	Speed 2 current	1	Armature current reference is limited by 30.38 Current lim at speed 2.								
	8	Speed 3 current	1	Armature current reference is limited by 30.39 Current limi at speed 3.								
	9	Speed 4 current	1	Armature current reference is limited by 30.40 Current limit at speed 4.								
	10	Speed 5 current	1	Armat at spe		ent referenc	e is limited	by 30.41 C	urrent limit			

Index	Name	<u>e </u>							
	Text								
	Rang	e	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре
	11	Min firing angle	1	Firing	angle is	limited by 3	0.44 Minim	um firing a	angle.
	12	Max firing angle	1	Firing	angle is	limited by 3	0.45 Maxin	num firing	angle.
	13	Min EMF controller	1	EMF co	ontroller	output is li	mited by 30).49 Minim	um EMF
	14	Max EMF controller	1	EMF co	ontroller	output is li	mited by 30).50 Maxim	ium EMF
	15	reserved							
	0000	h FFFFh	-		_	1 = 1	у	n	Signal
0.02	Torq	ue limit status							<u>, , , , , , , , , , , , , , , , , , , </u>
	Displ Bit as	ue limit word. ays the torque wor ssignment:	T						
	Bit	Name	Value	Remar	rks				
	0	Min 2-Q operation	1			it reference ck bridge 2		•	ation. See
	1	Min speed controller	1	Speed min to		er output is	limited by	30.13 Spee	d control
	2	Max speed controller	1	Speed max to		er output is	limited by	30.14 Spee	ed control
	3	Min external	1		al torqu e referen	e reference ce.	is limited b	y 30.15 Mir	nimum
	4	Max external	1	l l	al torqu e referen	e reference ce.	is limited b	y 30.16 Ma	ximum
	5	Min 1	1	Torqu	e referer	nce is limited	d by 30.19 N	/linimum to	orque 1.
	6	Max 1	1	Torqu	e referer	nce is limited	d by 30.20 N	Maximum t	orque 1.
	7	Min 2	1	Torqu	e referer	nce is limited	d by 30.23 N	Ainimum ta	orque 2.
							,	· i i i i i i i i i i i i i i i i i i i	•
	8	Max 2	1	Torqu	e referer	nce is limited			-
	9	Max 2 Max regenerating	1	Torqu			d by 30.24 N	daximum t	orque 2.
	1	Max		Torque regene Speed	e referer erating.	nce is limited nce is limited er output is	d by 30.24 N	Maximum t Max torque	orque 2.
	9	Max regenerating Min emergency	1	Torque regene Speed emerg	e referer erating. controll gency sto controll	nce is limited nce is limited er output is	d by 30.24 Nd by 30.27 Nd by 30.27 Nd limited by	Maximum t Max torque 30.30 Mini	orque 2. during mum torque
	9	Max regenerating Min emergency stop Max emergency	1	Torque regene Speed emerg	e referer erating. controll gency sto controll	nce is limited nce is limited er output is op. er output is	d by 30.24 Nd by 30.27 Nd by 30.27 Nd limited by	Maximum t Max torque 30.30 Mini	orque 2. during mum torque
	9 10 11	Max regenerating Min emergency stop Max emergency stop	1	Torque regene Speed emerg	e referer erating. controll gency sto controll	nce is limited nce is limited er output is op. er output is	d by 30.24 Nd by 30.27 Nd by 30.27 Nd limited by	Maximum t Max torque 30.30 Mini	orque 2. during mum torque
	9 10 11 12	Max regenerating Min emergency stop Max emergency stop reserved	1	Torque regene Speed emerg	e referer erating. controll gency sto controll	nce is limited nce is limited er output is op. er output is	d by 30.24 Nd by 30.27 Nd by 30.27 Nd limited by	Maximum t Max torque 30.30 Mini	orque 2. during mum torque
	9 10 11 12 13	Max regenerating Min emergency stop Max emergency stop reserved reserved	1	Torque regene Speed emerg	e referer erating. controll gency sto controll	nce is limited nce is limited er output is op. er output is	d by 30.24 Nd by 30.27 Nd by 30.27 Nd limited by	Maximum t Max torque 30.30 Mini	orque 2. during mum torque
	9 10 11 12 13 14 15	Max regenerating Min emergency stop Max emergency stop reserved reserved reserved	1	Torque regene Speed emerg	e referer erating. controll gency sto controll	nce is limited nce is limited er output is op. er output is	d by 30.24 Nd by 30.27 Nd by 30.27 Nd limited by	Maximum t Max torque 30.30 Mini	orque 2. during mum torque

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Largest of all minimum	torque/current	limits in	percent of 9	9.02 M1 no	minal torq	ue. Evaluated			
	from 07.61 Drive block bridge 2.	bridge 2 set, 30.	05 Minim	um used tor	que and 30).34 M1 cur	rent limit			
	-325.00 325.00	_	%	See 46.04	у	n	Signal			
30.04	Maximum torque all lir	nits	175	1000 1010 1	17	1	10.9			
	Combination of all max Smallest of all maximum Evaluated from 30.06 N	rimum torque/cum torque/currer	nt limits in orque and	n percent of the distance of t			· -			
	-325.00 325.00	-	%	See 46.04	У	n	Signal			
30.05	Minimum used torque									
	Minimum used torque Minimum torque limit i Minimum torque sel. Connected to the torque -325.00 325.00	n percent of 99.0					ed with 30.17			
30.06	Maximum used torque		170	300 10.0 1	13	1	3 .9a.			
	Maximum used torque Maximum torque limit Maximum torque sel. Connected to the torque	in percent of 99.	6.01 Toro	ue reference	to limitat	ion.				
30.11	-325.00 325.00 M1 minimum speed	-	%	See 46.04	У	n	Signal			
	 Motor 1 minimum speed limit. Motor 1 minimum speed reference limit in rpm for 23.01 Speed reference ramp input and 24.01 Used speed reference. The unit is selected by 96.03 Unit for speed control. Notes: 30.11 M1 minimum speed is applied to 24.01 Used speed reference to avoid falling below the speed limits by means of 24.11 Speed correction. To be able to overspeed the drive (e.g., for winders) it is possible to switch off the speed limit for 24.01 Used speed reference by means of 06.10.b02 Auxiliary control word 1. 									
	-30000.00	-1500.00	rpm, %		n	у	Parameter			
	30000.00		or V							
30.12	M1 maximum speed	1	_1	1	1	1	1			
	Motor 1 maximum spec Motor 1 maximum spec Used speed reference. Notes: – 30.12 M1 maximum	ed reference limi The unit is select speed is applied	ted by 96 I to 24.01	.03 Unit for s	speed cont	rol.				
	speed limits by medTo be able to overslimit for 24.01 Used	peed the drive (e	e.g., for w	inders) it is p			•			
	-30000.00 30000.00	1500.00		See 46.02	n	у	Parameter			
30.13	Speed control min tore	que	1	1	1	1	1			
	Minimum speed contro Minimum speed contro Torque reference spee Notes :	oller output torqu oller output torqu		percent of S	99.02 M1 no	ominal tord	que. See 25.01			

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	limits, current li – No need to char	e limit depends als mits and field wea ge the default se nimum torque lim	akening). T tting of 30	he limit with .13 Speed cor	the largest ntrol min to	t value is va orque for 2	alid. -Q operation,
	-325.00 325.00	-325.00	%	See 46.04	n	у	Parameter
30.14	Speed control max	torque					
	Maximum speed co Maximum speed co 25.01 Torque refere Note : The used torc torque limits, curre	ntroller output to nce speed contro Jue limit depends nt limits and field	rque limit l. also on th weakening	e drive's actu g). The limit w	al limitatio	n situatior	n (other e is valid.
30.15	-325.00 325.00 Minimum torque re	325.00	%	See 46.04	n	у	Parameter
30.16	limits, current li - No need to char	orque reference li 1 Torque reference e limit depends als mits and field wea ige the default se use the minimum ock bridge 2. -325.00 eference orque reference l	imit in perdice 1 source so on the cakening). Titting of 30 torque lim // wimit. imit in perdice 1 in perdic	and 26.12 To Irive's actual I the limit with .15 Minimum it is internally See 46.04	rque refere limitation s the largest torque ref y set to -1 s n	ence 2 sour situation (of t value is value is value for %. See 07.6	other torque alid. 2-Q 51 Drive block Parameter or external
	Note : The used torce torque limits, curre	ue limit depends nt limits and field	also on the	e drive's actu g). The limit w	al limitatio	n situatior allest value	n (other e is valid.
30.17	-325.00 325.00 Minimum torque se	325.00	%	See 46.04	n	У	Parameter
	Minimum torque re Selects a source that user can define two such as a digital inp 30.17 Minimum torc The first set of limit The second set has	It switches between sets of torque lingut. Jue sel is independed in the sel is independed in the sel is independed by 30 sel is defined by 30 sel is define	en two dif nits and sv dent of 30. 0.19 Minimu	vitch betweer 18 Maximum um torque 1 a	n the sets of torque selond 30.20 M	using a bin 1aximum to	ary source



30.19 Maximum - 1 = 1 n y 30.19 Minimum torque 1 Minimum torque reference limit 1. Minimum torque reference limit 1. Minimum torque reference limit 1 in percent of 99.02 M1 nominal torque for See 30.17 Minimum torque sel. Notes: - The used torque limit depends also on the drive's actual limitation situal limits, current limits and field weakening). The limit with the largest valu. - No need to change the default setting of 30.19 Minimum torque 1 for 2-0 because the minimum torque limit is internally set to -1 %. See 07.61 Drives te = Block bridge 2. - 325.00 325.00 -325.00 % See 46.04 n y 30.20 Maximum torque reference limit 1. Maximum torque reference limit 1 in percent of 99.02 M1 nominal torque for See 30.17 Minimum torque sel. Note: The used torque limits depends also on the drive's actual limitation sit torque limits, current limits and field weakening). The limit with the smalles -325.00 325.00 325.00 % See 46.04 n y 30.21 Minimum torque 2 source Selects the source for the minimum torque sel. Other; source selection. O; Zero; 0, not in use. 1: Minimum torque 2 source Maximum torque 2 multiplied by -1. 4: Al1 scaled; 12.12 Al1 scaled value. 6: Al3 scaled; 12.22 Al2 scaled value. 8: Process PID output actual; 40.01 Process PID output actual. Other; source selection. O; Zero; 0, not in use. 1: Maximum torque 2 source Maximum torque 2 multiplied by -1. 4: Al1 scaled; 12.12 Al1 scaled value. 5: Al2 scaled; 12.22 Al2 scaled value. 8: Process PID output actual; 40.01 Process PID output actual. 9: Al3 scaled; 12.22 Al2 scaled value. 8: Process PID output actual; 40.01 Process PID output actual. 8: Process PID output actual; 40.01 Process PID output actual. 9: Al3 scaled; 12.22 Al2 scaled value. 9: Al3 scaled; 12.22 Al2 scaled value. 9: Process PID output	Index	Name						
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torque 2 Minimum torque 2	20.22				1-1		У	raidilleter

1	Name				<u></u>		
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Minimum torque re	ference limit 2.	•	•	•	•	•
	Minimum torque re	ference limit 2 in p	ercent of	99.02 M1 nor	ninal torqu	e for the to	orque limiter.
	See 30.17 Minimum	torque sel.					
	Notes:						
	-	e limit depends als					•
		mits and field wea nge the default set					
		nimum torque limi [.]	-		•	•	
	set = Block brid	•	t is interne	ally set to -1 /	70. See 01.0	I DI IVE DIO	ck bridge Z
	-325.00 325.00	-325.00	%	See 46.04	n	у	Parameter
30.24	Maximum torque 2	L	70	366 40.04	111	<u> y</u>	rarameter
30.24	<u> </u>						
	Maximum torque re		orcont of	00 02 M1 no	minal tarau	o for the t	araua limitar
	See 30.17 Minimum		percent or	99.02 MI 1101	minai torqu	ie for the to	orque ilitiliter.
	Note: The used tord	•	also on th	e drive's actu	al limitatio	n situation	(other
	torque limits, curre						
	-325.00 325.00	325.00	%	See 46.04	n	у	Parameter
30.27	Max torque during				1	17	1
JU.2.	Maximum torque lin		ation				
	Maximum and torq			41 nominal to	raue only a	lurina reae	enerating
	Note : The used tord	-					-
	torque limits, curre	•					(00.10.
	-325.00 325.00	325.00	%	See 46.04	n	У	Parameter
30.30	Minimum torque er	mergency stop		· ·		17	· L
	Minimum speed co		aue limit f	or a ramped	Off3 (emer	gency stor	o) command.
	Minimum speed co	-	•	•			
	command is active						
	of 30.13 Speed cont	rol min torque is t	aken. See	21.03 Emerg	ency stop r	node, 06.20	0.b11 Run
	inhibit status word	and 06.20.b13 Run	inhibit st	atus word.			
	Notes:						
	 The emergency 						
			overrides a	all other mini	mum torqu	ie limits. M	inimum
	current limits re	emain valid.					
	current limits re - No need to char	emain valid. nge the default set	ting of 30	.30 Minimum	torque em	ergency st	op for 2-Q
	current limits re No need to char operation, beca	emain valid. nge the default set use the minimum	ting of 30	.30 Minimum	torque em	ergency st	op for 2-Q
	current limits re No need to char operation, beca bridge 2 set = B	emain valid. nge the default set use the minimum lock bridge 2.	ting of 30 torque lim	.30 Minimum it is internall	torque em y set to -1 ^c	nergency st %. See 07.6	op for 2-Q 1 Drive block
20.21	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00	emain valid. Inge the default set use the minimum in lock bridge 2.	ting of 30	.30 Minimum	torque em	ergency st	op for 2-Q
30.31	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e	emain valid. Inge the default set use the minimum flock bridge 2. 0.00 0.	ting of 30 torque lim	.30 Minimum lit is internall See 46.04	torque em y set to -1 ^q n	nergency st %. See 07.6	op for 2-Q 1 Drive block Parameter
30.31	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co	emain valid. Inge the default set use the minimum flock bridge 2. 0.00 0.	ting of 30 torque lim %	.30 Minimum nit is internall See 46.04 for a ramped	torque em y set to -1 ⁹ n Off3 (eme	nergency st %. See 07.6 y rgency sto	op for 2-Q 1 Drive block Parameter o) command.
30.31	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co	emain valid. Inge the default set use the minimum lock bridge 2. 0.00 mergency stop Introller output tor	ting of 30 torque lim % que limit	.30 Minimum it is internall See 46.04 for a ramped when a ramp	n torque em y set to -1 9 n Off3 (eme ed Off3 (en	nergency st %. See 07.6 y rgency stop	op for 2-Q 1 Drive block Parameter p) command. top)
30.31	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co Maximum speed co command is active	emain valid. Inge the default set use the minimum flock bridge 2. O.00 Introller output tor and 30.31 Maximus	ting of 30 torque lim % que limit	.30 Minimum lit is internall See 46.04 for a ramped when a ramp emergency st	n torque em y set to -1 9 n Off3 (eme ed Off3 (en top is ≠ zere	y rgency stopergency stopergen	Parameter o) command. top) se, the value
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30.31	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co Maximum speed co command is active of 30.14 Speed continhibit status word	emain valid. Inge the default set use the minimum flock bridge 2. 0.00 Introller output tor ntroller output tor and 30.31 Maximus trol max torque is tand 06.20.b13 Run	ting of 30 torque limit que limit m torque ctaken. See	.30 Minimum lit is internall See 46.04 for a ramped when a ramp emergency st 21.03 Emerg atus word.	n Off3 (emerop is ≠ zerop is ≠ zerop is + z	rgency stop nergency stop nergency s o. Otherwis mode, 06.2	Parameter o) command. top) se, the value 0.b11 Run
30.31	current limits re No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co Maximum speed co command is active of 30.14 Speed continhibit status word Note: The emergen	emain valid. Inge the default set use the minimum flock bridge 2. O.00 Introller output tor ntroller output tor and 30.31 Maximum froller max torque is and 06.20.b13 Runcy stop torque limits.	ting of 30 torque limit que limit m torque ctaken. See	.30 Minimum lit is internall See 46.04 for a ramped when a ramp emergency st 21.03 Emerg atus word.	n Off3 (emerop is ≠ zerop is ≠ zerop is + z	rgency stop nergency stop nergency s o. Otherwis mode, 06.2	Parameter o) command. top) se, the value 0.b11 Run
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	current limits re- No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co command is active of 30.14 Speed continhibit status word Note: The emergen current limits rema -325.00 325.00	emain valid. Inge the default set use the minimum flock bridge 2. 0.00	ting of 30 torque limit que limit m torque ctaken. See	.30 Minimum lit is internall See 46.04 for a ramped when a ramp emergency st 21.03 Emerg atus word.	n Off3 (emerop is ≠ zerop is ≠ zerop is + z	rgency stop nergency stop nergency s o. Otherwis mode, 06.2	Parameter o) command. top) se, the value 0.b11 Run
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	current limits re- No need to char operation, beca bridge 2 set = B -325.00 325.00 Maximum torque e Maximum speed co command is active of 30.14 Speed continhibit status word Note: The emergen current limits rema -325.00 325.00	emain valid. Inge the default set use the minimum flock bridge 2. O.00 Introller output tor and 30.31 Maximum froller output tor and 06.20.b13 Runcy stop torque limit in valid. O.00 Indee 2 Urrent limit for brid	ting of 30 torque limit reque limit reque limit reque taken. See a inhibit stit override %	.30 Minimum nit is internall See 46.04 for a ramped when a ramp emergency st 21.03 Emerg atus word. es all other m	o torque em y set to -1 9 Off3 (eme ed Off3 (en top is ≠ zer jency stop i aximum to	rgency stophergency stophergency stophergency stopherwise mode, 06.2	Parameter o) command. top) se, the value 0.b11 Run Maximum Parameter

Index	Name							
	Text							
	Range	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Notes:	L	I		•			
	 The used curren 	t limit depend	ls also d	on the c	lrive's actu	al limitation	situation (other torque
	limits, current li	mits and field	weaker	ning). T	he limit wi	th the larges	t value is va	alid.
	 No need to char 	nge the default	t settin	g of 30.	34 M1 curr	ent limit brid	dge 2 for 2-	Q operation,
	because the mir		: limit is	intern	ally set to -	1 %. See 07.6	61 Drive blo	ck bridge 2
	set = Block brid							
	-325.00 0.00	-100.00		%	100 = 1 %	6 n	У	Parameter
30.35	M1 current limit bri	dge 1						
	Motor 1 armature c	urrent limit for	r bridge	1.				
	Current limit bridge	1 in percent o	f 99.11	M1 non	ninal curre	nt. Setting 30	0.35 M1 cur	rent limit
	bridge 1 = 0 % disal	oles bridge 1.						
	Note : The used curr	•						
	torque limits, curre				-		nallest valu	e is valid.
	0.00 325.00	100.00		%	100 = 1 %	6 n	у	Parameter
30.36	Speed level at maxi	mum current						
	Speed level for the	speed depend	ing curr	rent lim	it.			
	Speed level where t	he armature c	urrent r	eduction	on begins.			
		I						
		^						
				:	: :	; ;		
	30.37 Current limit					+		
	30.38 Current limit 30.39 Current limit							
	30.39 Current limit	at speed 3						
	30.40 Current limit	at speed 4 🖡		:				
				į	1 I 1 I			
	20.44 O			1				
	30.41 Current limit	at speed 5						
				!	1 I 1 I			
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		L			! !	<u>'</u>		→ n
		0	30.36	Space	d level at	;		
					current	'	max	
	n _{max} = maximum ab	coluto valuo et				d and 20 12 !	DZ_LIN_048_current	
20.07	0.00 30000.00	1500.00		rpm	See 46.0	2 n	у	Parameter
30.37	Current limit at spe							
	Speed depending c		•					
	Armature current li	•					•	
	current. Should be s		ımum a	bsolute	e value of 3	0.34 M1 curr	ent limit br	nage 2 and
	30.35 M1 current lin	_		41-	luiv1			(ath a
	Note: The used curr							
	torque limits, curre							
20.55	0.00 325.00	325.00		%	100 = 1 %	6 n	У	Parameter
30.38	Current limit at spe			_				
	Speed depending c		-					
	Armature current li	mit in percent	of 99.11	l M1 no	minal curre	ent at speed:		
	1							
	$(30.36) + \frac{1}{4} \times [n_{max} -$	- (30.36)]						
	4							

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	$With: n_{max} = Max[$ Note: The used cur		also on th	ie drive's actu	ual limitatio	on situatio	n (other
	torque limits, curre	ent limits and field	weakening		vith the sm	allest value	e is valid.
	0.00 325.00	325.00	%	100 = 1 %	n	у	Parameter
30.39	Current limit at sp	eed 3					
	Armature current l			minal curren	t at speed:		
	$(30.36) + \frac{1}{2} \times [n_{max}]$	- (30.36)J					
	$With: n_{max} = Max[]$	(30.11) , (30.12)]					
		rent limit depends					
	torque limits, curre						
	0.00 325.00	325.00	%	100 = 1 %	n	У	Parameter
30.40	Current limit at sp						
		current limit at spec					
	Armature current l	imit in percent of 9	9.11 M1 nc	minal curren	t at speed:		
	3						
	$(30.36) + \frac{3}{4} \times [n_{max}]$	– (30.36)]					
	$With: n_{max} = Max[$						
	Note: The used cur	rent limit depends	also on th	e drive's actu	ual limitatio	on situatio	other
	torque limits, curre	•					
	0.00 325.00	325.00	%	100 = 1 %	n	у	Parameter
30.41	Current limit at sp			1-00 - 00	1	17	1
		current limit at spec	ed 5				
		imit in percent of 9		minal curren	t at n _{max} :		
					THE THE		
	$With: n_{max} = Max[$	(30.11) , (30.12)]					
		rent limit depends					
	torque limits, curre						
	0.00 325.00	325.00	%	100 = 1 %	n	У	Parameter
30.44	Minimum firing an	•					
	Minimum firing and	=					
	Minimum firing and	<u> </u>	0	1.00 10		1	T_
	0.00 165.00	15.00		100 = 1°	n	у	Parameter
30.45	Maximum firing ar	-					
	Maximum firing an	-		<i>c</i>			
	_	gle in degrees. The	maxımun	n firing angel	can be for	ced using (06.10.610
	Auxiliary control w		1.	1		1	T_
	0.00 172.00	150.00	0	100 = 1°	n	n	Parameter
30.46	Maximum firing ar						
	INAccionación divida acada	مام مم مام					
	Maximum firing an	-					
	Selects the strateg	igle mode. Jy for the maximum m firing angle limit					

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	1: Fix + single ; the maximum firing angle limit is defined by 30.45 Maximum firing angle. When the maximum firing angle is reached, single firing pulses to suppress the DC current are fired. 2: Calculated ; the maximum firing limit is automatically reduced from 165° to 30.45 Maximum firing angle depending on the measured motor current and 27.31 M1 discontinuous current limit. 3: Calculated + single ; same function as Calculated, but single pulses fired are given, when the maximum firing angle is reached. Degrees Firing angle = 165°										
	30.45 Maximum firing angle										
	Measured motor current 0										
			curre	7.31 M1 discontinuous current limit							
	Note : Single firing p		tinuous c								
	0 3	Fix + single	-	1 = 1	n	у	Parameter				
30.49	Minimum EMF limit										
	Minimum EMF limit.		_								
	Negative limit for EN						1				
	-100.00 0.00	-100.00	%	100 = 1 %	n	у	Parameter				
30.50	Maximum EMF limit										
	Maximum EMF limit										
	Positive limit for EM	F controller in per	cent of no	ominal flux.	_						
	0.00 100.00	5.00	%	100 = 1 %	n	у	Parameter				

31 Fault functions and fault levels

Configuration of external events. Selection of the drive behavior in fault situations.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
31.01	External event 1 source										
	Source of external event 1.										
	Defines the source of external event 1. See 31.02 External event 1 type.										
	The external event is low active, thus:										
	0 = Trigger event.										
	1 = Normal o	1 = Normal operation.									
	Other [bit]; s	ource selection.									
	0: Active (false); trigger event.										

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	· ·	ue) ; no trigger event. No	ormal oper	ation.								
		00 DI delayed status.										
		001 DI delayed status.										
		02 DI delayed status.										
		003 DI delayed status.										
		04 DI delayed status.										
	8: DI6 ; 10.02.b05 DI delayed status. 11: DIO1 ; 11.02.b00 DIO delayed status.											
		11: DIO1 ; 11.02.b00 DIO delayed status. 12: DIO2 ; 11.02.b01 DIO delayed status.										
	· ·	b15 DI delayed status.	5.									
	0 19	Inactive (true)		1 = 1	T _n	.,	Darameter					
21.02		· · · ·		1-1	n	У	Parameter					
31.02		External event 1 type										
	Type of external event 1. Selects the type of external event 1.											
	Selects the type of external event 1. O: No action ; none, disable external event 1.											
	1: Fault ; the event generates fault 9081 External fault 1.											
	2: Warning ; the event generates rault 9081 External rault 1.											
	3: Warning or fault ; if the drive is in state Ready reference, the event generates fault 9081											
	External fault 1. Otherwise, the event generates warning A981 External warning 1.											
		4: Inactive or fault; if the drive is in state Ready reference, the event generates fault 9081										
	External fault 1. Otherwise, the event is inactive.											
		5: Inactive or warning; if the drive is in state Ready reference, the event generates warning										
		warning 1. Otherwise, t		-	•	,	3					
	0 5	No action	-	1 = 1	n	у	Parameter					
31.03	External even	t 2 source					•					
	Source of exte	ernal event 2.										
	Defines the so	ource of external event a	2. S ee 31.0	4 External ev	ent 2 type a	and 31.01 E	xternal event					
	1 source.											
	0 19	Inactive (true)	-	1 = 1	n	у	Parameter					
31.04	External even		I .			12						
	Type of external event 2.											
	Selects the type of external event 2. See 31.02 External event 1 type.											
	05	No action	_	1 = 1	n	у	Parameter					
31.05	External even				1	17						
	Source of external event 3.											
		Source of external event 3. Defines the source of external event 3. See 31.06 External event 3 type and 31.01 External event										
	1 source.	ource or execution everte.	J. J CC J1.0	o External e	reme o type t	2.1.0 52.02 2	Accordan everne					
	0 19	Inactive (true)	_	1 = 1	n	у	Parameter					
31.06	External even			<u> </u>		J	rararrecer					
31.00	Type of exteri											
		pe of external event 3. S	31 N2 F	vternal even	t 1 type							
	0 5	No action		1 = 1	n n	у	Parameter					
21.07				1-1	11	у	Parameter					
31.07	External even											
	Source of extens		4 Cac 21 A	0 Evetowal	(ant 1 to	and 21 01 F	whomal areas					
		ource of external event	4. See 31.0	o External e	vent 4 type	ana 31.01 E	xternai event					
ļi												
	1 source.	In a set of A		1 - 4	1_	T.,	Dans					
31.08	1 source. 0 19 External even	Inactive (true)	-	1 = 1	n	у	Parameter					

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Type of exterr	nal event 4. pe of external event 4. S	See 31 02 F	yternal even	t 1 type						
	0 5	No action	_	1 = 1	n n	у	Parameter				
31.09	External even			11-1	11	у	rarameter				
32.03	Source of external Defines the source.										
	0 19	Inactive (true)	-	1 = 1	n	У	Parameter				
31.10	External event 5 type										
	Type of external event 4. Selects the type of external event 4. See 31.02 External event 1 type.										
			see 31.02 E				Τ				
24.42	05	No action	-	1 = 1	n	У	Parameter				
31.13		ode communication									
	fieldbus commo: Coast stop Maximum firir current is zero are stopped. 1: Emergency along the eme speed level th the armature breakers are of In case 19.20 F and the drive 3: Torque limit torque limit. V 30.45 Maximu zero the firing In case 19.20 F and the drive 4: Dynamic br	Stop mode for communication losses. Selects the way the motor is stopped for all communication losses (local, extension I/O, fieldbus communication, master-follower link, DDCS and DCSLink) causing a fault. 0: Coast stop; the motor coasts to a stop. The firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current as fast as possible. When the armatur current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. 1: Emergency ramp stop; the input of the drive ramp is set to zero. Thus, the motor stops along the emergency stop ramp. See 23.23 Emergency stop time. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control. 3: Torque limit; the output of the drive ramp is set to zero. Thus, the motor stops at the active torque limit. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control. 4: Dynamic braking; the motor stops by means of dynamic braking. After dynamic braking is finished the firing pulses are blocked. The breakers are opened. Field exciter and fans are									
		Emergency ramp stop				У					
31.14	Fault stop mo	ode fault level 3									
	Stop mode for faults with fault level 3. Selects the way the motor is stopped for all faults with fault level 3. Note: 31.14 Fault stop mode fault level 3 does not apply to communication faults. 0: Coast stop; the motor coasts to a stop. The firing angle is forced to the value of 30.45 Maximum firing angle to decrease the armature current as fast as possible. When the armatur current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped. 4: Dynamic braking; the motor stops by means of dynamic braking. After dynamic braking is finished the firing pulses are blocked. The breakers are opened. Field exciter and fans are										

Index	Name												
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	0 4	Coast stop	-	1 = 1	n	у	Parameter						
31.15	Fault stop m	ode fault level 4	•				•						
	Stop mode fo	or faults with fault leve	el 4.										
	Selects the w	Selects the way the motor is stopped for all faults with fault level 4.											
	Note: 31.15 Fault stop mode fault level 4 does not apply to communication faults.												
	0: Coast stop ; the motor coasts to a stop. The firing angle is forced to the value of 30.45												
		Maximum firing angle to decrease the armature current as fast as possible. When the armature current is zero the firing pulses are blocked. The breakers are opened. Field exciter and fans											
		<u> </u>	blocked. Th	e breakers a	re opened. I	Field excite	er and fans						
	are stopped.			_									
	1: Emergency ramp stop ; the input of the drive ramp is set to zero. Thus, the motor stops												
İ	along the emergency stop ramp. See 23.23 Emergency stop time. When reaching 21.08 M1 zero												
İ	speed level the firing angle is forced to the value of 30.45 Maximum firing angle to decrease												
	the armature current. When the armature current is zero the firing pulses are blocked. The												
	breakers are opened. Field exciter and fans are stopped. In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed.												
	In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed, and the drive is forced to speed control.												
	3: Torque limit ; the output of the drive ramp is set to zero. Thus, the motor stops at the active												
	torque limit. When reaching 21.08 M1 zero speed level the firing angle is forced to the value of												
	30.45 Maximum firing angle to decrease the armature current. When the armature current is												
	zero the firing pulses are blocked. The breakers are opened. Field exciter and fans are stopped												
	In case 19.20 Follower force ramp stop = Force speed control the torque selector is bypassed,												
	and the drive is forced to speed control.												
	4: Dynamic braking ; the motor stops by means of dynamic braking. After dynamic braking is												
	finished the firing pulses are blocked. The breakers are opened. Field exciter and fans are												
	stopped.		1	1		Т							
	0 4	Emergency ram	ip -	1 = 1	n	У	Parameter						
		stop											
31.21	Mains phase loss												
İ	Type of event mains phase loss.												
	Selects the type of event mains phase loss.												
İ	0: No action ; none, disable mains phase loss.												
	1: Fault ; the event generates fault 3130 Mains phase loss. 2: Warning ; the event generates warning A130 Mains phase loss.												
			irning A130 i				T						
	02	Warning	-	1 = 1	n	У	Parameter						
31.22	STO indication run/stop												
İ	Safe torque off, type of event when safe torque off is active.												
		Selects which events are given when one or both safe torque off signals are switched off or are											
		lost. The events also depend on whether the drive is running or stopped when they occur. In case a fault occurs, the load switching device (mains breaker, DC-breaker,) is opened by											
			ching device	e (mains brea	aker, DC-bre	aker,) is	opened by						
		the relay output XSMC:1/2. The tables below show the events generated depending on 31.22 STO indication run/stop.											
		elow show the events g	gerierated di	epending on	31.22 310 11	ildicationi	unystop.						
	Notes:												
	_ 31 22 STC	indication run/ston d	 31.22 STO indication run/stop does not affect the operation of the safe torque off function itself. The safe torque off function will operate regardless of the setting of 31.22 STO 										
		•		•		•							
	itself. The	e safe torque off funct	ion will oper	ate regardle	ss of the se	tting of 31	.22 STO						
	itself. The indication	e safe torque off funct n run/stop. A running o	ion will oper drive will sto	ate regardle p when rem	ss of the se oving either	tting of 31 one or bo	.22 STO th safe						
	itself. The indication	e safe torque off funct n run/stop. A running of ff signals. It will not sta	ion will oper drive will sto	ate regardle p when rem	ss of the se oving either	tting of 31 one or bo	.22 STO th safe						
	itself. The indication torque of faults are	e safe torque off funct n run/stop. A running of ff signals. It will not sta	ion will oper drive will sto art until both	ate regardle p when rem n safe torque	ess of the se oving either e off signals	tting of 31 one or bo are restor	.22 STO th safe ed and all						

Index Name Text Range Default Unit Scale/ Volatile Change running

- For more information on the safe torque off, see <u>Supplement for functional safety</u> (3ADW000452).

Settin	g of 31.22	Fault /									No indica	ation /			
STO indication		Fault	Fault / W	Fault / Warning		Fault / Event		Warning / Warning		Event / Event		No indication		Warning / Event	
run/st	ор														
IN1	IN2		running	stopped	running	stopped	running	stopped	running	stopped	running	stopped	running	stopped	
0	0	5091	5091	A5A0	5091	B5A0	A5A0	A5A0	B5A0	B5A0	None	None	A5A0	B5A0	
0	1	5091	5091	A5A0	5091	B5A0	A5A0	A5A0	B5A0	B5A0	None	None	A5A0	B5A0	
1	0	5091	5091	A5A0	5091	B5A0	A5A0	A5A0	B5A0	B5A0	None	None	A5A0	B5A0	
1	1	normal or	peration												

- The normal safe torque off operation (IN1 = IN2 = 0) has different, selectable events.

0: Fault/Fault;

Inpu	ts	Event
IN1	IN2	Running/Stopped
0	0	Fault 5091 Safe torque off.
0	1	Faults 5091 Safe torque off and FA81 Safe torque off 1 loss fault.
1	0	Faults 5091 Safe torque off and FA82 Safe torque off 2 loss fault.
1	1	Normal operation.

1: Fault/Warning;

Input	ts	Event	Event						
IN1	IN2	Running	Stopped						
0	0	Fault 5091 Safe torque off.	Warning A5A0 Safe torque off.						
0	1	Faults 5091 Safe torque off and FA81 Safe torque off 1 loss fault.	Warning A5A0 Safe torque off and FA81 Safe torque off 1 loss fault.						
1	0	Faults 5091 Safe torque off and FA82 Safe torque off 2 loss fault.	Warning A5A0 Safe torque off and FA82 Safe torque off 2 loss fault.						
1	1	Normal operation.							

2: Fault/Event;

Input	s	Event	
IN1	IN2	Running	Stopped
0	0	Fault 5091 Safe torque off.	Event B5A0 Safe torque off.
0			Event B5A0 Safe torque off and FA81 Safe torque off 1 loss fault.
1		•	Event B5A0 Safe torque off and FA82 Safe torque off 2 loss fault.
1	1	Normal operation.	

3: Warning/Warning;

Inpu	ts	Event
IN1	IN2	Running/Stopped
0	0	Warning A5A0 Safe torque off.
0	1	Warning A5A0 Safe torque off and FA81 Safe torque off 1 loss fault.
1	0	Warning A5A0 Safe torque off and FA82 Safe torque off 2 loss fault.
1	1	Normal operation.

4: Event/Event;

Index	Name												
	Text												
	Range			Default	Unit	Scale/ FbEq1		Volatile	Change running	Туре			
		Inpu	ts	Event	•			•	•				
		IN1	IN2	Running/Stopped									
		0	0	Event B5A0 Safe to	rque off.								
		0	1	Event B5A0 Safe to	rque off a	nd FA81	Safe	torque off	1 loss faul	t.			
		1	0	Event B5A0 Safe to				•					
		1	1	Normal operation.				33. 43.3 3					
	5: No i	- ndica	_	No indication;									
	l F	Inpu		Event									
		IN1	IN2	Running/Stopped									
	-	0	0	STO is performed, k	out not in	dicated.							
	-	0	1	FA81 Safe torque of									
	-	1	0	A82 Safe torque off 2 loss fault.									
		1	1	•	A82 Safe torque off 2 loss fault. Iormal operation.								
	6: Warı	ning /		•									
	T T	Inpu		Event									
		IN1	IN2	Running Stopped									
	-	0	0	+	torque o	•	fe torque c	.ff					
	-	0	1							ff and FA81			
			1						f 1 loss fau				
		1	0	Warning A5A0 Safe FA82 Safe torque of	•				fe torque c f 2 loss fau	ff and FA82 lt.			
		1	1	Normal operation.									
	0 6			Fault/Fault	-	1 = 1		n	n	Parameter			
31.24	Stall fu	ıncti	on	·		L			-L	1			
	Stall, function.												
				of event stall. The driv			_			•			
				ll torque level and un e, disable stall superv		s 31.26 S	tall s	peed level	for 31.28 S	tall time.			
				generates fault 7121		all.							
				ent generates warni			all.						
	0 2			No action	-	1 = 1		n	у	Parameter			
31.25	Stall to	orque	elevel		•	<u>'</u>		•		•			
	Stall, to	orque	e level.										
				n percent of 99.02 M		l torque.			_				
	0.00			75.00	%	See 46	5.04	n	у	Parameter			
31.26	Stall sp												
	Stall, s	•											
	Stall sp			T- 00	T	G 40	. 02			D			
21 27	0.00		00.00	5.00	rpm	See 46	0.02	n	У	Parameter			
31.27	Stall ti												
	Stall, d	-		stall function event									
	0.0 3			0.0	s s	10 = 1	<u> </u>	n	у	Parameter			
	0.0		. •	10.0	ر ا	1-0-1	_	1"	y	I. a. a. i.e.e.			

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
31.28	M1 overspeed t	rip level positive	<u>'</u>		L.		<u>'</u>					
	If the positive (I generated. Example : If the	eed trip level positive maximum) trip level maximum speed is 1 m. See 31.30 M1 over	for overspe 1100 rpm an	d overspeed								
	-30000.00 30000.00	-	rpm	See 46.02	у	n	Signal					
31.29	M1 overspeed t	rip level negative		.	- I	· I	•					
	If the negative (generated. Example : If the	eed trip level negativ minimum) trip level minimum speed is -: m. See 31.30 M1 ove	for overspe 1420 rpm ar	d overspeed	trip margii	·						
31.30	M1 overspeed t	rip margin	· ·	•	- 11	'	-1					
	It is recommend motor speed. Examples: - If the maxim 1400 rpm. S - If the minim -1720 rpm. S	um speed or 30.12 M ded to set 31.30 M1 of num speed is 1100 rp ee 31.28 M1 overspe um speed is -1420 rp see 31.29 M1 overspe peed fault for moto	owerspeed trom and over ed trip level pm and over eed trip level	speed trip mapositive. speed trip mapositive. speed trip mapositive.	least to 20 argin is 300 argin is 30	% of the n O rpm, the O rpm, the	naximum drive trips at drive trips a					
	90.01 Motor speed for control											
	A	31 28 M1	overspeed trin	level positive								
	31.28 M1 overspeed trip level positive 31.30 M1 overspeed trip margin											
		J		30.12 M1 m	naximum spee	ed						
	0			Time								
				30.11 M1 m	ninimum spee	d						
		31.30 M	1 overspeed tri	o margin								
	\	31.29 M:	1 overspeed tri	o level negative	DZ_LIN_050_motor sp	eed cai						

Parameter

У

rpm

See 46.02

0.00 ... 30000.00 300.00

Index Name Text Default Unit Scale/ Volatile Range Change Type FbEq16 running 31.31 **Emergency ramp supervision** Maximum deviation from the expected deceleration rate. 31.32 Emergency ramp supervision, 31.33 Emergency ramp supervision delay and 01.07 Speed change rate, provide a supervision function for a ramped Off3 (emergency stop) command. See 21.03 Emergency stop mode, 06.20.b11 Run inhibit status word and 06.20.b13 Run inhibit The supervision is based on either observing the time within which the motor stops or comparing the actual and expected deceleration rates. Maximum ramp-down time If 31.31 Emergency ramp supervision = 0.00 %, the maximum stop time is set in 31.32 Emergency ramp supervision delay. Comparing deceleration rates Otherwise, 31.31 Emergency ramp supervision defines the maximum allowed deviation from the expected deceleration rate, which is calculated from parameters 23.11 ... 23.19 for Off3 stop mode 1 (21.03 Emergency stop mode = Ramp stop) or 23.23 Emergency stop time for Off3 stop mode 2 (21.03 Emergency stop mode = Emergency ramp stop). If 01.07 Speed change rate deviates too much from the expected rate, the event generates fault 73B0 Emergency ramp stop. Additionally, 06.17.b08 Drive status word 2 is set and the motor coasts to a stop. Note: The emergency stop ramp supervision is disabled, if 31.31 Emergency ramp supervision = 0.00% and 31.32 Emergency ramp supervision delay = 0.0 s. 0.00 ... 325.00 0.00 % 100 = 1 % Parameter 31.32 **Emergency ramp supervision delay** Maximum ramp-down time or supervision activation delay. Maximum ramp-down time If 31.31 Emergency ramp supervision = 0.00 %, 31.32 Emergency ramp supervision delay defines the maximum time a ramped Off3 (emergency stop) command can take. If the motor has not stopped when the time elapses, the event generates fault 73B0 Emergency ramp stop, sets 06.17.b08 Drive status word 2 and the motor coasts to a stop. Supervision activation delay If 31.31 Emergency ramp supervision > 0.00 %, 31.32 Emergency ramp supervision delay defines a delay between the receipt of a ramped Off3 (emergency stop) command and the activation of the supervision. It is recommended to specify a short delay to allow the speed change rate to stabilize. Note: The emergency stop ramp supervision is disabled, if 31.31 Emergency ramp supervision = 0.00 % and 31.32 Emergency ramp supervision delay = 0.0 s. 0.0 ... 3250.0 0.0 10 = 1 sParameter 31.33 Ramp stop supervision Maximum deviation the from expected deceleration rate. 31.33 Ramp stop supervision, 31.34 Ramp stop supervision delay and 01.07 Speed change rate, provide a supervision function for a normal (non-emergency) ramp stop. See 06.09.b03 Used main control word. The supervision is based on either observing the time within which the motor stops or comparing the actual and expected deceleration rates. Maximum ramp-down time If 31.33 Ramp stop supervision = 0.00 %, the maximum stop time is set in 31.34 Ramp stop supervision delay. Comparing deceleration rates Otherwise, 31.33 Ramp stop supervision defines the maximum allowed deviation from the

expected deceleration rate, which is calculated from parameters 23.11 ... 23.19. If 01.07 Speed

Parameter

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	ramp stop. Addition	tes too much from the onally, 06.17.b14 Drive op supervision is disa	status w	ord 2 is set a	and the mo	tor coasts	to a stop.			
31.34	0.00 325.00 Ramp stop superv	0.00	%	100 = 1 %	n	у	Parameter			
	Maximum ramp-do Maximum ramp-do If 31.33 Ramp stop maximum time a n elapses, the event and the motor coa Supervision activa If 31.33 Ramp stop between the receip recommended to s	own time or supervision time supervision = 0.00 % formal ramp stop can generates fault 73B1 sts to a stop.	, 31.34 Ra take. If th Normal ra , 31.34 Ra nd and th o allow th	mp stop sup ne motor has amp stop, se mp stop sup ne activation ne speed cha	s not stoppets 06.17.bit bervision do of the sup ange rate t	ped when the standard when the	ne time atus word 2 es a delay e is			

0.0 ... 3250.0 31.35 Motor feedback fault

Motor feedback fault.

Selects how the drive reacts to a loss of a speed feedback measured with an encoder or tacho. See 90.41 M1 feedback selection.

s

10 = 1 s

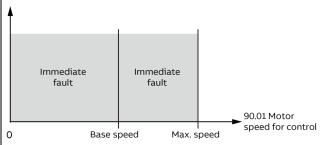
n

0: No action; none, disable motor feedback fault.

Ramp stop supervision delay = 0.0 s.

0.0

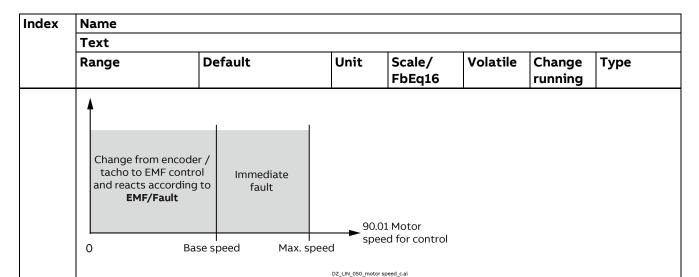
1: Fault; the event generates fault 7301 Motor speed feedback, or 7381 Speed feedback device and the motor stops according to 31.14 Fault stop mode fault level 3.



DZ_LIN_050_motor speed_c.ai

2: EMF/Fault; the event changes the speed feedback to EMF and stops the motor at the emergency stop ramp. Then the event generates fault 7301 Motor speed feedback or 7381 Speed feedback device.

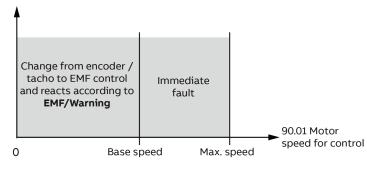
In case speed actual is greater than base speed the event generates fault 7301 Motor speed feedback, or 7381 Speed feedback device and the motor stops according to 31.14 Fault stop mode fault level 3.



3: **EMF/Warning**; the event changes the speed feedback to EMF and generates warning A798 Encoder interface communication, A7B0 Motor speed feedback or A7E1 Speed feedback device.

Attention: The warning can only be reset by setting 96.27 Control board boot = Reboot or by cycling the auxiliary power.

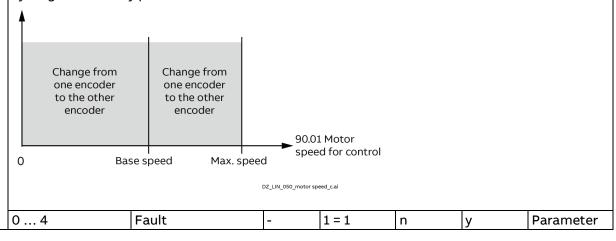
In case speed actual is greater than base speed the event generates fault 7301 Motor speed feedback, or 7381 Speed feedback device and the motor stops according to 31.14 Fault stop mode fault level 3.



DZ_LIN_050_motor speed_c.ai

4: **Encoder/Warning**; This selection is only valid if 2 pulse encoders are connected. Depending on the setting of 90.41 M1 feedback selection, the speed feedback is changed from one encoder to the other encoder, in case of a problem. Additionally, the event generates warning A798 Encoder interface communication, A7B0 Motor speed feedback or A7E1 Speed feedback device.

Attention: The warning can only be reset by setting 96.27 Control board boot = Reboot or by cycling the auxiliary power.



Index Name Text Range Default Unit Scale/ Volatile Change running Type

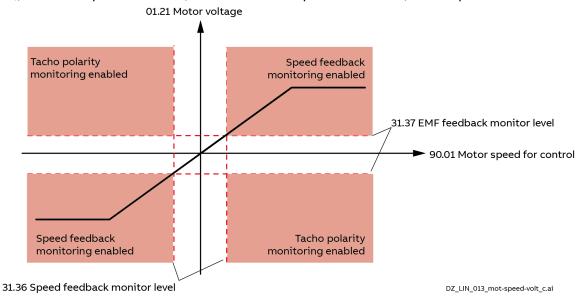
31.36 Speed feedback monitor level

Speed feedback monitor level.

The speed feedback monitor compares a measured speed feedback from an encoder or a tacho with the measured armature voltage. 31.36 Speed feedback monitor level and 31.37 EMF feedback monitor level set the levels and activate the monitor.

The drive reacts according to 31.35 Motor feedback fault and generates either warning A7B0 Motor speed feedback or fault 7301 Motor speed feedback, if the measured speed feedback, see 90.01 Motor speed for control, does not exceed 31.36 Speed feedback monitor level while the measured armature voltage, see 01.21 Armature voltage in V, exceeds 31.37 EMF feedback monitor level.

Example: With 31.36 Speed feedback monitor level = 15 rpm and 31.37 EMF feedback monitor level = 50 V_{DC} the drive trips when the armature voltage, see 01.21 Armature voltage in V, is > 50 V_{DC} , while the speed feedback, see 90.01 Motor speed for control, is \leq 15 rpm.



Commissioning hint: Set 31.36 Speed feedback monitor level = 5 % of 99.14 M1 nominal (base) speed and 31.37.EMF feedback monitor level = 10 % of 99.12 M1 nominal voltage.

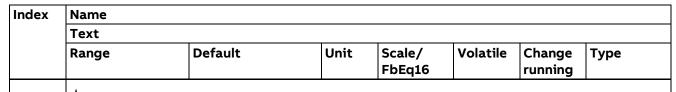
	0.00 30000.00	15.00	rpm	See 46.02	n	У	Parameter
31.37	EMF feedback mor	nitor level					
	EMF feedback mor	nitor level.					
	See 31.36 Speed fe	edback monitor level.					
	0.0 3250.0	50.0	V	10 = 1 V	n	у	Parameter
			•			•	

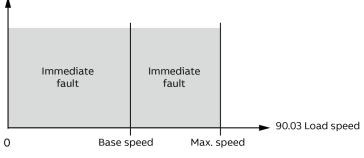
31.38 Load feedback fault

Load feedback fault.

Selects how the drive reacts to a loss of a load feedback. See 90.51 Load feedback selection.

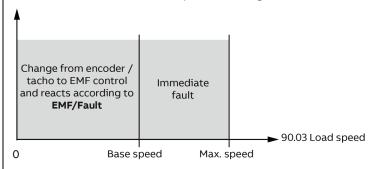
- 0: No action; none, disable load feedback fault.
- 1: **Fault**; the event generates fault 73A1 Load speed feedback and the motor stops according to 31.14 Fault stop mode fault level 3.





DZ_LIN_050_motor speed_c.ai

2: **EMF/Fault**; the event changes the speed feedback to EMF and stops the motor at the emergency stop ramp. Then the event generates fault 73A1 Load speed feedback. In case speed actual is greater than base speed the event generates fault 73A1 Load speed feedback and the motor stops according to 31.14 Fault stop mode fault level 3.

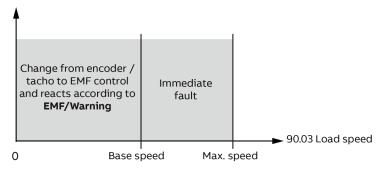


DZ_LIN_050_motor speed_c.ai

3: **EMF/Warning**; the event changes the speed feedback to EMF and generates warning A798 Encoder interface communication or A7B1 Load speed feedback.

Attention: The warning can only be reset by setting 96.27 Control board boot = Reboot or by cycling the auxiliary power.

In case speed actual is greater than base speed the event generates fault 73A1 Load speed feedback and the motor stops according to 31.14 Fault stop mode fault level 3.



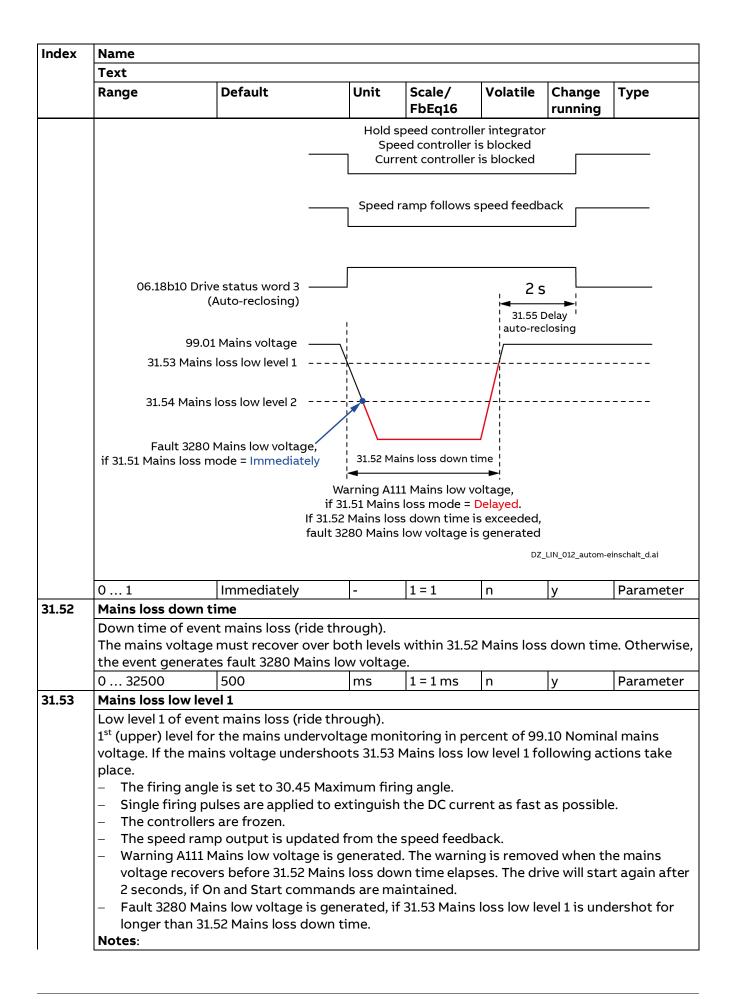
DZ_LIN_050_motor speed_c.ai

4: **Encoder/Warning**; This selection is only valid if 2 pulse encoders are connected. Depending on the setting of 90.41 M1 feedback selection, the speed feedback is changed from one encoder to the other encoder, in case of a problem. Additionally, the event generates warning A798 Encoder interface communication or A7B1 Load speed feedback.

Attention: The warning can only be reset by setting 96.27 Control board boot = Reboot or by cycling the auxiliary power.

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	A	<u>.</u>	•		•							
	Change fro	om Change from										
	one encod	er one encoder										
	to the oth encoder											
	encoder	encodei										
				90.03 Load spee	2d							
	0	Base speed Max. s		50.05 Loud spec	-u							
		base speed Trax. s	peca									
	0 4	Fault	DZ_LIN_050_n	notor speed_c.ai	T _n		Parameter					
31.41	Drive fan fault		-	1-1	n	У	Parameter					
31.4I		rive cooling fan fault.										
		e of event drive cooling	fan fault	Socialso 20	20 Drivo fa	n acknowle	odgo sourco					
		one, disable drive cooling			וע טכווע וע	ii ackiiowit	age source.					
					ae							
	1: Fault ; the event generates fault 5080 Drive fan acknowledge. 2: Warning ; the event generates warning A581 Drive fan acknowledge.											
	02	Fault	Ĭ-	1 = 1	ln j	V	Parameter					
31.44	Armature over		L	<u>l</u>	_1	12						
	Armature overc	urrent level.										
	The event generates fault 2310 Armature overcurrent, if 31.44 Armature overcurrent level in											
	percent of 99.11 M1 nominal current is exceeded. It is recommended to set 31.44 Armature											
	overcurrent level at least 25 % higher than e.g., 30.35 M1 current limit bridge 1.											
	-	99.11 M1 nominal currer			Armature o	overcurren	t level = 250					
		s with armature curren	ts > 2125	A _{DC} .			T.					
	0.00 400.00	250.00	%	100 = 1 %	n	у	Parameter					
31.45	Maximum curre	ent rise level										
		ture current rise level.										
	_	rates fault F539 Fast cu			ximum curi	ent rise lev	el in percent					
		ninal current per 1 ms is										
		opens the mains contac			er if preser	1	1					
	0.00 325.00	325.00	%/ms	100 = 1	n	У	Parameter					
24.42				%/ms								
31.46	Current ripple 1											
	Type of event a											
		e of event armature cur										
	• •	unction detects broken	-	yristors, curr	rent transfo	ormers (15	1, 152) or a					
		f the current controller. one, disable current ripp										
		nt generates fault F517		e current rin	ple. Superv	ises fuses	and					
	thyristors.	generates radic i 311	·	- carrent	r.c. Japei v	.505 10505						
	_	event generates warni	ng A117 A	rmature curr	ent ripple.	Supervises	fuses and					
	thyristors.	ing ; the event generates warning A117 Armature current ripple. Supervises fuses and ors.										
	-	I 2 ; the event generates	fault F5	l7 Armature o	current ripp	ole. Superv	ises fuses,					
		current transformers.				•	•					
		hod 2; the event genera		ing A117 Arm	nature curr	ent ripple.	Supervises					
	fusos thuristor	s, and current transforr	mars									

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0 4	Fault method 2	-	1 = 1	n	у	Parameter				
31.47	Current ripple	level									
	Level for armature current ripple level. Threshold for 31.46 Current ripple function in percent of 01.40 Drive current. Typical values when a thyristor is missing. - About 300 % of 01.40 Drive current for an armature drive. - About 90 % of 01.40 Drive current for high inductive loads (e.g., field exciter).										
31.50	0.0 1000.0 Armature over	150.0	%	10 = 1 %	n	У	Parameter				
	percent of 99.1 overvoltage lev Example : With the drive trips Note :	erates fault F503 Armat 2 M1 nominal voltage is yel at least 20 % higher 99.12 M1 nominal volta with armature voltages ye supervision is inactiv	s exceede than 99.12 .ge = 525 V s > 630 V _D	d. It is recom 2 M1 nomina 7 _{DC} and 31.50 c.	nmended to I voltage.) Armature o	set 31.50 A	Armature e level = 120 %				
	0.0 1000.0	120.0	% %	10 = 1 %	n	y	Parameter				
31.51	Mains loss mo		70	10 - 1 70		У	1 drameter				
	Selects the typ 0: Immediately The event of undershot. It is undershot. The event of undershot. The event of undershot. The event of 31.54 Mains recovers be 31.54 Mains 154 Mains	generates warning A111 The warning is remove time elapses. generates fault 3280 Ma for longer than 31.52 M mmediately generates	. Mains low votains loss of fault 3280. . Mains low ershot. The lown time tains low votershot for	oltage, if 31.5 down time. Mains low warning is elapses. longer than	tage recove 53 Mains los voltage, if 33 31.53 Mains removed w 53 Mains los 31.52 Mains	rs before 3 ss low level 1.54 Mains loss low level ss low level s loss dowr	1.52 Mains 1 is loss low level vel 1 and/or ains voltage 1 and/or a time.				

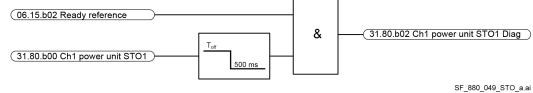


Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	 In case an On command is given, and the measured mains voltage is too low for longer than 500 ms A111 Mains low voltage is generated. If the problem persists for longer than 1 									
	31.54 MaiMains losmonitorirThe addit	ains low voltage is general ns loss low level 2 is no so low level 2 is no so low level 1 first. Thus, and 31.53 Mains loss low aironal 2 s delay of the act are auto-reclosing.	t monitored for a prope level 1 must	er function of t be higher th	the mains an 31.54 M	undervolta ains loss lo	ige ow level 2.			
	0.00 150.0		%	100 = 1 %	n	у	Parameter			
31.54	Mains loss lo	w level 2	l .							
	2 nd (lower) lin voltage. If the place: - If 31.51 Ma - Fau - If 31.51 Ma - The - The - Sind - The - Wai mai sta - Fau for - Thu	f event mains loss (ride nit for the mains under e mains voltage unders ains loss mode = Imme of 3280 Mains low voltage in an angle is set to 3 gle firing angle is set to 3 gle firing pulses are apple controllers are frozen. E speed ramp output is rning A111 Mains low voltage recovers be rt again after 2 second of 11 3280 Mains low voltage rthan 31.52 Main is, undershooting 31.54	voltage monhoots 31.54 diately: age is genered: nals are ign 0.45 Maxim plied to exti from the sp oltage is ger fore 31.52 N s, if On and age is genered s loss down Mains loss	Mains loss loss loss de ated immediored. um firing and neguish the Deed feedbacherated. The flains loss do Start commated, if 31.53 time. low level 2 g	ately. gle. C current a k. warning is wn time ela ands are ma Mains loss enerates no	as fast as p removed wapses. The aintained. low level 2	ossible. when the drive will is undershot the fault.			
	than 500 s 3280 Ma - 31.54 Mai Mains los	on Command is given ms A111 Mains low volt ains low voltage is gene ns loss low level 2 is no s low level 1 first. Thus, ng 31.53 Mains loss low 0 60.00	age is gene erated. t monitored for a prope	rated. If the plants of the reference of	oroblem pe mains volta the mains	ersists for le ge drops b undervolta	elow 31.53			
31.55	+		7,0	100 170	1	13	. a.a.meter			
	Delay auto-re Selects the d 0: No delay ; r applications. 1: 2 s delay ; 2	Delay auto-reclosing Delay auto-reclosing. Selects the delay time for auto-reclosing after a mains loss. O: No delay; no delay time for auto-reclosing after a mains loss. Used for non-motoric applications. 1: 2 s delay; 2 s delay time for auto-reclosing after a mains loss. Used for motoric applications.								
21.50	0 1	2 s delay	-	1 = 1	n	У	Parameter			
31.56	Selects how to 0: No action ;	n loss event D communication loss a the drive reacts to an ex none, disable commun ne event generates war	xtension I/C ication loss	function.						

	Name													
	Text													
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре							
		ent generates fault 7	082 Ext I/O	comm loss a	ınd the mot	or stops d	ue to 31.13							
		de communication.			1		1							
	0 2	Fault	-	1 = 1	n	у	Parameter							
31.57	Minimum field current trip delay													
	31.57 Minimun current recove disregarded. S Note : 31.57 Mi field exciter.	Delay time of event minimum field current. 31.57 Minimum field current trip delay delays fault F541 M1 field exciter low current. If the field current recovers before the delay elapses, fault F541 M1 field exciter low current will be disregarded. See 31.58 M1 field current low level. Note: 31.57 Minimum field current trip delay is blocked when 99.06 Operation mode = Large field exciter.												
	0 32500	2000	ms	1 = 1 ms	n	У	Parameter							
31.58	M1 field curre	nt low level current low level.												
	cases, the event gene reference - 31.58 M1 fi Fix/optito these case The event reference	eld current low level is fault level is automaterates fault F541 M1 files still undershot when eld current low level is rque, EMF/optitorques, the fault level is automates fault F541 I	ically set to seld exciter long 31.57 Mining some selection of the selecti	50 % of 28.3 ow current, i num field cu or 28.17 M1 E al/optitorqu set to 50 % o ter low curre num field cu	7 M1 field har field har field har field har field cours and EMF, and field har field, if 50 % and field.	eating refe 3.37 M1 field elay elapse Introl mode Preversal/o field currer of 28.14 M1	rence. The d heating es. e = optitorque. In at reference. I field current							
	0.00 135.00	50.00	%	100 = 1 %	n	У	Parameter							
		urrent level												
31.59	M1 field overd					Motor 1 field overcurrent level. The event generates fault F515 M1 field exciter overcurrent, if 31.59 M1 field overcurrent level ir percent of 99.13 M1 nominal field current is exceeded. It is recommended to set 31.59 M1 field overcurrent level at least 25 % higher than 99.13 M1 nominal field current. Notes: The field overcurrent fault is inactive, if 31.59 M1 field overcurrent level = 135 %. During field boost, the internal field overcurrent level is set to field overcurrent level plus field boost current.								
31.59	Motor 1 field of The event gen percent of 99. overcurrent le Notes: – The field of boost, the current.	overcurrent level. erates fault F515 M1 f 13 M1 nominal field cu vel at least 25 % highe vercurrent fault is ina internal field overcur	er than 99.13 ctive, if 31.5 rent level is	eeded. It is ro 8 M1 nomina 9 M1 field ov set to field o	ecommend I field curre ercurrent le vercurrent	ed to set 3: nt. evel = 135 % level plus f	1.59 M1 field 6.During field ield boost							
31.59	Motor 1 field of The event gen percent of 99. overcurrent le Notes: — The field of boost, the	overcurrent level. erates fault F515 M1 f 13 M1 nominal field cu vel at least 25 % highe vercurrent fault is ina internal field overcur	er than 99.13 ctive, if 31.5	eeded. It is re 3 M1 nomina 9 M1 field ov	ecommende I field curre Percurrent le	ed to set 3: nt. evel = 135 %	1.59 M1 field 6.During field							

Index	Name												
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	0 2	Warning	-	1 = 1	n	у	Parameter						
31.61	Reversal volt	delay	•	•	•	1	•						
	Reversal volt (high armature voltage b	efore bra	king) delay.									
	Time delay for	event reversal volt func	tion.										
	0 32500 500 ms 1 = 1 ms n y Parameter												
31.62	Isolation mon	itor event source											
	reserved												
	0 19	Inactive (true)	-	1 = 1	n	у	Parameter						
31.63	Isolation mon	itor event type											
	reserved												
	0 2	No action	-	1 = 1	n	у	Parameter						
31.70	External even	t 1 fault level											
		external event 1.											
		ult level of external even	t 1.										
		 fault ; see <u>Fault levels</u> .	1-										
		s running; see Fault leve		2. coo Fault	lovole								
	-	4: L3 Stop via 31.14 Fault stop mode fault level 3; see Fault levels.											
	8: L4 Stop via 31.15 Fault stop mode fault level 4; see <u>Fault levels</u> . 16: L5 Stop via 31.13 Fault stop mode communication; see <u>Fault levels</u> .												
	0 16	L1 Standard fault	1-	1 = 1	n	у	Parameter						
31.71		t 1 warning level			1	17	1						
	2: L2 Keep fan 4: L3 Auto-rec	ntactor inhibited; see <u>W</u> is running; see <u>Warning l</u> closing active; see <u>Warning l</u> d warning; see <u>Warning l</u> L4 Standard	<u>evels</u> . ng levels.		n	у	Parameter						
		warning											
31.72	External even	t 2 fault level											
	Fault level of external event 2. Defines the fault level of external event 2. See 31.70 External event 1 fault level.												
	0 16	L1 Standard fault	-	1 = 1	n	у	Parameter						
31.73		t 2 warning level											
	Defines the wa	of external event 2. arning level of external e											
	0 16	rnal event 1 warning leve	-	1 = 1			Parameter						
	0 10		-	1 - 1	n	У	Parameter						
	warning												
R1 7/1	Evternal even			External event 3 fault level Fault level of external event 3.									
31.74		t 3 fault level											
31.74	Fault level of e	t 3 fault level	t 3.										
31.74	Fault level of e	t 3 fault level external event 3. ult level of external even	t 3.	1=1	n	v	Parameter						
31.74	Fault level of e Defines the fa See 31.70 Exte 0 16	t 3 fault level external event 3. ult level of external even ernal event 1 fault level.	t 3.	1 = 1	n	у	Parameter						

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Defines the warning level of external event 3. See 31.71 External event 1 warning level.											
	0 16	L4 Standard warning	-	1 = 1	n	у	Parameter					
31.76	External ever	nt 4 fault level	•	'	•	•						
	Defines the f	Fault level of external event 4. Defines the fault level of external event 4. See 31.70 External event 1 fault level.										
	0 16	L1 Standard fault	-	1 = 1	n	у	Parameter					
31.77	External ever	nt 4 warning level					-1					
	Warning level of external event 4. Defines the warning level of external event 4. See 31.71 External event 1 warning level.											
	0 16	L4 Standard warning	-	1 = 1	n	У	Parameter					
31.78	External ever	nt 5 fault level										
	Fault level of external event 5. Defines the fault level of external event 5. See 31.70 External event 1 fault level.											
	0 16	L1 Standard fault	-	1 = 1	n	у	Parameter					
31.79	External ever	nt 5 warning level					•					
	Warning level of external event 5. Defines the warning level of external event 5. See 31.71 External event 1 warning level.											
	0 16	L4 Standard warning	-	1 = 1	n	у	Parameter					
31.80	Power units	STO status word					•					
	Safe torque off, power unit(s) status word. Displays the safe torque off status word of the power units (H7, H8) connected to channel1 and channel2 of the SDCS-DSL-H12 or channel1 channel4 of the SDCS-DSL-H14. Relationship between Chx power unit STOx and Chx power unit STOx Diag:											
	06 15 b02 Read	dy reference										



See Supplement for functional safety (3ADW000452).

Bit assignment:

Bit	Name	Value	Remarks
0	Ch1 power unit STO1	1	Channel1 power unit: The state of V11 (STO1) at
			the SDCS-OPL-H01 is high, normal operation.
		0	Channel1 power unit: The state of V11 (STO1) at
			the SDCS-OPL-H01 is low, save torque off is
			requested.
1	Ch1 power unit STO2	1	Channel1 power unit: The state of V12 (STO2) at
			the SDCS-OPL-H01 is high, normal operation.

Index	Name											
	Text											
	Rang	е	Default			Un	it	Scale/ FbEq16	Volatile	Change running	Туре	
					0	Channel1 power unit: The state of V12 (S the SDCS-OPL-H01 is low, save torque of requested.						
	2	Ch1 power (unit STO1	Diag	1		Channel1 power unit: Upper part of the B6-bridge is released. Channel1 power unit: Upper part of the B6-bridge is blocked.					
					0							
	3	Ch1 power (unit STO2	Diag	1	Channel1 power unit: Lower part of the B6-bridge is released.						
					0	Channel1 power unit: Lower part of the B6-bridge is blocked.						
	4	Ch2 power						oit 0 Ch1 pc				
	5	Ch2 power	unit STO2					oit 1 Ch1 po				
	6	Ch2 power	unit STO1	Diag			See l	oit 2 Ch1 po	wer unit S1	ΓΟ1 Diag.		
	7	Ch2 power	unit STO2	Diag			See l	oit 3 Ch1 po	wer unit S	ΓO2 Diag.		
	8	Ch3 power	unit STO1				See l	oit 0 Ch1 pc	wer unit S	ΓΟ1.		
	9	Ch3 power	unit STO2				See l	oit 1 Ch1 po	wer unit ST	02.		
	10	Ch3 power	unit STO1	Diag			See l	oit 2 Ch1 po	wer unit S1	ΓΟ1 Diag.		
	11	Ch3 power	unit STO2	Diag			See l	oit 3 Ch1 po	wer unit S	ΓO2 Diag.		
12 Ch4 power unit STO1 See bit 0 Ch1 power unit STO1.												
	13				See l	oit 1 Ch1 po	wer unit ST	02.				
	14	•						oit 2 Ch1 po				
	15	Ch4 power Diag	power unit STO2				See l	oit 3 Ch1 po	wer unit S1	ΓO2 Diag.		
		h FFFFh	-			-		1 = 1	у	n	Signal	
31.81	Powe	er units XSMC	:STO stat	us wo	rd							
	Displ chan See <u>S</u>	torque off, po ays the XSMC nel2 of the SE supplement fo ssignment:	C:STO stat OCS-DSL-H	us wo 112 or 0	rd of t chann	the p el1 .	oowe cha	r units (H7, Innel4 of th			nnel1 and	
	Bit	Name		Value	e R	ema	rks					
	0		wer unit	1				ower unit:	The relay o	utput XSM	C:STO at	
		XSMC:S							-	•		
	XSMC:STO the SDCS-OPL-H01 is closed, normal operation. O Channel1 power unit: The relay output XSMC:ST											
the SDCS-OPL-H01 is open. The fault shactive.						,						
	1 Ch2 power unit XSMC:STO 2 Ch3 power unit XSMC:STO				S	ee b	it 0 C	h1 power u	nit XSMC:S	TO.		
					S	ee b	it 0 C	h1 power u	nit XSMC:S	TO.		
	3	Ch4 po XSMC:S	wer unit STO		S	ee b	it 0 C	h1 power u	nit XSMC:S	TO.		
	4	15 reserve										
	0000	h FFFFh				_		1 = 1	у	n	Signal	
31.82	Ch1 p	ower unit ST	O time 1							<u> </u>		

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Safe torque of	f, STO1 execution tim	e of channe	1 power unit	(V11).	•						
	Time it takes a	fter V11 at the SDCS-	OPL-H01 has	been switcl	hed from 1	to 0 until t	he firing					
	pulses are blocked for STO1. Thus, the time difference between 31.80.b00 Power units STO											
	status word and 31.80.b02. See Supplement for functional safety (3ADW000452).											
		nt for functional safe	ty (3ADW000		1	T	1					
	0 65535	-	ms	1 = 1 ms	у	n	Signal					
31.83	Ch1 power uni											
	•	f, STO2 execution tim		•								
		fter V12 at the SDCS-					_					
		cked for STO2. Thus, t	the time diff	erence betw	een 31.80.b	001 Power ι	inits STO					
	status word an		+,, (2 \ D)\\(0.00	1452)								
		nt for functional safe					Cianal					
21.04	0 65535	- + CTO +: 1	ms	1 = 1 ms	у	n	Signal					
31.84	Ch2 power uni											
	· ·	oower unit STO time :	1	1	1		1					
	0 65535		ms	1 = 1 ms	у	n	Signal					
31.85	Ch2 power uni											
	<u>-</u>	oower unit STO time a	2.	1	1		1					
	0 65535	-	ms	1 = 1 ms	у	n	Signal					
31.86	Ch3 power uni											
	· .	oower unit STO time	1.		1	•	_					
	0 65535	-	ms	1 = 1 ms	у	n	Signal					
31.87	Ch3 power uni											
		power unit STO time i	2.									
	0 65535	-	ms	1 = 1 ms	у	n	Signal					
31.88	Ch4 power uni	t STO time 1										
	See 31.82 Ch1 p	oower unit STO time	1.									
	0 65535	-	ms	1 = 1 ms	у	n	Signal					
31.89	Ch4 power uni	t STO time 2										
	See 31.83 Ch1 p	oower unit STO time i	2.									
	0 65535	-	ms	1 = 1 ms	у	n	Signal					
31.90	XSMC:STO ind	ication	•	•		· · ·						
	Safe torque of	f, XSMC:STO indication	on (zero curr	ent time out	indication).						
	•	as the possibility to o					pervision of					
	the DC current	in case of a safe toro	que off reque	est.								
		rque off is requested			cted in less	than 300 i	ns the					
		y is kept closed and r		•								
		rque off is requested										
		y is opened, and the			31.90 XSM	IC:STO indi	ication.					
		nt for functional safe			octor VCMC	CTO.						
		rent generates fault 5 e event generates wai					\circ					
		e event generates war vent generates event	-				.					
	Notes:	rent generates event	DONO Daie U		المدري المحالة							
		of XSMC:STO can be	supervised i	n 31.91b04 S	TO status	word.						
		ly possible by activat	•				nower					
	11000010011					cycling the	power.					

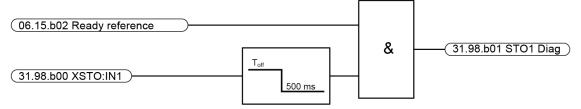
ex	Name												
	Text												
	Range	D	efault		Unit	Scale/ FbEq16	Volatile	Change running	Туре				
91	STO stat	us word				1.02920		1	L				
-	Safe toro	ue off, drive the safe tore lement for f	que off sta	tus word	d of the	drive (H1	H6) or cont	rol unit (H7	7, H8).				
	Bit	Name	Value	Pemai	Remarks								
	0	STO State		_	Safe torque off is inactive, normal operation.								
		(0: Active)			-	ff is active.	, normai op	eration.					
	1	reserved	- 0	Jaiet	orque o	ii is active.							
	2	XSTO:IN1	1	Thost	The state of XSTO:IN1 is high, normal operation.								
	2	X310:INI					•	•					
	3	XSTO:IN2	1		The state of XSTO:IN1 is low, save torque off is requested. The state of XSTO:IN2 is high, normal operation								
	3	X510:1N2		The state of XSTO:IN2 is high, normal operation. The state of XSTO:IN2 is low, save torque off is requested.									
	4	VCMC CTC	0					•	•				
	4	XSMC:STC				out XSMC:ST							
			0		The relay output XSMC:STO is open. The fault shutdown path is active.								
	-	CTO Come	4										
	5	STO Sum Fault	0		5092 STO overall fault is active.								
				5092 STO overall fault is inactive, normal operation. The state of both XSTO:IN1 and XSTO:IN2 is low, safe									
	6	STO Input	1	torque off is requested.									
		OFF	0				II and VCTC	المنط من ۱۸۱۵	h nounce!				
			0	opera		oth XSTO:IN	II aliu ASTC	inz is nigi	i, normai				
					If the state of XSTO:IN1 and XSTO:IN2 is different, either								
				fault FA81 Safe torque off 1 loss fault or fault FA82 Safe									
				torque off 2 loss fault is generated.									
	7	STO Reset	: 1	This bit becomes high after 600 ms when no safe torque									
		Indication		off related fault is active, see 5092 STO overall fault, and bit									
				STO Input OFF signal is high, see 31.91b06 STO status									
				word.	•	J	J ,						
				Active	: It is po	ssible to res	et the safe	ty relay.					
			0	Inactiv	ve: It is ı	not possible	to reset the	e safety rel	ay, normal				
				opera	tion.								
	8	Current	1	Zero a	ırmatur	e current det	ected. See	06.24.b13	Current				
		Zero		contro	oller sta	tus word 1.							
			0	Armat	ure curi	ent not zero	. See 06.24	.b13 Currer	nt controlle				
				status	word 1	•							
	9 15	reserved											
	0000h	FFFFh -			-	1 = 1	У	n	Signal				
94	STO time	1											
	Safe toro	ue off, time	XSTO:IN1	of the dr	ive (H1	H6) or cor	ntrol unit (H	17, H8).					
		kes after XS							are blocked				
		orque off 1.											
		•	unctional s	al safety (3ADW000452).									
	0 6553	5 -			ms	1 = 1 ms	у	n	Signal				
5	STO time				1	1		1	, ,				
-		ue off, time											

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Time it takes after XSTO:IN2 has been switched from 1 to 0 until the firing pulses are blocked for safe torque off 2. See Supplement for functional safety (3ADW000452).									
	0 65535	-	ms	1 = 1 ms	у	n	Signal			

31.98 STO actual status

Safe torque off, drive/control unit actual status word.

Displays the safe torque off actual status word of the drive (H1 \dots H6) or control unit (H7, H8). Relationship between XSTO:INx and Chx power unit STOx Diag:



SF_880_049_STO_a.ai

See Supplement for functional safety (3ADW000452).

Bit assignment:

Bit	Name	Value	Remarks				
0	XSTO:IN1	1	The state of XSTO:IN1 is high, normal operation.				
		0	The state of XSTO:IN1 is low, save torque off is requested.				
1	STO1 Diag	1	Upper part of the B6-bridge is released.				
		0	Upper part of the B6-bridge is blocked.				
2	XSTO:IN2	1	The state of XSTO:IN2 is high, normal operation.				
		0	The state of XSTO:IN2 is low, save torque off is requested.				
3	STO2 Diag	1	Lower part of the B6-bridge is released.				
		0	Lower part of the B6-bridge is blocked.				
4	reserved						
5	reserved						
6	reserved						
7	reserved						
8	Current	1	Armature current not zero. See 06.24.b13 Current				
	Not Zero		controller status word 1.				
		0	Zero armature current detected. See 06.24.b13 Current				
			controller status word 1.				
9	XSMC:STO	1	The relay output XSMC:STO is closed, normal operation.				
		0	The relay output XSMC:STO is open. The fault shutdown				
			path is active.				
10	STO Active	1	Safe torque off is active.				
		0	Safe torque off is inactive, normal operation.				
11	STO Reset	1	This bit becomes high after 600 ms when no safe torque				
	Indication		off related fault is active, see 5092 STO overall fault, and				
			bit STO Input OFF signal is high, see 31.91b06 STO status				
			word.				
			Active: It is possible to reset the safety relay.				
		0	Inactive: It is not possible to reset the safety relay, normal				
			operation.				
12 1	5 reserved						

Index	Name Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	0000h FFFFh	-	-	1 = 1	у	n	Signal		
21.00	CTO facile dia sus a	-4	-				-		

31.99 STO fault diagnostic

Safe torque off, fault diagnostic status word.

Displays the safe torque off fault diagnostic status word.

See Supplement for functional safety (3ADW000452).

Bit assignment:

Bit	Name	Value	Remarks				
0	XSTO:IN1	1	The state of XSTO:IN1 is high, normal operation.				
		0	The state of XSTO:IN1 is low, save torque off is requested.				
1	STO1 Diag	1	Upper part of the B6-bridge is released.				
		0	Upper part of the B6-bridge is blocked.				
2	XSTO:IN2	1	The state of XSTO:IN2 is high, normal operation.				
		0	The state of XSTO:IN2 is low, save torque off is requested.				
3	STO2 Diag	1	Lower part of the B6-bridge is released.				
		0	Lower part of the B6-bridge is blocked.				
4	Bridge 2	1	Bridge 2 selected. See 27.19 Selected bridge.				
		0	Bridge 1 selected. See 27.19 Selected bridge.				
5	Generating	1	Drive is generating. See 06.24.b09 Current controller status word 1.				
		0	Drive is motoring. See 06.24.b09 Current controller status word 1.				
6	Single	1	Single firing pulses.				
	pulses	0	No firing pulses or normal firing pulses.				
7	Enabled	1	Drive is in state Ready reference. See 06.15.b02 Main status word.				
		0	Drive is not in state Ready reference. See 06.15.b02 Main status word.				
8	Current Not Zero	1	Armature current not zero. See 06.24.b13 Current controller status word 1.				
		0	Zero armature current detected. See 06.24.b 13 Current controller status word 1.				
9	XSMC:STO	1	The relay output XSMC:STO is closed, normal operation.				
		0	The relay output XSMC:STO is open. The fault shutdown path is active.				
10	reserved						
11	reserved						
12	Ch1 power	1	Channel1 power unit current not zero.				
	unit Current Not Zero	0	Channel1 power unit zero current detected.				
13	Ch2 power	1	Channel2 power unit current not zero.				
	unit Current Not Zero	0	Channel2 power unit zero current detected.				
14	Ch3 power	1	Channel3 power unit current not zero.				
14							

Index	Name									
	Text									
	Range		Defa	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре
		Current Not Zer								
	15	Ch4 pov	ver	1	Chann	el4 powe	r unit currer	nt not zero	•	
		unit Current		0	Chann	el4 powe	er unit zero c	urrent det	ected.	
		Not Zer	0							
	0000h	FFFFh	-			-	1 = 1	у	n	Signal
31.100	STO test	mode								
	Safe torq	ue off, tes	st mo	ode.						
	Contains			•		•				
	See Supp						<u>452)</u> .			
	0: None ; r			•						
										safe torque
				-						id 31.98.b10
	STO actual status is set to one. Then the test mode is automatically reset to None.									
				-			-	The fault s	shutdown p	eath is active.
	Then the	test mod	e is a	utomatic	ally res	et to Non	e.	1	Г	_
	0 2		Non	е		-	1 = 1	у	у	Parameter

32 Supervision

Configuration of signal supervision functions 1 ... 3. Three values can be monitored. A warning or fault is generated whenever predefined limits are exceeded.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
32.xx	Not part of the firmware.									
32.xx		•	•	•	- 1	•	•			

33 Generic timer & counter

Configuration of maintenance timers/counters.

Index	Name	Name										
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
33.xx	Not part of the firmware.											
33.xx		·										

35 Motor thermal protection

Motor thermal protection settings such as temperature measurement configuration and load curve definition.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
35.01	Estimated temper	ature 1				•					
	Estimated motor t	emperatu	re 1 based on	motor 1.							
	Displays motor 1 temperature as estimated by motor 1 thermal model based on the armature										
	current. See parameters 35.50 35.55 and 99.11 M1 nominal current. The unit is selected by										
	96.02 Unit selectio	n.	T	T		1	1				
	-80.0 1000.0	-	°C or °F	1 = 1°C or °F	n	n	Signal				
35.02	Measured motor temperature 1										
	Measured motor temperature 1. Displays the motor temperature received through the source defined by 35.11 Temperature 1.										
		Displays the motor temperature received through the source defined by 35.11 Temperature 1 source. The unit is selected by 96.02 Unit selection.									
	Note : With a PTC sensor, the unit is Ω .										
	-80.0 1000.0,	_	°C,	1 = 1°C,	у	n	Signal				
	-76 1832 or		°F or	°F or	,	''	Signal				
	0 5000		Ohm	Ohm							
35.03	Estimated temper	ature 2	•			- I	•				
	Estimated motor t		re 2 based on	motor 2.							
	Displays motor 2 to	emperatur	e as estimate	d by motor 2 the	rmal model	based on t	he armature				
	current. See param		8 35.63 and	d 42.08 M2 nomir	nal current. 1	The unit is s	selected by				
	96.02 Unit selectio	n.	1	1		1	,				
	-80.0 1000.0	-	°C or °F	1 = 1°C or °F	n	n	Signal				
35.04	Measured temperature 2										
	Measured motor temperature 2. Displays the motor temperature received through the source defined by 35.21 Temperature 2										
	source. The unit is	•		_	ce defined b	by 35.21 Ter	mperature 2				
	Note: With a PTC s		-	selection.							
	-80.0 1000.0,	_	°C,	1 = 1°C,	у	n	Signal				
	-76 1832 or		°F or	°F or	У	''	Signal				
	0 5000		Ohm	Ohm							
35.11	Temperature 1 sou	ırce	1	1							
	Temperature 1 fee		nnel source.								
	Selects the source	for 35.01 E	Estimated ten	nperature 1 and 3	35.02 Measu	red temper	ature 1.				
	0: Disable ; disable	•									
	1: Estimated temp			•			•				
	parameters 35.50 .				tor estimate	d tempera	ture 1. See				
	also chapter Motor 2: KTY84 analog I/				ag innut cal	set ad by 2E	1.4				
	Temperature 1 Al s	-			•	•					
	H01 or on an I/O ex		_	tput. The input a	na oatpat ci	an be on en	C 3D C3 CO11				
	For wiring example			and switch settir	ngs see char	oter Motor	thermal				
	protection of this		,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		J						
	3: KTY84 encoder	module 1;	1 KTY84 sense	or connected to e	encoder mod	dule 1. See	91.21 Module				
	1 temp sensor type			•							
	4: KTY84 encoder				encoder mo	dule 2. See	91.24 Module				
I	2 temp sensor type	e and 91.25	Module 2 ter	np filter time.							

Index	Name								
	Text								
	Range	Default	Unit	Scale/	Volatile	Change	Туре		
				FbEq16		running			
	5: 1 • PT100 aı	nalog I/O; 1 PT	100 sensor	connected to an a	nalog input s	elected by	35.14		
	Temperature :	1 AI source and	an analog	output. The input	and output ca	an be on th	e SDCS-CON-		
	H01 or on an I	/O extension m	nodule.						
	For wiring exa	ımples, parame	eter-, jumpe	er- and switch sett	ings see chap	oter <u>Motor</u>	<u>thermal</u>		
	protection of								
	6: 2 • PT100 a	nalog I/O ; as s	election 1 •	PT100 analog I/O	, but with 2 se	ensors con	nected in		
	series.								
		n alog I/O ; as se	election 1 •	PT100 analog I/O,	but with 3 se	nsors con	nected in		
	series.								
			-	gital input DI6. Eitl		•	ture, or 4000		
				n in 35.02 Measure					
				connected to enco	der interface	1. See 91.2	1 Module 1		
	•	ype and 91.22 i		•					
	10: PTC encoder module 2 ; 1 PTC sensor connected to encoder interface 2. See 91.24 Module 2 temp sensor type and 91.25 Module 2 temp filter time.								
	•			•					
				e is taken from the					
				ne source is assum	ied to be in tr	ie unit of te	emperature		
		6.02 Unit selec					l h 25 14		
				sor connected to			-		
	•	/O extension m	_	output. The input	and output Co	an be on th	e SDCS-CON-		
				er- and switch sett	ings soo shar	stor Motor	r thermal		
	protection of		eter-, jurripe	er- and Switch Sett	ings see chap	inotor	triermai		
			coloction :	1 • PT1000 analog	I/O but with	2 concors	connected in		
	series.	alialog 1/O, as	Selection.	1 • F 11000 analog	i/O, but with	2 36113013	connected in		
		analog I/O: as	selection 1	I • PT1000 analog	I/O but with	3 sensors (connected in		
	series.	, and 09 1, 0 , as	J SCICCCIOIT 2	r v r r r r r r r r r r r r r r r r r r	i, o, bac with	5 50115015	connected in		
		a I/O:1 3 • P	TC sensors	connected to an a	analog input s	selected by	35 14		
		_		output. The input	• .	-			
		/O extension m							
				er- and switch sett	ings see char	ter Motor	thermal		
	protection of	•	, , ,		90 000 0				
			ure, or 4000	Ω Ω , excessive tem	perature, will	be shown	in 35.02		
	Measured tem	•	•	·	•				
		•	notor 1; est	timated temperat	ure for motor	1 during sl	nared motion		
	To setup use	oarameters 35.	50 35.55	. the result is shov	vn in 35.01 Mo	otor estima	ited		
	temperature 1	l. See also chap	ter <u>Motor t</u>	hermal protection	of this manu	ıal.			
	0 21	Disable	-	1 = 1	n	у	Parameter		
35.12	Temperature	1 fault level		•	•		•		
			ature monit	toring function 1.					
				ature monitoring	function 1. W	hen the			
			-	re 1 exceeds the le			fault 4981		
		ature 1 measur	•		,	J = 2.230	-		
	•	ected by 96.02							
		TC sensor, the							
	-80.0 1000.		°C,	1 = 1°C,	n	у	Parameter		
	-76 1832 or	266 or	°F or	°F or		,			
			Ohm	Ohm					
	10 5000	4500	1011111	IOIIII					
35.13	0 5000	4500 1 warning leve		Olilli					

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Defines the warni measured/estima A491 Motor temp The unit is selecte Note : With a PTC	ated motor erature 1 m ed by 96.02	temperatu easured/es Unit select	re 1 exceeds the stimated.	_		
	-80.0 1000.0, -76 1832 or 0 5000	125, 257 or 4500	°C, °F or Ohm	1 = 1°C, °F or Ohm	n	у	Parameter
35.14	Temperature 1 Al	source	1		l		I
	For wiring examp protection of this Other; source selected; rolling 1: Al1 actual value 2: Al2 actual value 3: Al3 actual value Note: Examples for this protection of the prot	s manual. ection. not in use. e; standard e; standard e; standard	analog inpu analog inpu analog inpu	ut Al1. ut Al2. ut Al3.		oter <u>Motor</u> (<u>thermal</u>
	0 3	Not selected	-	1 = 1	n	У	Parameter
	Klixon source for The event genera selected and the 0 = Klixon open. 1 = Klixon closed. Note: It is possible 0: Klixon open; klimit 1: Klixon closed; klimit 2: None; inactive. 3: DI1; 10.02.b00 In 5: DI3; 10.02.b01 In 5: DI3; 10.02.b03 In DI5; 10.02.b04 In DI5; 10.02.b05 In: DIO1; 11.02.b00 In DIO1; 11.02.b00 In DIO1; 11.02.b00 In DIO1; 11.02.b00 In DIO1; 11.02.b00 In DIL; 10.02.b15	tes fault 49 klixon is oper le to connect ixon is oper klixon is clos Supervision DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s DI delayed s	81 Motor to en. It several kl in Generates sed. Norma in 1 klixon is tatus. tatus. tatus. itatus. itatus. ed status. ed status.	emperature 1 me ixons in series. s fault 4981 Mot I operation.	easured/estima	-	·
	0 19	None	-	1 = 1	n	у	Parameter
35.21	Temperature 2 so Temperature 2 fe Selects the source 2. 0: Disable ; disable 1: Estimated tem parameters 35.58 also chapter Moto	edback cha e for 35.03 I e temperati perature 2; 3 35.63. Tl	Motor estin ure 2 feedba Estimated ne result is	nated temperati ack channel. motor temperat shown in 35.03 l	ture 2 based on	motor 2. T	o setup use

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	2: KTY84 an	alog I/O; 1 KTY84	4 sensor con		nalog input sel		5.24					
		e 2 AI source and			• .	-						
	•	I/O extension m	_		·							
	For wiring ex	kamples, parame	eter-, jumper-	and switch set	tings see chap	ter <u>Motor</u>	thermal					
	protection o	f this manual.										
	3: KTY84 en	coder module 1;	1 KTY84 sens	or connected t	o encoder mod	dule 1. See 9	91.21 Module					
	1 temp sense	or type and 91.22	Module 1 te	mp filter time.								
		coder module 2;			o encoder mod	dule 2. See	91.24 Modul					
	•	or type and 91.25		•								
		analog I/O ; PT10			_	•	•					
	Temperature 2 Al source and an analog output. The input and output can be on the SDCS-CO											
		H01 or on an I/O extension module. For wiring examples, parameter-, jumper- and switch settings see chapter Motor thermal										
	_		eter-, jumper-	and switch set	tings see chap	ter <u>Motor</u>	<u>thermal</u>					
		f this manual.										
		analog I/O; as se	election 1 • P	T100 analog I/C), but with $2 se$	ensors conr	nected in					
	series.											
		analog I/O ; as se	election 1 • P	T100 analog I/C), but with 3 se	nsors conr	nected in					
	series.											
		TC sensor conne	_	•								
		ormal temperatu	ıre, or 4000 !	Ω , excessive ter	nperature, will	be shown	in 35.04					
		mperature 2.										
		der module 1; 1 P			oder interface	1. See 91.2	I Module I					
	•	type and 91.22 N		•		- 2 C 01	24 Mardula 2					
		oder module 2 ; 1 type and 91.25 N			coder interiac	e 2. See 91.	24 Module 2					
		mperature; the t		•	o source solec	tad by 25.2	4					
		e 2 Al source. The	•			•						
	•	96.02 Unit select		300100 13 03301	ned to be in th	ie dilic or co	imperature					
		00 analog I/O; PT		connected to a	standard ana	log input s	elected by					
		erature 2 Al sourc					-					
		H01 or on an I/O		•								
		kamples, parame			tings see chap	ter Motor	thermal					
	_	f this manual.	,,			-						
	14: 2 • PT10 0	00 analog I/O ; as	selection 1	PT1000 analog	J/O, but with	2 sensors o	connected in					
	series.	_		_								
	15: 3 • PT10 0	00 analog I/O ; as	selection 1	PT1000 analog	J I/O, but with	3 sensors o	connected in					
	series.											
		og I/O ; 1 3 • P				•						
	Temperature	e 2 AI source and	an analog o	utput. The input	t and output ca	an be on th	e SDCS-COI					
	H01 or on an	I/O extension m	nodule.									
	_	kamples, parame	eter-, jumper	and switch set	tings see chap	ter <u>Motor</u>	<u>thermal</u>					
		f this manual.										
		ormal temperatu	ure, or 4000 !	Ω , excessive ter	nperature, will	be shown	in 35.04					
		mperature 2.			_							
		d temperature n		•		_						
		etup use parame					or estimated					
		2. See also chap	ter <u>Motor th</u>		on of this manu	ıal.	1					
	0 21	Disable	_	1 = 1	l	1	Parameter					
	0 21	Disable		1 - 1	n	У	Parameter					

Fault level for motor temperature monitoring function 2.

	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Defines the fault measured/estima Motor temperatu The unit is selecte Note : With a PTC	ated motor Ire 2 measur ed by 96.02	temperature ed/estimate Unit selection	2 exceeds the leve d.			fault 4982
	-80.0 1000.0, -76 1832 or 0 5000	130, 266 or 4500	°C, °F or Ohm	1 = 1°C, °F or Ohm	n	у	Parameter
35.23	Temperature 2 w	arning leve				•	•
	Warning level for Defines the warning measured/estima A492 Motor temp The unit is selected Note: With a PTC -80.0 1000.0,	ing level for ated motor perature 2 m ed by 96.02 sensor, the 125,	motor temper temperature leasured/esti Unit selection unit is Ω.	erature monitoring 2 exceeds the leve mated. n. 1 = 1°C,	g function 2		
	-76 1832 or	257 or	°F or	°F or			
35.24	0 5000	4500	Ohm	Ohm			
	ortection of this Other; source sele 0: Not selected; r 1: Al1 actual value 2: Al2 actual value 3: Al3 actual value Note: Examples f	ection. not in use. e; standard e; standard e; standard	analog input analog input	AI2. AI3.	rotection.		
			1	- 1000 010110	1		
	10 3	Not	-	1 = 1	n	y	Parameter
35.25	0 3 Supervision 2 klix	selected	-	1 = 1	n	у	Parameter

Index Name Text Range Default Unit Scale/ Volatile Change Type FbEq16 running 19: DIL; 10.02.b15 DI delayed status. None 1 = 1 n У Parameter 35.50

Motor ambient temperature 1

Ambient temperature for motor 1 thermal model.

Defines the ambient temperature of motor 1 for motor 1 thermal model. Diagram see chapter Motor thermal protection. Motor 1 thermal model estimates motor 1 temperature based on parameters 35.50 ... 35.55 and 99.11 M1 nominal current.

The unit is selected by 96.02 Unit selection.

WARNING

The model cannot protect the motor if the motor does not cool properly because of dust, dirt, etc.

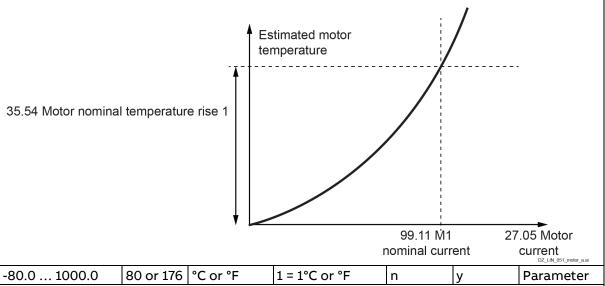
-80.0 ... 1000.0 35 or 95 °C or °F 1 = 1°C or °F n Parameter

35.54 Motor nominal temperature rise 1

Temperature rise for motor 1 thermal model.

Defines the temperature rise of motor 1 when the motor 1 is loaded with 99.11 M1 nominal current. This is basically the scaling from current² to the rated motor 1 temperature. See the motor manufacturer's recommendations in the motor data sheet.

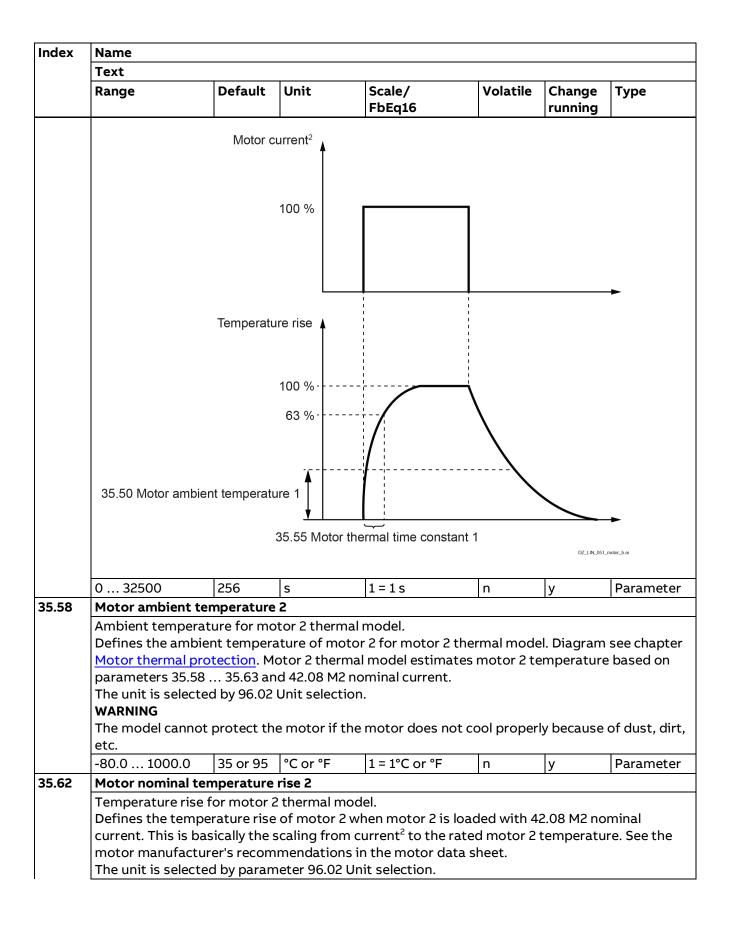
The unit is selected by parameter 96.02 Unit selection.

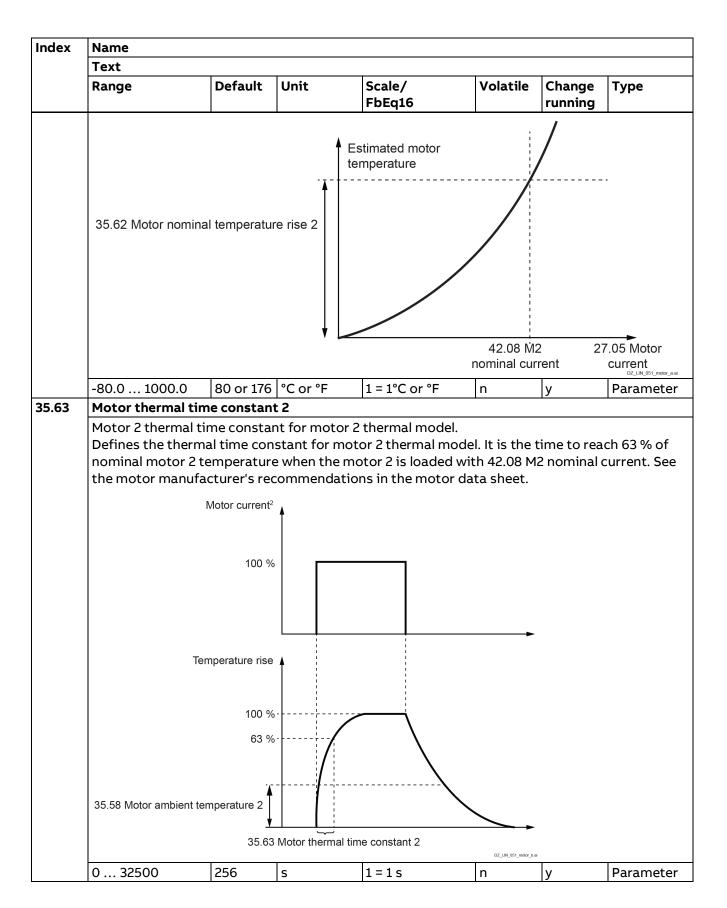


35.55 Motor thermal time constant 1

Motor 1 thermal time constant for motor 1 thermal model.

Defines the thermal time constant for motor 1 thermal model. It is the time to reach 63 % of nominal motor 1 temperature when the motor 1 is loaded with 99.11 M1 nominal current. See the motor manufacturer's recommendations in the motor data sheet.





36 Load analyzer

Peak value and amplitude logger settings.

Index	Name Text									
	36.xx	Not part of the firmware.								
36.xx		<u>.</u>			•					

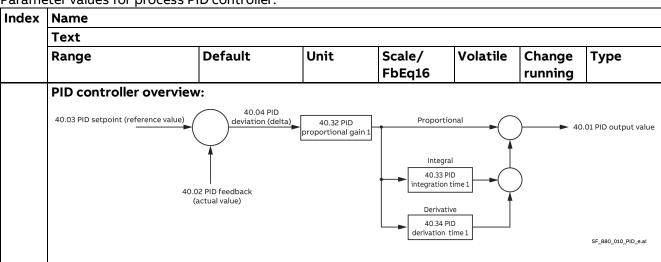
37 User load curve

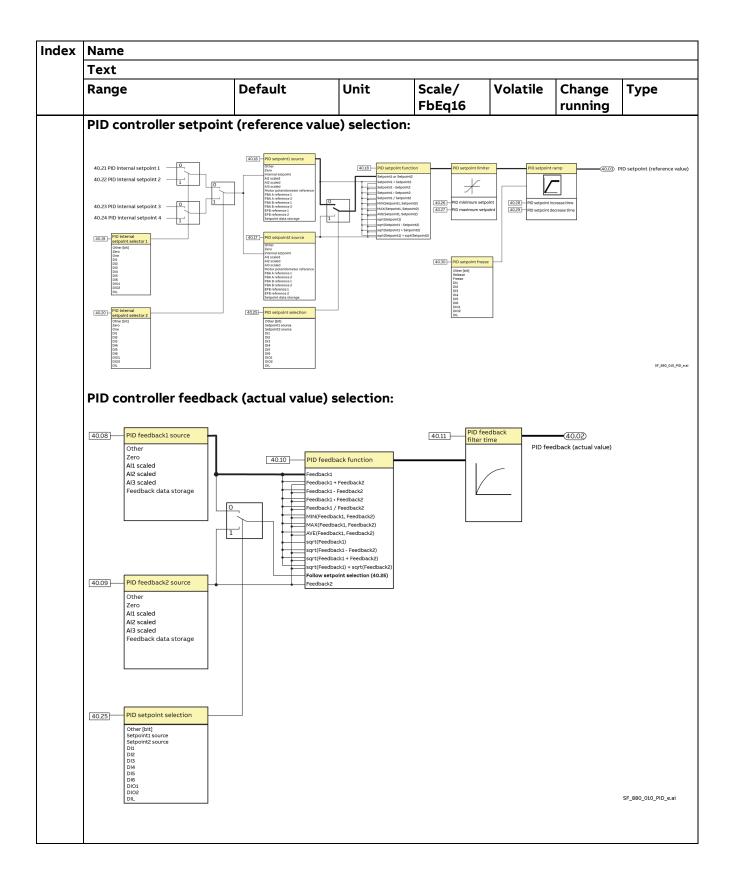
Settings for user load curve.

Index	Name Text									
	37.xx	Not part of the firmware.								
37.xx		·								

40 Process PID

Parameter values for process PID controller.





Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	PID controller funct	ion:	1	<u> </u>	-	<u> </u>	1				
					_						
					c	ID ontroller	–40.06 PID status word				
					s	tatus					
	_		scaling	PID controller		utput limiter	40.01) PID output value				
	PID feedback (actual value) (40.02) PID setpoint (reference value) (40.03)		15/40.14	Set1	PID integral reference	*					
			in unit selection out unit selection			inimum output					
			setpoint scaling output scaling 40.3		40.37 PID m	aximum output					
		40.07 PID	operation mode	PID derivation time 1	1						
		Othe	17 40.5	PID set1/set2 selection Set2							
		Enal D11 D12 D13 D14									
		DIS DI6 DIO1 DIO2	40.6	PID proportional gain 2							
		DIL Enak	ele when drive is running 40.6	PID integration time 2 PID derivation time 2							
			reset 40.6	PID derivation filter time	2						
		Rese	t controller								
			output freeze								
		40.39 PID 6	output freeze dead band range dead band delay								
		(ACCAPA) PID	sead band delay								
40.01	PID output value										
	Process PID, output.		Para dan arab		·· f 40 1	I DID t					
	Displays the PID con and 40.15 PID outpu	-	• .		ing of 40.14	FPID setpo	oint scaling				
	-32768.0 32767.0		See 40.13	1 = 1	l _v	l _n	Signal				
	-32100.0 32101.0	-	3ee 40.13	(40.13)	У	n	Signal				
40.02	PID feedback (actua	l value)		(10.13)							
	Process PID, feedback (actual value).										
	Displays the PID con	,	fter source se	election and	l filtering.						
	-32768.00 32767.0	0 -	See 40.12	1 = 1	у	n	Signal				
				(40.12)							
40.03	PID setpoint (refere	nce value)									
	Process PID, setpoin										
	Displays the PID con		1	1			T				
	-32768.00 32767.0	00 -	See 40.12	1 = 1 (40.12)	У	n	Signal				
40.04	PID deviation (delta)	1		1	1	1				
	Process PID, deviation	•									
	Displays the PID con		By default, it i	is Setpoint -	Feedback,	but it can	be inverted				
	using 40.31 PID devi			_	_	_	_				
	-32768.00 32767.0	0 -	See 40.12	1 = 1	У	n	Signal				
				(40.12)							
40.05	PID integral referen										
	Process PID, integrat		L-DID :	. !! 6 !!	. alau						
	Displays the integra			_			ng of 40.14				
	PID setpoint scaling	and 40.15 PID out	put scanng (s	scaling facto	or = 40.15/4	·U.14).					

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	-32768.0 32767.0	-	See 40.13	1 = 1 (40.13)	у	n	Signal

40.06 PID status word

Process PID, status word.

Displays the PID controller status information.

Bit assignment:

Bit	Name	Value	Remarks
0	Active	1	The PID controller is active. See 40.07 PID operation mode.
		0	The PID controller is inactive.
1	Setpoint frozen	1	The PID controller setpoint is frozen. See 40.30 PID setpoint freeze.
		0	The PID controller setpoint is released.
2	Output frozen	1	The PID controller output is frozen. See 40.38 PID output freeze.
		0	The PID controller output is released.
3 6	reserved		
7	Output limited at	1	The PID controller output is limited by 40.37 PID maximum output.
	maximum	0	The PID controller output is not limited.
8	Output limited at	1	The PID controller output is limited by 40.36 PID minimum output.
	minimum	0	The PID controller output is not limited.
9	Dead band control	1	The PID controller dead band is active. See 41.39 PID dead band range.
		0	The PID controller dead band is inactive.
10	PID set1/set2	1	The PID controller set2 is used. See 40.57 PID set1/set2 selection.
		0	The PID controller set1 is used.
11	reserved		
12	PID internal setpoint	1	The PID controller Internal setpoint is active. See 40.16 PID setpoint 1 source or 40.17 PID setpoint 2 source.
		0	An external setpoint is active.
13 15	reserved		

1 = 1

n

40.07 PID operation mode

0000h ... FFFFh

Process PID, operation mode.

Enable/Disable the PID controller.

Other; source selection.

0: **Disable**; 0, disable the process PID.

1: **Enable**; 1, enable the process PID.

3: **DI1**; 10.02 DI delayed status bit 0.

4: **DI2**; 10.02 DI delayed status bit 1.

5: **DI3**; 10.02 DI delayed status bit 2.

Signal

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	6: DI4 ; 10.02 DI dela	ayed status bit 3.	!		<u> </u>		•			
	7: DI5 ; 10.02 DI dela	-								
	8: DI6 ; 10.02 DI dela	-								
	11: DIO1 ; 11.02 DIO	delayed status bit	0.							
	12: DIO2 ; 11.02 DIO	delayed status bit	1.							
	19: DIL ; 10.02 DI de	layed status bit 15.								
	21: Enable when dr	ive is running; the	process PID	controller is	enabled wh	en the drive	e is running.			
	See 06.15.b02 Mair	n status word.								
	0 21	Disable	-	1 = 1	n	у	Parameter			
40.08	PID feedback1 sou	rce	I	.	II.		<u> </u>			
	Process PID, feedb	ack (actual value) s	ources.							
	Selects the first source of the PID controller feedback.									
	Other; source selection.									
	0: Zero ; output is s	et to zero.								
	1: Al1 scaled ; 12.12	AI1 scaled value.								
	2: AI2 scaled ; 12.22	AI2 scaled value.								
	3: Al3 scaled; 12.32 Al3 scaled value.									
	10: Feedback data	storage; 40.91 PID	feedback c	lata storage.						
	0 10	Al1 scaled	-	1 = 1	n	у	Parameter			
40.09	PID feedback2 sou	rce	•	•	1		•			
+0.03	Process PID, feedb	ack (actual value) s	ources.							
	•	source of the PID		edback.						
	Other; source selec	ction.								
	0: Zero ; output is s	et to zero.								
	1: Al1 scaled (12.12); 12.12 AI1 scaled va	alue.							
	2: AI2 scaled (12.22	?) ; 12.22 AI2 scaled v	⁄alue.							
	3: AI3 scaled (12.32	?) ; 12.32 AI3 scaled \	⁄alue.							
	10: Feedback data	storage; 40.91 PID	feedback c	lata storage.						
	0 10	Zero	-	1 = 1	n	у	Parameter			
40.10	PID feedback func	tion		·			_			
	Process PID, feedb	ack (actual value) f	unction.							
		tical function betw		PID feedback1	source and	40.09 PID	feedback2			
	source.									
	0: Feedback1 ; feed	back1 selected by 4	40.08 PID fe	eedback1 sour	ce.					
	1: Feedback1 + Fee	dback2; the sum o	f the two fe	edback sourc	es is used.					
	2: Feedback1 - Fee	dback2; the result	of feedback	ເ1 source minເ	ıs feedback	2 source is	used.			
	3: Feedback1 • Fee	dback2; the multip	lication of t	he two feedb	ack sources	is used.				
	4: Feedback1 / Fee	edback2; the result	of feedbac	k1 source divi	ded by feed	lback2 sour	ce is used.			
	5: MIN(Feedback1,	Feedback2); the sr	maller of th	e two feedbac	ck sources i	s used.				
	6: MAX(Feedback1	, Feedback2) ; the g	reater of th	ne two feedba	ck sources	is used.				
	7: AVE(Feedback1,	Feedback2); the av	verage of th	ne two feedba	ck sources	is used.				
	8: sqrt(Feedback1)); square root of fee	edback1 so	urce.						
	9: sqrt(Feedback1	- Feedback2); squa	are root of (feedback1 so	urce minus	feedback2	source).			
	10: sqrt(Feedback	1 + Feedback2) ; sqt	uare root of	f (feedback1 s	ource plus f	feedback2 s	source).			
	11: sqrt(Feedback1	l) + sqrt(Feedback	2) ; square r	oot of feedba	ck1 source ¡	olus square	root of			
	feedback2 source.									
	_	t selection (40.25);				dependent	on the			
	selection of the so			•						
	21: Feedback2; fee	dback2 selected by	40.09 PID	feedback2 soι	ırce.					

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0 21	Feedback1	-	1 = 1	n	у	Parameter				
40.11	PID feedback filter tin	ne	•		•	'					
	Process PID, feedback	(actual value) fi	ilter.								
	Defines the filter time			oller feedback	, .•						
	0.000 30.000	0.000	S	1000 = 1 s	n	у	Parameter				
40.12	PID unit selection		•		•	1-					
	Process PID, input values unit selection. Defines the unit for signals/parameters 40.02 40.04 and 40.21 40.24. 0: No Unit ; no unit used. 3: Hz ; hertz. 4: %; percent. 7: rpm ; rpm. 250: PID customer unit ; User definable unit for 40.12 PID in unit selection. The name of the unit										
		•									
	can be edited using th	e control panel:	ivienu - Set	1 = 1			T. Parameter				
40.13	PID out unit selection	%	-	1 = 1	n	У	Parameter				
40.14	Process PID, output va Defines the unit for 40 0: No Unit; no unit use 3: Hz; hertz. 4: %; percent. 7: rpm; rpm. 249: PID out unit; User unit can be edited usin 0 250 PID setpoint scaling Process PID, setpoint (Defines, together with control chain. The output of the PID of	d. definable unit of the control power of the control power of the control power of the control power of the controller has not	for parame anel: Menu - e) scaling. ut scaling,	1 = 1 a general scali	n ng factor fo	D out unit. y	Parameter				
	22760 00 22767 00	100.00		1 - 1	T _n	1,,	Davamatav				
40.15	-32768.00 32767.00	100.00	-	1 = 1	n	У	Parameter				
40.15	Process PID, output so See 40.14 PID setpoint -32768.00 32767.00	_	-	1 = 1	n	у	Parameter				
40.16	PID setpoint1 source	1100.00			1	ا ا	I arameter				
	Process PID, setpoint (Selects the first source setpoint1 source. Other; source selection (0: Zero; 0 %, setpoint; de PID internal setpoint; setpoint se	e of the PID con n. is set to zero. epending on the	troller setp								

-	Name														
	Text														
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре								
	5: AI3 scaled ; 12.32 A	I3 scaled value.	'	•	•	•	•								
	7: FBA A reference 1;	03.05 FBA A refer	ence 1.												
	8: FBA A reference 2	; 03.06 FBA A refe	rence 2.												
l l	9: FBA B reference 1 ; 03.07 FBA B reference 1.														
	10: FBA B reference 2 ; 03.08 FBA B reference 2.														
l l	11: EFB reference 1; 03.09 EFB reference 1.														
l l	12: EFB reference 2 ; 03.10 EFB reference 2.														
	17: Motor potentiometer reference ; 22.80 Motor potentiometer reference. 24: Setpoint data storage ; 40.92 PID setpoint data storage.														
	•		etpoint da												
	0 24	Zero	-	1 = 1	n	У	Parameter								
-	PID setpoint2 source														
	Process PID, setpoin	t (reference value) sources.												
			ontroller se	tpoint. Availa	ble in 40.25	PID setpo	int selection								
	Selects the second source of the PID controller setpoint. Available in 40.25 PID setpoint selection as setpoint2 source.														
-	See 40.16 PID setpoi	nt 1 source.	1				_								
	0 24	Zero	-	1 = 1	n	у	Parameter								
40.18	PID setpoint function	n													
	Process PID, setpoin	t (reference value) function.												
	Selects a mathemati	ical function betw	een 40.16 P	ID setpoint1	source, 40.1	7 PID setpo	oint2 source								
	and 40.25 PID setpoi	int selection.													
	0: Setpoint1 or Setp	oint2; setpoint so	urce is sele	cted by 40.25	PID setpoi	nt selectio	n.								
	1: Setpoint1 + Setpo	int2; the sum of th	ne two setp	oint sources	is used	0: Setpoint1 or Setpoint2 ; setpoint source is selected by 40.25 PID setpoint selection.									
	1: Setpoint1 + Setpoint2 ; the sum of the two setpoint sources is used. 2: Setpoint1 - Setpoint2 ; the result of setpoint1 source minus setpoint2 source is used.														
	3: Setpoint1 - Setpoint2 ; the result of setpoint1 source minus setpoint2 source is used.														
	3: Setpoint1 • Setpo	int2; the multiplica	ation of the	ource minus s two setpoin	setpoint2 so t sources is	used.									
	3: Setpoint1 • Setpo 4: Setpoint1 / Setpo	int2; the multiplica oint2; the result of	ation of the setpoint1 s	ource minus s two setpoint ource divided	setpoint2 so t sources is d by setpoir	used. nt2 source i									
	3: Setpoint1 • Setpo 4: Setpoint1 / Setpo 5: MIN(Setpoint1, Se	int2; the multiplication int2; the result of etpoint2); the sma	ation of the setpoint1 s ller of the t	ource minus s two setpoint ource divided wo setpoint s	setpoint2 so t sources is d by setpoir sources is us	used. nt2 source i sed.									
	3: Setpoint1 • Setpo 4: Setpoint1 / Setpo 5: MIN(Setpoint1, Se 6: MAX(Setpoint1, Se	int2; the multiplica vint2; the result of etpoint2); the sma etpoint2); the gre	ation of the setpoint1 s ller of the t ater of the	ource minus s two setpoint ource divided wo setpoint s two setpoint	setpoint2 so t sources is d by setpoir sources is us sources is u	used. nt2 source i sed. used.									
	3: Setpoint1 • Setpoint2 / Setpoint1 / Setpoint5: MIN(Setpoint1, Setpoint1,	int2; the multiplication int2; the result of etpoint2); the sma etpoint2); the greetpoint2); the aver	ation of the setpoint1 s ller of the t ater of the age of the	ource minus s two setpoint ource divided wo setpoint s two setpoint two setpoint	setpoint2 so t sources is d by setpoir sources is us sources is u	used. nt2 source i sed. used.									
	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1); setpoint1); setpoint1); setpoint1); setpoint1); setpoint1); setpoint1); setpoint1	int2; the multiplication int2; the result of expoint2); the smaletpoint2); the greetpoint2); the aver quare root of setpointed.	ation of the setpoint1 s ller of the t ater of the age of the point1 source	ource minus so two setpoint cource divided wo setpoint two setpoint two setpoint ce.	setpoint2 so t sources is d by setpoir sources is us sources is u sources is u	used. nt2 source i sed. used. used.	is used.								
	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - S	int2; the multiplication int2; the result of expoint2); the smaletpoint2); the greetpoint2); the aver quare root of setpetpoint2); square	ation of the setpoint1 s ller of the t ater of the age of the point1 source root of (se	ource minus so two setpoint source divided wo setpoint two setpoint two setpoint ce. tpoint1 source	setpoint2 so t sources is d by setpoir sources is u sources is u sources is u	used. nt2 source i sed. used. used. point2 sou	is used. arce).								
	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - Se	int2; the multiplica pint2; the result of etpoint2); the sma etpoint2); the gre etpoint2); the aver quare root of setp etpoint2); square Setpoint2); square	ation of the setpoint1 s ller of the t ater of the age of the point1 source root of (se	ource minus setwo setpoints cource divided wo setpoint setwo setpoint two setpoint two setpoint ce. tpoint1 source	setpoint2 so t sources is d by setpoir sources is us sources is u sources is u e minus set rce plus set	used. nt2 source i sed. used. used. used. upoint2 sou point2 sou	is used. irce). rce).								
	3: Setpoint1 • Setpoint2 / Setpoint1 / Setpoint3 / Setpoint4. Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4 -	int2; the multiplica pint2; the result of etpoint2); the sma etpoint2); the gre etpoint2); the aver quare root of setp etpoint2); square Setpoint2); square	ation of the setpoint1 s ller of the t ater of the age of the point1 source root of (se	ource minus setwo setpoints cource divided wo setpoint setwo setpoint two setpoint two setpoint ce. tpoint1 source	setpoint2 so t sources is d by setpoir sources is us sources is u sources is u e minus set rce plus set	used. nt2 source i sed. used. used. used. upoint2 sou point2 sou	is used. irce). rce).								
	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - Setpoint1 - Setpoint1 - Setpoint1 + 11: sqrt(Setpoint1) + setpoint2 source.	int2; the multiplication int2; the result of expoint2); the small expoint2); the greet point2); the averaguare root of setpoint2); square setpoint2); square sqrt(Setpoint2);	ation of the setpoint1 s ller of the t ater of the age of the point1 source root of (se	ource minus so two setpoints ource divided wo setpoint two setpoint two setpoint ce. tpoint1 source etpoint1 source t of setpoint1	setpoint2 so t sources is d by setpoir sources is us sources is u sources is u e minus set rce plus set l source plus	used. nt2 source i sed. used. used. upoint2 sou point2 sou s square ro	is used. arce). rce). pot of								
	3: Setpoint1 • Setpoint2 / Setpoint1 / Setpoint3 / Setpoint4. Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4, Setpoint4 -	int2; the multiplica bint2; the result of etpoint2); the sma etpoint2); the gre etpoint2); the aver quare root of setp etpoint2); square Setpoint2); square sqrt(Setpoint2);	ation of the setpoint1 s ller of the t ater of the age of the point1 source root of (se	ource minus setwo setpoints cource divided wo setpoint setwo setpoint two setpoint two setpoint ce. tpoint1 source	setpoint2 so t sources is d by setpoir sources is us sources is u sources is u e minus set rce plus set	used. nt2 source i sed. used. used. used. upoint2 sou point2 sou	is used. arce). rce). pot of								
	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - Setpoint1 - Setpoint1 + Setpoint2 source. 0 11	int2; the multiplication int2; the result of expoint2); the small expoint2); the greet point2); the aver quare root of set point2); square setpoint2); square sqrt(Setpoint2); Setpoint1 or Setpoint2	ation of the setpoint1 s ller of the t ater of the age of the point1 source root of (se	ource minus so two setpoints ource divided wo setpoint two setpoint two setpoint ce. tpoint1 source etpoint1 source t of setpoint1	setpoint2 so t sources is d by setpoir sources is us sources is u sources is u e minus set rce plus set l source plus	used. nt2 source i sed. used. used. upoint2 sou point2 sou s square ro	is used. arce). rce). pot of								
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40.19	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - Setpoint1 - Setpoint1 - Setpoint1 + Setpoint2 source. O 11 PID internal setpoint Process PID, internal 40.19 PID internal setpoint2 setpoint3 setpoint3 setpoint4.	int2; the multiplication int2; the result of expoint2); the small expoint2); the great point2); the averaguare root of set point2); square setpoint2); square setpoint2); Setpoint1 or Setpoint2 t selector 1 I setpoint selection to selection to selector 1 are	ation of the setpoint1 setpoint1 setpoint1 setpoint1 source root of (setpoint1 source root of (s	two setpoints ource divided wo setpoint two setpoint two setpoint two setpoint to setpoint 1 source to f setpoint 1 = 1	setpoint2 so t sources is d by setpoir sources is us sources is us sources is us e minus set rce plus set l source plus	used. nt2 source i sed. used. used. used. upoint2 sou point2 sou s square ro	is used. arce). arce). arcot of Parameter								
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40.19	3: Setpoint1 • Setpoint2 / Setpoint1 / Setpoint3 / Setpoint4. Setpoint5: MIN(Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - Setpoint1 - Setpoint1 - Setpoint2 setpoint1 + Setpoint2 source. O 11 PID internal setpoint Process PID, internal 40.19 PID internal setpoint out	int2; the multiplication int2; the result of expoint2); the small expoint2); the great point2); the averaguare root of set point2); square setpoint2); square setpoint2); Setpoint1 or Setpoint2 t selector 1 I setpoint selection to parameters 40 40.20 PID interna	ation of the setpoint1 setpoint1 setpoint1 setpoint1 setpoint1 source root of (setpoint1 setpoint1 two setpoints ource divided wo setpoint two setpoint two setpoint two setpoint to setpoint 1 source to f setpoint 1 = 1	setpoint2 so t sources is d by setpoir sources is us sources is us e minus set rce plus set l source plus n	used. nt2 source i sed. used. used. used. upoint2 sou point2 sou s square ro	is used. arce). arce). arcot of Parameter									
40.19	3: Setpoint1 • Setpoint1 / Setpoint1 / Setpoint1 / Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1, Setpoint1 - Setpoint1 - Setpoint1 - Setpoint1 + Setpoint2 source. O 11 PID internal setpoint Process PID, internal 40.19 PID internal setpoint out	int2; the multiplica int2; the result of itpoint2); the sma etpoint2); the gre etpoint2); the aver quare root of setp ietpoint2); square Setpoint2); square Setpoint2); Setpoint1 or Setpoint2 t selector 1 I setpoint selectio tpoint selector 1 at of parameters 40	ation of the setpoint1 setpoint1 setpoint1 setpoint1 setpoint1 source root of (setpoint1 setpoint1 ource minus so two setpoints ource divided wo setpoint two setpoint two setpoint two setpoints ource tpoint1 source tpoint1 source to f setpoint1	setpoint2 so t sources is d by setpoir sources is us sources is us e minus set rce plus set l source plus n	used. nt2 source i sed. used. used. used. upoint2 sou point2 sou s square ro	is used. arce). arce). arcot of Parameter									
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Index	Name												
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	0: Zero ; 0, choose zero	•	•	•	•	•	•						
	1: One ; 1, choose one.												
	3: DI1 ; 10.02 DI delayed												
	4: DI2 ; 10.02 DI delayed												
	5: DI3 ; 10.02 DI delayed												
	6: DI4 ; 10.02 DI delayed												
	7: DI5 ; 10.02 DI delayed												
	8: DI6 ; 10.02 DI delayed												
	11: DIO1 ; 11.02 DIO delayed status bit 0. 12: DIO2 ; 11.02 DIO delayed status bit 1. 19: DIL ; 10.02 DI delayed status bit 15.												
			1	1			15 .						
	0 19	Zero	-	1 = 1	n	У	Parameter						
40.20	PID internal setpoint s												
	Process PID, internal s												
	40.19 PID internal setp				•								
	internal setpoint out o	1	21 40.24.		ID internal s	setpoint se							
	0 19	Zero	-	1 = 1	n	у	Parameter						
40.21	PID internal setpoint 1												
	Process PID, internal setpoint 1.												
	Defines the PID controller internal setpoint 1.												
	-32768.00 32767.00	0.00	See 40.12	1 = 1 (40.12)	n	У	Parameter						
40.22	PID internal setpoint 2	2											
	Process PID, internal s	etpoint 2.											
	Defines the PID controller internal setpoint 2.												
	-32768.00 32767.00	0.00	See 40.12	1 = 1	n	у	Parameter						
				(40.12)									
40.23	PID internal setpoint 3	3	•			•	•						
İ	Process PID, internal se												
	Defines the PID contro	•	oint 3.										
	-32768.00 32767.00	0.00	See 40.12	1 = 1	n	у	Parameter						
40.24	DID intermed actuaint 4												
40.24	PID internal setpoint 4	ļ											
40.24	Process PID, internal se												
40.24	Process PID, internal se	etpoint 4.	oint 4.										
40.24	Process PID, internal so Defines the PID contro	etpoint 4. ller internal setpo		1 = 1	ln	lv.	Parameter						
40.24	Process PID, internal se	etpoint 4.	oint 4. See 40.12	1 = 1 (40.12)	n	у	Parameter						
	Process PID, internal so Defines the PID contro -32768.00 32767.00	etpoint 4. ller internal setpo 0.00		1 = 1 (40.12)	n	У	Parameter						
	Process PID, internal so Defines the PID contro -32768.00 32767.00 PID setpoint selection	etpoint 4. ller internal setpo 0.00			n	У	Parameter						
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	Process PID, internal so Defines the PID contro -32768.00 32767.00 PID setpoint selection Process PID, setpoint so Configures the selection	etpoint 4. ller internal setpo 0.00 selection. on between 40.16	See 40.12 PID setpoir	(40.12)	nd 40.17 PI	D setpoint2	2 source.						
	Process PID, internal son Defines the PID control -32768.00 32767.00 PID setpoint selection Process PID, setpoint son Configures the selection This parameter is only	etpoint 4. ller internal setpo 0.00 selection. on between 40.16 effective when 4	See 40.12 5 PID setpoir 0.18 PID set	(40.12) nt1 source a	nd 40.17 Pl	D setpoint2	2 source.						
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	Process PID, internal son Defines the PID control -32768.00 32767.00 PID setpoint selection Process PID, setpoint selection Configures the selection This parameter is only Note: Also valid for the selection (40.25).	etpoint 4. Iller internal setpo 0.00 selection. on between 40.16 effective when 4 e feedback source	See 40.12 5 PID setpoir 0.18 PID set	(40.12) nt1 source a	nd 40.17 Pl	D setpoint2	2 source.						
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	Process PID, internal son Defines the PID control -32768.00 32767.00 PID setpoint selection Process PID, setpoint son Configures the selection This parameter is only Note: Also valid for the selection (40.25). Other [bit]; source selection: Setpoint1 source; 0, 10 per parameter is only Note: Also valid for the selection (40.25).	etpoint 4. ller internal setpo 0.00 selection. on between 40.16 effective when 4 e feedback source ection. 40.16 PID setpoi	See 40.12 5 PID setpoir 0.18 PID set e, if 40.10 PII nt1 source.	(40.12) nt1 source a	nd 40.17 Pl	D setpoint2	2 source.						
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Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	5: DI3 ; 10.02 DI delaye								
	6: DI4 ; 10.02 DI delay								
	7: DI5 ; 10.02 DI delaye								
	8: DI6 ; 10.02 DI delaye								
	11: DIO1 ; 11.02 DIO de	•							
	12: DIO2 ; 11.02 DIO de		•						
	19: DIL ; 10.02 DI delay			T	1	<u> </u>	T_		
	0 19	Setpoint1	-	1 = 1	n	У	Parameter		
		source							
40.26	·								
	Process PID, minimum setpoint limit. Defines the minimum limit for the PID controller setpoint.								
			controller s	setpoint.		_			
	-32768.00 32767.0	0 -100.00	-	1 = 1	n	у	Parameter		
40.27	PID maximum setpoi	int							
	Process PID, maximum setpoint limit.								
	Defines the maximum	n limit for the PID	controller	setpoint.					
	-32768.00 32767.0	0 100.00	-	1 = 1	n	у	Parameter		
40.28	PID setpoint increase	e time					•		
	Process PID, setpoint increase time.								
	Defines the minimum time it takes for the setpoint to increase from 0 units to 100 units. The								
	unit depend on the setting of 40.12 PID unit selection.								
	0.00 325.00	0.00	s	100 = 1 s	n	у	Parameter		
			L	l		1-			
40.29	PID setpoint decrease time Process PID, setpoint decrease time.								
40.29									
40.29	Process PID, setpoint	t decrease time.	the setpoi	nt to decrease	e from 100 i	units to 0 u	ınits. The		
40.29	Process PID, setpoint Defines the minimum	t decrease time. n time it takes for	•		e from 100 (units to 0 ι	units. The		
40.29	Process PID, setpoint Defines the minimum unit depend on settin	t decrease time. In time it takes for Ing of 40.12 PID un	it selection	l .		1			
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	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze	t decrease time. n time it takes for ng of 40.12 PID un 0.00	it selection s	l .		1			
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze s	t decrease time. In time it takes foring of 40.12 PID un 0.00 etpoint selection.	it selection s	100 = 1 s	n	у	Parameter		
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	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze so Freezes, or defines a feature is useful whe and the connected see	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not a set point is kensor must be e.g.	s selection s see used to fooased on a	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not the setpoint is kensor must be e.gelection.	e used to foased on a ., serviced	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set 0: Release; 0, release	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not the setpoint is kensor must be e.gelection. the PID controller	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze so Freezes, or defines a feature is useful whe and the connected second of the pit; source second or release; 0, release 1: Freeze; 1, freeze the	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not setpoint is kensor must be e.gelection. the PID controller see PID controller see PID controller see PID controller see time PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see PID controller see time see time.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
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	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze so Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set 0: Release; 0, release 1: Freeze; 1, freeze the 3: DI1; 10.02 DI delayer	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not the setpoint is been sor must be e.guelection. the PID controller selection of the election of the el	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze so Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set O: Release; 0, release 1: Freeze; 1, freeze the 3: DI1; 10.02 DI delayer 4: DI2; 10.02 DI delayer 4: DI2; 10.02 DI delayer DI2; 10.02 DI2	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not setpoint is kensor must be e.g election. The PID controller seed status bit 0. ed status bit 1. ed status bit 2.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set Other [bit]; source set O: Release; 0, release 1: Freeze; 1, freeze the 3: DI1; 10.02 DI delayed 4: DI2; 10.02 DI delayed 5: DI3;	et decrease time. In time it takes for ing of 40.12 PID un 0.00 etpoint selection. In the setpoint is kensor must be e.gelection. Ithe PID controller seed status bit 0. Ithe ded status bit 1. Ited status bit 2. Ited status bit 3.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze so Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set O: Release; 0, release 1: Freeze; 1, freeze the 3: DI1; 10.02 DI delayed 4: DI2; 10.02 DI delayed 5: DI3; 10.02 DI delayed 6: DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02 DI4; 10.02	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. source that can be not setpoint is because the PID controller selection. The PID controller selection of status bit 0. The decrease status bit 1. The decrease status bit 2. The decrease status bit 3. The decrease status bit 4.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set Other [bit]; source set Other [bit]; source set Other [bit]; 10.02 DI delayed to DI2; 10.02 DI delayed to DI3; 10.02 DI delayed to DI4; 10.02 DI delayed to DI5; 10.02 DI delayed to DI5; 10.02 DI delayed to DI6; 10.02 DI6	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. Source that can be not the setpoint is kensor must be e.g. election. Ithe PID controller seed status bit 0. ed status bit 1. ed status bit 2. ed status bit 3. ed status bit 4. ed status bit 5. elayed status bit 5. elayed status bit 0.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
40.30	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set O: Release; 0, release 1: Freeze; 1, freeze the 3: DI1; 10.02 DI delayed 4: DI2; 10.02 DI delayed 5: DI3; 10.02 DI delayed 6: DI4; 10.02 DI delayed 7: DI5; 10.02 DI delayed 8: DI6;	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. Source that can be not the setpoint is kensor must be e.g. election. Ithe PID controller seed status bit 0. ed status bit 1. ed status bit 2. ed status bit 3. ed status bit 4. ed status bit 5. elayed status bit 5. elayed status bit 0.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set Other [bit]; source set Other [bit]; source set Other [bit]; 10.02 DI delayed to DI2; 10.02 DI delayed to DI3; 10.02 DI delayed to DI4; 10.02 DI delayed to DI5; 10.02 DI delayed to DI5; 10.02 DI delayed to DI6; 10.02 DI6	et decrease time. In time it takes for ing of 40.12 PID un 0.00 etpoint selection. It source that can be in the setpoint is kensor must be e.g. election. It the PID controller seed status bit 0. ed status bit 1. ed status bit 2. ed status bit 3. ed status bit 4. ed status bit 5. elayed status bit 5. elayed status bit 0. elayed status bit 0. elayed status bit 0. elayed status bit 1.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set of the process of the pro	et decrease time. In time it takes for ing of 40.12 PID un 0.00 etpoint selection. It source that can be in the setpoint is kensor must be e.g. election. It the PID controller seed status bit 0. ed status bit 1. ed status bit 2. ed status bit 3. ed status bit 4. ed status bit 5. elayed status bit 5. elayed status bit 0. elayed status bit 0. elayed status bit 0. elayed status bit 1.	e used to foased on a a, serviced or setpoint.	100 = 1 s reeze, the set process feeds	n point of the	y e PID controcted to an a	Parameter		
40.30	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze so Freezes, or defines a feature is useful whe and the connected set of the pit is source set of the	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. Isource that can be not the setpoint is been sor must be e.g. election. Ithe PID controller selection. Ithe PID controller selection selection to ed status bit 0. ed status bit 1. ed status bit 2. ed status bit 3. ed status bit 4. ed status bit 5. elayed status bit 5. elayed status bit 15. Release	e used to foased on a a, serviced or setpoint.	reeze, the set process feeds without stopp	point of the pack connecting the pro	PID controcted to an access.	Parameter oller. This analog input		
40.30	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze set Freezes, or defines a feature is useful whe and the connected set Other [bit]; source set Other [bit]; source set Other [bit]; source set Other [bit]; 10.02 DI delayed to DI2; 10.02 DI delayed to DI3; 10.02 DI delayed to DI4; 10.02 DI delayed to DI5; 10.02 DI delayed to DI6; 10.02 DI6; 10.02	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. Source that can be not the setpoint is been sor must be e.g. election. Ithe PID controller seed status bit 0. ed status bit 1. ed status bit 2. ed status bit 3. ed status bit 4. ed status bit 5. elayed status bit 5. elayed status bit 15. Release fon	e used to foased on a, serviced or setpoint.	reeze, the set process feeds without stopp	point of the pack connecting the pro	PID controcted to an access.	Parameter oller. This analog input		
	Process PID, setpoint Defines the minimum unit depend on settin 0.00 325.00 PID setpoint freeze Process PID, freeze s. Freezes, or defines a feature is useful whe and the connected set 0: Release; 0, release 1: Freeze; 1, freeze the 3: DI1; 10.02 DI delaye 4: DI2; 10.02 DI delaye 6: DI4; 10.02 DI delaye 6: DI4; 10.02 DI delaye 8: DI6; 10.02 DI delaye 8: DI6; 10.02 DI delaye 11: DIO1; 11.02 DIO delaye 11: DIO2; 11.02 DIO delaye 11: DIO2; 11.02 DIO delaye 12: DIO2; 11.02 DIO delaye 13: DIO; 10.02 DI delaye 14: DIO2; 11.02 DIO delaye 15: DIC; 10.02 DI delaye 16: DIC; 10.02 DI delaye 17: DIO; 11.02 DIO delaye 19: DIL; 10.02 DIL; 10.02 DIL; 10	t decrease time. In time it takes for ag of 40.12 PID un 0.00 etpoint selection. Source that can be the setpoint is been sor must be e.g. election. Ithe PID controller selection. Ithe PID controller selection set at the set of status bit 1. end status bit 2. end status bit 3. end status bit 4. end status bit 4. end status bit 5. elayed status bit 1. elayed status bit 1. elayed status bit 1. elayed status bit 1. elayed status bit 1. elayed status bit 15. ela	e used to foased on a, serviced or setpoint.	reeze, the set process feeds without stopp	point of the pack connecting the pro	PID controcted to an access.	Parameter oller. This analog input		

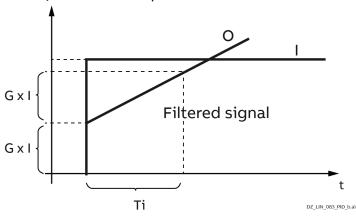
Index	Name Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0: Setpoint - Feedbac	k ; 0, normal devia	tion (deviati	on = setpoir	nt - feedba	ck).				
	1: Feedback - Setpoint ; 1, invert the deviation(deviation = feedback - setpoint).									
	0 1	Setpoint -	-	1 = 1	n	у	Parameter			
		Feedback								
40.32	PID proportional gair	1								
	Process PID, gain 1.									
	Defines gain 1 of the I	PID controller. See	40.33 PID in	tegration ti	me 1.					
	0.10 100.00	1.00	-	100 = 1	n	у	Parameter			

40.33 PID integration time 1

Process PID, integration time 1.

Defines the integration time 1 of the PID controller. This time needs to be set to the same order of magnitude as the reaction time of the process. Otherwise, it will cause instability.

Error/Controller output

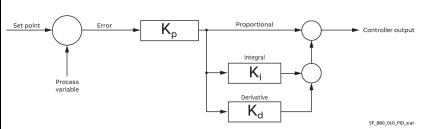


I = controller input (error)

O = controller output

G = gain

Ti = integraqtion time



Note: Setting 40.33 PID integration time 1 = 0 disables the integration time 1 and turns the PID controller into a PD controller.

0.00 ... 325.00 | 1.00 | s | 100 = 1 s | n | y | Parameter

40.34 PID derivation time 1

Process PID, derivation time 1.

Defines the derivation time 1 of the PID controller. The derivative component at the controller output is calculated on basis of two consecutive error values, E_{K-1} and E_K , according to following formula:

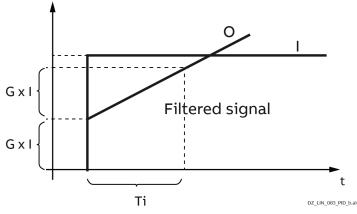
Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	$(40.34) \bullet (E_{K}-E_{K-1})$	·	<u> </u>	<u> </u>	l						
	T_{S}										
	T _s = 2 ms sample time Error = E = setpoint - f										
	0.000 32.500	0.000	s	1000 = 1 s	n	V	Parameter				
40.35	PID derivation filter t	me 1				12					
	Process PID, derivation Defines the derivation smooth the derivative	filter time 1 of th			me of the 1	L-pole filter	is used to				
	% A	% (
		_Unfiltered sig	gnal								
	100										
	63										
		Filtered sign	al								
	1 😲		-	t							
	$O = x (1-e^{t/T})$	T $O = I \times (1-e^{t/T})$									
		l = filter input (step) O = filter output t = time									
	T = filter time o	onstant									
	0.000 32.500	0.000	S	1000 = 1 s	n	у	Parameter				
40.36	PID minimum output										
	Process PID, minimum output limit. Defines the minimum limit for the PID controller output. Using the minimum and maximum limits restricts the operation range.										
	-32768.0 32767.0	-100.00	-	1 = 1 (40.13)	n	у	Parameter				
40.37	PID maximum output										
	Process PID, maximum										
	Defines the maximum		controller o	utput. Using	the minim	um and ma	ximum				
	limits restricts the op			Ta a	<u> </u>		I				
	-32768.0 32767.0	100.00	-	1 = 1 (40.13)	n	У	Parameter				
40.38	PID output freeze	•		•	-	-	1				
	Process PID, freeze ou	•									
	Freezes, or defines a s feature can be used w stopping the process.	hen e.g., a sensor									
	Other [bit]; source sel										

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0: Release ; 0, releas	e the PID contro	ller output.	•			<u> </u>				
	1: Freeze; 1, freeze t	he PID controller	output.								
	3: DI1 ; 10.02 DI dela	yed status bit 0.									
	4: DI2 ; 10.02 DI dela	yed status bit 1.									
	5: DI3 ; 10.02 DI dela	yed status bit 2.									
	6: DI4 ; 10.02 DI dela	yed status bit 3.									
	7: DI5 ; 10.02 DI dela	yed status bit 4.									
	8: DI6 ; 10.02 DI delayed status bit 5.										
	11: DIO1 ; 11.02 DIO d	8: DIO ; 10.02 DI delayed status bit 5. 11: DIO1 ; 11.02 DIO delayed status bit 0.									
		11: DIO1 ; 11.02 DIO delayed status bit 0. 12: DIO2 ; 11.02 DIO delayed status bit 1.									
	L9: DIL ; 10.02 DI delayed status bit 15.										
	0 19	Release	-	1 = 1	n	у	Parameter				
40.39	PID dead band rand		L	L							
	Process PID, dead b										
		-	noint Whene	ver the proce	ss foodback	anters the	dead band				
	Defines a dead band around the setpoint. Whenever the process feedback enters the dead band,										
	a delay timer starts. If the feedback remains within the dead band longer than the delay in 40.40 PID dead band delay, the PID controller output is frozen. Normal operation resumes after the										
	PID dead band delay, the PID controller output is frozen. Normal operation resumes after the										
	feedback value leaves the dead band.										
	40.30 PID dead bar	40.30 PID dead band range									
			·								
	40.03 PID setpoint (referen	ce value)	*	1 1	-						
				1 1	,						
			<u> </u>	1 1	<u>_</u>						
	40.02 PID feedback (actu	ual value)		1 1	1	1					
					1	1					
				1 1							
	40.01 PID out	out value			<u> </u>	\longrightarrow					
					_ ' \						
			\longleftrightarrow	<u>~</u>	40.	01 PID output v	alue is frozen				
			40.4	O PID dead band de	lay						
							Time				
						D7 11N 022 D	ID deadband b.ai				
	0.0 32767.0	0.0		1 – 1	n						
40.40				1 = 1	n	У	Parameter				
40.40		•									
	Process PID, delay f										
	Delay for the dead l				<u> </u>		T_				
	0.0 3600.0	0.0	S	10 = 1 s	n	у	Parameter				
40.57	PID set1/set2 selec	tion									
	Process PID, set sel	ection.									
	Configures the sele	ction between th	ne PID 1 contr	oller set1, par	ameters 40	.32 40.3	5, and PID				
	controller set2, para	ameters 40.60	40.63.								
	Other [bit]; source										
	0: Select set1 ; 0, se		er set1.								
	1: Select set2; 1, sel										
	3: DI1 ; 10.02 DI dela										

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	4: DI2 ; 10.02 DI delayed	d status bit 1.			•	•	•			
	5: DI3 ; 10.02 DI delayed	d status bit 2.								
	6: DI4 ; 10.02 DI delaye									
	7: DI5 ; 10.02 DI delayed									
	8: DI6 ; 10.02 DI delayed status bit 5.									
	11: DIO1 ; 11.02 DIO dela									
	12: DIO2 ; 11.02 DIO del	ayed status bit 1.								
	19: DIL ; 10.02 DI delaye	ed status bit 15.								
	0 19	Select set1	-	1 = 1	n	у	Parameter			
40.58	PID reset	•			•					
	Process PID, reset sele	ection.								
	Reset the PID controlle		ID controller	output to t	he value of	40.59 PID	controller			
	balancing reference.			•						
	Selects the source to f	orce the PID cont	roller outpu	t balancing.						
	Other [bit]; source sel		•	3						
	0: No Reset ; 0, enable	the PID controller	output. Noi	mal operat	ion.					
	1: Reset ; 1, force the Pl		•	•		ller balanci	ng			
	reference.	·								
	0 1	No Reset	_	1 = 1	n	у	Parameter			
40.59	PID controller balanci	ng reference	1	1		17				
	Process PID, controlle		g reference.							
	Defines the reference			oalancing. S	caling depe	ends on the	e setting of			
	40.14 PID setpoint sca		•	_	• .		_			
	The output of the PID controller is forced to this value when the PID controller output balancing is enabled. See 40.59 PID controller balancing enable.									
	is enabled. See 40.59 F	PID controller bala	incing enabl	e.						
		PID controller bala		1	In	lv	Parameter			
	is enabled. See 40.59 F -32768.0 32767.0	PID controller bala -	See 40.13	1 = 1	n	у	Parameter			
40 60	-32768.0 32767.0	-		1	n	у	Parameter			
40.60	-32768.0 32767.0 PID proportional gain	-		1 = 1	n	у	Parameter			
40.60	-32768.0 32767.0 PID proportional gain Process PID, gain 2.	2	See 40.13	1 = 1 (40.13)		У	Parameter			
40.60	-32768.0 32767.0 PID proportional gain Process PID, gain 2. Defines gain 2 of the P	2 ID controller. See	See 40.13	1 = 1 (40.13) tegration ti	me 2.					
	-32768.0 32767.0 PID proportional gain Process PID, gain 2. Defines gain 2 of the P 0.00 100.00	2 PID controller. See	See 40.13	1 = 1 (40.13)		у	Parameter Parameter			
40.60	-32768.0 32767.0 PID proportional gain Process PID, gain 2. Defines gain 2 of the P 0.00 100.00 PID integration time 2	ID controller. See	See 40.13	1 = 1 (40.13) tegration ti	me 2.					
	-32768.0 32767.0 PID proportional gain Process PID, gain 2. Defines gain 2 of the P 0.00 100.00 PID integration time 2 Process PID, integration	ID controller. See 1.00	See 40.13 40.61 PID in	1 = 1 (40.13) tegration ti 100 = 1	me 2.	у	Parameter			
	-32768.0 32767.0 PID proportional gain Process PID, gain 2. Defines gain 2 of the P 0.00 100.00 PID integration time 2	ID controller. See 1.00 2 on time 2. n time 2 of the PII	See 40.13 40.61 PID in - Controller.	1 = 1 (40.13) tegration ti 100 = 1 This time n	ime 2.	y set to the s	Parameter			

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре

Error/Controller output



I = controller input (error)

O = controller output

G = gain

Ti = integraqtion time

Note: Setting 40.61 PID integration time 2 = 0 disables the integration time 2 and turns the PID controller into a PD controller.

0.00 325.00	1.00	s	100 = 1 s	n	у	Parameter
-------------	------	---	-----------	---	---	-----------

40.62 PID derivation time 2

Process PID, derivation time 2.

Defines the derivation time 2 of the PID controller. The derivative component at the controller output is calculated on basis of two consecutive error values, E_{K-1} and E_K , according to following formula:

$$\frac{(40.62) \cdot (E_{K}-E_{K-1})}{T_{S}}$$

 $T_s = 2 \text{ ms sample time.}$

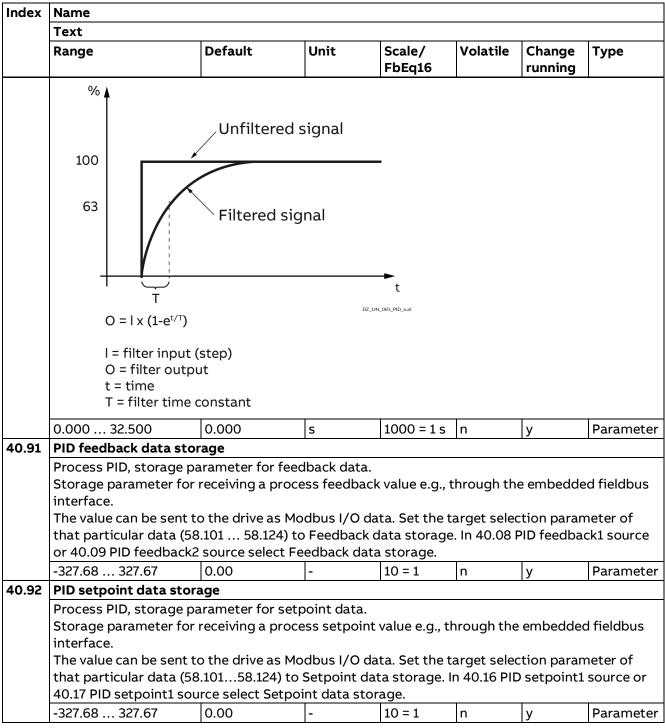
Error = E = setpoint - feedback.

0.000 3	2 500	0.000	c	1000 = 1 s	n	V	Daramotor
10.000 3	Z.5UU I	0.000	S	1000 – 1 S	n	V	Parameter

40.63 PID derivation filter time 2

Process PID, derivation filter time 1.

Defines the derivation filter time 2 of the PID controller. Filter time of the 1-pole filter is used to smooth the derivative component 2 of the PID controller.



42 Shared motion (2nd motor)

Configuration of 2nd motor.

Note: Only motors with the same electrical data, especially base speed, and maximum speed, can be run at the same time.

Index	Name Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Type			
42.01	Motor 1/2 selection									
	Source of motor 1/2 selection.									

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Defines the source Selected motor. Attention: The comotor is in operation for field 0 = Motor 1. 1 = Motor 2. Other [bit]; source 0: Motor 1; motor 1: Motor 2; motor 1: Motor 2; motor 3: DI1; 10.02.b00 [4: DI2; 10.02.b01 [5: DI3; 10.02.b02 [6: DI4; 10.02.b03 [7: DI5; 10.02.b04 [8: DI6; 10.02.b05 [11: DIO1; 11.02.b06]]	e of the selection be neept of shared mo tion and the second deconomy. Switching e selection. 1 is active. Normal of 2 is active. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status.	etween mo tion is bas motor is e ng between operation.	FbEq16 tor 1 (M1) and ed on two inde	motor 2 (Nependent fonomy, see	running 12). Result field exciter chapter M	see 06.14 rs. One ode of		
		DI delayed status.	-						
	0 19	Motor 1	-	1 = 1	n	n	Parameter		
	Motor 2 nominal t 41.04 M2 nominal torque =	ed nominal torque. Forque is calculated $\frac{60}{2\pi} imes \frac{[42.09 M2 nominal voltage]}{100}$ and by 96.02 Unit selections	– 24.08 M2 nomi		2 armature resisl e) speed	:ance] × 42.08 M2	nominal current		
	0 200000000.0		Nm or Lb ft	1 = 1 Nm or Lb ft	У	n	Signal		
42.05	M2 nominal powe	r	1 = 10 1 0	1-10-10					
	Motor 2, calculated nominal power (electrical). Motor 2 nominal power (electrical) is calculated the following way: $42.05 M2 nominal power = \frac{42.09 M2 nominal voltage \times 42.08 M2 nominal current}{1000}$ The unit is selected by 96.02 Unit selection.								
	0.00 32500.00	-	kW or	1 = 1 kW or	у	n	Signal		
42.08	M2 nominal curre	nt	hp	hp					
 2.00	Motor 2 nominal of Motor 2 nominal a Note: For 12-pulse The allowable ran		DCS880 12 minal curre	?-pulse manua	I (3ADW00		drive Parameter		
42.09	M2 nominal volta			17	1	3	. arameter		
03	Motor 2 nominal v		C) from the	e motor rating	plate.				

Index	Name										
	Text Range Default Unit Scale/ Volatile Change Type										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Note: For 12-pulse (3ADW000533).	serial mode or seri	ial sequent	tial mode, see	DCS880 12	-pulse man	iual				
	0.0 3250.0	350.0	V	10 = 1 V	n	у	Parameter				
42.10	M2 nominal field	current	'	•	•	1-	•				
	Motor 2 nominal f	ield current.									
	Motor 2 nominal fi	ield current from th	e motor ra	ating plate.							
	0.3 3250.0	0.3	Α	10 = 1 A	n	у	Parameter				
42.11	M2 nominal (base) speed									
	Motor 2 nominal (I	base) speed.									
	Motor 2 nominal (I	base) speed from tl	he motor r	ating plate, us	sually the fi	eld weak p	oint.				
	0.00 30000.00	1500.00	rpm	10 = 1 rpm	n	у	Parameter				
42.14	M2 speed scaling										
	42.14 M2 speed sc	000 speed units in aling is valid for val e value of 42.19 M2 d scaling actual.	ues greate	er than 0 rpm.	For a value	equal to 0	rpm, the				
	42.19 M2 minimum	M2 speed scaling > 42.14 M2 speed scaling > 42	aling —		- 42.15 M2 s	peed scalir	ng actual				
	42.20 M2 maximum					SF_880_027_spee	ed scaling_b.ai				
	overriding con The maximum Commissioning hi Set 42.11 M2 nd Set 42.14 M2 s speed and 42.2 Make sure that M2 speed scali 42.19 M2 m 42.20 M2 m 42.25 M2 o 42.14 M2 s 42.11 M2 nd	d scaling must be strol (e.g., fieldbus). amount of speed uints: ominal (base) speed ininimum speed and peed scaling to the 20 M2 maximum speed in actual (1.6 = 320 ininimum speed. verspeed trip marg peed scaling. ominal (base) speed t of range warning	d to the bath 42.20 M2 maximum eed. following 1000/20000 jin.	oo. se speed of m maximum spe absolute spee parameters is)):	notor 1. ed to ± max ed value of less than o	ximum spe 42.19 M2 m	ed. ninimum				
	0.0 30000.0	0.0	rpm	See 42.15	n	у	Parameter				
42.15	M2 speed scaling	actual		ı		1-					
	· · · · · · · · · · · · · · · · · · ·	ling actual and acc	eleration /	deceleration ra	amp rate.						

Index	Name Text										
	Text Range Default Unit Scale/ Volatile Change Type										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
42.16 42.17	to 20000 speed u speed scaling. Defines the accele Deceleration time to 42.15 M2 speed speed. 0.0 30000.0 M2 torque scaling Motor 2 torque scaling va communication. 0.00 325.00 M2 torque scaling Motor 2 torque scaling va communication. 5.00 325.00	aling. aling of all torque re lue corresponds to 100.00 actual	rpm elated para 10000 in e	rameters in rp -follower link te. See 23.12 A d deceleration 9 M2 minimus 1 = 1 rpm meters in per g.g., fieldbus o See 42.17	communication ramp times m speed or y cent of 42.0 r master-fo	time 1 and s are there 42.20 M2 N	2.14 M2 23.13 fore related faximum Signal inal torque. Parameter minal				
		See 46.03 M1 torque corque in Nm or lb ft -	-	en in 42.04 M2	2 nominal to	orque.	Signal				
42.18	Motor 2 speed feedback selection. Selects the motor speed feedback for motor control. Other; source selection. 1: OnBoard encoder; the speed feedback is measured by means of a pulse encoder connected to the SDCS-CON-H01. See group 94. 2: Encoder 1; the speed feedback is measured by encoder 1. See group 92. 3: Encoder 2; the speed feedback is measured by encoder 2. See group 93. 4: Tacho; the speed feedback is measured by means of an analog tacho connected to the SDCS-CON-H01. See group 94. 5: EMF; the speed feedback is calculated from the EMF (base speed area) and field current (field weakening area). Thus, it is possible to go into the field weakening range, but with a low performance compared to encoder or analog tacho feedback. Commissioning hint: The flux linearization must be tuned manually. 6: External; the speed feedback is connected using 90.39 External speed source. 7: EMF voltage; the speed feedback is calculated from the EMF only. Thus, no field weakening is possible.										
42.19	1 7 M2 minimum spec	EMF ed	-	1 = 1	n	У	Parameter				
	Used speed reference Notes: - 42.19 M2 mining the speed limit - To be able to o	speed reference lir	ed to 24.0 1 Speed co	Used speed in the	reference to	o avoid falli switch off t	ng below :he speed				

Index	Name										
	Text	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	-30000.00 30000.00	-1500.00	rpm	See 42.15	n	У	Parameter				
42.20	M2 maximum spec	ed					•				
	Motor 2 maximum speed limit. Motor 2 maximum speed reference limit in rpm for 23.01 Speed reference ramp input and 24.01										

Motor 2 maximum speed reference limit in rpm for 23.01 Speed reference ramp input and 24.01 Used speed reference.

Notes:

- 42.20 M2 maximum speed is applied to 24.01 Used speed reference to avoid exceeding the speed limits by means of 24.11 Speed correction.
- To be able to overspeed the drive (e.g., for winders) it is possible to switch off the speed limit for 24.01 Used speed reference by means of 06.10.b02 Auxiliary control word 1.

-30000.00	1500.00	rpm	See 42.15	n	у	Parameter
30000.00						

42.21 M2 zero speed level

Motor 2 zero speed level.

Depending on the situation, the following is happening:

- When a Stop command is given, the motor decelerates along a speed ramp or at torque limit until the zero-speed level is reached and 42.22 M2 zero speed delay is elapsed. See 21.04 Stop mode. Afterwards the motor will coast. At that moment, existing brakes are closed (applied).
- When an emergency stop request (SS1) is given by a fieldbus safety module (FSPS-21/FSO-21), the motor decelerates according to 23.23 Emergency stop time until the zero-speed level is reached, and 42.22 M2 zero speed delay is elapsed. At that moment, existing brakes are closed (applied) and the STO command is applied by the safety fieldbus module (FSPS-21/FSO-21). See 21.03 Emergency stop mode.

While the speed feedback is in the level, Zero speed is set high. See 06.21.b00 Speed control status word.

Notes:

- If 21.01 Start mode = Start from zero and a restart command (a new Run command) is given before 42.21 M2 zero speed level is reached and 42.22 M2 zero speed delay is elapsed, warning A137 Start condition conflict is generated.
- Any Run command re-starts 21.09 M1 zero speed delay.
- Setting 42.21 M2 zero speed level = 30000.00 rpm disables the zero-speed supervision.

		0.00 30000.00	75.00	rpm	See 42.15	n	v	Parameter
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42.22 M2 zero speed delay

Motor 2 zero speed delay.

The zero-speed delay compensates for the time the motor needs to decelerate from 42.21 M2 zero speed level to standstill. Until 42.22 M2 zero speed delay elapses the drive remains active, and the brake is kept open (lifted).

Without zero speed delay:

The drive receives a Stop command and decelerates along a speed ramp or at torque limit. When the motor speed feedback falls below 42.21 M2 zero speed level, the drive stops and the motor coasts to standstill.

dex	Name												
	Text Range Default Unit Scale/ Volatile Change Type												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	Speed	1	<u> </u>		I.		_I						
	A												
		The	drive stops	s and the									
		_/ mot	or coasts t	o a stop									
		42,2	1 M2 zero spe	eed level									
		Time	_	_036_speed_a.ai									
	With zero speed	-											
		es a Stop command		_		-							
		r speed feedback fall		-		•	-						
		the zero speed delay	elapses, tr	ne drive keeps	on working	and thus t	the motor						
	can decelerate t	.o stanostiii.											
	Speed												
		The dr	ive remains a	active and									
		THE GI	ive remains	active and									
		, the mo	otor decelera	ites to									
		the mo stands		ites to									
		/		ates to									
		/		ates to									
		/		ates to									
		stands											
		stands	till										
		stands	till										
	42.22 M2	stands	still 12 zero speed	level									
		stands stands Time	otill 12 zero speed	level	le (FSPS-21/	FSO-21), Si	ee 42.21 M2						
	Is also used for	stands 42.21 M Time zero speed delay the SS1 function with	otill 12 zero speed	level	le (FSPS-21/	FSO-21). S	ee 42.21 M2						
		stands 42.21 M Time zero speed delay the SS1 function with	otill 12 zero speed	level	le (FSPS-21/	·	ee 42.21 M2						
2.23	Is also used for zero speed level	stands 42.21 M Time zero speed delay the SS1 function with	n a fieldbus	level 036_speed_a.ai 5 safety modu	1	FSO-21). So	1						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed t	stands 42.21 M Time Exero speed delay the SS1 function with 0.2 rip level positive	n a fieldbus	level 036_speed_a.ai 5 safety modu	1	·	1						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed to Motor 2 overspeed to Motor	the SS1 function with 0.2 rip level positive eed trip level positive	n a fieldbus	level O36_speed_a.ai s safety modu 10 = 1 s	n	у	Paramete						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed to Motor 2 overspeed to Motor	stands 42.21 M Time Exero speed delay the SS1 function with 0.2 rip level positive	n a fieldbus	level O36_speed_a.ai s safety modu 10 = 1 s	n	у	Paramete						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed to Motor 2 overspeed to generated. Example: If the	stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum) trip level f maximum speed is 13	n a fieldbus s cor overspe	level o36_speed_a.ai a safety modu 10 = 1 s ed is exceede d overspeed t	n d, fault 7310	y Overspeed	Paramete d is						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed to Motor 2 overspel f the positive (regenerated. Example: If the trips at 1400 rp.	the SS1 function with 0.2 rip level positive eed trip level positive maximum) trip level f	n a fieldbus s cor overspe	level o36_speed_a.ai a safety modu 10 = 1 s ed is exceede d overspeed t	n d, fault 7310	y Overspeed	Paramete d is						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed for the positive (regenerated). Example: If the trips at 1400 rpic-30000.00	stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum) trip level f maximum speed is 13	n a fieldbus s cor overspe	level o36_speed_a.ai a safety modu 10 = 1 s ed is exceede d overspeed t	n d, fault 7310	y Overspeed	Paramete d is						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed if the positive (regenerated). Example: If the trips at 1400 rpin-30000.00 30000.00	stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum) trip level f maximum speed is 13 m. See 42.25 M2 over	a a fieldbus s cor overspe 100 rpm an speed trip	level safety modu 10 = 1 s ed is exceeded overspeed to margin.	n d, fault 7310 rip margin i	y Overspeed s 300 rpm,	Paramete d is the drive						
2.23	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed if the positive (regenerated). Example: If the trips at 1400 rpin-30000.00 30000.00	stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum) trip level f maximum speed is 13	a a fieldbus s cor overspe 100 rpm an speed trip	level safety modu 10 = 1 s ed is exceeded overspeed to margin.	n d, fault 7310 rip margin i	y Overspeed s 300 rpm,	Paramete d is the drive						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed for the positive (regenerated). Example: If the trips at 1400 rpices at	the SS1 function with l. 0.2 rip level positive read trip level positive maximum trip level function with limit seed trip level positive read trip level function with limit seed trip level positive read trip level function with limit seed trip level positive read trip level negative red trip level negative red trip level negative	a a fieldbus a fieldbus b. croverspe 100 rpm an speed trip rpm e.	level orange in level loss afety modu 10 = 1 s ed is exceede d overspeed to margin. See 42.15	n d, fault 7310 rip margin i	y Overspeed s 300 rpm,	Paramete d is the drive Signal						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed ff the positive (regenerated). Example: If the trips at 1400 rpice -30000.00 30000.00 M2 overspeed t Motor 2 overspeed ff the negative (stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum speed is 13 m. See 42.25 M2 over rip level negative	a a fieldbus a fieldbus b. croverspe 100 rpm an speed trip rpm e.	level orange in level loss afety modu 10 = 1 s ed is exceede d overspeed to margin. See 42.15	n d, fault 7310 rip margin i	y Overspeed s 300 rpm,	Paramete d is the drive Signal						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed if the positive (regenerated). Example: If the trips at 1400 rpices at	stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum speed is 13 m. See 42.25 M2 over rip level negative eed trip level negative eed trip level negative minimum) trip level f	n a fieldbus s cor overspe loo rpm an speed trip rpm e. for overspe	level 036_speed_a.ai s safety modu 10 = 1 s ed is exceede d overspeed to margin. See 42.15 ed is exceede	n d, fault 7310 rip margin i	y Overspeeds 300 rpm,	Paramete d is the drive Signal						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed to Motor 2 overspeed to generated. Example: If the trips at 1400 rpical representation of the megative (generated). Motor 2 overspeed to Motor 2 overspeed to generated. Example: If the megative (generated). Example: If the	stands Time Zero speed delay the SS1 function with 0.2 rip level positive red trip level positive maximum speed is 13 m. See 42.25 M2 over rip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative	a fieldbus a fieldbus b s cor overspe cor overspe cor overspe cor overspe do rpm an speed trip rpm cor overspe do rpm ar	level 36_speed_a.ai 5 safety modu 10 = 1 s ed is exceeded doverspeed to margin.	n d, fault 7310 rip margin i	y Overspeeds 300 rpm,	Paramete d is the drive Signal						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed t Motor 2 overspeed if the positive (regenerated). Example: If the trips at 1400 rps -30000.00 M2 overspeed t Motor 2 overspeed t Motor 2 overspeed t Motor 2 overspeed t Example: If the trips at -1720 rps at -1720 rps	stands Time Zero speed delay the SS1 function with 0.2 rip level positive eed trip level positive maximum speed is 13 m. See 42.25 M2 over rip level negative eed trip level negative eed trip level negative minimum) trip level f	a fieldbus a fieldbus s cor overspe 100 rpm an speed trip rpm e. for overspe 420 rpm ar speed trip	level safety modu 10 = 1 s ed is exceede the margin. See 42.15 ed is exceede and overspeed the margin.	n d, fault 7310 rip margin i y d, fault 7310 trip margin	y Overspeeds 300 rpm, n Overspeeds 300 rpm	Paramete d is the drive Signal d is						
	Is also used for zero speed level 0.0 3250.0 M2 overspeed to Motor 2 overspeed to generated. Example: If the trips at 1400 rpical representation of the megative (generated). Motor 2 overspeed to Motor 2 overspeed to generated. Example: If the megative (generated). Example: If the	stands Time Zero speed delay the SS1 function with 0.2 rip level positive red trip level positive maximum speed is 13 m. See 42.25 M2 over rip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative red trip level negative	a fieldbus a fieldbus b s cor overspe cor overspe cor overspe cor overspe do rpm an speed trip rpm cor overspe do rpm ar	level 36_speed_a.ai 5 safety modu 10 = 1 s ed is exceeded doverspeed to margin.	n d, fault 7310 rip margin i	y Overspeeds 300 rpm,	Paramete d is the drive Signal						

Index Name Text Default Unit Scale/ Volatile Range Change Type FbEq16 running Motor 2 overspeed trip margin. Defines, together with 42.19 M2 minimum speed and 42.20 M2 maximum speed, the maximum allowed speed of the motor (overspeed protection). The event generates fault 7310 Overspeed, if the speed feedback, see 90.01 Motor speed for control, exceeds the speed limit defined by 42.19 M2 minimum speed or 42.20 M2 maximum speed by more than the overspeed trip It is recommended to set 42.25 M2 overspeed trip margin at least to 20 % of the maximum motor speed. **Examples:** If the maximum speed is 1100 rpm and overspeed trip margin is 300 rpm, the drive trips at 1400 rpm. See 42.23 M2 overspeed trip level positive. If the minimum speed is -1420 rpm and overspeed trip margin is 300 rpm, the drive trips at -1720 rpm. See 42.24 M2 overspeed trip level negative. Note: The overspeed fault for motor 1 is inactive, if 42.25 M2 overspeed trip margin = 0. 90.01 Motor speed for control 42.23 M2 overspeed trip level positive 42.25 M2 overspeed trip margin 42.20 M2 maximum speed Time 42.19 M2 minimum speed 42.25 M2 overspeed trip margin 42.24 M2 overspeed trip level negative 0.00 ... 30000.00 300.00 See 42.15 n Parameter rpm 42.28 M2 tacho type Motor 2 type of connected tacho. Depending on the type of the connected tacho, a hardware filter of 40 ms is activated. 0: **DC tacho**; disable filter. 1: AC tacho; enable filter. 0 ... 1 DC tacho 1 = 1 n Parameter ٧ 42.29 M2 tacho voltage at 1000 rpm Motor 2 tacho voltage at 1000 rpm. A tacho generates this voltage at a speed of 1000 rpm, see tacho nameplate. It is used to calculate 42.31 M2 tacho tuning gain. Measure and set the value using 99.20 Tuning requested = Speed feedback assistant. 42.29 M2 tacho voltage at $1000 \text{ rpm} \ge 1.0 \text{ V}$, the value is set by hand. 42.29 M2 tacho voltage at 1000 rpm = 0.0 V, the value is to be measured by means of the speed feedback assistant. 42.29 M2 tacho voltage at 1000 rpm ≤ -1.0 V, the value was successfully measured and set by means of the speed feedback assistant. ٧ 10 = 1 V -270.0 ... 270.0 0.0 n У Parameter M2 tacho max displayable speed 42.30

Index	Name										
	Text Range Default Unit Scale/ Volatile Change Type										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
42.31	 Via 42.29 M2 ta Via parameter 0.00 30000.00 M2 tacho tuning g Motor 2 tacho tuning Internally used tac The value is only via 	ximum tacho spee M2 tacho voltage a ed, see 42.15 M2 sp 42.25 M2 overspee alid if written to by ng requested = Spe acho voltage at 100 download. 0.00 ain ng gain. ho gain tuning for	ed for moto at 1000 rpr beed scalin d trip marg /: eed feedba 00 rpm. rpm motor 2.	or 2. This value m, and the ma g actual, 42.19 gin and 42.11 M ck assistant. See 42.15	ximum spec 9 M2 minim	ng on the t ed of the d um speed,	rive system. 42.20 M2				
	Via 42.29 M2 taVia parameter0 5	icho voltage at 100 download. 5	00 rpm.	1 = 1	n	Ty	Parameter				
42.32	M2 tacho fine-tun			11-1	111	у	Parameter				
	feedback selection – Via parameter Attention: The valued feedback of a hand speed in the drive.	sured speed feedbalid if written to by grequested = Taction is automaticadownload. ue of 42.32 M2 tack tack and no	ack of a ha	ndheld tacho. ning. During tl o EMF. ing adjust mu elta between s	he tacho fin st be the m	ne-tuning 4 neasured spence and m	2.18 M2 peed easured				
	-30000.00 30000.00	0.00	rpm	See 42.15	n	У	Paramete				
42.33	M2 tacho fine-tun	_									
	Motor 2 tacho fine-tuning factor. Internally used tacho fine-tuning factor for motor 2.										
42.34	0.30 3.00	1.00		100 = 1	n	У	Parameter				
TC.34	M2 tacho offset Motor 2 tacho offset. Adds an offset to 94.03 Tacho speed. -10.00 10.00										
42.36	M2 current proportio Motor 2 proportio Example: The cont proportional gain 0.00 325.00	tional gain nal gain (K _P) of the roller generates 15	armature 5 % of mot	current contro	oller. rrent with 4 2.08 M2 no	-2.36 M2 cu minal curre	rrent				
42 27				100 - 1	n	У	raiailletei				
42.37	M2 current integration		rmature cı	urrent controll	er.						

	Name											
	Name Text Range Default Unit Scale/ Volatile Change Type											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Setting the integr	ation time to zero o	disables th	e integral par	of the arm	ature curre	ent					
		ets the integrator.										
	The integration time defines the time within the integral part of the armature current											
				•								
	controller achieves the same value as the proportional part when the error value is constant. Example : The controller generates 15 % of motor nominal current with 42.36 M2 current proportional gain = 3 if the armature current error is 5 % of 42.08 M2 nominal current. On that											
						ninal curre	nt. On that					
		h 42.37 M2 current i nerates 30 % of mot	•			current or	coric					
		ms are elapsed. 15										
	the integral part.	ins are elapsed. 15	70 GELIVE I	rom the prop	or cional pai	t and 15 70	derive ir om					
	0.0 32500.0	50.0	ms	1 = 1 ms	n	у	Parameter					
42.38	M2 discontinuous		1113	1-11115	111	У	Farameter					
42.36												
		uous current limit. Ious/discontinuous	· curront in	parcent of 1	0 00 M2 non	sinal curror	at The					
		ious/discontinuous ious/discontinuous		•								
	controller status v	•	cui i ei i c	ate can be rec	ad 11 0111 00.	L4.DIL Cui	enc					
	0.00 325.00	100.00	%	100 = 1 %	n	у	Parameter					
42.39	M2 armature resis		70	100 - 1 70	ļ i i	у	Farameter					
42.33												
	Motor 2 armature		mO Head	for the EME o	alculation /c	omnoncat	ion.					
	TRESISTANCE OF THE						1()():					
	$EMF = U_A - R_A \times I_A - L_A \times \frac{dI_A}{dt}$											
		armature circuit in $I_A - L_A imes rac{dI_A}{dt}$	mizz. Osea	TOI THE LIMIT CO	ilculation) c	ompensac						
	$EMF = U_A - R_A \times$					·						
	$EMF = U_A - R_A \times 42.39 \text{ M2 armature}$ request, or from t	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data shee	obtained l	oy means of a	utotuning, s	see 99.20 T	uning					
	$EMF = U_A - R_A \times 42.39 \text{M2}$ armature request, or from to Note : Do not char	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheenge the default valu	obtained l et. es of 42.39	by means of a	utotuning, s resistance	see 99.20 T and 42.40	uning M2					
	$EMF = U_A - R_A \times 42.39 \text{M2}$ armature request, or from t Note : Do not char armature inductal	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data shee	obtained l et. es of 42.39	by means of a	utotuning, s resistance	see 99.20 T and 42.40	uning M2					
	$EMF = U_A - R_A \times 42.39 \text{M2}$ armature request, or from to Note : Do not char	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheenge the default valu	obtained l et. es of 42.39	oy means of a M2 armature ing them will	utotuning, s resistance falsify the a	see 99.20 T and 42.40	uning M2					
42.40	$EMF = U_A - R_A \times 42.39 \text{M2}$ armature request, or from t Note : Do not char armature inductal	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheen ge the default valunce before autotum 0	obtained l et. es of 42.39 ing! Chang	oy means of a M2 armature ing them will	utotuning, s resistance falsify the a	see 99.20 T and 42.40 utotuning	uning M2 results.					
42.40	$EMF = U_A - R_A \times 42.39 \text{M2}$ armature request, or from to the same armature inductants of 065500	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet nge the default valunce before autotum 0	obtained l et. es of 42.39 ing! Chang	oy means of a M2 armature ing them will	utotuning, s resistance falsify the a	see 99.20 T and 42.40 utotuning	uning M2 results.					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from t Note: Do not char armature inductar 0 65500 M2 armature indu Motor 2 armature	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet nge the default valunce before autotum 0	obtained let. es of 42.39 ing! Chang mOhm	oy means of a M2 armature ing them will	utotuning, s resistance falsify the a	see 99.20 T and 42.40 utotuning	uning M2 results.					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from t Note: Do not char armature inductation 65500 M2 armature inductation Motor 2 armature Inductance of the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 inctance inductance.	obtained let. es of 42.39 ing! Chang mOhm	oy means of a M2 armature ling them will 1 = 1 mOhm	utotuning, s resistance falsify the a	see 99.20 T and 42.40 utotuning y	uning M2 results. Parameter					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from to the sequence of the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valuate before autotum 0 octance inductance. armature circuit in	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained	oy means of a M2 armature ling them will 1 = 1 mOhm	utotuning, s resistance falsify the a	see 99.20 T and 42.40 utotuning y	uning M2 results. Parameter					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from to the the the the the the the the the the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 inductance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce.	obtained bet. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39	oy means of a M2 armature ing them will 1 = 1 mOhm by means of a	resistance falsify the a	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40	uning M2 results. Parameter Tuning M2					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from to the sequence of the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in the inductance can be he motor data sheet age the default valunce before autotum acce before autotum 0	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang	oy means of a M2 armature ing them will 1 = 1 mOhm by means of a M2 armature ing them will	resistance falsify the and autotuning, sautotuning, resistance falsify the a	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning	Tuning Tuning Tuning M2 results.					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from to the sequence of the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 inductance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce.	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang	oy means of a M2 armature ing them will 1 = 1 mOhm by means of a M2 armature ing them will	resistance falsify the and autotuning, sautotuning, resistance falsify the a	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning	Tuning Tuning Tuning M2 results.					
42.40	EMF = U _A - R _A × 42.39 M2 armature request, or from to the sequence of the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in the inductance can be he motor data sheet age the default valunce before autotum acce before autotum 0	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang	oy means of a M2 armature ing them will 1 = 1 mOhm by means of a M2 armature ing them will	resistance falsify the and autotuning, sautotuning, resistance falsify the a	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning	Tuning Tuning Tuning M2 results.					
42.40 42.41	EMF = U _A - R _A × 42.39 M2 armature request, or from to the the the the the the the the the the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce before autotum 0.0	obtained let. es of 42.39 ing! Chang mH. e obtained et. es of 42.39 ing! Chang ance is not	by means of a mature ing them will by means of a mature ing them will armature ing them will a used for the	utotuning, so resistance falsify the and uning, so resistance falsify the and EMF calculars.	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning	Tuning Tuning Tuning M2 results. persults. pensation.					
	EMF = U _A - R _A × 42.39 M2 armature request, or from the Note: Do not charamature inductation. 65500 M2 armature inductane of the 42.40 M2 armature request, or from the Note: Do not charamature inductane armature inductane Attention: 42.40 M2 on 3250.0 M2 current limit be	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce before autotum 0.0	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang ance is not	by means of a mature ing them will by means of a mature ing them will armature ing them will a used for the	utotuning, so resistance falsify the and uning, so resistance falsify the and EMF calculars.	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning	Tuning Tuning Tuning M2 results. pensation.					
	EMF = U _A - R _A × 42.39 M2 armature request, or from to the the the the the the the the the the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valuate before autotum 0 inctance inductance. armature circuit in e inductance can be he motor data sheet age the default valuate before autotum 0.0 incidge 2	obtained bet. es of 42.39 ing! Chang mH. e obtained et. es of 42.39 ing! Chang ance is not mH	by means of a mature ing them will by means of a mature ing them will them will them will them will to sed for the mature ing them will the will the wil	resistance falsify the and autotuning, sutotuning, sutotuning, resistance falsify the and EMF calculan	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning ution/comp	Tuning Tuning Tuning M2 results. pensation. Parameter					
	EMF = U _A - R _A × 42.39 M2 armature request, or from to the the the the the the the the the the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce before autotum 0.0 eridge 2 current limit for brige 2 in percent of 43	obtained bet. es of 42.39 ing! Chang mH. e obtained et. es of 42.39 ing! Chang ance is not mH	by means of a mature ing them will by means of a mature ing them will them will them will them will to sed for the mature ing them will the will the wil	resistance falsify the and autotuning, sutotuning, sutotuning, resistance falsify the and EMF calculan	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning ution/comp	Tuning Tuning Tuning M2 results. pensation. Parameter					
	EMF = U _A - R _A × 42.39 M2 armature request, or from to the the the the the the the the the the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce before autotum 0.0 eridge 2 current limit for brige 2 in percent of 43	obtained bet. es of 42.39 ing! Chang mH. e obtained et. es of 42.39 ing! Chang ance is not mH	by means of a mature ing them will by means of a mature ing them will them will them will them will to sed for the mature ing them will the will the wil	resistance falsify the and autotuning, sutotuning, sutotuning, resistance falsify the and EMF calculan	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning ution/comp	Tuning Tuning Tuning M2 results. pensation. Parameter					
	EMF = U _A - R _A × 42.39 M2 armature request, or from the Note: Do not charamature inductation. 65500 M2 armature inductance of the 42.40 M2 armature inductance of the 42.40 M2 armature request, or from the Note: Do not charamature inductance inductance armature inductance. 42.40 M2 armature inductance. 42.40 M2 armature inductance. 42.40 M2 armature inductance. 42.40 M2 armature inductance. 42.40 M2 armature inductance. 42.40 M2 armature. 42.	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 ectance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce before autotum 0.0 eridge 2 current limit for brige 2 in percent of 43	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang ance is not mH	by means of a mature fing them will by means of a mature fing them will tused for the minal current	resistance falsify the a n n autotuning, setting 42	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning ution/comp	Tuning Tuning M2 Tuning M2 results. pensation. Parameter Parameter					
	EMF = U _A - R _A × 42.39 M2 armature request, or from the Note: Do not charamature inductation. 65500 M2 armature inductation. 65500 M2 armature inductation. Motor 2 armature inductance of the 42.40 M2 armature request, or from the Note: Do not charamature inductation. 42.40 M2 armature inductation. 42.40	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet ge the default value ince before autotum 0 Inctance inductance. armature circuit in the inductance can be he motor data sheet ge the default value ince before autotum 0.0 Inciding 2 The current limit for bring 2 in percent of 43 ables bridge 2.	obtained let. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang ance is not mH idge 2. 2.08 M2 no	by means of a mature ing them will by means of a mature ing them will tused for the minal current drive's actual drive's actual	resistance falsify the a n n autotuning, resistance falsify the a EMF calcula n . Setting 42	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning ution/comp	Tuning Tuning Tuning M2 results. pensation. Parameter Parameter					
	EMF = U _A - R _A × 42.39 M2 armature request, or from to the the the the the the the the the the	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheetinge the default value of the motor data sheeting armature circuit in e inductance. The inductance can be he motor data sheetinge the default value of the default value of the motor data sheetinge the default value of the default	obtained bet. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang ance is not mH idge 2. 2.08 M2 no	by means of a mature ing them will a mature ing them will by means of a mature ing them will used for the minal current drive's actual the limit with the li	resistance falsify the and autotuning, sutotuning, resistance falsify the and EMF calculation in the largest variation since the largest varia	see 99.20 Tand 42.40 autotuning y see 99.20 and 42.40 autotuning ation/comp y 41 M2 curre atuation (or value is valients)	Tuning M2 Tuning M2 results. Parameter M2 results. pensation. Parameter ent limit ther torque id.					
	EMF = U _A - R _A × 42.39 M2 armature request, or from the street inductant on the street inductant on the street inductance of the street inductance of the street inductance of the street inductance of the street inductance inductant	$I_A - L_A imes rac{dI_A}{dt}$ e resistance can be he motor data sheet age the default valunce before autotum 0 actance inductance. armature circuit in e inductance can be he motor data sheet age the default valunce before autotum 0.0 armature induct 0.0 armatu	obtained bet. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang ance is not mH idge 2. 2.08 M2 not eskening). Tetting of 42	by means of an M2 armature ing them will 1 = 1 mOhm by means of an M2 armature ing them will to used for the 10 = 1 mH minal current the limit with the limit with the M2 current M2 current M3 actual M4 M2 current	resistance falsify the and autotuning, resistance falsify the and EMF calculation since the largest value in the l	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning tion/comp y .41 M2 curr ituation (or value is vali e 2 for 2-Q	Tuning M2 results. Parameter Tuning M2 results. bensation. Parameter ent limit ther torque id. operation,					
	EMF = U _A - R _A × 42.39 M2 armature request, or from the street inductant on the street inductant on the street inductance of the street inductance of the street inductance of the street inductance of the street inductance inductant	$I_A - L_A imes rac{dI_A}{dt}$ The resistance can be the motor data sheeting the default valuated before autotum of the motor data sheeting the default valuated before autotum of the motor data sheeting the default valuated before autotum of the motor data sheeting the default valuated before autotum of the motor data sheeting the default valuated before autotum of the motor data sheeting the default for bright of the default seating the	obtained bet. es of 42.39 ing! Chang mOhm mH. e obtained et. es of 42.39 ing! Chang ance is not mH idge 2. 2.08 M2 not eskening). Tetting of 42	by means of an M2 armature ing them will 1 = 1 mOhm by means of an M2 armature ing them will to used for the 10 = 1 mH minal current the limit with the limit with the M2 current M2 current M3 actual M4 M2 current	resistance falsify the and autotuning, resistance falsify the and EMF calculation since the largest value in the l	see 99.20 T and 42.40 utotuning y see 99.20 and 42.40 utotuning tion/comp y .41 M2 curr ituation (or value is vali e 2 for 2-Q	Tuning M2 results. Parameter Tuning M2 results. bensation. Parameter ent limit ther torque id. operation,					

Index	Name Text										
	Text Range Default Unit Scale/ Volatile Change Type										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
42.42	M2 current limit bi	ridge 1	•	-	•	•	•				
	Motor 2 armature	current limit for br	ridge 1.								
	Motor 2 armature current limit for bridge 1. Current limit bridge 1 in percent of 42.08 M2 nominal current. Setting 42.42 M2 current limit										
	bridge 1 = 0 % disables bridge 1. Note: The used current limit depends also on the drive's actual limitation situation (other										
	Note: The used cur	rent limit depend	s also on th	ne drive's actu	al limitatio	n situation	(other				
		ent limits and field	l weakenin	g). The limit w	ith the sma	llest value	is valid.				
	torque limits, current limits and field weakening). The limit with the smallest value is valid. 0.00 325.00										
42.43	M2 armature induc	tance current cor	ntroller								
	Motor 2 armature i	nductance. Note :	Typically le	eft at default.							
	Inductance of the a		mH. Used	for the feed for	orward (EM	F compens	ation) of				
	the current contro										
	0.0 3250.0	0.0	mH	10 = 1 mH	n	у	Parameter				
42.44	M2 armature induc	tance EMF speed	feedback								
İ	Motor 2 armature i										
	Inductance of the a	armature circuit in	mH. Used	for the EMF c	alculation.						
	0.0 3250.0	0.0	mH	10 = 1 mH	n	у	Paramete				
42.45	M2 field current re	ference									
	Motor 2 field curre	nt reference.									
	Displays motor 2 fi	eld current refere	nce in perc	ent of 42.10 M	12 nominal f	ield curren	t.				
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal				
42.46	M2 field current										
	M2 field current Motor 2 field current.										
	Motor 2 measured	field current in pe	rcent of 42	2.10 M2 nomina	al field curr	ent.					
	-325.00 325.00	-	%	100 = 1 %	у	n	Signal				
42.49	M2 used field excit	er type		•		•					
İ	Motor 2 field excite	er type.									
	Motor 2 field exciter type. 42.49 M2 used field exciter type ≠ None, activates motor 2 field exciter. Now it reacts to an On										
	command and generates field current.										
	Note: To activate both field exciters (motor 1 and motor 2) set also 99.07 M1 used field exciter										
	type ≠ None.										
	Attention: The concept of shared motion is based on two independent field exciters. One motor is in operation and the second motor is e.g., in field economy, see chapter Mode of										
	•			•	•						
	operation for field		-		naings is no	ot allowed.					
	0: None ; no or third 1: OnBoard ; integra				M						
	2: DCF803-0016 ; ex					m 0 3 A 1	I6 Δ				
	Note: Use 35 A terr		sia exercer v	asea for field (carrerres ire	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,					
	→ 33 0 1										
	5 0 2 X100	8-75-76-76-0									
	3: FEX-425-Int ; inte from 0.3 A 25 A. Note: Use 35 A terr		l exciter (fo	or size H5 and	H6 only) us	ed for field	currents				

Index Name Text Range Default Unit Scale/ Volatile Change Type FbEq16 running %|**⊕** 2 |**⊘**| X100 4: DCF803-0035; external 1-Q 35 A field exciter used for field currents from 0.3 A ... 35 A. Note: Use 35 A terminals: Φ 5A $| \varpi |$ X100 0 5: DCF803 terminal 5 A; external 1-Q 16 A field exciter (DCF803-0016), internal 1-Q 25 A field exciter (FEX-425-Int) or external 1-Q 35 A field exciter (DCF803-0035) used for field currents from 0.3 A ... 5 A. Note: Use 5 A terminals. Φ X100 0 6: DCF803-0050; external 1-Q 50 A field exciter. 7: DCF804-0050; external 4-Q 50 A field exciter. 8: DCF803-0060; external 1-Q 60 A field exciter. 9: DCF804-0060; external 4-Q 60 A field exciter. 10: DCS880-S01; external 2-Q standard DCS880 module. 11: DCS880-S02; external 4-Q standard DCS880 module. 16: External field exciter via Al1; third party field exciter, acknowledge via Al1. 17: External field exciter via AI2; third party field exciter, acknowledge via AI2. 18: External field exciter via AI3; third party field exciter, acknowledge via AI3. 19: Multiple field exciters; reserved. 0 ... 19 OnBoard 1 = 1 n n Parameter 42.50 M2 EMF/field control mode Motor 2 EMF/field control mode. Motor 2 EMF/field control mode selection. Note: It is not possible to go into field weakening range when 42.18 M2 feedback selection = 0: Fix; constant field (no field weakening), EMF controller blocked, field reversal blocked, optitorque blocked. 1: EMF; field weakening active, EMF controller released, field reversal blocked, optitorque blocked. 2: Fix/reversal; constant field (no field weakening), EMF controller blocked, field reversal active, optitorque blocked.

Parameters

optitorque blocked.

optitorque active.

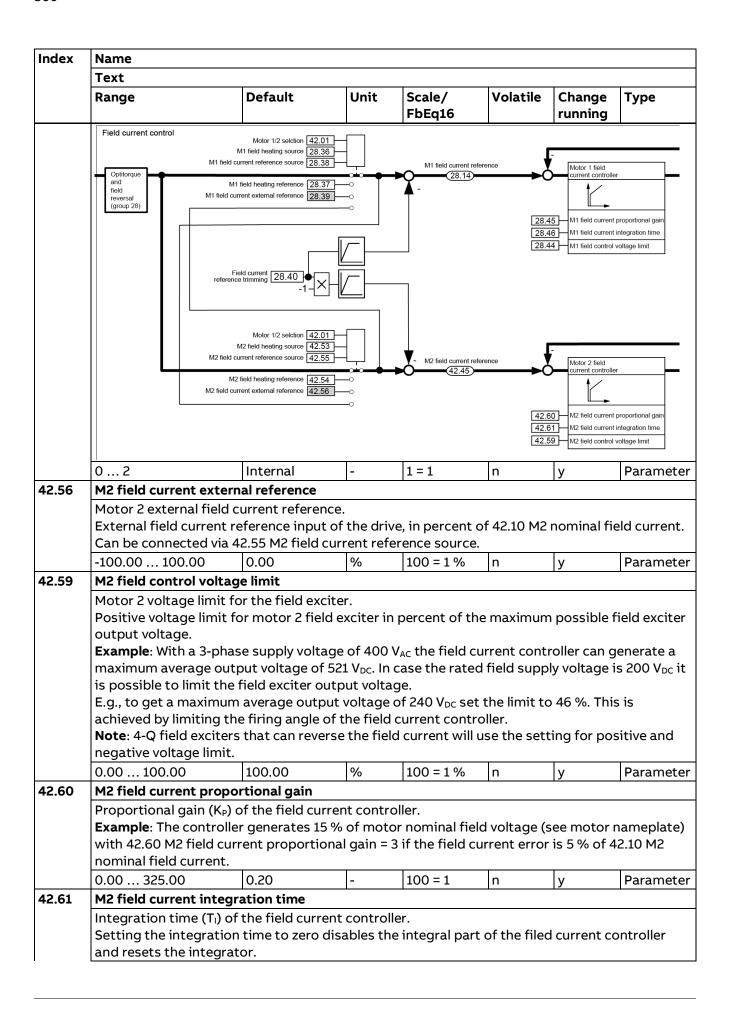
blocked, optitorque active.

3: EMF/reversal; field weakening active, EMF controller released, field reversal active,

4: Fix/optitorque; constant field (no field weakening), EMF controller blocked, field reversal

5: EMF/optitorque; field weakening active, EMF controller released, field reversal blocked,

Index	Name Text						
		6: Fix/reversal/optitorque; constant field (no field weakening), EMF controller blocked, field reversal active, optitorque active. 7: EMF/reversal/optitorque; field weakening active, EMF controller released, field reversal active, optitorque active.					
	0 7	Fix	-	1 = 1	n	у	Parameter
42.53	M2 field heating source						
	reserved						
	0 19	Disable field heating	-	1 = 1	n	у	Parameter
42.54	M2 field heating reference						
	Motor 2 field heating current reference. Field current reference in percent of 42.10 M2 nominal field current for field heating and field economy. Field heating: Field heating is enabled according to 28.36 M1 field heating source. Field heating is disabled when 42.54 M2 field heating reference = 0. Field economy: Field economy is only available when 2 motors with 2 independent field exciters are connected to the drive. Field economy for motor 2 is enabled, if: 42.54 M2 field heating reference < 100 %. 28.36 M1 field heating source = Disable field heating or Enable field heating. Field economy for motor 2 is activated, if: The On command is given for longer than 10 s. Motor 1 is selected via 42.01 Motor 1/2 selection. Motor 1 is active. See 06.18.b04 Drive status word 3. 28.38 M1 field current reference source = 42.55 M2 field current reference source = Internal.						
40	0.00 100.00	0.00	%	100 = 1 %	n	у	Parameter
42.55	M2 field current reference source Motor 2 field current reference source. Selector for motor 2 field current reference. 0: Internal; motor 2 field current reference according to field heating or shared motion. See 42.53 M2 field heating source and 42.01 Motor 1/2 selection. 1: Motor 1 reference; motor 1 field current reference is taken. 2: Motor 2 external; 42.56 M2 field current external reference.						



Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
42.62	achieves the sam Example: The cor with 42.60 M2 field cur ms follows: The controller ge constant, after 2 from the integra 0 32500 M2 field current Motor 2 field cur	200 low level	ortional par 5 % of moto onal gain = : tion and wit otor nomina 15 % derive	rt when the e or nominal fie 3 if the field o th 42.61 M2 fie I field voltage from the pro	rror value is eld voltage (s current error eld current i e, if the field portional pa	constant. see motor is 5 % of 4 ntegration current er art and 15 %	nameplate 42.10 M2 time = 200 ror is 6 derive Paramet
	trip delay elapse: Notes: 42.62 M2 field cases, the fau event general reference is seen at 2.62 M2 field Fix/optitorque these cases, The event general reference is seen at 2.62 M2 field fix/optitorque these cases, The event general reference is seen at 2.62 M2 field fix/optitorque these cases, The event general reference is seen at 2.62 M2 field fix/optitorque these cases, and the control of	M2 nominal field cus. d current low level is ult level is automatives fault F542 M2 fistill undershot where d current low level is ue, EMF/optitorque the fault level is autonerates fault F542 Istill undershot wherestell undershot wheres.	s not valid d cally set to ! eld exciter l n 31.57 Minir s not valid fo e, Fix/revers comatically s	uring field he 50 % of 42.54 ow current, if num field cur or 42.50 M2 E al/optitorqu set to 50 % of ter low curre	eating and fi M2 field head 50 % of 42. rent trip del MF/field colle e and EMF/r f 42.45 M2 fi nt, if 50 % o	eld econon ating refer 54 M2 field ay elapses ntrol mode reversal/op eld current f 42.45 M2	ny. In these ence. The I heating e = otitorque. I reference field curre
	0.00 135.00	50.00	%	100 = 1 %	n n	у	Paramet
42.63	M2 field overcur		170	100 - 1 70	"	У	T arainet
	percent of 42.10 overcurrent level Notes : – The field over	ercurrent level. ates fault F518 M2 f M2 nominal field cu l at least 25 % highe rcurrent fault is inacternal field overcure	er than 42.10 ctive, if 42.6 cent level is	eeded. It is re) M2 nominal 3 M2 field ove set to field ove	ecommende field current ercurrent lev vercurrent le	d to set 42. vel = 135 %. vel plus fie	.63 M2 field
		125.00	%	1100 = 1 %	l n	W	Paramet
42.66		125.00	% 	100 = 1 %	n	у	Paramet

The scaling factor is released when 42.10 M2 nominal field current < 42.66 Set: M2 field exciter current scaling and 42.49 M2 used field exciter type = OnBoard ... DCF804-0060.

set automatically.

Index	Nam	ne											
	Text												
	Rang	ge	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0.00	60.00	0.00		Α	100 = 1 A	n	у	Parameter				
42.67	M2 field exciter freewheeling level												
	The volta free Note	or 2 field exciter free freewheeling level is age. If 2 successive A wheeling level, the fire The freewheeling CF804-0060.	s shown AC-volta reewhee	in perce ge meas eling fun	suremen	ts differ mor activated.	re than 42.67	7 M2 field e	xciter				
	0.00	100.00	20.00		%/ms	100 = 1	n	у	Parameter				
						%/ms							
42.68		ield exciter operatior 2 operation mode											
	phas 0: 1- 1: 3- 0	field exciters DCF80 se supply or a single phase; single-phase phase; 3-phase supp 1 or 2 mechanical bra	-phase s supply oly for th 3-phase	supply. for the f ne field s	field exci		n	y	Parameter				
I	For	more information se	ee group	44 Med	hanical l	orake contro	<u>l</u> .						
42.71	M2 k	orake control status	3										
	Motor 2 mechanical brake control status word. Displays the mechanical brake control status word of motor 2. Bit assignment:												
	Bit	Name	Value	Remar	ks								
	О	Brake open command	1		Open cor	nmand. t to the desi	red digital o	utput.					
			0	Brake (Close cor	mmand.							
	1	Brake open torque	1	Brake o	open tor	que requeste	ed from the	drive logic.					
		requested	0	Brake o	open tor	que not requ	ested.						
	2	Ramp output zero	1	Force t	he ramp	output to ze	ero during o	pening the	brake.				
		during opening	0	Ramp	output n	ot forced.							
	3	Stop ramp	1	Ramp	down to	zero speed r	equested fr	om the driv	/e logic.				
	11	1		1									

Parameters

requested

enabled

Brake control

Brake closed

Brake opening

Brake open

Brake closing

4

5

6

7

8

0

1

0

1

0

1

0

1

0

0

Ramp down not requested.

Brake control is enabled.

Brake control is disabled.

Brake is currently opening.

Brake is currently closing.

Brake is either open or closed.

Brake is either open or closed.

Brake is closed.

Brake is open.

Brake is open.

Brake is closed.

Index	Nam	ne									
	Text	t									
	Ran	ge	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	9	reserved			•	•		•	•		
	10	reserved									
	11	reserved									
	12	Torque proving	1	Torque	nrovino	g requested.					
	12	request		-		•					
		•	0	<u> </u>		not request	ea.				
	13	Torque proving O	K 1	-	e proving						
			0	Torque	e proving	g failed.					
	14	Torque proving	1	Torque	e proving	g failed.					
		not OK	0	Torque	e proving	g is OK.					
	15	Brake	1	Brake a	acknowl	edge failed.					
		acknowledge failed	0			edge OK.					
	200	01 ====1	1		1	Ta a		1	la: ı		
42.72	-	Oh FFFFh orake torque memo	-]-	1 = 1	у	n	Signal		
42.73	42.7 42.7 -325	orake control statu: 9 M2 brake open to 2 M2 brake torque 5.0 325.0	rque sou	ırce and	42.80 M	l2 brake open	torque.		2.		
42.73	M2 brake open torque reference Motor 2 currently active brake open torque. Displays the currently active brake open torque. See 42.79 M2 brake open torque source and 42.80 M2 brake open torque. The value presets integration time 1 (TI) of the speed controller.										
	Disp 42.8 The	or 2 currently active plays the currently a 0 M2 brake open to value presets integ	e brake o active bra orque. aration til	pen toro ike oper me 1 (TI)	torque.	See 42.79 M2	2 brake oper				
	Disp 42.8 The	or 2 currently active plays the currently a 0 M2 brake open to	e brake o active bra orque. aration til	pen toro ike oper me 1 (TI)	torque.	See 42.79 M2	2 brake oper				
	Disp 42.8 The -325	or 2 currently active plays the currently a control of M2 brake open to value presets integral of 325.0	e brake o active bra orque. ration tii 0.0	pen tord ke oper me 1 (TI)	torque.	See 42.79 M2	2 brake oper	n torque so	urce and		
	Disp 42.8 The -325 M2 k Mot Enal 0 = 1 1 = E	or 2 currently active plays the currently a color of M2 brake open to value presets integrated on 325.0 brake control enable or 2 enable the brake bles/Disables the modisable the mechanical or a color of the mechanical of the me	e brake o active bra orque. aration tiu 0.0 le ke contro nechanica nical brake	pen toro ke oper me 1 (TI) ol. al brake e contro	of the some control.	See 42.79 M2 speed control 10 = 1 %	2 brake oper	n torque so	urce and		
	Disp 42.8 The -325 M2 k Mot Enal 0 = 1 1 = E Othe	or 2 currently active plays the currently a 0 M2 brake open to value presets integrated in 25.0 brake control enables/Disable the mechanical er [bit]; source sele	e brake o active bra orque. Iration til 0.0 le ke contro nechanica ical brake cal brake ction.	pen tore lke oper me 1 (TI) bl. al brake e control	of the some control.	See 42.79 M2 speed control 10 = 1 %	2 brake oper	n torque so	ource and		
	Disp 42.8 The -325 M2 k Mot Enal 0 = I 1 = E Otho 0: N 1: Se 3: Di	or 2 currently active plays the currently a color of M2 brake open to value presets integrated on 325.0 brake control enable or 2 enable the brake bles/Disables the modisable the mechanical or a color of the mechanical of the me	e brake of active brace or que. Tration time of the control of th	pen toro tke oper me 1 (TI) ol. al brake e control control nechanic ius.	of the some control.	See 42.79 M2 speed control 10 = 1 %	2 brake oper	n torque so	urce and		
	Disp 42.8 The -325 M2 k Mot Enal 0 = I 1 = E Oth 0: N 1: Se 3: Di 4: Di 5: Di 6: D	or 2 currently active plays the currently a 0 M2 brake open to value presets integrated on 325.0 brake control enables/Disables the moles/Disables the mechanical er [bit]; source selected; 0, Disablected; 1, enable the l1; 10.02.b00 DI dela 12; 10.02.b02 DI dela 14; 10.02.b03 DI dela 14; 10.02.b03 DI dela 14; 10.02.b03 DI dela 14; 10.02.b03 DI dela 15; 10.02.b03 DI dela 16; 10.02.b03 DI dela 1	e brake of active brach or que. Tration til 0.0 Exercontrol Tracke control Tracke cal brake cal brake cal brake ction. To ble the nue mecha ayed state ayed stat	pen tore ake oper me 1 (TI) ol. al brake e control nechanic nical bra aus. aus. aus.	of the some control.	See 42.79 M2 speed control 10 = 1 %	2 brake oper	n torque so	ource and		
42.76	Disp 42.8 The -325 M2 k Mot Enal 0 = 1 1 = E Otho 0: No 1: Se 3: Di 4: Di 5: Di 6: Di 7: Di 8: D	or 2 currently active plays the currently at 0 M2 brake open to value presets integrated on 325.0 brake control enables/Disables the moles/Disables the moles bles/Disables the mechanical for 2 enable the mechanical for 2 enable the mechanical for 2 enable the mechanical for 2 enable the mechanical for 3 elected; 0, Disable the mechanical for 3 elected; 1, enable the 11; 10.02.b00 DI dela for 3 elected; 1, enable the 12; 10.02.b01 DI dela for 3 elected; 1 ele	e brake of active brace or que. I ration til 0.0 le	pen tore tke oper me 1 (TI) ol. al brake e control nechanic nical bra tus. tus. tus. tus.	of the some control.	See 42.79 M2 speed control 10 = 1 %	2 brake oper	n torque so	urce and		
	Disp 42.8 The -325 M2 k Mot Enal 0 = 1 1 = E Oth 0: N 1: Se 3: Di 4: Di 5: Di 6: Di 7: Di 8: Di 11: D	or 2 currently active plays the currently a 0 M2 brake open to value presets integrated on 325.0 brake control enables / Disable the mechanical er [bit]; source selected; 0, Disable the mechanical er [bit]; source selected; 1, enable the 11; 10.02.b00 DI dela 12; 10.02.b02 DI dela 13; 10.02.b03 DI dela 14; 10.02.b04 DI dela 15; 10.02.b05 DI dela 16; 10.02.b05 DI dela 16; 10.02.b05 DI dela 16; 11.02.b00 DIO DIO2; 11.02.b00 DIO	e brake of active brach or que. Tration time of the control of th	pen tore ake oper me 1 (TI) ol. al brake e control nechanic nical bra ius. ius. ius. ius. itus.	of the some control.	See 42.79 M2 speed control 10 = 1 %	2 brake oper	n torque so	urce and		
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M2 brake open delay Motor 2 brake open delay. Defines the delay between the brake Open command, see 42.71.b00 M2 brake control statu and the release of the speed controller. Thus, the output of the speed ramp is forced to zer The delay time starts when the drive has increased the motor torque to the level required for the brake release. See 42.73.M2 brake open torque reference. Simultaneously with the start of the timer, the brake control logic energizes the brake control output, and the brake starts to open. Set 42.78 M2 brake open delay to the value of the mechanical opening delay specified by the brake manufacturer. 0.00 5.00 0.00 s 100 = 1 s n y Param		Name										
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Enables/Disables the brake open/close acknowledge. When a brake control error, unexpected state of the brake acknowledge, is detected, the dreacts as defined by 42.87 M2 brake fault function. 0 = Brake closed. 1 = Brake open. Other [bit]; source selection. 0: No acknowledge; 0. Disable the brake acknowledge. 1: Acknowledge; 0. Disable brake acknowledge to open. 2: None; inactive. Disable brake acknowledge. 3: Dit; 10.02.b00 DI delayed status. 4: Di2; 10.02.b01 DI delayed status. 5: Di3; 10.02.b02 DI delayed status. 5: Di3; 10.02.b02 DI delayed status. 7: Di5; 10.02.b03 DI delayed status. 8: Di6; 10.02.b05 DI delayed status. 11: DiO1; 11.02.b00 DIO delayed status. 12: DiO2; 11.02.b01 DIO delayed status. 12: DiO2; 11.02.b01 DIO delayed status. 12: DiO2; 11.02.b01 DIO delayed status. 12: DiO3; 11.02.b02 DIO delayed status. 13: DiO4; 11.02.b00 DIO delayed status. 14: DiO5; 11.02.b01 DIO delayed status. 15: DiO6; 11.02.b01 DIO delayed status. 16: DiO6; 11.02.b01 DIO delayed status. 17: DiO6; 11.02.b01 DIO delayed status. 18: DiO6; 11.02.b01 DIO delayed status. 19: DiO6; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO6; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO6; 11.02.b01 DIO delayed status. 10: DiO6; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO delayed status. 10: DiO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 DIO7; 11.02.b01 D		Range	Default	Unit	-	Volatile	_	Туре				
11: DIO1; 11.02.b00 DIO delayed status. 12: DIO2; 11.02.b01 DIO delayed status. 012		Enables/Disables When a brake con reacts as defined 0 = Brake closed. 1 = Brake open. Other [bit]; sourc 0: No acknowledge; 1 2: None; inactive. 3: DI1; 10.02.b00 I 4: DI2; 10.02.b01 I 5: DI3; 10.02.b02 I 6: DI4; 10.02.b03 I	the brake open/clo trol error, unexpect by 42.87 M2 brake f e selection. ge; 0. Disable the brake ac Disable brake acknown DI delayed status. DI delayed status. DI delayed status. DI delayed status.	ed state of ault funct ault funct ake ackno	vledge. of the brake action. wledge.	cknowledge,		d, the drive				
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Motor 2 brake open delay. Defines the delay between the brake Open command, see 42.71.b00 M2 brake control status and the release of the speed controller. Thus, the output of the speed ramp is forced to zer The delay time starts when the drive has increased the motor torque to the level required for the brake release. See 42.73.M2 brake open torque reference. Simultaneously with the start of the timer, the brake control logic energizes the brake control output, and the brake starts to open. Set 42.78 M2 brake open delay to the value of the mechanical opening delay specified by the brake manufacturer. 0.00 5.00				-	1 = 1	n	У	Parameter				
Motor 2 brake open torque source. Defines a source that is used as motor 2 brake open torque reference. The value of the sour is only taken if: The absolute value is greater than the setting of 42.80 M2 brake open torque. The sign is the same as the setting of 42.80 M2 brake open torque. Otherwise, the value of 42.80 M2 brake open torque is used. Other; source selection. O: Zero; 0 %, brake open torque is set to zero. 1: Al1 scaled; 12.12 Al1 scaled value. 2: Al2 scaled; 12.22 Al2 scaled value. 3: FBA A reference 1; 03.05 FBA A reference 1. 4: FBA A reference 2; 03.06 FBA A reference 2. 7: M2 brake torque memory; 44.72 M2 brake torque memory. 8: M2 brake open torque; 42.80 M2 brake open torque. Attention: For the hoist in a crane use only positive values. O 8 M2 brake open - 1 = 1 n y Param		and the release of the speed controller. Thus, the output of the speed ramp is forced to zero. The delay time starts when the drive has increased the motor torque to the level required for the brake release. See 42.73.M2 brake open torque reference. Simultaneously with the start of the timer, the brake control logic energizes the brake control										
Motor 2 brake open torque source. Defines a source that is used as motor 2 brake open torque reference. The value of the sour is only taken if: The absolute value is greater than the setting of 42.80 M2 brake open torque. The sign is the same as the setting of 42.80 M2 brake open torque. Otherwise, the value of 42.80 M2 brake open torque is used. Other; source selection. O: Zero; 0 %, brake open torque is set to zero. 1: Al1 scaled; 12.12 Al1 scaled value. 2: Al2 scaled; 12.22 Al2 scaled value. 3: FBA A reference 1; 03.05 FBA A reference 1. 4: FBA A reference 2; 03.06 FBA A reference 2. 7: M2 brake torque memory; 44.72 M2 brake torque memory. 8: M2 brake open torque; 42.80 M2 brake open torque. Attention: For the hoist in a crane use only positive values. 0 8 M2 brake open - 1 = 1 n y Param		The delay time stathe brake release. Simultaneously woutput, and the b	arts when the drive . See 42.73.M2 brake ith the start of the rake starts to open te open delay to the	er. Thus, thas increate open torestimer, the	he output of t used the moto que reference brake control	the speed ra or torque to t e. I logic energi	mp is force the level re- izes the bra	ed to zero. quired for ake control				
	42.70	The delay time stathe brake release. Simultaneously woutput, and the best 42.78 M2 brake manufacture 0.00 5.00	arts when the drive . See 42.73.M2 brake ith the start of the rake starts to open te open delay to the rer. 0.00	er. Thus, the has increated open tore timer, the value of the	he output of t used the moto que reference brake control he mechanica	the speed ra or torque to to e. I logic energi al opening de	mp is force the level re- izes the bra elay specific	ed to zero. quired for ake control				
42.80 M2 brake open torque	42.79	The delay time state the brake release. Simultaneously woutput, and the bound of the bound of the bound of the brake manufacture of the brake manufacture of the brake open to be brake open to be brake open to be brake open to be brake open to be brake of the brake of the brake of the brake of the brake of the brake open of the brake open b	arts when the drive . See 42.73.M2 brake ith the start of the rake starts to open te open delay to the rer. 0.00 orque source en torque source. that is used as moto value is greater than e same as the settin lue of 42.80 M2 brake ection. the open torque is see 2 Al1 scaled value. 2 Al2 scaled value. 2 Al2 scaled value. 6 1; 03.05 FBA A reference 2; 03.06 FBA A refere	er. Thus, the has increate open to retimer, the value of the setting of 42.80 are open to reference 1. erence 2. 2 brake to rake open e only pos	he output of the sed the motor que reference brake control he mechanica 100 = 1 s open torque of 42.80 M of M2 brake oper que is used.	the speed rather torque to feed to fee	mp is force the level re- izes the bra elay specific y ne value of n torque.	ed to zero. quired for ake control ed by the Paramete the source				

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Defines the sign,	e.g., for the direction	of rotati	on, and the m	ninimum abs	solute value	e of the
	·	e in percent of 42.04		•			
		.79 M2 brake open to					
		f the source selected	•	•	•		
		e only if it has the sai	me sign a	s 42.80 M2 br	rake open to	orque and r	nas a greater
	absolute value.		10,	10 10	-	1	Τ
	-325.0 325.0	0.0	%	10 = 1 %	n	у	Parameter
42.81	M2 keep brake cl						
	Motor 2 keep bral						_
		hat prevents the bra	ke from c	pening. See 4	12.71 b00 M2	2 brake con	itrol status.
	0 = Normal brake						
	•	sed or force brake to	o close.				
	Other [bit]; source		tion				
	•	, normal brake opera p brake closed or for		to closo			
	3: DI1 ; 10.02.b00 I	-	ce bi ake	to close.			
	4: DI2 ; 10.02.b01 [_					
	5: DI3 ; 10.02.b02 [-					
	6: DI4 ; 10.02.b03 l	_					
	7: DI5 ; 10.02.b04 I	-					
	8: DI6 ; 10.02.b05	OI delayed status.					
	11: DIO1 ; 11.02.b0	O DIO delayed status					
	12: DIO2 ; 11.02.b0	1 DIO delayed status.	•				
	19: DIL ; 10.02.b15	DI delayed status.					
	0 19	Not selected	-	1 = 1	n	n	Parameter
42.82	M2 brake close re	quest					
	reserved						
	0 19	Not selected	-	1 = 1	n	n	Parameter
42.83	M2 brake close de	elav					l
	Motor 2 brake clo						
		between the brake C	lose com	mand, see 42	2.71.b00 M2 l	brake cont	rol status,
		when the drive is beir					
	zero speed refere	nce until the brake a	ctually clo	ses and the b	orake ackno	wledge is r	eceived.
		e close delay to the v	alue of th	ne mechanica	l make-up ti	me/close	delay
	specified by the b	rake manufacturer.					
	0.00 60.00	0.00	S	100 = 1 s	n	у	Parameter
42.87	M2 brake fault fu	nction					
	Motor 2 brake fau	It function.					
	Determines how t	he drive reacts upon	a mecha	nical brake co	ontrol error.	It is the rea	action of a
		g brake acknowledge					
		M2 brake acknowled			wledge, the	brake ackn	owledge is
		generate no warning	s or fault	5.			
	0: Warning;						
		Close command, the	_		-		_
		ake close acknowled	_				=
		Open command, the	_		_		
		ake open acknowled	_				-
	_	erates warning A7A5		•	-		•
	conditions car	nnot be fulfilled. E.g.,	the requ	ired motor st	artıng torqu	ie is not re	ached.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	1: Fault;		<u> </u>	<u>'</u>		<u>, </u>	
		Close command, the	_				_
		rake close acknowle	-				-
		Open command, the	_				
		orake open acknowle	_				-
	_	nerates fault 71A5 M					•
		annot be fulfilled. E.g	ı., the requ	ired motor st	arting torqu	ie is not rea	ached.
	3: Crane;						
		Close command, the	_		_	_	_
		cknowledge is not re			_		•
		mains active with zer	•				_
		er the brake close ac	knowieage	e nas been rec	eived fauit	/ IAZ Mecna	anicai brake
	_	d is generated.	not rocci,	مطعاله عمامه	ام م م م م ا		ad using
		:lose acknowledge is ergency off) comma					ea using
	· ·	ergency orr) command, the				-	ononing
		orake open acknowle	_				
		nerates fault 71A5 M	_				-
	_	annot be fulfilled. E.g					•
	03	Warning		1 = 1	n	y	Parameter
42.88	M2 brake fault d			11-1		У	T drameter
42.00				1			
	_	ne for all events brak	e acknowi	eage.			
		ault delay delays: 1 Mechanical brake c	lacina fail	- d			
	_	2 Mechanical brake c	_				
	_	5 Mechanical brake o					
	_	echanical brake closi		t anowed.			
		echanical brake closi echanical brake oper	-				
		echanical brake oper	_				
		owledge is correct b	_		all brake ev	ents will be	۵.
	disregarded.	owicage is correct s	crore the	aciay ciapses,	an brane ev	Circs will by	_
	_	time must be set lon	ger than th	ne feedback ti	ime at norm	al operatio	on.
	0.00 60.00	0.00	s	100 = 1 s	n	у	Parameter
42.90	M2 brake long ti			100 10		3	- arameter
TE.50	Motor 2 brake lo						
		brake fault function	- Crane ar	nd a brake clos	se acknowle	dae is not	received
		brake long time warr				_	
		ns active with zero sp	-	_			-
		he brake close ackno					-
	closing failed is						
		e acknowledge is not	received a	at all, the drive	e can only be	e stopped i	using the
		off) command. See			-		J • •
	0.00 60.00	4.00	s	100 = 1 s	n n	у	Parameter
42.95	M2 brake torque			1200 20		13	1
12.55		orque proving time.					
		rith F556 Torque pro	ana if tha	Pun comman	dis sot and	12 71 h12 N	12 brako
		not high before 42.9					iL DI ake
		oving is inactive, if 42.5			_	•	
	0.00 100.00	0.00	S MZ DI	100 = 1 s	n n	у у	Parameter

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре

42.96 M2 Torque proving reference

Motor 2 Torque proving reference.

Reference selection for torque proving.

Notes:

- External/Internal torque proving is inactive, if 42.95 M2 brake torque proving time = 0.
- The brake stays closed during torque proving.

Other; source selection.

- 0: **None/External proving**; external torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 1: **Al1 scaled**; 12.12 Al1 scaled value. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 2: **AI2 scaled**; 12.22 AI2 scaled value. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 3: **FBA A reference 1**; 03.05 FBA A reference 1. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 4: **FBA A reference 2**; 03.06 FBA A reference 2. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 7: **M2 brake torque memory**; 42.72 M2 brake torque memory. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 8: **M2 brake open torque**; 42.80 M2 brake open torque. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.
- 9: **Fix value 25** %; torque reference is set to 25 % of 42.04 M2 nominal torque. Internal torque proving is enabled, if 42.95 M2 brake torque proving time > 0.

External torque proving procedure:

- In the drive set 42.95 M2 brake torque proving time > 0.
- In the drive set 42.96 M2 Torque proving reference = None/External proving.
- The overriding control gives a Run command.
- The drive sets bit Torque proving request, see 42.71.b12 M2 brake control status.
- The overriding control reads that bit, switches the drive to torque control and sends a torque reference.
- The overriding control executes the torque proving.
- The overriding control sets bit Torque proving OK, see 06.11.b04 Auxiliary control word 2, when the torque proving is finished without problems. Then the drive is switched back to speed control.
- The drive sets bit Torque proving OK, see 42.71.b13 M2 brake control status.
- The drive continues with the brake open sequence.

Internal torque proving procedure:

- In the drive set 42.95 M2 brake torque proving time > 0.
- In the drive set 42.96 M2 Torque proving reference = Al1 scaled, ..., Fix value 25 %.
- The drive starts with the internal torque proving after a Run command is set.
- The drive sets bit Torque proving OK, see 42.11.b13 M brake control status, if 01.18 Motor torque 100 ms filtered has reached 80 % of the given torque reference.
- The drive continues with the brake open sequence.

44 Mechanical brake control

Configuration of the mechanical brake control.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	_	Туре
				LDEd10		running	

Mechanical brake control

The DCS880 mechanical brake control provides the function to open (lift) and close (apply) the brake in cooperation with the speed controller, see group 25 Speed control, and the speed ramp, see group 23 Speed reference ramp. The incorporation provides a smooth operation with a minimum brake wear due to friction, even for hanging loads.

The best stop behavior is utilized using the S-ramp. See group 23 Speed reference ramp. The mechanical brake control is equipped with additional monitoring functions for the brake acknowledge feedback to avoid further damage in case of aging or mechanical problems of the brake.

Attention:

- The mechanical brake control is activated with the Run command, see 06.09.b03 Main control word.
- The mechanical brake control requires a continuous On command, see 06.09.b00 Main control word, thus, the motor maintains the full excitation current.
- The use of the Start command in local mode via Drive Composer or Control panel sets both, the On and Run commands, at the same time. That means, local mode is forbidden to be used together with the mechanical brake control and hanging loads.
- Reason: The full field current needs time to be established.

44.01 M1 brake control status

Motor 1 mechanical brake control status word.

Displays the mechanical brake control status word of motor 1.

Bit assignment:

Bit	Name	Value	Remarks
0	Brake open command	1	Brake Open command. Connect this bit to the desired digital output.
		0	Brake Close command.
1	Brake open torque	1	Brake open torque requested from the drive logic.
	requested	0	Brake open torque not requested.
2	Ramp output zero	1	Force the ramp output to zero during opening the brake.
	during opening	0	Ramp output not forced.
3	Stop ramp	1	Ramp down to zero speed requested from the drive logic.
	requested	0	Ramp down not requested.
4	Brake control	1	Brake control is enabled.
	enabled	0	Brake control is disabled.
5	Brake closed	1	Brake is closed.
		0	Brake is open.
6	Brake opening	1	Brake is currently opening.
		0	Brake is either open or closed.
7	Brake open	1	Brake is open.
		0	Brake is closed.
8	Brake closing	1	Brake is currently closing.
		0	Brake is either open or closed.

	Nam								
	Text	1							
	Ran	ge	Default	:	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	9	reserved			1	•	•		
	10	reserved							
	11	reserved							
	12	Torque proving	1	Torque pro	wing re	auested			
	1	request	0	 		·	۵		
	1	'		Torque pro		· ·	a.		
	13	Torque proving (Torque pro					
			0	Torque pro	ving fa	iled.			
	14	Torque proving	1	Torque pro	ving fa	iled.			
		not OK	0	Torque pro	ving is	OK.			
	15	Brake	1	Brake ackn	owledo	e failed.			
		acknowledge failed	0	Brake ackn					
	000	0h FFFFh	_		-	1 = 1	у	n	Signal
44.02	M1 k	orake torque mem	ory						
	44.0	orake control statu 19 M1 brake open t 12 M1 brake torque	s. This va orque sou	urce and 44.1	sed as r 10 M1 b	rake open t	or the brak corque.	e open tor	
44.03	44.0 44.0 -325 M1 k Mot Disp	9 M1 brake open to 2 M1 brake torque .0 325.0 brake open torque or 1 currently activolays the currently	s. This value solution or the commence of the	lue can be usurce and 44.1 can be reset e pen torque.	sed as r 10 M1 b using (rake open t 06.11.b05 A 10 = 1 %	or the brak corque. uxiliary col	e open tord	2. Signal
44.03	44.0 44.0 -325 M1 k Mot Disp 44.1	9 M1 brake open to 2 M1 brake torque .0 325.0 brake open torque or 1 currently activolays the currently 0 M1 brake open to	s. This value solution of the control of the contro	llue can be usurce and 44.1 can be reset e pen torque. ake open tore	sed as r 10 M1 b using (% que. Se	rake open t 06.11.b05 A 10 = 1 % e 44.09 M1	or the brak corque. uxiliary con y brake ope	e open tord	2. Signal
44.03	44.0 44.0 -325 M1 k Mot Disp 44.1 The	9 M1 brake open to 2 M1 brake torque .0 325.0 brake open torque or 1 currently activolays the currently 0 M1 brake open to value presets inter	s. This value sorque sor memory 0.0 reference brake of active brake orque.	llue can be usurce and 44.1 can be reset e pen torque. ake open tord	sed as r 10 M1 b using (% que. Se	rake open t 06.11.b05 A 10 = 1 % e 44.09 M1	or the brak corque. uxiliary col y brake ope	e open tord ntrol word n	2. Signal ource and
44.03	44.0 44.0 -325 M1 k Mot Disp 44.1 The -325	9 M1 brake open to 2 M1 brake torque .0 325.0 brake open torque or 1 currently activolays the currently 0 M1 brake open to	s. This value solution of the control of the contro	llue can be usurce and 44.1 can be reset e pen torque. ake open tord	sed as r 10 M1 b using (% que. Se	rake open t 06.11.b05 A 10 = 1 % e 44.09 M1	or the brak corque. uxiliary con y brake ope	e open tord	2. Signal
	44.0 44.0 -325 M1 k Mot Disp 44.1 The -325 M1 k Mot Enal 0 = [1 = E Othe 0: Ne 1: Se 3: DI 4: DI 5: DI 6: DI 7: DI 8: DI 12: C	9 M1 brake open to 2 M1 brake torque .0 325.0 brake open torque or 1 currently activolays the currently 0 M1 brake open to value presets intervalue presets inte	s. This value or a corque soon memory 0.0 reference brake of active brake or active brake or active brake or active brake or active brake or active brake or active brake or active brake ical brake	e pen torque. ake open tord. al brake control. control. cus.	que. Se the spee	rake open to 26.11.b05 A 10 = 1 % et 44.09 M1 et controlle 10 = 1 % et controlle 10 = 1	or the brak corque. uxiliary col y brake ope	e open tord ntrol word n	2. Signal ource and

ndex	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Enables/Disables When a brake correacts as defined 0 = Brake closed. 1 = Brake open. Other [bit]; sourd 0: No acknowled 1: Acknowledge; 2: None; inactive. 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04	ce selection. ge; 0. Disable the brake 1. Force the brake ackn Disable brake acknowl DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status.	state of th t function. acknowled owledge to	e brake ack	knowledge,	is detecte	d, the drive
	11: DIO1 ; 11.02.b0	DI delayed status. 00 DIO delayed status. 01 DIO delayed status.		1	Т.,	Т.,	Do wo wo ob o
	0 12	None	-	1 = 1	n	У	Paramete
·4.U8	and the release o	en delay. / between the brake Op of the speed controller.	Thus, the o	utput of th	e speed ra	mp is force	ed to zero.
44.08	Motor 1 brake op Defines the delay and the release of The delay time st the brake release Simultaneously v output, and the k Set 44.08 M1 bra	en delay. / between the brake Op of the speed controller. carts when the drive has e. See 44.03.M1 brake op with the start of the tim brake starts to open. ke open delay to the va	Thus, the o increased en torque er, the bral	utput of th the motor reference. ke control l	e speed ra torque to to ogic energi	mp is force the level re- izes the bra	ed to zero. quired for ake control
4.06	Motor 1 brake op Defines the delay and the release of The delay time st the brake release Simultaneously v output, and the k Set 44.08 M1 bra brake manufactu	en delay. by between the brake Op the speed controller. carts when the drive has carts when the drive has carts when the drive has carts when the drive has carts when the drive has carts when the drive has carts to open. ke open delay to the valuer.	Thus, the of increased pen torque er, the bral ue of the n	utput of th the motor reference. ke control l nechanical	e speed ra torque to f ogic energi opening de	mp is force the level re- izes the bra	ed to zero. quired for ake control ed by the
14.08	Motor 1 brake op Defines the delay and the release of The delay time st the brake release Simultaneously woutput, and the k Set 44.08 M1 brake manufacture 0.00 5.00	ven delay. If the speed controller. It is a sp	Thus, the o increased en torque er, the bral	utput of th the motor reference. ke control l	e speed ra torque to f ogic energi opening de	mp is force the level re- izes the bra	ed to zero. quired for ake control
	Motor 1 brake op Defines the delay and the release of The delay time st the brake release Simultaneously voutput, and the k Set 44.08 M1 brake manufacture 0.00 5.00 M1 brake open to Motor 1 brake op Defines a source is only taken if: The absolute The sign is the Otherwise, the var Other; source see 0: Zero; 0 %, bral 1: Al1 scaled; 12.1 2: Al2 scaled; 12.2 3: FBA A reference 4: FBA A reference 7: M1 brake oper	pen delay. If the speed controller. It arts when the drive has e. See 44.03.M1 brake op with the start of the time brake starts to open. It is a compared to the value of the value is greater than the same as the setting calue of 44.10 M1 brake open delay to the value is greater than the same as the setting calue of 44.10 M1 brake open delay to the value is greater than the same as the setting of the same as the	Thus, the of increased pen torque er, the bral lue of the management of the manageme	utput of the the motor reference. Recontrol lenechanical 100 = 1 s on torque resist used.	e speed ra torque to to ogic energi opening de n	mp is force the level re- izes the bra elay specifi y	ed to zero. quired for ake control ed by the Paramete
	Motor 1 brake op Defines the delay and the release of The delay time st the brake release Simultaneously voutput, and the k Set 44.08 M1 brake manufacture 0.00 5.00 M1 brake open to Motor 1 brake op Defines a source is only taken if: The absolute The sign is the Otherwise, the var Other; source see 0: Zero; 0 %, bral 1: Al1 scaled; 12.1 2: Al2 scaled; 12.2 3: FBA A reference 4: FBA A reference 7: M1 brake oper	pen delay. I between the brake Operative the speed controller. It is seed 44.03.M1 brake operation the start of the time brake starts to open. I between the drive has a seed 44.03.M1 brake operation the time brake starts to open. I be open delay to the valuer. I compare source been torque source. I compare that is used as motor 1 and the same as the setting of the	Thus, the of increased pen torque er, the bral lue of the management of the manageme	utput of the the motor reference. Recontrol lenechanical 100 = 1 s on torque resist used.	e speed ra torque to to ogic energi opening de n	mp is force the level re- izes the bra elay specifi y	ed to zero. quired for ake control ed by the Paramete
	Motor 1 brake op Defines the delay and the release of The delay time st the brake release Simultaneously voutput, and the k Set 44.08 M1 brake manufacture 0.00 5.00 M1 brake open to Motor 1 brake op Defines a source is only taken if: The absolute The sign is the Otherwise, the var Other; source se 0: Zero; 0 %, bral 1: Al1 scaled; 12.1 2: Al2 scaled; 12.2 3: FBA A reference 4: FBA A reference 7: M1 brake oper Attention: For the	ren delay. I between the brake Op If the speed controller. I carts when the drive has I carts when the drive has I carts when the drive has I carts when the drive has I carts when the drive has I carts when the drive has I carts when the drive has I carts when the drive has I carts when the time I carts to open. I capen delay to the valuer. I capen torque source. I capen torque is greater than the I capen torque is set to I capen torque is	Thus, the of increased pen torque er, the bral lue of the management of the manageme	utput of the the motor reference. Recontrol lenechanical 100 = 1 s on torque resistant and see memory. The tracks are memory. The tracks are memory. The tracks are tracks are memory. The tracks are tracks are memory. The tracks are	e speed ra torque to f ogic energi opening de n ference. The brake oper n torque.	mp is force the level re- izes the bra elay specifi y ne value of n torque.	ed to zero. quired for ake control ed by the Paramete the source

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	•	.g., for the direction of	-		nimum abs	olute value	e of the					
		in percent of 99.02 M		•								
	-	09 M1 brake open torq										
	Note: The value of the source selected by 44.09 M1 brake open torque source is used as the brake open torque only if it has the same sign as 44.10 M1 brake open torque and has a greater											
	absolute value.	only if it has the same	sign as 4	4.10 M1 bra	ke open to	rque and n	as a greater					
		10.0	0.4	10 10/			T					
	-325.0 325.0	0.0	%	10 = 1 %	n	У	Parameter					
44.11	M1 keep brake clo											
	Motor 1 keep brake		_									
		at prevents the brake	from oper	ning. See 44	.01 b00 M	l brake cor	itrol status.					
	0 = Normal brake o	•										
	-	sed or force brake to cl	lose.									
	Other [bit]; source	normal brake operation	'n									
	, ,	brake closed or force		loco								
	3: DI1 ; 10.02.b00 D		DI ake to C	iose.								
	· ·	•										
	4: DI2 ; 10.02.b01 DI delayed status. 5: DI3 ; 10.02.b02 DI delayed status.											
	6: DI4 ; 10.02.b03 DI delayed status.											
	7: DI5 ; 10.02.b04 DI delayed status.											
	8: DI6 ; 10.02.b05 DI delayed status.											
	11: DIO1 ; 11.02.b00 DIO delayed status.											
	12: DIO2 ; 11.02.b01 DIO delayed status.											
	19: DIL ; 10.02.b15 [I delayed status.										
	0 19	Not selected	-	1 = 1	n	n	Parameter					
44.12	M1 brake close rec	uest	•			-						
	reserved											
	0 19	Not selected	_	1 = 1	n	n	Parameter					
44.13	M1 brake close de	av										
	M1 brake close delay Motor 1 brake close delay.											
	Defines the delay between the brake Close command, see 44.01.b00 M1 brake control status,											
	and the moment when the drive is being switched off. The speed controller is kept active with											
	zero speed reference until the brake actually closes and the brake acknowledge is received.											
	Set 44.13 M1 brake close delay to the value of the mechanical make-up time/close delay											
	specified by the br	_			•	•	•					
	0.00 60.00	0.00	s	100 = 1 s	n	у	Parameter					
44.17	M1 brake fault fun	ction				1,5						
	Motor 1 brake faul	function.										
		ne drive reacts upon a i	mechanica	al brake con	trol error.	It is the rea	action of a					
		, brake acknowledge. S										
		M1 brake acknowledge					owledge is					
		enerate no warnings o					J					
	0: Warning;	-										
	 Warning; After a brake Close command, the event generates warning A7A1 Mechanical brake closing 											
	 After a brake C 	failed if the brake close acknowledge is not set within 44.18 M1 brake fault delay.										
			is not set	within 44.1	8 M1 brake	fault dela	y.					
	failed if the bra											
	failed if the bra – After a brake O	ke close acknowledge	ent genera	ites warnin	g A7A2 Me	chanical br	ake opening					
	failed if the bra – After a brake O failed if the bra	ke close acknowledge pen command, the eve	ent genera is not set	ites warnin within 44.1	g A7A2 Med 8 M1 brake	chanical br fault delay	ake opening y.					

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	failed if the b After a brake failed if the b The event ger conditions ca 3: Crane; After a brake brake close a controller ren received. After closing failed If the brake c the Off2 (eme	Close command, the everake close acknowledge Open command, the everake open acknowledge nerates fault 71A5 Mechannot be fulfilled. E.g., the Close command, the evecknowledge is not receivains active with zero sper the brake close acknowledge is not ergency off) command. So Open command, the everake open acknowledge	e is not set ent genera is not set anical brak ne required ent genera ved within beed refere wledge ha received a See 20.04.1	within 44.1 within 44.1 within 44.1 within 44.1 within 44.1 motor standard warnin 44.20 M1 beince until the been recent at all, the droff2 source tees fault 71	8 M1 brake A3 Mechar 8 M1 brake not allowed rting torqu g A116 Brai rake long to ne brake cla ived fault of ive can onle 1 (emerge A3 Mechar	nical brake e fault delay nical brake e fault delay d if the bra ie is not rea ke long fall cime. The s ose acknow 71A2 Mecha y be stopp ncy off). nical brake	y. opening y. ke open ached. ing if the peed vledge is anical brake ed using opening				
	 failed if the brake open acknowledgement is not set within 44.18 M1 brake fault delay. The event generates fault 71A5 Mechanical brake opening not allowed if the brake open conditions cannot be fulfilled. E.g., the required motor starting torque is not reached. 										
44.18	0 3 M1 brake fault de	Warning	-	1 = 1	n	у	Parameter				
	44.18 M1 brake fa Warning A7A2 Warning A7A2 Warning A7A2 Fault 71A2 M6 Fault 71A3 M6 Fault 71A5 M6 If the brake acknowisregarded.	ne for all events brake act ault delay delays: I Mechanical brake closi Mechanical brake oper Mechanical brake oper chanical brake closing to the chanical brake opening to the chanical brake opening to the chanical brake opening to the company owledge is correct befound to the company of the company o	ng failed. ning failed. ning not all failed. failed. not allowe re the dela	owed. ed. y elapses, a							
44.20	Motor 1 brake long falling. In case 44.17 M1 brake fault function = Crane and a brake close acknowledge is not received within 44.20 M1 brake long time warning A116 Brake long falling is generated. The speed controller remains active with zero speed reference until the brake close acknowledge is received. After the brake close acknowledge has been received fault 71A2 Mechanical brake closing failed is generated. If the brake close acknowledge is not received at all, the drive can only be stopped using the Off2 (emergency off) command. See 20.04.Off2 source 1 (emergency off).										
	0.00 60.00	4.00	S	100 = 1 s	n	у	Parameter				
44.25	M1 brake torque	proving time	M1 brake torque proving time Motor 1 brake torque proving time. The drive trips with F556 Torque proving if the Run command is set and 44.01.b13 M1 brake control status is not high before 44.25 M1 brake torque proving time is elapsed.								
44.25	Motor 1 brake to The drive trips w control status is	rque proving time. ith F556 Torque proving	11 brake to	rque provin	g time is e	lapsed.	И1 brake				

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре

44.26 M1 Torque proving reference

Motor 1 Torque proving reference.

Reference selection for torque proving.

Notes:

- External/Internal torque proving is inactive, if 44.25 M1 brake torque proving time = 0.
- The brake stays closed during torque proving.

Other; source selection.

- 0: **None/External proving**; external torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 1: **Al1 scaled**; 12.12 Al1 scaled value. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 2: **AI2 scaled**; 12.22 AI2 scaled value. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 3: **FBA A reference 1**; 03.05 FBA A reference 1. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 4: **FBA A reference 2**; 03.06 FBA A reference 2. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 7: **M1 brake torque memory**; 44.02 M1 brake torque memory. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 8: **M1 brake open torque**; 44.10 M1 brake open torque. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.
- 9: **Fix value 25 %**; torque reference is set to 25 % of 99.02 M1 nominal torque. Internal torque proving is enabled, if 44.25 M1 brake torque proving time > 0.

External torque proving procedure:

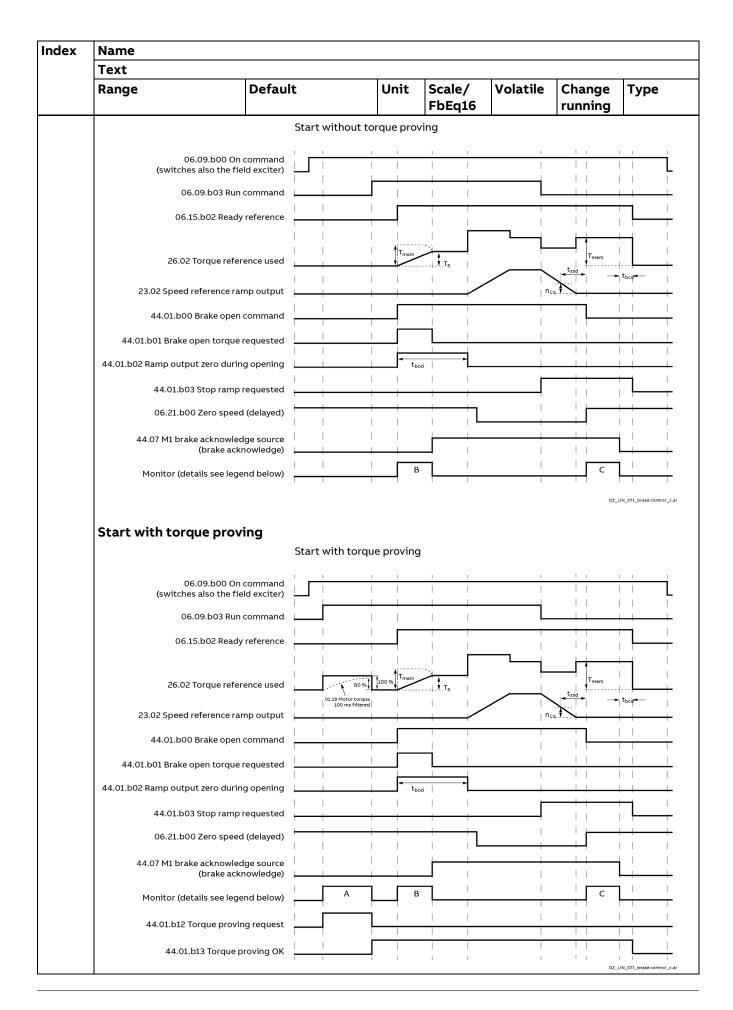
- In the drive set 44.25 M1 brake torque proving time > 0.
- In the drive set 44.26 M1 Torque proving reference = None/External proving.
- The overriding control gives a Run command.
- The drive sets bit Torque proving request, see 44.01.b12 M1 brake control status.
- The overriding control reads that bit, switches the drive to torque control and sends a torque reference.
- The overriding control executes the torque proving.
- The overriding control sets bit Torque proving OK, see 06.11.b04 Auxiliary control word 2, when the torque proving is finished without problems. Then the drive is switched back to speed control.
- The drive sets bit Torque proving OK, see 44.01.b13 M1 brake control status.
- The drive continues with the brake open sequence.

Internal torque proving procedure:

- In the drive set 44.25 M1 brake torque proving time > 0.
- In the drive set 44.26 M1 Torque proving reference = AI1 scaled, ..., Fix value 25 %.
- The drive starts with the internal torque proving after a Run command is set.
- The drive sets bit Torque proving OK, see 44.01.b13 M1 brake control status, if 01.18 Motor torque 100 ms filtered has reached 80 % of the given torque reference.
- The drive continues with the brake open sequence.

Start without torque	rovina					
0 9	Fix value 25 %	-	1 = 1	n	У	Parameter

Start without torque proving



Index	Name							
	Text							
	Range	1	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Legend							
	T _{bod} :	Brake open o	lelay.	44	1.08 M1 bra	ake open d	elay.	
	T _{mem} :	Torque mem	ory.	44	4.02 M1 bra	ike torque	memory.	
	T _s :	Active start t	orque.	44	4.03 M1 bra	rque refer	ence.	
	t _{zsd} :	Zero speed le	evel.	21	.08 M1 zer	o speed lev	el.	
	n _{cs} : Zero speed dela		lelay.	21	.09 M1 zer	o speed de	lay.	
	t _{bcd} :	Brake close o	lelay.	44	1.13 M1 bra	ke close de	elay.	
	Monitor A	External toro		44	1.25 M1 bra	ıke torque	proving tin	ne.
	Internal tor		ue proving: orque reference					
	Monitor B	Brake open a	cknowledge.	44	1.18 M1 bra	ke fault de	lay.	
	Monitor C	Brake close a	cknowledge.			ke fault de ike long tin	•	

45 Energy efficiency

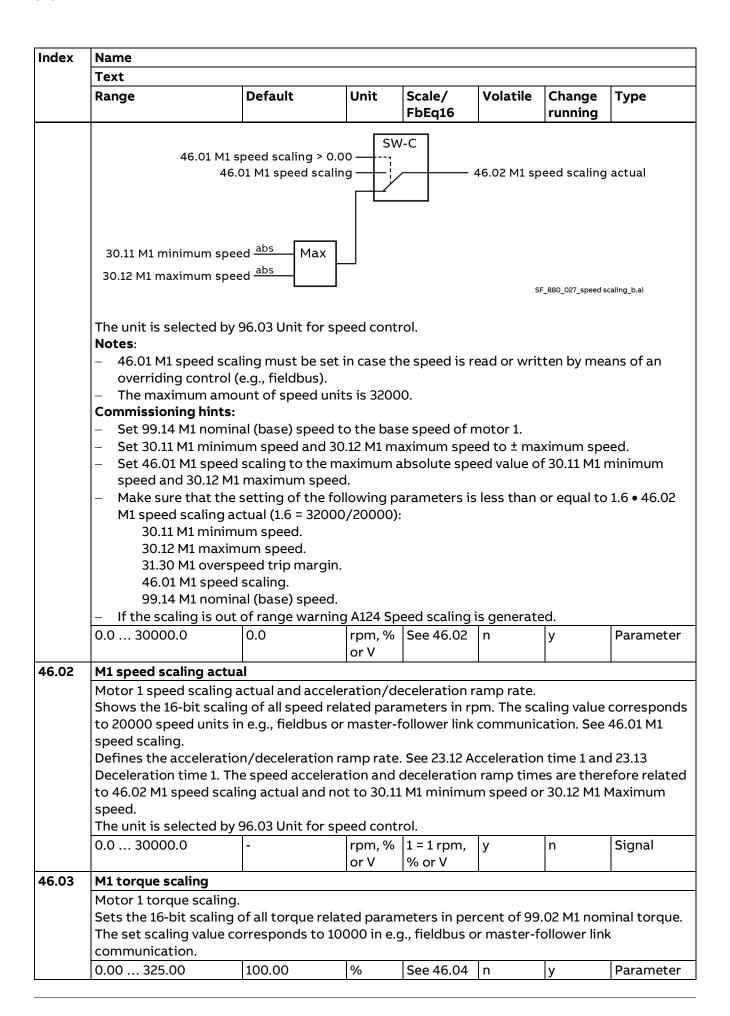
Settings for the energy saving calculators.

Index 45.xx	Name Text									
	Not part of the firmware.									
45.xx										
					1	1	1			
					1	1				

46 Monitoring/Scaling settings

Speed supervision settings, signal filtering and general scaling settings.

Index	Name	Name									
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
46.01	M1 speed scaling										
	corresponds to 46.01 M1 speed maximum abso	scaling. scaling of all speed re 20000 speed units in scaling is valid for va- blute value of 30.11 M1 peed scaling actual.	n e.g., fieldl Ilues greate	ous or maste er than 0 rpn	er-follower l n. For a valu	ink commu le equal to	nication. 0 rpm, the				



Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
46.04	M1 torque scaling	actual									
	Motor 1 torque scaling actual. Shows the 16-bit scaling of all torque related parameters in percent of 99.02 M1 nominal torque. The scaling value corresponds to 10000 in e.g., fieldbus or master-follower link communication. See 46.03 M1 torque scaling. Motor 1 nominal torque in Nm or lb ft can be seen in 99.02 M1 nominal torque.										
	0.00 325.00	<u> </u>	%	100 = 1 %	V	n .	Signal				
46.11	Filter time motor	speed			17		1-3-				
	Motor speed feedback filter time constant. Filter time constant for 01.01 Used motor speed filtered, 01.02 EMF speed filtered, 01.03 OnBoard tacho speed filtered, 01.04 OnBoard encoder speed filtered, 01.05 Encoder 1 speed filtered, and 01.06 Encoder 2 speed filtered. Note: This filter is used for speed feedback signals to be displayed e.g., in door meters. It does not influence the speed feedback for the drive control.										
	0 32500	500	ms	1 = 1 ms	n	у	Parameter				
		al filter time constant for 01.17 Motor t		red. Is used f	or the EMF	controller	and the EMF				
46.14	Filter time power	output				•					
	Filter time consta	nal filter time const nt for 01.24 Output				1					
46.21	0 32500	500	ms	1 = 1 ms	n	у	Parameter				
	At speed hysteresis Levels for At setpoint indication in speed control. Defines the At setpoint levels for a speed-controlled drive. When the absolute difference between 22.01 Speed reference unlimited and 90.01 Motor speed for control is in the 46.21 At speed hysteresis, the drive sets 06.15.b08 Main status word. 90.01 Motor speed for control (rpm) 22.01 + 46.21 (rpm) 22.01 - 46.21 (rpm) 0 rpm										
	0.00 20000.00	20.00	1	Con 4C 02	SF_880_028_hyst_		Do wo we at a w				
46.23	0.00 30000.00	20.00	rpm	See 46.02	n	У	Parameter				
40.23	At torque hysteresis Levels for At setpoint indication in torque control. Defines the At setpoint levels for a torque-controlled drive. When the absolute difference between 26.73 Torque reference 4 and 01.17 Motor torque filtered is in the 46.23 At torque hysteresis, the drive sets 06.15.b08 Main status word.										

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	At setpoint 06.15.b08 Mai	O1.17 Motor torque filtered (%) 26.73 + 46.23 (%) 26.73 Torque reference 4 (%) 26.73 - 46.23 (%) 0 %								
	0.00 325.00	10.00	%	See 46.04	n	у	Parameter			
46.31	Above speed level									
	Above level indication for speed control. Defines the level for the Above level indication in a speed-controlled drive. When 90.01 Motor speed for control exceeds the level, the drive sets 06.17.b10 Drive status word 2. Note: With 46.31 Above speed level, it is possible to automatically switch between two 2 sets acceleration/deceleration times for the speed ramp or two sets of proportional gain and integration time for the speed controller. See 23.11 Ramp set selection = Speed level and 25.13 Speed controller set selection = Speed level or Speed error.									
46.33	0.00 30000.00 1500.00 rpm See 46.02 n y Parameter Above torque level									
	Above level indication for torque control. Defines the level for the Above level indication in a torque-controlled drive. When 01.17 Motor torque filtered exceeds the level, the drive sets 06.17.b10 Drive status word 2. 0.00 325.00 300.00 % See 46.04 n y Parameter									

47 Data storage

Data storage parameters that can be written to and read from using other parameters' source and target settings.

Note: There are different storage parameters for different data types. Integer-type storage parameters 47.11 47.28 cannot be used as source for other parameters. No Other: source selection possible

Index	Name											
	Text											
	Range	Default	Unit	Scale/	Volatile	Change	Туре					
47.01	Data storage 1 real32			FbEq16		running						
	Data storage parameters 47 - Are 32-bit real (floa	Data storage parameter 1. Storage parameters 47.01 47.08: Are 32-bit real (floating-point) numbers that can be used as source values for other parameters, e.g., as Other; source selection.										
	data. - Can be used as the data. - Scaling and range a	 data. Can be used as the source of transmitted 16-bit data. See group 61 D2D and DDCS transmit data. Scaling and range are defined by parameters 47.31 47.38. This data storage parameter is of is of the type retain. Its value will be saved when the drive is 										
	See 47.31											
47.02	Data storage 2 real32											
	Data storage parameter 2. See 47.01 Data storage 1 real32.											

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	See 47.32	0.000	-	See 47.32	n	у	Parameter				
47.03	Data storage 3 real	32			1	•	•				
	Data storage param	neter 3.									
	See 47.01 Data stora										
	See 47.33	0.000	-	See 47.33	n	у	Parameter				
47.04	Data storage 4 real	32									
	Data storage parameter 4.										
	See 47.01 Data store	age 1 real32.									
	See 47.34	0.000	-	See 47.34	n	у	Parameter				
47.05	Data storage 5 real	32			1	•	•				
	Data storage param	neter 5.									
	See 47.01 Data stora	age 1 real32.									
	See 47.35	0.000	-	See 47.35	n	у	Parameter				
47.06	Data storage 6 real	32									
	Data storage param	neter 6.									
	See 47.01 Data store	age 1 real32.									
	See 47.36	0.000	-	See 47.36	n	у	Parameter				
47.07	Data storage 7 real	32									
	Data storage param	neter 7.									
	See 47.01 Data stora	age 1 real32.									
	See 47.37	0.000	-	See 47.37	n	у	Parameter				
47.08	Data storage 8 real32										
	Data storage parameter 8.										
	See 47.01 Data storage 1 real32.										
	See 47.38	0.000	-	See 47.38	n	у	Parameter				
47.11	Data storage 1 int3	2									
	Data storage parameter 9. 32-bit integer.										
	-2147483648	0	-	-	n	у	Parameter				
	2147483647										
47.12	Data storage 2 int3	2									
	Data storage param	neter 10.									
	32-bit integer.										
	-2147483648	0	-	-	n	у	Parameter				
	2147483647										
47.13	Data storage 3 int3	2									
	Data storage param	neter 11.									
	32-bit integer.										
	-2147483648	0	-	-	n	у	Parameter				
	2147483647										
47.14	Data storage 4 int3										
	Data storage param 32-bit integer.	neter 12.									
	-2147483648	0	-	-	n	у	Parameter				
	2147483647										
47.15	Data storage 5 int3	2	•								

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Data storage param 32-bit integer.	eter 13.										
	-2147483648 2147483647	0	-	-	n	У	Parameter					
47.16	Data storage 6 int3	2										
	Data storage param 32-bit integer.	eter 14.										
	-2147483648 2147483647	0	-	-	n	У	Parameter					
47.17	Data storage 7 int3	2				•						
	Data storage param 32-bit integer.	eter 15.										
	-2147483648 2147483647	0	-	-	n	у	Parameter					
47.18	Data storage 8 int3	2	,			•	•					
	Data storage parameter 16. 32-bit integer.											
	-2147483648 2147483647	0	-	-	n	у	Parameter					
47.21	Data storage 1 int16											
	Data storage param 16-bit integer.	eter 17.										
	-32768 32767	0	-	1 = 1	n	у	Parameter					
47.22	Data storage 2 int10	5					•					
	Data storage parameter 18. 16-bit integer.											
	-32768 32767	0	-	1 = 1	n	у	Parameter					
47.23	Data storage 3 int16											
	Data storage param 16-bit integer.	eter 19.										
	-32768 32767	0	-	1 = 1	n	у	Parameter					
47.24	Data storage 4 int1	6										
	Data storage parameter 20. 16-bit integer.											
	-32768 32767	0	-	1 = 1	n	у	Parameter					
47.25	Data storage 5 int1											
	Data storage param 16-bit integer.	eter 21.										
	-32768 32767	0	-	1 = 1	n	у	Parameter					
47.26	Data storage 6 int1	6										
	Data storage param 16-bit integer.	eter 22.										
	-32768 32767	0	-	1 = 1	n	у	Parameter					
47.27	Data storage 7 int10	5										
	Data storage param 16-bit integer.	eter 23.										
	-32768 32767	0	-	1 = 1	n	у	Parameter					
_												

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Type			
17.28	Data storage 8 int	16	•	•	•	•				
	Data storage parameter 24. 16-bit integer.									
	-32768 32767	0	-	1 = 1	n	у	Parameter			
17.31	Data storage 1 rea	l32 type								
47.32	- Transmits 16-b 0: Unscaled; data s 1: Transparent; Scaling: 3: Torque; the scaling: 4: Speed; the scaling: 30000.00. 5: Current; the scaling: 25.00. 0 5 Data storage 2 real Defines the scaling:	data. See group 6 it data. See group 6 it data. See group storage only. Range aling: 1 = 1. Range: -3 ing is defined by 46 ding is in percent of Unscaled LI32 type 2 Data storage 2 re	2 D2D and 61 D2D an e: -2147483 -32768 3 27.68 3 6.04 M1 to 5.02 M1 spe of 99.11 M1	DDCS received DDCS trans 3.264 2147 32767. 7.67. rque scaling a cominal curr	re data. smit data. 473.264. actual. Ran ctual. Range	ge: -325.00 e: -30000.0 %. Range:) 325.00. 00 -325.00 Parameter			
	type.			1 .			Τ_			
	0 5	Unscaled	-	1 = 1	n	у	Parameter			
47.33	Data storage 3 real Data type for 47.03 Defines the scaling type. 0 5	B Data storage 3 re		rage 3 real32	2. See 47.31	Data stora	ige 1 real32			
47.34	Data storage 4 rea									
	Data type for 47.04 Defines the scaling type. 0 5	1 Data storage 4 re		rage 4 real3	2. See 47.31	Data stora	age 1 real32			
47.35	Data storage 5 rea					7				
	Data type for 47.09 Defines the scaling type.	Data storage 5 regards and range of 47.0								
	0 5	Unscaled	-	1 = 1	n	У	Parameter			
47.36	Data storage 6 real Data type for 47.00 Defines the scaling type. 0 5	Data storage 6 re		rage 6 real3;	2. See 47.31		age 1 real32			
17 27				11	11	У	raiailleter			
47.37	Data storage 7 real Data type for 47.07 Defines the scaling type.	7 Data storage 7 re		rage 7 real32	2. See 47.31	Data stora	ge 1 real32			

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0 5	Unscaled	-	1 = 1	n	у	Parameter				
47.38	Data storage 8 real32 type										
	Data type for 47.08 Data storage 8 real32. Defines the scaling and range of 47.08 Data storage 8 real32. See 47.31 Data storage 1 retype.										
	0 5	Unscaled	-	1 = 1	n	у	Parameter				

48 Drive Composer pro diagrams

This group contains signals used for the automatic update of the Drive Composer pro diagrams.

Index	Name Text									
	48.01 to 48.12	Diagram signal 1 Diagram signal 20								
	Signal is used f	or the automatic upo	date of the I	Orive Compo	ser pro dia	grams.				
	0 65535	_		1 = 1	V	n	Signal			

49 Panel port communication

 $\dot{\bar{}}$ Communication settings for the control panel port on the drive.

Attention: Any changed parameters must be validated by means of 49.06 Refresh settings = Refresh.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Attention: Any changed parameters must be validated by means of 49.06 Refresh settings = Refresh.										
49.01	Node ID number										
ı	Control panel/PC tool lin	k node ID numbe	er.								
	Defines the node ID of th	e drive. All drives	connect	ed to the ne	twork (par	nel bus) mu	ıst have a				
	unique node ID.										
	Note : For drives in a netv	· ·	ole to res	erve 49.01 N	etwork ID	number = 1	for				
	spare/replacement drive		T	T	Г						
	1 32	1	-	1 = 1	n	У	Parameter				
49.03	Baud rate										
	Control panel/PC tool lin	•									
	Defines the transfer rate	•	anel/PC t	ool link.							
	1: 38.4 kbps ; 38.4 kbit/s.										
	2: 57.6 kbps ; 57.6 kbit/s.										
	3: 86.4 kbps ; 86.4 kbit/s.										
	4: 115.2 kbps ; 115.2 kbit/										
	_ ·	5: 230.4 kbps ; 230.4 kbit/s.									
	6: 460.8 kbps ; 460.8 kbit										
	7: 921.6 kbps ; 921.6 kbit/		1	Ι			Τ_				
	17	230.4 kbps	-	1 = 1	n	У	Parameter				
49.04											
ı	Control panel/PC tool lin	k communicatio	n loss tim	eout.							

Index										
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Defines the time	delay for the control	panel/PC t	ool commun	ication loss	before the	e action			
	defined in 49.05 (Communication loss	action is ex	cecuted. Tim	e count stai	rts when th	ne			
	communication li	nk fails to update th	e message.							
	0 32500	1000	ms	1 = 1 ms	n	у	Parameter			
49.05	Communication loss action									
	Control panel/PC	tool link communica	ition loss a	ction.						
	Selects how the c	frive reacts to a cont	rol panel/P	C tool comm	nunication l	oss.				
	0: No action ; non	e, disable communic	ation loss f	unction.						
		t generates fault 708								
		to 31.13 Fault stop m			nis occurs o	nly when th	ne drive is			
		he control panel/PC				_				
	•	vent generates warni	-				cation. This			
		gh no control is expe	cted from	the control p	anel/PC to	Ol.				
	WARNING	is safe to continue o	navation in	of		با مصام مد				
		is safe to continue o e evet generates war	•				sication and			
	-	e evet generates wan	ning Aree (control pane	1/ PC (001 III	ik commu	lication and			
1	Itraazas tha snaac	to the level the drive	o was oner	ating at The	last speed	ic datarmir	ned based on			
	· ·	d to the level the drive	•	-	last speed	is determir	ned based on			
	the speed feedba	d to the level the drivenck using an 850 ms l	•	-	last speed	is determir	ned based on			
	the speed feedba	ick using an 850 ms l	ow-pass fil	ter.	·		ned based on			
	the speed feedba WARNING Make sure that it	ick using an 850 ms l is safe to continue o	ow-pass fil	ter. case of a co	mmunicatio	on break.				
	the speed feedba WARNING Make sure that it 4: Speed reference	ick using an 850 ms l	ow-pass fil peration in nerates wa	ter. case of a co rning A7EE C	mmunicatio	on break. el/PC tool li	ink			
	the speed feedba WARNING Make sure that it 4: Speed reference	ick using an 850 ms l is safe to continue o ce safe; the event ger	ow-pass fil peration in nerates wa	ter. case of a co rning A7EE C	mmunicatio	on break. el/PC tool li	ink			
	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING	ick using an 850 ms l is safe to continue o ce safe; the event ger	ow-pass fil peration in nerates wa the value o	ter. case of a co rning A7EE C defined in 22	mmunicatio ontrol pane .46 Speed re	on break. el/PC tool li eference sa	ink			
	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING	ick using an 850 ms I is safe to continue o ce safe; the event ger and sets the speed to	ow-pass fil peration in nerates wa the value o	ter. case of a co rning A7EE C defined in 22	mmunicatio ontrol pane .46 Speed re	on break. el/PC tool li eference sa	ink			
49.06	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING Make sure that it 0 4	ick using an 850 ms less safe to continue on the safe; the event general sets the speed to is safe to continue o	ow-pass fil peration in nerates wa the value o	case of a co rning A7EE C defined in 22 case of a co	mmunication ontrol pane 46 Speed rommunication	on break. el/PC tool li eference sa on break.	ink afe.			
49.06	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING Make sure that it 0 4 Refresh settings	ick using an 850 ms less safe to continue on the safe; the event general sets the speed to is safe to continue o	ow-pass fil peration in nerates wa the value of peration in -	ter. case of a corning A7EE Codefined in 22 case of a code 1 = 1	mmunication ontrol pane .46 Speed ro mmunication	on break. el/PC tool li eference sa on break.	ink afe.			
49.06	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING Make sure that it 0 4 Refresh settings Control panel/PC	is safe to continue of the safe; the event general sets the speed to is safe to continue of Fault	peration in nerates wanted the value of peration in -	case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command.	mmunication ontrol pane .46 Speed ro mmunication	on break. el/PC tool li eference sa on break. y	ink afe. Parameter			
49.06	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING Make sure that it 0 4 Refresh settings Control panel/PC	is safe to continue of the safe; the event general sets the speed to is safe to continue of Fault stool link communicatings of parameters 49	peration in nerates wanted the value of peration in -	case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command.	mmunication ontrol pane .46 Speed ro mmunication	on break. el/PC tool li eference sa on break. y	ink afe. Parameter			
49.06	the speed feedba WARNING Make sure that it 4: Speed reference communication a WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the settin the refresh is don	is safe to continue of the safe; the event general sets the speed to is safe to continue of Fault stool link communicatings of parameters 49	peration in nerates wanthe value of peration in - ation refres	ter. case of a corning A7EE Codefined in 22 case of a code 1 = 1 h command. The value of the code	mmunication on the control panel of the control pan	on break. el/PC tool li eference sa on break. y	Parameter			
49.06	the speed feedbawARNING Make sure that it 4: Speed reference communication awARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing	is safe to continue of the safe; the event gend and sets the speed to is safe to continue of Fault it tool link communications of parameters 49 ne.	peration in herates was the value of peration in leading and the value of the value	ter. case of a corning A7EE Codefined in 22 case of a code 1 = 1 h command. The value of the code	mmunication on the control panel of the control pan	on break. el/PC tool li eference sa on break. y	Parameter			
49.06	the speed feedbal WARNING Make sure that it 4: Speed reference communication al WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal	is safe to continue of the safe; the event gent and sets the speed to is safe to continue of Fault. It tool link communicatings of parameters 49 me. may cause a communication of the same to the same	peration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a code 1 = 1 h command. The value of the code	mmunication on the control panel of the control pan	on break. el/PC tool li eference sa on break. y	Parameter			
49.06	the speed feedbal WARNING Make sure that it 4: Speed reference communication al WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal	is safe to continue of the safe; the event gent and sets the speed to is safe to continue of Fault is continue of the safe to continue of the safe to communicate of parameters 49 ne. I may cause a communication of the safe to continue of the safe to continue of the safe to continue of the safe to continue of the safe to communicate of the safe to continue of the	peration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a code 1 = 1 h command. The value of the code	mmunication on the control panel of the control pan	on break. el/PC tool li eference sa on break. y	Parameter			
49.06	the speed feedbal WARNING Make sure that it 4: Speed reference communication al WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal 1: Refresh; 1, refre	is safe to continue of the safe; the event gend sets the speed to is safe to continue of the safe; the continue of the safe to continue of the safe to continue of the safe to continue of the safe to communicate of the safe to communicate of the safe to communicate of the safe to communicate of the safe to communicate of the safe to communicate of the safe to communicate of the safe to communicate of the safe to communicate of the safe to continue of the safe	peration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in 22	mmunication on the control pane of the control	on break. el/PC tool lieference sa on break. y omatically tedrive may	Parameter to Done when be required.			
	the speed feedbawARNING Make sure that it 4: Speed reference communication awARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normat: Refresh; 1, refreson 1	is safe to continue of the safe; the event gent and sets the speed to is safe to continue of the safe	peration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in 22	mmunication on the control pane of the control	on break. el/PC tool lieference sa on break. y omatically tedrive may	Parameter to Done when be required.			
	the speed feedbal WARNING Make sure that it 4: Speed reference communication al WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal 1: Refresh; 1, refres 0 1 Panel actual sour Control panel value	is safe to continue of the safe; the event gent and sets the speed to is safe to continue of the safe	peration in nerates was the value of peration in - ation refres 0.01 49.05 nication br hing done. L 49.05.	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in eak, so recorning are consected.	mmunication ontrol pane. 46 Speed remmunication n	on break. el/PC tool lieference sa on break. y omatically to e drive may	Parameter to Done when be required.			
	the speed feedbawarning Make sure that it 4: Speed reference communication awarning Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal: Refresh; 1, refresorm 1: Refresh; 1, refresorm Control panel valueselects a value to	is safe to continue of ce safe; the event gent and sets the speed to is safe to continue of Fault It tool link communicatings of parameters 49 inc. In all operation or refrest esh parameters 49.00 inceeding to be ceeding.	peration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in eak, so recorning a code in the co	mmunication on trol pane and the speed remaining the speed remaini	on break. el/PC tool lieference sa on break. y omatically the drive may	Parameter To Done when to be required. Parameter			
	the speed feedbawarning Make sure that it 4: Speed reference communication awarning Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal: Refresh; 1, refresorm 1: Refresh; 1, refresorm Control panel valueselects a value to	is safe to continue of the safe; the event gent and sets the speed to discontinue of the safe to continue eration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in eak, so recorning a code in the co	mmunication on trol pane and the speed received in the second pane and the second pane	on break. el/PC tool lieference sa on break. y omatically the drive may	Parameter To Done when to be required. Parameter				
	the speed feedbal WARNING Make sure that it 4: Speed reference communication al WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal: Refresh; 1, refres 0 1 Panel actual sour Control panel values Selects a value to Note: 49.24 Panel	is safe to continue of the safe; the event gent and sets the speed to dissafe to continue of the safe	peration in herates was the value of peration in least on the value of	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in eak, so recorning a code in the co	mmunication on trol pane and the speed received in the second pane and the second pane	on break. el/PC tool lieference sa on break. y omatically the drive may	Parameter To Done when to be required. Parameter			
	the speed feedback WARNING Make sure that it 4: Speed reference communication at WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal: Refresh; 1, refres 0 1 Panel actual sour Control panel value Selects a value to Note: 49.24 Paner reference source. Other; source selects	is safe to continue of the safe; the event gent and sets the speed to dissafe to continue of the safe	peration in herates was the value of the val	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in eak, so recorning a code in the co	mmunication on trol pane and the speed received in the second pane and the second pane	on break. el/PC tool lieference sa on break. y omatically the drive may	Parameter To Done when to be required. Parameter			
	the speed feedback WARNING Make sure that it 4: Speed reference communication at WARNING Make sure that it 0 4 Refresh settings Control panel/PC Applies the setting the refresh is don Note: Refreshing 0: Done; 0, normal 1: Refresh; 1, refres 0 1 Panel actual sour Control panel value Selects a value to Note: 49.24 Panel reference source. Other; source sele 0: Automatic; the	is safe to continue of ce safe; the event gent and sets the speed to dissafe to continue of Fault It tool link communicatings of parameters 49 dec. In may cause a communication or refrest esh parameters 49.00 Done Toe Use selection. It is be displayed in the total actual source is only dection.	peration in nerates was the value of peration in least on the value of peration in least on the value of least	ter. case of a corning A7EE Codefined in 22 case of a co 1 = 1 h command. The value in eak, so record 1 = 1	mmunication ontrol pane. 46 Speed remmunication n reverts autonnecting the y control panel is	on break. el/PC tool lieference sa on break. y omatically the drive may y el. s not the action	Parameter To Done when to be required. Parameter			

50 Fieldbus adapter (FBA)

Fieldbus communication configuration.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
50.01	FBA A enable		•	•	•		
50.02	Fieldbus adapter A ena Enables/Disables commodition of the adapter 0: Disable ; disable commodition in the adapter 1: Slot 1 ; enable commodition in the adapter 2: Slot 2 ; enable commodition in the adapter and adapter A commodition in the adapt	munication between in slot 1 slot 3 munication between incation between incation between incation between incation between incation between incation loss eacts to a fieldbu	. veen drive an drive an drive an drive an drive an action.	e and fieldbus an	us adapter adapter A. adapter A. adapter A. n	A. The adapte The adapte	r is in slot 1. er is in slot 2.
	0: No action; none, disal: Fault; the event gene 31.13 Fault stop mode of fieldbus. 2: Warning; the event gene ocontrol is expected for warning. Make sure that it is safe 3: Last speed; the event the level the drive was ousing an 850 ms low-pawarning. Make sure that it is safe 4: Speed reference safe speed to the value define warning. Make sure that it is safe 5: Fault always; the event of 31.13 Fault stop mode the fieldbus.	rates fault 7510 F communication. T enerates warning from the fieldbus e to continue ope generates warning operating at. The ass filter. e to continue ope e; the event gene ned in 22.46 Spec e to continue ope ent generates fau le communication	FBA A cor This occu g A7C1 FB i. eration in ng A7C1 F last spec eration in rates war ed referer eration in lt 7510 FB	case of a coming A7C1 Fince safe. case of a coming A7C1 Fince safe. case of a coming A7C1 Fince safe.	ommunication and the drive of t	is controlled in is occurs of ion break. In on the sponding ion break. In on the motontrol is expensed ion break.	the speed to eed feedback and sets the cor stops due pected from
50.03	0 5	No action	-	1 = 1	n	У	Parameter
50.03	FBA A comm loss timed Fieldbus adapter A com Defines the time delay FBA A comm loss func i update the message. 0 32500	nmunication loss for the fieldbus c	ommunio	cation loss b			
50.04	FBA A ref1 type		_			17	
	Fieldbus adapter A refe Selects the type and so fieldbus adapter A. 0: Auto ; automatic type is connected to. If 03.0! applied.	aling of 03.05 FB.	ording to	which refer	ence chain	03.05 FBA	A reference 1

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	03.05 FBA A re	ference 1 is connect	ed to:	Auto type a	nd scaling	is set to:				
	22.11 Speed ref	erence 1 source		Speed						
	22.12 Speed ref	erence 2 source								
	23.32 Direct sp	eed reference								
	26.11 Torque re	ference 1 source		Torque						
	26.12 Torque re	ference 2 source								
	27.22 Current re	Current								
	28.18 EMF refe	rence source		General						
	28.20 EMF volta	age correction sourc	:e							
	28.20 EMF voltage correction source 28.29 Flux correction source									
	3: Torque ; the sca 4: Speed ; the sca 5: Current ; the sc	ic reference with a so aling is defined by 46 ling is defined by 46 aling is in percent of	6.04 M1 to .02 M1 sp	orque scaling eed scaling a	actual. ctual.		ais).			
	0 5	Auto	-	1 = 1	n	у	Parameter			
50.05	FBA A ref2 type									
	-	A reference 2 type.	FDA Ae f	2t		.t/	(C) +-			
		and scaling of 03.06 A. See 50.04 FBA A r		erence 2 sent	by the mas	iter (e.g., Pi	LC) to			
	0 5	Auto	- Lype.	1 = 1	n	у	Parameter			
50.07	FBA A act1 type	riaco		1		J	- arameter			
	Selects the type/ (e.g., PLC). 0: Auto; type/soutype. For individudent: Transparent; the value 1. No scaling: General; the value 1. Autoria 2: General; the value 1. Autoria 2: General; the value 1. Autoria 2: General; 26.05 March 1. Autoria 2: General; 24.02 UM1 speed; 24.02 UM1 speed scaling 5: Current; 27.05 nominal current.	sed speed feedback	of actual vow the type. 50.10 FBA of the scaling of FBA A actual red is sent as actual at as actual actual red as	oe of reference A A act1 trans g is 1 = 1 unit. et1 transpare er and two de t as actual value al value 1. The	e 1 selected parent sour nt source is cimals). He sould be sounced in the sould be s	I by 50.04 Force is sent as actions as defined in percent of the s	FBA A ref1 as actual tual value 1 fined by ed by 46.02 f 99.11 M1			
	0 6	Auto	-	1 = 1	n	у	Parameter			
50.08	FBA A act2 type		•	•	•					
	Fieldbus adapter A actual value 2 type. Selects the type/source and scaling of actual value 2 sent by fieldbus adapter A to the master (e.g., PLC). See 50.07 FBA A act1 type.									
	T(e.g., PLC) See 50).07 FBA A act1 type	_							
	(e.g., PLC). See 50	0.07 FBA A act1 type. Auto	-	1 = 1	n	у	Parameter			

	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Fieldbus adapter	A status word trans	parent so							
	Selects the source	e of the status word	when the	fieldbus ada	apter is set	to a transp	arent			
	communication p	rofile e.g., by its cor	nfiguration	parameters	s in group 5	1. The para	meter to be			
	used is fieldbus d	•								
		ection e.g., 06.88 FB	A A profile	status wor	d.					
		o source selected.				T				
	0 0	Not selected	-	1 = 1	n	у	Parameter			
50.10	FBA A act1 transp	arent source								
	Fieldbus adapter	A actual value 1 trar	sparent so	ource.						
		e of actual value 1 se	-	•	r A to the m	aster (e.g.,	PLC), when			
		ıl 1 type = Transpare								
		ection e.g., a value f	rom group	1.						
		o source selected.				T				
	0 0	Not selected	-	1 = 1	n	у	Parameter			
50.11	FBA A act2 transp	parent source								
	-	A actual value 2 trar	•							
		e of actual value 2 se	•	•	r A to the m	aster (e.g.,	PLC), when			
		al 2 type = Transpare								
		ection e.g., a value f	rom group	1.						
		o source selected.					_			
	0 0	Not selected	-	1 = 1	n	у	Parameter			
50.12	FBA A debug mod	le								
	Fieldbus adapter /	A debug mode.								
	Enables the displa	ay of the raw (unmo			y and sent	from fieldb	us adapter A			
	Enables the displa The data are displ	ay of the raw (unmo layed in parameters	50.13 5	0.18.		from fieldb	us adapter A			
	Enables the displa The data are displ Note : This function	ay of the raw (unmo layed in parameters anality should only b	50.13 5 e used for	0.18. debugging.		from fieldb	us adapter A			
	Enables the displate The data are displayed Note: This function O: Disable; disable	ay of the raw (unmo layed in parameters onality should only b e the display of raw	50.13 5 e used for data from	0.18. debugging. fieldbus ada	apter A.	from fieldb	us adapter A			
	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to	ay of the raw (unmo layed in parameters mality should only b e the display of raw the display of raw d	50.13 5 e used for data from	0.18. debugging. fieldbus ada	apter A.	from fieldb	us adapter A			
	Enables the displate The data are displayed Note: This function O: Disable; disable	ay of the raw (unmo layed in parameters onality should only b e the display of raw	50.13 5 e used for data from	0.18. debugging. fieldbus ada	apter A.	from fieldb	us adapter A Parameter			
50.13	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to	ay of the raw (unmo layed in parameters onality should only be the display of raw the display of raw d Disable	50.13 5 e used for data from	0.18. debugging. fieldbus ada eldbus adap	apter A. oter A.		,			
50.13	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to 1 1 FBA A control work	ay of the raw (unmo layed in parameters onality should only be the display of raw the display of raw d Disable	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus ada eldbus adap	apter A. oter A.		,			
50.13	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (ay of the raw (unmo layed in parameters onality should only be the display of raw the display of raw d Disable rd A raw control word. (unmodified) control	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus ada eldbus adap	apter A. oter A. n	n	Parameter			
50.13	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (ay of the raw (unmo layed in parameters onality should only be the display of raw the display of raw d Disable rd	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus adaped	apter A. oter A. n	n	Parameter			
50.13	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (if 50.12 FBA A deb 000000000h	ay of the raw (unmo layed in parameters onality should only be the display of raw the display of raw d Disable rd A raw control word. (unmodified) control	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus ada eldbus adap	apter A. oter A. n	n	Parameter			
	Enables the displate The data are displayed. Note: This function 0: Disable; disabled 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (if 50.12 FBA A debut 1000000000000000000000000000000000000	ay of the raw (unmo layed in parameters onality should only be the display of raw d che display of raw d Disable rd A raw control word. (unmodified) control oug mode = Enable.	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl	n _C) to field	Parameter bus adapter A			
	Enables the displate The data are displayed Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (if 50.12 FBA A deb 000000000h	ay of the raw (unmo layed in parameters onality should only be the display of raw d che display of raw d Disable rd A raw control word. (unmodified) control oug mode = Enable.	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl	n _C) to field	Parameter bus adapter A			
	Enables the displate The data are displayed. Note: This function 0: Disable; disabled 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (if 50.12 FBA A debut 1000000000000000000000000000000000000	ay of the raw (unmo layed in parameters onality should only be the display of raw de he display of raw de Disable rd A raw control word. (unmodified) control oug mode = Enable.	50.13 5 be used for data from ata from fi	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl	n _C) to field	Parameter bus adapter /			
	Enables the displation The data are displayed in the last are displaye	ay of the raw (unmo layed in parameters onality should only be the display of raw de he display of raw de Disable rd A raw control word. (unmodified) control oug mode = Enable.	s 50.13 5 be used for data from ata from fi - ol word ser	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl	n _C) to field	Parameter bus adapter A			
	Enables the displate The data are displayed. Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (if 50.12 FBA A deb 00000000h FFFFFFFh FBA A reference 1 Fieldbus adapter and Displays the raw (if 50.12 FBA A reference 1)	ay of the raw (unmo layed in parameters onality should only be the display of raw de be the display of raw de Disable Araw control word. (unmodified) control oug mode = Enable.	s 50.13 5 se used for data from fi - ol word ser -	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl	n _C) to field	Parameter bus adapter A			
	Enables the displate The data are displayed. Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter and Displays the raw (if 50.12 FBA A deb 00000000h FFFFFFFh FBA A reference 1 Fieldbus adapter and Displays the raw (if 50.12 FBA A reference 1)	ay of the raw (unmo layed in parameters onality should only be the display of raw di he display of raw di Disable rd A raw control word. (unmodified) control oug mode = Enable. - A raw reference 1. (unmodified) reference	s 50.13 5 se used for data from fi - ol word ser -	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl	n _C) to field	Parameter bus adapter /			
	Enables the displate The data are displayed. Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter A deb 00000000h FFFFFFFh FBA A reference 1 Fieldbus adapter A Displays the raw (adapter A if 50.12	ay of the raw (unmo layed in parameters onality should only be the display of raw di he display of raw di Disable rd A raw control word. (unmodified) control oug mode = Enable. - A raw reference 1. (unmodified) reference	s 50.13 5 se used for data from fi - ol word ser -	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl y e master (e.g.)	n _C) to field n .g., PLC) to	Parameter bus adapter / Signal fieldbus			
50.14	Enables the display The data are display Note: This function 0: Disable; disabled 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter A debugger of the Control of the Contr	ay of the raw (unmo layed in parameters onality should only be the display of raw de che display of raw de Disable rd A raw control word. (unmodified) control oug mode = Enable. - A raw reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1.	s 50.13 5 se used for data from fi - ol word ser -	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl y e master (e.g.)	n _C) to field n .g., PLC) to	Parameter bus adapter A Signal fieldbus			
50.14	Enables the display The data are displayed. Note: This function 0: Disable; disabled 1: Enable; enabled to 0 1 FBA A control work Fieldbus adapter A debus adapter A debus adapter A debus adapter A fieldbus adapter A fieldbus adapter A Displays the raw (adapter A if 50.12 FBA A reference 1 Fieldbus adapter A dapter A if 50.12 -2147483648 2147483647 FBA A reference 2	ay of the raw (unmo layed in parameters onality should only be the display of raw de che display of raw de Disable rd A raw control word. (unmodified) control oug mode = Enable. - A raw reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1. (unmodified) reference 1.	s 50.13 5 se used for data from fi - ol word ser -	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., Pl y e master (e.g.)	n _C) to field n .g., PLC) to	Parameter bus adapter / Signal fieldbus			
50.14	Enables the display The data are displayed in the late of the late	ay of the raw (unmodayed in parameters on ality should only be the display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw control word. (unmodified) control with a raw reference 1. (unmodified) reference FBA A debug mode	s 50.13 5 he used for data from fine the from fine the from fine the from the fr	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., PI y e master (e.g.)	n _C) to field n .g., PLC) to	Parameter bus adapter / Signal fieldbus Signal			
50.14	Enables the displating The data are displayed in the late of the l	ay of the raw (unmodayed in parameters on ality should only be the display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw control word. (unmodified) control with a raw reference 1. (unmodified) reference 5. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 3. (unmodified)	s 50.13 5 he used for data from finata	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., PI y e master (e.g.)	n _C) to field n .g., PLC) to	Parameter bus adapter A Signal fieldbus Signal			
50.14	Enables the displating The data are displayed in the late of the l	ay of the raw (unmodayed in parameters on ality should only be the display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw control word. (unmodified) control with a raw reference 1. (unmodified) reference FBA A debug mode	s 50.13 5 he used for data from finata	0.18. debugging. fieldbus adaped	apter A. oter A. oter A. y e master (e.g., PI	n _C) to field n .g., PLC) to	Parameter bus adapter A Signal fieldbus fieldbus			
50.13 50.14	Enables the display The data are displayed. Note: This function 0: Disable; disable 1: Enable; enable to 0 1 FBA A control work Fieldbus adapter A deb 00000000h FFFFFFFh FBA A reference 1 Fieldbus adapter A displays the raw (adapter A if 50.12 -2147483647 FBA A reference 2 Fieldbus adapter A displays the raw (adapter A if 50.12 -2147483647 FBA A reference 2 Fieldbus adapter A displays the raw (adapter A if 50.12 -2147483647	ay of the raw (unmodayed in parameters on ality should only be the display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw display of raw control word. (unmodified) control with a raw reference 1. (unmodified) reference 5. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 2. (unmodified) reference 3. (unmodified)	s 50.13 5 he used for data from finata	0.18. debugging. fieldbus adaped	apter A. oter A. n ster (e.g., PI y e master (e.g.)	n_C) to field	Parameter bus adapter A Signal fieldbus Signal			

Index	Name Toyt									
	Text									
	Range	Default	:	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Fieldbus adapter A I Displays the raw (ur if 50.12 FBA A debug	nmodified) s	tatus w	ord sent	by fieldbus	adapter A t	o the mast	ter (e.g., PLC)		
	00000000h FFFFFFFh	-		-	1 = 1	У	n	Signal		
50.17	FBA A actual value 1	L								
	Fieldbus adapter An Displays the raw (ur (e.g., PLC) if 50.12 Fi -2147483648	nmodified) a	ictual va		1 = 1	fieldbus ad	apter A to	the master Signal		
50.18	2147483647 FBA A actual value 2									
30.10	Fieldbus adapter A no Displays the raw (ur (e.g., PLC) if 50.12 Fl -2147483648	raw actual van nmodified) a	ictual va		CT2) sent by	fieldbus ad	apter A to	the master		
	2147483647									
50.21	FBA A timelevel sel	I.		1	· ·		I			
	FBA A timelevel sel: 50.21 FBA A timelevel sel									
	50.21 FBA A timelev	vel sel	Cyclic h	nigh*	Cyclic low	**				
	50.21 FBA A timeled	vel sel	Cyclic h 2 ms	nigh*	Cyclic low ³	**				
		vel sel		nigh*	+ -	**				
	Normal	vel sel	2 ms	nigh*	10 ms	**				
	Normal Fast	vel sel	2 ms 500 μs	nigh*	10 ms 2 ms	**				
	Normal Fast Very fast Monitoring *Cyclic high data co **Cyclic low data co data out and acyclic Control word, REF1 of cyclic high messa 0: Normal; normal s 1: Fast; fast speed. 2: Very fast; very fast	nsist of stat nsist of the data. and REF2 fro ges. peed.	2 ms 500 μs 250 μs 10 ms cus word parame	l, ACT1 a ter data ïeldbus	10 ms 2 ms 2 ms 10 ms and ACT2 fro mapped in gare handled	m the fieldl groups 52 F as interrup	BA A data i	ed on receipt		
	Normal Fast Very fast Monitoring *Cyclic high data co **Cyclic low data co data out and acyclic Control word, REF1 of cyclic high messa 0: Normal; normal s 1: Fast; fast speed. 2: Very fast; very fast 3: Monitoring; low s	nsist of stat nsist of the data. and REF2 fro ges. peed. st speed.	2 ms 500 μs 250 μs 10 ms cus word parame om the f	l, ACT1 a ter data ïeldbus	10 ms 2 ms 2 ms 10 ms 10 ms and ACT2 fro mapped in gare handled	m the fieldl groups 52 F as interrup	BA A data i	ed on receipt usage.		
50.29	Normal Fast Very fast Monitoring *Cyclic high data co **Cyclic low data co data out and acyclic Control word, REF1 of cyclic high messa 0: Normal; normal s 1: Fast; fast speed. 2: Very fast; very fast	nsist of stat nsist of the data. and REF2 fro ges. peed.	2 ms 500 μs 250 μs 10 ms cus word parame om the f	l, ACT1 a ter data ïeldbus	10 ms 2 ms 2 ms 10 ms and ACT2 fro mapped in gare handled	m the fieldl groups 52 F as interrup	BA A data i	ed on receipt		

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0 10	DCP	-	1 = 1	n	n	Parameter			
50.31	FBA B enable		•	•	•	•	•			
50.32	FBA B enable Fieldbus adapter B e Enables/Disables co location of the adaptor B: Disable; disable com 2: Slot 1; enable com 3: Slot 3; enable com 0 3 FBA B comm loss fur Fieldbus adapter B c Selects how the drive 0: No action; none, of 1: Fault; the event ge 31.13 Fault stop mod fieldbus.	mmunication better in slot 1 slot munication between munication between Disable ommunication between Disable ommunication let reacts to a field in the communication between the communication let reacts fault 75	ot 3. Letween drive ween drive ween drive - oss action. dbus comnication loss	ve and fieldkand fieldbus and fieldbus 1 = 1	ous adapter B. s adapter B. n n oss.	B. The adapte The adapt The adapt n	er is in slot 1. er is in slot 2. er is in slot 3. Parameter os due to			
	WARNING Make sure that it is s 3: Last speed; the ev to the level the drive feedback using an 8! WARNING Make sure that it is s 4: Speed reference s speed to the value de WARNING Make sure that it is s 5: Fault always; the s to 31.13 Fault stop m	et generates wa was operating a 50 ms low-pass afe to continue afe; the event g efined in 22.46 S afe to continue event generates	arning A7C2 at. The last filter. operation enerates w speed refer operation fault 7520	r FBA B common speed is detention of a case of	munication termined bacommunicat FBA B communication, a	and freeze ased on the tion break. munication tion break. and the mo	speed and sets the			
	the fieldbus.	ode communica	icion, mis	occurs even	tilougiiilo t	.Ontrol is e	cpected from			
	0 5	No action	-	1 = 1	n	у	Parameter			
50.33	FBA B comm loss tin		1			12	1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2			
	Fieldbus adapter B communication loss timeout. Defines the time delay for the fieldbus communication loss before the action defined in 50.32 FBA B comm loss func is executed. Time count starts when the communication link fails to update the message.									
50.34	0 32500	300	ms	1 = 1 ms	n	У	Parameter			
50.34	FBA B ref1 type Fieldbus adapter B refeldbus adapter B. Selects the type and fieldbus adapter B. Selects 50 5	scaling of 03.07	FBA B refe	rence 1 sent	by the mas	iter (e.g., P	LC) to			
50.35	FBA B ref2 type	1			1	ر ا	1			
23.33	Fieldbus adapter B re Selects the type and fieldbus adapter A. S	scaling of 03.08	BFBA B refe	rence 2 sent	t by the mas	ster (e.g., P	LC) to			

	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	0 5	Auto	-	1 = 1	n	У	Parameter				
50.37	FBA B act1 type	.	I			1-					
		B actual value 1 typ	e.								
		source and scaling		alue 1 sent b	y fieldbus a	dapter B to	the master				
	(e.g., PLC). See 50	.07 FBA A act1 type			-						
	0 6	Auto	-	1 = 1	n	у	Parameter				
50.38	FBA B act2 type		•	•	•	1-	•				
	Selects the type/s	B actual value 2 typ source and scaling	of actual va	alue 2 sent b	y fieldbus a	dapter B to	the master				
	0 6	.07 FBA A act1 type Auto	•	1 = 1	n	T.,	Parameter				
50.39			-	1 - 1	[1]	у	Parameter				
50.39	FBA B SW transpa										
	•	B status word trans of the status word	•		antor is sot	to a transn	aront				
		rofile e.g., by its co			•						
	used is fieldbus de		inigaraciói	i parameter.	s in group s	Title pare	inicial to be				
		ection e.g., 06.89 FE	BA B profile	status wor	d.						
		o source selected.	·								
	0 0	Not selected	-	1 = 1	n	У	Parameter				
50.40	FBA B act1 transp	arent source	I	1	l	17	-1				
	-	B actual value 1 trar	nsparent so	ource.							
	-	e of actual value 1 s			r B to the m	aster (e.g.,	PLC), when				
	50.37 FBA B actua	l 1 type = Transpare	ent or Gene	eral.							
		ection e.g., a value f	rom group	1.							
		o source selected.	1			T	1				
	0 0	Not selected	-	1 = 1	n	У	Parameter				
50.41	FBA B act2 transp										
	Fioldbug adaptor I	B actual value 2 trai	nsparent s	ource.							
	-		-								
	Selects the source	e of actual value 2 s	ent by field	dbus adapte	r B to the m	aster (e.g.,	PLC), when				
	Selects the source 50.38 FBA B actua	e of actual value 2 s I 2 type = Transpar	ent by field ent or Gen	dbus adapte eral.	r B to the m	aster (e.g.,	PLC), when				
	Selects the source 50.38 FBA B actua Other ; source sele	e of actual value 2 s I 2 type = Transpar ection e.g., a value f	ent by field ent or Gen	dbus adapte eral.	r B to the m	aster (e.g.,	PLC), when				
	Selects the source 50.38 FBA B actua Other ; source sele 0: Not selected ; no	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected.	ent by field ent or Gend rom group	dbus adapte eral. o 1.	ı						
FO 42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; no 0 0	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected	ent by field ent or Gend rom group	dbus adapte eral.	r B to the m	aster (e.g.,	PLC), when				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; no 0 0 FBA B debug mod	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected	ent by field ent or Gend rom group	dbus adapte eral. o 1.	ı						
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; no 0 0 FBA B debug mod Fieldbus adapter	e of actual value 2 s Il 2 type = Transparection e.g., a value f o source selected. Not selected le B debug mode.	ent by field ent or Gend rom group -	dbus adapte eral. o 1. 1 = 1	n	у	Parameter				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; not 0 0 FBA B debug mod Fieldbus adapter I Enables the displa	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmo	ent by field ent or Genorom group - odified) dat	dbus adapte eral. 1. 1 = 1	n	у	Parameter				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; not 0 0 FBA B debug mod Fieldbus adapter Enables the displa The data are displa	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmo	ent by field ent or Generom group - diffied) dates 50.43 5	dbus adapte eral. o 1. 1 = 1 ta received b	n by and sent	у	Parameter				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; note 0 0 FBA B debug mod Fieldbus adapter I Enables the displate The data are displated to the selected of the s	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmodayed in parameters anality should only b	ent by field ent or Generom group - odified) dat 5 50.43 5 be used for	ta received be debugging.	n by and sent	у	Parameter				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; no 0 0 FBA B debug mod Fieldbus adapter I Enables the displa The data are displ Note: This functio 0: Disable; disable	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmo	ent by field ent or Generom group - diffied) dates 50.43 500 used for data from	ta received koo.48. debugging.	n by and sent	у	Parameter				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; no 0 0 FBA B debug mod Fieldbus adapter I Enables the displa The data are displ Note: This functio 0: Disable; disable	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmode) ayed in parameters enality should only be the display of raw	ent by field ent or Generom group - diffied) dates 50.43 500 used for data from	ta received koo.48. debugging.	n by and sent	у	Parameter				
	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; note 0 0 FBA B debug mod Fieldbus adapter Enables the displated the data are displated to the composition of the composition	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmonayed in parameters enality should only be the display of raw d bisable	ent by field ent or Generom group - diffied) dates 50.43 500 used for data from	ta received be debugging. fieldbus adapte	n by and sent apter B. oter B.	y from fieldb	Parameter ous adapter B				
50.42	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; not 0 0 FBA B debug mod Fieldbus adapter Enables the displa The data are displa Note: This functio 0: Disable; disable 1: Enable; enable to 0 1 FBA B control wor	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected le B debug mode. ay of the raw (unmonayed in parameters enality should only be the display of raw d bisable	ent by field ent or Generom group - odified) data 5 50.43 5 be used for data from field	ta received be debugging. fieldbus adapte	n by and sent apter B. oter B.	y from fieldb	Parameter ous adapter B				
	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; note 0 0 FBA B debug mod Fieldbus adapter I Enables the displated The data are dis	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected B debug mode. ay of the raw (unmodayed in parameters enality should only keet the display of raw debug of raw debu	ent by field ent or Generom group - odified) data 5 50.43 5 be used for data from field -	ta received be debugging. fieldbus adapted to the fiel	n oy and sent apter B. oter B.	y from fieldb	Parameter Bus adap				
	Selects the source 50.38 FBA B actua Other; source sele 0: Not selected; note 0 0 FBA B debug mod Fieldbus adapter I Enables the displated The data are dis	e of actual value 2 s I 2 type = Transpare ection e.g., a value f o source selected. Not selected B debug mode. ay of the raw (unmotayed in parameters enality should only be the display of raw d be the display of raw d Disable rd B raw control word unmodified) control	ent by field ent or Generom group - odified) data 5 50.43 5 be used for data from field -	ta received be debugging. fieldbus adapted to the fiel	n oy and sent apter B. oter B.	y from fieldb	Parameter B. Parameter B.				

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Fieldbus adapter B ra								
	Displays the raw (unradapter B if 50.42 FB.				e master (e.	.g., PLC) to	fieldbus		
	-2147483648 2147483647	-	-	1 = 1	у	n	Signal		
50.45	FBA B reference 2	-				I	1		
	Fieldbus adapter B ra Displays the raw (unr adapter B if 50.42 FB	nodified) referen			e master (e	.g., PLC) to	fieldbus		
	-2147483648 2147483647	-	-	1 = 1	у	n	Signal		
50.46	FBA B status word		•	•	•	1			
	Fieldbus adapter B ra Displays the raw (unr if 50.42 FBA B debug	nodified) status	word sent	t by fieldbus	adapter B t	to the mas	ter (e.g., PLC)		
	00000000h FFFFFFFh	-	-	1 = 1	У	n	Signal		
50.47	FBA B actual value 1					•			
	Fieldbus adapter B ra Displays the raw (unr (e.g., PLC) if 50.42 FB -2147483648	nodified) actual v	value 1 (A0		fieldbus ad	apter B to	the master Signal		
	2147483647								
50.48	FBA B actual value 2								
	Fieldbus adapter B ra Displays the raw (unr (e.g., PLC) if 50.42 FB	nodified) actual v	value 2 (A		fieldbus ac	lapter B to	the master		
	-2147483648 2147483647	-	-	1 = 1	у	n	Signal		
50.51	FBA B timelevel sel					•			
	Fieldbus adapter B communication time levels. See 50.21 FBA A timelevel sel.								
	0 3	Normal	-	1 = 1	n	n	Parameter		
50.59	FBA B profile		•	•	•	1			
	Fieldbus adapter B po Internally the DCS880 specific profiles are h 0: ABB Drives profile) uses a transpar nandled using 50.	.59 FBA B	profile.	•				
	10000. Classic setting 10: DCP ; speed: value	g due to compati	ibility reas	sons with fir	mware vers	ions 2.04.0	and lower.		
	profiles. For firmware Note: For details, ple	e versions 2.04.3	and highe	er.					
	0 10	DCP	<u> </u>	1 = 1	n	n	Parameter		

51 FBA A settings

Fieldbus adapter A configuration.

Attention: Any changed parameters must be validated by means of 51.27 FBA A par refresh = Refresh.

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Attention: Any ch Refresh.	anged parameters	must be va	lidated by m	neans of 51.	27 FBA A pa	ar refresh =		
51.01	FBA A type								
		A type. of the connected f s not found or is no		•		d by 50.01	FBA A enable.		
	0 485	_	_	1 = 1	у	n	Signal		
51.02 to 51.26	FBA A Par2 FBA		I		<u> </u>	1	Joighan		
51.27	documentation of Note : Not all para 0 65535	51.26 are adapter the fieldbus adapter meters are necessare ne	ter module	•	n	y	Parameter		
J1. E1	FBA A par refresh Fieldbus adapter A refresh. Validates any changed fieldbus adapter A module configuration settings. The value reverts to Done automatically when the refresh is done. 0: Done; 0, refreshing done. 1: Refresh; 1, refreshing. 0 1 Done - 1 = 1 y n Parameter								
51.28	FBA A par table v	er	•			•			
	Fieldbus adapter A parameter table revision. Displays the parameter table revision of the fieldbus adapter A module-mapping file (stored in the memory of the drive) in format axyz, where ax = major table revision number and yz = minor table revision number. O000h FFFFh - 1 = 1 y n Signal								
51.29	FBA A drive type	code							
	Fieldbus adapter Displays the drive memory of the dr	A drive type code. type code in the fi	eldbus ada	·		1	T		
	0 65535	<u> -</u>	-	1 = 1	у	n	Signal		
51.30	FBA A mapping fi	le ver A mapping file revi	sion						
	-	ous adapter A mod		ng file revisio	on stored in	the memo	ry of the		

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	0 65535	-	-	1 = 1	у	n	Signal		
51.31	D2FBA A comm status								
	Fieldbus adapter A compisplays the status of to the status of the status	the fieldbus adaptous adapter A is adapter A is initial as occurred in the fieldbus adapter or mapping file to apter A communicat a communicat fieldbus adapter.	nter A monot confidizing. The common A configupload hacation is cation is cation break	igured. unication be uration erro as failed mor off-line. on-line, or fie	etween fiel r. Mapping e than thre	file is not ee times. pter A has	found in the		
	06	ļ-	<u> </u> -	1 = 1	у	n	Signal		
51.32	FBA A comm SW ver								
	Fieldbus adapter A, firmware patch and build versions. Displays the patch and build versions of the adapter module A firmware in format xxyy, where xx = patch version number and yy = build version number. Example: C802 = 200.02 (patch version 200, build version 2). 0000h FFFFh								
51.33		-	-	1 = 1	У	n	Signal		
31.55	FBA A appl SW ver Fieldbus adapter A, firmware major and minor versions. Displays the major and minor versions of the adapter module A firmware in format xyy, where x = major revision number and yy = minor revision number. Example: 300 = 3.00 (major version 3, minor version 00).								
	0000h FFFFh	-	-	1 = 1	У	n	Signal		

52 FBA A data in

Selection of data sent by fieldbus adapter A to the fieldbus controller (e.g., PLC).

Note: 32-bit values require two consecutive parameters. Whenever a 32-bit value is selected in a data parameter, the next parameter is automatically reserved.

Index	Name Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
52.01	FBA A data in1		•	•	•	•			
	Fieldbus adapter A Parameters 52.01 controller (e.g., PLC Other; source select 0: None; inactive. D 4: SW 16bit; status 5: Act1 16bit; actua 6: Act2 16bit; actua 15: Act1 32bit; actua 16: Act2 32bit; actua Attention:	. 52.12 select data c). tion (10 ms updat isable FBA A data word (16-bit) (2 m Il value ACT1 (16-bit) al value ACT2 (16-bal value ACT1 (32-k	e). in. is update). it) (2 ms upit) (2 ms upit) (2 ms upit) (2 ms upit) (2 ms upit)	the drive by Taken from odate). Depe pdate). Depe update). Dep	06.88 FBA ending on 50 ending on 5 ending on 5	A profile st D.07 FBA A 0.08 FBA A 50.07 FBA A	atus word. act1 type. act2 type. act1 type .		

	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Some fieldbus ada	pters, see the adapt	ers manu	ıal, overwrite	the setting	of 52.01 F	BA A data in1		
	and force the sett	ing to SW 16bit.							
	0 16	None	-	1 = 1	n	у	Parameter		
52.02	FBA A data in2	<u>.</u>	•		•				
	Parameters 52.01 controller (e.g., PL Other; source sele 0: None; inactive. I 4: SW 16bit; status 5: Act1 16bit; actu 6: Act2 16bit; actu 15: Act1 32bit; actu 16: Act2 32bit; actu Attention: Some fieldbus ada	A data from the drive 52.12 select data s C). ction (10 ms update Disable FBA A data in s word (16-bit) (2 ms al value ACT1 (16-bit al value ACT1 (32-bit ual value ACT2 (32-bit ua	sent from). update).) (2 ms up) (2 ms up t) (2 ms u it) (2 ms u	Taken from odate). Dependate). Dependate). Dependate). Dependate). Dependate). Dependate).	06.88 FBA Anding on 50 ending on 5 ending on 5	A profile sta 0.07 FBA A 0.08 FBA A 0.07 FBA A 60.08 FBA A	atus word. act1 type. act2 type. act1 type . A act2 type.		
	III and force the s	, c c c							
	016	None	_	1 = 1	n	v	Parameter		
52.03 to 52.12	0 16 FBA A data in3		-	1=1	n	у	Parameter		
to	Fieldbus adapter A Parameters 52.01 controller (e.g., PL Other; source sele 0: None; inactive. I 4: SW 16bit; status 5: Act1 16bit; actu 6: Act2 16bit; actu 15: Act1 32bit; actu	FBA A data in12 A data from the drive 52.12 select data s	sent from). n. update).) (2 ms up) (2 ms up t) (2 ms up	eldbus contr the drive by Taken from odate). Depe odate). Depe pdate). Depe	oller (e.g., F fieldbus ad 06.88 FBA A nding on 50 nding on 50 ending on 5	A profile stands of the control of t	the fieldbus atus word. act1 type. act2 type.		

53 FBA A data out

Selection of data sent by the fieldbus controller (e.g., PLC) to fieldbus adapter A.

Note: 32-bit values require two consecutive parameters. Whenever a 32-bit value is selected in a data parameter, the next parameter is automatically reserved.

Index	Name Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
53.01	FBA A data out	FBA A data out1								
	Fieldbus adapter A data from the fieldbus controller (e.g., PLC) to the drive.									
	Parameters 53.	Parameters 53.01 53.12 select data sent from the fieldbus controller (e.g., PLC) by fieldbus								
	adapter A to the drive.									
	Other; source selection (10 ms update).									
	0: None; inactive. Disable FBA A data out.									
	1: CW 16bit ; co	1: CW 16bit; control word (16-bit) (2 ms update). Send to 06.03 FBA A transparent control word								
	2: Ref1 16bit ; reference REF1 (16-bit) (2 ms update). Send to 03.05 FBA A reference 1.									

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
53.02	12: Ref1 32bit; refe 13: Ref2 32bit; refe Attention: Some fieldbus add out1 and force the 0 13 FBA A data out2 Fieldbus adapter Parameters 53.01 adapter A to the c Other; source sele 0: None; inactive. 1: CW 16bit; contr 2: Ref1 16bit; refe 3: Ref2 16bit; refe 12: Ref1 32bit; refe 13: Ref2 32bit; refe Attention:	ection (10 ms upda Disable FBA A data ol word (16-bit) (2 rence REF1 (16-bit) rence REF2 (16-bit) erence REF1 (32-bit erence REF2 (32-bi	t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon t) (2 ms upon	ate). Send to date). Send to date). Send to ual, overwrit 1 = 1 roller (e.g., Pathe fieldbush). Send to 06 ate). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date). Send to date).	o 03.05 FBA to 03.06 FBA e the settin n LC) to the cost controller 0.03 FBA A tr 0.03.05 FBA to 03.06 FBA to 03.06 FBA to 03.06 FBA	A reference A reference A reference A reference A reference Control A reference A reference A reference A reference A reference A reference A reference	te 1. ce 2. FBA A data Parameter by fieldbus control word. e 1. e 2. ce 1. ce 2.			
	Some fieldbus adapters, see the adapters manual, overwrite the setting of 53.02 FBA A data out2 and force the setting to Ref1 16bit.									
	0 13	None	-	1 = 1	n	у	Parameter			
53.03 to 53.12	FBA A data out3 FBA A data out12									
53.12	Fieldbus adapter A data from the fieldbus controller (e.g., PLC) to the drive. Parameters 53.01 53.12 select data sent from the fieldbus controller (e.g., PLC) by fieldbus adapter A to the drive. Other; source selection (10 ms update). 0: None; inactive. Disable FBA A data out. 1: CW 16bit; control word (16-bit) (2 ms update). Send to 06.03 FBA A transparent control word 2: Ref1 16bit; reference REF1 (16-bit) (2 ms update). Send to 03.05 FBA A reference 1. 3: Ref2 16bit; reference REF2 (16-bit) (2 ms update). Send to 03.06 FBA A reference 2. 12: Ref1 32bit; reference REF1 (32-bit) (2 ms update). Send to 03.05 FBA A reference 1. 13: Ref2 32bit; reference REF2 (32-bit) (2 ms update). Send to 03.06 FBA A reference 2. 0 13 None - 1 = 1 n y Parameter									

54 FBA B settings

Description see group 51 FBA A settings.

55 FBA B data in

Description see group 52 FBA A data in.

56 FBA B data out

Description see group 53 FBA A data out.

58 Embedded fieldbus

Embedded fieldbus (EFB) configuration.

Attention: Any changed parameters must be validated by means of 58.06 Communication control = Refresh settings.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Attention: Any ch control = Refresh	anged parameters settings.	must be va	lidated by m	neans of 58.	06 Commu	ınication			
58.01	Protocol enable									
	Enables/Disables Note: When the e communication is 0: None; inactive,	us, enable/disable. the embedded fiel mbedded fieldbus i disabled. disable communica nable the embedde	s enabled, ation.	the drive-to-	-drive link in	group 60	DDCS			
	01	None	_	1 = 1	n	n	Parameter			
58.02	Protocol ID	11101110				1				
		us, Protocol ID, and ocol ID and revision		s specify the	· 	1	· ·			
58.03	Node address	-	- -	1-1	У	n	Signal			
	The address rFor drives in a spare/replaceChanges to 58	spare/replacement drives.								
	0 255	1		1 = 1	n	V	Parameter			
58.04	Baud rate	*		1 - 1		У	rarameter			
	station. Note: Changes to validated by 58.00 2: 9.6 kbps; 9.6 kb 3: 19.2 kbps; 19.2 4: 38.4 kbps; 38.4 5: 57.6 kbps; 57.6 6: 76.8 kbps; 76.8 7: 115.2 kbps; 115.	fer rate of the embers 58.04 Baud rate ta 6 Communication coit/s. kbit/s. kbit/s. kbit/s. kbit/s. kbit/s. kbit/s.	ke effect a	fter the drive	e is reboote	d or the ne	w setting is			
	27	19.2 kbps	-	1 = 1	n	у	Parameter			
58.05	Parity									
56.05	Embedded fieldbus, parity bit and stop bits. Selects the type of parity bit and the number of stop bits. Use the same setting as in the master station.									

Index	Name Text									
										Range
		Note: Changes to 58.05	Parity take effe	ct after th	ne drive is re	booted or	the new se	etting is		
	validated by 58.06 Com	munication cont	rol.							
1	0: 8 NONE 1 ; eight data	bits, no parity b	it, one sto	op bit.						
	1: 8 NONE 2 ; eight data	1: 8 NONE 2; eight data bits, no parity bit, two stop bits.								
	2: 8 EVEN 1 ; eight data bits, even parity bit, one stop bit.									
	3: 8 ODD 1 ; eight data bits, odd parity bit, one stop bit.									
	0 3 8 EVEN 1 - 1 = 1 n y Parameter									
58.06	Communication control									
	Embedded fieldbus, refresh command. Applies any changed embedded fieldbus settings or activates silent mode. The value reve automatically to Enabled when the refresh is done. O: Enable ; normal operation or refreshing done.									
	1: Refresh settings ; refresh changed configuration settings of the embedded fieldbus. 2: Silent mode ; activate the silent mode. No messages are transmitted. Silent mode can be									
	terminated by setting 5			•			ac can be			
	0 2	Enable	-	1 = 1	у	у	Parameter			
E9 07	Communication diagna	stice	•	•	•	•	•			

58.07 Communication diagnostics

Embedded fieldbus, communication status word.

Displays the status of the embedded fieldbus communication.

Bit assignment:

Bit	Name	Value	Remarks
0	Initialization failed	1	Embedded fieldbus initialization failed.
1	Address configuration error	1	Node address not allowed by protocol.
2	Silent mode	1	Drive not allowed transmitting.
		0	Drive allowed transmitting.
3	reserved		
4	Wiring error	1	Error detected: Possibly A/B wires swapped.
5	Parity error	1	Error detected: Check 58.04 Baud rate and 58.05 Parity.
6	Baud rate error	1	Error detected: Check 58.05 Parity and 58.04 Baud rate.
7	No bus activity	1	0 bytes received during the last 5 seconds.
8	No packets	1	O packets (addressed to any device) detected during the last 5 seconds.
9	Noise or addressing error	1	Error detected: Interference or another drive with the same address is online.
10	Communication loss	1	0 packets addressed to the unit received within 58.16 Communication loss time.
11	CW/References loss	1	No control word or references received within 58.16 Communication loss time.
12	reserved		
13	reserved		
14	reserved		
15	reserved		

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0000h FFFFh	-	-	1 = 1	у	n	Signal
58.08	Received packets	1				'	1 -
	Embedded fieldbus,	number of recei	ved packet	s addressed	to the drive	е.	
	Displays a count of vincreases constantly Can be reset from the	alid packets add	dressed to	the drive. Du	ıring norma	l operatior	
	0 4294967295	0		1 = 1	y	n	Signal
58.09	Transmitted packet			11-1	y	111	Jigilai
33.03	Embedded fieldbus, Displays a count of v number increases co Can be reset from th	number of trans alid packets tra nstantly.	nsmitted b	y the drive. [•	·	
	0 4294967295	0	-	1 = 1	у	n	Signal
58.10	All packets	1	·				<u> </u>
	Embedded fieldbus, Displays a count of v this number increase Can be reset from th	alid packets addes constantly.	dressed to	any device o		•	•
	0 4294967295	0	-	1 = 1	У	n	Signal
58.11	UART errors		•				
	Displays a count of configuration proble Can be reset from th	m on the bus.	-				
58.12	CRC errors		I				
	Embedded fieldbus, Displays a count of p indicates interference Can be reset from the	eackets with a C e on the bus. e control panel	RC error re	Reset depre	essed for ov	er 3 secono	ds.
58.14	0 4294967295 Communication loss	0	-	1 = 1	у	n	Signal
30.14	Embedded fieldbus, Selects how the drive Note: Changes to 58 the new setting is va 0: No action; none, of 1: Fault; the event ge Fault stop mode confieldbus. 2: Last speed; the ev the level the drive wa using an 850 ms low WARNING Make sure that it is s 3: Speed reference s speed to the value de WARNING	communication e reacts to a fiel .14 Communicat lidated by 58.06 isable communicates fault 66 nmunication. The et generates was operating atpass filter. afe to continue afe; the event generates generating at.	dbus comn tion loss ac Communi cation loss 81 EFB con is occurs o arning A7CE The last sp operation is	nunication lotion take effication control function. nunication nly when the EFB commuted is determined at a case of a case arring A7CE	ect after thol. and the moder drive is conunication armined based	otor stops ntrolled fro nd freezes t d on the sp cion break.	due to 31.13 om the the speed to beed feedback

Index	Name Text									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
		is safe to continue o	•							
	_	ne event generates f								
	-	mode communicat	ion. This c	ccurs even t	hough no c	ontrol is ex	pected from			
	the fieldbus.									
	_	rent generates warn	_	FB commun	nication. Thi	s occurs e	en though			
	no control is expe	cted from the fieldb	us.							
	_	is safe to continue o	noration i	n casa of a c	ommunicat	ion brook				
	0 5	No action		1 = 1	n		Parameter			
0 1 F	Communication le			1 - 1	П	У	Parameter			
8.15										
		us, communication l				4	:: - - - -			
		ssage types reset th ss. See 58.14 Comm								
	time.	755. See 56.14 COMM	iuriication	ioss action a	ana 56.16 C	ommunica	11011 1055			
		58.15 Communication	on loss ma	nde take effe	ect after the	drive is re	hooted or			
	_	validated by 58.06				. 41116 15 16	booted of			
	_	ny message address				t.				
		a write of the contr					ieldbus			
	resets the timeou									
	12	CW/Ref1/Refa	2 -	1 = 1	n	у	Parameter			
8.16	Communication le			Į.	I	12	I			
	Embedded fieldbu	us, communication b	oss timeo	ut.						
		us, communication le			cation loss	before the	action			
	Defines the time of	us, communication le delay for the embede ommunication loss	ded fieldb	us communi						
	Defines the time of defined in 58.14 C	delay for the embed	ded fieldb action is e	us communi xecuted. See	e 58.15 Com	ımunicatio	n loss mode			
	Defines the time of defined in 58.14 C Note : Changes to	delay for the embedo ommunication loss	ded fieldb action is e on loss tin	us communi xecuted. See ne take effec	e 58.15 Com	ımunicatio	n loss mode			
	Defines the time of defined in 58.14 C Note : Changes to	delay for the embedo ommunication loss 58.16 Communication	ded fieldb action is e on loss tin	us communi xecuted. See ne take effec	e 58.15 Com	ımunicatio	n loss mode.			
8.17	Defines the time of defined in 58.14 C Note : Changes to new setting is vali	delay for the embedo ommunication loss 58.16 Communication dated by 58.06 Com	ded fieldb action is e on loss tin munication	us communi xecuted. Sec ne take effec on control.	e 58.15 Com et after the	munication drive is reb	n loss mode ooted or the			
58.17	Defines the time of defined in 58.14 C Note : Changes to new setting is valid 0 32.5 Transmit delay	delay for the embedo ommunication loss 58.16 Communication dated by 58.06 Com	ded fieldb action is e on loss tin nmunications	us communi xecuted. Sec ne take effec on control.	e 58.15 Com et after the	munication drive is reb	n loss mode. ooted or the			
58.17	Defines the time of defined in 58.14 C Note: Changes to new setting is valion 0 32.5 Transmit delay Embedded fieldbu	delay for the embedo ommunication loss 58.16 Communication dated by 58.06 Com 0.3	ded fieldb action is e on loss tin nmunication s	us communi xecuted. See ne take effec on control. 10 = 1 s	e 58.15 Com et after the o	munication drive is reb	n loss mode ooted or the Parameter			
58.17	Defines the time of defined in 58.14 C Note: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldby Defines a minimum	delay for the embeddommunication loss of 58.16 Communication loss idated by 58.06 Communication 0.3	ded fieldb action is e on loss tin nmunication s se delay. addition t	us communi xecuted. See ne take effect on control. 10 = 1 s	n delay impos	munication drive is reby y	Parameter			
68.17	Defines the time of defined in 58.14 C Note: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldby Defines a minimum Note: Changes to	delay for the embeddommunication loss 58.16 Communication dated by 58.06 Com 0.3	ded fieldb action is e on loss tin nmunication s se delay. addition t	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed eect after the	n delay impos	munication drive is reby y	Parameter			
8.17	Defines the time of defined in 58.14 C Note: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldby Defines a minimum Note: Changes to	delay for the embeddommunication loss 58.16 Communication dated by 58.06 Com 0.3 us, minimum response delay in 58.17 Transmit delay	ded fieldb action is e on loss tin nmunication s se delay. addition t	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed eect after the	n delay impos	munication drive is reby y	Parameter			
	Defines the time of defined in 58.14 Contents of Note: Changes to new setting is validate. O 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validate.	delay for the embeddommunication loss 58.16 Communication dated by 58.06 Com 0.3 us, minimum response delay in 58.17 Transmit delayed by 58.06 Communication of the communicatio	ded fieldb action is e on loss tin imunication s se delay. addition to y take effe	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed ect after the entrol.	n n delay impos	munication drive is reb y sed by the pooted or th	Parameter orotocol. ne new			
	Defines the time of defined in 58.14 Contents of Note: Changes to new setting is validated of the Note: Changes to Defines a minimum Note: Changes to setting is validated of the Note: Of the Note: Changes to Setting is validated of the Note: Of the Not	delay for the embeddommunication loss 58.16 Communication dated by 58.06 Com 0.3 us, minimum response delay in 58.17 Transmit delayed by 58.06 Communication of the communicatio	se delay. addition to take effection communication to take effection communication com	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed ect after the entrol.	n n delay impos	munication drive is reb y sed by the pooted or th	Parameter orotocol. ne new			
	Defines the time of defined in 58.14 Contents of Note: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500	delay for the embeddommunication loss 58.16 Communication loss 64.16 Communication dated by 58.06 Communication loss 64.17 Transmit delayed by 58.06 Communication loss 64.16 Communication loss 64.17 Transmit delayed by 58.06 Communication loss 64.17 Transmit delayed by 58.	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms	n stafter the delay imposed rive is reb	munication drive is reb	Parameter orotocol. ne new Parameter			
	Defines the time of defined in 58.14 Contents of Note: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms	n stafter the delay imposed rive is reb	munication drive is reb	Parameter orotocol. ne new Parameter			
	Defines the time of defined in 58.14 Contents of Note: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldby Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldby Displays the raw (delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms	n stafter the delay imposed rive is reb	munication drive is reb	Parameter orotocol. ne new Parameter			
58.18	Defines the time of defined in 58.14 Conte: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldbut Displays the raw (drive. For debugg	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod	e 58.15 Comet after the order the or	with the property of the prope	Parameter Parameter Parameter Parameter Parameter Control of the control of			
58.18	Defines the time of defined in 58.14 Conte: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldby Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldby Displays the raw (drive. For debugg 0000h FFFFh EFB status word	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	ded fieldb action is e on loss tin nmunication s se delay. addition t y take effection co	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod	e 58.15 Comet after the order the or	with the property of the prope	Parameter Parameter Parameter Parameter Crotocol. The new Parameter LC) to the			
58.18	Defines the time of defined in 58.14 Conte: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldbut Displays the raw (drive. For debugg 0000h FFFFh EFB status word Embedded fieldbut Embe	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms l word sen	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod 1 = 1	e 58.15 Comet after the order that after the order	munication drive is reb	Parameter Parameter Parameter Parameter Crotocol. Parameter LC) to the Signal			
58.17 58.18 58.19	Defines the time of defined in 58.14 Contender in 5	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss, minimum response delay in 58.17 Transmit delayed by 58.06 Communication loss, raw control word funmodified) control ing purposes.	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms l word sen	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod 1 = 1	e 58.15 Comet after the order that after the order	munication drive is reb	Parameter Parameter Parameter Parameter Crotocol. Parameter LC) to the Signal			
58.18	Defines the time of defined in 58.14 Contended in 58.14 Contended for the setting is validated on the setting is validated on 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validated on 32500 EFB control word Embedded fieldbut Displays the raw (drive. For debugg 0000h FFFh EFB status word Embedded fieldbut Displays the raw (PLC). For debugging fields of the setting is validated fieldbut Displays the raw (PLC). For debugging fields of the setting is validated fieldbut Displays the raw (PLC). For debugging fields of the setting is validated fieldbut Displays the raw (PLC). For debugging fields of the setting field	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss, minimum response delay in 58.17 Transmit delayed by 58.06 Communication loss, raw control word funmodified) control ing purposes.	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms l word sen	us communi xecuted. See the take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod 1 = 1	e 58.15 Comet after the order to the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five in the Modelay impo	munication drive is reb	Parameter Parameter Parameter Parameter Corotocol. The new Parameter LC) to the Signal Coller (e.g.,			
58.18 58.19	Defines the time of defined in 58.14 Conte: Changes to new setting is valid 0 32.5 Transmit delay Embedded fieldbut Defines a minimum Note: Changes to setting is validate 0 32500 EFB control word Embedded fieldbut Displays the raw (drive. For debugg 0000h FFFFh EFB status word Embedded fieldbut Displays the raw (PLC). For debugging 0000h FFFFh	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss, minimum response delay in 58.17 Transmit delayed by 58.06 Communication loss, raw control word funmodified) control ing purposes.	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms l word sen	us communi xecuted. See ne take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms 1 = 1 by the drive	e 58.15 Comet after the order that after the order	munication drive is reb	Parameter Parameter Parameter Parameter Crotocol. The new Parameter LC) to the Signal			
58.18	Defines the time of defined in 58.14 Control profile	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms l word sen	us communi xecuted. See ne take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms 1 = 1 by the drive	e 58.15 Comet after the order to the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five in the Modelay impo	munication drive is reb	Parameter Parameter Parameter Parameter Corotocol. The new Parameter LC) to the Signal Coller (e.g.,			
58.18 58.19	Defines the time of defined in 58.14 Control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC). For debuggionous here were provided to the control profile Embedded fieldbur Displays the raw (PLC).	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication loss 60.3 Lest a service of the service of	ded fieldb action is e on loss tin nmunicatio s se delay. addition t y take effe ication co ms l. l word sent word sent	us communi xecuted. See take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod 1 = 1	e 58.15 Comet after the order to the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five is rebuilded by the Modelay imposed five in the Modelay impo	munication drive is reb	Parameter Parameter Parameter Parameter Corotocol. The new Parameter LC) to the Signal Coller (e.g.,			
58.18 58.19	Defines the time of defined in 58.14 Control profile Embedded fieldbur Defines the raw (Defines the control profile Embedded fieldbur Defines the contro	delay for the embeddommunication loss 58.16 Communication loss 58.16 Communication dated by 58.06 Communication loss of the communication loss of th	se delay. addition to take effection communication to take effection communication com	us communi xecuted. See take effect on control. 10 = 1 s to any fixed of ect after the entrol. 1 = 1 ms t by the Mod 1 = 1	e 58.15 Comet after the order after the order the order the order to the Model of t	munication drive is reb	Parameter Parameter Parameter Parameter Corotocol. Parameter LC) to the Signal Coller (e.g.,			

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0: ABB Drives Pr	ofile; ABB Drives pro	file (with a		ol word) wi	th register	s in the
		or backward compati					
	2: Transparent; t	transparent profile (1	L6-bit or 32	2-bit control	word) with	registers i	n the classic
	format.						
	0 2	ABB Drives	-	1 = 1	n	у	Paramete
58.26	EFB ref1 type						
	Embedded field	ous, reference 1 type					
	Selects the type to the embeddee	and scaling of 03.09 d fieldbus.	EFB refere	ence 1 sent b	y the Modb	us controll	er (e.g., PLC
	0: Auto ; automa	tic type and scaling a	according '	to which refe	erence chair	n 03.09 EFE	reference
	is connected to.	If 03.09 EFB reference	ce 1 is not	connected to	any chain,	setting Tra	ansparent i
	applied.						
			_	1			
		erence 1 is connected	d to:	Auto type a	and scaling	is set to:	
		ference 1 source		Speed			
	 	ference 2 source					
	·	peed reference					
		eference 1 source		Torque			
	 	eference 2 source					
		reference source		Current			
	28.18 EMF refe			General			
		tage correction sourc	ce				
	28.29 Flux corr	rection source					
	1. Transparent: I	No scaling is applied.					
		ric reference with a s		00 = 1 (e.g. :	integer and	two decim	als)
		caling is defined by 4	_		-	two accin	iais).
	- ·	aling is defined by 46					
		caling is in percent o				. %.	
	05	Auto	-	1 = 1	n	у	Paramete
58.27	EFB ref2 type			l.		12	
		ous, reference 2 type	·				
		and scaling of 03.10		ence 2 sent b	y the Modb	us controll	er (e.g., PL0
		d fieldbus. See 58.26			•		
	0 5	Auto	-	1 = 1	n	у	Paramete
58.28	EFB act1 type	1	<u>'</u>				.
		ous, actual value 1 ty	pe.				
		/source and scaling o		alue 1 sent b	y the embed	dded fieldb	us to the
	Modbus controll						
	0: Auto; type/so	urce and scaling follo	ow the typ	e of reference	e 1 selected	d by 58.26 I	FB ref1 typ
	For individual se	ttings see below.					
	-	The value selected by		•	arent source	e is sent as	actual valu
	_	pplied. The 16-bit sca	_				
		alue selected by para					ent as actu
		-bit scaling of 100 = 1	_	_			
	_	Motor torque filtered	is sent as	actual value	1. The scal	ing is defin	ed by 46.04
	M1 torque scalin	g actual.					

Index	Name							
	Text							
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	46.02 M1 sp 5: Current ; nominal cu	oeed scaling 27.05 Motor rrent.	otor speed filte actual. current is sent tion is sent as a	as actual	value 1. The	scaling is i	n percent c	of 99.11 M1
	0 6		Auto	-	1 = 1	n	у	Parameter
58.29	Selects the Modbus co	fieldbus, ac type/sourc	tual value 2 typ e and scaling of ., PLC). See 58.2	f actual va	1 type.		1	T
58.30	0 6		Auto parent source	-	1 = 1	n	у	Parameter
	Selects the Other; sour	source of th	atus word trans ne status word n e.g., 06.15 Mai Irce selected.	when 58.2	25 Control pr Word.			Davo most ov
58.31		ansparent s	Not selected	-	1 = 1	n	У	Parameter
58.32	Other; sour 0: Not sele 0 0 EFB act2 tr Embedded Selects the (e.g., PLC), Other; sour	rce selection cted; no sou ransparent s fieldbus, ac source of a when 58.29 rce selection	EFB act1 type = n e.g., a value fro irce selected. Not selected source tual value 2 tran ctual value 2 sel EFB act2 type = n e.g., a value fro irce selected.	- nsparent s nt by the c	1.	n ieldbus to t	y he Modbus	Parameter s controller
	0 0		Not selected	-	1 = 1	n	у	Parameter
58.33	Defines the Modbus re- Note: Chan setting is v	fieldbus, ad e mapping b gister range ages to 58.33 alidated by 16-bit value Register ad For examp 402280. 32-bit value Register ad For examp 424560.	Idressing mode etween parame	eters and looke take of ication con the second of the seco	effect after to introl. es 1 99): parameter g d be mapped es 1 99): parameter g d be mapped	the unit is regroup + para d to registe group + 2 × p d to registe	ebooted or ameter ind r 400000 + parameter	ex. - 2200 + 80 = index.

Index	Name										
	Text										
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	2: Mode 2 ;	32-bit value	es (groups 1 12	7, indexe	s 1 255):						
		Register ad	ldress = 400000	+ 512 × p	arameter gr	oup + 2 × p	arameter i	ndex.			
		For exampl	e, parameter 22.8	80 would	be mapped	to registe	400000 +	11264 + 160			
		= 411424.									
	0 2		Mode 0	-	1 = 1	n	у	Parameter			
58.34	Word orde	r									
	Embedded	l fieldbus, wo	ord order.								
		-	.6-bit registers o	f 32-bit p	arameters a	re transfer	red. For ea	ch register,			
			he high order by					•			
	Note: Char	nges to 58.34	Word order take	e effect a	fter the drive	e is reboot	ed or the r	new setting is			
	validated k	oy 58.06 Com	munication cont	rol.				J			
	0: HI-LO ; tl word.	ne 1 st register	r contains the hig	gh order v	word. The 2 ⁿ	^d register (ontains th	e low order			
	1: LO-HI ; th word.	ne 1 st register	contains the lov	v order w	ord. The 2 nd	register co	ontains the	high order			
	0 1		LO-HI	-	1 = 1	n	у	Parameter			
58.101	Data I/O 1	Data I/O	24	•	1		,-	1			

to 58.124

Embedded fieldbus, I/O data.

Defines the address in the drive, which the Modbus master accesses when it reads from or writes to register address 400001 ... 400024.

The master defines the type of the data (input/output). The value is transmitted in a Modbus frame consisting of two 16- bit words. If the value is 16-bit, it is transmitted in the LSW (least significant word). If the value is 32-bit, the subsequent parameter is also reserved for it and must be set to None.

Notes:

- Input means data transfer from the drive to the master (e.g., PLC).
- Output means data transfer from the master (e.g., PLC) to the drive.

Other; source selection (10 ms update).

- 0: **None**; inactive. Data I/O is disabled.
- 1: **CW 16bit**; control word (16-bit) (2 ms update). Taken from 06.09 Used main control word./Send to 06.01 Main control word.
- 2: **Ref1 16bit**; reference 1 REF1 (16-bit) (2 ms update). Taken from 03.09 EFB reference 1./Send to 03.09 EFB reference 1.
- 3: **Ref2 16bit**; reference 2 REF2 (16-bit) (2 ms update). Taken from 03.10 EFB reference 2./Send to 03.10 EFB reference 2.
- 4: SW 16bit; status word (16-bit) (2 ms update). Taken from 06.15 Main status word./NA.
- 5: Act1 16bit; actual value 1 ACT1 (16-bit) (2 ms update). Depending on 58.28 EFB act1 type./NA.
- 6: **Act2 16bit**; actual value 2 ACT2 (16-bit) (2 ms update). Depending on 58.29 EFB act2 type./NA.
- 11: **CW 32bit**; control word (32-bit) (2 ms update). Taken from 06.09 Used main control word./Send to 06.01 Main control word.
- 12: **Ref1 32bit**; reference 1 REF1 (32-bit) (2 ms update). Taken from 03.09 EFB reference 1./Send to 03.09 EFB reference 1.
- 13: **Ref2 32bit**; reference 2 REF2 (32-bit) (2 ms update). Taken from 03.10 EFB reference 2./Send to 03.10 EFB reference 2.
- 14: SW 32bit; status word (32-bit) (2 ms update). Taken from 06.15 Main status word./NA.
- 15: **Act1 32bit**; actual value 1 ACT1 (32-bit) (2 ms update). Depending on 58.28 EFB act1 type./NA.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	16: Act2 32bit; actual vitype./NA. 21: CW2 16bit; control vity 24: SW2 16bit; status vity 31: RO/DIO control woword./Send to 10.99 Resident 32: AO1 data storage; status at 13.91 AO1 data storage; sto 13.92 AO2 data storage; sto 13.92 AO2 data storage./Send to 40.93 41: Setpoint data storage./Send to 40.93 storage./Send to 40.93	word 2 (16-bit) (2 yord 2 (16-bit) (2 rd; see 10.99 RO/ O/DIO control wo see 13.91 AO1 dat see 13.92 AO2 dat age. rage; see 40.91 F L Feedback data s	ms updated in the second in th	update). Der te). ee). rol word. Ta e. Taken fron e. Taken fron data storage	ken from 1 n 13.91 AO1 m 13.92 AO e. Taken fro	58.29 EFB 0.99 RO/D data stora 2 data stor om 40.91 Fe	IO control age./Send to age./Send eedback data				
	0 41	None	-	1 = 1	n	у	Parameter				

60 DDCS Communication

DDCS communication configuration.

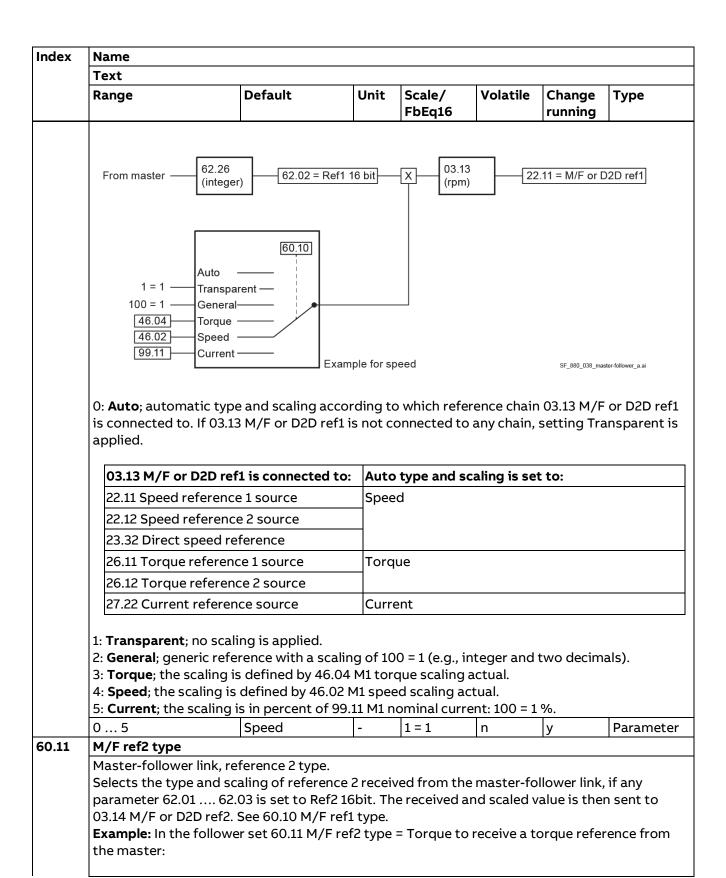
The DDCS protocol is used in the communication between:

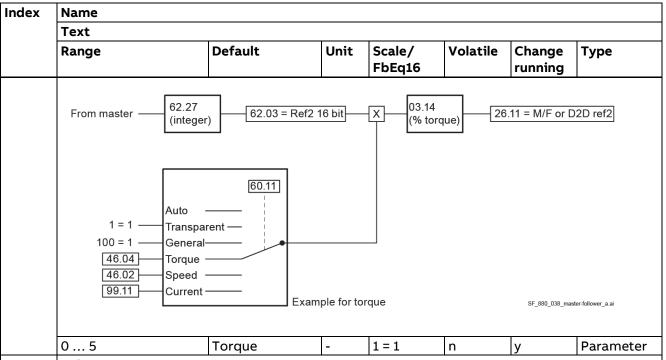
- Drives in a master-follower link configuration.
- Drives and a DDCS controller such as an AC 800M.

All of the above utilize a fiber optic link, which requires FDCO modules. Master-follower link and DDCS controller communication can also be implemented through shielded twisted-pair cable via connector XD2D (drive-to-drive link) of the drive.

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
60.01	M/F communication port											
	Selects the com 0: Not in use; no 1: Slot 1A; activ 2: Slot 2A; activ 3: Slot 3A; activ 4: Slot 1B; activ	r link, communication nmunication channel b ot in use, disable comr ates channel A on the l rates channel A on the l rates channel B on the l	etween FD munication FDCO-0x w FDCO-0x w FDCO-0x w FDCO-0x w	hich is in sl hich is in sl hich is in sl hich is in sl	ot 1. lot 2. lot 3. lot 1.	ster-follow	er link.					
	6: Slot 3B ; activ	rates channel B on the lates channel B on the lates connector XD2D.										
	0 7	Not in use	-	1 = 1	n	n	Parameter					
60.02	Defines the noon node address a Notes: – The allowab	r link, node address. de address of the drive	ster is 1.		ver link. Two		h the same					
60.03		1	-	1 - 1	11	n	rarameter					
60.03	M/F mode											

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Master-follower		,		•		•
		of the drive on the m					
	•	ot in use, disable mast					
		faster ; the drive is the	e master or	n the maste	r-follower li	nk either v	ia FDCO-0x c
	via connector XI		6 11		6 11		. =====
		Follower; the drive is a	tollower o	n the maste	er-follower l	ink either v	/ia FDCO-0x
	or via connector 3: ApplPrg Mast						
	4: ApplPrg Follo						
		forcing ; the role of the	drive on t	he master-f	ollower link	is defined	by 60 15
		nd 60.16 Force followe		ine in doce. I		is defined	Sy 00.20
	6: ApplPrg forci						
	05	Not in use	-	1 = 1	n	n	Parameter
60.05	M/F HW connec						
		link, hardware conne	ction.				
		ology of the master-fo					
	-	es are connected in a			ding of mes	sages is er	nabled. Not t
	<u>~</u> .	ng connector XD2D.		5 5	J	J	
	1: Star ; the drive	es are connected in a s	star topolo	gy, e.g., thre	ough a bran	ching unit	Forwarding
	of messages is o	disabled. To be set wh	nen using c	onnector XI	D2D.		
	Note: Set to Sta	r if the master-follow	er link is m	ade using c	onnector XI	D2D.	
	0 1	Ring	-	1 = 1	n	n	Parameter
60.08	M/F comm loss	timeout					
		link, communication					
		e delay for the master	-follower li	nk before tl	he action de	efined in 60).09 M/F
		tion is executed.	1				
	0 65535	100	ms	1 = 1 ms	n	у	Parameter
60.09	M/F comm loss	function					
	Master-follower	link, communication	loss action	(followers	only).		
		drive reacts to a mas					
	•	ne, disable communic					
		event generates warn	_			nmunicatio	n. This
	_	n the drive is controll	ed from the	e master-fo	llower link.		
	WARNING					باحجيجا محاد	
		it is safe to continue c nt generates fault 758	•				the motor
		13 Fault stop mode co					
	·	the master-follower l		.1011. 11115 00	curs orny w	incir tire ari	VC 15
		the event generates f		aster-follo	wer link cor	nmunicatio	on, and the
		e to 31.13 Fault stop n					
		n the master-follower					
	03	Fault	-	1 = 1	n	у	Parameter
60.10	M/F ref1 type		l			12	
		link, reference 1 type.					
		and scaling of refere		ved from th	e master-fo	llower link	if any
		L 62.03 is set to Re					-
	·						
	03.13 M/F or D2	D ref1.					
	· ·	D ref1. follower set 60.10 M/	F ref1 type	= Speed to	receive a sp	oeed refere	ence from the



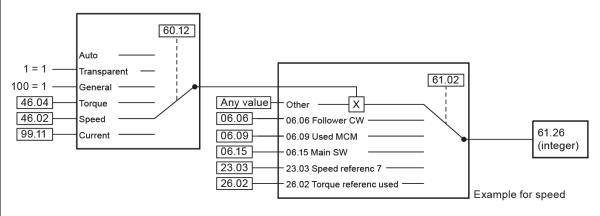


60.12 M/F act1 type

Master-follower link, actual value 1 type.

Selects the transmit type and scaling if 61.02 M/F data 2 selection = Other.

Example: In the follower set 60.12 M/F act1 type = Speed to send a speed feedback to the master:



SF 880 038 master-follower b.ai

- 0: **Auto**; type/source and scaling follow the type of reference 1 selected by 60.10 M/F ref1 type. For individual settings see below.
- 1: **Transparent**; no scaling is applied. The 16-bit scaling is 1 = 1 unit. Only valid for 61.02 M/F data 2 selection = Other.
- 2: **General**; generic actual value with a scaling of 100 = 1 (e.g., integer and two decimals). Only valid for 61.02 M/F data 2 selection = Other.
- 3: **Torque**; the scaling is defined by 46.04 M1 torque scaling actual. Only valid for 61.02 M/F data 2 selection = Other.
- 4: **Speed**; the scaling is defined by 46.02 M1 speed scaling actual. Only valid for 61.02 M/F data 2 selection = Other.
- 5: **Current**; the scaling is in percent of 99.11 M1 nominal current. Only valid for 61.02 M/F data 2 selection = Other.

0 5	Speed	-	1 = 1	n	y	Parameter

Index Name **Text** Default Unit Scale/ Volatile Range Change **Type** FbEq16 running 60.13 M/F act2 type Master-follower link, actual value 2 type. Selects the transmit type and scaling if 61.03 M/F data 3 selection = Other. See 60.12 M/F act1 type. Example: In the follower set 60.13 M/F act2 type = Torque to send a torque feedback to the master: 60.13 Auto 1 = 1 -Transparent 61.03 100 = 1 General 46.04 Any value Torque 46.02 06.06 Speed 06 06 Follower CW 99.11 Current 06.09 61.27 06.09 Used MCM 06.15 (integer) · 06.15 Main SW 23.03 23.03 Speed referenc 7 26.02 26.02 Torque referenc used Example for torque SF_880_038_master-follower_b.ai 0 ... 5 Torque 1 = 1 n **Parameter** 60.14 M/F follower selection Master-follower link, follower supervision selection (master only). Defines the supervised followers. Reaction see 60.17 Follower fault action. Values are visible in parameters 62.28 ... 62.36. Note: Wrong setting of 60.14 M/F follower selection causes either warning A7CB Masterfollower link communication or fault 7582 Master-follower link communication depending on 60.09 M/F comm loss function. 0: Broadcast; supervision is disabled. 2: **Follower node 2**; data is read from follower node 2, supervision is enabled. 4: Follower node 3; data is read from follower node 3, supervision is enabled. 6: Follower node 2+3; data is read from followers' node 2 and 3, supervision is enabled. 8: Follower node 4; data is read from follower node 4, supervision is enabled. 10: Follower node 2+4; data is read from followers' node 2 and 4, supervision is enabled. 12: Follower node 3+4; data is read from followers' node 3 and 4, supervision is enabled. 14: Follower node 2+3+4; data is read from followers' node 2, 3 and 4, supervision is enabled. 0 ... 14 Broadcast 1 = 1 n Parameter 60.15 Force master Master-follower link, force master. When 60.03 M/F mode is set to FDCO-XD2D forcing or ApplPrg forcing, 60.15 Force master selects a source that forces the drive to be the master on the master-follower link. 0 = Drive is not the master on the master-follower link. 1 = Drive is the master on the master-follower link. Other [bit]: source selection. 0: False; 0, not the master. 1: True; 1, the master. $0 \dots 1$ **False** 1 = 1 n Parameter

Index Name Text Default Unit Scale/ Volatile Change Range Type FbEq16 running 60.16 **Force follower** Master-follower link, force follower. When 60.03 M/F mode is set to FDCO-XD2D forcing or ApplPrg forcing, 60.16 Force follower selects a source that forces the drive to be a follower on the master-follower link. 0 = Drive is not a follower on the master-follower link. 1 = Drive is a follower on the master-follower link. Other [bit]; source selection. 0: False; 0, not a follower. 1: True; 1, a follower. 0 ... 1 False 1 = 1 Parameter n У

60.17 Follower fault action

Master-follower link, follower faulty action (master only).

Selects how the master reacts to a faulty follower on the master-follower link.

- 0: **No action**; no action taken. Unaffected drives on the master-follower link will continue running.
- 1: **Warning**; the event generates warning AFE7 Follower in the master. Unaffected drives on the master-follower link will continue running.
- 2: **Fault**; the event generates fault FF7E Follower in the master and the motor(s) stop(s) according to 31.13 Fault stop mode communication.

Note: Each follower to be supervised must be configured to feed 06.15 Main status word back to the master. Thus:

- In all followers one of the three data words in parameters 61.01 ... 61.03 must be set to 06.15 Main SW.
- In the master the corresponding target parameter 62.04 ... 62.14 must be set to 06.12x Follower SW node x.

0...2 Fault - 1=1 n y Parameter

60.18 Follower enable

Master-follower link, follower enable action (master only).

Interlocks the starting of the master depending on the status of all followers on the master-follower link.

- 0: **MSW bit 0**; the master can only start if all followers are Ready to be switched on, see 06.15.b00 Main status word.
- 1: **MSW bit 1**; the master can only start if all followers are Ready to operate, see 06.15.b01 Main status word.
- 2: **MSW bits 0+1**; the master can only start if all followers are Ready to be switched on and Ready to operate, see 06.15.b00 Main status word and 06.15.b01 Main status word.
- 3: Always; the starting of the master is not interlocked by the status of any follower.
- 4: **MSW bit 12**; the master can only start if the user-definable 06.11.b12 Main status word in each follower is set. See 06.31 MSW bit 12 sel.
- 5: **MSW bits 0+12**; the master can only start if in all followers 06.11.b00 Main status word and 06.11.b12 Main status word are set.
- 6: **MSW bits 1+12**; the master can only start if in all followers 06.11.b01 Main status word and 06.11.b12 Main status word are set.

Note: Each follower to be supervised must be configured to feed 06.15 Main status word back to the master. Thus:

- In all followers one of the three data words in parameters 61.01 ... 61.03 must be set to 06.15 Main SW.
- In the master the corresponding target parameter 62.04 ... 62.14 must be set to 06.12x
 Follower SW node x.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0 6	Always	-	1 = 1	n	у	Parameter
60.19	M/F comm supervis	sion sel 1					
	reserved						
	0000h FFFFh	0000h	-	1 = 1	у	у	Parameter
60.20	M/F comm supervis	sion sel 2					
	reserved						
	0000h FFFFh	0000h	-	1 = 1	у	у	Parameter
60.23	M/F status supervis	sion sel 1					
	reserved						
	0000h FFFFh	0000h	-	1 = 1	у	у	Parameter
60.24	M/F status supervis	sion sel 2					
	reserved						
	0000h FFFFh	0000h	-	1 = 1	у	у	Parameter
60.27	M/F status supervis	sion mode sel 1	•	- U		1-	1
	reserved						
	0000h FFFFh	0000h	-	1 = 1	у	у	Parameter
60.28	M/F status supervis	sion mode sel 2	1	·I		12	
	reserved						
	0000h FFFFh	0000h	_	1 = 1	у	у	Parameter
	10000II FFFFII						
60.31						12	-
60.31	M/F wake up delay		ı				
60.31	M/F wake up delay Master-follower link	, wake-up delay.	mastei	r-follower li			lts or
60.31	M/F wake up delay Master-follower link Defines a wake-up d				nk commun	ication fau	
60.31	M/F wake up delay Master-follower link Defines a wake-up d warnings can be ger without causing nui	, wake-up delay. delay during which no nerated. This allows a sance events.	ll drives	s on the ma	nk commun ster-followe	ication fau er link to po	ower up
60.31	M/F wake up delay Master-follower link Defines a wake-up d warnings can be ger without causing nui: The master cannot s	, wake-up delay. delay during which no nerated. This allows a sance events. start until the delay is	II drives elapse	s on the ma	nk commun ster-followe	ication fau er link to po	ower up
60.31	M/F wake up delay Master-follower link Defines a wake-up d warnings can be ger without causing nui The master cannot s switched on, see 06	, wake-up delay. delay during which no nerated. This allows a sance events. start until the delay is .15.b00 Main status v	Il drives elapse vord.	on the ma	nk commun ster-followe nitored follo	ication fau er link to po	ower up eady to be
	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nuin The master cannot s switched on, see 06 0.0 180.0	, wake-up delay. delay during which no nerated. This allows a sance events. start until the delay is .15.b00 Main status v	II drives elapse	s on the ma	nk commun ster-followe	ication fau er link to po	ower up
60.31	M/F wake up delay Master-follower link Defines a wake-up d warnings can be ger without causing nui The master cannot s switched on, see 06 0.0 180.0 Extension adapter of	a, wake-up delay. Idelay during which no nerated. This allows a sance events. Istart until the delay is .15.b00 Main status v	Il drives elapse vord.	on the mand or all more	nk commun ster-followe nitored follo	ication fau er link to po wers are R	ower up eady to be
	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nuit The master cannot s switched on, see 06 0.0 180.0 Extension adapter of FEA-03 I/O extension	delay during which no herated. This allows a sance events. Start until the delay is .15.b00 Main status volume port	elapse vord. s	on the mand or all more 10 = 1 s ort.	nk commun ster-followe nitored follo	ication fau er link to po owers are R	eady to be
	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nui: The master cannot s switched on, see 06: 0.0 180.0 Extension adapter of FEA-03 I/O extension Selects the communi	delay during which no nerated. This allows a sance events. start until the delay is .15.b00 Main status value on adapter communication channel betw	Il drives s elapse vord. s ation p	on the mand or all more 10 = 1 s ort. CO-0x and	nk commun ster-followe nitored follo	ication fau er link to po owers are R	eady to be
	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nui: The master cannot s switched on, see 06: 0.0 180.0 Extension adapter of FEA-03 I/O extension Selects the communi O: Not in use; not in	delay during which no nerated. This allows a sance events. start until the delay is .15.b00 Main status value on adapter communication channel betw use, disable communic	elapse vord. s ation p reen FD	on the mand or all more 10 = 1 s ort. CO-0x and	nk commun ster-followe nitored follo n	ication fau er link to po owers are R	eady to be
	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nui: The master cannot s switched on, see 06: 0.0 180.0 Extension adapter of FEA-03 I/O extension Selects the community O: Not in use; not in 1: Slot 1A; activates	delay during which no nerated. This allows a sance events. start until the delay is .15.b00 Main status version port on adapter communication channel between the communication of the same portenancel A on the FDC	elapse vord. s ation p reen FD dication	on the mand or all more 10 = 1 s ort. CO-0x and which is in sleep	nk commun ster-followe nitored follo n FEA-03 I/O	ication fau er link to po owers are R	eady to be
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60.41	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nui: The master cannot s switched on, see 06: 0.0 180.0 Extension adapter of FEA-03 I/O extension Selects the communion Not in use; not in 1: Slot 1A; activates 2: Slot 2A; activates 3: Slot 3A; activates 4: Slot 1B; activates 5: Slot 2B; activates 6: Slot 3B; activates 0 6 DDCS controller driv	a, wake-up delay. delay during which no herated. This allows a sance events. start until the delay is .15.b00 Main status version adapter communication channel between use, disable communication channel A on the FDC channel A on the FDC channel B on the FDC cha	ation preen FD cation (O-0x w)	on the mand or all more 10 = 1 s ort. CO-0x and or all in slow in s	nk commun ster-followenitored followenitored follow	ication fau er link to po wers are R y extension a	eady to be Parameter adapter.
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60.31	M/F wake up delay Master-follower link Defines a wake-up of warnings can be ger without causing nuit The master cannot is switched on, see 06 0.0 180.0 Extension adapter of FEA-03 I/O extension Selects the commun 0: Not in use; not in 1: Slot 1A; activates 2: Slot 2A; activates 3: Slot 3A; activates 4: Slot 1B; activates 5: Slot 2B; activates 6: Slot 3B; activates 0 6 DDCS controller driv DDCS controller link In ModuleBus commun 0: ABB engineered of	delay during which no herated. This allows a sance events. start until the delay is .15.b00 Main status with 10.0 comm port In adapter communication channel between use, disable communication channel A on the FDC channel A on the FDC channel B on the FDC cha	ation preen FD vication was CO-0x wa	on the mand or all more of all more of all more of the control of	nk commun ster-followen itored followen n FEA-03 I/O ot 1. ot 2. ot 3. ot 1. ot 2. ot 3. ot 1. ot 2. ot 3.	ication fau er link to po owers are R y extension a n	eady to be Parameter adapter. Parameter andard" type.
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	Name												
	Text												
	Range	De	fault	Unit	Scale/ FbEq16	Volatile	Change running	Type					
	Selects the co	mmunication	channel betv	veen FD		DDCS contr		as an AC					
	800M).	·											
	*	not in use, co	mmunication	is disak	oled.								
	1: Slot 1A; acti												
	2: Slot 2A ; activates channel A on the FDCO-0x which is in slot 2. 3: Slot 3A ; activates channel A on the FDCO-0x which is in slot 3.												
	,												
	4: Slot 1B ; activates channel B on the FDCO-0x which is in slot 1. 5: Slot 2B ; activates channel B on the FDCO-0x which is in slot 2.												
	6: Slot 3B ; activates channel B on the FDCO-0x which is in slot 3.												
	7: XD2D ; activ			CO-OX W	VIIICII IS III SI	01 3.							
	0 7		t in use	1_	1 = 1	n	n	Paramete					
0.52	DDCS control				11-1		''	T di di liece					
J.JE	DDCS control												
	Defines the no	•		r the DC	CS controll	er Two driv	es with the	e same nod					
	address are no		or the arre to	tile DE	CS CONTROL	ci. i wo di i	CS WICH CIT	c same noa					
	DriveBus conr												
	- AC 800M v	with CI858, di	rives must be	address	sed from 1	24.							
	– AC 80, driv	ves must be a	ddressed froi	n 1 1	2.								
	Note: The	BusManager	function mus	t be dis	abled in the	DriveBus c	ontroller.						
	Optical Modul												
	 AC 800M, 	drives must b											
	– AC 800M, drives must be addressed the following way:												
	1. Mult	tiply the hunc	lreds of the po	sition v	alue by 16.								
	1. Mult 2. Add	tiply the hunc the tens and		sition v	alue by 16.	result.							
	1. Mult 2. Add	tiply the hunc	lreds of the po	sition v	alue by 16.	result.							
	1. Mult 2. Add Exar	tiply the hunc the tens and	lreds of the po	osition v osition	value by 16. value to the								
	1. Mult 2. Add Exar	tiply the hunc the tens and mples: esition value	lreds of the po ones of the p	osition vosition	value by 16. value to the								
	1. Mult 2. Add Exar	tiply the hunc the tens and mples: sition value	ones of the po	osition vosition lue by 16. value to the									
	1. Mult 2. Add Exar Po	tiply the hunc the tens and mples: sition value	60.52 DDCS 16 • 1 + 01 =	osition vosition lue by 16. value to the									
	1. Mult 2. Add Exar Po 10: 712 — AC 80 with	tiply the hund the tens and mples: esition value 1 2	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 =	control 17 124 ust be a	value by 16. value to the	dress	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult	tiply the hunce the tens and mples: esition value 1 2 h TB810 or TB tiply the hunce	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 =	control 17 124 ust be a	value by 16. value to the ler node add ddressed th value by 16.	dress ne following	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add	tiply the hunce the tens and mples: sition value 1 2 h TB810 or TB tiply the hunce the tens and	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 =	control 17 124 ust be a	value by 16. value to the ler node add ddressed th value by 16.	dress ne following	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add	tiply the hunce the tens and mples: esition value 1 2 h TB810 or TB tiply the hunce	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 =	control 17 124 ust be a	value by 16. value to the ler node add ddressed th value by 16.	dress ne following	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar	tiply the hunce the tens and mples: sition value 1 2 n TB810 or TB tiply the hunce the tens and mples:	60.52 DDCS 60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives multiple ones of the poones of the	control 17 124 ust be a osition vosition	value by 16. value to the ler node add ddressed th value by 16. value to the	dress ne following result.	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar	tiply the hund the tens and mples: sition value 1 2 h TB810 or TB tiply the hund the tens and mples:	60.52 DDCS 60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives multiple of the properties of the pr	control 17 124 ust be a position vosition vosition	value by 16. value to the ler node add ddressed th value by 16. value to the	dress ne following result.	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar	tiply the hunce the tens and mples: esition value TB810 or TB tiply the hunce the tens and mples: esition value	60.52 DDCS 16 • 1 + 01 = 1811, drives multiple ones of the point of	control 17 124 ust be a osition vosition control	value by 16. value to the ler node add ddressed th value by 16. value to the	dress ne following result.	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar	tiply the hunce the tens and mples: sition value TB810 or TB tiply the hunce the tens and mples: sition value	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives mulreds of the property ones of the property of the propert	control 17 124 ust be a osition vosition control	value by 16. value to the ler node add ddressed th value by 16. value to the	dress ne following result.	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712	tiply the hunce the tens and mples: sition value 1 2 h TB810 or TB tiply the hunce the tens and mples: sition value	60.52 DDCS 16 • 1 + 01 = 1811, drives multiple ones of the point of	control 17 124 ust be a osition vosition control	ddressed the value by 16.	ne following result.	way:						
	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712	tiply the hund the tens and mples: sition value 1 2 h TB810 or TB tiply the hund the tens and mples: sition value 1 2	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives mulreds of the poones	control 17 124 ust be a osition vosition control	value by 16. value to the ler node add ddressed th value by 16. value to the	dress ne following result.	way:	Paramete					
0.55	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712 1 254 DDCS control	tiply the hunce the tens and mples: sition value 1 2 n TB810 or TB tiply the hunce the tens and mples: sition value 1 2 ler HW conne	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives multiple ones of the point one	control 17 124 ust be a position vosition control 17 124	ddressed the value by 16.	ne following result.		Paramete					
0.55	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712 1 254 DDCS control DDCS control	tiply the hunce the tens and mples: sition value 1 2 In TB810 or TB tiply the hunce the tens and mples: sition value 1 2 In TB810 or TB tiply the hunce the tens and mples: sition value 1 2 Ier HW connections, hardw	60.52 DDCS 16 • 1 + 01 = 1811, drives multiple ones of the poones of the	control 17 124 ust be a position vosition control 17 124 -	ddressed the value by 16. value to the ddressed the value by 16. value to the der node addressed the value to the der node addressed th	ne following result.		Paramete					
0.55	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712 1 254 DDCS control Selects the to	tiply the hund the tens and mples: sition value 1 2 h TB810 or TB tiply the hund the tens and mples: sition value 1 2 ler HW conneller link, hardw pology of the	60.52 DDCS 16 • 1 + 01 = 1811, drives multiple ones of the poones of the	control 17 124 ust be a position vosition vosition control 17 124	ddressed the value by 16. value to the ddressed the value by 16. value to the derivative to the deri	dress ne following result. dress	n						
0.55	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712 1 254 DDCS control DDCS control Selects the to 0: Ring; The di	tiply the hund the tens and mples: sition value 1 2 n TB810 or TB tiply the hund the tens and mples: sition value 1 2 ler HW conneller link, hardw pology of the rives are confirmed the tens are confirmed to the tens and mples:	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives multiple ones of the properties o	control 17 124 ust be a position vosition vosition control 17 124	ddressed the value by 16. value to the ddressed the value by 16. value to the derivative to the deri	dress ne following result. dress	n ssages is e	nabled.					
0.55	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712 1 254 DDCS control DDCS control Selects the to 0: Ring; The dr 1: Star; The dr	tiply the hund the tens and mples: sition value 1 2 n TB810 or TB tiply the hund the tens and mples: sition value 1 2 ler HW conneller link, hardw pology of the rives are connives	60.52 DDCS 16 • 1 + 01 = 16 • 7 + 12 = 811, drives multiple ones of the properties o	control 17 124 ust be a position vosition vosition control 17 124	ddressed the value by 16. value to the ddressed the value by 16. value to the derivative to the deri	dress ne following result. dress	n ssages is e	nabled.					
0.55	1. Mult 2. Add Exar Po 10: 712 - AC 80 with 1. Mult 2. Add Exar Po 10: 712 1 254 DDCS control DDCS control Selects the to 0: Ring; The di	tiply the hund the tens and mples: sition value 1 2 n TB810 or TB tiply the hund the tens and mples: sition value 1 2 ler HW conneller link, hardw pology of the rives are connives	60.52 DDCS 16 • 1 + 01 = 1811, drives multiple ones of the point of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point ones of the point of the point ones of the point ones of the point of the p	control 17 124 ust be a position vosition vosition control 17 124	ddressed the value by 16. value to the ddressed the value by 16. value to the derivative to the deri	dress ne following result. dress	n ssages is e	nabled.					

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	controller comm 1: 1 Mbps ; 1 Mbit/ 2: 2 Mbps ; 2 Mbit, 4: 4 Mbps ; 4 Mbit 8: 8 Mbps ; 8 Mbit	nunication speed of t port. 's. /s. /s. /s.	the DDCS o	controller lir	nk channel s	elected by	60.51 DDCS
	18	4 Mbps	-	1 = 1	n	у	Parameter
60.58	DDCS controller of Notes: - 60.58 DDCS of interval of the - There is a 60-s delay, the con - The AC 800M communication - The sending in		s executed time shou y immedia action is di s a commu nd idle inte is differen	I. Id be set to Itely after persabled, but Inication breedervals. It from the e	at least 3 ti ower-up of communica eak. Re-esta execution in	mes the tra the drive. I ation itself blishing th terval of th	ansmit During the can be active. e
60.59	parameter Sci 0 65535	an Cycle Time (by de	_		n	у	Parameter
	0: No action; non- 1: Fault; the event 31.13 Fault stop m DDCS controller li 2: Last speed; the speed to the leve from the DDCS co using an 850 ms l WARNING Make sure that it 3: Speed reference sets the speed to drive is controlled WARNING Make sure that it 4: Fault always; the stops due to 31.13 expected from the	drive reacts to a DDC e, disable communic t generates fault 758 node communication ink. e evet generates war I the drive was opera ontroller link. The last	ation loss 1 DDCS co 1. This occur ning A7CA ting at. The t speed is 1 peration in 1 peration in 22.46 Spe 1 troller link 1 peration in 2 peration in 2 peration in 3 peration in 4 peration in 5 peration in 6 pera	function. ntroller comurs only when DDCS controls occurs or determined an case of a carning A7CA ed reference on case of a carning A7CA controls controls controls controls controls occurs on	en the drive roller commonly when the based on the communicate safe. This communicate comm	is controlled loss and for the speed for the	ed from the reezes the ontrolled eedback m loss and y when the e motor control is
	when the drive is WARNING	vent generates warni controlled from the l is safe to continue o	DDCS cont	troller link.			-

Index	Name								
Index	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	DDCS controller link, re Selects the type and so DDCS communication 0: Auto ; automatic typ is connected to. If the	caling of 03.11 DDC option module (FI e and scaling acco	OCO-0x) ording to	o which refer	rence chair	the incom	ing reference		
	03.11 DDCS controlle	er ref1 is connecte	d to:	Auto type aı	nd scaling	is set to:			
	22.11 Speed reference	e 1 source		Speed					
	22.12 Speed reference	e 2 source							
	23.32 Direct speed re	eference							
	26.11 Torque referen		,	Torque					
	26.12 Torque referen								
	27.22 Current referer			Current					
	28.18 EMF reference			General					
	28.20 EMF voltage co			Cerrerai					
	28.29 Flux correction								
	20.29 Flux Correction	isource							
	2: General ; generic refe 3: Torque ; the scaling i 4: Speed ; the scaling is 5: Current ; the scaling 0 5	s defined by 46.04 defined by 46.02	M1 tor M1 spe	que scaling a ed scaling ac	actual. tual.		Parameter		
60.61	DDCS controller ref2 t		1			17			
	DDCS controller link, re Selects the type and so DDCS communication 0 5	aling of 03.12 DD0							
60.62	DDCS controller act1 t	ype	1	-			1		
	DDCS controller act1 type DDCS controller link, actual value 1 type. Selects the type/source and scaling of actual value 1 sent by a DDCS communication option module (FDCO-0x) to the DDCS controller. O: Auto; type/source and scaling follow the type of reference 1 selected by 60.60 DDCS controller ref1 type. For individual settings see below. 1: Transparent; no scaling is applied. The 16-bit scaling is 1 = 1 unit. 2: General; generic actual value with a scaling of 100 = 1 (e.g., integer and two decimals). 3: Torque; 01.17 Motor torque filtered is sent as actual value 1. The scaling is defined by 46.0 M1 torque scaling actual. 4: Speed; 01.01 Used motor speed filtered is sent as actual value 1. The scaling is defined by 46.0 M1 speed scaling actual. 5: Current; 27.05 Motor current is sent as actual value 1. The scaling is in percent of 99.11 M nominal current.								
60.55	05	Auto	-	1 = 1	n	у	Parameter		
60.63	DDCS controller act2 t								
	DDCS controller link, ac Selects the type/sourc module (FDCO-0x) to t	e and scaling of a		-			ion option		

Index	Name	Name											
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	05 Auto - 1=1 n y Para												
60.64	Mailbox data s	et selection					•						
	Selects the pair chapter DDCS of 0: Data set 32/	r link, mailbox data se of data sets used by controller interface. 33; data sets 32 and 3 25; Data sets 24 and 2	the mailbox 3 are dedica	x service in a	mailbox se	rvice.	nk. See						
	0 1	Data set 32/3	33 -	1 = 1	n	у	Parameter						
60.104	DT comm port												
	reserved												
	0 14	Not in use	-	1 = 1	n	n	Parameter						

61 D2D and DDCS transmit data

Defines the data sent from the drive to the DDCS/D2D link.

Note: 32-bit values require two consecutive parameters. Whenever a 32-bit value is selected in a data parameter, the next parameter is automatically reserved.

Index	Name										
inaex	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
61.01	M/F data 1 selection										
	Select data 61.25 M/F of Other; sour 0: None; ina 1542: 06.06 followers. 1545: 06.09 1551: 06.15 5891: 23.03 followers.	ce selection.	Follower controlsed main controlstatus word. U	e master-foll ol word. Usu ol word. Isually sent f erence 7. Usi	ally sent fro from the follually sent fro	om the mas lowers to t om the ma	ter to the he master. ster to the				
	to the follow	wers. 06.06 Follower C	w -	1 = 1	n	у	Parameter				
61.02	M/F data 2		vv -	1 - 1	111	У	Parameter				
	Select data 61.26 M/F c	Master-follower link, data 2 from the drive to the master-follower link. Select data sent as word 2 from the drive to the master-follower link. The value is visible in 61.26 M/F data 2 value. See 61.01 M/F data 1 selection.									
61.03		0 6658 23.03 Speed reference 7 - 1 = 1 n y Parameter M/F data 3 selection									
	Master-follo Select data 61.27 M/F d										
		lused									
61.25	M/F data 1	1									

Index	Name												
	Text												
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре						
	Master-follow	ver link, data 1 value from	the drive	to the maste	er-follower	link.	1						
	Shows the val	ue sent as word 1 to the n	naster-fo	llower link as	s integer.								
	If no data has	f no data has been preselected by 61.01 M/F data 1 selection, the value to be sent can be written directly into 61.25 M/F data 1 value.											
	written direct	ly into 61.25 M/F data 1 va	alue.										
	0 65535	0	-	1 = 1	у	n	Signal						
61.26	M/F data 2 va	lue	•	•									
	Master-follow	er link, data 2 value from	the drive	to the maste	er-follower	link.							
	Shows the val	ue sent as word 2 to the r	naster-fo	ollower link a	s integer.								
	If no data has	been preselected by 61.0	2 M/F da	ta 2 selectio	n, the value	to be sent	t can be						
	written direct	ly into 61.26 M/F data 2 va	alue.										
	0 65535	0	-	1 = 1	у	n	Signal						
61.27	M/F data 3 va	lue		•	•	•	•						
	Master-follow	er link, data 3 value from	the drive	to the maste	er-follower	link.							
	Shows the val	ue sent as word 3 to the r	naster-fo	ollower link a	s integer.								
	If no data has	been preselected by 61.0	3 M/F da	ta 3 selectio	n, the value	to be sent	t can be						
	written direct	ly into 61.27 M/F data 3 va	alue.										
	0 65535	0	-	1 = 1	у	n	Signal						
	Parameters 6	1.45 61.50 select data s	ent from	the drive, in	data sets i	and 4, to	the DDCS						
		ese data sets are used in d											
	ABB standard	drive.											
	Signals 61.95	61.100 display the data	to be se	nt to the DD	CS controll	er in intege	er format. If						
	no data has b	een preselected, the value	to be se	ent can be wr	itten direc	tly into the	se signals.						
	Example: 61.4	5 Data set 2 data 1 selecti	on prese	lects the dat	a for data	set 2 word	1. 61.95 Data						
		alue displays the selected		_		•	ected, the						
		nt can be written directly	into 61.9	5 Data set 2	data 1 valu	e.							
61.45	Data set 2 da	ta 1 selection											
		ler link, data set 2 data 1 f											
	Select data se	ent as data set 2 data 1 fro	m the dr	ive to the DD	CS contro	ller link. Th	e value is						
		5 Data set 2 data 1 value.											
	Other; source												
		ive. Disable DDCS control											
		tatus word (16-bit). Taken											
		actual value 1 ACT1 (16-bit		_			• •						
		actual value 2 ACT2 (16-bi	t). Deper				, ,,						
	06	None	-	1 = 1	n	У	Parameter						
61.46	Data set 2 da												
		ler link, data set 2 data 2 f											
		ent as data set 2 data 2 fro				_	e value 1s						
		6 Data set 2 data 2 value. 9	See 61.45		1		T ₌ .						
	0 6	None	<u> -</u>	1 = 1	n	у	Parameter						
61.47	Data set 2 da	ta 3 selection Data set	4 data 3	selection									
to 61.50													
	See 61.45 Dat	a set 2 data 1 selection.											
	0 6	None	-	1 = 1	n	у	Parameter						
	Parameters 6	1.51 61.74 select data se	ent from	the drive, in	data sets 1	1, 13, 15, 17	, 19, 21, 23						
	and 25, to the	DDCS controller. These d	ata sets	are used in c	ommunica	tion with 6	0.50 DDCS						
	controller driv	ve type = ABB engineered	drive.										

Index	Name										
	Text	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	The update	The update intervals of the data sets are as follows:									
	 Data set 	s 10 and 11: 2 ms.									
		s 12 and 13: 4 ms.									
		s 14 17: 10 ms.									
		s 18 25, 32 and 33: 10									
	Signals 61.101 61.124 display the data to be sent to the DDCS controller in integer format. I										
	no data has been preselected, the value to be sent can be written directly into these signals Example: 61.51 Data set 11 data 1 selection preselects the data for data set 11 word 1. 61.101 Data set 11 data 1 value displays the selected data in integer format. If no data is preselecte										
		be sent can be written		_		-	Ji eselectea,				
61.51	+	data 1 selection	directly into	OI.IOI Data	set II data	ı value.					
61.51			1 £	ماله ماد ماداد	DDCC	امال میں اڈسار					
		oller link, data set 11 da [.] sent as data set 11 data					ao valuo is				
		101 Data set 11 data 1 v		inve to the L	DC3 COITH	JIIEI IIIIK. II	ie value is				
		ce selection.	aide.								
	-	ctive. Disable DDCS cor	ntroller link d	ata in.							
	-	status word (16-bit). Ta			tus word.						
	-	t ; actual value 1 ACT1 (1				ntroller act	1 type.				
	6: Act2 16bi	t ; actual value 2 ACT2 (1	6-bit). Depe	nding on 60.	63 DDCS co	ontroller ac	t2 type.				
	0 6	None	-	1 = 1	n	у	Parameter				
61.52	Data set 11	data 2 selection			l .						
	DDCS contro	oller link, data set 11 da	ta 2 from the	drive to the	DDCS conf	troller link.					
		sent as data set 11 data					he value is				
	visible in 61.	102 Data set 11 data 2 v	alue. See 61.	51 Data set 1	l1 data 1 sel	lection.					
	0 6	None	-	1 = 1	n	у	Parameter				
61.53	Data set 11	data 3 selection Dat	a set 25 data	a 3 selection		•					
to											
61.74											
	See 61.51 Da	ita set 11 data 1 selectio	n.								
	0 6	None	-	1 = 1	n	у	Parameter				
61.95	Data set 2 d	lata 1 value	•		L.	1-					
	DDCS contro	oller link, data set 2 dat	a 1 from the	drive to the	DDCS contr	oller link.					
		alue sent as data set 2									
	If no data ha	as been preselected by	61.45 Data s	et 2 data 1 se	election, the	e value to b	e sent can be				
	written dire	ctly into 61.95 Data set	2 data 1 valu	e.							
	0 65535	0	-	1 = 1	у	n	Signal				
61.96	Data set 2 d	lata 2 value									
	DDCS contro	oller link, data set 2 dat	a 2 from the	drive to the	DDCS conti	roller link.					
	Shows the value sent as data set 2 data 2 to the DDCS controller link as integer.										
	If no data has been preselected by 61.46 Data set 2 data 2 selection, the value to be sent can be										
	written dire	ctly into 61.96 Data set	2 data 2 valu	e.							
	0 65535	0	-	1 = 1	у	n	Signal				
61.97	Data set 2 d	lata 3 value Data set	4 data 3 val	ue							
to											
61.100	0										
	See 61.95 Da	ata set 2 data 1 value.									
	0 65535	0	-	1 = 1	у	n	Signal				

Index	Name										
	Text										
	Range Default Unit Scale/ Volatile Change Type FbEq16										
	DDCS contro	ller link, data set 11 data 1	from the	drive to the	DDCS cont	roller link.					
	Shows the value sent as data set 11 data 1 to the DDCS controller link as integer.										
	If no data ha	s been preselected by 61.5	1 Data se	t 11 data 1 s	election, th	e value to l	oe sent can				
	be written di	rectly into 61.101 Data set	11 data 1	value.							
61.102	0 65535 0 - 1 = 1 y n Signal										
	Data set 11 data 2 value										
	DDCS controller link, data set 11 data 2 from the drive to the DDCS controller link.										
	Shows the value sent as data set 11 data 2 to the DDCS controller link as integer.										
	If no data has been preselected by 61.52 Data set 11 data 2 selection, the value to be sent can										
	be written directly into 61.102 Data set 11 data 2 value.										
	0 65535	0	-	1 = 1	у	n	Signal				
51.103 Data set 11 data 3 value Data set 25 data 3 value											
ю.											
51.124											
	See 61.101 Da	See 61.101 Data set 11 data 1 value.									
	0 65535	0	-	1 = 1	٧	n	Signal				

62 D2D and DDCS receive data

Defines the data sent from the DDCS/D2D link to the drive.

Note: 32-bit values require two consecutive parameters. Whenever a 32-bit value is selected in a data parameter, the next parameter is automatically reserved.

Index	Name Text										
	62.01	M/F data 1 selection									
	only). Select data ser is visible in 62. Other; source 0: None; inacti 1: CW 16bit; cc 2: Ref1 16bit; r by 60.10 M/F r	ve. ontrol word (16-bit). Se eference REF1 (16-bit) ef1 type. eference REF2 (16-bit)	master via end to 06.0). Send to 0	master-follo 7 Follower co 3.13 M/F or I	ower link to to ontrol word D2D ref1. Ty	the followe received. pe and sca	rs. The value				
62.02	M/F data 2 selection										
	Master-follower link, data 2 from the master via master-follower link to the followers (followers only). Select data sent as word 2 from the master via master-follower link to the followers. The value is visible in 62.26 M/F data 2 value. See 62.01 M/F data 1 selection.										
	0 3	Ref1 16bit	-	1 = 1	n	у	Parameter				
62.03	M/F data 3 se					.1. 6.11					
	Master-follower link, data 3 from the master via master-follower link to the followers (followers only).										

Index	Name							
Index	Text							
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
			d 3 from the mas ata 3 value. See 6				the followe	rs. The value
	0 3	Ref	2 16bit	-	1 = 1	n	у	Parameter
62.04	Follower nod	e 2 data 1	sel					
	only). Select data so value is visibl Other; source 0: None; inact 26: 06.122 Fo	ent as wor e in 62.28 e selection tive. Ilower SW	nta 1 from follower of 1 from follower Follower node 2 of . node 2; follower node 2 and sent	r node 2 data 1 va	via master-f alue. word node 2	follower link (16-bit). 06	to the ma	ster. The
	0 26		L22 Follower SW le 2	-	1 = 1	n	у	Parameter
62.05	Follower nod	e 2 data 2	sel	1	1	1	1	1
	(master only) Select data se	ent as wor	ata 2 from followerd 2 from follower node 2 from	r node 2	via master-	follower linl	k to the ma	ster. The
52.06	Follower nod				1	1	J	rarameter
	(master only) Select data se	ent as wor	ta 3 from follow d 3 from followe Follower node 2	r node 2	via master-	follower linl	k to the ma	ster. The
62.07	Follower nod	e 3 data 1	sel					
	only). Select data so value is visibl Other; source 0: None; inact 26: 06.123 Fo	ent as wor e in 62.31 l e selection tive. Ilower SW n follower ole.	node 3; follower node 3 and sent 123 Follower SW	r node 3 data 1 va status v to 06.12	via master-f llue. word node 3	follower link (16-bit). 06	to the ma	ster. The
62.08	Follower nod							
2.30	Master-follov (master only) Select data se	ver link, da ent as wor	ta 2 from follow d 2 from followe Follower node 3 (r node 3	via master-	follower linl	k to the ma	ster. The
62.00					1-1	1"	У	raiaiiieter
62.09	Master-follov (master only)	ver link, da	ita 3 from follow	er node	3 via master	-follower lir	nk to the m	aster

Index	Name								
	Text								
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре	
	Select data sent								
	value is visible in	62.33	Follower node 3 o	data 3 val	ue. See 62.0	7 Follower	node 3 da	ta 1 sel.	
	0 26	Nor	ne	-	1 = 1	n	у	Parameter	
62.10	Follower node 4	data 1	sel						
	Master-follower (master only). Select data sent value is visible in Other; source se 0: None; inactive 26: 06.124 Follower enable.	as wor 62.34 election e. wer SW	d 1 from follower Follower node 4	r node 4 val data 1 val	via master-f ue. vord node 4	ollower link (16-bit). 06	c to the ma	aster. The tatus word	
	0 26		124 Follower SW	-	1 = 1	n	у	Parameter	
62.11	Follower node 4	1				1	1		
	Master-follower (master only). Select data sent value is visible in	as wor 62.35	d 2 from followe Follower node 4 (r node 4 v	via master-f lue. See 62.1	ollower linl 0 Follower	k to the ma	aster. The ta 1 sel.	
52.12	0 26 Follower node 4	Nor		-	1 = 1	n	У	Parameter	
	(master only). Select data sent value is visible in 0 26		Follower node 4						
62.25	M/F data 1 value								
	Master-follower (followers only). Shows the value integer by 62.01 0 65535	link, da	s word 1 from the	e master	via master-f	ollower lin	k to the fol	llowers as	
62.26	M/F data 2 value	2		l	l .		- I		
	Master-follower link, data 2 value from the master via master-follower link to the followers (followers only). Shows the value sent as word 2 from the master via master-follower link to the followers as integer by 62.02 M/F data 2 selection. Can also be used as source by other parameters.								
62.27	0 65535 M/F data 3 value	0		[-	1 = 1	У	n	Signal	
OE.E I	Master-follower (followers only). Shows the value integer by 62.03 0 65535	link, da	s word 3 from the	e master	via master-1	follower lin ource by ot	k to the fo	llowers as	
62.28	Follower node 2		value		1 - 1	У	111	Jigilai	
UL.LÖ	Master-follower (master only).			ollower n	ode 2 via ma	aster-follov	wer link to	the master	

Index	Name											
muex	Text											
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Shows the va	lue sent as	word 1 from f	ollower no	ode 2 via ma	ster-follow	er link to th	e master as				
	integer by 62	.04 Follow	er node 2 data	1 sel. Can	also be used	d as source	by other pa	arameters.				
	0 65535	0		-	1 = 1	у	n	Signal				
52.29	Follower node 2 data 2 value											
	Master-follov	Master-follower link, data 2 value from follower node 2 via master-follower link to the master										
	(master only)											
			s word 2 from f									
		.05 Follow	er node 2 data	2 sel. Can	also be used	d as source	by other p					
	0 65535	0		-	1 = 1	У	n	Signal				
2.30	Follower nod	e 2 data 3	value									
	Master-follov	ver link, da	ita 3 value from	follower	node 2 via m	aster-follo	wer link to	the master				
	(master only)											
			s word 3 from f									
			er node 2 data	3 sel. Can	1	1	by other p	1				
	0 65535	0		-	1 = 1	У	n	Signal				
2.31	Follower nod											
		-	ita 1 value from	follower	node 3 via m	aster-follo	wer link to	the master				
	(master only)											
			s word 1 from f									
			er node 3 data	ı sei. Can								
	0 65535	0		-	1 = 1	У	n	Signal				
2.32	Follower nod											
	Master-follower link, data 2 value from follower node 3 via master-follower link to the master											
	(master only). Shows the value sent as word 2 from follower node 3 via master-follower link to the master as											
	0 65535		er node 3 data	Z Sei. Cari	1	1	 	1				
2 22		0		-	1 = 1	у	n	Signal				
2.33	Follower nod			6 11								
			ita 3 value from	itollower	node 3 via m	aster-follo	wer link to	tne master				
	(master only)		sward 2 fram f	allower n	ada 2 via ma	ctor follow	or link to th	o master a				
		Shows the value sent as word 3 from follower node 3 via master-follower link to the master as integer by 62.09 Follower node 3 data 3 sel. Can also be used as source by other parameters.										
	0 65535	0	er node 5 data	J Sei. Cari	1 = 1		n	Signal				
2.34	Follower nod		value	-	1-1	У	11	Signal				
2.34				£ - II								
	Master-follower link, data 1 value from follower node 4 via master-follower link to the master											
	(master only)		s word 1 from f	ollower ne	odo 4 via ma	stor-follow	or link to th	o master as				
			er node 4 data									
	0 65535	0	er node + data		1 = 1	y	n	Signal				
2.35	Follower nod		value		1-1	У	11	Signal				
2.33				fallannan		a a ban ƙalla		+				
			ita 2 value from	Tollower	node 4 via m	iaster-rollo	wer link to	the master				
	(master only)		s word 2 from f	allower n	ada 4 via ma	stor follow	or link to th	o master a				
			er node 4 data 2									
	0 65535	0	a noue 4 data	_ Sei. Cail	1 = 1		1					
2 26			value		1-1	у	n	Signal				
2.36	Follower nod			C 11			1	.1 :				
		•	ita 3 value from	tollower	node 4 via m	naster-follo	wer link to	tne master				
	(master only)	•										

	Name									
Index	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Shows the value se	ent as word 3 from	follower n	ode 4 via ma	aster-follow	er link to tl	he master as			
	integer by 62.12 Fo	ollower node 4 data	a 3 sel. Can	also be use	d as source	by other pa	arameters.			
	0 65535	0	-	1 = 1	у	n	Signal			
62.37	M/F communication	on status 1								
	reserved									
	0000h FFFFh	-	-	1 = 1	у	n	Signal			
62.38	M/F communication	on status 2	l .	•		- I	<u> </u>			
	reserved									
	0000h FFFFh	_	_	1 = 1	у	n	Signal			
62.41	M/F follower read	v status 1				1	19			
	reserved	<i>,</i>								
	0000h FFFFh			1 = 1	у	n	Signal			
62.41	M/F follower read	v status 2		11-1	У		Joignai			
UL.71	reserved	y status L								
	0000h FFFFh			1 = 1		T _n	Teignal			
		C2.50 a ala at taur	- 		y o al fu a va tha	n DDCC	Signal			
•	Parameters 62.45	•	-							
	sets 1 and 3. These = ABB standard dr		a in comm	unication wi	th 60.50 DL	CS Control	lier drive type			
	Signals 62.95 62		ata rocoivo	d from the D	DCS contro	aller in inte	ger format			
	and can also be us				DC3 COILLIC		gerionnac			
		_	•	iccci 5.						
	Example: 04.45 Da	ta set 1 data 1 sele	ection selec	ts a target f	or data set	1 data 1. Th	nen 62.95			
	-	ta set 1 data 1 sele alue displavs the re		_						
	Data set 1 data 1 va	alue displays the re		_						
62.45	-	alue displays the re trameters.		_						
62.45	Data set 1 data 1 va source by other pa Data set 1 data 1 s	alue displays the re trameters. selection	eceived da	ta in integer	format and	can also b	e used as a			
62.45	Data set 1 data 1 va	alue displays the re trameters. selection	eceived da	ta in integer	format and	can also b	e used as a			
62.45	Data set 1 data 1 va source by other pa Data set 1 data 1 s DDCS controller lir	alue displays the re trameters. selection nk, data set 1 data	eceived da	DDCS contro	format and	CS controll	er link to the			
62.45	Data set 1 data 1 vasource by other pa Data set 1 data 1 s DDCS controller lindrive.	alue displays the re trameters. selection nk, data set 1 data s data set 1 data 1 t	eceived da 1 from the from the D	DDCS control	format and	CS controll	er link to the			
62.45	Data set 1 data 1 vasource by other pa Data set 1 data 1 s DDCS controller lindrive. Select data sent as	alue displays the re trameters. selection nk, data set 1 data s data set 1 data 1 data visible in 62.95 Dat	eceived da 1 from the from the D	DDCS control	format and	CS controll	er link to the			
62.45	Data set 1 data 1 vasource by other pa Data set 1 data 1 s DDCS controller lindrive. Select data sent as drive. The value is s Other; source select o: None; inactive.	alue displays the re trameters. selection nk, data set 1 data s data set 1 data 1 data 1 data visible in 62.95 Dat ction. Disable DDCS cont	1 from the from the D ta set 1 dat	DDCS control DCS control a 1 value.	oller via DDCS	CS controll	er link to the			
62.45	Data set 1 data 1 vasource by other pa Data set 1 data 1 s DDCS controller lindrive. Select data sent as drive. The value is s Other; source select o: None; inactive. It: CW 16bit; controller lindrive.	alue displays the retrameters. selection nk, data set 1 data s data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Se	1 from the from the D ta set 1 dat roller link c nd to 06.11	DDCS control a 1 value. lata out. 0 DDCS con	oller via DDC ler via DDCS	CS controller	er link to the			
62.45	Data set 1 data 1 vasource by other pa Data set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 drive. Select data sent as drive. The value is set 1 data 1 set 1 data 1 set 1 s	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Seence REF1 (16-bit).	1 from the from the D ta set 1 dat roller link c and to 06.11	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con	format and oller via DDC der v	CS controller 1.	er link to the			
62.45	Data set 1 data 1 vasource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data sent as drive. The value is set 1 Other; source select 0: None; inactive. It CW 16bit; control 2: Ref1 16bit; refer 3: Ref2 16bit; refer	alue displays the re trameters. selection nk, data set 1 data s data set 1 data 1 data 1 data visible in 62.95 Data ction. Disable DDCS control word (16-bit). Se ence REF1 (16-bit).	1 from the from the D ta set 1 dat roller link c and to 06.11	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS co	oller via DDCs trol word. ontroller ref	CS controller CS controller	er link to the			
	Data set 1 data 1 vasource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data sent as drive. The value is set 1 data sent as drive. The value is set 1 data sent as drive. The value is set 1 data sent as drive. The value is set 1 set 1 data 1 data 1 set 1 data 1 data 1 set 1 data 1 set 1 data 1 data 1 set 1 data 1 data 1 set 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 data 1 da	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). None	1 from the from the D ta set 1 dat roller link c and to 06.11	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con	format and oller via DDC der v	CS controller 1.	er link to the			
	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Selence REF2 (16-bit). None selection	1 from the from the D ta set 1 dat roller link c and to 06.11 . Send to 0 . Send to 0	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co	format and oller via DDCS trol word. ontroller refontroller refontroller ref	CS controller 1. 2.	er link to the link to the			
	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Selence REF2 (16-bit). None selection	1 from the from the D ta set 1 dat roller link c and to 06.11 . Send to 0 . Send to 0	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co	format and oller via DDCS trol word. ontroller refontroller refontroller ref	CS controller 1. 2.	er link to the link to the			
62.45	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Tence REF2 (16-bit) None selection nk, data set 1 data	1 from the from the D ta set 1 dat roller link c and to 06.11 . Send to 0 . Send to 0	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS co 3.12 DDCS co 1 = 1	oller via DDCs trol word. ontroller refontroller ref	CS controller 1. 22. y CS controll	er link to the link to the Parameter er link to the			
	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 1 data 2 set 2 data set 3 da	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Seence REF1 (16-bit). Seence REF2 (16-bit). None selection nk, data set 1 data 2 sedata set 1 data 2	1 from the from the D ta set 1 dat roller link c and to 06.11 . Send to 0 . Send to 0	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS co 3.12 DDCS co 1 = 1 DDCS control	trol word. ontroller refontroller CS controller 1. 22. Y CS controller 6 controller	er link to the Parameter er link to the				
	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Tence REF2 (16-bit) None selection nk, data set 1 data 2 visible in 62.96 Date ction.	1 from the from the D ta set 1 dat roller link c and to 06.11 . Send to 0 . Send to 0	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co 1 = 1 DDCS control a 2 value. Se	trol word. ontroller refontroller refontroller via DDC	CS controller 1. 2. y CS controller 5 controller 6 controller 6 controller	er link to the Parameter er link to the r link to the at 1 selection.			
62.46	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data 3 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Vence REF2 (16-bit) None selection nk, data set 1 data 2 visible in 62.96 Date None	1 from the from the D ta set 1 dat roller link c nd to 06.11 . Send to 0 . Send to 0 . The company of the D ta set 1 dat from the D ta set 1 dat -	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co 1 = 1 DDCS control a 2 value. Se 1 = 1	trol word. ontroller refontroller CS controller 1. 22. Y CS controller 6 controller	er link to the Parameter er link to the				
62.46	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Vence REF2 (16-bit) None selection nk, data set 1 data 2 visible in 62.96 Date None	1 from the from the D ta set 1 dat roller link c nd to 06.11 . Send to 0 . Send to 0 . The company of the D ta set 1 dat from the D ta set 1 dat -	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co 1 = 1 DDCS control a 2 value. Se 1 = 1	trol word. ontroller refontroller refontroller via DDC	CS controller 1. 2. y CS controller 5 controller 6 controller 6 controller	er link to the Parameter er link to the r link to the at 1 selection.			
62.46 62.47 to	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data 3 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). Vence REF2 (16-bit) None selection nk, data set 1 data 2 visible in 62.96 Date None	1 from the from the D ta set 1 dat roller link c nd to 06.11 . Send to 0 . Send to 0 . The company of the D ta set 1 dat from the D ta set 1 dat -	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co 1 = 1 DDCS control a 2 value. Se 1 = 1	trol word. ontroller refontroller refontroller via DDC	CS controller 1. 2. y CS controller 5 controller 6 controller 6 controller	er link to the Parameter er link to the r link to the at 1 selection.			
62.46 62.47 to	Data set 1 data 1 vasource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 2 set 1 data 3 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). None selection nk, data set 1 data 2 visible in 62.96 Date None selection Data selection Data selection Data	1 from the from the D ta set 1 dat roller link c and to 06.11 Send to 0 - 2 from the from the D ta set 1 dat - set 3 data 3	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co 1 = 1 DDCS control a 2 value. Se 1 = 1	trol word. ontroller refontroller refontroller via DDC	CS controller 1. 2. y CS controller 5 controller 6 controller 6 controller	er link to the Parameter er link to the r link to the at 1 selection.			
	Data set 1 data 1 visource by other paraset 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 1 set 1 data 2 set 1 data 3 set	alue displays the retrameters. selection nk, data set 1 data 1 visible in 62.95 Date ction. Disable DDCS control word (16-bit). Selence REF1 (16-bit). None selection nk, data set 1 data 2 visible in 62.96 Date None selection Data selection Data selection Data	1 from the from the D ta set 1 dat roller link c and to 06.11 Send to 0 - 2 from the from the D ta set 1 dat - set 3 data 3	DDCS control a 1 value. lata out. 0 DDCS con 3.11 DDCS con 3.12 DDCS co 1 = 1 DDCS control a 2 value. Se 1 = 1	trol word. ontroller refontroller refontroller via DDC	CS controller 1. 2. y CS controller 5 controller 6 controller 6 controller	er link to the Parameter er link to the r link to the at 1 selection.			

Index	Name Toyt										
62.51	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Parameters 62.51 63 sets 10, 12, 14, 16, 18, 25 DDCS controller drive The update intervals 62 — Data sets 10 and 13 — Data sets 12 and 13 — Data sets 14 17: — Data sets 18 25, Signals 62.101 62.12 and can also be used a Example: 62.51 Data s Data set 10 data 1 valuations of the parameter of the	20, 22 and 24. The type = ABB engin of the data sets a 1: 2 ms. 3: 4 ms. 10 ms. 32 and 33: 100 m 4 display the data as sources by other 10 data 1 selection eters.	ese data s neered dri re as follo ns. a receive ner param rtion selec ceived da	data receive ets are used ve. ows: d from the D eters. cts a target f ita in integer	DCS contro	DDCS connication wi	ger format Then 62.101 be used as a				
	DDCS controller link, of drive. Select data sent as dad drive. The value is visil Other; source selection O: None; inactive. Disate: CW 16bit; control with 2: Ref1 16bit; reference 3: Ref2 16bit; reference of the drive.	ta set 10 data 1 f ble in 62.101 Data n. ble DDCS contro ord (16-bit). Senc e REF1 (16-bit). S e REF2 (16-bit). S	rom the I set 10 da ller link da d to 06.11 end to 03	DDCS contro ata 1 value. ata out. DDCS cont .11 DDCS co 3.12 DDCS co	ller via DDC rol word. ntroller ref	CS controlle 1. 2.	er link to the				
62.52	0 3 Data set 10 data 2 sel	None	-	1 = 1	n	У	Parameter				
	DDCS controller link, of drive. Select data sent as da drive. The value is visil selection. 0 3	lata set 10 data 2 ta set 10 data 2 f	rom the [DCS contro	ller via DD0	CS controlle	er link to the				
62.53	Data set 10 data 3 sel		et 24 data	3 selection		13					
to 62.74	Data set 10 data 3 selection Data set 24 data 3 selection										
	See 62.51 Data set 10 (data 1 selection									
	0 3	None	_	1 = 1	n	у	Parameter				
62.95	1 1111		1	<u> </u>	1	ال	, a. a.i.ietti				
JL. 33	Data set 1 data 1 value DDCS controller link, data set 1 data 1 from the DDCS controller via DDCS controller link to the drive. Shows the value sent as data set 1 data 1 from the DDCS controller via DDCS controller link to the drive as integer by 62.45 Data set 1 data 1 selection. Can also be used as source by other parameters.										
	0 65535	0	-	1 = 1	у	n	Signal				
62.96	Data set 1 data 2 value DDCS controller link, or drive. Shows the value sent at the drive as integer by parameters.	lata set 1 data 2 f as data set 1 data	a 2 from t	he DDCS cor	ntroller via	DDCS cont	roller link to				

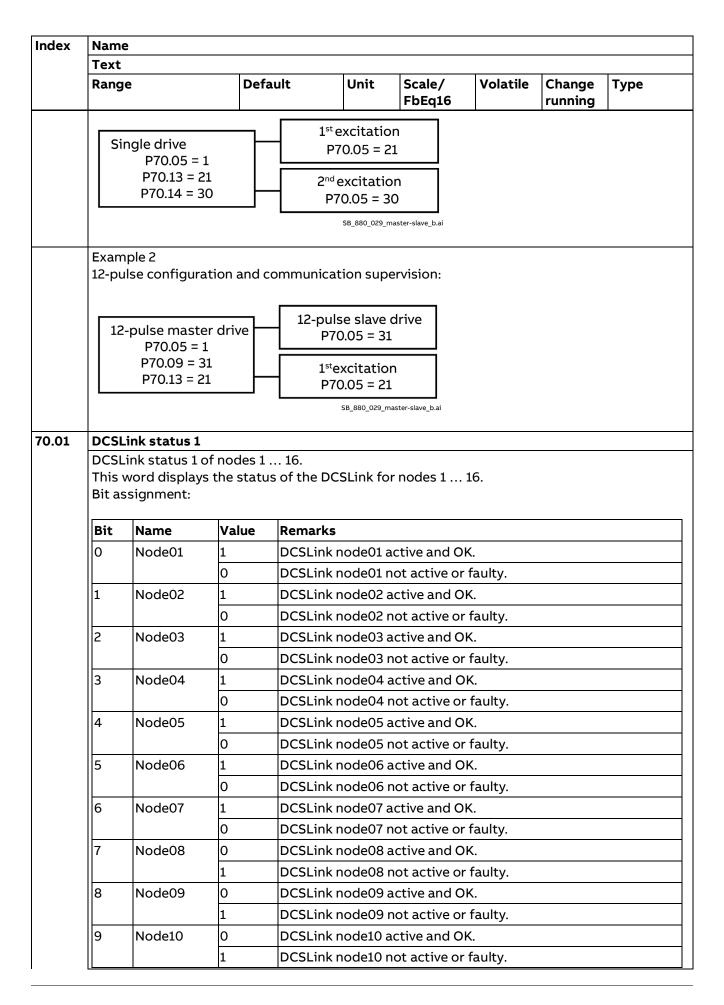
Index	Name									
Index	Text									
	Range		Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	0 65535		0	-	1 = 1	у	n	Signal		
62.97 to 62.100	Data set 1 dat	a 3 value	Data set 3	data 3 val	ue					
	See 62.95 Data	a set 1 da	ta 1 value.							
	0 65535	0		-	1 = 1	у	n	Signal		
62.101	Data set 10 da	ta 1 valu	е				•	•		
	drive. Shows the valuation drive as in parameters. 0 65535									
62.102		ta 2 valu			+ +	J	'''	Joignai		
	Data set 10 data 2 value DDCS controller link, data set 10 data 2 from the DDCS controller via DDCS controller link to drive. Shows the value sent as data set 10 data 2 from the DDCS controller via DDCS controller link the drive as integer by 62.52 Data set 10 data 2 selection. Can also be used as source by other parameters.									
	0 65535		0	-	1 = 1	у	n	Signal		
62.102 to 62.124	Data set 10 da			24 data 3 v	/alue					
	See 62.101 Dat		data 1 value.				1	1		
	0 65535	0		-	1 = 1	У	n	Signal		

70 DCSLink Communication

Defines the communication parameters for the DCSLink board SDCS-DSL-H1x.

For communication between the armature converter and the field exciters or 12-pulse communication only the basic communication parameters 70.05 ... 70.14 must be set.

F	Name										
	Text										
	Range	Def	ault	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Parameter settings for:										
	Single drive wit	70.05 DC 70.13 M1 70.14 M2	See example 1.								
	12-pulse drive		70.05 DCSLink node ID= 1. 70.09 12-pulse slave node ID = 31. 70.13 M1 field exciter node ID = 21.								



To Node11 O DCSLink node11 active and OK. 1 DCSLink node11 not active or faulty. 11 Node12 O DCSLink node12 active and OK. 1 DCSLink node12 not active or faulty. 12 Node13 O DCSLink node13 active and OK. 1 DCSLink node13 not active or faulty. 12 Node14 O DCSLink node14 active and OK. 1 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 O DCSLink node15 active and OK. 1 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty. 14 Node15 O DCSLink node15 not active or faulty. 15 DCSLink node15 not active or faulty. 16 DCSLink node15 not active or faulty. 17 DCSLink node15 not active or faulty. 18 DCSLink node15 not active or faulty. 19 DCSLink node15 not active or faulty. 10 DCSLink node15 not active or faulty.	dex	Nam	ie										
To Node11 O DCSLink node11 active and OK. 1 DCSLink node11 not active or faulty. 11 Node12 O DCSLink node12 active and OK. 1 DCSLink node12 not active or faulty. 12 Node13 O DCSLink node13 active and OK. 1 DCSLink node13 not active or faulty. 12 Node14 O DCSLink node14 active and OK. 1 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 O DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty. 15 DCSLink node15 not active or faulty. 16 DCSLink node15 not active or faulty. 17 DCSLink node15 not active or faulty. 18 DCSLink node15 not active or faulty. 19 DCSLink node15 not active or faulty. 10		Text											
1 DCSLink node11 not active or faulty. 11 Node12 0 DCSLink node12 active and OK. 1 DCSLink node12 not active or faulty. 12 Node13 0 DCSLink node13 active and OK. 1 DCSLink node13 not active or faulty. 12 Node14 0 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.		Rang	ge		Default	FbEq16 running							
11 Node12 0 DCSLink node12 active and OK. 1 DCSLink node12 not active or faulty. 12 Node13 0 DCSLink node13 active and OK. 1 DCSLink node13 not active or faulty. 12 Node14 0 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.		10	Node11	0	DCSLink r	node11 a	ctive and OI	K.					
1 DCSLink node12 not active or faulty. 12 Node13 0 DCSLink node13 active and OK. 1 DCSLink node13 not active or faulty. 12 Node14 0 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.				1	DCSLink r	DCSLink node11 not active or faulty.							
12 Node13 0 DCSLink node13 active and OK. 1 DCSLink node13 not active or faulty. 12 Node14 0 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.		11	Node12	0	DCSLink r	DCSLink node12 active and OK.							
1 DCSLink node13 not active or faulty. 12 Node14 0 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.				1	DCSLink r	DCSLink node12 not active or faulty.							
12 Node14 0 DCSLink node14 active and OK. 1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.		12	Node13	0	DCSLink r	node13 a	active and O	K.					
1 DCSLink node14 not active or faulty. 14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.					DCSLink r	node13 r	not active or	faulty.					
14 Node15 0 DCSLink node15 active and OK. 1 DCSLink node15 not active or faulty.		12	12 Node14 0		DCSLink r	DCSLink node14 active and OK.							
1 DCSLink node15 not active or faulty.				1	DCSLink r	node14 r	not active or	faulty.					
		14	Node15	0	DCSLink r	node15 a	active and O	K.					
15 Node16 0 DCSLink node16 active and OK.				1	DCSLink r	DCSLink node15 not active or faulty.							
		15	Node16	0	DCSLink r	DCSLink node16 active and OK.							
1 DCSLink node16 not active or faulty.				1	DCSLink r	DCSLink node16 not active or faulty.							
		0000	Oh FFFFh		-	-	1=1	v	ln	Signal			
0000h FFFFh - 1 = 1 y n 5	.02		Link status 2	L		1	1		1				

DCSLink status 2 of nodes 17 ... 32.

This word displays the status of the DCSLink for nodes 17 \dots 32.

Bit assignment:

Bit	Name	Value	Remarks	
0	Node17	1	DCSLink node17 active and OK.	
		0	DCSLink node17 not active or faulty.	
1	Node18	1	DCSLink node18 active and OK.	
		0	DCSLink node18 not active or faulty.	
2	Node19	1	DCSLink node19 active and OK.	
		0	DCSLink node19 not active or faulty.	
3	Node20	1	DCSLink node20 active and OK.	
		0	DCSLink node20 not active or faulty.	
4	Node21	1	DCSLink node21 active and OK.	
		0	DCSLink node21 not active or faulty.	
5	Node22	1	DCSLink node22 active and OK.	
		0	DCSLink node22 not active or faulty.	
6	Node23	1	DCSLink node23 active and OK.	
		0	DCSLink node23 not active or faulty.	
7	Node24	0	DCSLink node24 active and OK.	
		1	DCSLink node24 not active or faulty.	
8	Node25	0	DCSLink node25 active and OK.	
		1	DCSLink node25 not active or faulty.	
9	Node26	0	DCSLink node26 active and OK.	
		1	DCSLink node26 not active or faulty.	

Index	Nam	е							
	Text								
	Rang	je	D	efault	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	10	Node27	0	DCSLink	k node27 a	ctive and O	K.	•	
			1	DCSLink	k node27 r	not active or	faulty.		
	11	Node28	0	DCSLink	k node28 a	active and O	K.		
			1	DCSLink	k node28 i	not active or	faulty.		
	12	Node29	О	DCSLink	k node29 a	active and O	K.		
			1	DCSLink	k node29 i	not active or	faulty.		
	12	Node30	0			active and O			
			1	DCSLink	k node30 i	not active or	faulty.		
	14	Node31	0			ctive and OI			
			1			not active or			
	15	Node32	0			active and O			
		1100052	1			not active or			
			*	Destin	(TIOGESE I	iot detive or	radicy.		
						1		•	
70.05	-)h FFFFh Link node ID	-		-	1 = 1	у	n	Signal
70.06	0 Bauc	erates warning 63 I rate I rate.	0		n configui	1 = 1	n	n	Parameter
	the E 0: 20 1: 50 2: 12: 3: 25 4: 50 5: 80 7: 1 N	nes the transf OCSLink cable b kbit/s; 20 kb kbit/s; 50 kb 5 kbit/s; 125 k 0 kbit/s; 250 0 kbit/s; 800 4bit/s; 1 Mbit 1: Maximum to 2: is 50 (e.g., 2	: bit/s, to bit/s, to kbit/s, t kbit/s, kbit/s, kbit/s, kbit/s,	tal cable leng tal cable leng total cable le total cable le total cable l total cable l I cable lengt le length sho	gth max. 5 gth max. 5 ngth max ength max ength ma ength ma h approxi ould not ex	500 m. 500 m. 500 m. x. 250 m. x. 100 m. x. 50 m. mately 25 m. xceed 100 m	. Maximum		
	0	7	5	00 kbit/s	-	1 = 1	n	у	Parameter
70.08	12-p	ulse timeout							
	Defir pulse upda 70.08 inact Note	ulse communines the time communicate the messa 12-pulse time: ve, if 70.08 1: 70.08 12-pulexciter or xxx	lelay be tion is g ge. leout is 2-pulse	fore a 12-pul enerated. Ti only active in timeout is s	se commo me count in the 12-p et to 0 ms	starts when ulse master s.	the commo	unication li communica	nk fails to tion fault is

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0 32500	100	ms	1 = 1 ms	n	у	Paramete			
70.09	12-pulse slave no	ode ID								
	Defines the DCS example 2 above The 12-pulse noo	le ID is inactive, if 7 ulse slave node ID i	12-pulse sla 0.09 12-puls	e slave nod	e ID is set to	0.				
	0 63	31	-	1 = 1	n	n	Paramete			
70.12	Field exciter tim	eout	•	.		· ·				
	depending on the field exciter with the communication break. Time count starts when the communication link fails to update the message. 70.12 Field exciter timeout is only active in the armature drive. The communication fault is inactive, if 70.12 Field exciter timeout is set to 0 ms. Note: 70.12 Field exciter timeout is void, when 99.07 M1 used field exciter type = NotUsed, OnBoard or External field exciter via Aix and 42.49 M2 used field exciter type = NotUsed, OnBoard or External field exciter via Alx.									
	0 32500	100	ms	1 = 1 ms	n	у	Paramete			
70.13	M1 field exciter		11113	1 - 11113		У	T di di liecc			
	Defines the DCS and 2 above. Motor 1 field exc Notes: - 70.13 M1 field OnBoard or E	iter node ID (armat Link node ID of mo iter node ID is inac d exciter node ID is External field excite ature converter 99.0 nat in motor 1 large	tor 1 field ex tive, if 70.13 void, when 9 er via Alx. 07 M1 used f	citer in the M1 field exc M2 M1 use M2 M1 use M3 M2 M2 M3 M3 M3 M3 M3 M3 M3 M3 M3 M3 M3 M3 M3	iter node ID ed field excit type = DCS8	is set to 0. er type = N	NotUsed,			
	Armature co	onverter		Moto	r 1 large fiel	d exciter				
	99.07 M1 use	ed field exciter type	e = DCS880-		Command		ield			
	-	ed field exciter type			er link					
	0 32	21		1 = 1	n	n	Paramete			
70.14	M2 field exciter	I				1	1			
	Motor 2 field exc Defines the DCS above.	Link node ID of mo	tor 2 field ex							

Motor 1 field exciter node ID is inactive, if 70.14 M2 field exciter node ID is set to 0.

Notes:

- 70.14 M2 field exciter node ID is void, when 42.49 M2 used field exciter type = NotUsed,
 OnBoard or External field exciter via Alx.
- If in the armature converter 99.07 M1 used field exciter type = DCS880-S01 or DCS880-S02, make sure, that in motor 2 large field exciter 20.01 Command location = Field exciter link.

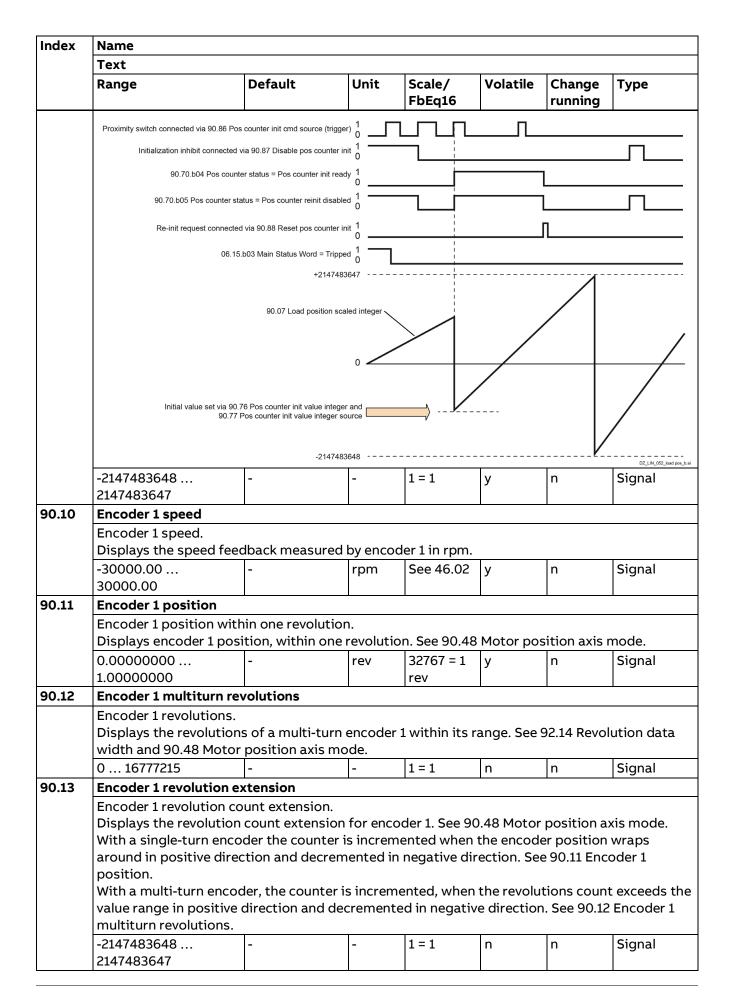
Index	Name									
	Text									
	Range	Default	Unit		ale/ Eq16	Volatile	Change running	Туре		
	Armature converter					Motor 2 large field exciter				
	99.07 M1 use	99.07 M1 used field exciter type = DCS880-S01					20.01 Command location = Field			
	99.07 M1 use	ed field exciter type	= DCS880-	502	excite	link				
					•					
	0 32	30	-	1 =	1	n	n	Parameter		

74 ... 89 Application specific groups Groups used for application programming.

90 Feedback selection

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
90.01	Motor speed for co	ontrol								
	Measured (tacho/e Displays measured M1 feedback select unit is selected by 9 In case a measured function. See 90.43	, EMF or external ion. A filter time of 96.03 Unit for spe or external feedb	motor speed constant is d eed control. back is selec	d depending lefined by 90 ted, it is also	on the use 0.42 Motor o scaled by	ed feedbac speed filte the motor	er time. The			
	-30000.00 30000.00	-	rpm, % or V	See 46.02	У	n	Signal			
90.02	Motor position		•	•	•	.	•			
	M1 Motor feedback An encoder feedback and 90.44 Motor ge 0.000000000	ck is scaled by the		32767 = 1		•				
90.03	1.00000000 Load speed			rev						
	Measured (tacho/e Displays measured Load feedback sele In case an encoder	Measured (tacho/encoder), EMF or external load speed. Displays measured, EMF or external load speed depending on the used feedback. See 90.51 Load feedback selection. A filter time constant is defined by 90.52 Load speed filter time. In case an encoder feedback from the load is selected, it is also scaled by the load gear function. See 90.53 Load gear numerator and 90.54 Load gear denominator. In case a feedback from the motor is used, it is inversely scaled by 90.61 Gear numerator and 90.62 Gear denominator (90.62 divided by 90.61).								
	In case a feedback 90.62 Gear denomi	from the motor is	used, it is i	nversely scal).	ed by 90.6		_			
	In case a feedback	from the motor is	used, it is i	nversely scal			Signal			
90.04	In case a feedback 90.62 Gear denomi -30000.00	from the motor is nator (90.62 divic	s used, it is i led by 90.61 rpm	nversely scal).	ed by 90.6	1 Gear num	_			

Index	Name									
ındex	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	In case an encoder feed function. See 90.53 Local In case a feedback from 90.62 Gear denominate Offset and resolution are resolution.	ad gear numeraton the motor is us or (90.62 divided	or and 90. ed, it is ir by 90.61)	54 Load gea oversely scal	ar denomin ed by 90.6	ator. I Gear num	erator and			
90.05	2147483647 Load position scaled				У	, ''	Signal			
	Scaled (translatory) load position as decimal number. Displays the output of the position counter function as decimal number. The position is relative to the initial position set by 90.76 Pos counter init value int and 90.77 Pos counter init value int source. The number of decimal places is defined by 90.82 Pos counter decimals. Note: This is a floating-point parameter, and the accuracy is compromised near the ends of t range. Consider using 90.07 Load position scaled integer instead.									
	-2147483.648 2147483.647	-	-	1 = 1	у	n	Signal			
90.06	Motor position scaled Scaled motor position. Displays the calculated The axis mode (linear of mode and 90.49 Motor Note: The position value Position in either 50.07 or 50.38 FBA B actual 2	I (rotational) mot or rollover) and re position resolut ue can be sent on FBA A actual 1 ty	solution a ion. a fast tin	are defined l ne level to th 3 FBA A actu	ne fieldbus al 2 type, 5	controller 0.37 FBA B	by selecting actual 1 type			
	-2147483.648 2147483.647	-	-	1 = 1	У	n	Signal			
90.07	Load position scaled i Scaled (translatory) load Displays the output of compatibility with DCS set by 90.76 Pos count	ad position as int the position cour 6600 and DCS800	nter funct drives. T	he position	is relative	to the initia				



	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
90.14	Encoder 1 position	raw	•		•	•	•
	Raw encoder 1 posi	tion within one re	volution.				
	Displays the raw m			1 position wi	ithin one re	volution. 1	he encoder
	interface provides	a 24-bit unsigned	integer.		_	1	1
	0 16777215	-	-	1 = 1	У	n	Signal
0.15	Encoder 1 revolution	ons raw					
	Raw encoder 1 revo						
	Displays the revolution		ırn encode	1 within its \	/alue range	as a raw n	neasuremer
	0 16777215	-	-	1 = 1	у	n	Signal
90.20	Encoder 2 speed						
	Encoder 2 speed.						
	Displays the speed	feedback measur	ed by enco	der 2 in rpm.			
	-30000.00	-	rpm	See 46.02	у	n	Signal
	30000.00						
90.21	Encoder 2 position	l					
	Encoder 2 position	within one revolu	tion.				
	Displays encoder 1	position, within o	ne revoluti	on. See 90.48	Motor pos	sition axis	mode.
	0.00000000	-	rev	32767 = 1	У	n	Signal
	1.00000000			rev			
90.22	Encoder 2 multitur	n revolutions					
	Encoder 2 revolution						
	width and 90.48 Mo	tions of a multi-tu otor position axis			range. See	93.14 Revo	T
	width and 90.48 Mo 0 16777215	otor position axis		2 within its 1	n see	93.14 Revo	Signal
90.23	width and 90.48 Mo 0 16777215 Encoder 2 revolution	otor position axis - on extension	mode. -			Т	T
90.23	width and 90.48 Mo 0 16777215	otor position axis - on extension on count extension tion count extension encoder the count direction and decr	n. ion for encer is incrented in	1 = 1 oder 2. See 90 nented when n negative din	n 0.48 Motor the encode rection. See	position a er position e 90.21 Enc	Signal xis mode. wraps oder 2 t exceeds th
90.23	width and 90.48 Mo 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position	otor position axis - on extension on count extension tion count extension encoder the count direction and decr	n. ion for encer is incrented in	1 = 1 oder 2. See 90 nented when n negative din	n 0.48 Motor the encode rection. See	position a er position e 90.21 Enc	Signal xis mode. wraps oder 2 t exceeds th
90.23	width and 90.48 Mo 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position multiturn revolution	otor position axis - on extension on count extension tion count extension encoder the count direction and decr	n. ion for encer is incrented in	1 = 1 oder 2. See 90 nented when n negative din nented, when ted in negative	n. 20.48 Motor the encode rection. See the revolute direction	position a er position e 90.21 Enc tions coun n. See 90.22	Signal xis mode. wraps oder 2 t exceeds the Encoder 2
	width and 90.48 Me 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn elevation revolution With a multi-turn elevation revolution -2147483648	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. -	n. ion for encer is incrented in	1 = 1 oder 2. See 90 nented when n negative din nented, when ted in negative	n. 20.48 Motor the encode rection. See the revolute direction	position a er position e 90.21 Enc tions coun n. See 90.22	Signal xis mode. wraps oder 2 t exceeds tl
	width and 90.48 Mo 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position multiturn revolution -2147483648 2147483647	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. - raw	mode. - ion for encer is incrented in the incrented incremented incremented incremented incremented incremented incremented incremented incremented incremented incremented incremented incremented incremented increment	1 = 1 oder 2. See 90 nented when n negative din nented, when ted in negative	n. 20.48 Motor the encode rection. See the revolute direction	position a er position e 90.21 Enc tions coun n. See 90.22	Signal xis mode. wraps oder 2 t exceeds the Encoder 2
	width and 90.48 Me 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position multiturn revolution -2147483648 2147483647 Encoder 2 position Raw encoder 2 position Displays the raw minimum and position of the pos	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. - iraw ition within one re easurement data	mode. - n. ion for encer is incrented in the content of the cont	1 = 1 oder 2. See 90 nented when n negative din nented, when ted in negative 1 = 1	n 0.48 Motor the encode rection. See the revolute direction	position a er position e 90.21 Enc tions coun n. See 90.22	signal xis mode. wraps oder 2 t exceeds the Encoder 2 Signal
	width and 90.48 Me 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position multiturn revolution -2147483648 2147483647 Encoder 2 position Raw encoder 2 position	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. - iraw ition within one re easurement data	mode. - n. ion for encer is incrented in the content of the cont	1 = 1 oder 2. See 90 nented when n negative din nented, when ted in negative 1 = 1	n	position a er position e 90.21 Enc tions coun n. See 90.22	signal xis mode. wraps oder 2 t exceeds the Encoder 2 Signal
90.24	width and 90.48 Me 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn earound in positive of position. With a multi-turn envalue range in position multiturn revolution-2147483648 2147483647 Encoder 2 position Raw encoder 2 position Displays the raw multierface provides and multierface	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. - oraw ition within one re easurement data a 24-bit unsigned -	mode. - n. ion for encer is incrented in the content of the cont	1 = 1 oder 2. See 90 nented when negative dinnented, when ted in negative 1 = 1 2 position w	n 0.48 Motor the encode rection. See the revolute direction	position a er position e 90.21 Enc	signal xis mode. wraps oder 2 t exceeds the Encoder 2 Signal
90.24	width and 90.48 Mo 0 16777215 Encoder 2 revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position multiturn revolution -2147483648 2147483647 Encoder 2 position Raw encoder 2 position Displays the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides an analysis of the raw multinerface provides and an analysis of the raw multinerface provides an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw multinerface provides and an analysis of the raw mul	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. - oraw ition within one re easurement data a 24-bit unsigned - ons raw olution count. tions of a multi-tu	mode. - ion for encer is incrented in the content of the content	1 = 1 oder 2. See 90 nented when negative din negative 1 = 1 2 position w 1 = 1	n	position a er position e 90.21 Encotions count n	Signal xis mode. wraps oder 2 t exceeds the Encoder 2 Signal The encoder
	width and 90.48 Me 0 16777215 Encoder 2 revolution Displays the revolution Displays the revolution With a single-turn of around in positive of position. With a multi-turn envalue range in position With a multi-turn envalue range in position Part of the second of	otor position axis - on extension on count extension tion count extension encoder the count direction and decr ncoder, the count tive direction and ns. - oraw ition within one re easurement data a 24-bit unsigned - ons raw olution count. tions of a multi-tu	mode. - ion for encer is incrented in the content of the content	1 = 1 oder 2. See 90 nented when negative din negative 1 = 1 2 position w 1 = 1	n	position a er position e 90.21 Encotions count n	Signal xis mode. wraps oder 2 t exceeds tl Encoder 2 Signal

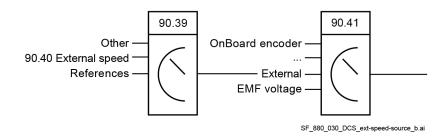
Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Motor revolution count extension. Displays the revolution count extension for the motor. The counter is incremented, when the position selected by 90.41 Motor feedback selection wraps around in positive direction and decremented in negative direction.										
	-2147483648										
90.27	Load revolution extension										
	Displays the revolu	Load revolution count extension. Displays the revolution count extension for the load. The counter is incremented, when the position selected by 90.51 Load feedback selection wraps around in positive direction and decremented in negative direction.									
	2147483647			1 = 1	n	n	Signal				

90.39 External speed feedback source

Selects the external speed feedback source.

90.39 External speed source is valid if 90.41 M1 feedback selection = External. The external speed feedback can be connected in several ways:

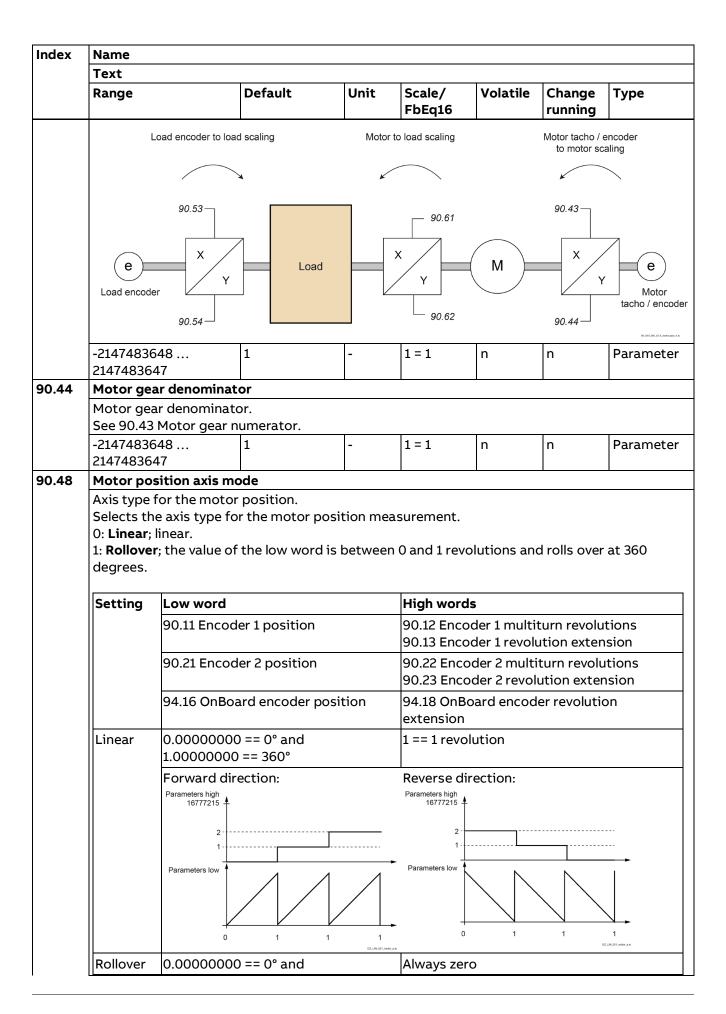
- Any source via option Other.
- Via 90.40 External speed. This parameter can be written to by e.g., Adaptive Program, application program or overriding control.
- Via an analog input.
- Via serial communication using the fast communication cycle of REF1/REF2 instead of the slower communication cycle of direct parameter access. See also 50.21 FBA A timelevel sel and corresponding parameters.

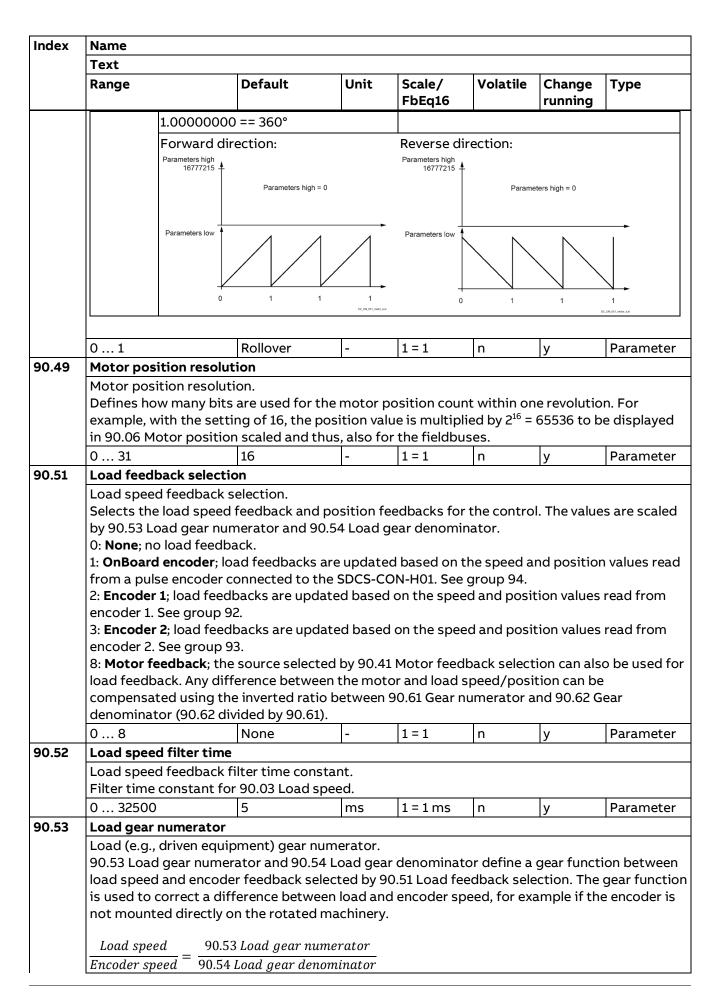


Other; source selection.

- 0: 90.40 External speed; 90.40 External speed.
- 4: All scaled; 12.12 All scaled value.
- 5: AI2 scaled; 12.22 AI2 scaled value.
- 6: AI3 scaled; 12.32 AI3 scaled value.
- 7: **FBA A reference 1**; 03.05 FBA A reference 1.
- 8: FBA A reference 2; 03.06 FBA A reference 2.
- 9: **FBA B reference 1**; 03.07 FBA B reference 1.
- 10: FBA B reference 2; 03.08 FBA B reference 2.
- 11: **EFB reference 1**; 03.09 EFB reference 1.
- 12: EFB reference 2; 03.10 EFB reference 2.
- 13: DDCS controller ref1; 03.11 DDCS controller ref1.
- 14: DDCS controller ref2; 03.12 DDCS controller ref2.
- 15: **M/F or D2D ref1**; 03.13 M/F or D2D ref1.
- 16: M/F or D2D ref2; 03.14 M/F or D2D ref2.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0 16	90.40 External speed	-	1=1	n	у	Parameter
90.40	External speed						
		edback. an be written to by e.g d if 90.39 External spe					
	-30000.00 30000.00	0.00	rpm	See 46.02	У	У	Parameter
90.41	M1 feedback sele	ction					
	Other; source selections of the SDCS-CON 2: Encoder 1; the selection as Encoder 2; the selection as Encoder 2; the selection as Encoder 2; the selection as Encoder 2; the selection as Encoder 3; the speed other words flux). Thus, it is possible to encoder or ana Commissioning in 6: External; the selection as External; the selection as External; the selection as External; the selection as External; the selection as External; the selection as External; the selection as External; the selection as External; the selection as External; the selection as External selection	r speed feedback for mection. ler; the speed feedbac -H01. See group 94. speed feedback is measpeed feedback is meased feedback is measur	k is meansured because of the second	asured by meanly encoder 1. Solvy encoder 2. Solvy encode	See group See group halog tacho tage, 28.15 with a low anually.	92. 93. o connecte M1 field cu performar	d to the urrent (in nce compared k source.
	17	EMF	-	1 = 1	n	у	Parameter
90.42	Motor speed filte	er time	I		1	1,5	
	Filter time constant Note: There are the second of the sec	lback filter time constant for 90.01 Motor spennee different filters for peed filter time is filters smaller than 30 ms. The result of the second sec	eed for our speed ring the 4.19 Speeme constraine 2	feedback and espeed feedb eed error filter stants greate	ack and she time 2 are than 30 n	e filtering t	he speed .8 Speed erroi
	0 32500	5	ms	1 = 1 ms	n	У	Parameter
90.43	between motor s difference betwe		tor con d (tach	trol. The gear o/encoder) sp	function i	s used to c	orrect a





Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Load encoder to le	oad scaling	Motor	to load scaling	Motor tacho / encoder to motor scaling		
	90.53 Response to the second of the second	Load		90.61 X Y	Y		Motor tacho / encoder
	-2147483648 2147483647	1	-	1 = 1	n	n	Parameter
90.54	Load gear denominate Load (e.g., driven equ See 90.53 Load gear r	ipment) gear de	enominato	r.			
	-2147483648 2147483647	1	-	1 = 1	n	n	Parameter
90.56	Load position offset						
	Load side position of Defines a load side po				1		
	-2147483648 2147483647	0	-	1 = 1	n	У	Parameter
90.57	Load position resolut Load position resolut Defines how many bit with the setting of 16 Load position.	ion. s are used for t , the position va		tiplied by 2 ¹⁶	= 65536 to	be display	ed in 90.04
	0 31	16	-	1 = 1	n	у	Parameter
90.61	· _		r	ator define a	gear funct	ion betwee	en motor and

Index	Name Toxt									
	Text									
	Range	Defaul	t	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Load encoder t	to load scaling		Motor t	o load scaling		Motor tacho / e to motor sca			
	90.53—			90.61			90.43			
	Load encoder X 90.54	Y	Load		Y 90.62	M	X Y 90.44	Motor tacho / encoder		
	-2147483648 2147483647	1		-	1 = 1	n	n	Parameter		
90.62	Gear denominator	•		•	•	•	•			
	Gear denominator ((load side).								
	See 90.61 Gear num	nerator.					T-			
	-2147483648 2147483647	1		-	1 = 1	n	n	Parameter		
90.63	Feed constant num	erator		· ·			•	1		
	90.63 Feed constan			64 Feed	constant de	enominator	define the	feed		
	90.63 Feed constant 90.64 Feed constant The feed constant	sition calcul t numerator denominato converts rot	lation. . <u>.</u> r ational n	notion in	to translato	ory motion.				
	90.63 Feed constant 90.64 Feed constant The feed constant is the distance the	t numerator denominato converts rot load moves	lation. r ational n during o	notion in ne turn o	to translato f the motor	ory motion. shaft.	E.g., the fe			
	90.63 Feed constant 90.64 Feed constant The feed constant is the distance the later than the translatory load	t numerator denominato converts rot load moves d position is	lation. T ational n during o s shown i	notion in ne turn o n 90.07 L	to translato f the motor oad positic	ory motion. shaft. on scaled in	E.g., the fe			
	90.63 Feed constant 90.64 Feed constant The feed constant is the distance the	t numerator denominato converts rot load moves d position is	lation. T ational n during o s shown i	notion in ne turn o n 90.07 L	to translato f the motor oad positic	ory motion. shaft. on scaled in	E.g., the fe			
90.64	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the later than the translatory load Note: The load positions of the constant of the constant of the translatory load Note: The load positions of the constant of	t numerator denominato converts rot load moves d position is ition is only	lation. T ational n during o s shown i	notion in ne turn o n 90.07 L	to translato f the motor oad positio v position i	ory motion. shaft. on scaled in nput data i	E.g., the fed teger. s received.	ed constant		
90.64	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the later than the translatory load Note: The load positions of the later than 12147483648 2147483647	t numerator denominato converts rot load moves d position is ition is only 1	lation. T ational n during o s shown i	notion in ne turn o n 90.07 L	to translato f the motor oad positio v position i	ory motion. shaft. on scaled in nput data i	E.g., the fed teger. s received.	ed constant		
90.64	onstant for the position of th	t numerator denominato converts rot load moves d position is ition is only 1 ominator	lation. T ational n during o s shown i updated	notion in ne turn o n 90.07 L	to translato f the motor oad positio v position i	ory motion. shaft. on scaled in nput data i	E.g., the fed teger. s received.	ed constant		
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	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the last the translatory load Note: The load positive of the translatory load Note: The load positive of the translatory load Note: The load positive of the load p	t numerator denominato converts rot load moves d position is ition is only 1 ominator ominator stant numerator	lation. T ational n during o s shown i updated	notion in ne turn o n 90.07 L	to translato f the motor oad position v position i 1 = 1	ory motion. shaft. on scaled in nput data i	E.g., the fed teger. s received. y	ed constant Parameter		
	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the last The translatory load Note: The load positive of the last The load positive of the last The load positive of the last The load positive of the last The load positive of the last The load positive of the last The load positive of the last The load positive of the last The load positive of the last The load positive of the last The	t numerator denominato converts rot load moves d position is ition is only 1 ominator ominator stant numerator 1 atus word.	ational n during o s shown i updated	notion in ne turn o n 90.07 L after nev	to translato f the motor oad position v position i 1 = 1	ory motion. shaft. on scaled in nput data i	E.g., the fed teger. s received. y	ed constant Parameter		
	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the last last the last last last last last last last last	t numerator denominato converts rot load moves d position is ition is only 1 ominator ominator stant numerator 1 atus word.	ational n during o s shown i updated	notion in ne turn o n 90.07 L after nev	to translato f the motor oad position v position i 1 = 1	ory motion. shaft. on scaled in nput data i	E.g., the fed teger. s received. y	ed constant Parameter		
90.64	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the last The translatory load Note: The load positive of the constant denotes the constant denotes of the constant denote	t numerator denominato converts rot load moves d position is ition is only 1 cominator cominator stant numer 1 atus word. of the posit encoder	ational n during o s shown i updated	notion in ne turn o n 90.07 L after nev - - ter.	to translator the motor oad position in the second position in the s	ory motion. r shaft. on scaled in nput data i	E.g., the feateger.	Parameter Parameter		
	90.63 Feed constant 90.64 Feed constant The feed constant of is the distance the later than the translatory load Note: The load positions of the constant denotes the constant denotes of the constant	t numerator denominato converts rot load moves d position is ition is only 1 cominator cominator stant numer 1 atus word. of the posit encoder	ational n during o s shown i updated	notion in ne turn o n 90.07 L after nev - - - - - - Remarl OnBoar source	to translator the motor oad position in the second position in the s	ory motion. shaft. on scaled in nput data i	E.g., the feeteger. s received. y y	ed constant Parameter Parameter dback		

Index	Name									
	Text									
	Range		Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре	
	2	Encoder 2 fee	dback	1	Encode	r 2 is selecte	ed as load f	eedback s	ource.	
	3	Motor feedba	.ck	1	Motor f	eedback is s	elected as	load feedk	oack source.	
	4	Pos counter ir	nit ready	1	Positio	n counter is	successful	ly initialize	d.	
				0	Positio	n counter is	not initiali:	zed, or enc	oder	
					recomn	ck was lost. I nended. Not r sync mode	e: Always z			
	5	Pos counter r	o_init	1	counter sync mode = Cyclic. Position counter initialization is prevented. See					
		disabled	e-1111C	90.87 Disable pos cou			•	eu. see		
	6	Position data		1		r feedback i			the drive is	
		inaccurate	ı		stoppe	d, the position	on countin	g will conti	nue based	
	7 15	reserved								
					1					
	0000h	. FFFFh	-		-	1 = 1	n	n	Signal	
90.73	Pos cour	nter error and l	oot act	ion						
	position 1: Contin loss of lo 90.70.b0 WARNIN If load fe	est re-initialization counter is reconuter is reconute from previous description of the counter is the counter in the counter is the counter in the counter is the counter in the counter is the counter in the counter is the counter in the counter is the counter in the counter is the counter in the counter is reconuter in the counter in the counter is the counter in the counter in the counter in the counter is reconuter in the counter in t	ommend ous value r drive re status is when the Reques	ed. ethe posteboot. 90 set to interest to set to interest to int	sition cou 0.70.b04 I ndicate th	unting resun Pos counter nat an error l	nes from tl status is n has occurre	ne previous ot cleared, ed.	s value over a but	
			reinitial	ization						
90.76		nter init value i								
	Defines a	counter, initial an initial position ater init value in see 90.07 Load	on or dis	tance fo	r the pos ounter in	it value inte	ger.		set 90.77	
	-2147483 21474836		0		-	1 = 1	n	у	Parameter	
90.77	Pos cour	nter init value i	nteger s	ource						
	Pos counter init value integer Position counter, source of the Selects the source of the initia counter init cmd source (trigg source becomes the position of Other; source selection. 0: Zero; 0.		ne initial e (triggen sition of	position r) activat the loac	as intege es, the so	er. When the	0.77 Pos co	-		
90.82	0 1	nter decimals	Pos cou init valu integer	inter ie	-	1 = 1	n	у	Parameter	
30.02	FUS COUR	ונכו עבנוווומוס								

ndex	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Position counter	, number of decima	places.				-1
	Scales the values	s of 90.05 Load posi	tion scaled	and 90.80 P	os counter	init value v	vhen writter
	to or read by an	external source (e.g.	, fieldbus).	The setting	correspond	ls to the nu	ımber of
	decimal places.						
	Examples with a	setting of 3:					
		llue written into 90.8				ernal sourc	e is divided
	-	value written is 1234					
		90.05 Load position				read by an	external
	source. The v	alue shown is 12.345	and the va	alue written	is 12345.	_	T
	0 9	3	-	1 = 1	n	у	Paramete
0.85	Pos counter syn	c mode					
	Position counter	, synchronization m	ode.				
	Position counter	synchronization mo	de for enc	oder feedba	ck.		
	0: Single ; the nex	kt synchronization o	f the encod	der feedback	must be pr	epared by	resetting
	90.70.b04 Pos co	ounter status using	90.88 Rese	t pos counte	r init ready.	,	
	1: Cyclic; the syn	chronization of the	encoder fe	edback happ	ens at ever	y occurren	ce of the
	synchronization	event.					
	0 1	Single	-	1 = 1	n	у	Paramete
0.86	Pos counter init	cmd source (trigge	r)	I	I		
		, source of the initia		mmand			
		source e.g., a limit s			e position o	ounter Wh	en the digit
		the selection in 90.7					
	the load.	the selection in 50.7	7 1 03 COuri	cer iiiic value	. IIIC SOUICE	becomes t	ne position
	the load.						
	0 = No trigger						
	0 = No trigger.						
	$0 \rightarrow 1 = Trigger.$	on counter initializat	ion can be	prevented h	w 90 97 Die	ahla nos co	ounter init
	0 → 1 = Trigger. Note: The position	on counter initializat	tion can be	prevented b	y 90.87 Dis	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour	ce selection.		prevented b	y 90.87 Dis	able pos co	ounter init.
	0 → 1 = Trigger.Note: The positionOther [bit]; sour0: No trigger con	ce selection. mmand ; 0, normal o _l		prevented b	oy 90.87 Dis	able pos co	ounter init.
	 0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger con 1: Trigger comm 	ce selection. mmand ; 0, normal o _l and ; 1.		prevented b	oy 90.87 Dis	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 1: Trigger comm 3: DI1; 10.02.b00	ce selection. mmand ; 0, normal o _l and ; 1. DI delayed status.		prevented b	y 90.87 Dis	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 1: Trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01	ce selection. mmand ; 0, normal o _l and ; 1. DI delayed status. DI delayed status.		prevented b	y 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: Di1; 10.02.b00 4: Di2; 10.02.b01 5: Di3; 10.02.b02	ce selection. mmand; 0, normal o and; 1. DI delayed status. DI delayed status. DI delayed status.		prevented b	oy 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour O: No trigger comm 1: Trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status.		prevented b	oy 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 1: Trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status.		prevented b	oy 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status.	peration.	prevented b	oy 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b05	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status.	oeration.	prevented b	oy 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b06 12: DIO2; 11.02.b06	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status.	oeration.	prevented b	oy 90.87 Disa	able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b05 12: DIO2; 11.02.b05 19: DIL; 10.02.b15	ce selection. mmand; 0, normal of and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI delayed status.	oeration. us. us.			able pos co	ounter init.
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 19: DIL; 10.02.b15 50: Z OnBoard; t	ce selection. mmand; 0, normal or and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. DI delayed status.	oeration. us. us. channel of t	the OnBoard	l encoder.		
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b05 12: DIO2; 11.02.b05 19: DIL; 10.02.b15 50: Z OnBoard; t 51: Z OnBoard for	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. DI DIO delayed status. Laken from the zero corward; taken from zero.	us. Is. Channel of the	the OnBoard	l encoder. rd encoder		
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 50: Z OnBoard; to source the source of the so	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. Aken from the zero orward; taken from zero orward; taken from zero delayed status.	oeration. Is. Channel of the channel of the control of the contr	the OnBoard el the OnBoa status word.	l encoder. rd encoder	and the mo	otor is
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 1: Trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 50: Z OnBoard; to rotating forward 52: Z OnBoard research	ce selection. mmand; 0, normal or and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. Aken from the zero or ward; taken from zero erverse; taken from zero erverse;	us. channel of tero channel ed control sero channe	the OnBoard el the OnBoa status word. I the OnBoar	l encoder. rd encoder	and the mo	otor is
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 1: Trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 50: Z OnBoard; to rotating forward 52: Z OnBoard research	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. Aken from the zero orward; taken from zero orward; taken from zero delayed status.	us. channel of tero channel ed control sero channe	the OnBoard el the OnBoa status word. I the OnBoar	l encoder. rd encoder	and the mo	otor is
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 50: Z OnBoard; to some containing forward reprotating reverse.	ce selection. mmand; 0, normal opand; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI bio delayed status. See DI delayed status. Aken from the zero oprward; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exerse; taken from zero exercicles exe	us. channel of tero channel ed control sero channe	the OnBoard el the OnBoa status word. I the OnBoar tatus word.	l encoder. rd encoder rd encoder a	and the mo	otor is otor is
	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b06 12: DIO2; 11.02.b06 19: DIL; 10.02.b15 50: Z OnBoard; to some containing forward representating reverses. 0 52	ce selection. mmand; 0, normal or and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. See DI delayed status. Aken from the zero orward; taken from zero erward; taken from zero erward; taken from zero erward. See 06.21.b01 Speedeverse; taken from zero erward.	us. channel of tero channel ed control sero channe	the OnBoard el the OnBoa status word. I the OnBoar	l encoder. rd encoder	and the mo	otor is
90.87	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 50: Z OnBoard; to solve the solve	ce selection. mmand; 0, normal or and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. See DI delayed status. aken from the zero orward; taken from zero deverse; taken from zero deverse; taken from zero deverse; taken from zero deverse. No trigger	oeration. Is. Channel of the control sero channel discontrol sero channel di	the OnBoard el the OnBoa status word. I the OnBoar tatus word.	l encoder. rd encoder rd encoder a	and the mo	otor is otor is
90.87	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 50: Z OnBoard; to solve the solve	ce selection. mmand; 0, normal or and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. See DI delayed status. Aken from the zero orward; taken from zero erward; taken from zero erward; taken from zero erward. See 06.21.b01 Speed	oeration. Is. Channel of the control sero channel discontrol sero channel di	the OnBoard el the OnBoa status word. I the OnBoar tatus word.	l encoder. rd encoder rd encoder a	and the mo	otor is otor is
90.87	0 → 1 = Trigger. Note: The position Other [bit]; sour 0: No trigger comm 3: DI1; 10.02.b00 4: DI2; 10.02.b01 5: DI3; 10.02.b02 6: DI4; 10.02.b03 7: DI5; 10.02.b04 8: DI6; 10.02.b05 11: DIO1; 11.02.b01 12: DIO2; 11.02.b01 19: DIL; 10.02.b15 50: Z OnBoard; to some containing forward containing reverse. 0 52 Disable pos counter	ce selection. mmand; 0, normal or and; 1. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI delayed status. DI DIO delayed status. DI DIO delayed status. See DI delayed status. aken from the zero orward; taken from zero deverse; taken from zero deverse; taken from zero deverse; taken from zero deverse. No trigger	channel of the control sero channel d control	the OnBoard el the OnBoa status word. I the OnBoar tatus word. 1 = 1	l encoder. rd encoder rd encoder a	and the mo	otor is otor is Paramete

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	0 = Release.											
	1 = Disable.											
	Other [bit]; source selection.											
	0: Enable; 0, normal operation.											
	1: Disable; 1.											
	3: DI1 ; 10.02.b00 DI de	_										
	4: DI2 ; 10.02.b01 DI de	•										
	5: DI3 ; 10.02.b02 DI de	-										
ı	6: DI4 ; 10.02.b03 DI de	•										
	7: DI5 ; 10.02.b04 DI de	-										
	8: DI6 ; 10.02.b05 DI de	•										
İ	11: DIO1 ; 11.02.b00 DIO	-										
	12: DIO2 ; 11.02.b01 DIO											
	19: DIL ; 10.02.b15 DI d	elayed status.										
<u> </u>	0 19	Release	-	1 = 1	n	у	Parameter					
90.88	Reset pos counter ini	t ready										
	Position counter, sour	ce of the initializa	tion com	mand reset.	,							
	Selects a source that	enables a new init	ialization	of the posit	ion counte	r. It resets	90.70.b04					
	Pos counter status.											
	0 = No reset.											
	$0 \rightarrow 1 = Reset.$											
ı	Other [bit]; source sel											
	Other [bit], source ser	ection.										
	0: No Reset ; 0.	ection.										
		ection.										
	0: No Reset ; 0.		ced.									
	0: No Reset ; 0. 1: Reset ; 1.	ve. No reset is for	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti	ve. No reset is for layed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de	ve. No reset is for layed status. layed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de	ve. No reset is for layed status. layed status. layed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de 5: DI3; 10.02.b02 DI de	ve. No reset is for layed status. layed status. layed status. layed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de 5: DI3; 10.02.b02 DI de 6: DI4; 10.02.b03 DI de	ve. No reset is for layed status. layed status. layed status. layed status. layed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de 5: DI3; 10.02.b02 DI de 6: DI4; 10.02.b03 DI de 7: DI5; 10.02.b04 DI de	ve. No reset is for layed status. layed status. layed status. layed status. layed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de 5: DI3; 10.02.b02 DI de 6: DI4; 10.02.b03 DI de 7: DI5; 10.02.b04 DI de 8: DI6; 10.02.b05 DI de	ve. No reset is for layed status. layed status. layed status. layed status. layed status. O delayed status.	ced.									
	0: No Reset; 0. 1: Reset; 1. 0: Not selected; inacti 3: DI1; 10.02.b00 DI de 4: DI2; 10.02.b01 DI de 5: DI3; 10.02.b02 DI de 6: DI4; 10.02.b03 DI de 7: DI5; 10.02.b04 DI de 8: DI6; 10.02.b05 DI de 11: DIO1; 11.02.b00 DIO	ve. No reset is for layed status. layed status. layed status. layed status. layed status. d delayed status.	ced.									

91 Encoder module settings

Configuration of the encoder interface modules.

Attention: Any changed parameters must be validated by means of 91.10 Encoder parameter refresh = Refresh.

Index	Name Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Attention: Any refresh = Refres	changed parameters sh.	must be va	alidated by m	neans of 91.	10 Encoder	parameter			
91.01	FEN DI status									
	Module 1 and 2, status of digital inputs.									
	Displays the electrical status of digital inputs DI1 and DI2.									

	Name								
	Text								
	Range		Default	U	nit	Scale/ FbEq16	Volatile	Change running	Туре
	and DI2	nd 1 reflect the storm of module 2. e: 00000000000000000000000000000000000		DI1 of m	odule				tatus of DI1
	Bit	Name	Value	Remark					
	0	DI1/Module 1	1	On. See	parar	neters 91.11	and 91.12.		
	1	DI2/Module 1	1	On. See	parar	neters 91.11	and 91.12.		
	2	reserved							
	3	reserved							
	4	DI1/Module 2	1	On. See	parar	neters 91.13	and 91.14.		
	5	DI2/Module 2	1	On. See	parar	neters 91.13	and 91.14.		
	6 15	reserved							
	0000h	FFFFh	_			1 = 1	у	n	Signal
91.02		1 status				1	y	11	Joighan
	16: FEN 17: FEN 18: FEN 21: FEN	own; the module -01; a FEN-01 ha -11; a FEN-11 has -21; a FEN-21 has -31; a FEN-31 has -31; an FSE-31 has	s been det been det been det been det	tected ar ected and ected and ected an	nd is ac d is ac id is ac d is ac	tive. Not su tive. tive.	pported at	the time of	f publication.
	0 26	31 , an 31 31 no	-	-	110 15 0	1=1	у	n	Ci aua a l
91.03		2 status] 3	1	ISignal
	Display 0: No o l	2, status. s the type of the			he loc				Signal
	2: Unkn 16: FEN 17: FEN 18: FEN	ption; no modulonmmunication; a own; the modulon out a FEN-01 has ren; a FEN-21 has ren; a FEN-21 has ren; an FEN-31 has ren; an FEN-31 has ren;	module he type is u s been de been det s been det	as been on the control of the contro	pecified detect and is ac d is ac ad is ac	ed slot. ed but canr ctive. tive. Not su ctive.	not be comr	municated	location. with.
	2: Unkn 16: FEN 17: FEN 18: FEN	ommunication; a own; the module -01; a FEN-01 ha -11; a FEN-11 has -21; a FEN-21 has	module he type is u s been de been det s been det	as been on the control of the contro	pecified detect and is ac d is ac ad is ac	ed slot. ed but canr ctive. tive. Not su ctive.	not be comr	municated	location. with.
91.04	2: Unkn 16: FEN 17: FEN 18: FEN 21: FEN 0 21 Module	ommunication; a own; the module -01; a FEN-01 ha -11; a FEN-11 has -21; a FEN-21 has -31; an FEN-31 has -1 temperature	module he type is us been det been det sbeen det sbeen det -	nas been on the control of the contr	pecified detect and is ac d is ac ad is ac	ed slot. ed but canr ctive. tive. Not su ctive. active.	not be comr	municated the time of	location. with. f publication.
91.04	2: Unkn 16: FEN 17: FEN 21: FEN 0 21 Module Module Display The uni Note: W	own; the module own; the module o1; a FEN-01 ha -11; a FEN-11 has -21; a FEN-21 has -31; an FEN-31 has 1 temperature 1, measured ten s the temperatu t is selected by 9 /ith a PTC senso	module he type is us been det been det as been det	as been on the sected and the sected and the sected and the sected and the sected and the sected and the sected and the section is Ω.	pecified detect and is act and is	ed slot. ed but cannotive. tive. Not suctive. active. 1 = 1	pported at	nunicated the time of	location. with. f publication. Signal
91.04	2: Unkn 16: FEN 17: FEN 18: FEN 21: FEN 0 21 Module Display The uni	own; the module own; the module o1; a FEN-01 ha -11; a FEN-11 has -21; a FEN-21 has -31; an FEN-31 has 1 temperature 1, measured ten s the temperatu t is selected by 9 /ith a PTC senso	module he type is us been det been det as been det	as been on the nknown. It is a nected and it is a	pecified detect and is acid is	ed slot. ed but cannotive. tive. Not suctive. active. 1 = 1 e sensor inp 1 = 1°C, °F or	pported at	municated the time of	location. with. f publication.
91.04	2: Unkn 16: FEN 17: FEN 18: FEN 21: FEN 0 21 Module Display The uni Note: W	own; the module own; the module o1; a FEN-01 ha -11; a FEN-11 has -21; a FEN-21 has -31; an FEN-31 has 1 temperature 1, measured ten s the temperatu t is selected by 9 /ith a PTC senso	module he type is us been det been det as been det	as been on the nknown. It is a nected and it is a	pecified detect and is act of the condition of the condit	ed slot. ed but cannotive. tive. Not subtive. active. $1 = 1$ e sensor inp	pported at	nunicated the time of	location. with. f publication. Signal

	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	Displays the tem	perature measured	through th	e sensor inp	ut of modu	le 2.			
		ted by 96.02 Unit sel							
	Note: With a PTC	Sensor, the unit is							
	0 1000	-	°C,	1 = 1°C,	У	n	Signal		
			°F or	°F or					
			Ohm	Ohm					
1.10	Encoder parame								
		parameter refresh.							
	_	anged module parar					_		
	done.	to take effect. The v	alue reverts	to Done au	comatically	when the r	rerresn is		
	0: Done ; 0, refre	shina done							
	1: Refresh ; 1, refr	•							
	0 1	Done	_	1 = 1	у	у	Paramete		
1.11	Module 1 type	Done		+ +	y	J	T di di liete		
	Module 1, type.								
		pecifies the type of)	module 1						
	0: None ; inactive	= -	module 1.						
	,	 1, 2 inputs (TTL enco	oder). 1 outi	out.					
		1, 2 inputs (absolute			1 output. N	lot suppor	ted at the		
	time of publicati		,	,					
	·								
	3: FEN-21 ; FEN-2	1, 2 inputs (resolver,	TTL encode	er), 1 output					
		1, 2 inputs (resolver, 1, 1 input (HTL enco		•					
	4: FEN-31 ; FEN-3	•	der), 1 outp	ut.					
	4: FEN-31 ; FEN-3	1, 1 input (HTL enco	der), 1 outp	ut.	n	n	Parameter		
1.12	4: FEN-31 ; FEN-3 5: FSE-31 ; FSE-31	1, 1 input (HTL enco L. 1 input (HTL safety None	der), 1 outp	ut. no output.		n	Parameter		
1.12	4: FEN-31 ; FEN-3 5: FSE-31 ; FSE-31 0 5	1, 1 input (HTL enco L 1 input (HTL safety None	der), 1 outp	ut. no output.		n	Paramete		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-33 0 5 Module 1 location Module 1, location Activates and sp	1, 1 input (HTL enco L 1 input (HTL safety None on on. becifies the slot (1	der), 1 outp / encoder), - - 3) on the d	ut. no output. 1 = 1 rive's contro	n I board into	which mo	dule 1 is		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-33 0 5 Module 1 location Module 1, location Activates and sprinstalled. Alternation	None None on ecifies the slot (1 atively, specifies the	der), 1 outp / encoder), - - 3) on the d	ut. no output. 1 = 1 rive's contro	n I board into	which mo	dule 1 is		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-33 0 5 Module 1 location Activates and spinstalled. Alternation	None None on. becifies the slot (1 atively, specifies the 1 is in slot 1.	der), 1 outp / encoder), - - 3) on the d	ut. no output. 1 = 1 rive's contro	n I board into	which mo	dule 1 is		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module	None None on. ecifies the slot (1 atively, specifies the 1 is in slot 2.	der), 1 outp / encoder), - - 3) on the d	ut. no output. 1 = 1 rive's contro	n I board into	which mo	dule 1 is		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-33 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module	None None None on. ecifies the slot (1 atively, specifies the 1 is in slot 1. e1 is in slot 2. e1 is in slot 3.	der), 1 outp / encoder), - 3) on the d node ID of	ut. no output. 1 = 1 rive's contro the slot on a	n I board into FEA-03 I/C	which mo	dule 1 is		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-33 0 5 Module 1 location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node	None None None None In 1 input (HTL safety None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of	ut. no output. 1 = 1 rive's contro the slot on a	n I board into FEA-03 I/C	o which mo O extension	odule 1 is n module.		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-32 0 5 Module 1 location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node I	None None None on. ecifies the slot (1 atively, specifies the 1 is in slot 1. 1 is in slot 2. 1 is in slot 3. ID of a slot on the F	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O e	ut. no output. 1 = 1 rive's contro the slot on a	n I board into FEA-03 I/C	o which mo O extension	odule 1 is n module.		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node Incomposer or set	None None None In I input (HTL safety None In I input (HTL safety None I in I input (HTL safety None I in I input (HTL safety None I in I input (HTL safety I input (H	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O e	ut. no output. 1 = 1 rive's contro the slot on a xtension modern	n I board into FEA-03 I/C dule. dule can be	which mo extension typed in u	odule 1 is n module. sing Drive		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node I Composer or set 1 254	None None None on. ecifies the slot (1 atively, specifies the 1 is in slot 1. 1 is in slot 2. 1 is in slot 3. ID of a slot on the F	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O e	ut. no output. 1 = 1 rive's contro the slot on a	n I board into FEA-03 I/C	o which mo O extension	odule 1 is n module.		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node of Composer or set of 1 254 Module 2 type	None None None In I input (HTL safety None In I input (HTL safety None I in I input (HTL safety None I in I input (HTL safety None I in I input (HTL safety I input (H	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O e	ut. no output. 1 = 1 rive's contro the slot on a xtension modern	n I board into FEA-03 I/C dule. dule can be	which mo extension typed in u	odule 1 is n module. sing Drive		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node of the composer or set of the composer or set of the composer. Module 2 type Module 2, type.	None None None None In I input (HTL safety None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. -	ut. no output. 1 = 1 rive's contro the slot on a xtension modern	n I board into FEA-03 I/C dule. dule can be	which mo extension typed in u	odule 1 is n module. sing Drive		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node is Composer or set 1 254 Module 2 type Module 2, type. Activates (and s	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. -	ut. no output. 1 = 1 rive's contro the slot on a xtension modern	n I board into FEA-03 I/C dule. dule can be	which mo extension typed in u	odule 1 is n module. sing Drive		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node In Composer or set 1 254 Module 2 type Module 2, type. Activates (and sign): None; inactive	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. - module 2.	ut. no output. 1 = 1 rive's contro the slot on a xtension modern contension modern.	n I board into FEA-03 I/C dule. dule can be	which mo extension typed in u	odule 1 is n module. sing Drive		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node of Composer or set of 1 254 Module 2 type Module 2, type. Activates (and some one of the composer) 1: FEN-01; FEN-01	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. - module 2.	ut. no output. 1 = 1 rive's contro the slot on a xtension mod tension mod	n I board into FEA-03 I/C dule. dule can be	typed in us	odule 1 is module.		
1.12	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node of Composer or set 1 254 Module 2 type Module 2, type. Activates (and spinstalled) 0: None; inactive 1: FEN-01; FEN-01 2: FEN-11; FEN-11	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. - module 2.	ut. no output. 1 = 1 rive's contro the slot on a xtension mod tension mod	n I board into FEA-03 I/C dule. dule can be	typed in us	odule 1 is module.		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alterna 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node is Composer or set 1 254 Module 2 type Module 2, type. Activates (and signs of the s	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O estanel. - module 2. oder), 1 outple encoder, Toutple encoder)	ut. no output. 1 = 1 rive's contro the slot on a xtension mod tension mod 1 = 1 out. TL encoder),	n I board into FEA-03 I/C dule. dule can be	typed in us	odule 1 is module.		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node of the composer or set of the composer or	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. - module 2. oder), 1 outp	ut. no output. 1 = 1 rive's contro the slot on a xtension mod tension mod 1 = 1 out. TL encoder), er), 1 output.	n I board into FEA-03 I/C dule. dule can be	typed in us	odule 1 is module.		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Module 1, location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node If Composer or set 1 254 Module 2 type Module 2, type. Activates (and spinstalled) 1: FEN-01; FEN-01 2: FEN-11; FEN-11 time of publication 3: FEN-21; FEN-2 4: FEN-31; FEN-3	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. - module 2. oder), 1 outp	ut. no output. 1 = 1 rive's contro the slot on a xtension mod tension mod 1 = 1 out. TL encoder), er), 1 output ut.	n I board into FEA-03 I/C dule. dule can be	typed in us	odule 1 is module. sing Drive Parameter ted at the		
	4: FEN-31; FEN-3 5: FSE-31; FSE-31 0 5 Module 1 location Activates and spinstalled. Alternation 1: Slot 1; module 2: Slot 2; module 3: Slot 3; module 04 254: Node Note: The node of the composer or set of the composer or	None None None None None None None None	der), 1 outp / encoder), - 3) on the d node ID of EA-03 I/O exanel. - module 2. oder), 1 outp	ut. no output. 1 = 1 rive's contro the slot on a xtension mod tension mod 1 = 1 out. TL encoder), er), 1 output.	n I board into FEA-03 I/C dule. dule can be	typed in us	odule 1 is module.		

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Activates and spe	cifies the slot (1 3	3) on the d	rive's contro	ol board into	which mo	dule 2 is
	installed. Alternat See 91.12 Module	ively, specifies the r 1 location.	node ID of	the slot on a	a FEA-03 I/C	extension	n module.
	1 254	Slot 3	-	1 = 1	n	n	Parameter
91.21	Module 1 temp se	nsor type					•
	Specifies the type Note: Module 1 m 0: None; disable n 1: PTC; PTC senso Temperature 2 so 2: KTY84; KTY84 s	ensor connected to	d by paran re monitor lule 1. See	neters 91.11 ring function 35.11 Tempe	91.12. ı. rature 1 sou		
	Temperature 2 so			Ta a			
	02	None	-	1 = 1	n	у	Parameter
91.22	Defines the filter	ne constant for tem time constant for th		ature measu	rement thro	ough modu	ı
91.24	0 10000 Module 2 temp se	1500	ms	1 = 1 ms	n	У	Parameter
	Note: Module 2 m 0: None; disable n 1: PTC; PTC senso Temperature 2 so 2: KTY84; KTY84 s Temperature 2 so	sensor connected to urce.	d by parar re monitor lule 2. See o module 2	neters 91.13 ring functior 35.11 Tempe . See 35.11 T	91.14. n. rature 1 sou emperature	1 source a	and 35.21
	0 2	None	-	1 = 1	n	У	Parameter
91.25	-	ter time ne constant for tem time constant for th 1500	•			ough modu y	ile 2.
91.31	Module 1 TTL out	put source		1		1-	1
	output. Note: This 0: Not selected; m 1: Module input 1; 2: Module input 2	er input on module s can be used as a s nodule 1 TTL output module 1 input 1 is module 1 input 2 is	plitter. not in use echoed by	e. or emulated	d to the TTL	output.	he TTL
	0 2	Not selected	-	1 = 1	n	у	Parameter
91.32		on pulses/rev per revolution for th er of TTL pulses per 0			oder emula	tion outpu	it of module I
91.33	Module 1 emulate				1''	<u> </u> 7	1 aranneter
J1.JJ	Module 1, position	of the emulated ze pulses are emulate	•		ro-position	received fr	om the

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Examples: - With a value of 0.50 revolutions. - With a value of 0.0 zero position.	•				•	•				
	0.00000 1.00000	0.00000	rev	32767 = 1 rev	n	у	Parameter				
91.41	Module 2 TTL output s	source	•		•	•					
	Selects the encoder in output. Note: This can 0: Not selected ; modul 1: Module input 1 ; module input 2; module input 2; module input 2; module input 3;	be used as a spli le 2 TTL output no dule 2 input 1 is ec	tter. ot in use. choed by	or emulated	to the TTL	output.	he TTL				
	0 2	Not selected	-	1 = 1	n	у	Parameter				
91.42	Module 2 emulation p		TTI avatura								
	Module 2, pulses per re Defines the number of 2.				der emula	tion outpu	t of module				
	0 65535	0	-	1 = 1	n	у	Parameter				
91.43	Module 2 emulated Z-	pulse offset									
		ses are emulated	in relatio								
I	 With a value of 0.50000, a zero pulse is emulated whenever the encoder position passes 0.5 revolutions. With a value of 0.00000, a zero pulse is emulated whenever the encoder position passes 										
	 With a value of 0.0 zero position. 	0000, a zero puls	e is emula	ated whenev	er the enco	oder positi	on passes				

92 Encoder 1 configuration

Settings for encoder 1.

Notes:

- The contents of the parameter group varies according to the selected encoder type.
- It is recommended that encoder connection 1 (this group) is used whenever possible since the data received through this interface are more actual than the data received through connection 2 (group 93).

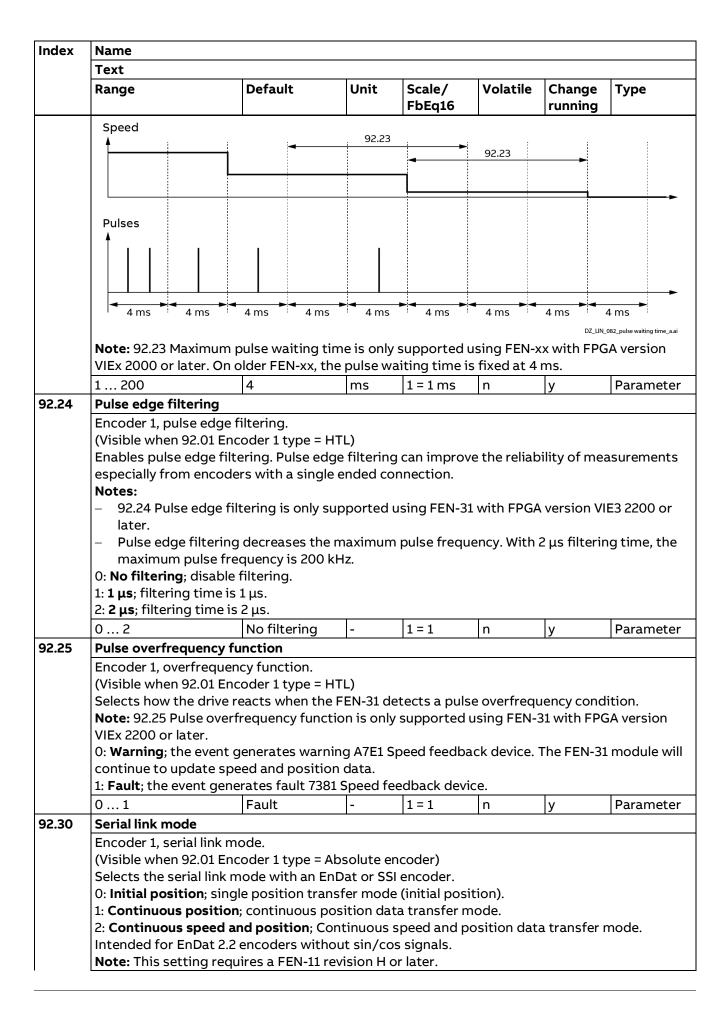
Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Type			
92.01	Encoder 1 type		•			•	•			
	0: None ; inactiv 1: TTL ; TTL, mod	specifies the type of)	N-01 (X31), F	EN-11 (X41)	or FEN-21 ()	X51).				

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	4: Resolver ; reso 5: HTL ; HTL, mod 6: HTL 1 ; HTL, mod 7: HTL 2 ; HTL, mod	der; absolute encode lver, module type (in dule type (input): FEN odule type (input): FS odule type (input): FS	put): FEN- I-31 (X82). SE-31 (X31) SE-31 (X32)	21 (X52).	·	12).	
	Attention: FEN-1	1 is not supported at None configured	t the time	1 = 1	n n	n	Parameter
92.02	Encoder 1 source						
	physical location module settings 0: Module 1 ; mod	ule (either module 1 c s and types of encod	der interfa	ce modules a	are defined .12.		
	0 1	Module 1	-	1 = 1	n	n	Parameter
92.10	Pulses/revolution	on .	•	•	•	1	•
	(Visible when 92.	s per revolution (ppr) 01 Encoder 1 type = ⁻ 1 pulses per revolution	TTL, TTL+		olate.		_
	0 65535	2048	ppr	1 = 1 ppr	n	у	Parameter
92.10	Sine/cosine num	nber					
	(Visible when 92. Defines encoder Note: No need to	per of sine/cosine wa 01 Encoder 1 type = 7 1 number of sine/co o set 92.10 Sine/cosir e. See 92.30 Serial lin	Absolute e sine wave ne number	ncoder) cycles withir	n one revolu		used in
	0 65535	0	-	1 = 1	n	у	Parameter
92.10	(Visible when 92. Defines the frequency Note: With an En	I frequency Ition signal frequency 01 Encoder 1 type = I Juency of the excitation Dat or HIPERFACE en Signal frequency is a	Resolver) on signal. ncoder and				
	1 20	1	kHz	1 = 1 kHz	n	у	Parameter
92.11	Selects the type 0: Quadrature; q 1: Single track; s Note: With settir direction of rota	01 Encoder 1 type = 0 of encoder 1. uadrature encoder w ingle-track encoder v ng Single track, the m tion.	rith two ch vith one ch	annels, A an nannel, A. peed value is			
	0 1	Quadrature	-	1 = 1	n	у	Parameter
92.11		on source e for absolute position 01 Encoder 1 type = 1		ncoder)			

ndex	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
2.11	0: None; not select 1: Commutation 2: EnDat; serial in 3: Hiperface; serial 4: SSI; resolver, so 5: Tamagawa; se 0 5 Excitation signal Encoder 1, excita (Visible when 92.) Defines the rms a 4.0 12.0 Speed calculatio Encoder 1, encod (Visible when 92.) Selects the speed *With a single-trapositive. 0: A&B all; channel *Channel B define	signals; commutation terface: EnDat encoral interface: HIPERFA erial interface: SSI erial interface: Tamage None amplitude tion signal amplitude of the except of the	on signal der. ACE encoder. lawa 17/ - e. Resolver; itation s V mode. ITL, TTL	formation. s. oder. 33-bit encode 1 = 1 ignal. 10 = 1 V + or HTL) der type = Sinedges are used	n n ngle track, thed for the sp above.	y ne speed is eed calcula	ition.		
	1: A all; channel A rising and falling edges are used for speed calculation. *Channel B defines the direction of rotation, see comment above. 2: A rising; channel A rising edges are used for speed calculation. *Channel B defines the direction of rotation, see comment above. 3: A falling; channel A falling edges are used for speed calculation. *Channel B defines the direction of rotation, see comment above. 4: Auto rising; one of the above modes is selected automatically depending on the pulse								
	frequency:	4-1 1	.						
		ency of the channel(ed mode					
	< 2442 Hz			B all					
	2442 488	4 Hz	A a						
	> 4884 Hz			ising					
	5: Auto falling ; or frequency:	ne of the above mod	1		atically depe	nding on th	ne pulse		
	Pulse freque	ency of the channel(s) Us	ed mode					
	< 2442 Hz		Α&	B all					
	2442 488	4 Hz	A a	II					
	> 4884 Hz		A f	alling					
	0 5	0		4 - 4		1	<u> </u>		
12	0 5	Auto rising	-	1 = 1	n	У	Paramete		
2.12	Zero pulse enable								
		e zero puise. 01 Encoder 1 type = <i>I</i> s the encoder zero pi			encoder inpu	ıt (X42) of 1	the FEN-11.		

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	HIPERFACE, SSI or 0: Disable ; disable	e exists with serial Tamagawa. the encoder zero po ne encoder zero pul	ulse.	, when 92.11	. Absolute p	osition sou	ırce = EnDat,			
	0 1	Disable	-	1 = 1	n	у	Parameter			
92.12	(Visible when 92.03	of resolver pole pa LEncoder 1 type = R er of pole pairs of th	esolver)							
	1 32		_	1 = 1	n	у	Parameter			
92.13	Position estimation	n enable		1-1		У	Farameter			
	Enables/Disables to Disable; disable times the number pulses per revoluti 1: Enable; enable to	I Encoder 1 type = T the position estima the position estima of pulses per revolu on for single-track on the position estimat the is extrapolated at	tion to inc ation. Mea Ition for q encoders. ion. Estim	rease the position of the posi	ion is used. ncoders and on is used. U	The resolud 2 times th	tion is 4 ne number of			
	01	Enable	-	1 = 1	n	у	Parameter			
	(Visible when 92.0) Defines the number Example: A setting The value is used value is used value position Note: With an EnD	of bits used in the Encoder 1 type = A er of bits used to income of 15 bits correspondence = Tamagawa at or HIPERFACE en width is automatic	bsolute endicate the onds to 32 position sa, 92.13 Pocoder and	ncoder) position with 768 position source = Enl sition data la FEN-11 wi	thin one revoluments per revol	volution. ution. ace or SSI. V ernally set t rsion VIE12	to 17. 200 or later,			
92.14	Speed estimation	enable				-				
	Encoder 1, enable speed estimation. (Visible when 92.01 Encoder 1 type = TTL, TTL+ or HTL) Selects whether calculated or estimated speed is used. Estimation increases the speed ripple in steady state operation but improves the dynamics. Note: 92.14 Speed estimation enable is not effective using FEN-xx with FPGA version VIEx 2000 or later. 0: Disable; last calculated speed is used. The calculation interval is 62.5 µs 4 ms. 1: Enable; estimated speed is used, estimated at the time of data request.									
	0 1	Disable	-	1 = 1	n	у	Parameter			
92.14	(Visible when 92.0) Defines the number Example: A setting The value is used value position	idth r of bits used in the I Encoder 1 type = A er of bits used in the g of 12 bits would su when 92.11 Absolute source = Tamagawa iturn data requestin	bsolute enerolution position s position s a, setting s	ncoder) on counting of onting to 40! source = Enl	96 revolutic Dat, Hiperfa	ons. ace or SSI. V	Vhen 92.11			

Index	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Note: With an En	Dat or HIPERFACE 6	encoder and	a FEN-11 FF	PGA version	VIE12200 d	or later, 92.14					
	Revolution data v	width is automatica	lly set usin	g 91.10 Enco	der parame	ter refresh	= Refresh.					
	0 32	0	-	1 = 1	n	у	Parameter					
92.15	Transient filter											
	Encoder 1, transient filter.											
	(Visible when 92.	(Visible when 92.01 Encoder 1 type = TTL, TTL+ or HTL)										
	Activates the trai	nsient filtering for e	encoder 1. T	hus, uninten	itional chan	ges in dire	ction of					
	_	rotation are ignored. Should be activated when the connected mechanics are vibrating heavily										
	1	0: 4880 Hz ; change in direction of rotation allowed below 4880 Hz.										
	1: 2440 Hz ; change in direction of rotation allowed below 2440 Hz.											
92.17	2: 1220 Hz ; change in direction of rotation allowed below 1220 Hz. 3: Disable ; change in direction of rotation allowed at any pulse frequency.											
			ation allow		lse frequen	Ţ.						
	0 3	4880 Hz	-	1 = 1	n	у	Parameter					
	Accepted pulse f	Accepted pulse freq of encoder 1										
	Encoder 1, maximum pulse frequency.											
	(Visible when 92.01 Encoder 1 type = HTL 1 or HTL 2)											
	Defines the maxi	mum pulse frequen	cy of encod	der 1.								
	0 300	0	kHz	1 = 1 kHz	n	у	Parameter					
92.21	Encoder cable fault mode											
	Encoder 1, mode for a cable fault.											
	(Visible when 92.01 Encoder 1 type = TTL, TTL+ or HTL)											
	Selects which encoder track channels are monitored for wiring faults. In case of problems, the											
	event generates warning A7E1 Speed feedback device or fault 7381 Speed feedback device,											
	depending on the setting of 31.35 Motor feedback fault.											
	0: A, B ; tracks A and B.											
	1: A, B, Z ; tracks A, B and Z.											
	2: A+, A-, B+, B- ; tracks A+, A-, B+ and B											
	3: A+, A-, B+, B-, 	Z+, Z- ; tracks A+, A-,	B+, B-, Z+	and Z	1	1	1					
	0 3	A, B	-	1 = 1	n	у	Parameter					
92.23	Maximum pulse	Maximum pulse waiting time										
	Encoder 1, maxim	num pulse waiting t	ime.									
	(Visible when 92.	01 Encoder 1 type =	TTL or HTL	.)								
		r is used as speed fe			•							
	1 -	urement interval. Th										
	-	oulse waiting time c		•	-	•						
		coder 1. If no pulse	_									
	I	feedback is set to z		_	e can impro	ve measur	ing					
		ecially at low, near										
		neasurement is affe	-	-								
		n the measured spe	ed from th	e ınterface is	s zero, the d	Irive updat	es its speed					
	data based on po	osition changes.										



Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0 2	Initial position	-	1 = 1	n	у	Parameter
92.31	EnDat max calcula	tion time				1-	
	(Visible when 92.0 Selects the maxim Note: 92.31 EnDat	um calculation time. I Encoder 1 type = Ab um encoder calculati max calculation time e.g., without increm nk mode. 50 ms	ion time needs t	for an EnDa o be set only	when an Ei		
92.32	SSI cycle time	30 1113			1	J	- arameter
	Selects the transm Note: 92.32 SSI cyc	1 Encoder 1 type = Ab hission cycle for an SS tle time needs to be s t incremental sin/co	SI encod set only v	er. when an SSI			
	0 5	100 μs	-	1 = 1	n	у	Parameter
92.33	Defines the length	ssage length. 1 Encoder 1 type = Ab of an SSI message. I llated by adding 1 to	The leng	th is the nun		-	
92.34	SSI position msb	'	I	- 1			1
	Encoder 1, position (Visible when 92.0 With an SSI encoder message. 1 126	n data MSB (M ost S ig 1 Encoder 1 type = Ab er, defines the location	solute e	ncoder)			n SSI Parameter
92.35	SSI revolution msl	·		<u> </u>			
	(Visible when 92.0	on count MSB (M ost 1 Encoder 1 type = Ab er, defines the location	solute e	ncoder)			n an SSI Parameter
92.36	SSI data format	-			1	ر ا	
J2.J0	Encoder 1, SSI data (Visible when 92.0	a format. 1 Encoder 1 type = Ab er, selects the data fo		ncoder)			

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	0: Binary ; binary c 1: Gray ; gray code		'							
	0 1	Binary		1 = 1	n	у	Parameter			
92.37	SSI baud rate	Billary		1 - 1	11	У	Paramete			
92.40	Encoder 1, SSI baud rate. (Visible when 92.01 Encoder 1 type = Absolute encoder) With an SSI encoder, selects the baud rate. 0: 10 kbit/s; 10 kbit/s. 1: 50 kbit/s; 50 kbit/s. 2: 100 kbit/s; 100 kbit/s. 3: 200 kbit/s; 200 kbit/s. 4: 500 kbit/s; 500 kbit/s. 5: 1000 kbit/s; 1000 kbit/s.									
	05	100 kBit/s		1 = 1	n	у	Parameter			
	SSI zero phase	1200 (1010) 3			1	ן ז	I arainete			
	zero on the SSI serial link data. 92.40 SSI zero phase is used to adjust the synchronization of the SSI position data and the position based on sine/cosine incremental signals. Incorrect synchronization may cause an error of ±1 incremental period. Note: 92.40 SSI zero phase needs to be set only when an SSI encoder is used in initial position mode (see 92.30 Serial link mode). 0: 315 45 deg; 315° 45°. 1: 45 135 deg; 45° 135°. 2: 135 225 deg; 135° 225°.									
	3: 225 315 deg ; <i>i</i>	315-45 deg	_	1 = 1	n	V	Paramete			
92.45	Hiperface parity	313-45 deg		1 - 1		У	Paramete			
	Encoder 1, HIPERFACE parity. (Visible when 92.01 Encoder 1 type = Absolute encoder) With a HIPERFACE encoder, selects the use of parity and stop bits. Note: Typically, 92.45 Hiperface parity does not need to be set. 0: Odd; odd parity indication bit, one stop bit. 1: Even; even parity indication bit, one stop bit.									
	0 1	Odd	-	1 = 1	n	у	Parameter			
92.46	Hiperface baud rate Encoder 1, HIPERFACE baud rate. (Visible when 92.01 Encoder 1 type = Absolute encoder) With a HIPERFACE encoder, selects the transfer rate of the link. Note: Typically, 92.46 Hiperface baud rate does not need to be set. 0: 4800 bits/s; 4800 bits/s. 1: 9600 bits/s; 9600 bits/s. 2: 19200 bits/s; 19200 bits/s. 3: 38400 bits/s; 38400 bits/s.									
	0 3	4800 bits/s	-	1 = 1	n	у	Paramete			
92.47	Hiperface node ac	ddress	ı	<u>.</u>						
	Encoder 1, HIPERF	ACE encoder node 1 Encoder 1 type =		ncoder)						

Index	Name									
	Text									
	Range Default Unit Scale/ Volatile Change running Type									
	With a HIPERFACE encoder, selects the node address. Note: Typically, 92.47 Hiperface node address does not need to be set.									
	0 255	64	-	1 = 1	n	у	Parameter			

93 Encoder 2 configuration

Settings for encoder 2.

Description see group 92 Encoder 1 configuration.

Notes:

- The contents of the parameter group varies according to the selected encoder type.
- It is recommended that encoder connection 1 (group 92) is used whenever possible since the data received through that interface is fresher than the data received through connection 2 (this group).

94 OnBoard speed feedback configuration

Settings for analog tacho and OnBoard encoder.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
94.01	EMF speed									
	EMF speed. Displays the speed 96.03 Unit for speed				, % or V. T	he unit is s	elected by			
	-30000.00	-		See 46.02	у	n	Signal			
	30000.00		or V							
94.02	Tacho voltage									
94.03	Value of XTAC (tach Displays the value o	•	ected to XTA	C in V.						
	-3250.0 3250.0	-	V	10 = 1 V	у	n	Signal			
	Tacho speed									
	Tacho speed. Displays the speed feedback measured by the tacho in rpm.									
	-30000.00 30000.00	-	rpm	See 46.02	У	n	Signal			
94.04	OnBoard encoder speed									
	OnBoard encoder speed. Displays the speed feedback measured by the OnBoard encoder in rpm.									
	-30000.00 30000.00	-	rpm	See 46.02	У	n	Signal			
94.07	M1 tacho type		•	•	•	'	•			
	Motor 1 type of connected tacho. Depending on the type of the connected tacho, a hardware filter of 40 ms is activated. 0: DC tacho; disable filter. 1: AC tacho; enable filter.									
	0 1	DC tacho	-	1 = 1	n	у	Parameter			
94.08	M1 tacho voltage a	1000 rpm	•		1		•			
	A tacho generates t calculate 94.10 M1 t	Motor 1 tacho voltage at 1000 rpm. A tacho generates this voltage at a speed of 1000 rpm, see tacho nameplate. It is used to calculate 94.10 M1 tacho tuning gain. Measure and set the value using 99.20 Tuning requested = Speed feedback assistant.								

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	- 94.08 M1 tacho	voltage at 1000 rp	m ≥ 1.0 V,	the value is s	et by hand						
	- 94.08 M1 tacho voltage at 1000 rpm = 0.0 V, the value is to be measured by means of the										
	speed feedbac										
		voltage at 1000 rp		, the value wa	s successf	ully measu	ired and set				
		e speed feedback a			1						
	-270.0 270.0	0.0	V	10 = 1 V	n	у	Parameter				
94.09	M1 tacho max disp										
	Internally used ma voltage, see 94.08 For maximum spee maximum speed, 3	Motor 1 maximum displayable speed. Internally used maximum tacho speed for motor 1. This value is depending on the tacho output voltage, see 94.08 M1 tacho voltage at 1000 rpm, and the maximum speed of the drive system. For maximum speed, see 46.02 M1 speed scaling actual, 30.11 M1 minimum speed, 30.12 M1 maximum speed, 31.30 M1 overspeed trip margin and 99.14 M1 nominal (base) speed.									
	Via 99.20 TunirVia 94.08 M1 ta	The value is only valid if written to by: - Via 99.20 Tuning requested = Speed feedback assistant.									
	0.00 30000.00	0.00	rpm	See 46.02	n	у	Parameter				
94.10	M1 tacho tuning g	ain									
	The value is only valid if written to by: - Via 99.20 Tuning requested = Speed feedback assistant. - Via 94.08 M1 tacho voltage at 1000 rpm. - Via parameter download.										
	0 5	5	-	1 = 1	n	У	Parameter				
94.11	Motor 1 tacho fine-tuning adjust. Internally used fine-tuning adjust of the tacho for motor 1. The value equals the speed feedback measured by means of a handheld tacho. Set the value of 94.11 M1 tacho fine-tuni adjust to the measured speed feedback of a handheld tacho. The value is only valid if written to by: - Via 99.20 Tuning requested = Tacho fine-tuning. During the tacho fine-tuning 90.41 M1 feedback selection is automatically forced to EMF. - Via parameter download. Attention: The value of 94.11 M1 tacho fine-tuning adjust must be the measured speed feedback of a handheld tacho and not to the delta between speed reference and measured speed in the drive. -30000.00 O.00 rpm See 46.02 n y Parameter speed reference Parameter Paramete										
94.12	M1 tacho fine-tuni	ing factor									
		ho fine-tuning facto	or for mot								
	0.30 3.00	1.00	-	100 = 1	n	у	Parameter				
	M1 tacho offset										
94.13	M1 tacho offset	et.									
94.13	M1 tacho offset Motor 1 tacho offs										
94.13	M1 tacho offset Motor 1 tacho offs	et. 94.03 Tacho speed. 0.00	rpm	See 46.02	n	У	Parameter				

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	OnBoard encoder, position within one revolution.										
	Displays the OnBoard encoder position, within one revolution. See 90.48 Motor position axis mode.										
	0.00000000	-	rev	32767 = 1	у	n	Signal				
	1.0000000			rev							
94.18	OnBoard encoder revolution extension										
	OnBoard encoder, revolution count extension. Displays the revolution count extension for the OnBoard encode. See 90.48 Motor position axis mode.										
	The counter is incremented, when the encoder position wraps around in positive direction and decremented in negative direction. See 90.11 Encoder 1 position.										
	-2147483648 2147483647	-	-	1=1	у	n	Signal				
94.23	OnBoard encoder	 oulses/revolution									
34.L3	OnBoard encoder,										
	Defines the OnBoa	•		tion see enc	oder name	olate					
	Note: Formula to ca	•	•								
				0.1000.01		. 0,000					
	$f_{max} [kHz] = \frac{n_{max} [rpm] \times ppr}{60 \text{ s} * 1000}$										
	with: ppr = pulses per revolution, see 94.26 OnBoard encoder transient filter.										
	0 65535	2048	ppr	1 = 1 ppr	n	у	Parameter				
94.24	OnBoard encoder t		IPP.	-	1)					
- 1,- 1	OnBoard encoder type OnBoard encoder, type.										
	Selects the type of the OnBoard encoder.										
	0: Quadrature ; quadrature encoder with two channels, A and B.										
	1: Single track; single-track encoder with one channel, A.										
	Note: With setting Single track, the measured speed value is always positive regardless of										
							raiess of				
	direction of rotation						raiess of				
			-	1 = 1	n	у	Parameter				
94.25	direction of rotation	Quadrature	-			_	T				
94.25	direction of rotation 0 1	Quadrature	- mode			_	T				
94.25	direction of rotation 0 1 OnBoard encoder some of the speed of t	Quadrature speed calculation speed calculation calculation mode.	- mode mode.	1 = 1	n	у	Parameter				
94.25	onBoard encoders OnBoard encoders Selects the speed of O: A&B all; channels	Quadrature speed calculation speed calculation calculation mode. A and B rising and	rode mode.	1 = 1 ges are used	n I for the sp	y eed calcula	Parameter tion and				
94.25	direction of rotation of 1 OnBoard encoder of the second of the sec	Quadrature Speed calculation speed calculation calculation mode. S A and B rising and 4 OnBoard encode	- mode mode. d falling ed r type = Qu	1 = 1 ges are used adrature. Th	n I for the speed ev	y eed calcula aluation fa	Parameter tion and ctor = 4.				
94.25	direction of rotation of 1 OnBoard encoder some of the speed of t	Quadrature Speed calculation speed calculation calculation mode. S A and B rising and 4 OnBoard encode s channel A rising a	- mode mode. d falling ed r type = Qu ind falling e	ges are used adrature. The	n I for the sp e speed ev ed for spee	y eed calcula aluation fa	Parameter tion and ctor = 4. on. Channel B				
94.25	direction of rotation of 1 OnBoard encoder some of the speed of t	Quadrature Speed calculation Speed calculation Calculation mode. S A and B rising and OnBoard encode C channel A rising a	- mode mode. d falling ed r type = Qu ind falling e	ges are used adrature. The	n I for the sp e speed ev ed for spee	y eed calcula aluation fa	Parameter tion and ctor = 4. on. Channel B				
94.25	direction of rotation of 1 OnBoard encoders OnBoard encoders Selects the speed of 0: A&B all; channels direction. Set 94.24 1: A all, B directions defines the direction evaluation factor =	Quadrature Speed calculation speed calculation calculation mode. A and B rising and OnBoard encode channel A rising a on of rotation. Set	r type = Qu und falling ed ralling ed ralling e	ges are used adrature. The edges are use oard encode	n I for the speed eved for speed r type = Qu	y eed calcula aluation fa ed calculati adrature. T	Parameter Ition and ctor = 4. on. Channel B				
94.25	direction of rotation of 1 OnBoard encoder of selects the speed of 0: A&B all; channels direction. Set 94.24 1: A all, B direction; defines the direction evaluation factor = 2: A rising, B direction	Quadrature speed calculation speed calculation calculation mode. A and B rising and OnBoard encode channel A rising a on of rotation. Set 2.	r type = Quand falling ed nod falling ed and falling ed 94.24 OnB	ges are used adrature. The edges are used oard encode re used for s	n I for the speed eved for speed r type = Qu	y eed calcula aluation fa d calculati adrature. T	Parameter Ition and ctor = 4. on. Channel B The speed				
94.25	direction of rotation of 1 OnBoard encoder so the speed of the sp	Quadrature speed calculation speed calculation calculation mode. A and B rising and OnBoard encode channel A rising a on of rotation. Set 2. cion; channel A risin on of rotation. Set	r type = Quand falling ed nod falling ed and falling ed 94.24 OnB	ges are used adrature. The edges are used oard encode re used for s	n I for the speed eved for speed r type = Qu	y eed calcula aluation fa d calculati adrature. T	Parameter Ition and ctor = 4. on. Channel B The speed				
94.25	direction of rotation of 1 OnBoard encoder so the speed of the sp	Quadrature Speed calculation Speed calculation Calculation mode. S A and B rising and OnBoard encode C channel A rising a C no frotation. Set C. Cion; channel A risin Con of rotation. Set Con of rotation. Set Con of rotation. Set	r type = Quand falling ed and falling ed of alling ed and falling ed 94.24 OnB	ges are used ladrature. The edges are used oard encode re used for soard encode	n I for the speed eved for speed r type = Queed calcurtype = Queen typ	eed calcula aluation fa ad calculati adrature. T lation. Cha adrature. T	Parameter Ition and ctor = 4. on. Channel B The speed Innel B The speed				
94.25	direction of rotation of 1 OnBoard encoder so the speed of the sp	Quadrature speed calculation speed calculation calculation mode. A and B rising and Channel A rising a con of rotation. Set 2. cion; channel A risi on of rotation. Set 1. tion; channel A fall	r type = Quand falling ed 94.24 OnB	ges are used adrature. The edges are used for so oard encode are used for so are used for so oard encode	n I for the speed eved for speed rtype = Que peed calcur type = Que speed calcurs type = Que spe	eed calcula aluation fa d calculati adrature. T lation. Cha adrature. T	Parameter Ition and ctor = 4. on. Channel B The speed Innel B The speed Innel B The speed				
94.25	direction of rotation of 1 OnBoard encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoderines the direction evaluation factor = 2: A rising, B direct defines the direction evaluation factor = 3: A falling, B direct defines the direction defines the direction encoderines the direction defines the direction defines the direction defines the direction defines the direction of the state of the stat	Quadrature speed calculation speed calculation calculation mode. A and B rising and OnBoard encode channel A rising a on of rotation. Set 2. cion; channel A risi on of rotation. Set 1. tion; channel A fall on of rotation. Set	r type = Quand falling ed 94.24 OnB	ges are used adrature. The edges are used for so oard encode are used for so are used for so oard encode	n I for the speed eved for speed rtype = Que peed calcur type = Que speed calcurs type = Que spe	eed calcula aluation fa d calculati adrature. T lation. Cha adrature. T	Parameter Ition and ctor = 4. on. Channel B The speed Innel B The speed Innel B The speed				
94.25	direction of rotation of 1 OnBoard encoder of the speed of the sp	Quadrature speed calculation speed calculation calculation mode. A and B rising and OnBoard encode channel A rising a on of rotation. Set 2. cion; channel A risin on of rotation. Set 1. tion; channel A fall on of rotation. Set 1.	r type = Quand falling ed gand falling ed gand falling ed 94.24 OnB gedges a gedges a gedges a gedges a	ges are used ladrature. The edges are used oard encode re used for soard encode are used for oard encode	n I for the sp e speed ev ed for spee r type = Qu peed calcu r type = Qu speed calc	eed calcula aluation fa ad calculati adrature. T lation. Cha adrature. T ulation. Ch	Parameter tion and ctor = 4. on. Channel B The speed nnel B The speed annel B The speed				
94.25	direction of rotation of 1 OnBoard encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoders on Board encoderines the direction evaluation factor = 2: A rising, B direct defines the direction evaluation factor = 3: A falling, B direct defines the direction defines the direction encoderines the direction defines the direction defines the direction defines the direction defines the direction of the state of the stat	Quadrature speed calculation speed calculation calculation mode. A and B rising and ConBoard encode channel A rising a con of rotation. Set 2. cion; channel A risi con of rotation. Set 1. tion; channel A fall con of rotation. Set 1. tion; channel A fall con of rotation. Set 1.	r type = Quand falling ed 94.24 OnB 194.24 OnB 194.24 OnB 194.24 OnB	ges are used ladrature. The edges are used for soard encode are used for oard encode are used for oard encode	n I for the speed evelowed for speed rype = Quertype =	eed calcula aluation fa ad calculati adrature. T lation. Cha adrature. T ulation. Ch adrature. T	Parameter Ition and ctor = 4. on. Channel B The speed Innel B The speed Innel B The speed Innel B The speed Innel B The speed				

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	5: B all ; channel B rising and falling edges are used for speed calculation. EMF speed feedback defines the direction of rotation. Can be used if channel A is defective. Set 94.24 OnBoard encoder type = Single-track. The speed evaluation factor = 2.										
	0 5										

94.26 OnBoard encoder transient filter

OnBoard encoder, transient filter.

Activates the transient filtering for the OnBoard encoder. Thus, unintentional changes in direction of rotation are ignored. Should be activated when the connected mechanics are vibrating heavily.

- 0: 0.0 µs; filter not active. Maximum frequency at the encoder is 300.0 kHz.
- 1: **1.6 µs**; fastest filter time. Maximum frequency at the encoder is 300.0 kHz.
- 2: 3.2 µs; fast filter time. Maximum frequency at the encoder is 150.0 kHz.
- 3: 6.4 µs; medium filter time. Maximum frequency at the encoder is 75.0 kHz.
- 4: 12.8 μs; slow filter time. Maximum frequency at the encoder is 37.5 kHz.

Note: Formula to calculate the frequency at the encoder with maximum speed:

$$f_{max} [kHz] = \frac{n_{max} [rpm] \times ppr}{60 \text{ s } *1000}$$

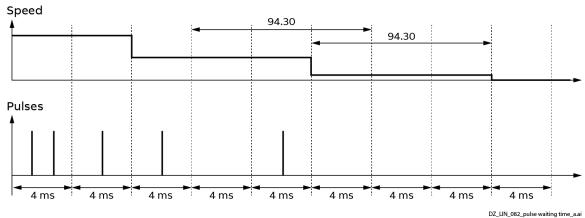
with: ppr = pulses per revolution, see 94.23 OnBoard encoder pulses/revolution.

0 4	1.6 µs	-	1 = 1	n	У	Parameter
-----	--------	---	-------	---	---	-----------

94.30 OnBoard encoder maximum pulse waiting time

OnBoard encoder, maximum pulse waiting time.

When an encoder is used as speed feedback device the actual speed is measured by counting pulses per measurement interval. The base (minimum) measurement interval is 4 ms. 94.30 OnBoard encoder maximum pulse waiting time determines the pulse waiting time for the speed feedback calculation of the OnBoard encoder. If no pulse edges are detected within the measurement interval, the measured speed feedback is set to zero. Increasing the time can improve measuring performance especially at low, near zero speeds.



Notes:

Formula to calculate the maximum speed using an encoder:

$$n_{max} [rpm] = \frac{300 [kHz] * 60 [s]}{ppr} * 1000$$

with: ppr = pulses per revolution, see 94.23 OnBoard encoder pulses/revolution. 300 kHz are the maximum allowed input frequency.

Index	Name	Name									
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	– Formula to cal	culate the minimun	n speed re	solution usin	g an encod	er:					
	$n_{min} [rpm] = \frac{60 [s]}{k \times ppr \times t_{cycle} [ms]} * 1000$										
	with: k = speed evaluation factor, see 94.25 OnBoard encoder speed calculation mode.										
	ppr = pulses per revolution, see 94.23 OnBoard encoder pulses/revolution. t_{cycle} = cycle time of the speed feedback measurement, 4 ms. See 94.30 OnBoard encoder maximum pulse waiting time.										
	 Only the speed measurement is affected. The position is updated whenever a new pulse edge is detected. When the measured speed from the interface is zero, the drive updates its speed data based on position changes. 										
	0 200	4	ms	1 = 1 ms	n	у	Parameter				

95 HW configuration

Various hardware-related settings.

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
5.14	Set: Power unit		•		•		•				
	Set: Power unit Set the type of power unit. 95.14 Set: Power unit is only shown and available when there is a mismatch between 95.14 Set Power unit read from SDCS-CON-H01 and 95.14 Set: Power unit read from the plugged-in memory unit. See also 07.02 Power unit set. Either adapt the SDCS-CON-H01 using 95.14 Set: Power unit and 95.25 Set: Type code or use a memory unit with an appropriate firmware. 0: DCS converter; the unit is a DCS880. 20: DCT controller; the unit is a DCT880. 40: TSU supply unit; the unit is a TSU880. 50: DCS H2 converter; the converter is a DCS880 H2. 100: Unsupported power unit type; mismatch between 95.14 Set: Power unit read from SDCS CON-H01 and 95.14 Set: Power unit read from the plugged-in memory unit. This event										
	generates fault 50FE Type code and shows 95.14 Set: Power unit. 0 100 Unsupported - 1 = 1 n n Parameter power unit type										
5.15	Set: Special HW se	Set: Special HW settings									
75.15	Hardware configuration. Contains hardware-related settings. 95.15 Set: Special HW settings is write protected. To enable use 95.24 Service mode = Set: Type code. Service mode = Set: Type code must be set back to Normal mode by the user. 0: 3ph B6C; the connected power part is a B6 configuration connected to three phase mains. 1: M3C; * the connected power part is a M3 configuration. 2: 2xM3C; * the connected power part is a double M3 configuration. 3: M6C; * the connected power part is a M6 configuration.										

Index	Name Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	4: 1ph B2C ; the connected power part is a B2 configuration or a B6 configuration connected to single phase mains. This setting is e.g., needed for the demo unit. * More information on request.										
	0 4	3ph B6C	-	1 = 1	n	n	Parameter				

95.16 Control unit configuration

Control/Electronic unit configuration.

Contains the structure of the unit. Either electronic unit and power unit are in the same housing as in units of sizes H1 ... H6 or control unit and power units are separate like in units of sizes H7, H8 or hardparallel dives.

A wrong setting of 95.16 Control unit configuration generates warning A113 Power unit, communication and/or A7AB I/O extension configuration.

- 0: **Internal**; electronic unit and power unit are usually in the same housing. E.g., for units of sizes H1 ... H6. Fiber optic control inactive.
- 1: **1 external PU**; control unit and one power unit are separate. For units of sizes H7 and H8. Channel1 of the SDCS-DSL-H1x is active. Fiber optic control active.
- 2: **2 external PUs**; control unit and two power units are separate. For two units of size H8 in hardparallel configuration. Channel1 and channel2 of the SDCS-DSL-H1x are active. Fiber optic control active.
- 3: **3 external PUs**; control unit and three power units are separate. For three units of size H8 in hardparallel configuration. Channel1 ... channel3 of the SDCS-DSL-H14 are active. Fiber optic control active.
- 4: **4 external PUs**; control unit and four power units are separate. For four units of size H8 in hardparallel configuration. Channel1 ... channel4 of the SDCS-DSL-H14 are active. Fiber optic control active.
- 9: **Automatic**; automatic setting according to 95.25 Set: Type code. For units of sizes H1 ... H8. **Example:** DCS880-S02-4000-05 power units in a hardparallel configuration.
- Setting of 95.16 Control unit configuration, 95.25 Set: Type code and 95.27 Set: Drive DC current scaling for 1 ... 4 power units.
- 07.62 Drive DC current scaling set shows the result.
- Both burden resistor arrangements are set automatically according to the type code. See parameters 95.16 and 95.25 ... 95.29. Thus, no cutting is required.

Amount of power units	DSL-H12/H14				07.62 Drive DC current scaling set
1	1	1 External PU	S02-4000-05	O A _{DC}	4000 A _{DC}
2	1, 2	2 External PUs	S02-4000-05	O A _{DC}	8000 A _{DC}
3	1, 2, 3	3 External PUs	S02-4000-05	O A _{DC}	12000 A _{DC}
4	1, 2, 3, 4	4 External PUs	S02-4000-05	O A _{DC}	16000 A _{DC}

09	Automatic	-	1 = 1	n	n	Parameter
			1			1

95.24 Service mode

Drive service mode.

The service mode contains Type code settings, thyristor test and firing pulse test procedures. Service mode is automatically reset to Normal mode after the thyristor test is finished/failed. In case errors occur during the selected procedure, warning AF90 Autotuning is generated. The reason of the error can be seen in the AUX code.

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	Service mode = Set	: Type code or Firing	g pulses	Vxx must be s	set back to	Normal m	ode by the
	user.						
	Notes:						
		hain is blocked whil individual firing puls					e the drive
		ormal operating mo	-	_	6 Operatio	n mode.	
		enables setting of fo	llowing	parameters:			
	 95.15 Set: Speci 						
	 95.25 Set: Type 	code.					
	 95.27 Set: Drive 	DC current scaling.					
	 95.28 Set: Drive 	AC voltage scaling.					
	Note:						
	 For drives size I 	H5 H8 make sure,	that 99.	11 M1 nominal	current is	set to 50 A	or higher.
	5: Thyristor test ; st	tarts a complete thy	ristor te	est. All thyristo	ors are test	ed. 05.22 D	Diagnostic
	shows the results.						
	11: Firing pulses V1	1; only firing pulses	for thyr	istor V11 are re	eleased.		
	12: Firing pulses V1	.2; only firing pulses	for thyr	istor V12 are r	eleased.		
	13: Firing pulses V1	.3; only firing pulses	for thyr	istor V13 are r	eleased.		
	14: Firing pulses V1	.4 ; only firing pulses	for thy	istor V14 are	released.		
	15: Firing pulses V1	. 5 ; only firing pulses	for thyr	istor V15 are r	eleased.		
	16: Firing pulses V1	. 6 ; only firing pulses	for thyr	istor V16 are ı	released.		
	21: Firing pulses V2	21 ; only firing pulses	for thyr	istor V21 are r	eleased.		
	22: Firing pulses V2	22 ; only firing pulses	for thy	istor V22 are i	released.		
	23: Firing pulses V2	23; only firing pulses	for thy	ristor V23 are i	released.		
	24: Firing pulses V2	24 ; only firing pulses	for thy	ristor V24 are	released.		
	25: Firing pulses V2	25 ; only firing pulses	for thy	ristor V25 are	released.		
	26: Firing pulses V2	26 ; only firing pulses	for thy	ristor V26 are	released.		
	31: Ch1 HP thyristo	r test ; starts a com	plete Th	yristor test. A	ll thyristors	of the pov	wer unit
	connected to chann	nel1 of the SDCS-DL	S-H1x ar	e tested. 05.2	2 Diagnost	ic shows tl	ne results.
	32: Ch2 HP thyristo	or test; starts a com	plete Th	yristor test. A	II thyristor:	s of the po	wer unit
	connected to chann	nel2 of the SDCS-DL	S-H1x ar	e tested. 05.2	2 Diagnost	ic shows t	he results.
	33: Ch3 HP thyristo	or test; starts a com	plete Th	yristor test. A	II thyristor	s of the po	wer unit
	connected to chann	nel3 of the SDCS-DL	S-H1x ar	e tested. 05.2	2 Diagnost	ic shows t	he results.
	34: Ch4 HP thyristo	or test ; starts a com	plete Th	nyristor test. A	ll thyristor	s of the po	wer unit
	connected to chanr	nel4 of the SDCS-DL	.S-H1x aı	e tested. 05.2	2 Diagnost	ic shows t	he results.
	0 34	Normal mode	-	1 = 1	у	n	Parameter
	Set: Type code	· ·	- I	1	17		1
5.25							
5.25	I Set the type code o	of the drive.					
95.25	Set the type code of Contains the drive's		temper	ature measure	ement and	its quadrai	nt type. 95.25
95.25	Contains the drive's	s current-, voltage-,	•			-	
95.25	Contains the drive's Set: Type code is pr	s current-, voltage-, reset in the factory	and is w	rite protected	l. To enable	use 95.24	
9 5.25	Contains the drive's Set: Type code is pr mode = Set Type co	s current-, voltage-, reset in the factory o ode. The change of t	and is w the type	rite protected code is imme	l. To enable diately take	e use 95.24 en over.	Service
3 5.25	Contains the drive's Set: Type code is promode = Set Type co 95.24 Service mode	s current-, voltage-, reset in the factory a ode. The change of t e = Set Type code m	and is w the type ust be s	rite protected code is imme et back to Nor	l. To enable diately take mal mode	e use 95.24 en over. by the use	Service
35.25	Contains the drive's Set: Type code is pr mode = Set Type co 95.24 Service mode 0: None ; the user se	s current-, voltage-, reset in the factory ode. The change of t e = Set Type code m ets the type code, se	and is w the type ust be seee 95.26	rite protected code is imme et back to Nor Set: Drive blo	l. To enable diately take mal mode ck bridge 2	e use 95.24 en over. by the use e, 95.27 Set	Service 7. Drive DC
95.25	Contains the drive's Set: Type code is prode = Set Type code 95.24 Service mode 0: None ; the user securrent scaling, 95.	s current-, voltage-, reset in the factory ode. The change of t e = Set Type code me ets the type code, se 28 Set: Drive AC vol	and is w the type ust be seee 95.26	rite protected code is imme et back to Nor Set: Drive blo	l. To enable diately take mal mode ck bridge 2	e use 95.24 en over. by the use e, 95.27 Set	Service . Drive DC
95.25	Contains the drive's Set: Type code is promode = Set Type code is promode = Set Type code is promode = Set Type code is None; the user securrent scaling, 95. temperature e.g., for	s current-, voltage-, reset in the factory and a code. The change of the E set Type code meets the type code, see 28 Set: Drive AC voltor rebuild kits.	and is w the type ust be seee 95.26	rite protected code is imme et back to Nor Set: Drive blo	l. To enable diately take mal mode ck bridge 2	e use 95.24 en over. by the use e, 95.27 Set	Service . Drive DC
95.25	Contains the drive's Set: Type code is prode = Set Type code 95.24 Service mode 0: None ; the user securrent scaling, 95.	s current-, voltage-, reset in the factory and a code. The change of the E set Type code meets the type code, see 28 Set: Drive AC voltor rebuild kits.	and is w the type ust be seee 95.26	rite protected code is imme et back to Nor Set: Drive blo	l. To enable diately take mal mode ck bridge 2	e use 95.24 en over. by the use e, 95.27 Set	Service . Drive DC
95.25	Contains the drive's Set: Type code is promode = Set Type code is promode = Set Type code is promode = Set Type code is None; the user securrent scaling, 95 temperature e.g., for 1: S01-0020-04; type	s current-, voltage-, reset in the factory and a code. The change of the E set Type code meets the type code, see 28 Set: Drive AC voltor rebuild kits.	and is w the type ust be so ee 95.26 tage sca	rite protected code is imme et back to Nor Set: Drive blo	l. To enable diately take mal mode ck bridge 2	e use 95.24 en over. by the use e, 95.27 Set	Service . Drive DC

Index	Name									
	Text									
	Range	Defau	ılt	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	The drive's basic typ	oe code: D	CS880-a	aab-cccc	ddef + plus	code				
	Product family:	DCS880			-					
	Product type:	aa	= S 0	Standar	d converter	module				
			= R0	Rebuild	kit					
			= U1	Upgrad	e kit					
			= A0	Enclosed converter						
	Bridge type:	b	= 1	Single bridge (2-Q)						
			= 2	2 anti-parallel bridges (4-Q)						
	Module type:	сссс	=	Rated DC current (IP00)						
	Rated AC voltage:	dd	= 04	100 V _{AC}	415 V _{AC}					
			= 05	100 V _{AC}	500 V _{AC} (IEC)/525 V _{AC}	(UL)			
			= 06	270 V _{AC}	600 V _{AC}					
			= 07	-	690 V _{AC}					
			= 08	1	800 V _{AC}					
			= 10		990 V _{AC}					
			= 12		1190 V _{AC}					
	Power connection:	е	= X		d H1 H7					
			= L	Left sid						
			= R	Right si						
	Revision code:	f	= 0	1 st gene						
			= A	H7: Dou						
			= B	H5/H6:	New cooling	g fan R2E250	-RE04-10			
	Attention : When usi setting is limited to	_				oltage range	of the typ	e code		
	0 520	None		-	1 = 1	n	n Paramete			
95.26	Set: Drive block brid	dge 2			I	1	- I	•		
95.26	Set the quadrant type of the drive (1 or 2 bridges). Bridge 2 can be blocked. 0: Auto ; operation mode is taken from 95.25 Set: Type code. If 95.25 Set: Type code = None set 95.26 Set: Drive block bridge 2 = Block bridge 2 or Release bridge 2. 1: Block bridge 2 ; block bridge 2 (= 2-Q operation), e.g., for 2-Q rebuild kits. 2: Release bridge 2 ; release bridge 2 (= 4-Q operation), e.g., 4-Q for rebuild kits. This value overrides the type code and is immediately visible in 07.61 Drive block bridge 2 set									
	0 2	Auto		-	1 = 1	n	n	Parameter		
95.27				1	1	1	1	<u> </u>		
·	Set: Drive DC current scaling Set the nominal DC current of the drive. Adjustment of DC current measuring channels (SDCS-PIN-H01 or SDCS-PIN-H51). 95.27 Set: Drive DC current scaling is write protected. To enable use 95.24 Service mode = Set Type code 95.24 Service mode = Set Type code must be set back to Normal mode by the user.									
	O A Take value from 95.25 Set: Type code. This setting must be selected for converter modules with a standard hardware configuration including SDCS-PIN-H01 and a type code. This setting must be selected for converter modules with a standard hardware configuration including SDCS-PIN-H51 and a type code. This setting must be selected for converter modules with a standard hardware configuration including SDCS-PIN-H51 and a type code. No cutting of the burden resistors is required.									

ndex	Name											
	Text											
	Range		Defaul	t	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
		More d	letails se	ee DCS88	0 Hard	ware manual	(3ADW000	462).				
	1 32500 A	Take th	ne value	from 95.	27 Set:	Drive DC curre	ent scaling	as current				
	1 323337					e of paramete	_					
						scaling. Typic						
				no type c			,					
		 Not applicable for DCS880 sizes H1 H5 with a SDCS PIN-H01. 										
		This setting is used for converter hardware configuration if no type code										
		is available. If the scaling in 95.27 Set: Drive DC current scaling is used, the										
		burden resistor on the SDCS-PIN-H51 must be cut and scaled.										
		 This setting is not recommended for converter modules with a standard 										
				_		luding SDCS-						
						ection, Install	ation and S	Start-Up M	<u>anual for</u>			
		Rebuild	d kits (3/	4DW000	<u>599)</u> .							
	This value over set. Attention: Who					-						
		ed to ma	ax 1190 A	A_{DC} and m	nax 600	V _{AC} .						
5.28	0 22500	setting is limited to max 1190 A _{DC} and max 600 V _{AC} .										
	0 32500 0 A 1 = 1 A n n Parameter Set: Drive AC voltage scaling											
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltage	al AC volt AC volta ge scalin	tage of tage mean	suring ch e protect	annels ted. To	(SDCS-PIN-H(enable use 95	01 or SDCS	-PIN-H51). 9 mode = Se	95.28 Set: et Type code			
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltage 95.24 Service r	al AC volta AC volta ge scalin node = S	tage of tage mea g is write et Type	suring ch e protect code mu	annels ted. To st be se	(SDCS-PIN-H(enable use 95 et back to Nor	01 or SDCS	-PIN-H51). 9 mode = Se	95.28 Set: et Type code			
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltage 95.24 Service r	al AC volta AC volta ge scalin node = S	tage of tage meaning is writed to the tage meaning is writed to the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of t	suring ch e protect code mu rom 95.2!	nannels ted. To st be se	(SDCS-PIN-H(enable use 95 et back to Nor ype code.	01 or SDCS .24 Service mal mode	-PIN-H51). 9 mode = Se	95.28 Set: et Type code			
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltage 95.24 Service r	al AC volta AC volta ge scalin node = S	tage of tage meaning is writed to the tage meaning is writed to the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of t	suring ch e protect code mu rom 95.2!	nannels ted. To st be se	(SDCS-PIN-H(enable use 95 et back to Nor	01 or SDCS .24 Service mal mode	-PIN-H51). 9 mode = Se	95.28 Set: et Type code			
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltae 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Who	al AC volta ge scalin mode = S Take / Take rrides the	tage of tage meaning is writted type evalue for the type control of the type control of the type control of the type control of the type control of the type control of the type control of type control of the type control of the type control of the type control of the type control of the type control of the type control of the type control of the type control of the type control of type control of type control of the type control of type contr	suring che e protect code mu prom 95.25 rom 95.25 ode and is 5 module	nannels ted. To st be se 5 Set: T 8 Set: D s imme	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rrive AC voltag diately visible	o1 or SDCS .24 Service mal mode ge scaling.	-PIN-H51). 9 mode = Se by the use rive AC vol	95.28 Set: et Type code r. tage scaling			
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltag 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Whatesting is limit	al AC volta ge scalin mode = S Take / Take rrides the	tage of tage meaning is written to the value from the value from the tage with the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of the tage of tag	suring che e protect code mu prom 95.25 rom 95.25 ode and is 5 module	sannels ted. To st be se 5 Set: T 8 Set: D s imme es the cu	(SDCS-PIN-H(enable use 95 et back to Nor ype code. rive AC voltag diately visible urrent and vol V _{AC} .	of or SDCS. .24 Service mal mode ge scaling. e in 07.64 D tage range	-PIN-H51). So mode = So by the use rive AC vol	95.28 Set: et Type code r. tage scaling e code			
	Set: Drive AC v Set the nomina Adjustment of Drive AC voltag 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: What setting is limit 0.0 3250.0	Take Trides the en using	tage of tage meaning is written type evalue for type evalue for type evalue for type contact that is the type contact tha	suring ch e protect code mu rom 95.29 rom 95.29 ode and is 5 module	nannels ted. To st be se 5 Set: T 8 Set: D s imme	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rrive AC voltag diately visible	o1 or SDCS .24 Service mal mode ge scaling.	-PIN-H51). 9 mode = Se by the use rive AC vol	95.28 Set: et Type code r. tage scaling e code			
	Set: Drive AC v Set the nomina Adjustment of Drive AC voltae 95.24 Service r 0.0 V 0.1 3250.0 v This value over set. Attention: Whe setting is limit 0.0 3250.0 Set: Drive max	al AC volta FAC volta ge scalin mode = S Take Take rrides the en using led to ma	tage of tage meaning is writted type evalue for the type control of type control of the type control of type contr	suring che e protect code mu prom 95.28 rom 95.28 rode and is 5 module A _{DC} and muture	sannels ted. To st be se 5 Set: T 8 Set: D s imme es the cu nax 600	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rrive AC voltag diately visible urrent and vol V _{AC} . 10 = 1 V	of or SDCS. .24 Service mal mode ge scaling. e in 07.64 D tage range	-PIN-H51). So mode = So by the use rive AC vol	95.28 Set: et Type code r. tage scaling e code			
	Set: Drive AC v Set the nomina Adjustment of Drive AC voltag 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: What setting is limit 0.0 3250.0	al AC volta FAC volta ge scalin mode = S Take Take rrides the en using led to ma a bridge to um bridge	tage of tage meaning is written type e value from the type control of type control of type	suring che e protect code mu rom 95.29 rom 95.29 rode and is 5 module A _{DC} and meture erature o	sannels ted. To st be se ses: T ses: T ses: T ses: T ses: T the contact the co	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rive AC voltage diately visible urrent and vol V _{AC} . 10 = 1 V	of or SDCS. .24 Service mal mode ge scaling. e in 07.64 D tage range	-PIN-H51). So mode = So by the use rive AC vol	95.28 Set: et Type code r. tage scaling e code			
	Set: Drive AC v Set the nomina Adjustment of Drive AC voltag 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Who setting is limit 0.0 3250.0 Set: Drive max Set the maxim	al AC volta FAC volta ge scalin mode = S Take Take rrides the en using led to ma a bridge to um bridge	tage of tage meaning is written type e value from the type control of type control of type	suring ch e protect code mu rom 95.29 rom 95.29 ode and is 5 module A _{DC} and m	sannels ted. To st be se 5 Set: T 8 Set: D s imme es the cu nax 600 V	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rive AC voltage diately visible urrent and vol V _{AC} . 10 = 1 V	of or SDCS. 24 Service mal mode ge scaling. Fin 07.64 Detage range n	-PIN-H51). So mode = So by the use rive AC vol	95.28 Set: et Type code r. tage scaling e code			
	Set: Drive AC v Set the nomina Adjustment of Drive AC voltae 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Whe setting is limit 0.0 3250.0 Set: Drive max Set the maxim Adjustment of	Take Take Take Take Take Take Take Take Take Take Take Take Take Take	tage of tage meaning is written type evalue for type evalue for type evalue for type control type evalue for type control type evalue for type control type evalue for type control type evalue for type evalu	suring che e protect code mu rom 95.29 rom 95.29 rode and is 5 module A _{DC} and mu reture of tempera	sannels ted. To st be se Set: T Set: D s imme s the cu nax 600 V	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rive AC voltage diately visible urrent and vol V _{AC} . 10 = 1 V	of or SDCS. .24 Service mal mode ge scaling. e in 07.64 D tage range	rive AC vol	95.28 Set: et Type code r. tage scaling e code Parameter			
5.28	Set: Drive AC v Set the nomina Adjustment of Drive AC voltage 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Whe setting is limit 0.0 3250.0 Set: Drive max Set the maxim Adjustment of	Take Take Take Take Take Take Take Take Take Take Take Take Take Take	tage of tage meaning is written type evalue for type evalue for type evalue for type control type evalue for type control type evalue for type control type evalue for type control type evalue for type evalu	suring che protect code mu rom 95.25 rom 95.25 rode and is 5 module A _{DC} and mu reture of tempera	sannels ted. To st be set: To set: To set: Do	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rive AC voltage diately visible urrent and vol V _{AC} . 10 = 1 V	of or SDCS. 24 Service mal mode ge scaling. In of in	rive AC vol	95.28 Set: et Type code r. tage scaling e code Parameter erature.			
	Set: Drive AC v Set the nomina Adjustment of Drive AC voltag 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Whatesting is limit 0.0 3250.0 Set: Drive max Set the maxim Adjustment of 0°C/32°F 1°C 149°C/3 150°C/301°F This value over temperature s Maximum sett temperature is	al AC volta AC volta ge scalin mode = S Take Take Take rrides the en using red to ma a bridge to um bridge the drive 33°F 30 rrides the et. ing for cost measur	tage of tage meaning is written type evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed.	suring che e protect code mu rom 95.29 rom 95.20 rom 95.	sannels ted. To st be seed to seed the seed to seed the seed to seed the seed to seed the seed to seed	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rive AC voltage diately visible urrent and vol VAC. 10 = 1 V rive. pping level. 195.25 Set: Tyen 95.25 Set: Tyen 95.29 Set: Draw esupervision diately visible 19 is 55°C/131°	of or SDCS24 Service mal mode ge scaling. e in 07.64 D tage range n repe code. rive max br is inactive e in 07.65 D F because	rive AC vole of the type n rive max but the cooling	95.28 Set: et Type code r. tage scaling e code Parameter erature. ebuild kits. ridge g air input			
	Set: Drive AC v Set the nominal Adjustment of Drive AC voltage 95.24 Service r 0.0 V 0.1 3250.0 V This value over set. Attention: Whe setting is limite 0.0 3250.0 Set: Drive maximal Adjustment of 0°C/32°F 1°C 149°C/3 150°C/301°F This value over temperature setting is limite over temperature setting is limite over temperature setting is limite over temperature setting is limite over temperature setting is limite over temperature setting is limite over temperature setting is limite over temperature setting is limited in the setting in the setting is limited in the setting is limited in the settin	al AC volta FAC volta ge scalin mode = S Take Take Take rrides the en using ted to ma the drive 33°F 30 rrides the et. ing for cost measure ected by	tage of tage meaning is written type evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed. For its evalue for the type converter ed.	suring che e protect code mu rom 95.29 rom 95.20 rom 95.	sannels ted. To st be seed to seed the seed to seed the seed to seed the seed to seed the seed to seed	(SDCS-PIN-HO enable use 95 et back to Nor ype code. rive AC voltage diately visible urrent and vol VAC. 10 = 1 V rive. pping level. 195.25 Set: Tyen 95.25 Set: Tyen 95.29 Set: Draw esupervision diately visible 19 is 55°C/131°	of or SDCS. 24 Service mal mode ge scaling. In or special mode ge scaling. In or special mode ge scaling. In or special mode ge scaling. In or special mode ge scaling. In or special mode ge scaling. In or special mode ge scaling. In or special mode ge scaling. In or special mode ge scaling.	rive AC vole of the type n rive max but the cooling	95.28 Set: et Type code r. tage scaling e code Parameter Parameter erature. ebuild kits. ridge g air input			

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
5.32	DC current measurem	ent adjust	•	•	•				
	Set the DC current me 95.32 DC current meas to cover drives with d the measured armatu	surement adjust ifferent current n	in perce neasurir	nt of 07.62 Dr ng circuits for	bridge 1 ar	_			
	12.5 800.0	100.0	% %	10 = 1 %		v	Parameter		
95.33	DC current measurem		70	10 - 1 %	n	У	Parameter		
	Set the DC current me The offset value in per measurement. 95.33 E real armature current. Commissioning hints — In case the respon increase 95.33 DC	rcent of 99.11 M1 OC current measu : se of the current	nomina irement control	l current is ad offset adjust: ler is delayed	s 01.10 Mot when start	or current	in A to the		
	27.02	2 Used currer							
	0 I I Delay		DZ_LIN_060	t _motor current_a.ai					
	In case a 2-Q conve95.33 DC current n	•					ce increase		
	-10.0 10.0	0.0	%	10 = 1 %	n	у	Parameter		
95.34	DC voltage measuren	nent adjust							
	Set the DC voltage mea 95.34 DC voltage mea to cover drives with d rescales the armature 12.5 800.0	surement adjust ifferent voltage r	in perce neasurii	ent of 07.64 D		•	•		
95.35	DC voltage measuren		I			13	_L		
	DC voltage measurement offset Set the DC voltage measurement offset of the drive. The offset value in percent of 99.12 M1 nominal voltage added to the armature voltage measurement. 95.35 DC voltage measurement offset adjusts 01.21 Armature voltage in V to th real armature voltage (e.g., measured by a meter). See 95.37 DC voltage measurement mode. -10.0 10.1								
95.37	DC voltage measuren	nent mode	ı		1	1.5	1		
	DC voltage measurem Selects the DC voltage 0: Auto ; automatic vo command is given. Se The internal DC voltage	ent mode of the e measurement n Itage measureme e 06.09.b00 Used	node. ent offse d main c	ontrol word.	atic offset	is executed	d until an On		

	Name												
	Text												
	Range	I	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	Attention: The	armature	voltage measi	urement	circuit betwe	een drive ar	nd motor n	nust be					
	closed before th		_	n. If this	is not the cas	e set 95.37	DC voltag	e					
	measurement n												
	1: Manual ; manual voltage measurement offset. The value of 95.35 DC voltage measurement offset is taken.												
	offset is taken.												
	The internal DC voltage measurement is taken.												
	2: DC-contactor ; manual voltage measurement offset. The value of 95.35 DC voltage												
		surement offset is taken. Until an On command is given the voltage measurement is ed to zero. See also 20.33 Mains contactor control mode.											
						•							
	The internal DC	_				-£05.25.D	C lk						
	3: AI3 scaled ; m offset is taken.		tage measurer	nent off	set. The value	or 95.35 D	C voitage i	neasuremen					
	The external DC		maasuramant	ic takon	Thus the DC	`voltago m	oacuromor	at is located					
	at the motor te	_				_							
	analog input ca												
	voltage is done												
	measurement (CCCI J IL	.51 12. 10. 5	cc also b c.	JOOO EXCC	nai voitage					
	0 3		Manual	-	1 = 1	n	n	Parameter					
5 30	PLL input devia		idiiddi		1	''	1	rararrecer					
5.39	-												
	PLL input devia		ralta da arrala (m	م دانه ما/ +	ina a la usad a		ha Dil aa.	-+uallau					
	Actual measure	:u mams v	voitage cycle (p	Jei iou) t	iiiie. is useu d	is input of	TIE PLL COI	itioner.					
	For 60 Hz mains		e should be: $\frac{1}{60}$			T	1	T					
	-180.00 180.0		•	0	100 = 1°	у	n	Signal					
5.40	PLL output, int	ernal mai	ins frequency		PLL output, internal mains frequency								
	PLL output.												
								Joighan					
	Calculated and	internally	controlled ma	ins freq		t of PLL co	ntroller.	Jigital					
	0.00 100.00	internally -	controlled ma	ins freq	uency. Outpu 100 = 1 Hz	t of PLL co	ntroller.	Signal					
5.43		Ī-	-	Hz		1							
5.43	0.00 100.00	- chronizat	ion transform	Hz er	100 = 1 Hz	1							
95.43	0.00 100.00 PLL offset sync	chronizat to a synch	ion transformonronization tra	Hz er insforme	100 = 1 Hz er.	у	n	Signal					
)5.43	0.00 100.00 PLL offset sync PLL offset due 1	chronizat to a synch of a syncl	ion transformenronization tra hronization tra	Hz er Insforme	100 = 1 Hz er. er's phase shi	y ft compare	n	Signal					
5.43	0.00 100.00 PLL offset sync PLL offset due to Compensation	chronizat to a synch of a synch ne maxim	ion transformenronization tra hronization tra	Hz er Insforme	100 = 1 Hz er. er's phase shi	y ft compare	n	Signal					
	0.00 100.00 PLL offset sync PLL offset due t Compensation transformer. Th	chronizat to a synch of a synch ne maxim	ion transforme nronization tra hronization tra um phase shift	Hz er Insforme	100 = 1 Hz er. er's phase shi nsation is ±60	y ft compare 0.00°.	n d to the m	Signal					
	0.00 100.00 PLL offset sync PLL offset due to Compensation transformer. The -60.00 60.00	chronization a synchronization of a synchronization	ion transformen nronization tra hronization tra um phase shift 0.00	Hz er Insforme Insforme t compe	er. er's phase shi nsation is ±60 100 = 1°	y ft compare 0.00°.	n d to the m	Signal					
	0.00 100.00 PLL offset sync PLL offset due to Compensation transformer. The -60.00 60.00 PLL deviation le	to a synch of a synch ne maximo evel	ion transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization transformed ironization ir	Hz er Insforme t compe	er. er's phase shi nsation is ±60 100 = 1°	y ft compare).00°. n	n d to the m	Signal ains Parameter					
	0.00 100.00 PLL offset sync PLL offset due to Compensation transformer. Th -60.00 60.00 PLL deviation le Maximum allow	to a synch of a synch ne maximo evel evel to blowed	ion transformen ronization transformer transformer tra	Hz er unsformet compe control	er. er's phase shi nsation is ±60 100 = 1°	ft compare 0.00°. n	n d to the m	Signal ains Parameter					
	0.00 100.00 PLL offset synce PLL offset due to Compensation transformer. Th -60.00 60.00 PLL deviation le Maximum allow deviation and s	chronization a synchof a synchone maximum (check) (check) evel to blowed deviates 06.25	ion transforment on training t	Hz er ensforme ensforme t compe control controlle	er. er's phase shi nsation is ±60 100 = 1° ler. ler. Exceeding	ft compare 0.00°. n the level g 2. Thus, the	n d to the m	Signal ains Parameter larm A131 PL					
95.43 95.44	0.00 100.00 PLL offset synce of the syn	chronization a synchof a synchome maximion (evel evel to blowed deviate tets 06.25 ing angle	ion transformed fronization transformed fronization transformed from the current transformed from of the PLL shing forced to the forced to the figure from the forced to the figure from the forced to the figure from the fig	Hz er ensforme t compe control controller e value o	er. er's phase shi nsation is ±60 100 = 1° ler. ler. Exceeding	ft compare 0.00°. n the level g 2. Thus, the	n d to the m	Signal ains Parameter larm A131 PL					
	0.00 100.00 PLL offset synce PLL offset due to Compensation transformer. Th -60.00 60.00 PLL deviation le Maximum allow deviation and s	chronization a synchof a synchome maximion (evel evel to blowed deviate tets 06.25 ing angle	ion transformed fronization transformed fronization transformed from the current transformed from of the PLL shing forced to the forced to the figure from the forced to the figure from the forced to the figure from the fig	Hz er ensforme t compe control controller e value o	er. er's phase shi nsation is ±60 100 = 1° ler. ler. Exceeding	ft compare 0.00°. n the level g 2. Thus, the	n d to the m	Signal ains Parameter larm A131 PL					
	0.00 100.00 PLL offset synce of the syn	to a synch of a synch ne maximo evel evel to blowed deviate ets 06.25 ing angle ress the D	ion transformer nronization tra hronization tra um phase shift 0.00 ock the current tion of the PLL .b13 Current co is forced to the OC current are o	Hz er unsforme t compe control controller ne value o	er. er's phase shi nsation is ±60 100 = 1° ler. ler. Exceeding	ft compare 0.00°. n the level g 2. Thus, the	n d to the m	Signal ains Parameter larm A131 PL					
	0.00 100.00 PLL offset synce PLL offset due to Compensation transformer. Th -60.00 60.00 PLL deviation le Maximum allow deviation and s blocked, the firit pulses to suppress	to a synch of a synch of a synch ne maximo (evel evel to blooved deviate ets 06.25 ing angle ress the D	ion transformer formization transformer fronization transformer fronization transformer fronization transformer fron fronization of the PLL formula control for the forced to the forced to the forced to the forced to the forced fronization froniz	Hz er ensforme t compe control controller e value o given. = 0°.	er. er's phase shi nsation is ±60 100 = 1° ler. ler. Exceeding	ft compare 0.00°. n the level g 2. Thus, the	n d to the m	Signal ains Parameter larm A131 PL					
	0.00 100.00 PLL offset synce PLL offset due to Compensation transformer. The -60.00 60.00 PLL deviation le Maximum allow deviation and soblocked, the firit pulses to suppress for 50 Hz mains	to a synch of a synch of a synch ne maximo evel evel to blooved deviate ets 06.25 ing angle ress the D s is valid:	ion transformer formization transformer fronization transformer fronization transformer fronization transformer fron fronization of the PLL formula control for the forced to the forced to the forced to the forced to the forced fronization froniz	Hz er ensforme t compe control controller e value o given. = 0°.	er. er's phase shi nsation is ±60 100 = 1° ler. ler. Exceeding	ft compare 0.00°. n the level g 2. Thus, the	n d to the m	Signal ains Parameter larm A131 PL					

	Name Text										
	Text										
	Range	Defaul	t	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
95.45	PLL proportional ga	ain									
	PLL p-part. Gain of firing unit's	phase lock	loop. See	95.46	PLL filter tim	e.					
	0.01 2.00	0.50		-	100 = 1	n	у	Parameter			
95.46	PLL filter time										
	PLL filter time cons Filter of firing unit's Commissioning hin	phase lock	(loop.								
	95.45 PLL proportion	onal 95	.46 PLL fi	lter tin	ne						
	1.0										
	0.5										
	0.2	≤ 10 msec ≤ 20 msec									
	0.1	≤ 5	50 msec								
	0.05	≤ 1	.00 msec								
	0.02		200 msec								
	0.01		500 msec								
	0.01		700 111500								
	0.0 500.0										
	0.0 500.0	0.0		ms	10 = 1 ms	n	у	Parameter			
95.47	PLL Uk compensati	on	noncation	I	10 = 1 ms	n	у	Parameter			
95.47	_	mer u _k com g angle of the mutation no ge) of the mensation de	ne firing un otches of ains. fines the	n. Init's P the thy mains	LL can be cor ristors. The c	rected to conpensati	ompensate on depend	e the error Is on the u _k			
95.47	PLL Uk compensati PLL mains transform The measured firing caused by the commensured (short circuit voltage) 95.47 PLL Uk compensation	mer u _k com g angle of the nutation not ge) of the mensation de used by the	ne firing unotches of ains. fines the unit's no	n. unit's P the thy mains ominal	LL can be cor ristors. The c	rected to conpensati	ompensate on depend	e the error Is on the u _k			
95.47	PLL Uk compensation PLL mains transform The measured firing caused by the commensation (short circuit voltage) 95.47 PLL Uk compensation With: Uk = relation With: Uk = relation Commissioning hin the mains due to the side of the dedicate This situation leads	mer u_k com g angle of the nutation not ge) of the mensation decreased by the $a = u_k \times \frac{S_k}{S_k}$ at ed mains parent power at: 95.47 PLI e thyristors and transform to unstable	ne firing un otches of ains. fines the e unit's no $\frac{1}{2} \times 100 \%$ short circ er of the der of the tomp s switchin mer. e output of	mains ominal drive. cransfo	LL can be corvistors. The construction is used to see the mains	rected to concentration of the PLL correctio	ompensate on depend percent of ction: te for the p	e the error ls on the u _k 99.01 Mains phase shift of secondary			
95.47	PLL Uk compensation PLL mains transform The measured firing caused by the commensation (short circuit voltage) 95.47 PLL Uk compensation With: Uk = relation With: Uk = relation Commissioning him the mains due to the side of the dedicate This situation leads compensation slow	mer u_k com g angle of the mutation not ge) of the mensation deused by the $a=u_k \times \frac{S_c}{S_t}$ at ed mains parent power parent power et :95.47 PLI e thyristors ed transform to unstable u_k (1 by 1) u_k	ne firing un otches of ains. fines the e unit's no $\frac{1}{2} \times 100 \%$ short circ er of the der of the tomp s switchin mer. e output of	mains mains mains drive. cransfor consating in cautrent utput c	LL can be corvistors. The construction is used to see the mains as during high urrent become	compensation compe	ompensate on depend percent of ction: te for the pred on the sease 95.47	e the error ls on the u _k 99.01 Mains phase shift of secondary PLL Uk			
	PLL Uk compensation PLL mains transform The measured firing caused by the commensation (short circuit voltage) 95.47 PLL Uk compensation With: Uk = relation With: Uk = relation Uk =	mer u_k com g angle of the nutation not ge) of the mensation decreased by the $a = u_k \times \frac{S_k}{S_k}$ at ed mains parent power at: 95.47 PLI e thyristors and transform to unstable	ne firing un otches of ains. fines the e unit's no $\frac{1}{2} \times 100 \%$ short circ er of the der of the tomp s switchin mer. e output of	mains ominal drive. cransfo	LL can be corvistors. The construction is used to see the mains	rected to concentration of the PLL correctio	ompensate on depend percent of ction: te for the p	e the error ls on the u _k 99.01 Mains phase shift of secondary			
95.50	PLL Uk compensation PLL mains transform The measured firing caused by the commensation (short circuit voltage) 95.47 PLL Uk compensation With: Uk = relation With: Uk = relation Commissioning him the mains due to the side of the dedicate This situation leads compensation slow	mer u_k com g angle of the nutation not ge) of the mensation deused by the $a=u_k \times \frac{S_0}{S_0}$ at ed mains parent power arent power et 195.47 PLI et hyristors ed transform to unstably (1 by 1) u 0.0	ne firing un otches of ains. fines the e unit's no $\frac{1}{2} \times 100 \%$ short circ er of the der of the tomp s switchin mer. e output of	mains mains mains drive. cransfor consating in cautrent utput c	LL can be corvistors. The construction is used to see the mains as during high urrent become	compensation compe	ompensate on depend percent of ction: te for the pred on the sease 95.47	e the error ls on the u _k 99.01 Mains phase shift of secondary PLL Uk			

96 System

Language selection; access levels; macro selection; parameter save and restore; control board reboot; user parameter sets; unit selection; data logger triggering; user lock.

Index	Name								
ındex	Text								
	Range		Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре
96.01	Language	:	Į.		·L		<u> </u>		
96.01	Select lan Selects th on the co Notes: - Not al - 96.01 0: Not sel 1029: Cze 1030: Dan 1031: Deu 1033: Eng 1035: Suo 1036: Frai 1040: Ital 1043: Ned 1045: Pols 1053: Sve 1055: Türl 2052: Chii 2070: Por	guage.	n. Support Supported sch. upported sh. fied, PRC uguese.	ow are not feet the sted. ed. ed	ecessari languag	ly supporte jes visible in	d. the PC tool		when viewed
	0 3082	anoi; spanis	English	teu.	_	1 = 1	n	у	Parameter
96.02		tion word. e unit of par	ameters	indicatin	g powe	r, temperati	ure, and tor	que.	
	Bit	Name		Value	Rem	arks			
	0	Power unit	t	1	hp				
				0	kW				
	1	reserved							
	2	Temperati	ure unit	1	°F				
				0	°C				
	3	reserved							
	4	Torque un	it	1	Lb ft				
				0	Nm				
	5 15	reserved							
	0000h	FFFFh	0000h		_	1 = 1	n	у	Parameter
96.03		peed contro			1			17	
	Unit for tl	ne speed cor peed contro	ntrol.						

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	1: %; in percent of 99.2 2: V; in volt. Set 99.14 in Following signals/par - 01.72 24.01 Used s - 22.01 Speed refere - 22.08 Auxiliary speed - 22.31 Constant speed - 22.32 Constant speed - 22.81 Speed refere - 23.01 Speed refere - 23.02 Speed refere - 23.03 Speed refere - 23.03 Speed refere - 23.27 Ramp out bar - 24.01 Used speed - 24.04 Speed error - 24.11 Speed correct - 24.46 Speed error - 24.46 Speed error - 30.11 M1 minimum - 30.12 M1 maximum - 46.01 M1 speed score - 90.01 Motor speed - 94.01 EMF speed	M1 nominal (base) cameters are affect peed reference fast ence unlimited ence eed reference eed 6 eed 7 ence 1 ence 2 ence ramp input ence 7 clancing reference reference inverted etion step a speed aling aling actual	speed to ted:	. Set 99.14 M		(base) spe			
	 99.14 M1 nominal (base) speed Note: After changing, restart the drive and the PC tool to make the change visible. 								
	0 2	rpm	-	1 = 1	n Cria	y	Parameter		
96.04	Access levels active	[· E·	l	- -	<u> </u>	<u>, , , , , , , , , , , , , , , , , , , </u>			
	Active access levels								

Active access levels.

Shows, which access levels, have been activated by 96.07 Pass code and 96.102 User lock functionality.

Bit assignment:

Bit	Name	Value	Remarks
0	End user	1	End user active.
1	Service	1	Service active.
2	Advanced programmer	1	Advanced programmer active.
3	reserved		
4	reserved		
5	reserved		
6	reserved		
7	reserved		
8	reserved		
9	reserved		
10	reserved		

	Name									
	Text									
	Range	Range		Unit		it	Scale/ FbEq16	Volatile	Change running	Туре
	11	OEM access le	evel 1	1		ОЕМ	access leve	el 1 active.		
	12	OEM access level 2		1		ОЕМ	access lev	el 2 active.		
	13	OEM access level 3		1		ОЕМ	access leve	el 3 active.		
	14	Parameter loc	k	1		Para	meter lock	is active.		
	15	reserved								
		1 000.100.								
	0000	h FFFFh	T_		_		1 = 1	n	n	Signal
96.07	Pass		1-				1-1		111	Jigilai
	Pass code. Enter a pass code to activate the parameter lock or to configure the user lock. See 96.102 Use lock functionality. Parameter lock: Entering "358" toggles the parameter lock, which prevents the changing of all other parameters through control panel or PC tool. User lock (opening generates warning A6B0 User lock open): Entering the user pass code, by default "10,000,000", unhides parameters 96.100 96.102. Now it is possible to define a new user pass code and to select the actions to be prevented. Entering an invalid pass code will close an open user lock, by hiding parameters 96.100 96.102. After entering the code, check that the parameters are in fact hidden. Example: For better cyber security, set a user pass code preventing change of parameter values or loading of firmware and other files. To activate the user lock for the first time, enter the default user pass code "10,000,000" into 96.07 Pass code. This unhide parameters 96.100 96.102. Then enter a new user pass code into 96.100 Change user pass code and confirm the code in 96.101 Confirm user pass code. In									
	96.07 into 9 96.10 To clo	Pass code. This 6.100 Change u 2 User lock func ose the user lock	unhide para ser pass cod tionality def c, enter an in	ameter le and ine the valid u	rs 96 conf e act iser j	firm to fions to fions to	96.102. The code in to be preve	hen enter a 96.101 Con nted. 6.07 Pass c	a new user firm user p code then a	pass code ass code. In ctivate 96.2
	96.07 into 9 96.10 To clo Contr hidde To rec paran WARN Do no	Pass code. This 6.100 Change us 2 User lock functions the user lock old board boot on. The pen the lock, eneters 96.100	s unhide para ser pass coo tionality def k, enter an in or cycle the po nter Your use . 96.102.	ameter le and ine the valid u ower. ' er pass e. The	rs 96 confe e act iser i With	in the l	96.102. The code in to be preve code into 9 ock closed, o 96.07 Pas	hen enter a 96.101 Con nted. 6.07 Pass c parameter ss code. Th	a new user firm user p ode then a s 96.100 is will agair	pass code lass code. In ctivate 96.27 . 96.102 are n unhide
	96.07 into 9 96.10 To clo Contr hidde To rec paran WARN Do no	Pass code. This 6.100 Change us 2 User lock functions the user lock of board boot on. Depen the lock, eneters 96.100 IING	s unhide para ser pass coo tionality def k, enter an in or cycle the po nter Your use . 96.102.	ameter le and ine the valid u ower. ' er pass e. The	rs 96 confe e act iser i With	interest.	96.102. The code in to be preve code into 9 ock closed, o 96.07 Pas	hen enter a 96.101 Con nted. 6.07 Pass c parameter ss code. Th	a new user firm user p ode then a s 96.100 is will agair	pass code lass code. In ctivate 96.27 . 96.102 are n unhide
96.08	96.07 into 9 96.10 To clo Contr hidde To rec paran WARN Do no contr 0 9	Pass code. This 6.100 Change us 2 User lock functions the user lock of board boot on. Depen the lock, eneters 96.100 IING of forget Your us of board must be 9999999	s unhide para ser pass coo tionality def c, enter an in or cycle the po nter Your use . 96.102.	ameter le and ine the valid u ower. ' er pass e. The	rs 96 confe e act iser i With	interest.	96.102. The code in to be preve code into 9 ock closed, o 96.07 Pas	then enter a 96.101 Con nted. 6.07 Pass of parameter as code. The	a new user prode then a s 96.100 is will again	pass code lass code. In ctivate 96.27 . 96.102 are n unhide board! A ne
06.08	96.07 into 9 96.10 To clo Contr hidde To rec paran WARN Do no contre 0 9 Local Enabl contre WARN Befor the di 0: Ena 1: Diss	Pass code. This 16.100 Change us 2 User lock functions the user lock of board boot of n. 16.100 Change use 16.100 change use 16.100 change use 16.100 change	s unhide paraser pass coordinatity defice, enter an intercept the properties of the	ameter le and ine the valid u ower. ' er pass e. The	rs 96 confee act user p With s coo	offirm to firm	mean 1 = 1 ttons on the trol panel	then enter a 96.101 Connted. 6.07 Pass coparameter as code. The storeset to the control por PC tool in	a new user prode then a rs 96.100 is will again the control y	pass code lass code. In ctivate 96.27 . 96.102 are n unhide board! A new Parameter ne local led to stop
	96.07 into 9 96.10 To clo Contr hidde To rec paran WARN Do no contr 0 9 Local Enabl contr WARN Befor the di 0: Ena 1: Dis: 0 1	Pass code. This 6.100 Change us 2 User lock functions the user lock of board boot on. Depen the lock, eneters 96.100 IING of forget Your us of board must be 999999 control control access. es/Disables loca of the PC to IING e disabling loca rive. able; enable loca able; disable loca able; disable loca	s unhide para ser pass coo tionality def k, enter an in or cycle the po nter Your use . 96.102. ser pass cod be purchased 0 al control. St ol.	ameter le and ine the valid u ower. ' er pass e. The	rs 96 confee act user p With s coo	offirm to firm	96.102. The code in to be preve code into 9 ock closed, o 96.07 Passas no mean 1 = 1	96.101 Connted. 6.07 Pass of parameter as code. The storeset to the second parameter by	a new user prode then a se 96.100 is will again the control	pass code pass code. In ctivate 96.27. 96.102 are nunhide board! A new Parameter
96.08	96.07 into 9 96.10 To clo Contr hidde To rec paran WARN Do no contre 0 9 Local Enabl contr WARN Befor the di 0: Ena 1: Dis 0 1 Macro	Pass code. This 16.100 Change us 2 User lock functions the user lock of board boot of n. 16.100 Change us 16.100 Change us 16.100 Change us 16.100 Change 16	sunhide paraser pass coordinatity deficients, enter an inverse pass code purchased of the p	ameter le and ine the valid u ower. ' er pass e. The	rs 96 confee act user p With s coo	offirm to firm	mean 1 = 1 ttons on the trol panel	then enter a 96.101 Connted. 6.07 Pass coparameter as code. The storeset to the control por PC tool in	a new user prode then a rs 96.100 is will again the control y	pass code lass code. In ctivate 96.2 . 96.102 are n unhide board! A ne Parameter ne local ed to stop

	Name											
	Text											
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре					
	0: None; no macro selected.											
	1: Default ; defau	ult parameter set. Se	ee 96.15 Para	ameter resto	re = Defaul	t.						
	10: Factory; fact	ory parameter set.	See 96.14 M	acro select.								
	10: Factory ; factory parameter set. See 96.14 Macro select. 11: ABB standard ; macro ABB standard. See 96.14 Macro select.											
	12: ABB standard US ; macro ABB standard with US style DC-contactor. See 96.14 Macro select											
		rire ; macro 3 wire st										
		rire US ; macro 3 wire	-									
	_	fieldbus ; macro cor	ntrol via field	lbus/control	via local I/	O. See 96.1	4 Macro					
	select.											
	-	itiometer ; macro m	•									
	-	que ; macro speed c										
		macro for the demo	unit. See 96		1	plemented	1					
	0 20	-	-	1 = 1	У	n	Signal					
96.14	Macro select											
		(pre-defined param	•									
		. The value reverts a	-		en the mac	ro selectio	n is done.					
	The selected ma	acro is shown in 96.1	l1 Macro act	ive.								
	Notes:											
		depending paramet	ers will be s	et. The rest o	of the paran	neters will	not be					
	changed.											
	•	e to change all prese	•									
	_	e actual macro agaiı	n restores al	ll macro depe	ending para	meters to	the macro's					
	default value		. •									
		operation or applic				D - £ lt						
		tory parameter set.		15 Paramete	r restore =	Derault.						
		d ; macro ABB stand d US ; macro ABB sta		LIC ctulo DC	contactor							
		rire ; macro ABB sta		US Style DC-	contactor.							
		rire US ; macro 3 wire		vle DC-conta	ctor							
			-			1						
	15: Local I/O or fieldbus; macro control via fieldbus/control via local I/O.											
	16. Motor poten		otor notenti	16: Motor potentiometer; macro motor potentiometer.17: Speed or torque; macro speed control/torque control.								
	-	itiometer ; macro m	•									
	17: Speed or tore	tiometer ; macro me que ; macro speed c	ontrol/torq	ue control.								
	17: Speed or tor 20: Demo unit ; n	que ; macro me que; macro speed c macro for the demo	ontrol/torq	ue control. plemented .	ln .	n	Parameter					
96 15	17: Speed or tore 20: Demo unit ; n 0 20	ntiometer; macro me que; macro speed c macro for the demo Done	ontrol/torq	ue control.	n	n	Parameter					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter resto	que; macro me que; macro speed c macro for the demo Done	ontrol/torq	ue control. plemented .	n	n	Parameter					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter resto Reset parameter	que; macro me que; macro speed c macro for the demo Done pre r values.	ontrol/torquunit, not im	ue control. plemented. 1 = 1		- I						
96.15	17: Speed or tord 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the def	ptiometer; macro macro macro for the demo Done r values. fault settings of the	ontrol/torquinit, not im - e firmware. E	ue control. plemented. 1 = 1 Depending or	n the choice	e only certa	in					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter resto Reset parameter Restores the def parameters or a	ptiometer; macro mague; macro speed comacro for the demonstrate Done preservalues. If ault settings of the large are reservalues are reservalues are reservalues are reservalues are reservalues.	ontrol/torquinit, not im - e firmware. E	ue control. plemented. 1 = 1 Depending or	n the choice	e only certa	in					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter resto Reset parameter Restores the def parameters or a restore is done.	ntiometer; macro macro for the demo Done r values. fault settings of the	ontrol/torquent, not im - e firmware. Estored. The	ue control. plemented. 1 = 1 Depending or value reverts	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the def parameters or a restore is done. Note: Restoring	r values. fault settings of the ll parameters are remarked.	ontrol/torquinit, not im - e firmware. Eestored. The	ue control. plemented. 1 = 1 Depending or value reverts	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tord 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the definition parameters or a restore is done. Note: Restoring 0: Done; normal	prediction of the demo pore relations of the demo pone relations of the demo pore relations of the demo parameters are relation or restor operation or restor the demo pore restor or restor may cause a comm operation or restor the demonstration or restor	e firmware. Estored. The	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter resto Reset parameter Restores the def parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all pa	priometer; macro macro for the demo Done representation of the de	e firmware. Estored. The nunication bree done. red to defau	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the def parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all pa — Motor 1 and	r values. fault settings of the all parameters are restormand are restormed arameters are restormed.	e firmware. Estored. The nunication breedone. red to defauss.	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tord 20: Demo unit; in 0 20 Parameter restor Reset parameter Restores the definition parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all parameters and parameters or a	r values. fault settings of the ll parameters are rearmeters are restored. Motor 2 parameters el/PC communication	e firmware. Estored. The nunication breedone. red to defauss.	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tord 20: Demo unit; in 0 20 Parameter restor Reset parameter Restores the definition parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all parameters all parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all parameters all parameters all parameters or a legal parameters or a	r values. fault settings of the all parameters are resonance to preach the settings of the all parameters are resonance to preach the settings of the all parameters are restorated from the settings of the all parameters are restorated from the settings.	e firmware. Estored. The nunication breedone. red to defauss.	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tore 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the def parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all parameter Motor 1 and Control pane I/O extensio Fieldbus ada	priometer; macro mague; macro speed comacro for the demo Done r values. fault settings of the all parameters are restorarameters are restorarameters are restorarameters are restorarameters. Motor 2 parameters and module settings. Apter settings.	e firmware. Estored. The nunication breedone. red to defauss.	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tord 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the def parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all parameters - Motor 1 and - Control pane - I/O extensio - Fieldbus ada - Encoder con	priometer; macro mague; macro speed comacro for the demonstration Done preservatives. If ault settings of the ault settings of the ault settings of the ault settings of the ault settings or restored arameters are restored Motor 2 parameters and Motor 2 parameters and module settings. In module settings. In figuration data.	e firmware. Estored. The nunication breedone. red to defauss.	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					
96.15	17: Speed or tord 20: Demo unit; n 0 20 Parameter restor Reset parameter Restores the def parameters or a restore is done. Note: Restoring 0: Done; normal 8: Restore; all parameters or a Motor 1 and Control pane I/O extensio Fieldbus ada Encoder con Macro deper	priometer; macro mague; macro speed comacro for the demo Done r values. fault settings of the all parameters are restorarameters are restorarameters are restorarameters are restorarameters. Motor 2 parameters and module settings. Apter settings.	e firmware. Estored. The nunication breedone. red to defauss.	plemented. 1 = 1 Depending or value reverts reak, so records	n the choice automatic	e only certa ally to Don	in e, when the					

Index	Name								
	Text								
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	62: Clear ; all par	ameters are restore	d to default	, except:	J.		•		
	 Control pane 	el/PC communicatio	n settings.						
	 Fieldbus ada 	pter settings.							
	 Encoder con 	figuration data.							
	 Macro deper 	nding parameters.							
	- 99.10 Nomin	al mains voltage.							
	 User lock par 	rameters 96.100 9	96.102.						
	70: Default ; all p	arameters are resto	red to defa	ult.					
	0 70	Done	-	1 = 1	у	n	Parameter		
96.16	Parameter save	manually							
	Save/Load para	meters.							
	-	meter values to the		•	rameter sav	e manually	should be		
		example values sen							
		s automatically to D	one when tl	ne paramete	er save is do	ne.			
	Notes:								
	-	meter save function	-						
	-	neter value is saved a		-	-	the control	panel or PC		
		when altered through		s adapter co	nnection.				
		operation or save co	•		•				
		nd to save paramete	rs or saving				1_		
	0 1	Done	-	1 = 1	У	n	Parameter		
96.19	User set status								
	User parameter	set status display.							
		is of the user param							
		parameter sets hav							
		ently loading a user រុ							
	•	ntly saving a user pa		•					
		d or empty user set	•						
	·	er set 1 is loaded.							
		er set 2 is loaded.							
	•	er set 3 is loaded.							
		er set 4 is loaded.				T			
	0 7	-	_	1 = 1	n	n	Signal		
96.22	User set save/lo	oad							
6.22	User parameter	set handling.							
96.22	User parameter		up to four ι		ter sets. The	e value reve	erts		
96.22	User parameter Enables the savi	set handling.	•	ıser parame	ter sets. The	e value reve	erts		
96.22	User parameter Enables the savi automatically to Notes:	set handling. ng and restoring of Done when the load	ding or savi	iser parame ng is done.					
96.22	User parameter Enables the savi automatically to Notes:	set handling. ng and restoring of	ding or savi	iser parame ng is done.					
96.22	User parameter Enables the savi automatically to Notes: Hardware co	set handling. ng and restoring of Done when the load	ding or savi	iser parame ng is done. O extension	module, fie	ldbus, and	encoder		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group	ding or savi s such as I/0 os 14 16,	user parame ng is done. O extension 47, 51 56,	module, fie 58 and 92	ldbus, and 93) are no	encoder ot included ir		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group ameter sets.	ding or savi s such as I/0 os 14 16, n as 10.03 D	user parame ng is done. O extension 47, 51 56,	module, fie 58 and 92	ldbus, and 93) are no	encoder ot included ir		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input included in t	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group ameter sets. :/output values such	ding or savi s such as I/O os 14 16, n as 10.03 D ets.	user parameing is done. D extension 47, 51 56, I force selec	module, fie 58 and 92 tion and 10.	ldbus, and 93) are no	encoder ot included ir e data are not		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input included in t - The user par	set handling. ng and restoring of Done when the load infiguration settings in parameters (group ameter sets. coutput values such the user parameter s ameter set that was	ding or savi s such as I/O os 14 16, n as 10.03 D ets. s in use befo	user parameing is done. D extension 47, 51 56, I force selectore powering	module, fie 58 and 92 tion and 10.	ldbus, and 93) are no 04 DI force drive is in u	encoder ot included in e data are no		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input included in t - The user para next power-t	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group ameter sets. c/output values such he user parameter s ameter set that was up. Except User set I	s such as I/Gos 14 16, n as 10.03 Dets. in use befo	user parameing is done. D extension 47, 51 56, I force selectore powering used. See p	module, fie 58 and 92 tion and 10. g down the c arameters 9	ldbus, and 93) are no 04 DI force drive is in u 96.23 and 9	encoder ot included in e data are not use after the 16.24.		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input included in t - The user para next power-u - Parameter cl	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group ameter sets. coutput values such he user parameter s ameter set that was up. Except User set I hanges made after Id	s such as I/O os 14 16, os as 10.03 D ets. o in use befo /O mode is oading a us	user parameing is done. D extension 47, 51 56, I force selectore powering used. See per paramete	module, fie 58 and 92 tion and 10. g down the c arameters 9 er set are no	ldbus, and 93) are no 04 DI force drive is in u 96.23 and 9	encoder ot included in e data are no		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input included in t - The user para next power-u - Parameter cl	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group ameter sets. c/output values such he user parameter s ameter set that was up. Except User set I	s such as I/O os 14 16, os as 10.03 D ets. o in use befo /O mode is oading a us	user parameing is done. D extension 47, 51 56, I force selectore powering used. See per paramete	module, fie 58 and 92 tion and 10. g down the c arameters 9 er set are no	ldbus, and 93) are no 04 DI force drive is in u 96.23 and 9	encoder ot included in e data are no		
96.22	User parameter Enables the savi automatically to Notes: - Hardware co configuratio the user para - Forced input included in t - The user par next power-u - Parameter cl in it. They me	set handling. ng and restoring of Done when the load onfiguration settings n parameters (group ameter sets. coutput values such he user parameter s ameter set that was up. Except User set I hanges made after Id	s such as I/O os 14 16, os as 10.03 D ets. o in use befo oading a us	Iser parameing is done. D extension 47, 51 56, I force selectore powering used. See per paramete	module, fie 58 and 92 tion and 10. g down the c arameters 9 er set are no e/load.	Idbus, and 93) are no 04 DI force drive is in u 96.23 and 9 t automati	encoder ot included in e data are no ese after the 16.24. cally stored		

Index	Name								
	Text								
	Range	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре	
96.23	 The PC tool 'Backup/restore' function saves the active parameter set and all 4 user sets. The PC tool 'Save parameters to file' function only saves the active parameter set. Thus, user set 1 user set 4 must be saved separately. Done; normal operation, loading or saving is done. User set I/O mode; load user parameter set using 96.23 User set I/O mode in1 and 96.24 User set I/O mode in2. Load set 1; load user set 1. Load set 2; load user set 2. Load set 3; load user set 3. Save to set 1; save parameters to user set 1. Save to set 2; save parameters to user set 2. Save to set 3; save parameters to user set 3. Save to set 4; save parameters to user set 3. Save to set 4; save parameters to user set 4. Done - 1 = 1 y n Parameter User set I/O mode in1 								
	With 96.22 User set via 96.23 User set table. Source defined by set I/O mode in1	et save/load = I/O mode in1	Source	24 User s	et I/O mode oy 96.24 Use	in2 accord	ling to the	following	
	1		0	mode in		l la a u a a d			
	0			User set 1			-		
	1	0			User				
	1	1							
	0		1			User set			
	1		1				: 3		
	0 = Always off. 1 = Always on. Other [bit]; source. 0: Not selected; 0 1: Selected; 1. 3: DI1; 10.02.b00 D 4: DI2; 10.02.b01 D 5: DI3; 10.02.b02 D 6: DI4; 10.02.b03 D 7: DI5; 10.02.b04 D 8: DI6; 10.02.b05 D 11: DIO1; 11.02.b00 D 12: DIO2; 11.02.b00 D 19: DIL; 10.02.b15	, normal oper DI delayed sta DI delayed sta DI delayed sta DI delayed sta DI delayed sta DI delayed sta DI delayed sta DI DIO delayed DI delayed	ation. tus. tus. tus. tus. tus. tus. status. status. status.	-	1 = 1	User set	: 3	Parameter	
96.24	0 = Always off. 1 = Always on. Other [bit]; source 0: Not selected; 0 1: Selected; 1. 3: DI1; 10.02.b00 E 4: DI2; 10.02.b01 E 5: DI3; 10.02.b02 E 6: DI4; 10.02.b03 E 7: DI5; 10.02.b04 E 8: DI6; 10.02.b05 E 11: DIO1; 11.02.b06 12: DIO2; 11.02.b06 19: DIL; 10.02.b15 0 19	, normal oper OI delayed sta OI delayed sta OI delayed sta OI delayed sta OI delayed sta OI delayed sta OI delayed sta OI DIO delayed OI delayed OI delayed Not sele	ation. tus. tus. tus. tus. tus. tus. status. status. status.	-	1 = 1	User set	: 3	Parameter	
96.24	0 = Always off. 1 = Always on. Other [bit]; source. 0: Not selected; 0 1: Selected; 1. 3: DI1; 10.02.b00 D 4: DI2; 10.02.b01 D 5: DI3; 10.02.b02 D 6: DI4; 10.02.b03 D 7: DI5; 10.02.b04 D 8: DI6; 10.02.b05 D 11: DIO1; 11.02.b00 D 12: DIO2; 11.02.b00 D 19: DIL; 10.02.b15	, normal oper Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of DIO delayed Of DIO delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed	ation. tus. tus. tus. tus. status. status. status. cted	-	1 = 1	User set	: 3	Parameter	
96.24	0 = Always off. 1 = Always on. Other [bit]; source 0: Not selected; 0 1: Selected; 1. 3: DI1; 10.02.b00 D 4: DI2; 10.02.b01 D 5: DI3; 10.02.b02 D 6: DI4; 10.02.b03 D 7: DI5; 10.02.b04 D 8: DI6; 10.02.b05 D 11: DIO1; 11.02.b00 D 12: DIO2; 11.02.b00 D 19: DIL; 10.02.b15 D 0 19 User set I/O model	, normal oper Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of delayed sta Of DIO delayed Of DIO delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed Of delayed	ation. tus. tus. tus. tus. status. status. status. cted	-	1 = 1	User set	: 3	Parameter	

Index	Name Text										
	Rang	е	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	Reboot the control board.										
	Rebo	ots the control bo	ard. No cy	cling the powe	er of the con	nplete drive	required.				
		alue reverts autom	•		reboot is dor	ne.					
		ne ; 0, normal ope									
	1: Reboot ; 1, reboot the control board.										
	0 1	-	Done	-	1 = 1	У	n	Parameter			
96.28	FSO r	reboot									
	Reboot the FSO-21 safety functions module.										
		ots the optional F	•		nodule.						
		•		•							
		Note: The value does not revert to done automatically. 0: Done; 0, normal operation or reboot done.									
	1: Reboot ; 1, reboot the FSO-21 safety functions module.										
								Parameter			
96.31	Time	sync source state	us	1		l.		1			
	Time source status word.										
	Displays the time source status word. See 96.35 Time sync primary source.										
	Bit assignment:										
	Bit	Name	Value	Remarks							
	0	Time tick	1	1 st priority tic	k received:						
		received		Tick has beer		om 1 st priori	ty source.				
	1	Aux time tick	1	2 nd priority ti	ck received:	<u> </u>					
			1	2 nd priority tick received: Tick has been received from 2 nd priority							
		received									
	2	received Tick interval is	1	Tick has beer Yes:		om 2 nd prior	ity.				

Bit	Name	Value	Remarks
0	Time tick received	1	1 st priority tick received: Tick has been received from 1 st priority source.
1	Aux time tick received	1	2 nd priority tick received: Tick has been received from 2 nd priority.
2	Tick interval is too long	1	Yes: Tick interval too long, accuracy compromised.
3	DDCS controller	1	Tick received: Tick has been received from an external DDCS-PLC.
4	M/F	1	Tick received: Tick has been received through the master-follower link.
5	reserved		
6	D2D	1	Tick received: Tick has been received through the drive-to-drive link.
7	FBA A	1	Tick received: Tick has been received through fieldbus adapter A.
8	FBA B	1	Tick received: Tick has been received through fieldbus adapter B.
9	EFB	1	Tick received: Tick has been received through the embedded fieldbus.
10	reserved		
11	Panel link	1	Tick received: Tick has been received from the control panel, or the PC tool connected to the control panel.
12	Ethernet tool link	1	Tick received: Tick has been received from the PC tool through a FENA module.

Index	Nam	е									
	Text										
	Rang	je	Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре		
	13	Parameter setting	1		eceived: as been	set by para	meters 96.3	7 96.39.			
	14	RTC	1		ime in u	se: e have been	read from t	he real-tim	e clock.		
	15	Drive On-Time	1		on-time and date	in use: e are display	ing drive or	n-time.			
	0000h FFFFh 1 = 1 y n Signal										
96.35	Time	sync primary so	urce								
	Defines the 1 st priority external source for the drive time and date synchronization. 0: Internal; no external source selected. 1: DDCS controller; external DDCS-PLC. 2: FBA A or FBA B; fieldbus adapter A or fieldbus adapter B. 3: FBA A; fieldbus adapter A. 4: FBA B; fieldbus adapter B. 5: D2D or M/F; master drive of a master-follower link or drive-to-drive link. 6: EFB; embedded fieldbus. 7: reserved; 8: Panel link; control panel, or the PC tool connected to the control panel. 9: Ethernet tool link; PC tool through a FENA module.										
	0	eserved; 9	DDCS co	ontroller	-	1 = 1	n	у	Parameter		
96.36	M/F	and D2D clock sy	nchroniz	ation	1			12	-1		
	Activ	rate the clock syr rates the clock sy active; clock synch tive; clock synch	nchroniza chronizati	ation for lion not ac n active.		follower link $1 = 1$	and drive-t	1	mmunication.		
96.37		days since 1st Ja	l .		-	1-1	11	У	Parameter		
50.31	Days Num minu and may	since beginning ber of full days p ites within 24 h a time in the drive be necessary if t	of 1980. assed sin nd 96.39 via the pa	Time in marker	ns withir interfac	n one minute e from a field	e makes it p dbus or app	ossible to lication pr	set the date ogram. This		
96.38		in minutes with	l .		days	I - I day	У	<u> </u>	T drameter		
<i>3</i> 0.30	Minu Num 14:20 See 9	ites since midnig ber of full minuto). 96.37 Full days si	ht. es passed nce 1st Ja						oonds to		
96.39					1	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	J	l y	T draineter		
JU.JJ	Number of milliseconds since the last minute. Number of milliseconds passed since the last minute.										
	Num See 9		ds passe	d since th		inute.		У			

Index	Name								
	Text								
	Range		Defau	ılt	Unit	Scale/ FbEq16	Volatile	Change running	Туре
96.51	Clear faul	t and event	logger	•	<u> </u>				•
	Clears the	fault and e	vent lo	gger in th		omposer by sally reset to (O after the c	leaning ha	s been
06.61			_	1	-	1 - 1	у	У	Parameter
96.61	User data		us wor	d.	e user dat	a logger. Sed	e also chapt	er <u>User da</u>	ta logger.
	Bit	Name Running		Value	Remark	S			
	0			1	Running.				
		Running		0		st-trigger tin	ne is passed	d.	
	1	Triggered		1	Trigger		<u> </u>		
				0	Restart				
	2	Data avail	able	1		s data that	can be read		
				0		is no data.		•	
	3	Configure	<u>-</u>	1	Configu				
		Comigare	u	-	_	ifigured.			
	4 15	reserved			Not cor	irigui ca.			
	0000h FFFFh -		-		-	1 = 1	у	n	Signal
96.63	User data	logger trig	ger						
	Triggers o	ger commai	source	that trigg ormal ope	ers the us	ser data logg	ger.	lu.	Parameter
	0 1		comm		-	1-1	"	У	Parameter
96.64	User data	logger star	t						
	Starts or s	ce for the uselects a sout command	urce th	at starts t		ata logger.			
	0 1		No sta		-	1 = 1	n	У	Parameter
96.65	Factory d	ata logger t	ime lev	/el	•	•	•		
	Selects th factory da - 06.09 - 06.15 I - 06.25	ata logger s e sampling Ita logger a Used main o Main Status Current con Mains voltag	interva re: control Word. troller	l for the fa		ta logger. Th	e values tha	at are recoi	ded in the

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
	– 27.02 Used cu	ırrent reference.	•	•	•	•	•			
	– 27.05 Motor o									
	 27.18 Firing a 	_								
	 28.15 M1 field 		_							
		change this selection o	of param	neters.						
	500: 500 μs ; 500									
	2000: 2 ms ; 2 mil 10000: 10 ms ; 10									
	500 10000	500 μs	_	1 = 1	n	T _V	Parameter			
96.70	Disable adaptive	•	-	1 - 1	n	у	Parameter			
30.10		an adaptive program.								
	7	s an adaptive program	if prese	ent						
	-	ve program; 0, normal	•							
	1: Disable adapti		0,00.00.							
	01	Enable adaptive	_	1 = 1	n	n	Parameter			
		program								
96.71	Disable applicati	1	II.	•	l	- I	1			
		n application program	١.							
				esent.						
	Enables/Disables an application program if present. 0: Enable application program; 0, normal operation.									
	1: Disable applica	ation program; 1.								
	0 1	Enable	-	1 = 1	n	n	Parameter			
		application								
		program								
96.100	Change user pas	s code								
	New user pass co	ode. Only visible when	the user	lock is open	ı .					
	_	ırrent user pass code, e				_				
		Warning A6B1 User pas	s code r	not confirme	d is active u	intil the ne	w pass code			
	is confirmed.				<i>.</i>					
	_	ng the pass code, close				_				
		alid user pass code int	0 96.07	Pass code tr	ien activate	96.27 Con	troi board			
	boot or cycle the See 96.07 Pass co	•								
	10000000	10000000		1 = 1	\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	\ <u>'</u>	Parameter			
	99999999	10000000	-	1-1	У	У	Parameter			
96.101	Confirm user pas	ss code								
		w user pass code. Only	visible v	when the use	er lock is on	 ≏n				
		w user pass code enter			•					
	See 96.07 Pass co	•		00 0	pa.ss (
	10000000	10000000	_	1 = 1	у	у	Parameter			
	99999999	2000000			,	,	- arameter			
96.102	User lock function	onality								
	Selects the action	ns to be prevented by	the user	lock. Only vi	sible when	the user lo	ck is open.			
		ns or functionalities to		-			•			
	Note: Changes m	nade, take effect after	the user	lock is close	ed. See 96.0	7 Pass cod	e.			
	Bit assignment:									
		ı	L				1			
	Bit Name	e Value	Remar	ks						

-	Name Taut								
-	Text Range		Default		Unit	Scale/ FbEq16	Volatile	Change running	Туре
	0	Disable AB		1		ABB access		-	
	1	Freeze par lock state	ameter	1		changing th de = 358 has		er lock stat	e. 96.07
	2	Disable file download		1	- Firm - Safe - Para - Load - Load - Cha - Edit - Edit pan - Con such	loading of finware upgradety functions umeter restoring of adapting and debugging the horing drive texting the favorel. figuration set of the control of the favorel of th	des. module FS re. See 96.1 tive progra bugging ap me view of ts. rite parame ettings mad te formats	60-21 confi 15 Paramet ams. plication p the contro eters list or de via the c and	guration. er restore. rograms. ol panel. n the contr
	B Disable FB write to hidden	1		access of pa a fieldbus.	arameters o	on disabled	access		
	4	reserved							
	5	reserved							
	6	Protect AP	1	1	Prevent creating a backup and restoring from backup.				rom a
	7	Disable pa Bluetooth	nel	1	panel. If	le Bluetooth of a Bluetooth capable control . If the drive is part of a panel bus, Bluetooth i led of all connected panels.			
	8	reserved							
	9	reserved							
	10	reserved							
	11	Disable OE access leve		1	Disable	OEM access	level 1.		
	12	Disable OE access leve		1	Disable	OEM access	level 2.		
	13	Disable OE access leve		1	Disable	OEM access	level 3.		
	14 15	reserved							

99 Motor data

Motor configuration settings.

Index	Name									
	Text									
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре			
99.01	Mains voltage	•	•	•	•	•				

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
	Mains voltage.	•	•	•	•	•	•				
	Measured mains volt	age in percent o	of 99.10 Nor	ninal mains v	voltage.						
	0.00 325.00	-	%	100 = 1 %	у	n	Signal				
99.02	M1 nominal torque										
	Motor 1, calculated in Motor 1 nominal torce 99.02 M1 nominal torque = $\frac{60}{2\pi}$	que is calculated		•	. M1 armature res	istance] × 99.11	M1 nominal current				
	99.02 M1 nominal torque = $\frac{38}{2\pi}$ ×		,	99.14 M1 nominal (b	pase) speed						
	The unit is selected by	oy 96.02 Unit se	lection.								
	0 200000000.00	-	Nm or Lb ft	1 = 1 Nm or Lb ft	У	n	Signal				
99.03	M1 nominal power										
	Motor 1, calculated n	ominal power (electrical).								
	Motor 1 nominal pov	er (electrical) is	calculated	the following	g way:						
		Motor 1 nominal power (electrical) is calculated the following way: $99.03 M1 nominal power = \frac{99.12 M1 nominal voltage \times 99.11 M1 nominal current}{1000}$									
	99.03 M1 nominal pov	$ver = \frac{99.12 M17}{1}$	iominai voit	age × 99.11 h	<u>vi i nominai</u>	current					
	•			1000							
	The unit is selected b	ov 96.02 Unit se	lection.								
	0.00 32500.00	<u> </u>	kW or	1 = 1 kW or	- V	n	Signal				
			hp	hp							
99.06	Operation mode	I .				I					
	Operation mode of t	he drive.									
	Specifies the operati		drive.								
		_		oulse single a	armature c	onverter.					
	0: Armature converter ; the drive is used as a 6-pulse single armature converter. 1: Large field exciter ; the drive is used as a large field exciter.										
	Attention: The digital input for the external overvoltage protection is assigned by means of										
		20.47 Overvoltage protection trigger source.									
	2: 12-pulse parallel m	naster; the drive	is used as	L2-pulse para	allel master	. Connecte	ed to a 3-				
	winding transformer				-	-					
	3: 12-pulse parallel s			•		nnected to	a 3-winding				
	transformer having 3	•		-	-						
	4: 12-pulse serial ma					onnected to	a 3-winding				
	transformer having 3	•		-	_						
	5: 12-pulse serial sla		•			cted to a 3	-winding				
	transformer having 3	•		-	-		. 2				
	6: 6-pulse serial mas		-			nected to a	a 3-winding				
	transformer having r	10 (U°) phase sh	irt between	secondary v	vinaings.						

10: **Serial sequential master 0°**; the drive is used as a serial sequential master. Connected to a 3-winding transformer having no (0°) phase shift between secondary windings.

11: **Serial sequential slave 0°**; the drive is used as a serial sequential slave. Connected to a 3-

8: Serial sequential master 30°; the drive is used as a serial sequential master. Connected to a

9: Serial sequential slave 30°; the drive is used as a serial sequential slave. Connected to a 3-

11: **Serial sequential slave 0°**; the drive is used as a serial sequential slave. Connected to a 3-winding transformer having no (0°) phase shift secondary windings.

7: 6-pulse serial slave; the drive is used as 6-pulse serial slave. Connected to a 3-winding

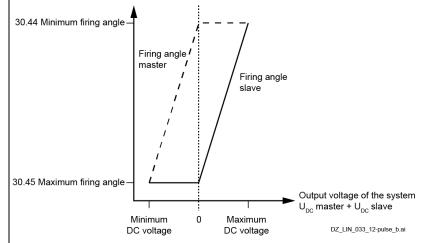
transformer having no (0°) phase shift between secondary windings.

3-winding transformer having a 30° phase shift between secondary windings.

winding transformer having a 30° phase shift between secondary windings.

Index Name Text Range Default Unit Scale/ Volatile Change Type running

Note: Sequential control of the firing angles. Only one of the two drives changes the firing angle. The other drive keeps the firing angle fixed at minimum- or maximum firing angle limit.



12: **Firing angle follower degree**; the drive is used as a firing angle follower. The firing angel is sent directly in degrees to the firing angle path of the follower. See 27.45 Firing angle follower reference.

Note: This function does not include a bridge reversal function. It is only valid for 2-Q drives. 13: **Firing angle follower scaled**; the drive is used as a firing angle follower. The firing angel is sent directly in percent to the firing angle path of the follower. See 27.45 Firing angle follower reference.

Note: This function does not include a bridge reversal function. It is only valid for 2-Q drives.

0 13	Armature	-	1 = 1	n	n	Parameter
	converter					

99.07 M1 used field exciter type

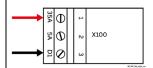
Motor 1 field exciter type.

99.07 M1 used field exciter type ≠ None, activates motor 1 field exciter. Now it reacts to an On command and generates field current.

Note: To activate both field exciters (motor 1 and motor 2) set also 42.49 M2 used field exciter type \neq None.

- 0: **None**; no or third-party field exciter connected.
- 1: OnBoard; integrated 1-Q field exciter (for sizes H1 ... H4 only).
- 2: DCF803-0016; external 1-Q 16 A field exciter used for field currents from 0.3 A ... 16 A.

Note: Use 35 A terminals:



3: **FEX-425-Int**; internal 1-Q 25 A field exciter (for size H5 and H6 only) used for field currents from 0.3 A ... 25 A.

Note: Use 35 A terminals:



	Text										
	Range	Default	Unit	Scale/	Volatile	Change	Туре				
				FbEq16		running					
		external 1-Q 35 A fi	eld exciter	used for field	d currents f	rom 0.3 A	35 A.				
	Note: Use 35 A te	rminals:									
	2 0 × X100										
		M.STAROLEON, and									
		al 5 A; external 1-Q									
	exciter (FEX-425-Int) or external 1-Q 35 A field exciter (DCF803-0035) used for field currents from 0.3 A 5 A.										
	Note: Use 5 A terminals:										
	Note. Ose 5 A ten	illiais.									
	35,4										
	2										
		M.ST.Stranger									
	6. DCE802-0050: oxtornal 1-0 50 A field excitor										
	6: DCF803-0050 ; external 1-Q 50 A field exciter.										
	7: DCF804-0050 ; external 4-Q 50 A field exciter. 8: DCF803-0060 ; external 1-Q 60 A field exciter.										
	·	external 4-Q 60 A f									
	10: DCS880-S01 ; e	external 2-Q standa	ard DCS880) module.							
		10: DCS880-S01; external 2-Q standard DCS880 module. 11: DCS880-S02; external 4-Q standard DCS880 module.									
	11: DC5880-S02; external 4-Q standard DC5880 module. 16: External field exciter via Al1; third party field exciter, acknowledge via Al1.										
			d party fiel	d exciter, acl	-						
	17: External field	exciter via AI2 ; thir	d party fiel d party fiel	d exciter, acl d exciter, acl	knowledge ^v	via AI2.					
	17: External field 18: External field	exciter via AI2 ; thir exciter via AI3 ; thir	d party fiel d party fiel	d exciter, acl d exciter, acl	knowledge v	via AI2.					
	17: External field of 18: External field 19: Multiple field	exciter via AI2; thir exciter via AI3; thir exciters; reserved.	d party fiel d party fiel	d exciter, acl d exciter, acl	knowledge v	via AI2.					
	17: External field 18: External field 19: Multiple field 20: Series wound	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved.	d party fiel d party fiel	d exciter, acl d exciter, acl d exciter, ac	knowledge knowledge	via AI2. via AI3.	Parameter				
19.10	17: External field of 18: External field 19: Multiple field 20: Series wound 0 20	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard	d party fiel d party fiel	d exciter, acl d exciter, acl	knowledge v	via AI2.	Parameter				
99.10	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard	d party fiel d party fiel	d exciter, acl d exciter, acl d exciter, ac	knowledge knowledge	via AI2. via AI3.	Parameter				
99.10	17: External field of 18: External field 19: Multiple field of 20: Series wound 0 20 Nominal mains von Nominal main	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard oltage	d party fiel d party fiel d party fiel	d exciter, acl d exciter, acl d exciter, acl	knowledge knowledge n	via AI2. via AI3. n					
99.10	17: External field of 18: External field of 19: Multiple field of 20: Series wound of 19: 20 Nominal mains von Nominal m	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard bitage bitage. Otage (AC) of the se	rd party fiel rd party fiel rd party fiel - - upply. The o	d exciter, acld exciter, acld exciter, acld exciter, acld = 1	knowledge knowledge	via AI2. via AI3. n	reset				
99.10	17: External field of 18: External field of 19: Multiple field of 20: Series wound of 19: Mominal mains von Nominal mains von Nominal mains von automatically according to the series of 19: External field of 19: External	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard oltage oltage. oltage (AC) of the so ording to 95.25 Set	rd party fiel rd party fiel rd party fiel - - upply. The o	d exciter, acld exciter, acld exciter, acld exciter, acld = 1	knowledge knowledge	via AI2. via AI3. n	reset				
99.10	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically accabsolute maximu	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard oltage oltage. oltage (AC) of the so ording to 95.25 Set m is 1200.0 V _{AC} .	rd party fiel rd party fiel rd party fiel - - upply. The o	d exciter, acld exciter, acld exciter, acld exciter, acld = 1	knowledge knowledge	via AI2. via AI3. n alues are pi	reset caling. The				
	17: External field of 18: External field of 19: Multiple field of 20: Series wound of 19: Mominal mains von Nominal mains von Nominal mains von automatically according to the series of 19: External field of 19: External	exciter via AI2; thir exciter via AI3; thir exciters; reserved. OnBoard oltage oltage. oltage (AC) of the so ording to 95.25 Set m is 1200.0 V _{AC} .	d party field part	d exciter, acl d exciter, acl d exciter, acl 1 = 1 default and reand 95.28 S	knowledge knowledge knowledge	via AI2. via AI3. n	reset caling. The				
	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre	exciter via AI2; thir exciter via AI3; thir exciters; reserved. OnBoard Oltage Oltage (AC) of the seconding to 95.25 Set m is 1200.0 V _{AC} . B 0.0 nt	d party field part	d exciter, acl d exciter, acl d exciter, acl 1 = 1 default and reand 95.28 S	knowledge knowledge knowledge	via AI2. via AI3. n alues are pi	reset caling. The				
	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal curre	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard oltage oltage. oltage (AC) of the so ording to 95.25 Set m is 1200.0 V _{AC} . B 0.0 nt current.	d party fiel d party fiel d party fiel - upply. The det: Type code	d exciter, acld	n naximum va	via AI2. via AI3. n alues are pi	reset caling. The				
	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal curre	exciter via AI2; thir exciter via AI3; thir exciters; reserved. OnBoard Oltage Oltage (AC) of the seconding to 95.25 Set m is 1200.0 V _{AC} . B 0.0 nt	d party fiel d party fiel d party fiel - upply. The det: Type code	d exciter, acld	n naximum va	via AI2. via AI3. n alues are pi	reset caling. The				
	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal curre Motor 1 nominal curre Notes:	exciter via AI2; thir exciter via AI3; thir exciters; reserved. motor; reserved. OnBoard oltage oltage. oltage (AC) of the so ording to 95.25 Set m is 1200.0 V _{AC} . B 0.0 nt current.	d party fiel d party fiel d party fiel - upply. The c t: Type code	d exciter, acld	n naximum vaset: Drive AG	n alues are provided by y	reset caling. The				
	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal of Motor 1 nominal of Notes: For 12-pulse p In case the co	exciter via AI2; thir exciter via AI3; thir exciters; reserved. OnBoard Oltage Oltage Oltage (AC) of the stording to 95.25 Set m is 1200.0 V _{AC} . Onboard Oltage (AC) of the stording to 95.25 Set m is 1200.0 V _{AC} . Onboard Output	d party fiel d party fiel d party fiel d party fiel - upply. The d t: Type codd V OC) from the CS880 12-p a large field	d exciter, acld	n maximum va Set: Drive AC n ng plate. (3ADW000 he value to	n nalues are provoltage soly	reset caling. The Parameter				
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99.11	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal o Motor 1 nominal o Notes: For 12-pulse p In case the co current from t The allowable current. See 0	exciter via AI2; thir exciters; reserved. motor; reserved. OnBoard oltage oltage. oltage (AC) of the seconding to 95.25 Set m is 1200.0 V _{AC} . armature current (Description of the second of th	d party field d party field party field d pa	d exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter and policy and policy exciter set to the content of the content is 10 exciter set to the c	n maximum vaset: Drive AC n ng plate. (3ADW000 he value to	n nalues are provoltage solution by y	reset caling. The Parameter				
	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal curre Motor 1 nominal a Notes: For 12-pulse p In case the co current from t The allowable current. See 0 0 32500 M1 nominal volta	exciter via AI2; thir exciters; reserved. OnBoard Oltage Oltage (AC) of the seconding to 95.25 Set m is 1200.0 V _{AC} . Barallel mode, see Description of the motor rating planar is used as a che motor rating planar for the motor. 7.62 Drive DC curred of the motor.	d party field d party field party field party field d part	d exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter and 95.28 States and 95.28 States and 95.28 States and exciter set to 200 Courrent is 10 Set.	n maximum vaset: Drive AC n mg plate. (3ADW000 he value to an mode. % 230 %	n alues are provided by the nominal of the nominal	reset caling. The Parameter al field minal drive				
99.11	17: External field 18: External field 19: Multiple field 20: Series wound 0 20 Nominal mains vo Nominal mains vo automatically acc absolute maximu 0.0 95.25/95.28 M1 nominal curre Motor 1 nominal of Motors: For 12-pulse p In case the concurrent from to Current from to The allowable current. See 0 0 32500 M1 nominal volta Motor 1 nominal volta	exciter via AI2; thir exciters; reserved. OnBoard Oltage Oltage (AC) of the seconding to 95.25 Set m is 1200.0 V _{AC} . Barallel mode, see Description of the motor rating planar is used as a che motor rating planar for the motor. 7.62 Drive DC curred of the motor.	d party field part	d exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter, acld exciter and 95.28 States and 95.28 States and 95.28 States and 95.28 States and exciter set to the content is 10 set.	n naximum vaset: Drive AG n plate. (3ADW000 he value to n mode. % 230 %	n alues are provided by the nominal of the nominal	reset caling. The Parameter al field minal drive				

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
	(3ADW000533). - In case the conve	al mode or serial erter is used as a motor rating pla	large field	exciter set th	ie value to		
	0.0 3250.0	350.0	V	10 = 1 V	n	у	Parameter
99.13	M1 nominal field cur	rent					
	Motor 1 nominal field Motor 1 nominal field Note : In case the cou the nominal field cur	d current from the nverter is used as rent.	a large fie	ld exciter use	1		
	0.3 3250.0	0.3	Α	10 = 1 A	n	У	Parameter
99.14	M1 nominal (base) s	•					
	Motor 1 nominal (ba Motor 1 nominal (ba unit is selected by 9 0.00 30000.00	se) speed from th	rpm, %			field weak	Parameter
00.17			or V				
99.17	Last tuning perform Last performed tuni						
	Shows the type of tu	•	rformed la	st See 99 20	Tunina re	auest	
	0 16	-			у	n	Signal
99.20	Tuning request)	1	10.9
		contains all auto- itomatically reset case errors occur on of the warning	to Normal during the can be se Tuning req ile 99.20 T	mode after a e selected tu en in the AUX uest must be uning reques	an autotur ning, warn (codes. e set back t t ≠ Norma	ing AF90 A to Normal I	utotuning is

- A standard DCS880 converter used as a large field exciter cannot be tuned by means of the armature converter it is connected to. Tune the field current controller by setting 99.20
 Tuning request = Field current autotuning in the large field exciter itself.
- 0: Normal mode; normal operating mode depending on 99.06 Operation mode.
- 1: Field current autotuning; autotuning the field current controller.

Attention: The field autotuning is realized through increasing the field voltage (≡ decreasing the firing angel) and not via field current reference. Please note that the limits in group 30 will not be taken in consideration during the autotuning. The maximum field current during tuning can be reduced by adapting 99.13 M1 nominal field current if required.

- 2: Armature current autotuning; autotuning the armature current controller.
- 3: **Speed feedback assistant**; test the speed feedback. See 90.41 M1 feedback selection, 94.08 M1 tacho voltage at 1000 rpm, 94.23 OnBoard encoder pulses/revolution, 94.24 OnBoard pulse encoder type and 94.25 OnBoard encoder speed calculation mode.

Attention: In case ODVA is used, internal fieldbus adapter parameters need to be validated after a speed feedback autotuning. When using 99.20 Tuning request = Speed feedback

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре
99.23	assistant, validate to refresh = Refresh of 4: Speed controller at 6: Flux linearization 10: Field current material: Field reversal as 12: Armature current 13: Find discontinuitation fine-tuning fat 15: Speed controlle 16: EMF controller to 16 Test signal output Test signal generat Output signal of the	r 54.27 FBA B par r autotuning; autotu autotuning; autotu autotuning; autotu autotuning; man sistant; assistant at manual tuning; ous current limit; ng; tacho fine-tuni actor. r manual tuning; man anual tuning; manua	efresh = R tuning the ning the El otuning the ual tuning to test the manual turing. See 94 manual tuning.	parameters efresh. speed controlle eflux lineariz of the field reversing of the Ascontinuous 1.11 M1 tacho	roller. r. cation. current cont sal. curmature cu current lim fine-tuning	running either 51.2 croller. crent contriit. g adjust an	7 FBA A par
	99.26 Test 99.27 Test 99.28 Con: refer	.20 Tuning reques	t and 99.3		99.20 =	30 Test sign 14 M1 field of 02 Used cur 84 Speed re 02 EMF volt o connection notor 2 or 27.02 n large field exc Operation mode	al index current reference rent reference ference 4 age reference 2 Used current tter mode.
	99.20/99.30	0.000	99.20/ 99.30	99.20/ 99.30	у	у	Signal
99.26							
99.26	Test signal shape Test signal generat Signal forms for the request. Note: After a power generator. 0: Zero; not in use. 1: Square wave; a se 2: Triangle; a triang 3: Sine wave; a sine 4: Constant test sigused. 5: Constant test sigused.	e test signal gener r-up, the value is so quare wave is used le wave is used. wave is used. gnal 1; a constant	et back to d. value set v	Zero and the	us disables onstant test	the test sig	gnal erence 1 is

Index	Name										
	Text										
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре				
99.27	Test signal period	d									
	Tuning request. Note : After a pow	or the test signal g	set back to	0.00.			T				
	0.00 655.36	0.00	S	10 = 1 s	У	у	Parameter				
99.28	Constant test sig	Constant test signal reference 1									
	 Test signal generator, test signal reference 1. Constant test reference 1 for the test signal generator and the manual tuning functions. See 99.20 Tuning request. Notes: The range, the unit and the scaling for the fieldbus communication depends on the chosen sink. See 99.20 Tuning request and 99.30 Test signal index. After a power-up, the value is set back to 0. Examples: 100.00 % voltage ≡ 10,000. 100.00 % current ≡ 10,000. 100.00 % power ≡ 10,000. 100.00 % torque ≡ see 46.04 M1 torque scaling actual ≡ 10,000. 										
	100.00 % pow100.00 % torq	ver ≡ 10,000.	-	ctual ≡ 20,00		у	Parameter				
	- 100.00 % pow - 100.00 % torq - 100.00 % spec 99.20/99.30	ver = 10,000. que = see 46.04 M1 ed = 46.02 M1 spee	d scaling ac	ctual ≡ 20,00	0.	у	Parameter				
99.29	- 100.00 % pow - 100.00 % torq - 100.00 % spec 99.20/99.30 Constant test sig	ver = 10,000. yue = see 46.04 M1 ed = 46.02 M1 spee 0 ynal reference 2	99.20/ 99.30	tual = 20,00 99.20/	0.	У	Parameter				
99.29	 100.00 % pow 100.00 % torq 100.00 % spee 99.20/99.30 Constant test sig Test signal general	ver = 10,000. Jule = see 46.04 M1 ed = 46.02 M1 spee 0 Jule = see 46.04 M1 grad = 46.02 M1 spee ator, test signal reference 2	99.20/ 99.30 ference 2.	etual = 20,00 99.20/ 99.30	у у						
99.29	 100.00 % pow 100.00 % torq 100.00 % spee 99.20/99.30 Constant test sig Test signal general Constant test reference	ver = 10,000. upue = see 46.04 M1 ed = 46.02 M1 spee 0 upual reference 2 ator, test signal reference 2 for the test	99.20/ 99.30 ference 2. st signal ge	etual = 20,00 99.20/ 99.30	у у						
99.29	 100.00 % pow 100.00 % torq 100.00 % spee 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant test	ver = 10,000. Jue = see 46.04 M1 ed = 46.02 M1 spee 0 Jual reference 2 ator, test signal reference 2 for the test signal reference	99.20/ 99.30 ference 2. st signal ge	etual = 20,00 99.20/ 99.30 nerator and	y the manual	tuning fun	ctions. See				
99.29	 100.00 % pow 100.00 % torq 100.00 % spee 99.20/99.30 Constant test sig Test signal general Constant test reference	ver = 10,000. upue = see 46.04 M1 ed = 46.02 M1 spee 0 upual reference 2 ator, test signal reference 2 for the test	99.20/ 99.30 99.30 ference 2. st signal gets 1. 99.20/	etual = 20,00 99.20/ 99.30 nerator and	у у						
	- 100.00 % pow - 100.00 % torq - 100.00 % spec 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant test 99.20/99.30	ver = 10,000. uue = see 46.04 M1 ed = 46.02 M1 spee 0 unal reference 2 ator, test signal reference 2 for the test signal reference 0	99.20/ 99.30 ference 2. st signal ge	etual = 20,00 99.20/ 99.30 nerator and	y the manual	tuning fun	ctions. See				
99.29	- 100.00 % pow - 100.00 % torq - 100.00 % spee 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant test 99.20/99.30 Test signal index	yer = 10,000. yue = see 46.04 M1 ed = 46.02 M1 spee 0 ynal reference 2 ator, test signal reference 2 for the test signal reference st signal reference	99.20/ 99.30 ference 2. st signal get e 1. 99.20/ 99.30	etual = 20,00 99.20/ 99.30 nerator and	y the manual	tuning fun	ctions. See				
	- 100.00 % pow - 100.00 % torq - 100.00 % spec 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant test 99.20/99.30 Test signal index Test signal general	yer = 10,000. yue = see 46.04 M1 ed = 46.02 M1 spee 0 ynal reference 2 ator, test signal reference 2 for the test signal reference 0	99.20/ 99.30 ference 2. st signal get e 1. 99.20/ 99.30 dex.	etual = 20,00 99.20/ 99.30 nerator and 99.20/ 99.30	the manual	tuning fun	ctions. See Parameter				
	- 100.00 % pow - 100.00 % torq - 100.00 % spec 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant test 99.20/99.30 Test signal index Test signal general	ver = 10,000. July a = see 46.04 M1 July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.04 M1 O	99.20/ 99.30 ference 2. st signal get e 1. 99.20/ 99.30 dex.	etual = 20,00 99.20/ 99.30 nerator and 99.20/ 99.30	the manual	tuning fun	ctions. See Parameter				
	- 100.00 % pow - 100.00 % torq - 100.00 % spec 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant te 99.20/99.30 Test signal index Test signal general Index pointer to the	ver = 10,000. July a = see 46.04 M1 July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.04 M1 O	99.20/ 99.30 ference 2. st signal get e 1. 99.20/ 99.30 dex.	etual = 20,00 99.20/ 99.30 nerator and 99.20/ 99.30	the manual	tuning fun	ctions. See Parameter				
	- 100.00 % pow - 100.00 % torq - 100.00 % spee 99.20/99.30 Constant test sig Test signal general Constant test refe 99.28 Constant test 99.20/99.30 Test signal index Test signal general Index pointer to the signal general signal general signal general signal general sign	ver = 10,000. July a = see 46.04 M1 July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.02 M1 spee O July a = 46.04 M1 O	99.20/ 99.30 ference 2. st signal get e 1. 99.20/ 99.30 dex. rameter) for	etual = 20,00 / 99.20/ 99.30 nerator and / 99.20/ 99.30 r the test sig	the manual y gnal generat	tuning fun y cor. E.g., a s	ctions. See Parameter setting of				
	- 100.00 % pow - 100.00 % torq - 100.00 % specence 99.20/99.30 Constant test signal general Constant test reference 99.28 Constant test 99.28 Constant test 109.20/99.30 Test signal index Test signal general index pointer to the 12207 equals 22.07 Notes: - 99.30 Test signal request.	yer = 10,000. yue = see 46.04 M1 ed = 46.02 M1 spee 0 ynal reference 2 ator, test signal reference 2 for the test signal reference 0 ator, test signal inchesink (signal/par Speed reference.	99.20/ 99.30 ference 2. st signal general signal general signal general signal general signal general signal general signal general signal general signal general signal	99.20/ 99.30 nerator and 99.20/ 99.30 r the test sig	the manual y gnal generat	tuning fun y cor. E.g., a s	ctions. See Parameter setting of				

200 Safety

Safety related status and control words.

Index	Na	me									
	Text										
	Range Default Unit Scale/ Volatile Change Type FbEq16										
200.01 to		is group contains par . See:	ameters related	d to an o	ptional safet	y functions	module (F	SPS-21/FSO-			
200.10	_ _	FSPS-21 PROFIsafe s				. <u>58638)</u> .					
200.05	FS	O control word 1									

Index	Name						
	Text						
	Range	Default	Unit	Scale/ FbEq16	Volatile	Change running	Туре

FSO-21/FSPS-21 control word.

Displays the FSO-21/FSPS-21 control word of the drive. This signal shows the control signals as received from the safety PLC.

Note: It is also used for the FSPS-21 module.

Attention: Do not write on this signal.

Bit assignment:

Bit	Name	Value	Remarks
0	STO Request	0	STO requested. The FSPS-21 module uses terminal XSTO on the SDCS-CON-H01 to activate the STO. See also 31.98.b10 STO actual status. See also drawing Profile conversion using a FSPS-21 fieldbus adapter. No STO requested. Normal operation.
1	Not used by DCS880		110 510 requested. Normal operation.
2	SS1 Request	0	SS1 requested. Activates command Off3 (emergency stop), see 06.09.b02 Used main control word. The drive always uses the emergency ramp stop. Details see 21.03 Emergency stop mode. The deceleration time is set in 23.23 Emergency stop time an relates to 46.02 M1 speed scaling actual. The SS1 safety time set in the safety PLC needs to be set slightly higher than 23.2 Emergency stop time. If 01.73 24.02 Used speed feedback fast is < than 21.06 Used zero speed level follows: After 21.07 Used zero speed delay is elapsed STO is activated. If the drive does not ramp down within the SS1 safety time for any reason, STO is activated by the FSPS-21 module using terminal XSTO on the SDCS-CON-H01. See also drawing Profile conversion using a FSPS-21 fieldbus adapter. No SS1 requested. Normal operation.
3 15	Not used by		·

Fault tracing

What this chapter contains

This chapter lists all warning/fault messages including probable causes and corrective actions. By means of this chapter, the causes of all warnings/faults can be identified and corrected. If not, an ABB service representative should be contacted.

Warnings/faults are listed below in separate tables. Each table is sorted by warning and fault code.

Safety



WARNING

Only qualified electricians are allowed to service the drive. Read the Safety instructions on the first pages of the <u>DCS880 Hardware manual (3ADW000462)</u> before working on the drive.

Indications

Warnings and faults

Warnings/faults indicate an abnormal drive status. The codes and names of active warnings/faults are displayed on the control panel of the drive as well as in the PC tool. Via fieldbus only the codes of the warnings/faults are available.

Warnings do not need to be reset. They stop showing when the cause of the warning ceases. Warnings do not latch, and the drive will continue to operate the motor.

Faults do latch inside the drive. They cause the drive to trip and the motor stops. After the cause of a fault has been removed, the fault can be reset from a selectable source. See 20.13 Fault reset selection. This can be the control panel, the PC tool, a digital input of the drive or the fieldbus. After the fault is reset, the drive can be restarted.

Note: Some faults require a reboot of the control board, either by cycling the power or via 96.27 Control board boot. This is mentioned in the fault listing wherever appropriate.

The warning/fault indications can be directed to a relay output or a digital input/output by selecting Warning, Tripped or Tripped (-1) in the source selection parameter. See groups:

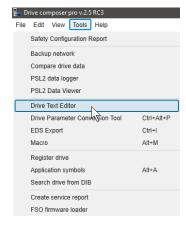
- 10 Standard DI, RO.
- 11 Standard DIO, FI, FO.
- 14 ... 16 I/O extension module 1 ... 3.

Events

In addition to warnings and faults, there are notices that are only recorded in the event logs of the drive. The codes of these notices are included in the Warning messages table.

Editable messages

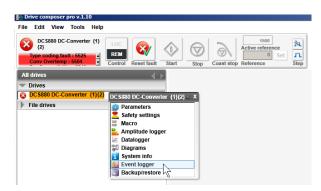
For some warnings/faults, the message text can be edited, and instructions and contact information added. To edit these messages, choose **Menu - Settings - Edit texts** on the control panel or use the Drive Text Editor in the Drive Composer pro.



Warning/fault history and analysis

Event logs

The drive has several event logs, to access, choose **Menu - Event log** on the control panel. The event logs can also be accessed and reset using the PC tool.



The event logs contain faults, warnings, and notices, as well as cleared entries. Each event log contains 32 most recent events. All indications in the event logs are stored including a time stamp and other information.

AUX codes

Some events generate AUX codes helping to pinpoint the problem.

The AUX codes are displayed on the control panel together with a corresponding message. It is also stored in the event logs details. In the PC tool, AUX codes can be found in the event listing.



Factory data logger

The drive has a factory data logger that samples preselected drive values. The default sampling time is 500 µs. See 96.65 Factory data logger time level for additional sampling times.

Approximately 7000 samples are recorded immediately before and after a fault. They are saved to the memory unit of the drive. The fault data of the last five faults are only accessible in the event log of the Drive Composer pro PC tool.



The values that are recorded in the factory data logger are:

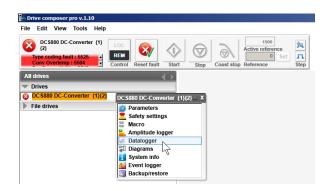
- 06.09 Used main control word.
- 06.15 Main Status Word.
- 06.25 Current controller status word 2.
- 99.01 Mains voltage.
- 24.01 Used speed reference.
- 90.01 Motor speed for control.
- 27.02 Used current reference.
- 27.05 Motor current.
- 27.18 Firing angle.

28.15 M1 field current.

The user cannot change this selection of signals.

User data logger

The settings and values of the custom user data logger are saved in the drive. It can be configured using the Drive Composer pro PC tool.



This functionality enables the free selection of up to eight drive parameters to be sampled at selectable intervals. The triggering conditions and the length of the monitoring period can also be defined by the user within the limit of approximately 8000 samples.

In addition to the PC tool, the status of the logger is shown in 96.61 User data logger status word. The triggering sources can be selected by 96.63 User data logger trigger and 96.64 User data logger start. The configuration, status and collected data is saved on the memory unit for later analysis.

Parameters that contain warning/fault information

The drive stores a list of active faults and the one causing the trip in signals 04.01 ... 04.05. Active warnings are shown in signals 04.06 ... 04.10. The group 04 also displays a list of faults and warnings that have previously occurred.

QR Code generation for mobile service application

A QR Code or a series of QR Codes can be generated by the drive for display on the control panel. The QR Code contains drive identification data, information on the latest events, status information and counter parameters. The code can be read with a mobile device containing the ABB service application, which then sends the data to ABB for analysis. For more information on the application, contact your local ABB service representative.

The QR Code can be generated by choosing Menu - Assistants - QRCode on the control panel.

Converter protection

Auto-reclosing (ride through a mains undervoltage)



WARNING

If auto-reclosing is enabled the motor automatically picks up speed again. Design the machine or equipment so, that human safety is ensured after auto-reclosing otherwise an accident could occur.

Auto-reclosing allows continuing drive operation immediately after a short mains undervoltage without any additional functions in the overriding control system.

To keep the overriding control system and the drive control electronics running through short mains undervoltage, an UPS is needed for the $115/230~V_{AC}$ auxiliary voltages. Without the UPS all DI like e.g., E-stop, start inhibition, acknowledge signals etc. would have false states and trip the drive although the system itself could stay alive. Also, the control circuits of the mains contactor must be supplied during the mains undervoltage.

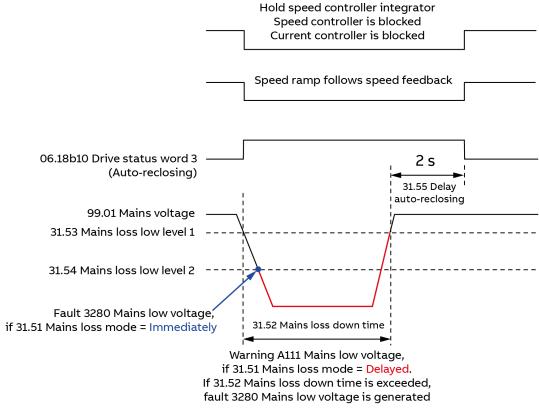
Mains loss mode

31.51 Mains loss mode = Immediately:

- The event generates warning A111 Mains low voltage, if 31.53 Mains loss low level 1 is undershot. The warning is removed when the mains voltage recovers before 31.52 Mains loss down time elapses.
- The event generates fault 3280 Mains low voltage, if 31.53 Mains loss low level 1 is undershot for longer than 31.52 Mains loss down time.
- The event immediately generates fault 3280 Mains low voltage, if 31.54 Mains loss low level 2 is undershot.

31.51 Mains loss mode = Delayed:

- The event generates warning A111 Mains low voltage, if 31.53 Mains loss low level 1 and/or 31.54 Mains loss low level 2 is undershot. The warning is removed when the mains voltage recovers before 31.52 Mains loss down time elapses.
- The event generates fault 3280 Mains low voltage, if 31.53 Mains loss low level 1 and/or 31.54 Mains loss low level 2 is undershot for longer than 31.52 Mains loss down time.
- Thus, undershooting 31.54 Mains loss low level 2 generates no immediate fault.



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Note: If no UPS is available, set 31.51 Mains loss mode = Immediately. Thus, the drive will trip with fault 3280 Mains low voltage avoiding secondary phenomena due to missing power for Al's and Dl's.

Short mains undervoltage

The supervision of mains undervoltage has two levels:

31.53 Mains loss low level 1 for warning, protection, and trip level and 31.54 Mains loss low level 2 as trip level.

If the mains voltage undershoots 31.53 Mains loss low level 1 following actions take place:

- The firing angle is set to 30.45 Maximum firing angle.
- Single firing pulses are applied to extinguish the DC current as fast as possible.
- The controllers are frozen.
- The speed ramp output is updated from the speed feedback.

- Warning A111 Mains low voltage is generated. The warning is removed when the mains voltage recovers before 31.52 Mains loss down time elapses. The drive will start again after 2 seconds (see 31.55 Delay auto-reclosing), if On and Start commands are maintained.
- Fault 3280 Mains low voltage is generated, if 31.53 Mains loss low level 1 is undershot for longer than
 31.52 Mains loss down time.

If the mains voltage undershoots 31.54 Mains loss low level 2 following actions take place:

- If 31.51 Mains loss mode = Immediately:
 - Fault 3280 Mains low voltage is generated immediately.
- If 31.51 Mains loss mode = Delayed:
 - The field acknowledge signals are ignored.
 - The firing angle is set to 30.45 Maximum firing angle.
 - Single firing pulses are applied to extinguish the DC current as fast as possible.
 - The controllers are frozen.
 - The speed ramp output is updated from the speed feedback.
 - Warning A111 Mains low voltage is generated. The warning is removed when the mains voltage recovers before 31.52 Mains loss down time elapses. The drive will start again after 2 seconds (see 31.55 Delay auto-reclosing), if On and Start commands are maintained.
 - Fault 3280 Mains low voltage is generated, if 31.53 Mains loss low level 2 is undershot for longer than 31.52 Mains loss down time.
 - Thus, undershooting 31.54 Mains loss low level 2 generates no immediate fault.

Notes:

- In case an On command is given and the measured mains voltage is too low for longer than 500 ms
 A111 Mains low voltage is generated. If the problem persists for longer than 10 s 3280 Mains low voltage is generated.
- 31.54 Mains loss low level 2 is not monitored unless the mains voltage drops below 31.53 Mains loss low level 1 first. Thus, for a proper function of the mains undervoltage monitoring 31.53 Mains loss low level 1 must be higher than 31.54 Mains loss low level 2.
- The additional 2 s delay of the auto-reclosing function can be switched off by means of 31.55 Delay auto-reclosing.

Converter overtemperature

The maximum temperature of the bridge can be read from 07.65 Drive max bridge temperature set and is automatically set by 95.25 Set: Type code or manually set by 95.29 Set: Drive max bridge temperature. **Note:** When setting the air entry temperature for H7 and H8 modules manually use 95.29 Set: Drive max bridge temperature = 50°C as absolute maximum.

Exceeding the level in 07.65 Drive max bridge temperature set generates fault 4310 Bridge temperature measured. The threshold for warning A4B0 Bridge temperature measured is 5°C below the tripping level. The measured temperatures can be read from 05.11 Ch1 bridge temperature, 05.12 Ch2 bridge temperature, 05.13 Ch3 bridge temperature and 05.14 Ch4 bridge temperature.

Fan, field, and mains contactor acknowledge

When an On command is given, the firmware closes the fan contactors and waits for the acknowledge. After it is received, the field contactor is closed, and the field converter is started. Now the firmware waits for the field acknowledge. Finally, the mains contactor is closed and its acknowledge is waited for. If the acknowledges are not received during 10 seconds after the On command is given, the corresponding faults are generated. These are:

- 5080 Drive fan acknowledge, see 20.38 Drive fan acknowledge source.
- 71B1 Motor fan acknowledge, see 20.39 Motor fan acknowledge source.
- F521 Field acknowledge, see 06.26 M1 field exciter status word.
- F524 Mains contactor acknowledge, see 20.34 Mains contactor acknowledge source.

Note: F521 Field acknowledge missing is the sum fault for all field related faults like:

- F515 M1 field exciter overcurrent, see 31.59 M1 field overcurrent level.
- F516 M1 field exciter communication, see 70.12 Field exciter timeout.
- F529 M1 field exciter not OK, fault during self-diagnosis.
- F537 M1 field exciter ready lost, AC voltage is missing or not in synchronism.
- F541 M1 field exciter low current, see 31.58 M1 field current low level.

Safe torque off

The drive monitors the status of the Safe Torque Off (STO) input, and 31.22 STO indication run/stop selects which indications are given when the signals are lost. The parameter does not affect the operation of the Safe Torque Off function itself. For more information on Safe Torque Off, see Supplement for functional safety.

Communication loss

The reaction to a communication loss and the time out can be set by means of the parameters listed in the below table. Additionally, all fault- and warning messages are shown as well.

Device	Loss control	Time out	Related fault	Related warning
Extension I/O	31.56 Ext I/O comm loss event	-	7082 Ext I/O comm loss	A799 Ext I/O comm loss A7AB I/O extension configuration
Control panel Drive Composer	49.05 Communication loss action	49.04 Communication loss time	7081 Control panel/PC tool link communication	A7EE Control panel/PC tool link communication
FBA A	50.02 FBA A comm loss func	50.03 FBA A comm loss timeout	7510 FBA A communication	A7C1 FBA A communication
FBA B	50.32 FBA B comm loss func	50.33 FBA B comm loss timeout	7520 FBA B communication	A7C2 FBA B communication
EFB	58.14 Communication loss action	58.16 Communication loss time	6681 EFB communication	A7CE EFB communication
Master-follower link	60.09 M/F comm loss function	60.08 M/F comm loss timeout	7582 Master-follower link communication	A7CB Master-follower link communication
DDCS controller	60.59 DDCS controller comm loss function	60.58 DDCS controller comm loss time	7581 DDCS controller comm loss	A7CA DDCS controller comm loss
SDCS-DSL-H1x	-	70.08 12-pulse timeout	F535 12-pulse communication	A7AB I/O extension configuration
		70.12 Field exciter timeout	F516 M1 field exciter communication F519 M2 field exciter communication	
12-pulse	-	70.08 12-pulse timeout	F535 12-pulse communication	A7AB I/O extension configuration
Field exciter	-	70.12 Field exciter timeout	F516 M1 field exciter communication F519 M2 field exciter communication	A7AB I/O extension configuration
Power unit	-	-	5681 Power unit, communication	A113 Power unit, communication A7AB I/O extension configuration

External events

Five different events from the process can be connected to selectable inputs to generate faults and warnings. See parameters 31.01 ... 31.10. When the signal is low, an external event (fault and/or warning) is generated. See A981 External warning 1 ... A985 External warning 5 and 9081 External fault 1 ... 9085 External fault 5.

Note: In case inverted fault inputs are needed, it is possible to invert the DI's.

Auxiliary undervoltage

Too low auxiliary voltage, e.g., short dip, while Ready run = 1 generates fault F501 Auxiliary undervoltage.

Auxiliary supply voltage	Trip level
230/115 V _{AC}	< 96 V _{AC}

Armature overcurrent

The nominal value of the armature current is set with 99.11 M1 nominal current. The overcurrent level is set by means of 31.44 Armature overcurrent level. Additionally, the actual current is monitored against the overcurrent level of the drive. This overcurrent level can be read from 07.63 Drive DC overcurrent level. Exceeding one of the two levels generates fault 2310 Armature overcurrent.

Mains overvoltage

Too high voltage on the mains/AC side. If the actual mains voltage is > 1.3 • 99.10 Nominal mains voltage for longer than 10 s while Ready run = 1, fault F513 Mains overvoltage is generated.

Mains synchronism

As soon as the mains contactor is closed, and the firing unit is synchronized with the incoming voltage, supervising of the synchronization is activated. If the synchronization fails, fault F514 Mains synchronization lost will be generated.

The synchronization of the firing unit takes typically 300 ms before the current controller is ready.

Bridge reversal

With a 6-pulse converter, the bridge reversal is initiated by changing the polarity 27.01 Current reference. Upon zero current detection, see 06.24.b13 Current controller status word 1, the bridge reversal is started. Depending on the moment, the new bridge may be "fired" either during the same or during the next current cycle.

The switchover can be delayed by 27.38 Reversal delay. The delay starts after zero current has been detected, see 06.24.b13 Current controller status word 1. Thus 27.38 Reversal delay is the length of the forced current gap during a bridge changeover. After the reversal delay is elapsed the system changes to the selected bridge without any further consideration.

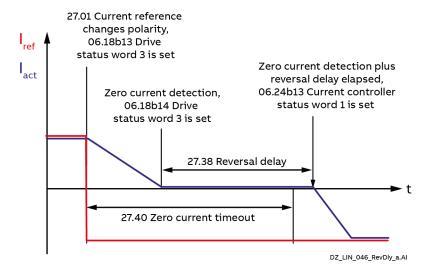
This feature may prove useful when operating with large inductances. Also, the time needed to change the current direction can be longer when changing from motoring mode to regenerative mode at high motor voltages, because the motor voltage must be reduced before switching to regenerative mode. See also 27.42 Reversal volt margin.

After a command to change the current direction, see 27.01 Current reference, the opposite current must be reached before 27.40 Zero current timeout has been elapsed otherwise the drive trips with fault F557 Reversal time.

The setting of 27.38 Reversal delay and 27.40 Zero current timeout depends on the discontinuous current limit:

27.31 M1 discontinuous current limit	27.38 Reversal delay	Delta	27.40 Zero current timeout
≤ 50.00 %	5.0 ms	15 ms	20 ms
≤ 35.00 %	10.0 ms	25 ms	35 ms
≤ 20.00 %	15.0 ms	35 ms	50 ms
≤ 10.00 %	20.0 ms	50 ms	70 ms

Example: The drive trips with fault F557 Reversal time:



Motor protection

Overspeed protection

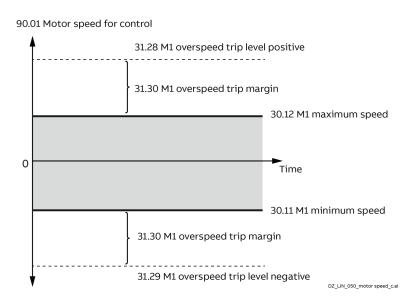
The motor is protected against overspeed e.g., in a case when the drive is in torque control mode and the load drops unexpected.

The overspeed trip levels, see 31.28 M1 overspeed trip level positive and 31.29 M1 overspeed trip level negative, are set by means of 31.30 M1 overspeed trip margin. Exceeding either level causes fault 7310 Overspeed.

It is recommended to set 31.30 M1 overspeed trip margin at least to 20 % of the maximum motor speed. **Examples**:

- If the maximum speed is 1100 rpm and overspeed trip margin is 300 rpm, the drive trips at 1400 rpm.
 See 31.28 M1 overspeed trip level positive.
- If the minimum speed is -1420 rpm and overspeed trip margin is 300 rpm, the drive trips at -1720 rpm.
 See 31.29 M1 overspeed trip level negative.

Note: The overspeed fault for motor 1 is inactive, if 31.30 M1 overspeed trip margin = 0.



Motor thermal protection and motor overload protection

The firmware is equipped with two identical temperature feedback channels including supervision functions, see group 35 Motor thermal protection.

Measured motor temperature

The following table shows what sensor types can be connected to standard I/O, I/O extension and/or encoder interface modules.

Hardware	Temperature sensor type			
	PT100, PT1000	PTC	KTY84	Klixon
SDCS-CON-H01	X	Х	Х	Х
FAIO-01	Х	Х	Х	-
FIO-11	X	Х	Х	-
FEN-01	-	Х	-	-
FEN-11/-21/-31	-	Х	Х	-

The DCS880 can measure the motor temperature and set warnings and faults if the motor temperature reaches critical values. Following temperature measurement sensors can be used:

- PT100.
- PT1000.
- PTC.
- KTY84.
- Klixon.

PT100, PT1000, PTC and KTY84 get connected to a constant current source and the voltage drop over them is then measured via analogue inputs. Additionally, it is possible to connect one PTC to a digital input. The feedback is used to calculate the actual temperature (PT100, PT1000, KTY84) or the resistance (PTC) and is displayed as a signal.

Klixons work like a switch and detect critical temperature levels. They are connected to digital inputs of the drive and generate a waring/fault message.

Both, temperature 1 channel and temperature 2 channel can be used at the same time.

	Temperature 1 channel	Temperature 2 channel
Measured temperature	35.02 Measured temperature 1. The unit depends on the selected measurement mode. For PT100 the unit is °C or °F and for PTC the unit is Ohm.	35.04 Measured temperature 2. The unit depends on the selected measurement mode. For PT100 the unit is °C or °F and for PTC the unit is Ohm.
Source	35.11 Temperature 1 source.	35.21 Temperature 2 source.
Fault level	35.12 Temperature 1 fault level. Generates fault 4981 Motor temperature 1 measured/estimated.	35.22 Temperature 2 fault level. Generates fault 4982 Motor temperature 2 measured/estimated.
Warning level	35.13 Temperature 1 warning level. Generates warning A491 Motor temperature 1 measured/estimated.	35.23 Temperature 2 warning level. Generates warning A492 Motor temperature 2 measured/estimated.

Temperature monitoring using PT100 or PT1000 sensors

 $1\dots3$ PT100 or PT1000 can be connected in series to an analog input and an analog output. The analog output feeds a constant excitation current of 9.1 mA (PT100) or 1 mA (PT1000) through the sensors. The sensors resistance increases as the motor temperature rises, as does the voltage over the sensors. The temperature measurement function reads the voltage through the analog input and converts it into °C or °F.

Temperature monitoring using PTC sensors

1... 3 PTC can also be connected in series to an analog input and an analog output. The analog output feeds a constant excitation current of 1.6 mA through the sensors. The sensors resistance increases as the motor temperature rises, as does the voltage over the sensors. The temperature measurement function calculates the resistance of the sensors and generates an event if overtemperature is detected. Additionally, 1 PTC can be connected to digital input DI6. The resistance of the PTC increases when its temperature rises. The increasing resistance of the sensor decreases the voltage at the input and eventually its state switches from 1 to 0 indicating overtemperature.

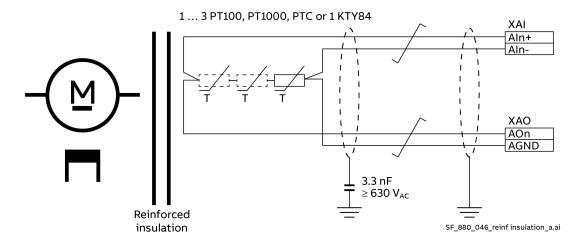
Temperature monitoring using KTY84 sensors

1 KTY84 can be connected to an analog input and an analog output. The analog output feeds a constant excitation current of 2.0 mA through the sensor. The sensor resistance increases as the motor temperature rises, as does the voltage over the sensor. The temperature measurement function reads the voltage through the analog input and converts it into °C or °F.

Using analog inputs and analog outputs

It is possible to connect a maximum of 3 PT100, 3 PT1000, 3 PTC or 1 KTY84 to temperature 1 feedback channel and 3 PT100, 3 PT1000, 3 PTC or 1 KTY84 to temperature 2 feedback channel. They are connected between an analog input and an analog output.

Do not connect both ends of the cable shields directly to ground. If a capacitor cannot be used at one end, leave that end of the shield unconnected.





WARNING

IEC 60664 requires double or reinforced insulation between live parts and the surface of accessible parts of electrical equipment which are either non-conductive or conductive but not connected to the protective earth.

To fulfill this requirement, the connection of a thermistor (and other similar components) to the digital inputs of the drive can be implemented in three alternate ways:

- 1. There is double or reinforced insulation between the thermistor and live parts of the motor.
- 2. Circuits connected to all digital and analog inputs of the drive are protected against contact and insulated with basic insulation (the same voltage level as the drive main circuit) from other low voltage circuits.
- 3. An external thermistor relay is used. The insulation of the relay must be rated for the same voltage level as the main circuit of the drive.

There are 2 ways to connect the PT100, PT1000, PTC and KTY84 to the drive:

- 1. Via standard I/O on the SDCS-CON-H01.
- 2. Via I/O extension modules FAIO-01 or FIO-11.

Standard I/O on the SDCS-CON-H01

At the same time, the use of only one of the two temperature channels is possible.

	Example for temperature 1	channel			
	Al1 and AO1	Al2 and AO1	AI3 and AO1		
Jumpers:	Al1 using J1: O Voltage (U), default O	Al2 using J2: O Voltage (U), default O	AI3 is always in voltage mode.		
	12.15 Al1 unit selection = V.	12.25 Al2 unit selection = V.			
	AO1 using J5: Current (I)				
	13.15 AO1 unit selection = m.	A.			
Source:	35.14 Temperature 1 Al source = Al1 actual value.	35.14 Temperature 1 Al source = Al2 actual value.	35.14 Temperature 1 Al source = Al3 actual value.		
1 3 PT100:	13.12 AO1 source = Force PT	100 excitation.			
	35.11 Temperature 1 source	= 1 3 • PT100 analog I/O.			
1 3 PT1000:	13.12 AO1 source = Force PT	1000 excitation.			
	35.11 Temperature 1 source = 1 3 • PT1000 analog I/O.				
1 3 PTC:	13.12 AO1 source = Force PTC excitation.				
	35.11 Temperature 1 source	= PTC analog I/O.			
1 KTY84:	13.12 AO1 source = Force KT	Y84 excitation.	<u> </u>		
	35.11 Temperature 1 source	= KTY84 analog I/O.			

1 PTC:	DI6 and +24VD
	35.11 Temperature 1 source = PTC DI6. The threshold is not adjustable.

I/O extension modules FAIO-01 or FIO-11

At the same time, the use of both of the two temperature channels is possible.

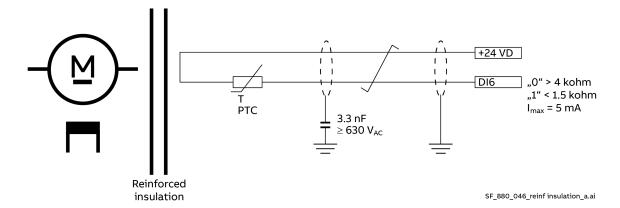
	Example for temperature 1 channel			Example for temperature 2 channel		
	Al1 and AO1			AI2 and AO2		
Switches:	XAI1			X/	AI2	
	Switch S1 Input mode and voltage range ¹⁾			Switch S2	Input mode and voltage range ¹⁾	
					8800	
	14.29 All HW switch pos	sition = V.	14	1.44 AI2 HV	V switch pos	sition = V.
	14.30 Al1 unit selection = V.			4.45 Al2 un	it selection =	= V.
	AO1 is always in current mode.			AO2 is always in current mode.		
Source:	35.14 Temperature 1 Al	source = Other.	35.14 Temperature 1 Al source = Other.			
	Set to 14.26 Al1 actual value.			Set to 14.41 AI2 actual value.		
1 3 PT100:	14.77 AO1 source = Force PT100			14.87 AO2 source = Force PT100		
	excitation.			xcitation.		
	35.11 Temperature 1 sou	ırce = 1 3 •	35.21 Temperature 2 source = 1 3 •			ırce = 1 3 •
	PT100 analog I/O.		Р	T100 analo	g I/O.	

1 3 PT1000:	14.77 AO1 source = Force PT1000	14.87 AO2 source = Force PT1000
	excitation.	excitation.
	35.11 Temperature 1 source = 1 3 •	35.21 Temperature 2 source = 1 3 •
	PT100 analog I/O.	PT100 analog I/O.
1 3 PTC:	14.77 AO1 source = Force PTC excitation.	14.87 AO2 source = Force PTC excitation.
	35.11 Temperature 1 source = PTC analog	35.21 Temperature 2 source = PTC analog
	1/0.	1/0.
1 KTY84:	14.77 AO1 source = Force KTY84	14.87 AO2 source = Force KTY84
	excitation.	excitation.
	35.11 Temperature 1 source = KTY84	35.12 Temperature 2 source = KTY84
	analog I/O.	analog I/O.

Using DI6 (XDI:6) on the SDCS-CON-H01

It is possible to connect 1 PTC to digital input DI6 to the temperature feedback channels. The sensor resistance must not exceed the threshold resistance of the digital input at the motor normal operating temperature.

Do not connect both ends of the cable shield directly to ground. If a capacitor cannot be used at one end, leave that end of the shield unconnected.



Klixon

The temperature measurement can be done using klixons. For this the drive provides two possibilities which can be used simultaneously.

The klixon is a thermal switch, opening its contact at a defined temperature. This can be used for supervision of the temperature by connecting the switch to a digital input of the drive. The digital input for the klixon(s) is selected with 35.15 Supervision 1 klixon source and 35.25 Supervision 2 klixon source. An open klixon generates fault 4981 Motor temperature 1 measured/estimated or fault 4982 Motor temperature 2 measured/estimated.

Note: It is possible to connect several klixons in series.

Motor thermal model

The drive includes two thermal models. Temperature 1 feedback channel is used for motor 1 and temperature 2 feedback channel is used for motor 2. Both models can be used at the same time in case one converter is shared by two motors (e.g., shared motion). During normal operation with motor 1 only the thermal model for motor 1 is needed.

It is recommended to use a motor thermal model, if a direct temperature measurement is not available, and the current limits of the drive are set higher than the motor nominal current.

The motor thermal model is based on the actual motor current related to motor nominal current and the ambient temperature. Thus, the motor thermal model does not directly calculate the temperature of the motor, but it calculates the temperature rise of the motor.

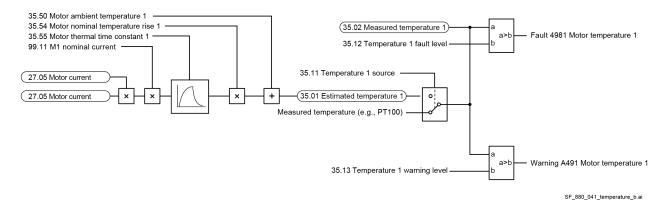
Example: 80 % of nominal motor current is calculated to a 64 % temperature rise.

The drive calculates the temperature of the motor based on the following assumptions:

 When power is applied to the drive for the first time, the motor is assumed to be at ambient temperature defined by 35.50 Motor ambient temperature 1 or 35.58 Motor ambient temperature 2.

- After this, when auxiliary power is applied to the drive, the motor is assumed to be at the temperature estimated before.
- The motor temperature is calculated using the user-adjustable motor thermal time constant, see 35.55 Motor thermal time constant 1 and 35.63 Motor thermal time constant 2, and the motor load (current²). The temperature rise of the motor behaves like the time constant which is proportional to the motor current².

Overview of motor 1 thermal model:



Motor overload protection according to NEC 430 part III

The motor overload protection is required and specified by multiple standards including the US National Electric Code (NEC 430 part III). The standard allows for motor overload protection without external temperature sensors.

The Motor overload protection fulfills standard IEC/EN 61800-5-1 ed. 2.1v. Requirements for thermal memory retention are met. The estimated temperature is retained over a power down.

The motor overload protection requires that a motor current tripping level be specified. This is defined by parameters in group 35 Motor thermal protection.

The motor overload algorithm monitors the squared ratio (motor current/tripping level)² and accumulates this over time. This is referred to as I^2 t protection. The accumulated value is shown in 35.01 Estimated temperature 1.

For testing purposed according to NEC 430 part III at 200 % nominal current and trip after 8 minutes following parameters have to be set to the following values:

- 35.01 Estimated temperature 1 = Signal, to be supervised.
- 35.11 Temperature 1 source = Estimated temperature motor 1.
- 35.12 Temperature 1 fault level = 130°C, default.
- 35.13 Temperature 1 warning level = 125°C, default.
- 35.50 Motor ambient temperature 1 = 35°C, default.
- 35.54 Motor nominal temperature rise 1 = 80°C, default.
- 35.55 Motor thermal time constant 1 = 256° s, default.

When the measured/estimated motor temperature 1 exceeds the level in 35.13 temperature 1 warning level, the event generates warning A491 Motor temperature 1 measured/estimated.

When the measured/estimated motor temperature 1 exceeds the level in 35.12 temperature 1 fault level, the event generates fault 4981 Motor temperature 1 measured/estimated.

Stall protection

The stall protection generates event motor stall when the motor is in apparent danger of overheating. The rotor is either mechanically stalled or the load is continuously too high. It is possible to adjust the supervision (time, speed, and torque).

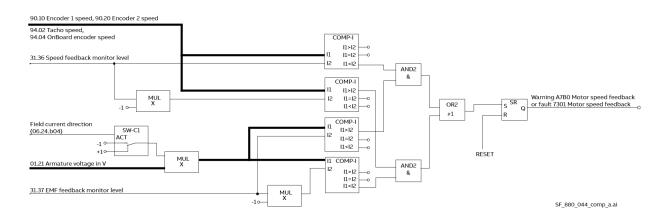
The drive reacts according to 31.24 Stall function and generates either warning A780 Motor stall or fault 7121 Motor stall, when the following is true:

- The actual torque, in percent of 99.02 M1 nominal torque, exceeds 31.25 Stall torque level.
- The actual speed is below 31.26 Stall speed level.
- The time defined in 31.27 Stall time is exceeded.

Speed feedback monitor

The speed feedback monitor supervises an attached analog tacho or encoder for proper function by means of measured speed and measured armature voltage. Above a certain armature voltage, see 01.21 Armature voltage in V, the measured speed feedback, see 90.01 Motor speed for control, must be above a certain level. The sign of the speed measurement must be correct as well.

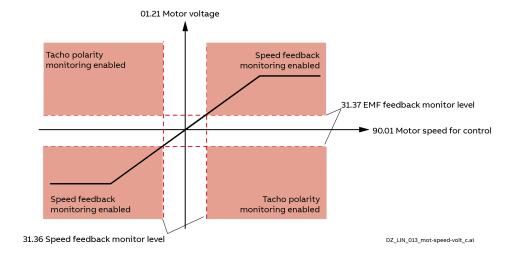
31.36 Speed feedback monitor level and 31.37 EMF feedback monitor level set the levels and activate the monitor.



The drive reacts according to 31.35 Motor feedback fault and generates either warning A7B0 Motor speed feedback or fault 7301 Motor speed feedback, when the following is true:

- The measured speed feedback, see 90.01 Motor speed for control, does not exceed 31.36 Speed feedback monitor level.
- The measured armature voltage, see 01.21 Armature voltage in V, exceeds 31.37 EMF feedback monitor level.

Example: 31.36 Speed feedback monitor level = 15 rpm and 31.37 EMF feedback monitor level = 50 V_{DC} . The drive trips when the armature voltage, see 01.21 Armature voltage in V, is > 50 V_{DC} , while the speed feedback, see 90.01 Motor speed for control, is \leq 15 rpm.



31.35 Motor feedback fault selects the reaction to a speed feedback problem:

- The drive is immediately tripped with fault 7301 Motor speed feedback.
- The speed feedback is switched to EMF and the drive is stopped according to the emergency stop ramp, then fault 7301 Motor speed feedback is set.
- The speed feedback is switched to EMF and warning A7B0 Motor speed feedback is set.
- This selection is only valid if 2 pulse encoders are connected. Depending on the setting of 90.41 M1 feedback selection the speed feedback is switched from one encoder to the other encoder in case of a problem. Additionally, warning A7B0 Motor speed feedback is set.

In case the field is weakened the drive immediately trips with fault 7301 Motor speed feedback, except two encoders are in use.

Commissioning hint: Set 31.36 Speed feedback monitor level = 5 % of 99.14 M1 nominal (base) speed and 31.37.EMF feedback monitor level = 10 % of 99.12 M1 nominal voltage.

Armature overvoltage

The nominal value of the armature voltage is set with 99.12 M1 nominal voltage.

The overvoltage level is set by means of 31.50 Armature overvoltage level. Exceeding this level generates fault F503 Armature overvoltage.

Field overcurrent

The nominal value of the field current is set with 99.13 M1 nominal field current.

The overcurrent level is set by means of 31.59 M1 field overcurrent level. Exceeding this level causes F515 M1 field exciter overcurrent.

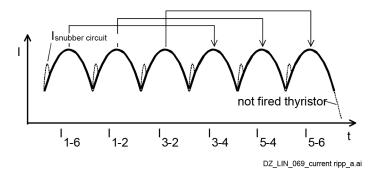
Armature current ripple

The current control is equipped with a current ripple monitor. This function can detect:

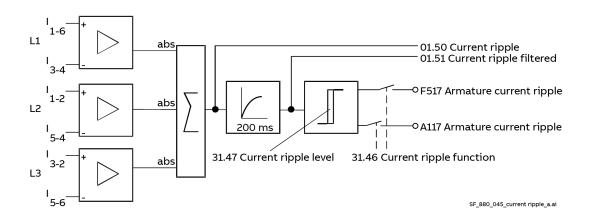
- A broken branch fuse or thyristor.
- A too high proportional gain (K_P) of the current controller (wrong tuning).
- A broken current transformer (T51, T52).
- Poor mains voltage condition.

The current ripple monitor level is set by means of 31.47 Current ripple level. Exceeding this level generates either fault F517 Armature current ripple or warning A117 Armature current ripple on the setting of 31.46 Current ripple function.

The current ripple monitor method is based on comparing positive and negative currents of each phase. The calculation is done per thyristor pair:



01.50 Current ripple is calculated as $abs(I_{1-6}-I_{3-4}) + abs(I_{1-2}-I_{5-4}) + abs(I_{3-2}-I_{5-6})$. By low pass filtering with 200 ms 01.51 Current ripple filtered is generated and compared against 31.47 Current ripple level.



Note: The load influences the error signal 01.51 Current ripple filtered. Armature drive currents near the discontinuous level will create values of about 300 % of 01.40 Drive current if a thyristor is not fired. High inductive loads will create values of about 90 % of 01.40 Drive current if a thyristor is not fired. Commissioning hints:

- It is not possible to pre-calculate clear levels.
- The current control reacts to an unstable current feedback.
- The load is continuously driving the current if a thyristor is not fired.

Current rise

The protection against fast current rise during generating is configured by means of 31.45 Maximum current rise. Exceeding this level causes fault F539 Fast current rise.

Note: This trip opens the mains contactor and the DC-breaker if present.

Field undercurrent

The nominal value of the field current is set with 99.13 M1 nominal field current.

The minimum field current level is set by means of 31.58 M1 field current low level. Undershooting this level for longer than defined in 31.57 Minimum field current trip delay causes fault F541 M1 field exciter low current.

Messages

Display of status messages, fault, and warning signals

A seven-segment display (V301) is located on the control board SDCS-CON-H01, and it shows the state of the drive:

then .	Power up, firmware is not running.
	Dot is slowly flashing (1 s), firmware is running. No warnings, no faults.
	Indication while loading firmware into the SDCS-CON-H01.
A	Warning.
F	Fault.

The seven-segment display shows the event in code. The letters and numbers of multi-character codes are displayed one after the other for 0.5 seconds at a time. Plain text messages are available on the control panel and in the fault logger of the Drive Composer.

$$\begin{array}{c}
0.5 \text{ s} \\
\hline
F \Rightarrow F \Rightarrow G \Rightarrow 0.5 \text{ s} \\
\uparrow & \Leftarrow & \Leftarrow & \downarrow
\end{array}$$

$$\begin{array}{c}
0.5 \text{ s} \\
0.5 \text{ s} \\
\downarrow & \downarrow
\end{array}$$

F514 Mains synchronization lost.

Status messages

Status messages will only be indicated on the seven-segment display of the SDCS-CON-H01.

7-segment display	Text on control panel, and Drive Composer	Definition
P. then b.	Not available.	Power up, firmware is not running.
•	Not available.	Dot is slowly flashing (1 s), firmware is running. No warnings, no faults.
L	Not available.	Indication while loading firmware into the SDCS-CON-H01.

Warnings and AUX codes

A warning is an event, that a condition occurred, which may lead to a dangerous situation. It is displayed and written into the event logger. However, the cause for the warning can inhibit the drive from continuing with normal operation. If the cause of the warning disappears the warning will be automatically reset.

The fault logger shows the appearing warning like this:



22.11.2018 14:18:13.294 A132 Parameter setting conflict

The disappearing warning is shown like this:



A 22.11.2018 14:18:11.116 A132 Parameter setting conflict

Warning levels

The warning handling provides 5 warning levels.

Warning level 1

- The drive keeps on running and the warning is indicated.
- After the drive is stopped, the mains contactor cannot be switched on again (no re-start possible).

Warning level 2

- The drive keeps on running and the warning is indicated.
- The fan contactor stays on as long as the warning is pending.
- After the warning disappears 20.40 Drive/Motor fan delay time starts.

Warning level 3

- Auto-reclosing logic is active (auto re-start). See 06.18.b10 Drive status word 3.
- Ready run is disabled, but the drive is automatically restarted when the warning condition vanishes. See 06.15.b01 Main Status Word.
- The firing angle is forced to the value of 30.45 Maximum firing angle.
- Single firing pulses to suppress the DC current are given.

Warning level 4

The drive keeps on running and the warning is indicated.

Warning level 5

- Used for STO related warnings.
- See Supplement for functional safety (3ADW000452).

Warning messages

The list contains the warning/notice code in hex, its name, the cause, and hints what to do.

Note: The list also contains notices that only appear in the Event log.

Code	Warning/Notice	Cause and what to do	Warning level
1310 132F	User defined.	User defined warning by application program.	1
A103	DC-breaker acknowledge.	Selected motor, the DC-breaker acknowledge at the DI is missing. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given, thus the drive cannot be started or restarted while the DC-breaker acknowledge is missing. Check: The setting of 20.35 DC-breaker acknowledge source. If necessary, invert the signal.	α
A104	Reversal volt function.		3

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 31.60 Reversal volt function. See 06.25.b03 Current controller status word 2 and fault F504.		
A105	Dynamic braking acknowledge.	 For proper armature voltage feedback. Selected motor, dynamic braking is still pending. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given until zero speed is reached, thus the drive cannot be started or re-started while dynamic braking is active, except if 21.01 Start mode = Flying start dynamic braking. Check: The setting of 20.43 Dynamic braking acknowledge source. The setting of 21.01 Start mode. 	3
A111	Mains low voltage. Programmable, see 31.51. Mains loss mode. See also fault 3280.	 Mains/AC side low (under-) voltage. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given. Check: The setting of 31.51. Mains loss mode, 31.52 Mains loss down time, 31.53 Mains loss low level 1 and 31.54 Mains loss low level 2. That the mains voltage scaling is correct. See 99.10 Nominal mains voltage. That the proper voltage coding resistors on the SDCS-PIN-H51 are used. The condition of the mains (voltage, cabling, fuses, switchgear). That all 3 phases are present directly at the drive. H1 H5: measure the fuses F100 F102 on the SDCS-PIN-H01. H6 H8: check and measure the connections XU1/XU2, XV1/XV2 and XW1/XW2 on the SDCS-PIN-H51. 	3

Code	Warning/Notice	Cause and what to do	Warning level
		 That the mains voltage is within the set tolerance. E.g., too deep mains voltage drops during load current. For mains supply imbalance. For loose mains cable connections. That the mains contactor closes and opens and the timing. For H1 H4, that the field circuit has no short circuit or ground fault. In case an On command is given, and the measured mains voltage is too low for longer than 500 ms warning A111 Mains low voltage is set. If the problem persists for longer than 10 s fault 3280 Mains low voltage is generated. 	
A113	Power unit, communication. See also fault 5681.	Communication errors between the control unit and a power unit. Check: The setting of 95.16. Control unit configuration. The connections between the control unit and the power unit: The auxiliary power of the SDCS-OPL-H01. The auxiliary code (format XXXYYYZZ). XXX specifies the transmitter FIFO error code. O00: No transmitter FIFO error. O01: Internal error [invalid call parameter]. O02: Internal error [configuration not supported]. O03: Transmission buffer full. YYY identifies the power unit. O00: Broadcast. O01: Power unit connected to channel1 on SDCS-DSL-H1x. O03: Power unit connected to channel2 on SDCS-DSL-H1x. O03: Power unit connected to channel3 on SDCS-DSL-H1x. O04: Power unit connected to channel4 on SDCS-DSL-H1x. O05: Power unit connected to channel4 on SDCS-DSL-H1x. O06: Power unit connected to channel4 on SDCS-DSL-H1x. O07: Power unit connected to channel4 on SDCS-DSL-H1x. O08: Power unit connected to channel4 on SDCS-DSL-H1x. O09: Transmitter side [link error] from power unit to	1

Code	Warning/Notice	Cause and what to do	Warning level
		 O2: Transmitter side [no communication] from power unit to control unit. O3: Receiver side [link error] from control unit to power unit. O4: Receiver side [no communication] from control unit to power unit. O5: Transmitter FIFO error, see XXX. O6: SDCS-OPL-H01 not found. 	
A114	Armature current deviation.	27.02 Used current reference differs from 27.05 Motor current for longer than 5 s by more than 20 % of nominal motor current. If the current controller cannot match the given current reference, the warning signal is created. Normally the reason is a too small mains voltage compared to the motor EMF. For non-motoric applications, it is possible to block the warning using 06.11.b07 Auxiliary control word 2. Check: For blown DC fuses. The ratio between mains voltage and armature voltage (either the mains voltage is too low, or the motor's armature voltage is too high). If the setting of 30.44 Minimum firing angle is too high.	4
A116	Brake long falling	Selected motor, the acknowledge signal for the mechanical brake closed (applied) stage at the DI is missing. Check: The mechanical brake itself. The mechanical brake cable connections. The mechanical brake settings in group 44 Mechanical brake control. That the acknowledgement signal, if used, matches the actual status of the brake. The used digital inputs and outputs (groups 10 and 11).	4
A117	Armature current ripple. Programmable, see 31.46 Current ripple function. See also fault F517.	One or several thyristors may carry no current. Check: - The values of 01.50 Current ripple and 01.51 Current ripple filtered1. - The setting of 31.46 Current ripple function and 31.47 Current ripple level. - For too high gain of current controller. See 27.29 M1 current proportional gain. - For too fast rise of the current reference. - The positive/negative current feedback with an oscilloscope (6 pulses within one cycle visible?). - The thyristor gate-cathode resistance. - The thyristor gate connection. - The current transformers (T51, T52). - The condition of the mains (voltage, cabling, fuses, switchgear).	4

Code	Warning/Notice	Cause and what to do	Warning level
		 The AUX code (format XX). Specifies the thyristors and current transformers (T51, T52) which may carry no current. 11 16: Thyristors 11 16 (bridge 1, forward bridge). 21 26: Thyristors 21 26 (bridge 2, reverse bridge). 31 36: Current transformer (T51, T52). 41 46: Current transformer (T51, T52). 	
A118		Application file new or different. Check the AUX code. Actions see below. Found a new application on the memory unit. Activate the application on the memory unit by means of 96.16 Parameter save manually = Enable application. Application in drive memory and on memory unit are different.	1
		Activate the application on the memory unit by means of 96.16 Parameter save manually = Enable application.	
A120	Overvoltage protection active.	 The overvoltage protection DCF506 of a large field exciter is active and the field exciter is blocked. Notes: Only valid if 99.06 Operation mode = Large field exciter. The DO of the DCF506 must be connected to a DI of the large field exciter. See 20.47 Overvoltage protection trigger source. This alarm typically pops up for a brief time when the field current changes its direction. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the field current are given. Check: The setting of 20.47 Overvoltage protection trigger source, if necessary, invert the signal. The field converter cables and connections. 	
A124	Speed scaling.	The settings of: - 30.11 M1 minimum speed. - 30.12 M1 maximum speed. - 31.30 M1 overspeed trip margin. - 46.01 M1 speed scaling. - 99.14 M1 nominal (base) speed. Must be set in a range of 0.1 1.6 • 46.02 M1 speed scaling actual (1.6 = 32000/20000). - The parameters causing the warning can be identified in the AUX code (format YYZZ). YY specifies the parameter group. ZZ specifies the parameter number. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given.	3
A130	Mains phase loss.		3

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 31.21 Mains phase loss. See also fault 3130.	One or several mains voltage phase(s) are missing, or the mains voltage phases are imbalanced. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given. Check: The condition of the mains (voltage, cabling, fuses, switchgear). That all 3 phases are present directly at the drive. H1 H5: measure the fuses F100 F102 on the SDCS-PIN-H01. H6 H8: check and measure the connections XU1/XU2, XV1/XV2 and XW1/XW2 on the SDCS-PIN-H51. For mains supply imbalance. For loose mains cable connections. That the mains contactor closes and opens. The AUX code: O: All phase voltages U (L1), V (L2) and W (L3) are missing. I: Mains voltage phases are imbalanced. Phase-to-phase voltage U _{vw} is the smallest voltage. 2: Mains voltage phases are imbalanced. Phase-to-phase voltage U _{vw} is the smallest voltage. 3: Phase V (L2) is missing. 4: Mains voltage phases are imbalanced. Phase-to-phase voltage U _{wu} is the smallest voltage. 5: Phase U (L1) is missing. 6: Phase W (L3) is missing.	icve!
A131	PLL deviation	-	3
A132	Parameter setting conflict.	Parameter settings conflicting with other parameters. The parameters causing the warning can be identified in the AUX code (format YYZZ YYZZ). YY specifies the parameter group. In case of 00, see the actions below. ZZ specifies the parameter number or the actions below. Additionally check: 95.25 Set: Type code for proper value.	4

Code	Warning/Notice	Cause and what to do	Warning level
	00009911	When coming together with warning A797 Speed feedback configuration and AUX code 00000008. The speed feedback configuration has changed. Use 91.10 Encoder parameter refresh to validate any changes in the encoder settings.	
	91119041	Mismatch between the settings of 91.11 Module 1 type and 90.41 M1 feedback selection for a safety encoder and an FSE-31/FSO-21. The safety features of an FSO-21 module which use a safe speed feedback (e.g., SLS, ramp supervision) require a safety encoder to be used together with an FSE-31 module. This safety encoder must be configured as Encoder 1. Check: That the setting of 90.41 M1 feedback selection = Encoder 1 or that the setting of 42.18 M2 feedback selection = Encoder 1. That the setting of 91.11 Module 1 type = FSE-31. That the setting of 91.12 Module 1 location matches the slot in which the FSE-31 module is located. Note: If a safety encoder is used, following settings in the FSO-21 Module apply: S_ENCGEN.1 = Version 1. S_ENCGEN.11 = STO / No STO.	
	99139907	Mismatch between the settings of 99.07 M1 used field exciter type and 99.13 M1 nominal field current. If 99.07 M1 used field exciter type = None set 99.13 M1 nominal field current to 0.3 A (default).	
	0070	No field reversal possible due to 28.54 Field current force direction = External reverse.	
	0071	Flux linearization parameters not consistent. See 28.31 Field current at 40 % flux, 28.32 Field current at 70 % flux and 28.33 Field current at 90 % flux.	
	0077	Encoder 1 parameters not consistent. Check: - 46.02 M1 speed scaling actual or 42.14 M2 speed scaling actual. - 92.10 Pulses/revolution. - 92.11 Pulse encoder type. At scaling speed, the pulse frequency must be greater than 600 Hz according to following formula: $f \geq 600 \ [Hz] = \frac{ppr \cdot evaluation \cdot speed scaling}{60 \ [s]}$ $f \geq 600 \ [Hz] = \frac{(92.10) \cdot (92.11) \cdot (46.02 or 42.14)}{60 \ [s]}$ E.g., the speed scaling must be greater than 9 rpm for a quadrature pulse encoder (with two channels, A and B) and	
	0078	1024 pulses. Encoder 2 parameters not consistent. Check:	

Code	Warning/Notice	Cause and what to do	Warning level
		 46.02 M1 speed scaling actual or 42.14 M2 speed scaling actual. 93.10 Pulses/revolution. 93.11 Pulse encoder type. At scaling speed, the pulse frequency must be greater than 600 Hz according to following formula: 	
		$f \ge 600 \ [Hz] = \frac{ppr \cdot evaluation \cdot speed \ scaling}{60 \ [s]}$	
		$f \ge 600 \ [Hz] = \frac{(92.10) \cdot (92.11) \cdot (46.02 \ or \ 42.14)}{60 \ [s]}$	
		E.g., the speed scaling must be greater than 9 rpm for a quadrature pulse encoder (with two channels, A and B) and 1024.	
A137	Start condition conflict.	Re-start of the drive is not possible. Check: The AUX code (format XXXX 00YY).	1
		XXXX specifies the parameter group and number e.g.: - 0619: 06.19 Drive inhibit status word 2. - 0620: 06.20 Run inhibit status word. - 9524: 95.24 Service mode ≠ Normal mode. YY specifies the bit showing the reason, if applicable.	
		 If 21.01 Start mode = Start from zero and a restart command (a new Run command) was given before 21.08 M1 zero speed level was reached and 21.09 M1 zero speed delay was elapsed. Note: Any Run command re-starts 21.09 M1 zero speed 	
A2B3	Residual current detected.	delay. The drive has detected an unbalance typically due to a residual current in the motor or the motor cables.	1
	Programmable, see 31.18 Residual current detection type. See also fault 2330.	 Sum of I_{L1}, I_{L2}, I_{L3} ≠ zero. Check: The settings of 31.17 Residual current detection source, 31.18 Residual current detection type, 31.19 Residual current detection level and 31.20 Residual current detection delay. The sum current transformer, if necessary, change transformer or connected drive hardware. The insulation resistances of motor and motor cables. Disconnect the mains, verify safe isolation from supply in armature and field circuits and make insulation tests for the complete installation. 	
A490	Incorrect temperature sensor setup.	Problem with motor temperature measurement. Check the AUX code (format 0XYYZZZZ). X identifies the affected temperature monitoring function. 0 = parameter 35.11. 1 = parameter 35.21. YY indicates the selected temperature source, e.g., the setting of the selection parameter in hexadecimal. ZZZZ indicates the problem. Actions see below.	1
	0001	Sensor type mismatch.	

Code	Warning/Notice	Cause and what to do		Warning level
		Check parameters 35.11/35.21	against 91.21/91.24.	
	0002		eck parameters 35.11 35.14/	
	0003	-	21 35.24 and 91.21/91.24 if	
			e sensor is connected to an	
		end	coder interface.	
		Che	eck the sensor and its wiring.	
A491	Motor temperature 1	Measured/Estimated motor to	emperature 1 has exceeded	2
	measured/estimated.	the warning level.		
	(Editable message	Wait until the motor/motor m		
	text)	contactor stays on as long as	the warning is pending.	
	See also fault 4981.	Check:		
		 Check the AUX code (formal 		
		•	neasured overtemperature.	
		 1: Estimated overten 	•	
		- 2: Measured overtem	•	
		- The value of 35.02 Measure	•	
		·	re. Let motor cool down and	
		restart.	atuma di comunica di laccal	
		- The value of 35.13 Tempera	=	
		- The cooling of the motor o	or other temperature	
		measured equipment.	a ambient temperature)	
		The ambient conditions (e.The airflow and fan operat	=	
		 The airnow and rarroperat The motor fan supply volta 		
		 The motor fan direction of 	<u> </u>	
		 The motor fan component 		
		 The motor cooling air inlet 		
		 The motor cooling air outle 	=	
		 The motor load and drive r 		
		 Inadmissible load cycle. 	3	
		 The wiring of the temperat 	ture sensor.	
			perature sensor by measuring	
		it.		
		Hint:		
		 The measured/estimated in 	motor temperature is blocked,	
		if 35.11 Temperature 1 sour	rce = Disable.	
A492	Motor temperature 2	Measured/Estimated motor to	emperature 2 has exceeded	2
	measured/estimated.	the warning level.		
	(Editable message	Wait until the motor/motor m		
	text)	contactor stays on as long as	the warning is pending.	
	See also fault 4982.	Check:		
		 Check the AUX code (forms) 		
		-	neasured overtemperature.	
		 1: Estimated overten 	•	
		- 2: Measured overtem	•	
		- The value of 35.03 Measure	•	
			re. Let motor cool down and	
		restart.	atura 2 manaja a lama	
		- The value of 35.23 Tempera	_	
		The cooling of the motor of massured againment.	or other temperature	
		measured equipment.	a ambient temperature)	
		 The ambient conditions (e. 	.g., ambient temperature).	

Code	Warning/Notice	Cause and what to do		Warning level
		it. Hint:	voltage. n of rotation. nents. nlet (e.g., filters). outlet. ive ratings.	level
A497	Motor temperature slot 1 measured. (Editable message text) See also fault 4991.	if 35.21 Temperature 2 The thermistor protection module (FEN- xxinstalled in slot 1 indicates overtemperature.		2
A498	Motor temperature slot 2 measured. (Editable message text) See also fault 4992	The thermistor protection module (FEN- xx) installed in slot 2 indicates overtemperature.	other temperature measured equipment. The motor load and drive ratings. The wiring of the	2
A499	Motor temperature slot 3 measured. (Editable message text) See also fault 4993.	The thermistor protection module (FEN-xx) installed in slot 3 indicates overtemperature.	temperature sensor. - The resistance of the temperature sensor by measuring it.	2
A4A0		 The ambient condition The airflow and fan op The heatsink fins for d Thermistor broken. 	at XXXXZZZZ). m. Actions see below. ng limit of xx °C or xx °F. trol board temperature. s. eration.	2
A4B0	Bridge temperature measured. See also fault 4310.	stays on as long as the wa Shutdown temperature, so temperature set. The bride already appear at approximatemperature. Check:	oled down. The fan contactor rning is pending.	2

Code	Warning/Notice	Cause and what to do	Warning level
		 The setting of 20.38 Drive fan acknowledge source. The setting of 20.40 Drive/Motor fan delay time. The ambient conditions (e.g., ambient temperature). The airflow and fan operation. The drive fan supply voltage. The drive fan direction of rotation. The drive fan components. The heatsink fins for dust pick-up. The drive cooling air inlet (e.g., filters). The drive cooling air outlet. For open drive doors. The motor power against the drive power. Inadmissible load cycle. When 95.25 Set: Type code = None, that 95.29 Set: Drive max bridge temperature is set properly. The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. In case of a 	
A534	12-pulse current difference. Programmable, see 29.09 12-pulse parallel current difference type. See also fault F534.	hardparallel configuration. The current difference of a 12-pulse parallel configuration exceeded the current difference level. Check: The settings of 29.07 12-pulse parallel current difference level and 29.08 12-pulse parallel current difference delay. The settings of the current controller in group 27 Armature current control.	4
A560	Power unit, unbalanced current. Programmable, see 29.63 Power unit unbalanced current function. See also fault F560.	 The unbalanced current between hardparallel connected power units is excessive. Check: That the mains and motor cable routing is according to the specification for hardparallel configurations. The branch fuses. The thyristors. The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. ZZ identifies the affected thyristor. Example: 00000314 means thyristor14 in the power unit connected to channel3. 	4
A561	Power unit, thyristor loss function. Programmable, see 29.68 Power unit thyristor loss function. See also fault F561.	Displays the thyristors/branch fuses of a power unit which are lost, in other words not conducting any current. Check: The branch fuses. The thyristors. The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. ZZ identifies the affected thyristor. Example: 00000314 means thyristor14 in the power unit connected to channel3.	4
A581	Drive fan acknowledge.	Drive cooling fan feedback at the DI is missing. Check:	2

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 31.41 Drive fan fault function. See also fault 5080.	 The settings of 20.38 Drive fan acknowledge source and 20.40 Drive/Motor fan delay time. The drive fan operation and connection. The drive fan circuit. The drive fan klixon. The drive fan supply voltage. The drive fan direction of rotation. The drive door open. The drive cooling air inlet (e.g., filter). The drive cooling air outlet. H7 and H8 pressure switch (setting should be 2 mbar). The used digital inputs and outputs (groups 10 and 11). 	
A596	12-pulse slave blocked.	The 12-pulse slave is preventing the 12-pulse master from starting. Check: Warnings in the 12-pulse slave. Note: The warning level depends on the 12-pulse slave warning level.	1 or 3
A5A0	Safe torque off. Programmable, see 31.22 STO indication run/stop. See also event B5A0 and fault 5091.	Safe torque off active, no drive problem. See Supplement for functional safety (3ADW000452). Check: - 31.22 STO indication run/stop. - The safe torque off circuit.	5
A5A3	Safe off mains contactor XSMC:STO. Programmable, see 31.90 XSMC:STO Indication. See also event B5A3 and fault 5093.	Safe torque off monitor DC current not zero (zero current time out). The DCS880 has the possibility to open the mains contactor using a hardware supervision of the DC current in case of a safe torque off request. This is called fault shutdown path. In case safe torque off is requested and current zero is detected in less than 300 ms the XSMC:STO relay is kept closed. In case safe torque off is requested and current zero is not detected in less than 300 ms the XSMC:STO relay is opened, and the fault shutdown path becomes active. See Supplement for functional safety (3ADW000452). Check: For defective parts (e.g., thyristors) in the unit. The SDCS-CON-H01.	5
A5F4	Control board battery.	The battery on the SDCS-CON-H01 is low. Exchange the battery:	4

Code	Warning/Notice	Cause and what to do	Warning level
A682	Flash erase speed exceeded.	The flash memory in the memory unit has been erased too frequently. This compromises the lifetime of the memory. Avoid forcing unnecessary parameter saves by 96.16 Parameter save manually or cyclic parameter writes. E.g., user logger triggering via parameters. Check the AUX code (format XYYYYZZZ). X specifies the source of warning. 1: Generic flash memory erase supervision. ZZZ specifies the flash memory subsector number that generated the warning.	1
A6B0	User lock open.	The user lock is open and parameters 96.100 96.102 are visible. Close the user lock by entering an invalid pass code in 96.07 Pass code.	4
A6B1	User pass code not confirmed.	A new user pass code has been entered but is not confirmed. A new user pass code has been entered in 96.100 Change user pass code. Confirm the new pass code by entering the same code in 96.101 Confirm user pass code. To cancel, close the user lock without confirming the new code. To close the user lock, enter an invalid user pass code into 96.07 Pass code then activate 96.27 Control board boot or cycle the power.	4
A6D1	FBA A parameter conflict. See also fault 65A1.	Fieldbus adapter A (FBA A): The drive does not have a functionality requested by a PLC or a requested functionality has not been activated. The settings of parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings are not set according to the fieldbus adapter, or the device has not been selected. Check: The PLC programming. The settings of parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings. The configuration of the fieldbus adapter.	4
A6D2	FBA B parameter conflict. See also fault 65A2.	Fieldbus adapter B (FBA B): The drive does not have a functionality requested by a PLC or a requested functionality has not been activated. The settings of parameter groups 50 Fieldbus adapter (FBA) and 54 FBA B settings are not set according to the fieldbus adapter, or the device has not been selected. Check: The PLC programming. The settings of parameter groups 50 Fieldbus adapter (FBA) and 54 FBA B settings. The configuration of the fieldbus adapter.	4
A6DA	Reference source parametrization.	A reference source is simultaneously connected to multiple parameters with different units.	4

Code	Warning/Notice	Cause and what to do	Warning level
	See also fault 65B1.	Check: The reference source selection parameters. The AUX code (format XXYY00ZZ). XX and YY specify the two sets of parameters where the source is connected to. 01 = Speed reference chain. See 22.11 Speed reference 1 source, 22.12 Speed reference 2 source, 22.15 Speed additive 1 source, 22.17 Speed additive 2 source and 23.32 Direct speed reference. 02 = Current, EMF and flux references. See 27.22 Current reference source, 28.18 EMF reference source, 28.20 EMF voltage correction source and 28.29 Flux correction source. 03 = Torque reference chain. See 26.11 Torque reference 1 source, 26.12 Torque reference 2 source and 26.16 Torque additive 1 source. 04 = Other torque-related parameters. See 26.25 Torque additive 2 source, 30.21 Minimum torque 2 source, 30.22 Maximum torque 2 source, 44.09 M1 brake open torque source and 42.79 M2 brake open torque source. 05 = Process PID. See 40.08 PID feedback1 source, 40.09 PID feedback2 source, 40.16 PID setpoint1 source and 40.17 PID setpoint2 source. 08 = Auxiliary sources. See 31.17 Residual current measurement source, 35.14 Temperature 1 Al source and 35.24 Temperature 2 Al source. 2Z specifies the conflicting reference source. 01 0E = Group 03 Input reference 1. 05 = 03.05 FBA A reference 2. 07 = 03.07 FBA B reference 1. 06 = 03.06 FBA A reference 2. 09 = 03.09 EFB reference 2. 09 = 03.09 EFB reference 2. 09 = 03.11 DDCS controller ref1. 00 = 03.13 M/F or D2D ref1. 00 = 03.13 M/F or D2D ref1. 00 = 03.13 M/F or D2D ref2. 33 = Group 40 Process PID. 30 = Group 22 Speed reference selection (motor potentiometer). 65 = Al1. 66 = Al2. 67 = Al3.	level
A6E5	Al parametrization.	 6F = DIO as frequency input. The current/voltage hardware setting of an analog input does not correspond to the parameter settings. Check the AUX code. The code identifies the analog input whose settings are in conflict. Adjust either the jumper (J1, J2) setting on the control board or parameters 12.15, 12.25. 	4

Code	Warning/Notice	Cause and what to do		Warning level
		Check: - The AUX code (format 0000000X). - X specifies the AI. - 1 = AI1. - 2 = AI2.		
A6E6	ULC configuration.			4
	0000	Speed points inconsistent. Check that each speed point, see parameters 37.1 has a higher value than the previous point.	1 37.15,	
		Underload point above overload point. Overload point below underload point. Check that each overloase parameters 37.31. has a higher value than corresponding underloase parameters 37.21.	37.35, In the load point,	
A780	Motor stall. Programmable, see 31.24 Stall function. See also fault 7121.	Selected motor, the motor is operating in the stal because of excessive load or insufficient motor por The motor torque exceeded 31.25 Stall torque level time longer than 31.28 Stall time while the speed f was below 31.26 Stall speed level. Check: The motor load/mechanics (e.g., brake). The drive ratings. For correct field current. The settings of 31.24 Stall function, 31.25 Stall level, 31.26 Stall speed level and 31.28 Stall time. The settings for current and torque limits in green control limits.	ower. el for a feedback torque e.	1
A781	Motor fan acknowledge. Programmable, see 20.39 Motor fan acknowledge source. See also fault 71B1.	Motor/External cooling fan feedback at the DI is missing. Check: The setting of 20.39 Motor fan acknowledge source. The fan operation and connection. Replace the motor/external fan if faulty. The fan contactor.		2
A782	Measurement circuit FEN temperature.	The fan supply voltage. Problem with the temperature measurement when a FEN-xx is used. Check that 35.11 Temperature 1 source and 35.21 Temperature 2 source setting corresponds to the actual installation connected to the encoder interface. Problem with the temperature measurement when a FEN-01 is used. A non-supported KTY sensor is connected to the encoder interface FEN-01. Use either a PTC sensor or another encoder interface module.		1
A797	Speed feedback configuration. Programmable, see 31.35 Motor feedback fault.	The speed feedback configuration via encoder int modules has changed. Check the AUX code (format XXYYZZZZ). XX specifies the encoder interface module. O1: For module 1 see parameters 91.11 and 91.1 O2: For module 2 see parameters 91.13 and 91.1	2.	4

Code	Warning/Notice	Cause and what to do		Warning level
	See also fault 73A0.	YY specifies the encoder.		
		 01: Group 92 Encoder 1 	configuration.	
		 – 02: Group 93 Encoder 2 	configuration.	
		ZZZZ indicates the proble	m. Actions see below.	
	0001	Adapter not found in spec	ified slot.	
		Check module location. Se	e parameters 91.12 and 91.14.	
	0002	Detected type of interface	module does not match	
		parameter setting.		
		Check the module type pa	rameters 91.11 and 91.13 against	
		status parameters 91.02 a	nd 91.03.	
	0003	Logic version too old.		
		Contact your local ABB rep	resentative.	
	0004	Firmware version too old.		
	0001	Contact your local ABB rep	resentative.	
	0006		e with interface module type.	
	0000		eters 91.11 and 91.13 against	
		encoder type parameters 9		
	0007	Adapter not configured.	52.01 and 55.01.	
	0007	Check module location par	ramotors 91 12 and 91 14	
	0000			
	0008	Speed feedback configura	<u> </u>	
		Use 91.10 Encoder parame	_	
		changes in the encoder se		
	0009	No encoders configured in		
			roup 92 Encoder 1 configuration	
		or 93 Encoder 2 configurat		
	000A	Non-existing emulation in		
		Check input selection para		
	000B		e selected input. E.g., resolver or	
		absolute encoder.		
		Check:		
		· · · · · · · · · · · · · · · · · · ·	ameters 91.31 and 91.41.	
			ype against the encoder type.	
	000C	Emulation in continuous m	node not supported.	
		Check:		
			ameters 91.31 and 91.41.	
		•	rameters 92.30 and 93.30.	
A798	Encoder interface	•	dback via an encoder interface	4
	communication.	module is lost.		
	Programmable, see	Check:		
	31.35 Motor feedback		face module is properly seated in	
	fault and 31.38 Load	its slot.		
	feedback fault.		face module or slot connectors	
			inpoint the problem, try installing	
		the module into anoth		
		 The AUX code (format 	•	
		YYYY indicates the pro	blem. Actions see below.	
	0001	Failed answer to encoder	Contact your local ABB	
		configuration message.	representative.	
	0002	Failed answer to adapter		
		watchdog disable		
		message.		

Code	Warning/Notice	Cause and what to do	Warning level
		Failed answer to adapter watchdog enable message.	
	0004	Failed answer to adapter configuration message.	
	0005	Too many failed answers inline to speed and position messages.	
	0006	DDCS driver failed.	
A799	Ext I/O comm loss. Programmable, see	The I/O extension module types and locations specified by parameters do not match the detected configuration or do	4
	31.56 Ext I/O comm loss event.	not communicate with the drive. Check:	
	See also fault 7082.	 The type and location settings of the modules. See parameters 14.01, 14.02, 15.01, 15.02 and 16.01, 16.02. That the module/board is properly seated in its slot. That the module/board and the slot connector is not damaged. 	
		 Try installing the module into another slot. Check the AUX code (format XXYYYYYY). XX specifies the number of the I/O extension module. 01: Group 14 I/O extension module 1. 02: Group 15 I/O extension module 2. 03: Group 16 I/O extension module 3. YYYYYY indicates the problem. Actions see below. 	
	000001	Communication with module failed.	1
		Module not found.	
		Configuration of module failed.	1
	000004	1	
A7A1	Mechanical brake closing failed. Programmable, see 44.17 M1 brake fault function. See also fault 71A2.	Selected motor, the acknowledge signal for the mechanical brake closed (applied) stage at the DI is missing. Check: The mechanical brake itself. The mechanical brake cable connections. The mechanical brake settings in group 44 Mechanical brake control. That the acknowledgement signal, if used, matches the actual status of the brake.	4
A7A2	Mechanical brake opening failed. Programmable, see 44.17 M1 brake fault function.	 The used digital inputs and outputs (groups 10 and 11). Selected motor, the acknowledge signal for the mechanical brake opened (lifted) stage at the DI is missing. Check: The mechanical brake itself. The mechanical brake cable connections. 	4
	See also fault 71A3.	 The mechanical brake settings in group 44 Mechanical brake control. That the acknowledgement signal, if used, matches actual status of brake. The used digital inputs and outputs (groups 10 and 11). 	
A7A5	Mechanical brake opening not allowed.	Selected motor, open (lift) conditions of the mechanical brake are not fulfilled.	4

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 44.17 M1 brake fault function. See also fault 71A5.	 The brake has been prevented from opening (lifting) by 44.11 M1 keep brake closed, 44.12 M1 Brake close request or torque actual does not reach 44.26 M1 Torque proving reference, during torque proving. Check: The mechanical brake settings in group 44 Mechanical brake control. Especially 44.11 M1 keep brake closed and 44.12 M1 Brake close request. That the acknowledgement signal, if used, matches the actual status of the brake. 	
A7AA	Extension AI parameterization.	 The used digital inputs and outputs (groups 10 and 11). The hardware current/voltage and parameter settings do not match for an analog input on an I/O extension module. Check the AUX code (format XX0000YY). XX specifies the number of the I/O extension module. O1: Group 14 I/O extension module 1. O2: Group 15 I/O extension module 2. O3: Group 16 I/O extension module 3. YY specifies the analog input on the module. Example: In case of I/O extension module 1 and analog input Al1 the AUX code is 01000001. The hardware current/voltage setting on the module is shown by 14.29 Al1 HW switch position. The corresponding parameter setting is in 14.30 Al1 unit selection. Adjust either the hardware setting on the module or the parameter to solve the mismatch. 	4
A7AB	000002 000003	The I/O extension module/DCSLink board (SDCS-DSL-H1x) types and locations specified by parameters do not match the detected configuration or do not communicate with the drive. Check: The type and location settings of the modules/board. See parameters 14.01, 14.02, 15.01, 15.02, 16.01, 16.02, 70.01, 70.02, 70.05 and 95.16. That the module/board is properly seated in its slot. That the module/board and the slot connector is not damaged. Try installing the module into another slot. Check the AUX code (format XXYYYYYY). XX specifies the number of the I/O extension module. 01: Group 14 I/O extension module 1. 02: Group 15 I/O extension module 2. 03: Group 16 I/O extension module 3. 04: Group 70 DCSLink Communication or group 95 HW configuration. YYYYYY indicates the problem. Actions see below. Communication with module/board failed. Module/Board not found. Configuration of module/board failed.	4
A7B0	000004 Motor speed feedback.	Selected motor, no motor speed feedback is received. Check the AUX code (format XXYYZZZZ).	4

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 31.35 Motor feedback fault. See also fault 7301.	 XX specifies the location of the speed feedback device. Either an encoder interface module or the control board. O1: Encoder interface module 1, see parameters 91.11 and 91.12. O2: Encoder interface module 2, see parameters 91.13 and 91.14. O3: Control board, see group 94 OnBoard speed feedback configuration. YY specifies the speed feedback device. O1: Encoder 1, see group 92 Encoder 1 configuration. O2: Encoder 2, see group 93 Encoder 2 configuration. O3: OnBoard encoder, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. ZZZZ indicates the problem. Actions see below. 	
	0001	Motor gear definition invalid or outside limits. Check motor gear settings. See 90.43 Motor gear numerator and 90.44 Motor gear denominator. This warning is always active independent of 31.35 Motor feedback fault.	
	0002	 Speed feedback device not configured. Check the settings of the speed feedback device: Encoder 1, see group 92 Encoder 1 configuration. Encoder 2, see group 93 Encoder 2 configuration. The OnBoard encoder, see group 94 OnBoard speed feedback configuration. The tacho, see group 94 OnBoard speed feedback configuration. Use 91.10 Encoder parameter refresh to validate any changes in the settings for an encoder. 	
	0003	Speed feedback device stopped working. Check the status of the speed feedback device.	
	0004	Speed feedback device drift detected. Check for slippage between speed feedback device and motor.	
A7B1	Load speed feedback.	 The comparison of the measured speed feedback from pulse encoder or analog tacho to measured EMF has failed. Check: The setting of 90.41 M1 feedback selection, 31.14 Fault stop mode fault level 3, 31.35 Motor feedback fault, 31.36 Speed feedback monitor level and 31.37 EMF feedback monitor level. At the encoder: The encoder itself, alignment, cabling, coupling, power supply (feedback might be too low), mechanical disturbances, jumper J4 on the SDCS-CON-H01. At the tacho: The tacho itself, tacho polarity and voltage, alignment, cabling, coupling, mechanical disturbances. EMF: The armature cable connection from the drive to the motor and the polarity. Selected motor, no load speed feedback is received. 	1

Code	Warning/Notice	Cause and what to do	Warning level
Coue	Programmable, see 31.38 Load feedback fault. See also fault 73A1.	Attention: The warning can only be reset by setting 96.27 Control board boot = Reboot or by cycling the auxiliary power. Check the AUX code (format XXYYZZZZ). XX specifies the location of the speed feedback device. Either an encoder interface module or the control board. - 01: Encoder interface module 1, see parameters 91.11 and 91.12. - 02: Encoder interface module 2, see parameters 91.13 and 91.14. - 03: Control board, see group 94 OnBoard speed feedback configuration. YY specifies the speed feedback device. - 01: Encoder 1, see group 92 Encoder 1 configuration. - 02: Encoder 2, see group 93 Encoder 2 configuration. - 03: OnBoard encoder, see group 94 OnBoard speed feedback configuration.	_
		 04: Tacho, see group 94 OnBoard speed feedback configuration. ZZZZ indicates the problem. Actions see below. 	
	0001	Load gear definition invalid or outside limits. Check load gear settings. See 90.53 Load gear numerator and 90.54 Load gear denominator. This warning is always active independent of 31.38 Load feedback fault.	
	0002	Feed constant definition invalid or outside limits. Check feed constant settings. See 90.63 Feed constant numerator and 90.64 Feed constant denominator. This warning is always active independent of 31.38 Load feedback fault.	
	0003	Motor/Load gear definition invalid or outside limits. Check motor/load gear settings. See 90.61 Gear numerator and 90.62 Gear denominator. This warning is always active independent of 31.38 Load feedback fault.	
		 Speed feedback device not configured. Check the settings of the speed feedback device: Encoder 1, see group 92 Encoder 1 configuration. Encoder 2, see group 93 Encoder 2 configuration. The OnBoard encoder, see group 94 OnBoard speed feedback configuration. The tacho, see group 94 OnBoard speed feedback configuration. Use 91.10 Encoder parameter refresh to validate any changes in the settings for an encoder. 	
	0005	Speed feedback device stopped working. Check the status of the speed feedback device.	
	0007	The comparison of the measured speed feedback from pulse encoder or analog tacho to measured EMF has failed. Check: The setting of 90.41 M1 feedback selection, 31.14 Fault stop mode fault level 3, 31.35 Motor feedback fault, 31.36	5

Code	Warning/Notice	Cause and what to do	Warning level
		 Speed feedback monitor level and 31.37 EMF feedback monitor level. At the encoder: The encoder itself, alignment, cabling, coupling, power supply (feedback might be too low), mechanical disturbances, jumper J4 on the SDCS-CON-H01. At the tacho: The tacho itself, tacho polarity and voltage, alignment, cabling, coupling, mechanical disturbances. EMF: The armature cable connection from the drive to the motor and the polarity. 	
A7C1	FBA A communication. Programmable, see 50.02 FBA A comm loss func. See also fault 7510.	Fieldbus adapter A (FBA A): Cyclical communication between PLC and fieldbus adapter module A or between drive and fieldbus adapter module A is lost. Fault 7510 FBA A communication is only activated after the first data set from the overriding control is received by the drive. Before the first data set is received, only warning A7C1 FBA A communication is active. The reason is to suppress unnecessary faults (the startup of the overriding control is usually slower than the one of the drive). Check: The status of the fieldbus communication. See user documentation of the fieldbus interface. The settings of groups 50 Fieldbus adapter (FBA), 51 FBA A settings, 52 FBA A data in and 53 FBA A data out. The cable connections. The fieldbus cable termination. The fieldbus adapter. That the master can communicate.	4
A7C2	FBA B communication. Programmable, see 50.32 FBA B comm loss func. See also fault 7520.	Fieldbus adapter B (FBA B): Cyclical communication between PLC and fieldbus adapter module B or between drive and fieldbus adapter module B is lost. Fault 7520 FBA B communication is only activated after the first data set from the overriding control is received by the drive. Before the first data set is received, only warning A7C2 FBA B communication is active. The reason is to suppress unnecessary faults (the startup of the overriding control is usually slower than the one of the drive). Check: The status of the fieldbus communication. See user documentation of the fieldbus interface. The settings of group 50 Fieldbus adapter (FBA), 54 FBA B settings, 55 FBA B data in and 56 FBA B data out. The cable connections. The fieldbus cable termination. The fieldbus adapter. That the master can communicate.	4
A7CA	DDCS controller communication. Programmable, see 60.59 DDCS controller comm loss function. See also fault 7581.	Cyclical communication between DDCS controller and drive is lost or there is no communication at all. The drive is waiting for the very first data set. Check: The status/settings of the DDCS controller. See user documentation of the DDCS controller.	4

Code	Warning/Notice	Cause and what to do	Warning level
		 The adapters between DDCS controller and drive. The setting of 20.01 Command location. The settings of group 60 DDCS communication, 61 D2D and DDCS transmit data and 62 D2D and DDCS receive data. The fiber optic cable connections. 	
A7CB	Master-follower link communication. Programmable, see 60.09 M/F comm loss function. See also fault 7582.	Cyclical communication between master and a follower (DDCS/D2D) is lost or there is no communication at all. The drive is waiting for the very first data set. Check: The AUX code. It indicates which node address on the master-follower link is affected. See 60.02 M/F node address in each drive. The setting of 60.14 M/F follower selection. The settings of group 60 DDCS communication. The cable connections.	4
A7CE	EFB communication. Programmable, see 58.14 Communication loss action. See also fault 6681.	Cyclical communication to the embedded fieldbus (EFB) is lost. Fault 6681 EFB communication is only activated after the first data set from the overriding control is received by the drive. Before the first data set is received, only warning A7CE EFB communication is active. The reason is to suppress unnecessary faults (the startup of the overriding control is usually slower than the one of the drive). Check: The status of the fieldbus master (online, offline, error etc.). The settings of group 58 FBA Embedded fieldbus. The cable connections to connector XD2D on the control board. The fieldbus cable termination.	4
A7DC	FSx undefined warning.	See <u>FSPS-21 PROFIsafe safety functions module</u> (AXD50000158638).	-
A7E1	Speed feedback device. Programmable, see 31.35 Motor feedback fault. See also fault 7381.	 Speed feedback device error. Check the AUX code (format XXYYZZZZ). XX specifies the location of the speed feedback device. Either an encoder interface module or the control board. O1: Encoder interface module 1, see parameters 91.11 and 91.12. O2: Encoder interface module 2, see parameters 91.13 and 91.14. O3: Control board, see group 94 OnBoard speed feedback configuration. YY specifies the speed feedback device. O1: Encoder 1, see group 92 Encoder 1 configuration. O2: Encoder 2, see group 93 Encoder 2 configuration. O3: OnBoard encoder, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. 	1

Code	Warning/Notice	Cause and what to do		Warning level
		 05: EMF, see group 94 configuration. ZZZZ indicates the proble 	OnBoard speed feedback m. Actions see below.	
	0001	encoder cable and encode Check:	ult mode.	
	0002	No encoder signal. Check the condition of the		_
		Overspeed. Overfrequency.	Contact your local ABB representative.	
	0005	Resolver ID run failed. Resolver overcurrent.		
		Absolute encoder communication error.		
		Absolute encoder initialization error.		
		Absolute SSI encoder configuration error.		
		Encoder reported an internal error.	See the documentation of the encoder.	
		Encoder reported a battery error.		
	0000	Encoder reported overspeed or decreased resolution due to overspeed.		
		Encoder reported a position counter error.		
		Encoder reported an internal error.		
	0010	EMF.	ge from speed feedback device to ive independent of 31.35 Motor	
	0011	encoder (only valid if 2 end	ge from one encoder to the other coders are connected). ive independent of 31.35 Motor	
	0012	Selected motor, wrong dir	ection of speed feedback.	1

Code	Warning/Notice	Cause and what to do	Warning level
		 The speed feedback direction of tacho and encoders is checked against the speed feedback direction of the EMF. See 90.41 M1 feedback selection. Check: The real direction of motor rotation. The settings of 31.36 Speed feedback monitor level and 31.37 EMF feedback monitor level. The connection of the tacho cable. To correct, swap the two wires. The connection of the encoder cable. To correct, swap e.g., channels A and A The connection of armature and field cables. 	
	0013	Selected motor, tacho range. Check: — That the tacho voltage at overspeed fits to the tacho input. It should not be higher than 270 V.	
	0014	Re-do the tacho fine-tuning. 31.30 M1 overspeed trip margin or 42.25 M2 overspeed trip margin have been changed. Use 99.20 Tuning request = Tacho fine-tuning. This warning is always active independent of 31.35 Motor feedback fault.	
A7EE	Control panel/PC tool link communication. Programmable, see 49.05 Communication loss action. See also fault 7081.	 This alarm occurs even though no control is expected from the control panel/PC tool. The control panel/PC tool connected via USB, or the PC tool connected via FENA-11/21 has stopped communicating. Check: The setting of 49.04 Communication loss time. If needed extend the time out to 2000 ms. Do not forget to verify the setting by means of 49.06 Refresh settings Refresh. The setting of 49.05 Communication loss action. If changed, do not forget to verify the setting by means of 49.06 Refresh settings Refresh. The control panel/PC tool connection/cable. The control panel connector. The mounting platform if being used (e.g., DPMP-01). Disconnect and reconnect the control panel/PC tool. 	4
A880	Motor bearings. Programmable, see 33.14 On-time 1 warn message, 33.24 On- time 2 warn message, 33.55 Value counter 1 warn message and 33.65 Value counter 2 warn message	Warning generated by an on-time timer or a value counter. See group 33 Generic timer & counter. Check the AUX code for the source of the warning. - 0: 33.13 On-time 1 source. - 1: 33.23 On-time 2 source. - 4: 33.53 Value counter 1 source. - 5: 33.63 Value counter 2 source.	4 (default) 1 5 user selectable
A881 A882 A883 A884	Output relay. Motor starts. Power ups. Mains contactor.	Warning generated by an edge counter. See group 33 Generic timer & counter. Programmable warnings, see 33.35 Edge counter 1 warn message and 33.45 Edge counter 2 warn message.	4 (default) 1 5 user selectable

Code	Warning/Notice	Cause and what to do	Warning level
A885	DC-breaker.	Check the AUX code for the source of the warning. - 2: 33.33 Edge counter 1 source. - 3: 33.43 Edge counter 2 source.	
A886	On-time 1. (Editable message text) Programmable, see 33.14 On-time 1 warn message.	Warning generated by on-time timer 1. See group 33 Generic timer & counter. Check the source of the warning. See 33.13 On-time 1 source.	4 (default) 1 5 user selectable
A887	On-time 2. (Editable message text) Programmable, see 33.24 On-time 2 warn message.	Warning generated by on-time timer 2. See group 33 Generic timer & counter. Check the source of the warning. See 33.23 On-time 2 source.	4 (default) 1 5 user selectable
A888	Edge counter 1. (Editable message text) Programmable, see 33.35 Edge counter 1 warn message.	Warning generated by edge counter 1. See group 33 Generic timer & counter. Check the source of the warning. See 33.33 Edge counter 1 source.	4 (default) 1 5 user selectable
A889	Edge counter 2. (Editable message text) Programmable, see 33.45 Edge counter 2 warn message.	Warning generated by edge counter 2. See group 33 Generic timer & counter. Check the source of the warning. See 33.43 Edge counter 2 source.	4 (default) 1 5 user selectable
A88A	Value counter 1. (Editable message text) Programmable, see 33.55 Value counter 1 warn message.	Warning generated by value counter 1. See group 33 Generic timer & counter. Check the source of the warning. See 33.53 Value counter 1 source.	4 (default) 1 5 user selectable
A88B	Value counter 2. (Editable message text) Programmable, see 33.65 Value counter 2 warn message.	Warning generated by value counter 2. See group 33 Generic timer & counter. Check the source of the warning. See 33.63 Value counter 2 source.	4 (default) 1 5 user selectable
A88C	Clean device.	Warning generated by an on-time timer. See group 33	4 (default)
A88D	Any fan.	Generic timer & counter.	1 5 user
A88E	Cabinet fan.	Programmable warnings, see 33.14 On-time 1 warn message	selectable
A88F	Cooling fan.	and 33.24 On-time 2 warn message.	
A890	Additional cooling fan.	Check the AUX code for the source of the warning. - 0: 33.13 On-time 1 source. - 1: 33.23 On-time 2 source. - 10: 05.04 Fan on-time counter.	
A8A0	Al supervision.		4

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 12.03 AI supervision function. See also fault 80A0.	An analog signal is outside the limits specified for the analog input. Check: The AUX code (format XYY). X specifies the location of the input. 0: Control board. 1: I/O extension module 1. 2: I/O extension module 2 3: I/O extension module 3. 4: YY specifies the input and limit. 01: Al1 under minimum. 02: Al1 over maximum. 03: Al2 under minimum. 04: Al2 over maximum. 05: Al3 under minimum. The signal level at the analog input. The wiring connected to the input. Polarity of the connection. The minimum and maximum limits of the input in groups 12 Standard AI, 14 I/O extension module 1, 15 I/O extension module 2 and 16 I/O extension module 3.	
A8B0	Signal supervision 1. (Editable message text) Programmable, see 32.06 Supervision 1 action. See also fault 80B0.	Warning generated by signal supervision 1. See group 32 Supervision. Check the source of the warning. See 32.07 Supervision 1 signal.	4 (default) 1 5 user selectable
A8B1	Signal supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2 action. See also fault 80B1.	Warning generated by signal supervision 2. See group 32 Supervision. Check the source of the warning. See 32.17 Supervision 2 signal.	4 (default) 1 5 user selectable
A8B2	Signal supervision 3. (Editable message text) Programmable, see 32.26 Supervision 3 action. See also fault 80B2.	Warning generated by signal supervision 3. See group 32 Supervision. Check the source of the warning. See 32.27 Supervision 3 signal.	4 (default) 1 5 user selectable
A8BE	ULC overload. Programmable, see 37.03 ULC overload actions. See also fault 8002.	Selected signal has exceeded the user overload curve. See group 37 User load curve. Check: - For any operating conditions increasing the monitored signal. E.g., the load of the motor if the torque or current is being monitored. - The definition of the load curve.	4 (default) 1 5 user selectable
A8BF	ULC underload.		4 (default)

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 37.04 ULC underload actions. See also fault 8001.	 Selected signal has fallen below the user underload curve. See group 37 User load curve. Check: For any operating conditions decreasing the monitored signal. E.g., the loss of load if the torque or current is being monitored. The definition of the load curve. 	15 user selectable
A8C0	Fan service counter.	A cooling fan has reached the end of its estimated lifetime. See 05.41 Main fan service counter. Check the AUX code for the fan to be replaced. O: Main cooling fan. 1: Auxiliary cooling fan. 2: Auxiliary cooling fan 2. 3: Cabinet cooling fan. Refer to the DCS880 Service manual (3ADW000488) of the drive for fan replacement instructions.	4
A981	External warning 1. (Editable message text) Programmable, see 31.01 External event 1 source and 31.02 External event 1 type. See also fault 9081.	There is no problem with the drive itself! Warning generated by external device 1. See group 31 Fault functions and fault levels. Warning level selection by parameters 31.70 31.79. Check: External device 1. 31.01 External event 1 source.	4 (default) 1 4 user selectable.
A982	External warning 2. (Editable message text) Programmable, see 31.03 External event 2 source and 31.04 External event 2 type. See also fault 9082.	There is no problem with the drive itself! Warning generated by external device 2. See group 31 Fault functions and fault levels. Warning level selection by parameters 31.70 31.79. Check: - External device 2. - 31.03 External event 2 source.	4 (default) 1 4 user selectable
A983	External warning 3. (Editable message text) Programmable, see 31.05 External event 3 source and 31.06 External event 3 type. See also fault 9083.	There is no problem with the drive itself! Warning generated by external device 3. See group 31 Fault functions and fault levels. Warning level selection by parameters 31.70 31.79. Check: External device 3. 31.05 External event 3 source.	4 (default) 1 4 user selectable
A984	External warning 4. (Editable message text) Programmable, see 31.07 External event 4 source and 31.08 External event 4 type. See also fault 9084.	There is no problem with the drive itself! Warning generated by external device 4. See group 31 Fault functions and fault levels. Warning level selection by parameters 31.70 31.79. Check: - External device 4. - 31.07 External event 4 source.	4 (default) 1 4 user selectable
A985	External warning 5. (Editable message text)	There is no problem with the drive itself! Warning generated by external device 5. See group 31 Fault functions and fault levels.	4 (default) 1 4 user selectable

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 31.09 External event 5 source and 31.10 External event 5 type. See also fault 9085.	Warning level selection by parameters 31.70 31.79. Check: - External device 5 31.09 External event 5 source.	
AF8C	Process PID sleep mode.	reserved	4
AF90	Autotuning. 00001111	The autotuning or assistant did not complete successfully. To clear the warning, either finish an autotuning/assistant successfully or keep Reset (e.g., via DI) depressed for over 3 seconds. Check the AUX code (format XXXXYYYY). XXXX specifies the autotuning or assistant. - 0000: General. - 0001: Field current autotuning. - 0002: Armature current autotuning. - 0003: Speed feedback assistant. - 0004: Speed controller autotuning. - 0005: EMF controller autotuning. - 0006: Flux linearization autotuning. - 0007: Thyristor test. For drives size H5 H8 make sure, that 99.11 M1 nominal current is set to 50 A or higher. - 0008: Tacho fine tuning. YYYY indicates the problem. Actions see below. - Operation mode ≠ Speed, see 19.01 Actual operation	4
	00010001	 mode. The drive was stopped before the autotuning finished. The On command was prematurely removed. 	_
		 Autotuning aborted by a fault. Repeat autotuning until successful. 	
	00010002	Motor is turning. No speed zero indication.	
	00010003	Armature current not zero.	
	00010004	Field current autotuning wrongly started in armature drive, please use the field exciter.	
	00010005	No field exciter selected. See 99.07 M1 used field exciter type.	
	00010006	Autotuning timeout, On command was not set in time.	
	00010007 0001000A		
	0001000B	Unable to detect a field inductance.	
		Firmware fault. Contact your local ABB representative.	
	00020002		-
	00020003	Autotuning timeout, Run command was not set in time or is missing.	

Code	Warning/Notice	Cause and what to do	Warning level
	00020004		
		 Armature current 99.11 M1 nominal current is set to zero. 	
		Motor is turning. No speed zero indication.	
	00020006	Armature circuit and/or armature voltage measurement	
		circuit wrongly connected (e.g., at C1/D1 or at the SDCS-PIN-H51).	
	00020007	No load connected to armature circuit.	
	00020008	Armature voltage measurement circuit open (e.g., not connected at C1/D1 or at the SDCS-PIN-H51) or interrupted. This can be checked by measuring the motor resistance at C1/D1 and the SDCS-PIN-H51. Check also current and torque limits.	
		Attention: The external EMF feedback might not be connected/have a wrong polarity. A not connected/wrong polarity of the external EMF feedback will cause a running away motor. Ignoring this can cause physical injury or death and/or damage to the equipment.	
	00020009	Firmware fault. Contact your local ABB representative.	
	00030001	 The drive was stopped before the autotuning finished. The Run command was prematurely removed. Autotuning aborted by a fault. Repeat autotuning until successful. 	
	00030002	Tuning of speed controller, speed feedback assistant or tacho fine-tuning not possible due to speed limitation. See 30.11 M1 minimum speed and 30.12 M1 maximum speed.	
		Tuning of speed controller, speed feedback assistant or tacho fine-tuning not possible due to voltage limitation. During the tuning of the speed controller, the speed feedback assistant or the tacho fine-tuning base speed, 99.14 M1 nominal (base) speed, might be reached. Thus, full armature voltage, 99.12 M1 nominal voltage, is necessary. In case the mains voltage is too low to provide for the needed armature voltage the autotuning procedure is canceled. Check and adapt if needed: 99.10 Nominal mains voltage. 99.12 M1 nominal voltage. 99.14 M1 nominal (base) speed.	
		Autotuning timeout, Run command was not set in time or is missing.	
	00030005	Motor could not accelerate to base speed. Decrease 23.12 Acceleration time 1 to get more torque and current.	
	00030006	Tacho adjustment faulty or not OK or the tacho voltage is too high during autotuning	
	00040001		
	00040002	Autotuning timeout, Run command was not set in time or is missing.	

Code	Warning/Notice	Cause and what to do	Warning level
	00040003	Tuning of speed controller, speed feedback assistant or	
		tacho fine-tuning not possible due to speed limitation. See	
		30.11 M1 minimum speed and 30.12 M1 maximum speed.	
	00040004	Motor is turning. No speed zero indication.	
	00040006		
	00040007	Motor could not decelerate with full autotuning torque.	
		Decrease 23.13 Deceleration time 1 to get more torque and current.	
	00040008	Armature current not zero.	
	00040009	Tuning of speed controller, speed feedback assistant or tacho fine-tuning not possible due to voltage limitation. During the tuning of the speed controller, the speed feedback assistant or the tacho fine-tuning base speed, 99.14 M1 nominal (base) speed, might be reached. Thus, full armature voltage, 99.12 M1 nominal voltage, is necessary. In case the mains voltage is too low to provide for the needed armature voltage the autotuning procedure is canceled. Check and adapt if needed: — 99.10 Nominal mains voltage. — 99.12 M1 nominal voltage. — 99.14 M1 nominal (base) speed.	
	0004000A	Required torque reference could not be reached before the drive reached base speed.	
	0004000В	Drive is not in speed control mode. See 19.01 Actual operation mode.	
	0004000C	Motor could not accelerate to base speed. Decrease 23.12 Acceleration time 1 to get more torque and current.	
	0004000D	No writing of control parameters of speed controller possible.	
	0004000E	Firmware fault. Contact your local ABB representative.	
		 The drive was stopped before the autotuning finished. The Run command was prematurely removed. Autotuning aborted by a fault. Repeat autotuning until successful. 	
			-
			- - -
	00060001	 The drive was stopped before the autotuning finished. The Run command was prematurely removed. Autotuning aborted by a fault. Repeat autotuning until successful. 	
	00060002	Autotuning timeout, Run command was not set in time or is missing.	

Code	Warning/Notice	Cause and what to do	Warning level
	00060003	Field weakening not allowed. See 90.41 M1 feedback	
		selection and 28.17 M1 EMF/Field control mode.	
	00060004	Motor is turning. No speed zero indication.	
	00060005	Drive is not in speed control mode. See 19.01 Actual operation mode.	
	00060006	Requested speed was not reached after 300 seconds.	
	00060007	Wrong order of measurement results in the flux linearization parameters. See 28.31 Field current at 40 % flux, 28.32 Field current at 70 % flux and 28.33 Field current at 90 % flux.	
	00060008	Firmware fault. Contact your local ABB representative.	
	00070002	 The drive was stopped before the autotuning finished. The Run command was prematurely removed. Autotuning aborted by a fault. Repeat autotuning until successful. 	
	00070003	Autotuning timeout, Run command was not set in time or is missing.	
	00070004	Field current not zero.	
		Armature current not zero.	
		Motor is turning. No speed zero indication.	
		Thyristor blocking test failed.	
		Motor connected to ground (near terminal C).	
		Motor connected to ground (near terminal D).	
		Armature winding is not connected (terminals C and D are open).	
	00070011	V11 short circuit.	
	00070012	V12 short circuit.	
	00070013	V13 short circuit.	
	00070014	V14 short circuit.	
	00070015	V15 short circuit.	
		V16 short circuit.	
	00070C11	V11 not conducting.	
		V12 not conducting.	
		V13 not conducting.	
		V14 not conducting.	
		V15 not conducting.	
		V16 not conducting.	
		V21 not conducting.	
		V22 not conducting.	
		V23 not conducting.	
		V24 not conducting.	
		V25 not conducting.	
		V26 not conducting.	
		V11 or V24 short circuit	
		V12 or V25 short circuit.	
		V13 or V26 short circuit.	
		V14 or V21 short circuit.	
		V15 or V22 short circuit.	

Code	Warning/Notice	Cause and what to do	Warning level
	00071623	V16 or V23 short circuit.	
	00072000	Armature winding is short-circuited (short circuit between terminals C and D).	
	0007FFFF	Thyristor test finishes successful, stack okay.	=
	00080001	 The drive was stopped before the autotuning finished. The Run command was prematurely removed. Autotuning aborted by a fault. 	
		 Repeat autotuning until successful. 	
	00080002	Autotuning timeout, Run command was not set in time or is missing.	
	00080003	Drive in on state when autotuning was requested. Remove the On command.	
	00080004	A fault happened during the autotuning. For details see event logger.	
AFE1	Off2 (emergency off).	The drive has received an Off2 command (emergency off/fast current off). There is no problem with the drive itself! Check: The AUX code (format 00XXYYYY). XX specifies the source of the Off2 command. 04: 20.04 Off2 source 1 (emergency off). 08: 20.08 Off2 source 2 (emergency off). 09: 06.09.b01 Used main control word. YYYY specifies the digital input or bit. 0000: Other [bit]; source selection. 0100: Off2 command; 0, emergency off/fast current off. 0101: Off2 inactive; 1, normal operation. 0103: Dl1; 10.02.b00 Dl delayed status. 0104: Dl2; 10.02.b01 Dl delayed status. 0105: Dl3; 10.02.b02 Dl delayed status. 0106: Dl4; 10.02.b03 Dl delayed status. 0107: Dl5; 10.02.b04 Dl delayed status. 0108: Dl6; 10.02.b05 Dl delayed status. 0111: DlO1; 11.02.b00 DlO delayed status. 0112: DlO2; 11.02.b01 DlO delayed status. 1011: DlO1; 11.02.b01 DlO delayed status. 1011: DlO2; 11.02.b01 DlO delayed status. 1101: DlC; 10.02.b15 Dl delayed status. 1101: O6.09.b01 Used main control word. That it is safe to continue operation. That it is safe to reset the source of the Off2 command. E.g., a push button. Then restart the drive. If necessary, invert the signal since the signal should be low active. If On/Run command is still high. Follower drive in a master-follower link configuration. The drive has received an Off2 command from the master. Informative warning. After stopping on an Off2 command, the master sends a short, 10 ms Off2 command to the	1
		Informative warning. After stopping on an Off2 command, the master sends a short, 10 ms Off2 command to the follower(s). Thus, the Off2 event is stored in the event log of	
VEES		the follower. The drive has received an Off3 command (emergency stop)	1
AFE2		The drive has received an Off3 command (emergency stop).	1

Code	Warning/Notice	Cause and what to do	Warning level
	Off3 (emergency stop).	There is no problem with the drive itself! Check: The AUX code (format 00XXYYYY). XX specifies the source of the Off3 command. 01: 200.05.b02 FSO control word 1. 05: 20.05 Off3 source (emergency stop). 09: 06.09.b02 Used main control word. YYYY specifies the digital input or bit. 0000: Other [bit]; source selection. 0100: Off3 command; 0, emergency stop. 0101: Off3 inactive; 1, normal operation. 0103: DI1; 10.02.b00 DI delayed status. 0104: DI2; 10.02.b01 DI delayed status. 0105: DI3; 10.02.b02 DI delayed status. 0106: DI4; 10.02.b03 DI delayed status. 0107: DI5; 10.02.b04 DI delayed status. 01011: DIO1; 11.02.b05 DI delayed status. 0111: DIO1; 11.02.b05 DI delayed status. 0112: DIO2; 11.02.b01 DIO delayed status. 0112: DIO2; 11.02.b15 DI delayed status. 1002: 06.09.b02 Used main control word. 1003: 200.05.b02 FSO control word 1. That it is safe to continue operation. That it is safe to reset the source of the Off3 command. E.g., a push button. Then restart the drive. If necessary, invert the signal since the signal should be low active. If On/Run command is still high. Follower drive in a master-follower link configuration. The drive has received an Off3 command from the master. Informative warning. After stopping on an Off3 command, the master sends a short, 10 ms Off3 command to the follower(s). Thus, the Off3 event is stored in the event log of the follower.	
AFE7	Follower. Programmable, see 60.17 Follower fault action. See also fault FF7E.	A follower has tripped. Check the AUX code to find out the node address of the faulted follower. See 60.02 M/F node address. Correct the fault in the follower.	1
B5A0	Safe torque off. Programmable, see 31.22 STO indication run/stop. See also warning A5A0 and fault 5091.	Safe torque off active, no drive problem. See Supplement for functional safety (3ADW000452). Check: - 31.22 STO indication run/stop. - The safe torque off circuit.	4
B5A3	Safe off mains contactor XSMC:STO.	Safe torque off monitor DC current not zero (zero current time out).	4

Code	Warning/Notice	Cause and what to do	Warning level
	Programmable, see 31.90 XSMC:STO Indication. See also warning A5A3 and fault 5093.	The DCS880 has the possibility to open the mains contactor using a hardware supervision of the DC current in case of a safe torque off request. This is called fault shutdown path. In case safe torque off is requested and current zero is detected in less than 300 ms the XSMC:STO relay is kept closed. In case safe torque off is requested and current zero is not detected in less than 300 ms the XSMC:STO relay is opened, and the fault shutdown path becomes active. See Supplement for functional safety (3ADW000452). Check: For broken parts (e.g., thyristors) in the unit. The SDCS-CON-H01. For high inductive loads.	
B5A4	Firmware internal diagnostics.	The control board rebooted unexpectedly. Notice.	4
B680	SW internal diagnostics	A timeout in the firmware was triggered. Contact your local ABB representative quoting the AUX code. Also make and send a 'support package' taken with Drive Composer pro: AAAA Make support package	4

Faults and AUX codes

To avoid dangerous situations, damage of the motor, the drive, or any other material some physical values must not exceed certain limits. Therefore, limit values can be specified for these values by parameter setting which cause a fault when the value exceeds the limits (e.g., max. armature voltage, max. converter temperature). Faults can also be caused by situations which inhibit the drive from normal operation (e.g., blown fuse).

A fault is a condition which requires an immediate stop of the drive, in order to avoid danger or damage. The drive is stopped automatically and cannot be restarted before removing its cause.

In case a fault occurs, it stays active until the cause is eliminated and a Reset is given. All fault signals are resettable except of:

- 50FE Type code.
- 6000 Internal firmware.
- F501 Auxiliary undervoltage.
- F547 Drive hardware.

To reset a fault following steps are required:

- The above-mentioned faults can only be reset by cycling the power.
- Remove the Run and On commands.
- Eliminate the faults.
- Acknowledge the fault with Reset via digital input, overriding control system or with Control panel/PC tool.
- Depending on the systems condition, generate On and Run commands again.

Fault levels

The fault signals will switch the drive off completely or partly depending on its fault level. The fault handling provides 6 fault levels.

Fault level 1

- The mains contactor is switched off immediately.
- The field contactor is switched off immediately.
- The fan contactor is switched off immediately.

Fault level 2

- The mains contactor is switched off immediately.
- The field contactor is switched off immediately.
- The fan contactor stays on as long as the fault is pending or if 20.40 Drive/Motor fan delay time is running.

Fault level 3

The drive is stopping via 31.14 Fault stop mode fault level 3, thus:

- The mains contactor is switched off immediately.
- The field contactor is switched off immediately in case of 31.14 Fault stop mode fault level 3 = Coast stop, but it stays on in case of field heating or 31.14 Fault stop mode fault level 3 = Dynamic braking (this is valid for all level 3 faults).
- The fan contactor stays on.

At standstill:

- The mains contactor cannot be switched on again.
- The field contactor stays on in case of field heating.
- The fan contactor stays on as long as 20.40 Drive/Motor fan delay time is running.

Fault level 4

The drive is stopping via 31.15 Fault stop mode fault level 4, thus:

- The mains contactor is switched off immediately in case of 31.15 Fault stop mode fault level 4 = Coast stop or Dynamic braking, but it stays on in case of 31.15 Fault stop mode fault level 4 = Ramp stop or Torque limit.
- The field contactor is switched off immediately in case of 31.15 Fault stop mode fault level 4 = Coast stop, but it stays on in case of field heating or 31.15 Fault stop mode fault level 4 = Ramp stop, Torque limit or Dynamic braking.

 The fan contactor is switched off immediately in case of 31.15 Fault stop mode fault level 4 = Coast stop but stays on in case of 31.15 Fault stop mode fault level 4 = Ramp stop, Torque limit or Dynamic braking.

At standstill:

- The mains contactor is switched off immediately.
- The field contactor stays on in case of field heating.
- The fan contactor stays on as long as 20.40 Drive/Motor fan delay time is running.

Fault level 5

The drive is stopping via any communication loss action - see 31.56 Ext I/O comm loss event, 49.05 Communication loss action, 50.02 FBA A comm loss func, 50.32 FBA B comm loss func, 58.14 Communication loss action, 60.09 M/F comm loss function and 60.59 DDCS controller comm loss function, thus:

- The mains contactor is switched off immediately or stays on depending on the selected communication loss action.
- The field contactor is switched off immediately or stays on depending on the selected communication loss action, but it stays on in case of field heating.
- The fan contactor is switched off immediately or stays on depending on the selected communication loss action.

At standstill:

- The mains contactor is switched off immediately.
- The field contactor stays on in case of field heating.
- The fan contactor stays on as long as 20.40 Drive/Motor fan delay time is running.

Fault level 6

Used for STO related faults. See <u>Supplement for functional safety (3ADW000452)</u>.

Fault messages

The list contains the fault code in hex, its name, the cause, and hints what to do.

Code	Fault	Cause and what to do	Fault level
1411	CU logic error	 The CPU of the control board, at some point, writes a value into a FPGA register and repeatedly reads the register. If the read value is not what the CPU thinks is correct, then it generates fault 1411 CU logic error. Probable causes could be that: The FPGA has been reset due to a disturbed mains/auxiliary voltage (e.g., a voltage dip). The FPGA has been reset due to a loss of the clock signal or too high interference in the clock signal. Check: The firmware version. See 07.05 Firmware version. For any mains/auxiliary voltage network issues when the fault happens. For strong disturbances when the fault happens. E.g., the start of a big machine etc. How many drives are affected. When several drives trip, if the trip happens at the same time (simultaneously) or if the drives trip one by one. 	
1412	Fault reset	A fault has been reset. Notice.	-
1414	Backup/Restore Timeout	The unit encountered problems creating a backup file or restoring one. Please try again. Check: - The control panel/PC-tool communication and if it is still in backup/restore state.	1
2310	Armature overcurrent.	The armature current has exceeded either 07.63 Drive DC overcurrent level or 31.44 Armature overcurrent level.	3

Code	Fault	Cause and what to do	Fault level
		Check: That the start-up data in group 99 corresponds to the motor rating plate and that the drive is matching the motor. The setting of 07.63 Drive DC overcurrent level and 31.44 Armature overcurrent level. If tripping while using the DCS880 Assistant, set 31.44 Armature overcurrent level = 230.00 %. When finished, set back to the original value. The settings of the current controller in group 27 Armature current control. The settings of current and torque limits in group 30 Control limits. The motor and motor cables. All connections in the armature circuit. The incoming voltage for synchronizing. If the synchronizing voltage is not taken from the mains directly, but via a synchronizing transformer or the 230 V _{AC} /115 V _{AC} network, check that there is no phase shift between the same phases. Use an oscilloscope to verify. The mains/branch fuses. That there are no contactors opening and closing in the motor cables. That there are no power factor correction capacitors or surge absorbers between line reactor and drive. The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. In case of a hardparallel configuration. ZZ identifies the cause: O1: Overcurrent in 27.05 Motor current. O2: Overcurrent in 27.06 Motor peak current. In case of a rebuild kit check: For proper connection of the firing pulses. For proper connection of the CTs. That 95.25 Set: Type code = None. The setting of 95.27 Set: Drive DC current scaling, because 07.63 Drive DC overcurrent level = 2.3 • 95.27 Set: Drive DC current scaling.	
2330	Residual current detected. Programmable, see 31.18 Residual current detection type. See also warning A2B3.	The drive has detected an unbalance typically due to a residual current in the motor or the motor cables. Sum of IL1, IL2, IL3 ≠ zero. Check: The settings of 31.17 Residual current detection source, 31.18 Residual current detection type, 31.19 Residual current detection level and 31.20 Residual current detection delay. The insulation resistances of motor and motor cables. Disconnect the mains, verify safe isolation from supply in armature and field circuits and make insulation tests for the complete installation.	1

Code	Fault	Cause and what to do	Fault level
		 The residual current transformer, if necessary, change transformer or connected drive hardware. 	
3130	Mains phase loss. Programmable, see 31.21 Mains phase loss. See also warning A130.	One or several mains voltage phase(s) are missing, or the mains voltage phases are imbalanced. The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given. Check: The condition of the mains (voltage, cabling, fuses, switchgear). That all 3 phases are present directly at the drive. H1 H5: measure the fuses F100 F102 on the SDCS-PIN-H01. H6 H8: check and measure the connections XU1/XU2, XV1/XV2 and XW1/XW2 on the SDCS-PIN-H51. For mains supply imbalance. For loose mains cable connections. That the mains contactor closes and opens. The AUX code: O: All phase voltages U (L1), V (L2) and W (L3) are missing. 1: Mains voltage phases are imbalanced. Phase-to-phase voltage U _{UV} is the smallest voltage. 2: Mains voltage phases are imbalanced. Phase-to-phase voltage U _{VW} is the smallest voltage. 3: Phase V (L2) is missing. 4: Mains voltage phases are imbalanced. Phase-to-phase voltage U _{WU} is the smallest voltage. 5: Phase U (L1) is missing. 6: Phase W (L3) is missing.	3
3280	Mains low voltage. Programmable, see 31.51. Mains loss mode. See also warning A111.	 Mains low (under-) voltage (AC side). The firing angle is forced to the value of 30.45 Maximum firing angle and single firing pulses to suppress the DC current are given. Check: The setting of 31.51. Mains loss mode, 31.52 Mains loss down time, 31.53 Mains loss low level 1 and 31.54 Mains loss low level 2. That the mains voltage scaling is correct. See 99.10 Nominal mains voltage. The selection of the voltage coding resistors on the SDCS-PIN-H51. The condition of the mains (voltage, cabling, fuses, switchgear). That all 3 phases are present directly at the drive. H1 H5: measure the fuses F100 F102 on the SDCS-PIN-H01. H6 H8: check and measure the connections XU1/XU2, XV1/XV2 and XW1/XW2 on the SDCS-PIN-H51. That the mains voltage is within the set tolerance. 	3

Code	Fault	Cause and what to do	Fault level
		– For mains supply imbalance.	
		 For loose mains cable connections. 	
		 That the mains contactor closes and opens. 	
		- For H1 H4, that the field circuit has no short circuit or	
		ground fault.	
		 In case an On command is given, and the measured 	
		mains voltage is too low for longer than 500 ms A111	
		Mains low voltage is set. If the problem persists for	
		longer than 10 s 3280 Mains low voltage is generated.	
4310	Bridge temperature	Excessive bridge temperature.	2
.0_0	measured.	Wait until the bridge is cooled down. The fan contactor	_
	See also warning	stays on as long as the fault is pending.	
	A4B0.	Temperature fault level, see 07.65 Drive max bridge	
	A4DU.	temperature set. The bridge overtemperature warning will	
		already appear at approximately 5°C below the	
		temperature fault level.	
		Check:	
		The values of 05.11 Ch1 bridge temperature 05.14	
		Ch4 bridge temperature.The setting of 20.38 Drive fan acknowledge source.	
		The ambient conditions (a.g., ambient temperature)	
		The ambient conditions (e.g., ambient temperature). The sinfluence of few approximations.	
		The airflow and fan operation.	
		The drive fan supply voltage.	
		The drive fan direction of rotation.	
		The drive fan components.	
		The heatsink fins for dust pick-up.	
		 The drive cooling air inlet (e.g., filters). 	
		- The drive cooling air outlet.	
		 For open drive doors. 	
		 The motor power against the drive power. 	
		 Inadmissible load cycle. 	
		– When 95.25 Set: Type code = None, that 95.29 Set: Drive	
		max bridge temperature is set properly.	
		 The AUX code (format XXXYYYZZ). 	
		YYY identifies the power unit channel. In case of a	
		hardparallel configuration.	
4981	Motor temperature 1	Measured/Estimated motor temperature 1 has exceeded	2
	measured/estimated	the fault level.	
		Wait until the motor/motor model is cooled down under	
	(Editable message	the warning level. The fan contactor stays on as long as the	
	text)	fault is pending. It is not possible to reset the fault as long	
	See also warning	as the motor remains too hot.	
	A491.	Check:	
		 Check the AUX code (format 0000000X). 	
		X specifies estimated or measured overtemperature.	
		 1: Estimated overtemperature. 	
		 2: Measured overtemperature. 	
		The value of 35.02 Measured temperature 1.	
		The real motor temperature. Let motor cool down and	
		restart.	
		The value of 35.12 Temperature 1 fault level. The value of 35.12 Temperature 1 fault level.	
		The value of 33.12 remperature 1 rault level.	

Code	Fault	Cause and what to do	Fault level
		 The setting of 35.15 Supervision 1 klixon source, if 	
		klixons are used.	
		 The cooling of the motor or other temperature 	
		measured equipment.	
		 The ambient conditions (e.g., ambient temperature). 	
		 The airflow and fan operation. 	
		 The motor fan supply voltage. 	
		 The motor fan direction of rotation. 	
		 The motor fan components. 	
		 The motor cooling air inlet (e.g., filters). 	
		 The motor cooling air outlet. 	
		 The motor load and drive ratings. 	
		 Inadmissible load cycle. 	
		 The wiring of the temperature sensor. 	
		- The resistance of the temperature sensor by measuring	
		it.	
		Hint:	
		The measured/estimated motor temperature is	
		blocked, if 35.11 Temperature 1 source = Disable.	
4982	Motor temperature 2	Measured/Estimated motor temperature 2 has exceeded	2
-	measured/	the fault level.	
	estimated.	Wait until the motor/motor model is cooled down under	
	(Editable message	the warning level. The fan contactor stays on as long as the	
	text)	fault is pending. It is not possible to reset the fault as long	
	See also warning	as the motor remains too hot.	
	A492.	Check:	
	A432.	- Check the AUX code (format 0000000X).	
		X specifies estimated or measured overtemperature.	
		- 1: Estimated overtemperature.	
		 2: Measured overtemperature. 	
		The value of 35.03 Measured temperature 2.	
		The real motor temperature. Let motor cool down and The real motor temperature.	
		restart.	
		The value of 35.22 Temperature 2 fault level.	
		The setting of 35.25 Supervision 2 klixon source, if	
		klixons are used.	
		The cooling of the motor or other temperature	
		measured equipment.	
		The ambient conditions (e.g., ambient temperature).	
		The ambient conditions (e.g., ambient temperature). The airflow and fan operation.	
		•	
		The motor ran supply voltage.	
		The motor fan direction of rotation. The motor fan components.	
		The motor cooling air inlet (o.g., filters)	
		The motor cooling air inlet (e.g., filters).	
		The motor cooling air outlet. The motor dead device which we	
		The motor load and drive ratings.	
		- Inadmissible load cycle.	
		The wiring of the temperature sensor.	
		The resistance of the temperature sensor by measuring	
		it.	
		Hint:	
		The measured/estimated motor temperature is	
		blocked, if 35.21 Temperature 2 source = Disable.	

Code	Fault	Cause and what to do		Fault level
4991	Motor temperature slot 1 measured. (Editable message text) See also warning A497.	The thermistor protection module (FEN-xx) installed in slot 1 indicates overtemperature.	Depending on the used module, a PTC and/or KTY temperature sensor can be attached. Check:	2
4992	Motor temperature slot 2 measured. (Editable message text) See also warning A498.	The thermistor protection module (FEN-xx) installed in slot 2 indicates overtemperature.	 The cooling of the motor or other temperature measured equipment. The motor load and 	2
4993	Motor temperature slot 3 measured. (Editable message text) See also warning A499.	The thermistor protection module (FEN-xx) installed in slot 3 indicates overtemperature.	drive ratings. The wiring of the temperature sensor. The resistance of the temperature sensor by measuring it.	2
5080	Drive fan acknowledge. Programmable, see 31.41 Drive fan fault function. See also warning A581.	 Drive cooling fan feedback at the DCheck: The settings of 20.38 Drive fan a 20.40 Drive/Motor fan delay tim The drive fan operation and cor The drive fan circuit. The drive fan klixon. The drive fan supply voltage. The drive fan direction of rotati The drive door open. The drive cooling air inlet (e.g., fanction) The drive cooling air outlet. H7 an H8 pressure switch (settion) The used digital inputs and out 	acknowledge source and ne. nection. on. filter).	4
5090	STO hardware fault.	Safe torque off hardware failure. The when the SDCS-CON-H01 detects a safe torque off circuit. Thus, the untorque off state. See Supplement for functional safe Check: Contact your local ABB represer code to repair the converter. The AUX code is in HEX and con information, especially with har When converted into a 32-bit bithe code indicate the following: Bit 0: Ch1 power unit STO Bit 1: Ch2 power unit STO Bit 2: Ch3 power unit STO Bit 3: Ch4 power unit STO Bits of non-existing power	ny hardware fault in the it is shut down to safe ty (3ADW000452). Intative quoting the AUX tains location dparallel power units. In any number, the bits of 2. 2. 2. 2.	6

Code	Fault	Cause and what to do	Fault level
		 Bits 4 11: N/A. Bit 12: Ch1 power unit STO1. Bit 13: Ch2 power unit STO1. Bit 14: Ch3 power unit STO1. Bit 15: Ch4 power unit STO1. Bits of non-existing power units are set to 1. Bits 16 23: N/A. Bit 24: STO2 drive/control unit. Bit 25: STO1 drive/control unit. Bit 26: STO Active drive/control unit. Bit 27: STO Active power units. Bits 31 28: Channel of the faulty power unit (04). 1111: STO Active of control unit and power units is in conflict. 	
5091	Safe torque off. Programmable, see 31.22 STO indication run/stop. See also warning A5A0 and event B5A0.	Safe torque off active, no drive problem. See Supplement for functional safety (3ADW000452). Check: - 31.22 STO indication run/stop. - The safe torque off circuit.	6
5092	STO overall fault.	OR function of faults 5090, 5093, 5095, FA81, FA82. It becomes active when any of the following faults is detected in the safe torque off related circuits: - 5090 STO hardware fault. - 5093 Safe off mains contactor XSMC:STO. - 5095 Power unit STO stuck at. - 5096 Power units STO discrepancy. - 5097 Power units STO hardware fault. - FA81 Safe torque off 1 loss fault. - FA82 Safe torque off 2 loss fault. See Supplement for functional safety (3ADW000452).	6
5093	Safe off mains contactor XSMC:STO. Programmable, see 31.90 XSMC:STO Indication. See also warning A5A3 and event B5A3.	Safe torque off monitor DC current not zero (zero current time out). The DCS880 has the possibility to open the mains contactor using a hardware supervision of the DC current in case of a safe torque off request. This is called fault shutdown path. In case safe torque off is requested and current zero is detected in less than 300 ms the XSMC:STO relay is kept closed. In case safe torque off is requested and current zero is not detected in less than 300 ms the XSMC:STO relay is opened, and the fault shutdown path becomes active. See Supplement for functional safety (3ADW000452). Note: Reset is only possible by activating 96.27 Control board boot or by cycling the power. Check: For broken parts (e.g., thyristors) in the unit. The SDCS-CON-H01. For high inductive loads.	6

Code	Fault	Cause and what to do	Fault level
5094	Measurement circuit bridge temperature.	Problems with the internal temperature measurement of the bridge. Check: - The wiring of the temperature sensor. This includes the fiber optic connection between control unit and power unit (e.g., plugs are swapped), if applicable. - The temperature sensor. - The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. In case of a hardparallel configuration.	4
5095	Power units STO stuck at.	If a discrepancy between the safe torque off signals in the control unit and a power unit is detected the drive is shut down. Check:	6
5096	Power units STO discrepancy.	If the state of STO1 and STO2 is different for longer than 200 ms fault 5096 is generated.	6

Code	Fault	Cause and what to do	Fault level
Code	Fault	State STO1 LOW HIGH HIGH LOW LOW HIGH HIGH LOW State STO2 LOW HIGH HIGH LOW LOW HIGH HIGH LOW Fault No Fault FA82 FA81 DZ_LIN_030_STO_d.ai See Supplement for functional safety (3ADW000452). Check: Operate the safety relay so that the On/Off timing of STO1 and STO2 are synchronized. If the safety relay contacts are welded. If welded, replace the safety relay. The gap between the On/Off timing of STO1 and STO2. Keep the gap smaller than 201 ms.	Fault level
		 If the problem persists, contact your local ABB representative to repair the converter. The AUX code (format 000000ZZ). 01: Ch1 power unit STO1 stuck at low. 02: Ch1 power unit STO2 stuck at high. 03: Ch1 power unit STO2 stuck at low. 04: Ch1 power unit STO2 stuck at low. 05: Ch2 power unit STO1 stuck at low. 06: Ch2 power unit STO1 stuck at high. 07: Ch2 power unit STO2 stuck at low. 08: Ch2 power unit STO2 stuck at low. 09: Ch3 power unit STO1 stuck at high. 10: Ch3 power unit STO1 stuck at high. 11: Ch3 power unit STO2 stuck at low. 12: Ch3 power unit STO2 stuck at high. 13: Ch4 power unit STO1 stuck at low. 14: Ch4 power unit STO1 stuck at high. 	
		 15: Ch4 power unit STO2 stuck at low. 16: Ch4 power unit STO2 stuck at high. 	
5097	Power units STO hardware fault.	 The unit is shut down: If a discrepancy between the safe torque off signals in the control unit and a power unit is detected. If a safety-relay does not switch off after the control unit has received a safe torque off request. Check: For loose fiber optic cable connections and re-plug the cables. For a broken SDCS-DSL-H12 or SDCS-DSL-H14 in the control unit and exchange it. Contact ABB to perform a revalidation test. For a broken SDCS-OPL-H01 in a power unit and exchange it. Contact ABB to perform a revalidation test. The AUX code is in HEX and contains location information. When converted into a 32-bit binary number, the bits of the code indicate the following: Bit 0: Ch1 power unit STO1. Bit 1: Ch1 power unit STO2. 	6

Code	Fault	Cause and what to do	Fault level
		 Bit 2: Ch1 power unit STO1 Diag. 	
		 Bit 3: Ch1 power unit STO2 Diag. 	
		 Bit 4: Ch2 power unit STO1. 	
		 Bit 5: Ch2 power unit STO2. 	
		 Bit 6: Ch2 power unit STO1 Diag. 	
		 Bit 7: Ch2 power unit STO2 Diag. 	
		 Bit 8: Ch3 power unit STO1. 	
		 Bit 9: Ch3 power unit STO2. 	
		 Bit 10: Ch3 power unit STO1 Diag. 	
		 Bit 11: Ch3 power unit STO2 Diag. 	
		 Bit 12: Ch4 power unit STO1. 	
		 Bit 13: Ch4 power unit STO2. 	
		 Bit 14: Ch4 power unit STO1 Diag. 	
		 Bit 15: Ch4 power unit STO2 Diag. 	
		 Bit 16: Ch1 power unit safety relay timeout. 	
		 Bit 17: Ch2 power unit safety relay timeout. 	
		 Bit 18: Ch3 power unit safety relay timeout. 	
		 Bit 19: Ch4 power unit safety relay timeout. 	
		– Bits 20 23: N/A.	
		 Bit 24: STO2 control unit. 	
		 Bit 25: STO1 control unit. 	
		– Bits 26, 27: N/A.	
		 Bit 28: Ch1 power unit faulty. 	
		 Bit 29: Ch2 power unit faulty. 	
		 Bit 30: Ch3 power unit faulty. 	
		 Bit 31: Ch4 power unit faulty. 	
50FE	Type code.	The hardware of the drive/SDCS-CON-H01 does not match	1
	7.	the information stored in the memory unit. This may occur	
		e.g., after a firmware update, memory unit replacement or	
		replacement of the SDCS-CON-H01.	
		To reset, cycle the auxiliary power of the drive.	
		Check:	
		- The settings of 95.14 Set: Power unit (if shown and	
		available), 95.25 Set: Type code, 95.27 Set: Drive DC	
		current scaling and 95.28 Set: Drive AC voltage scaling.	
		 The AUX code (format ZZ). 	
		ZZ indicates the AUX code category.	
		 06 = Power unit rating ID invalid. 	
		 07 = Reading power unit rating ID or power unit 	
		type failed on power unit connection.	
		 08 = Power unit not supported (illegal rating ID). 	
		- 09: = Power unit type mismatch. See 95.14 Set:	
		Power unit = Unsupported power unit type .	
		 10 = Type code out of range. For module sizes H1 	
		H5 the current and voltage range of the type	
		code setting is limited to max 1190 A _{DC} and max	
		600 V _{AC} .	
		 20 = Saving of 95.25 Set: Type code failed. 	
		 21 = Saving of 95.14 Set: Power unit failed. 	
5610	User defined.	User defined fault by application program.	1
562F			
5681	Power unit,	Communication errors between the control unit and a	1
	communication.	power unit.	_
	communication.	porter diffe.	

Code	Fault	Cause and what to do	Fault level
	See also warning	Check:	
	A113.	 The setting of 95.16. Control unit configuration. 	
		 The connections between the control unit and the 	
		power unit.	
		X X X X X X X X X X	
		 The auxiliary power of the SDCS-OPL-H01. The AUX code (format XXXYYYZZ). XXX specifies the transmitter FIFO error code. 	
		000: No transmitter FIFO error.001: Internal error [invalid call parameter].	
		002: Internal error [configuration not supported].003: Transmission buffer full.	
		YYY identifies the power unit. – 000: Broadcast.	
		- 000: Broadcast. - 001: Power unit connected to channel1 on SDCS-	
		DSL-H1x.	
		 002: Power unit connected to channel2 on SDCS- DSL-H1x. 	
		 003: Power unit connected to channel3 on SDCS-DSL-H1x. 	
		 004: Power unit connected to channel4 on SDCS- DSL-H1x. 	
		ZZ specifies the error source.	
		 01: Transmitter side [link error] from power unit to control unit. 	
		 02: Transmitter side [no communication] from power unit to control unit. 	
		O3: Receiver side [link error] from control unit to power unit.	
		 O4: Receiver side [no communication] from control unit to power unit. 	
		 O5: Transmitter FIFO error, see XXX. O6: SDCS-OPL-H01 not found. 	
5692	Power unit, power	Power unit, SDCS-POW-H01 failure.	1
	board failure.	Check the AUX code (format XXXYYYZZ).	
		YYY identifies the power unit channel. In case of a	
		hardparallel configuration.	
6000	Internal firmware.	Internal firmware error.	1
3000	internal minware.	To reset, cycle the auxiliary power of the drive. If the	_
		problem persists, contact your local ABB representative,	
		quoting the AUX code.	
		Check the AUX code (format YYYY).	

Code	Fault	Cause and what to do	Fault level
		YYYY indicates the problem. Actions see below.	
	0001	Default setting of parameters wrong.	
	0002	Parameter flash memory image too small for all	
		parameters.	
	0004	Illegal write attempt on a signal or write-protected	
		parameter, e.g., writing on 06.01 Main control word or	
		06.09 Used main control word.	
	0006	Wrong type code.	
	0007	An un-initialized interrupt has occurred.	
	0010	Wrong parameter value.	
	0101 9999	The read only parameter, which is being written to by]
		means of a pointer parameter, e.g., 62.51 Data set 10 data 1	
		selection, Adaptive Program, or application program, can	
		be identified by means of the last 4 digits.	
6306	FBA A mapping file.	Fieldbus adapter A mapping file read error.	5
		Contact your local ABB representative.	
6307	FBA B mapping file.	Fieldbus adapter B mapping file read error.	5
		Contact your local ABB representative.	
6481	Internal task	Internal fault.	1
	overload.	Cycle the power of the drive or use 96.27 Control board	
		boot. If the problem persists, contact your local ABB	
		representative stating the AUX code.	
6487	Internal stack	Internal fault.	1
	overflow.	Cycle the power of the drive or use 96.27 Control board	
		boot. If the problem persists, contact your local ABB	
		representative stating the AUX code.	
64A1	Internal file load.	File read error.	1
		Cycle the power of the drive or use 96.27 Control board	
		boot.	
		Check:	
		- The memory unit.	
		Re-load the firmware.	
		Exchange the memory unit. Figher as the SDCS CON LIGHT.	
		 Exchange the SDCS-CON-H01. If the problem persists, contact your local ABB 	
		representative.	
64A2	Internal record load.	Internal record load error.	1
UHAL	internari ecordioad.	Contact your local ABB representative.	1
64A3	Application loading.	Application file incompatible or corrupted.	1
04A3	Application loading.	Check the AUX code. Actions see below.	1
	9006	Not enough memory for the application.	-
			-
		The application contains the wrong library version.	-
	800A	The application contains an unknown target (system)	
	0000 0000	library function.	-
	SOOR XXXX	The application load failed.	
6445	1	For more details, check 05.22 Diagnostic.	
64A5	Licensing.	Running the control program is prevented either because a	1
		restrictive license exists, or because a required license is	
		missing.	
		Record the AUX codes of all active licensing faults and	
		contact your product vendor for further instructions.	

Code	Fault	Cause and what to do	Fault level
64A6	Adaptive program.	Error running the adaptive program. Check the AUX code (format XXXXYYYY). XXXX specifies the number of the function block. XXXX = 0000 is a generic error. YYYY indicates the problem. Actions see below.	1
	000A	Program corrupted or block non-existent. Restore the template program or download the program to the drive.	
	000C	Required block input missing. Check the inputs of the block.	
	000E	Program corrupted or block non-existent. Restore the template program or download the program to the drive.	
	0011	Program too large. Remove blocks until the error stops.	
	0012	Program is empty. Correct the program and download it to the drive.	
	001C	A nonexistent parameter or block is used in the program. Edit the program to correct the parameter reference, or to use an existing block.	
	001D	Parameter type invalid for selected input. Edit the program to correct the parameter reference.	
	001E	Output to parameter failed because the parameter was write-protected. Check: The parameter reference in the program. For other sources affecting the target parameter.	
	0023	Program file incompatible with current firmware version.	
		Adapt the program to current block library and firmware version.	
	002A	Too many blocks. Edit the program to reduce the number of blocks.	
	Other	Contact your local ABB representative, quoting the AUX code.	
64B0	Memory unit detached.	The memory unit was detached while the drive/control unit is powered. Switch off the power of the drive/control unit and reinstall the memory unit. In case the memory unit was not actually removed when the fault occurred, check that the memory unit is properly inserted into its connector and its mounting screw is tight. Then cycle the power of the drive or use 96.27 Control board boot. If the problem persists, contact your local ABB representative.	1
64B1	Internal firmware.	·	
64B2	User set fault.	Loading of user parameter set failed. Ensure that a valid user parameter set exists. Reload if uncertain. Check:	1

Code	Fault	Cause and what to do	Fault level
		 That the requested set does exists. See 96.14 Macro select. 	
		 That the set is compatible with the control program. If the drive was switched off during loading. 	
		- The memory unit.	
64E1	Kernel overload.	Operating system error. Cycle the power of the drive or use 96.27 Control board boot. If the problem persists, contact your local ABB representative.	1
6581	Parameter system.	Parameter load or save failed. Try forcing a save using 96.16 Parameter save manually.	3
65A1	FBA A parameter conflict.	Fieldbus adapter A (FBA A): The drive does not have a functionality requested by a PLC or a requested	5
	See also warning A6D1.	functionality has not been activated. The settings of parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings are not set according to the fieldbus adapter, or the device has not been selected. Check: The PLC programming. The settings of parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings. The configuration of the fieldbus adapter.	
65A2	FBA B parameter conflict. See also warning A6D2.	Fieldbus adapter B (FBA B): The drive does not have a functionality requested by a PLC or a requested functionality has not been activated. The settings of parameter groups 50 Fieldbus adapter (FBA) and 54 FBA B settings are not set according to the fieldbus adapter, or the device has not been selected. Check: The PLC programming. The settings of parameter groups 50 Fieldbus adapter (FBA) and 54 FBA B settings. The configuration of the fieldbus adapter.	5
65B1	Reference source parametrization. See also warning A6DA.	A reference source is simultaneously connected to multiple parameters with different units. Check: The reference source selection parameters. The AUX code (format XXYY00ZZ). XX and YY specify the two sets of parameters where the source is connected to. O1 = Speed reference chain. See 22.11 Speed reference 1 source, 22.12 Speed reference 2 source, 22.15 Speed additive 1 source, 22.17 Speed additive 2 source and 23.32 Direct speed reference. O2 = Current, EMF and flux references. See 27.22 Current reference source, 28.18 EMF reference source, 28.20 EMF voltage correction source and 28.29 Flux correction source. O3 = Torque reference chain. See 26.11 Torque reference 1 source, 26.12 Torque reference 2 source and 26.16 Torque additive 1 source.	

Code	Fault	Cause and what to do	Fault level
Code	T QUIL	- 04 = Other torque-related parameters. See 26.25 Torque additive 2 source, 30.21 Minimum torque 2 source, 30.22 Maximum torque 2 source, 44.09 M1 brake open torque source and 42.79 M2 brake open torque source and 42.79 M2 brake open torque source. - 05 = Process PID. See 40.08 PID feedback1 source, 40.09 PID feedback2 source, 40.16 PID setpoint1 source and 40.17 PID setpoint2 source. - 08 = Auxiliary sources. See 31.17 Residual current measurement source, 35.14 Temperature 1 AI source and 35.24 Temperature 2 AI source. - ZZ specifies the conflicting reference source. - 01 = 03.01 Panel references: - 01 = 03.01 Panel reference 1. - 06 = 03.06 FBA A reference 1. - 06 = 03.06 FBA A reference 2. - 07 = 03.07 FBA B reference 2. - 09 = 03.09 EFB reference 2. - 09 = 03.09 EFB reference 2. - 09 = 03.11 DDCS controller ref1. - 0C = 03.12 DDCS controller ref2. - 0D = 03.13 M/F or D2D ref1. - 0E = 03.14 M/F or D2D ref2. - 33 = Group 40 Process PID. - 3D = Group 22 Speed reference selection (motor potentiometer). - 65 = AII. - 66 = AI2. - 67 = AI3. - 6F = DIO as frequency input.	rault level
6681	EFB communication. Programmable, see 58.14 Communication loss action. See also warning A7CE.	Cyclical communication to the embedded fieldbus (EFB) is lost. Fault 6681 EFB communication is only activated after the first data set from the overriding control is received by the drive. Before the first data set is received, only warning A7CE EFB communication is active. The reason is to suppress unnecessary faults (the startup of the overriding control is usually slower than the one of the drive). Check: The status of the fieldbus master (online, offline, error etc.). The settings of group 58 FBA Embedded fieldbus. The cable connections to connector XD2D on the control board. The fieldbus termination.	5
6682	EFB configuration file.	Embedded fieldbus (EFB) configuration file could not be read. Reload firmware or replace the unit.	5
6683	EFB invalid parameterization.	Embedded fieldbus (EFB) parameter settings are inconsistent or not compatible with the selected protocol. Check the settings of group 58 Embedded fieldbus and verify they are consistent with the configured protocol.	5

Code	Fault	Cause and what to do	Fault level
6684	EFB load fault.	Embedded fieldbus (EFB) protocol firmware could not be loaded. Version mismatch between embedded fieldbus (EFB) protocol firmware and drive firmware.	5
6881	Text data overflow.	Internal fault.	5
6882	Text 32-bit table overflow.	Reset the fault. Contact your local ABB representative if the fault persists.	5
6883	Text 64-bit table overflow.		5
6885	Text file overflow.		5
7080	Encoder module communication.	Communication between drive and an encoder module is lost. See also A798 Encoder interface communication.	5
7081	Control panel/PC tool link communication. Programmable, see 49.05 Communication loss action. See also warning A7EE.	This fault occurs only when the drive is controlled from the control panel/PC tool (local mode). The control panel/PC tool connected via USB, or the PC tool connected via FENA-11/21 has stopped communicating. Check: The setting of 49.04 Communication loss time. If needed extend the time out to 2000 ms. Do not forget to verify the setting by means of 49.06 Refresh settings Refresh. The setting of 49.05 Communication loss action. If changed, do not forget to verify the setting by means of 49.06 Refresh settings Refresh. The control panel/PC tool connection/cable. The control panel connector. The mounting platform if being used (e.g., DPMP-01). Disconnect and reconnect the control panel/PC tool.	5
7082	00 0002	The I/O extension module types and location specified by parameters do not match the detected configuration or do not communicate with the drive. Check: The type and location settings of the modules. See parameters 14.01, 14.02, 15.01, 15.02, 16.01 and 16.02. That the module is properly seated in its slot. That the module and the slot connector is not damaged. Try installing the module into another slot. The AUX code (format XXYYYYYY). XX specifies the number of the I/O extension module. O1: Group 14 I/O extension module 1. O2: Group 15 I/O extension module 2. O3: Group 16 I/O extension module 3. YYYYYYY indicates the problem. Actions see below. Communication with module failed. Module not found. Configuration of module failed.	
	00 0003	-	
	00 0004		L

Code	Fault	Cause and what to do	Fault level
7083	Control panel reference conflict.	Use of saved control panel reference in multiple control modes attempted.	3
		The control panel reference can only be saved for one	
		reference type at a time. Consider the possibility of using a	
		copied reference instead of saved reference (see the	
		reference selection parameter).	
7084	Control panel/PC	The current version of the control panel/PC tool does not	4
	tool version conflict.	support a function. E.g., older control panel versions cannot be used as a source of external references.	
		Update the control panel/PC tool. Contact your local ABB	
		representative if necessary.	
7085	Incompatible option	Option module not supported. E.g., type Fxxx-xx-M	4
1065	module.	fieldbus adapters are not supported.	4
	module.	Replace the module with a supported type. Check the AUX	
		code. It specifies the interface to which the unsupported	
		module is connected:	
		- 1: Fieldbus interface A.	
		 2: Fieldbus interface B. 	
7121	Motor stall.	Selected motor, the motor is operating in the stall region	4
	Programmable, see	because of excessive load or insufficient motor power.	
	31.24 Stall function.	The motor torque exceeded 31.25 Stall torque level for a	
	See also warning	time longer than 31.28 Stall time while the speed feedback	
	A780.	was below 31.26 Stall speed level.	
		Check:	
		 The motor load/mechanics (e.g., brake). 	
		 The drive ratings. 	
		- For correct field current.	
		- The settings of 31.24 Stall function, 31.25 Stall torque	
		level, 31.26 Stall speed level and 31.28 Stall time.	
		 The settings for current and torque limits in group 30 Control limits. 	
71A2	Mechanical brake	Selected motor, the acknowledge signal at the DI for the	3
ITAL	closing failed.	mechanical brake closed (applied) stage is missing.	3
	Programmable, see	Check:	
	44.17 M1 brake fault	The mechanical brake itself.	
	function.	 The mechanical brake cable connections. 	
	See also warning	- The mechanical brake settings in group 44 Mechanical	
	A7A1.	brake control.	
		 That the acknowledgement signal, if used, matches 	
		actual status of brake.	
		 The used digital inputs and outputs (groups 10 and 11). 	
71A3	Mechanical brake	Selected motor, the acknowledge signal at the DI for the	3
	opening failed.	mechanical brake opened (lifted) stage is missing.	
	Programmable, see	Check:	
	44.17 M1 brake fault	The mechanical brake itself. The mechanical brake as ble as a series.	
	function.	The mechanical brake cable connections. The mechanical brake cable connections.	
	See also warning	The mechanical brake settings in group 44 Mechanical brake sentral	
	A7A2.	brake control.	
		 That the acknowledgement signal, if used, matches actual status of brake. 	
71A5	Mechanical brake	The used digital inputs and outputs (groups 10 and 11). Salasted mater, open (lift) conditions of the machanical.	3
ITAD	opening not allowed.	Selected motor, open (lift) conditions of the mechanical brake are not fulfilled.	٥
	Topering not allowed.	DI ANE ALE HUL TUITHIEU.	<u> </u>

The brake has been prevented from opening (lifting) by 44.17 M1 brake fault function. See also warning A7A5. A7A5. The mechanical brake closed, 44.26 M1 Torque proving reference, during torque proving. Check: The mechanical brake settings in group 44 Mechanical brake control. Especially 44.11 M1 keep brake closed and 44.12 M1 Brake close request. That the acknowledgement signal, if used, matches the actual status of the brake. The used digital inputs and outputs (groups 10 and 11). Selected motor, open (lift) conditions of the mechanical brake are not fulfilled. The brake has been prevented from opening (lifting) by an FSO-21 safety functions module. Check the safety circuits connected to the FSO-21 safety functions module. Programmable, see 20.39 Motor fan acknowledges ource. The fan operation and connection. Replace the motor/external fan if faulty. The fan operation and connection. Replace the motor/external fan if faulty. The fan supply voltage. The fan supply voltage. Selected motor, no motor speed feedback is received. The fan supply voltage. The fan supply voltage. A781. Selected motor, no motor speed feedback tis received. Check the AUX code (format XXYYZZZZ). XX specifies the location of the speed feedback device. Either an encoder interface module 0, see parameters 91.13 and 91.14. O3: Control board, see group 94 OnBoard speed feedback configuration. Y specifies the speed feedback device. O1: Encoder 1, see group 92 Encoder 1 configuration. O2: Encoder 2, see group 93 Encoder 2 configuration. O3: OnBoard encoder, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. ZZZI indicates the problem. Actions see below.	ult level
function. See also warning A7A5. The mechanical brake settings in group 44 Mechanical brake control. Especially 44.11 M1 keep brake closed and 44.12 M1 Brake close request. The mechanical brake settings in group 44 Mechanical brake control. Especially 44.11 M1 keep brake closed and 44.12 M1 Brake close request. That the acknowledgement signal, if used, matches the actual status of the brake. The used digital inputs and outputs (groups 10 and 11). Selected motor, open (lift) conditions of the mechanical brake are not fulfilled. The brake has been prevented from opening (lifting) by an FSO-21 safety functions module. Check the safety circuits connected to the FSO-21 safety functions module. Motor fan acknowledge. Programmable, see 20.39 Motor fan acknowledge source. The fan operation and connection. Replace the motor/external fan if faulty. The fan contactor. The fan operation and connection. Replace the motor/external fan if faulty. The fan contactor. The fan supply voltage. Selected motor, no motor speed feedback is received. Check the AUX code (format XXYYZZZZ). XX specifies the location of the speed feedback device. Either an encoder interface module or the control board. O1: Encoder interface module 2, see parameters 91.11 and 91.12. O2: Encoder interface module 2, see parameters 91.13 and 91.14. O3: Control board, see group 94 OnBoard speed feedback configuration. O2: Encoder 2, see group 93 Encoder 1 configuration. O3: OnBoard encoder, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration.	
Forgrammable, see 20.39 Motor fan acknowledge. Programmable, see 20.39 Motor fan acknowledge source. See also warning A781. Motor speed feedback. Programmable, see 21.35 Motor feedsdack aftut. See also warning A780. Programmable, see 31.35 Motor feedback fault. See also warning A7B0. Fig. 1.35 Motor feedback fault. See also warning A7B0. From Seed feedback configuration. O3: Control board, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration.	
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 O3: OnBoard encoder, see group 94 OnBoard speed feedback configuration. O4: Tacho, see group 94 OnBoard speed feedback configuration. 	
feedback configuration. – 04: Tacho, see group 94 OnBoard speed feedback configuration.	
 O4: Tacho, see group 94 OnBoard speed feedback configuration. 	
configuration.	
0002 Speed feedback device not configured.	
Check the settings of the speed feedback device:	
Encoder 1, see group 92 Encoder 1 configuration.	
Encoder 2, see group 93 Encoder 2 configuration.	
The OnBoard encoder, see group 94 OnBoard speed	
feedback configuration.	
The tacho, see group 94 OnBoard speed feedback	
configuration.	
Use 91.10 Encoder parameter refresh to validate any	
changes in the settings for an encoder.	
0003 Speed feedback device stopped working.	

Code	Fault	Cause and what to do	Fault level
		Check the status of the speed feedback device.	
	0004	Speed feedback device drift detected.	
		Check for slippage between speed feedback device and	
		motor.	
	0007	The comparison of measured speed feedback from pulse	
		encoder or analog tacho to measured EMF has failed.	
		Check:	
		 The setting of 90.41 M1 feedback selection, 31.14 Fault stop mode fault level 3, 31.35 Motor feedback fault, 	
		31.36 Speed feedback monitor level and 31.37 EMF	
		feedback monitor level.	
		 At the encoder: The encoder itself, alignment, cabling, 	
		coupling, power supply (feedback might be too low),	
		mechanical disturbances, jumper J4 on the	
		SDCS-CON-H01.	
		- If an encoder is used as speed feedback device, run the	
		drive in EMF speed feedback, 90.41 M1 feedback	
		selection = EMF, look at 94.16 OnBoard encoder position and use a scope to measure the encoder	
		pulses.	
		 At the tacho: The tacho itself, tacho polarity and 	
		voltage, alignment, cabling, coupling, mechanical	
		disturbances.	
		 EMF: The armature cable connection from the drive to 	
		the motor and their polarity.	
7310	Overspeed.	Selected motor, the motor is turning faster than highest	3
		allowed speed due to incorrectly set minimum/maximum	
		speed, insufficient braking torque or changes in load when in torque control.	
		Check:	
		The AUX code (format 0000000X).	
		 0: Speed was > 31.28 M1 overspeed trip level 	
		positive or 42.23 M2 overspeed trip level positive.	
		No AUX code is shown.	
		 1: Speed was < 31.29 M1 overspeed trip level 	
		negative or 42.24 M2 overspeed trip level	
		negative. AUX code 0000001 is shown.	
		26.04.2021 16:46:48.341 😮 7310 Overspeed 00000001	
		26.04.2021 16:46:41.826	
		 Record 23.03 Speed reference 7 and 90.01 Motor speed 	
		for control.	
		– The settings of 30.11 M1 minimum speed, 30.12 M1	
		maximum speed and 31.30 M1 overspeed trip margin.	
		The settings of the speed controller in group 25 Speed	
		control.	
		The setting of 46.02 M1 speed scaling actual.	
		The torque control settings.For correct speed feedback when using an encoder or a	
		tacho. Thus, compare the value of 90.01 Motor speed	
		for control vs. the measured motor speed (handheld	
		tacho).	

Code	Fault	Cause and what to do		Fault level	
		 For proper connection of the sp 	eed feedback		
		measurement.			
		 For correct field current. 			
		 If the motor was accelerated by 			
		 If the DC-voltage measurement 	· · · · · · · · · · · · · · · · · · ·		
		swapped when EMF speed feed			
		The DC voltage measurement is	properly connected to		
		the motor.	a DC fuesa DC		
		 If the armature circuit is open (e breaker,) when EMF speed fe 	• .		
7380	Encoder internal.	Internal encoder fault.		3	
		See the documentation of the enco			
		Contact your local ABB representat	ive.		
7381	Speed feedback	Speed feedback device error.		3	
	device.	Check the AUX code (format XXYYZ	•		
	Programmable, see	XX specifies the location of the spe			
	31.35 Motor	Either an encoder interface module			
	feedback fault.	- 01: Encoder interface module 1,	see parameters 91.11		
	See also warning	and 91.12. - 02: Encoder interface module 2, see parameters 91.13			
	A7E1.	and 91.14.	see parameters 31.13		
		- 03: Control board, see group 94			
		feedback configuration.			
		YY specifies the speed feedback de			
		O1: Encoder 1, see group 92 Encoder 1 configuration.			
	– 02: Encoder 2, see group 93 Encoder 2 configuration.				
		 03: OnBoard encoder, see group 94 OnBoard speed 			
	feedback configuration.				
		- 04: Tacho, see group 94 OnBoard speed feedback			
		configuration.			
		O5: EMF, see group 94 OnBoard speed feedback configuration.			
	configuration. ZZZZ indicates the problem. Actions see below.				
	0001	·		_	
	0001	Cable fault. If the encoder was working proviously, shock the encoder			
		If the encoder was working previously, check the encoder, encoder cable and encoder interface module for damage.			
		Check:			
		 The conductor order at both en 	ds of the encoder cable.		
		 The groundings of the encoder 			
		 92.21 Encoder cable fault mode. 			
		– 94.29 OnBoard encoder cable fa	ult mode.		
	0002	No encoder signal.			
		Check the condition of the encoder	•		
		Overspeed.	Contact your local ABB		
		Overfrequency.	representative.		
	0005	Resolver ID run failed.			
	0006	Resolver overcurrent fault.			
	0008	Absolute encoder communication			
		error.			
	0009	Absolute encoder initialization			
		error.			

Code	Fault	Cause and what to do		Fault level
	000A	Absolute SSI encoder		
		configuration error.		
	000B	Encoder reported an internal error.	See the	
	000C	Encoder reported a battery error.	documentation of the	
	000D	Encoder reported overspeed or	encoder.	
		decreased resolution due to		
		overspeed.		
	000E	Encoder reported a position		
		counter error.		
	000F	Encoder reported an internal error.		
		Selected motor, wrong direction of	speed feedback.	=
		The speed feedback direction of tac		
		checked against the speed feedbac		
		See 90.41 M1 feedback selection.		
		Check:		
		 The real direction of motor rota 	tion.	
		– The settings of 31.36 Speed feed	dback monitor level and	
		31.37 EMF feedback monitor lev	el.	
		 The connection of the tacho cal 	ole. To correct, swap the	
		two wires.		
		 The connection of the encoder of 	able. To correct, swap	
		e.g., channels A and A		
		 The connection of armature and 	l field cables.	
	0013	Selected motor, tacho range.		
		If Tacho range comes up for longer	than 10 s, there is an	
		overflow at the tacho input.		
		Check:		
		That the tacho voltage at overs		
		input. It should not be higher th		
73A0	Speed feedback	The speed feedback configuration	<i>i</i> ia encoder interface	3
	configuration.	modules has changed.	777\	
	Programmable, see	Check the AUX code (format XXYYZ		
	31.35 Motor	XX specifies the encoder interface r		
	feedback fault.	01: For module 1 see parameters02: For module 2 see parameter		
	See also warning A797.	YY specifies the encoder.	5 91.13 and 91.14.	
	AISI.	 O1: Group 92 Encoder 1 configur 	ation	
		O2: Group 93 Encoder 2 configur		
		ZZZZ indicates the problem. Action		
	0001	Adapter not found in specified slot.		1
		Check module location. See parame		
	0002	Detected type of interface module of		1
	0002	parameter setting.	does not materi	
		Check the module type parameters	91.11 and 91.13 against	
		status parameters 91.02 and 91.03.	oo agaot	
	0003	Logic version too old.		1
		Contact your local ABB representat	ive.	
	0004	Firmware version too old.		1
	0004	Contact your local ABB representat	ive.	
	0006	Encoder type incompatible with int		1
		Check module type parameters 91.1		

Code	Fault	Cause and what to do	Fault level
	0007	Adapter not configured.	
		Check module location parameters 91.12 and 91.14.	
	8000	Speed feedback configuration has changed.	
		Use 91.10 Encoder parameter refresh to validate any	
		changes in the encoder settings.	
	0009	No encoders configured in the encoder module.	
		Configure the encoder in group 92 Encoder 1 configuration	
		or 93 Encoder 2 configuration.	
	000A	Non-existing emulation input.	
		Check input selection parameters 91.31 and 91.41.	
	000B	Echo not supported by the selected input. E.g., resolver or	
		absolute encoder.	
		Check:	
		The input selection parameters 91.31 and 91.41.	
		 The interface module type against the encoder type. 	
	000C	Emulation in continuous mode not supported.	
		Check:	
		The input selection parameters 91.31 and 91.41.	
		The serial link mode parameters 92.30 and 93.30.	
73A1	Load speed	Selected motor, no load speed feedback is received.	3
	feedback.	Check the AUX code (format XXYYZZZZ).	
	Programmable, see	XX specifies the location of the speed feedback device.	
	31.38 Load feedback	Either an encoder interface module or the control board.	
	fault.	- 01: Encoder interface module 1, see parameters 91.11	
	See also warning	and 91.12.	
	A7B1.	– 02: Encoder interface module 2, see parameters 91.13	
		and 91.14.	
		O3: Control board, see group 94 OnBoard speed	
		feedback configuration.	
		YY specifies the speed feedback device.	
		 01: Encoder 1, see group 92 Encoder 1 configuration. 02: Encoder 2, see group 93 Encoder 2 configuration. 	
		O3: OnBoard encoder, see group 94 OnBoard speed	
		feedback configuration.	
		O4: Tacho, see group 94 OnBoard speed feedback	
		configuration.	
		ZZZZ indicates the problem. Actions see below.	
	0004	Speed feedback device not configured.	
	0004	Check the settings of the speed feedback device:	
		Encoder 1, see group 92 Encoder 1 configuration.	
		Encoder 1, see group 32 Encoder 1 configuration. Encoder 2, see group 93 Encoder 2 configuration.	
		The OnBoard encoder, see group 94 OnBoard speed The OnBoard encoder, see group 94 OnBoard speed	
		feedback configuration.	
		The tacho, see group 94 OnBoard speed feedback	
		configuration.	
		Use 91.10 Encoder parameter refresh to validate any	
		changes in the settings for an encoder.	
	0005	Speed feedback device stopped working.	
	0003	Check the status of the speed feedback device.	
	0007	The comparison of the measured speed feedback from	
		i ilic companison or ancimicasanca speca lecapack HOIII	i
		pulse encoder or analog tacho to measured EMF has failed.	

Code	Fault	Cause and what to do	Fault level
		 The setting of 90.41 M1 feedback selection, 31.14 Fault stop mode fault level 3, 31.35 Motor feedback fault, 31.36 Speed feedback monitor level and 31.37 EMF feedback monitor level. At the encoder: The encoder itself, alignment, cabling, coupling, power supply (feedback might be too low), mechanical disturbances, jumper J4 on the SDCS-CON-H01. At the tacho: The tacho itself, tacho polarity and voltage, alignment, cabling, coupling, mechanical disturbances. EMF: The armature cable connection from the drive to the motor and the polarity. 	
73B0	Emergency ramp stop.	 Emergency stop did not finish within the expected time. Check: The settings of 31.31 Emergency ramp supervision and 31.32 Emergency ramp supervision delay. The settings of parameters 23.11 23.19 for Off3 stop mode 1 (21.03 Emergency stop mode = Ramp stop). The setting of 23.23 Emergency stop time for Off3 stop mode 2 (21.03 Emergency stop mode = Emergency ramp stop). The current and torque limits in group 30 Control limits. 	3
73B1	Normal ramp stop.	Normal (non-emergency) ramp stop did not finish within the expected time. Check: The settings of 31.33 Ramp stop supervision and 31.34 Ramp stop supervision delay. The settings of parameters 23.11 23.19.	3
7510	FBA A communication. Programmable, see 50.02 FBA A comm loss func. See also warning A7C1.	Fieldbus adapter A (FBA A): Cyclical communication between PLC and fieldbus adapter module A or between drive and fieldbus adapter module A is lost. Fault 7510 FBA A communication is only activated after the first data set from the overriding control is received by the drive. Before the first data set is received, only warning A7C1 FBA A communication is active. The reason is to suppress unnecessary faults (the startup of the overriding control is usually slower than the one of the drive). Check: The status of the fieldbus communication. See user documentation of the fieldbus interface. The settings of groups 50 Fieldbus adapter (FBA), 51 FBA A settings, 52 FBA A data in and 53 FBA A data out. The cable connections. The fieldbus termination. The fieldbus adapter. That the master can communicate.	5
7520	FBA B communication.		5

Code	Fault	Cause and what to do	Fault level
	Programmable, see 50.32 FBA B comm loss func. See also warning A7C2.	Fieldbus adapter B (FBA B): Cyclical communication between PLC and fieldbus adapter module B or between drive and fieldbus adapter module B is lost. Fault 7520 FBA B communication is only activated after the first data set from the overriding control is received by the drive. Before the first data set is received, only warning A7C2 FBA B communication is active. The reason is to suppress unnecessary faults (the startup of the overriding control is usually slower than the one of the drive). Check: The status of the fieldbus communication. See user documentation of the fieldbus interface. The settings of group 50 Fieldbus adapter (FBA), 54 FBA B settings, 55 FBA B data in and 56 FBA B data out. The cable connections. The fieldbus adapter.	
7581	DDCS controller communication. Programmable, see 60.59 DDCS controller comm loss function. See also warning A7CA.	 That the master can communicate. Cyclical communication between DDCS controller and drive is lost or there is no communication at all. The drive is waiting for the very first data set. Check: The status/settings of the DDCS controller. See user documentation of the DDCS controller. The adapters between DDCS controller and drive. The setting of 20.01 Command location. The settings of group 60 DDCS communication, 61 D2D and DDCS transmit data and 62 D2D and DDCS receive data. The fiber optic cable connections. 	5
7582	Master-follower link communication. Programmable, see 60.09 M/F comm loss function. See also warning A7CB.	Cyclical communication between master and a follower (DDCS/D2D) is lost or there is no communication at all. The drive is waiting for the very first data set. Check: The AUX code. It indicates which node address on the master-follower link is affected. See 60.02 M/F node address in each drive. The setting of 60.14 M/F follower selection. The settings of group 60 DDCS communication. The cable connections.	5
7A9A	FSx undefined fault.	See FSPS-21 PROFIsafe safety functions module	-
7A9B	FSx internal fault.	(AXD50000158638).	
7A9C	FSx STO diagnostics fault.		
7A9D	FSx temperature fault.		
7A9F	FSx communication fault.		
7AA0	FSx safety ramp fault.		
8001	ULC underload.		1 (default)

See group 37 User load curve. Check for any operating conditions decreasing the monitored signal. E.g., the loss of load if the torque or current is being monitored. Check the definition of the load curve. Check for any operating conditions decreasing the monitored signal. E.g., the load of the user overload curve. See 37.03 ULC overload actions. See also warning ABBE. For any operating conditions increasing the monitored signal. E.g., the load of the motor if the torque or current is being monitored. The definition of the load curve. Programmable, see 37.03 ULC overload actions. See also warning ABBO. Programmable, see 12.03 Al supervision function. See also warning ABAO. Al supervision function. See also warning ABAO. An analog signal is outside the limits specified for the analog input. Check: The AUX code (format XYY). X specifies the location of the input. - 0: All under minimum. - 0: All under minimum. - 0: All under minimum. - 0: All under minimum. - 0: All under minimum. - 0: All over maximum. - 0: All under minimum. - 0: All over maximum. - 0: All under minimum. - 0: All under minimum. - 0: All over maximum. - 0: All under minimum. - 0: All under m	Code	Fault	Cause and what to do	Fault level
Selected signal has exceeded the user overload curve. See group 37 User load curve. See also warning A8BE. See also warning A8BE. See also warning A8BO. Al supervision		37.04 ULC underload actions. See also warning	See group 37 User load curve. Check for any operating conditions decreasing the monitored signal. E.g., the loss of load if the torque or current is being monitored.	1 6 user selectable
Programmable, see 37.03 ULC overload actions. See also warning A8BE. Pro any operating conditions increasing the monitored signal. E.g., the load of the motor if the torque or current is being monitored. The definition of the load curve. An analog signal is outside the limits specified for the analog input. Check: The AUX code (format XYY). X specifies the location of the input. O: Control board. I: // O extension module 1. 2: I/ O extension module 3. 4: YY specifies the input and limit. O1: Al1 under minimum. O2: Al1 over maximum. O3: Al2 under minimum. O6: Al3 over maximum. The wiring connected to the input. Polarity of the connection. The minimum and maximum limits of the input in groups 12 Standard Al, 14 I/O extension module 1. Fault generated by signal supervision 1. See group 32 Signal supervision 1 action. See also warning 80B0 Signal supervision 2. (Editable message text) Programmable, see 32.06 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. (Editable message text) Programmable, see 32.16 Supervision				
Analog input. Check: The AUX code (format XYY). X specifies the location of the input. O: Control board. I: I/O extension module 1. I: I/O extension module 2. I: I/O extension module 3. I: I/O extension module 3. I: I/O extension module 3. I: I/O extension module 3. III and I under minimum. O2: Al1 over maximum. O3: Al2 under minimum. O6: Al3 over maximum. The signal level at the analog input. The wiring connected to the input. Polarity of the connection. The minimum and maximum limits of the input in groups 12 Standard AI, 14 I/O extension module 3. Fault generated by signal supervision 1. See group 32 Signal supervision 1. (Editable message text) Programmable, see 32.06 Supervision 1. See also warning ABBO. Signal supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2. Signal supervision 2. Supervision. Fault generated by signal supervision 2. See group 32 Supervision. Check the source of the warning. See 32.17 Supervision 2 selects signal.	8002	Programmable, see 37.03 ULC overload actions. See also warning	group 37 User load curve. Check: - For any operating conditions increasing the monitored signal. E.g., the load of the motor if the torque or current is being monitored.	1 (default) 1 6 user selectable
Signal supervision 1. (Editable message text) Programmable, see 32.06 Supervision 1 action. See also warning A8B0. Signal supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2 action. See also warning Associated by signal supervision 2. See group 32 Supervision. Fault generated by signal supervision 2. See group 32 Supervision. Check the source of the warning. See 32.17 Supervision 2 selects Supervision. Check the source of the warning. See 32.17 Supervision 2 selects Supervision. See also warning	80A0	Programmable, see 12.03 Al supervision function. See also warning	analog input. Check: The AUX code (format XYY). X specifies the location of the input. 0: Control board. 1: I/O extension module 1. 2: I/O extension module 2 3: I/O extension module 3. 4: YY specifies the input and limit. 01: Al1 under minimum. 02: Al1 over maximum. 03: Al2 under minimum. 04: Al2 over maximum. 05: Al3 under minimum. The signal level at the analog input. The wiring connected to the input. Polarity of the connection. The minimum and maximum limits of the input in groups 12 Standard AI, 14 I/O extension module 1, 15	4
(Editable message text) Programmable, see 32.16 Supervision 2 action. See also warning Supervision. Check the source of the warning. See 32.17 Supervision 2 selects 1 6 to selects 1 6 to selects Supervision. Sup	80B0	(Editable message text) Programmable, see 32.06 Supervision 1 action. See also warning	Fault generated by signal supervision 1. See group 32 Supervision. Check the source of the warning. See 32.07 Supervision 1	1 (default) 1 6 user selectable
80B2 Signal supervision 3. 1 (defa		Signal supervision 2. (Editable message text) Programmable, see 32.16 Supervision 2 action. See also warning A8B1.	Supervision. Check the source of the warning. See 32.17 Supervision 2	1 (default) 1 6 user selectable

Code	Fault	Cause and what to do	Fault level
	(Editable message text) Programmable, see 32.26 Supervision 3 action. See also warning A8B2.	Fault generated by signal supervision 3. See group 32 Supervision. Check the source of the warning. See 32.27 Supervision 3 signal.	1 6 user selectable
9081	External fault 1. (Editable message text) Programmable, see 31.01 External event 1 source and 31.02 External event 1 type. See also warning A981.	– External device 1.	1 (default) 1 5 user selectable
9082	External fault 2. (Editable message text) Programmable, see 31.03 External event 2 source and 31.04 External event 2 type. See also warning A982.	There is no problem with the drive itself! Fault generated by external device 2. See group 31 Fault functions and fault levels. Fault level selection by parameters 31.70 31.79. Check: External device 2. 31.03 External event 2 source.	1 (default) 1 5 user selectable
9083	External fault 3. (Editable message text) Programmable, see 31.05 External event 3 source and 31.06 External event 3 type. See also warning A983.	There is no problem with the drive itself! Fault generated by external device 3. See group 31 Fault functions and fault levels. Fault level selection by parameters 31.70 31.79. Check: External device 3. 31.05 External event 3 source.	1 (default) 1 5 user selectable
9084	External fault 4. (Editable message text) Programmable, see 31.07 External event 4 source and 31.08 External event 4 type. See also warning A984.	There is no problem with the drive itself! Fault generated by external device 4. See group 31 Fault functions and fault levels. Fault level selection by parameters 31.70 31.79. Check: External device 4. 31.07 External event 4 source.	1 (default) 1 5 user selectable
9085	External fault 5. (Editable message text) Programmable, see 31.09 External event 5 source and 31.10	There is no problem with the drive itself! Fault generated by external device 5. See group 31 Fault functions and fault levels. Fault level selection by parameters 31.70 31.79. Check: External device 5. 31.09 External event 5 source.	1 (default) 1 5 user selectable

Code	Fault	Cause and what to do	Fault level
	External event 5 type. See also warning A985.		
F501	Auxiliary undervoltage.	Too low auxiliary voltage, e.g., short dip, while Ready run = 1. To reset, cycle the auxiliary power of the drive. Check: The auxiliary voltage itself. The internal auxiliary voltages on the SDCS-CON-H01. If the problem persists, change SDCS-CON-H01 and/or SDCS-PIN-H01 or SDCS-POW-H01, respectively. Auxiliary supply voltage 230/115 V _{AC} Yac	1
F503	Armature overvoltage.	 Too high voltage on the armature/DC side. Check: If the setting of 31.50 Overvoltage level is suitable for the system. The settings of the field current controller, EMF controller, flux linearization in group 28 EMF and field current control. E.g., field weakening is not activated. For too high field current (e.g., problems with field weakening). If the motor was accelerated by the load. For overspeed. For proper speed scaling. See 46.02 M1 speed scaling actual. For proper armature voltage feedback. The selection of the voltage coding resistors on the SDCS-PIN-H51. 	1
F504	Reversal volt function. Programmable, see 31.60 Reversal volt function. See 06.25.b03 Current controller status word 2 and warning A104.	Reversal volt function active. The armature voltage is too high compared to the mains voltage, before braking (switching from motoring to generating). Check: If the setting of 31.61 Reversal volt delay is suitable for the system. For too low mains voltage. See 99.01 Mains voltage. Too high motor voltage. Lower 99.12 M1 nominal voltage and 99.14 M1 nominal (base) speed accordingly. If the motor is accelerating during reversal e.g., hanging load. The settings of the field current controller, EMF controller, flux linearization in group 28 EMF and field current control. E.g., field weakening is not activated. For too high field current (e.g., problems with field weakening). For overspeed. For proper speed scaling. See 46.02 M1 speed scaling actual. For proper armature voltage feedback.	1

Code	Fault	Cause and what to do	Fault level
F513	Mains overvoltage.	Too high voltage on the mains/AC side. The actual mains voltage is > 1.3 * 99.10 Nominal mains voltage for longer than 10 s while Ready run = 1. Check:	1
		 If the mains voltage is within the set tolerance. If the mains voltage scaling is correct. See 99.10 Nominal mains voltage. The selection of the voltage coding resistors on the 	
		SDCS-PIN-H51.	
F514	Mains synchronization lost.		3
		 That 99.01 Mains voltage has the proper value after an On command has been given. The mains frequency (50 Hz ±5 Hz; 60 Hz ±5 Hz) and stability (df/dt = 17 %/s) see 95.39 PLL input deviation and 95.40 PLL output, internal mains frequency. The condition of the mains (voltage, cabling, busbars, fuses, switchgear). That all 3 phases are present directly at the drive. H1 H5: measure the fuses F100 F102 on the SDCS-PIN-H01. H6 H8: check and measure the connections XU1/XU2, XV1/XV2 and XW1/XW2 on the SDCS-PIN-H51. For mains supply imbalance. For loose mains cable/busbar connections. That the mains contactor closes and opens. After the mains breaker is opened, the voltage should be zero before the mains breaker is closed again. The mains contactor contacts for proper condition. For a ground fault. The AUX code: 1: No synchronization signal. 2: Phase sequence lost. 3: Deviation level of PLL exceeded. See 95.44 PLL deviation level. 	
F515	M1 field exciter	Motor 1 field exciter overcurrent.	1
	overcurrent.	Check: The AUX code: 0001: Overcurrent. 0002: Overflow A/D converter measurement range. Use 28.61 Set: M1 field exciter current scaling to increase the A/D converter measurement range. E.g., set it to the rated field converter current. That the setting in 99.07 M1 used field exciter type matches the used field circuit output (terminal 35 A or terminal 5 A output used).	

Code	Fault	Cause and what to do	Fault level
F516	M1 field exciter communication.	 Record 28.14 M1 field current reference and 28.15 M1 field current. In case this fault happens during field exciter autotuning, deactivate the supervision by setting 31.59 M1 field overcurrent level = 135 %. The setting of 31.59 M1 field overcurrent level. The settings of the field current controller in group 28 EMF and field current control. The connections of the field exciter. The insulation of cables and field winding. For fault messages at the field exciter itself (flashing LEDs). See 04.26 M1 field exciter fault word and 04.36 M1 field exciter warning word. Motor 1 field exciter loss of communication. Check: The settings of 99.07 M1 used field exciter type and 70.12 Field exciter timeout. The auxiliary voltage for integrated and external field exciter. The DCSLink cable connections. The DCSLink termination. Set dipswitch S1100:1 = ON (DCF803-0016, DCF803-0035 and FEX-425-Int). The DCSLink node ID settings. See 70.05 DCSLink node ID and 70.13 M1 field exciter node ID or switches S800 and S801 on DCF803-0016, DCF803-0035 and FEX-425-Int, respectively. For fault messages at the field exciter itself (flashing LEDs), 04.26 M1 field exciter fault word and 04.36 M1 field exciter warning word. The AUX code:	1
FF17	A	4: Commination timeout in a field exciter running as multi-FEX.	2
F517	Armature current ripple. Programmable, see 31.46 Current ripple function. See also warning A117.	 One or several thyristors may carry no current. Check: The values of 01.50 Current ripple and 01.51 Current ripple filtered1. The setting of 31.46 Current ripple function and 31.47 Current ripple level. For too high gain of current controller. See 27.29 M1 current proportional gain. The positive/negative current feedback with an oscilloscope (6 pulses within one cycle visible?). The thyristor gate-cathode resistance. The thyristor gate connection. The current transformers (T51, T52). The condition of the mains (voltage, cabling, fuses, switchgear). 	3

Code	Fault	Cause and what to do	Fault level
		 The AUX code (format XX). Specifies the thyristors and current transformers (T51, 	
		T52) which may carry no current.	
		- 11 16: Thyristors 11 16 (bridge 1, forward	
		bridge).	
		– 21 26: Thyristors 21 26 (bridge 2, reverse	
		bridge).	
		 31 36: Current transformer (T51, T52). 	
		 41 46: Current transformer (T51, T52). 	
F518	M2 field exciter	Motor 2 field exciter overcurrent.	1
	overcurrent.	Check:	
		- The AUX code:	
		- 0001: Overcurrent.	
		- 0002: Overflow A/D converter measurement	
		range. Use 42.66 Set: M2 field exciter current scaling to increase the A/D converter	
		measurement range. E.g., set it to the rated field	
		converter current.	
		That the setting in 42.49 M2 used field exciter type	
		matches the used field circuit output (terminal 35 A or	
		terminal 5 A output used).	
		35A 1	
		Field $ \mathcal{D} \mathcal{D} \mathcal{D} \mathcal{D} \mathcal{D} $ X100	
		Record 42.45 M2 field current reference and 42.46 M2	
		field current.	
		 In case this fault happens during field exciter 	
		autotuning, deactivate the supervision by setting 42.63	
		M2 field overcurrent level = 135 %.	
		 The setting of 42.63 M2 field overcurrent level. 	
		 The settings of the field current controller in group 42 	
		Shared motion (2nd motor).	
		 The connections of the field exciter. 	
		 The insulation of cables and field winding. 	
		 The resistance of the field winding. 	
		 For fault messages at the field exciter itself (flashing 	
		LEDs), 04.27 M2 field exciter fault word and 04.37 M2	
		field exciter warning word.	
F519	M2 field exciter	Motor 2 field exciter loss of communication.	1
	communication.	Check:	
		- The settings of 42.49 M2 used field exciter type and	
		70.12 Field exciter timeout. - The auxiliary voltage for integrated and external field	
		The auxiliary voltage for integrated and external field exciter.	
		- The DCSLink cable connections.	
		The DCSLink cable connections. The DCSLink termination set dipswitch S1100:1 = ON	
		(DCF803-0016, DCF803-0035 and FEX-425-Int).	
		The DCSLink node ID settings. See 70.05 DCSLink node The DCSLink node ID settings.	
		ID and 70.14 M2 field exciter node ID or switches S800	
		and S801 on DCF803-0016, DCF803-0035 and FEX-425-	
i		Int, respectively.	

Code	Fault	Cause and what to do	Fault level
		 For fault messages at the field exciter itself (flashing LEDs), 04.27 M2 field exciter fault word and 04.37 M2 field exciter warning word. The AUX code: 	
		 2: Communication timeout in the armature converter. 3: Communication timeout in a field exciter. 	
		- 4: Commination timeout in a field exciter running as multi-FEX.	
F521	Field acknowledge.	Selected motor, field acknowledge is missing. Check:	1
		 The setting of 99.07 M1 used field exciter type. The selection must match the connected field exciter type. 06.26 M1 field exciter status word. 	
		 For fault messages at the field exciter itself (flashing LEDs), 04.26 M1 field exciter fault word and 04.36 M1 field exciter warning word. 	
		F521 Field acknowledge missing is the sum fault for all field related faults like: - F515 M1 field exciter overcurrent.	
		 F516 M1 field exciter communication. F529 M1 field exciter not OK. 	
		F537 M1 field exciter ready lost.F541 M1 field exciter low current.	
F524	Mains contactor acknowledge.	Mains contactor acknowledge at the DI is missing. Check:	4
		 The settings of 20.33 Mains contactor control mode and 20.34 Mains contactor acknowledge source. The switch on/off sequence. 	
		 The auxiliary contactor/relay switching the mains contactor after an On/Off command. 	
		The safety relays if existing.The used digital inputs and outputs (groups 10 and 11).	
F529	M1 field exciter not OK.	Motor 1 field exciter is not okay. A fault was found during self-diagnosis of the field exciter, or a power failure happened in the field exciter.	1
		 Check: The field exciter operation. E.g., the field contactor or mains contactor (in case of an OnBoard field exciter) is not closed or closing too late. 	
		 For fault messages at the field exciter itself (flashing LEDs), 04.26 M1 field exciter fault word and 04.36 M1 field exciter warning word. 	
F530	M2 field exciter not OK.	Motor 2 field exciter is not okay. A fault was found during self-diagnosis of the field exciter, or a power failure happened in the field exciter. Check:	1
		 The field exciter operation. E.g., the field contactor or mains contactor (in case of an OnBoard field exciter) is not closed or closing too late. For fault messages at the field exciter itself (flashing) 	
		LEDs), 04.27 M2 field exciter fault word and 04.37 M2 field exciter warning word.	

Code	Fault	Cause and what to do	Fault level
F533	12-pulse reversal timeout.	The current direction is not changed before 29.06 12-pulse reversal timeout is elapsed. Check: For high inductive motor and increase the timeout. Too high motor voltage compared to mains voltage.	3
F534	12-pulse current difference. Programmable, see 29.09 12-pulse parallel current difference type. See also warning A534.	The current of difference of a 12-pulse parallel configuration exceeded the current difference level. Check: The settings of 29.07 12-pulse parallel current difference level and 29.08 12-pulse parallel current difference delay. The settings of the current controller in group 27 Armature current control.	3
F535	12-pulse communication.	 12-pulse communication is disturbed. Check: The settings of 70.05 DCSLink node ID, 70.08 12-pulse timeout and 70.09 12-pulse slave node ID. DCSLink cable connections. DCSLink termination. 	3
F536	12-pulse slave.	The 12-pulse slave has tripped. 12-pulse master is tripped by a fault of the 12-pulse slave. Correct the fault in the 12-pulse slave.	4
F537	M1 field exciter ready lost.	 Motor 1 field exciter lost the ready-for-operation message while working. The mains voltage of the field exciter is missing or not in synchronism. Check: If all mains phases are present. If the mains voltage is within the set tolerance. For fault messages at a DCF803/DCF804/FEX-425 see the flashing LEDs, 04.26 M1 field exciter fault word and 04.36 M1 field exciter warning word. For fault messages at a large field exciter (DCS880-S0b) see the seven-segment display and the event logger. 	1
F538	M2 field exciter ready lost.	 Motor 2 field exciter lost the ready-for-operation message while working. The mains voltage of the field exciter is missing or not in synchronism. Check: If all mains phases are present. If the mains voltage is within the set tolerance. For fault messages at a DCF803/DCF804/FEX-425 see the flashing LEDs, 04.27 M2 field exciter fault word and 04.37 M2 field exciter warning word. For fault messages at a large field exciter (DCS880-S0b) see the seven-segment display and the event logger. 	1
F539	Fast current rise.	The rise of the current (di/dt) is too fast. This indicates a short circuit or a commutation fault during regenerative braking. Check: The setting of 31.45 Maximum current rise level.	1
F541	M1 field exciter low current.	Motor 1 field exciter low (under-) current. Check:	1

Code	Fault	Cause and what to do	Fault level
		 Record 28.14 M1 field current reference and 28.15 M1 field current. The settings of 31.57 Minimum field current trip delay and 31.58 M1 field current low level. The settings of the EMF controller, flux linearization and field current controller in group 28 EMF and field current control. The motor nameplate for minimum current at maximum field weakening ≡ maximum speed. The field circuit fuses. The field auxiliary supply voltage. The field contactor is not closed. If the field current oscillates. If the motor is not compensated and has a high armature reaction. For fault messages at the field exciter itself (flashing LEDs), 04.26 M1 field exciter fault word and 04.36 M1 field exciter warning word. 	
F542	M2 field exciter low current.	 Motor 2 field exciter low (under-) current. Check: Record 42.45 M2 field current reference and 42.46 M2 field current. The settings of 31.57 Minimum field current trip delay and 42.62 M2 field current low level. The settings of the EMF controller, flux linearization and field current controller in group 42 Shared motion (2nd motor). The motor nameplate for minimum current at maximum field weakening ≡ maximum speed. The field circuit fuses. The field auxiliary supply voltage. The field contactor is not closed. If the field current oscillates. If the motor is not compensated and has a high armature reaction. For fault messages at the field exciter itself (flashing LEDs), 04.27 M2 field exciter fault word and 04.37 M2 field exciter warning word. 	1
F547	0051	Drive hardware failure. To reset, cycle the auxiliary power of the drive. If the problem persists, check the AUX code (format YYYY). YYYY indicates the problem. Actions see below. Parameter flash memory faulty (erase). Parameter flash memory faulty (program). Check connector XC12 on SDCS-CON-H01 and connector XC12 on SDCS-PIN-H01/H51.	1
F556	Torque proving.	Selected motor, torque proving. The acknowledge signal for torque proving is missing. Check: The setting of 44.25 M1 brake torque proving time. The Adaptive Program, application program or overriding control providing the torque proving OK signal. See 06.11.b04 Auxiliary control word 2.	3

Code	Fault				Fault level		
F557	Reversal time.	The current direction was not changed before 27.40 Zero			3		
	current timeout is elapsed. 27.01 Current reference						
		cha	anges polarity,				
		161	5.18b13 Drive us word 3 is set				
		l _{act}			rent detection plus		
			Zero current detection, 06.18b14 Drive status word 3 is set	06.24b13	al delay elapsed, 3 Current controller Is word 1 is set		
			27.38 Revers	al delay	- t		
			27.40 Zero current timeou	ıt 🔻			
					DZ_LIN_046_RevDly_a.Al		
		Check:					
		_	 For high inductive motor and increase the timeout. Too high motor voltage compared to mains voltage. 				
		_	e lower 27.38 Reversal		_		
			27.40 Zero current timeout.				
		The AUX					
		- 12:					
			bridge 2 did not take place.10: Extinguishing bridge 1 current after switching				
			the drive did not take Extinguishing bridge a	•	t after switching		
			the drive did not take		J		
			Changing current dire		om bridge 2 to		
			dge 1 did not take plac	e.			
	27 21 M41 dia continua		wing table:	Dalta	27.40.70.00		
	27.31 M1 discontinuo	us current	27.38 Reversal delay	Delta	27.40 Zero curre timeout	ent	
	≤ 50 %		5 ms	15	20 ms		
	≤ 35 %		10 ms	25	35 ms		
	≤ 20 %		15 ms	35	50 ms		
	≤ 10 %		20 ms	50	70 ms		
F560	Power unit,	The unbalance	ced current between h	ardpara	llel connected	3	
	unbalanced current.	power units	is excessive.	·			
	Programmable, see	Check:					
	29.63 Power unit	- That the mains and motor cable routing is according to					
	unbalanced current	 the specification for hardparallel configurations. The branch fuses. The thyristors. The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. 					
	function. See also warning						
	A560.						
		ZZ identifies the affected thyristor.					
		Example: 00000314 means thyristor14 in the power					
		unit conn	ected to channel3.				

Code	Fault	Cause and what to do	Fault level
F561	Power unit, thyristor loss function. Programmable, see 29.68 Power unit thyristor loss	Displays the thyristors/branch fuses of a power unit which are lost, in other words not conducting any current. Check: The branch fuses. The thyristors.	3
	function. See also warning A561.	 The AUX code (format XXXYYYZZ). YYY identifies the power unit channel. ZZ identifies the affected thyristor. Example: 00000314 means thyristor14 in the power 	
		unit connected to channel3.	
FA81	Safe torque off 1 loss fault.	If the state of XSTO:IN1 and XSTO:IN2 is different for longer than 200 ms a fault, FA81 or FA82, is generated.	6
FA82	Safe torque off 2 loss fault.	State XSTO1:IN1 LOW HIGH HIGH LOW LOW LOW HIGH HIGH LOW State XSTO1:IN2 LOW HIGH HIGH LOW LOW HIGH HIGH HIGH LOW Fault No Fault FA82 FA81 DZ_LIN_030_STO_d.ai	6
		See Supplement for functional safety (3ADW000452). Check: For poor contact of XSTO:IN1 and XSTO:IN2. The On/Off timing of XSTO:IN1 and XSTO:IN2. That the jumpers between XSTO:OUT1 and XSTO:IN1 and XSTO:OUT1 and XSTO:IN2 are removed. Operate the safety relay so that the On/Off timing of XSTO:IN1 and XSTO:IN2 are synchronized. If the safety relay contacts are welded. If welded, replace the safety relay. The gap between the On/Off timing of XSTO:IN1 and XSTO:IN2. Keep the gap smaller than 201 ms. If the problem persists, contact your local ABB representative to repair the converter.	
FB11	Memory unit missing.	No memory unit is attached to the control board. Power down the drive/control unit. Check that the memory unit is properly inserted into the control board. The memory unit attached to the control board is empty. Power down the drive/control unit. Attach a memory unit with the appropriate firmware to the control board.	
FB12	Memory unit incompatible.	The memory unit attached to the control board is incompatible. Try to download a compatible firmware. If the problem persists, power down the drive/control unit. Attach a compatible memory unit.	1
-	Panel and drive not compatible. Panel and Drive not Compatible	The control panel attached to the control board is incompatible or broken. Attach a working and compatible control panel.	1

Code	Fault Cause and what to do		Fault level
FB13	Memory unit, firmware incompatible.	The firmware on the attached memory unit is incompatible with the control board. Try to download a compatible firmware. If the problem persists, power down the drive/control unit. Attach a memory unit with a compatible firmware.	1
FB14	Memory unit, firmware load failed.	The firmware on the attached memory unit could not be	
FF7E	Follower	A follower has tripped.	4
	Programmable, see 60.17 Follower fault action. See also warning AFE7.	Check the AUX code to find out the node address of the faulted follower. See 60.02 M/F node address. Correct the fault in the follower.	
FF81	FBA A force fault.	A fault has been forced through fieldbus adapter A. Check the fault information provided by the PLC.	
FF82	FBA B force fault.	A fault has been forced through fieldbus adapter B. Check the fault information provided by the PLC.	
FF8E	EFB force fault.	A fault has been forced through the embedded fieldbus (EFB) interface. Check the fault information provided by the Modbus controller.	1 (default) 1 6 user selectable

Fieldbus control via embedded fieldbus (EFB)

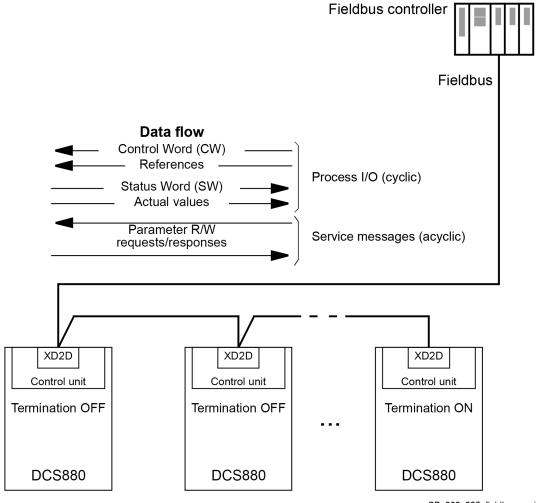
What this chapter contains

The chapter describes how the drive can be controlled via a fieldbus using the embedded fieldbus.

System overview

The drive can be connected to an external control system through the embedded fieldbus. The embedded fieldbus supports the Modbus RTU protocol. The drive control program can manage 10 Modbus registers in a 10-millisecond time level. For example, if the drive receives a request to read 20 registers, it will start its response within 22 ms of receiving the request. 20 ms for processing the request and 2 ms overhead for managing the bus. The actual response time depends on other factors as well, such as the baud rate, see 58.04 Baud rate.

The drive can be set to receive all control information through the fieldbus, or the control can be distributed between the embedded fieldbus and other available sources, for example, digital and analog inputs.



SB_880_025_fieldbus_a.ai

Connecting the fieldbus to the drive

Connect the fieldbus to terminal XD2D on the control board of the drive. See the <u>DCS880 Hardware</u> <u>manual (3ADW000462)</u> for more information on the connection, chaining, and termination of the link. **Note:** When connector XD2D is reserved by the embedded fieldbus interface, see 58.01 Protocol enable is set to Modbus RTU, the drive-to-drive link is automatically disabled.

Setting up the embedded fieldbus

Setup of the embedded fieldbus communication using the table below. The column Setting for fieldbus control shows the value to be used or the default value. The column Function/Information gives a brief description of the parameter.

Parameter	Setting for fieldbus control	Function/Information		
Communication initialization				
58.01 Protocol enable	Modbus RTU.	Initializes embedded fieldbus communication. The drive-to-drive link is automatically disabled.		
Embedded Modbus con	figuration			
58.03 Node address	1 (default).	Node address. All drives connected to the network must have a unique node address.		
58.04 Baud rate	19.2 kbps (default).	Defines the communication speed of the link. Use the same setting as in the master station.		
58.05 Parity	8 EVEN 1 (default).	Selects the parity and stop bit setting. Use the same setting as in the master station.		
58.14 Communication loss action	Fault.	Defines the action taken when a communication loss is detected.		
58.15 Communication loss mode	CW/Ref1/Ref2 (default).	Enables/Disables communication loss monitoring and defines the means for resetting the counter of the communication loss delay.		
58.16 Communication loss time	0.3 s (default).	Defines the timeout limit for the communication monitoring.		
58.17 Transmit delay	0 ms (default).	Defines a response delay for the drive.		
58.25 Control profile	ABB Drives Profile (default), Transparent.	Selects the control profile used by the drive. See chapter Basics of the embedded fieldbus interface.		
58.26 EFB ref1 type 58.29 EFB act2 type	Auto, Transparent, General, Torque, Speed, Current.	Selects the reference and actual value types. With the Auto setting, the type is selected automatically according to which reference chain the incoming reference is connected to.		
58.30 EFB status word transparent source	Other.	Defines the source of status word when 58.25 Control profile = Transparent.		
58.31 EFB act1 transparent source	Other.	Defines the source of actual value 1 when 58.28 EFB act1 type = Transparent or General.		
58.32 EFB act2 transparent source	Other.	Defines the source of actual value 2 when 58.29 EFB act2 type = Transparent or General.		
58.33 Addressing mode	E.g., Mode 0 (default).	Defines the mapping between parameters and holding registers in the 400001 465536 (10065535) Modbus register range.		
58.34 Word order	LO-HI (default).	Defines the order of the data words in the Modbus message frame.		
58.101 Data I/O 1	CW 16bit.	Define the address of the drive parameter which		
58.102 Data I/O 2	Ref1 16bit.	the Modbus master accesses when it reads from		
58.103 Data I/O 3	Ref2 16bit.	or writes to the register address corresponding to Modbus In/Out parameters. Select the parameters that you want to read or		
58.104 Data I/O 4	SW 16bit.			
58.105 Data I/O 5	Act1 16bit.	write through the Modbus I/O words.		
58.106 Data I/O 6	Act2 16bit.			

58.107 Data I/O 7 58.124 Data I/O 24	None (default).	
58.06 Communication control	_	Validates the settings of the configuration parameters.

Note: The new settings will take effect when the drive is powered up the next time, or when they are validated by 58.06 Communication control.

Setting the drive control parameters

After the embedded fieldbus interface has been set up, check, and adjust the drive control parameters listed in the table below. The column Setting for fieldbus control shows the value to be used when the embedded fieldbus signal is the desired source or destination for that particular drive control signal. The column Function/Information gives a brief description of the parameter.

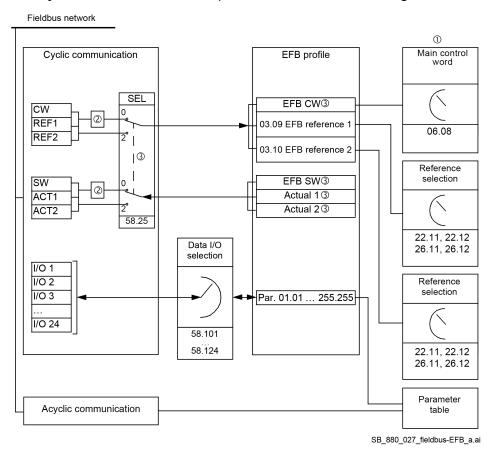
Parameter	Setting for fieldbus control	Function/Information
Control command source	ce selection	
06.08 Main control word source	EFB.	Selects 06.05 EFB transparent control word as source for 06.01 Main control word.
20.01 Command location	Main control word.	Selects 06.01 Main control word as source for 06.09 Used main control word.
Speed reference selection	on	
22.11 Speed reference 1 source	EFB reference 1, EFB reference 2.	Selects a reference received through the embedded fieldbus interface as speed reference 1.
22.12 Speed reference 2 source	EFB reference 1, EFB reference 2.	Selects a reference received through the embedded fieldbus interface as speed reference 2.
Torque reference select	ion	
26.11 Torque reference 1 source	EFB reference 1, EFB reference 2.	Selects a reference received through the embedded fieldbus interface as torque reference 1.
26.12 Torque reference 2 source	EFB reference 1, EFB reference 2.	Selects a reference received through the embedded fieldbus interface as torque reference 2.
Other selections		
	elected as the source at virtua EFB reference 1 or 03.10 EFB	ally any signal selector parameter by selecting reference 2.
10.24 RO1 source	RO/DIO control word bit 0.	Connects storage parameter bit 10.99.b00 RO/DIO control word to relay output RO1.
10.27 RO2 source	RO/DIO control word bit 1.	Connects storage parameter bit 10.99.b01 RO/DIO control word to relay output RO2.
10.30 RO3 source	RO/DIO control word bit 2.	Connects storage parameter bit 10.99.b02 RO/DIO control word to relay output RO3.
11.05 DIO1 function, 11.09 DIO2 function	Output (default).	Sets the digital input/output to output mode.
11.06 DIO1 output source	RO/DIO control word bit 8.	Connects storage parameter bit 10.99.b08 RO/DIO control word to digital input/output DIO1.

11.10 DIO2 output source	RO/DIO control word bit 9.	Connects storage parameter bit 10.99.b09 RO/DIO control word to digital input/output DIO2.
13.12 AO1 source	AO1 data storage.	Connects storage parameter 13.91 AO1 data storage to analog output AO1.
13.22 AO2 source	AO2 data storage.	Connects storage parameter 13.92 AO2 data storage to analog output AO2.
System control inputs		
96.16 Parameter save manually	Save (reverts automatically to Done).	Saves parameter value changes (including those made through fieldbus control) to the flash memory.

Basics of the embedded fieldbus interface

The cyclic communication between a fieldbus system and the drive consists of 16-bit or 32-bit data words, with the transparent control profiles.

The diagram below illustrates the operation of the embedded fieldbus interface. The signals transferred in the cyclic communication are explained further below the diagram.



- ① See also other parameters which can be controlled from the fieldbus.
- ② Data conversion if 58.25 Control profile is set to ABB Drives profile. See chapter About the control profiles.

Profile/Instance selection parameters. Fieldbus module specific parameters. For more information, see the User's Manual of the appropriate fieldbus adapter module.

- ③ If 58.25 Control profile is set to Transparent:
- The sources of the status word and actual values are selected by parameters 58.30 ... 58.32.
 Otherwise, actual values 1 and 2 are automatically selected according to their reference type.
- The control word is displayed by 06.05 EFB transparent control word.

Control word (CW) and status word (SW)

The control word is a 16-bit or 32-bit packed boolean word. It is the principal means of controlling the drive from a fieldbus system. It is sent by the fieldbus controller to the drive. By drive parameters, the user selects the EFB CW as the source of drive control commands, such as Start/Stop, Emergency stop or Reset. The drive switches between its states according to the bit-coded instructions of the control word and returns status information to the fieldbus controller in the status word.

The control word from the fieldbus is either written to the drive as it is, see 06.05 EFB transparent control word, or the data is converted. See chapter About the control profiles.

The status word is a 16-bit or 32-bit packed boolean word. The status word contains status information from the drive to the fieldbus controller. The status word is either written to the fieldbus controller as it is, or the data is converted. See chapter About the control profiles.

References

EFB references 1 and 2 are 16-bit or 32-bit signed integers.

The contents of each reference word can be used as the source of virtually any signal, such as speed, torque, current or a process reference. The embedded fieldbus communication displays references 1 and 2 in 03.09 EFB reference 1 and 03.10 EFB reference 2. Whether the references are scaled or not depends on the settings of 58.26 EFB ref1 type and 58.27 EFB ref2 type. See chapter About the control profiles.

Actual values

Actual values are 16-bit or 32-bit signed integers containing information on the operation of the drive. They convey selected drive values from the drive to the fieldbus controller. Whether the actual values are scaled or not depends on the settings of 58.28 EFB act1 type and 58.29 EFB act2 type. See chapter About the control profiles.

Data input/outputs

Data input/outputs are 16-bit or 32-bit words containing selected drive values. The address selection parameters 58.101 Data I/O 1 ... 58.124 Data I/O 24 define the addresses from which the fieldbus controller either reads data (input) or to which it writes data (output).

Control of drive outputs through EFB

The address selection parameters of the data input/outputs have a setting with which the data can be written into a storage parameter in the drive. These storage parameters are readily selectable as signal sources of the drive outputs.

The desired values of the relay outputs (RO1 ... RO3) and digital input/outputs (DIO1, DIO2) can be written into 10.99 RO/DIO control word, which is then selected as the source for those outputs. Each of the analog outputs (AO1, AO2) of the drive has a dedicated storage parameter called 13.91 AO1 data storage and 13.92 AO2 data storage. They are available in 13.12 AO1 source and 13.22 AO2 source.

Register addressing

The address field of Modbus requests for accessing holding registers is 16 bits. This allows the Modbus protocol to support addressing of 65536 holding registers.

Historically, Modbus master devices used 5-digit decimal addresses from 40001 ... 49999 to represent holding register addresses. The 5-digit decimal addressing limited to 9999 the number of holding registers that could be addressed.

Modern Modbus master devices typically provide a means to access the full range of 65536 Modbus holding registers. One of these methods is to use 6-digit decimal addresses from 400001 ... 465536. This manual uses 6-digit decimal addressing to represent Modbus holding register addresses.

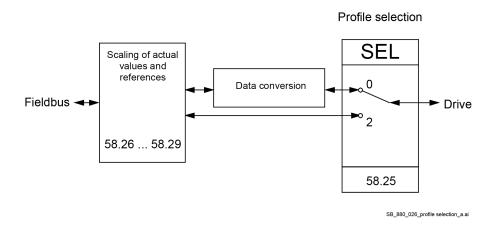
Modbus master devices that are limited to the 5-digit decimal addressing may still access registers 400001 ... 409999 by using 5-digit decimal addresses 40001 ... 49999. Registers 410000 ... 465536 are inaccessible to these masters.

Note: Register addresses of 32-bit values cannot be accessed by using 5-digit register numbers.

About the control profiles

A control profile defines the rules for data transfer between the drive and the fieldbus master, for example if packed boolean words are converted and how drive register addresses are mapped for the fieldbus master.

You can configure the drive to receive and send messages according to the ABB Drives profile or the Transparent profile. With the ABB Drives profile, the embedded fieldbus interface of the drive converts the control word and status word to and from the native data used in the drive. The Transparent profile involves no data conversion. The figure below illustrates the effect of the profile selection.



Control profile selection with 58.25 Control profile = ABB Drives profile or Transparent.

Note: Scaling of references and actual values can be selected independent of the profile selection by parameters 58.26 ... 58.29.

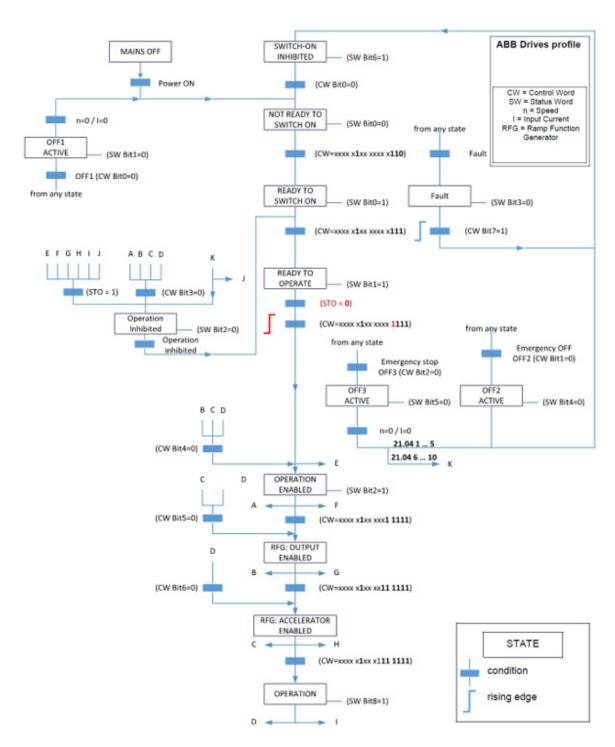
The ABB Drives profile

06.01 Main control word shows the contents of the fieldbus control word for the ABB Drives profile. The embedded fieldbus converts this word to the form in which it is used in the drive. The state machine is shown below.

06.15 Main status word shows the fieldbus status word for the ABB Drives profile. The embedded fieldbus converts the drive status word into this form for the fieldbus. The state machine is shown below.

State machine

The diagram below shows the state transitions in the drive when the drive is using the ABB Drives profile and configured to follow the commands of the control word from the embedded fieldbus interface.

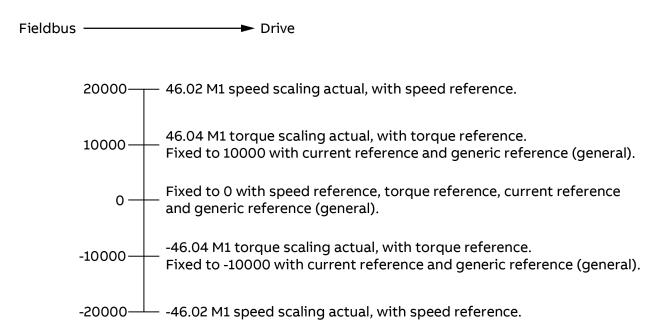


Additional information can be found in chapter Start/Stop sequences.

References

The ABB Drives profile supports the use of two references, EFB reference 1 and EFB reference 2. The references are 16-bit words containing a sign bit and a 15-bit integer.

The references are scaled as defined by parameters 46.01 ... 46.06. The used scaling depends on the setting of 58.26 EFB ref1 type and 58.27 EFB ref2 type.



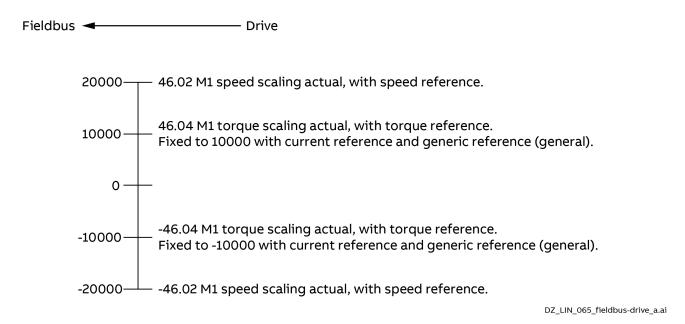
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The scaled references are shown in 03.09 EFB reference 1 and 03.10 EFB reference 2.

Actual values

The ABB Drives profile supports the use of two actual values, ACT1 and ACT2. Actual values are 16-bit words containing information on the operation of the drive.

The actual values are scaled as defined by parameters 46.01 ... 46.06. The used scaling depends on the setting of 58.28 EFB act1 type and 58.29 EFB act2 type.



Fieldbus control via embedded fieldbus (EFB)

Modbus holding register addresses

The table below shows the default Modbus holding register addresses for drive data. This profile provides a converted 16-bit access to the data.

Register address	Register data (16-bit words)		
400001	Control Word (CW), see 06.01 Main control word. The selection can be done using 58.101 Data I/O 1.		
400002	Reference 1 (REF1). The selection can be done using 58.102 Data I/O 2.		
400003	Reference 2 (REF2). The selection can be done using 58.103 Data I/O 3.		
400004	Status Word (SW), see 06.15 Main status word. The selection can be done using 58.104 Data I/O 4.		
400005	Actual value 1 (ACT1). The selection can be done using 58.105 Data I/O 5.		
400006	Actual value 2 (ACT2). The selection can be done using 58.106 Data I/O 6.		
400007 400024	Data in/out 7 24. The selection can be done using 58.107 Data I/O 7 58.124 Data I/O 24.		
400025 400089	Unused.		
400090 400100	Error code access. See chapter Error code registers, holding registers 400090 400100.		
400101 465536	Parameter read/write. Parameters are mapped to register addresses according to 58.33 Addressing mode.		

The Transparent profile

The Transparent profile enables a customizable access to the drive.

The content of the control word is user definable. The control word received from the fieldbus is visible in 06.05 EFB transparent control word and can be used to control the drive using pointer parameters and/or application programming.

The status word to be sent to the fieldbus controller is selected by 58.30 EFB status word transparent source. This can be, for example, the user-configurable status word in 06.50 User status word 1. The Transparent profile involves no data conversion of the control- or status word.

Whether references or actual values are scaled depends on the setting of parameters 58.26 ... 58.29. The references received from the fieldbus are visible in 03.09 EFB reference 1 and 03.10 EFB reference 2. The Modbus holding register addresses for the Transparent profile are the same as with the ABB Drives profile. See chapter Modbus holding register addresses.

Modbus function codes

The table below shows the Modbus function codes supported by the embedded fieldbus.

Code	Function name	Description	
01h	Read Coils.	Reads the 0/1 status of coils (0X references).	
02h	Read Discrete Inputs.	Reads the 0/1 status of discrete inputs (1X references).	
03h	Read Holding Registers.	Reads the binary contents of holding registers (4X references).	
05h	Write Single Coil.	Forces a single coil (OX reference) to 0 or 1.	
06h	Write Single Register.	Writes a single holding register (4X reference).	
08h	Diagnostics.	Provides a series of tests for checking the communication, or for checking various internal error conditions. Supported sub codes:	

	I	
		 O0h Return Query Data: Echo/loopback test. O1h Restart Communication Option: Restarts and initializes the EFB, clears communications event counters. O4h Force Listen Only Mode. O4h Clear Counters and Diagnostic Register. O8h Return Bus Message Count. OCh Return Bus Communication Error Count. ODh Return Bus Exception Error Count. OEh Return Slave Message Count. OFh Return Slave No Response Count. 10h Return Slave NAK (negative acknowledge) Count. 11h Return Slave Busy Count. 12h Return Bus Character Overrun Count. 14h Clear Overrun Counter and Flag.
OBh	Get Communication Event Counter.	Returns a status word and an event count.
0Fh	Write Multiple Coils.	Forces a sequence of coils (0X references) to 0 or 1.
16h	Mask Write Register.	Modifies the contents of a 4X register using a combination of an AND mask, an OR mask, and the register's current contents.
17h	Read/Write Multiple Registers.	Writes the contents of a contiguous block of 4X registers, then reads the contents of another group of registers (the same or different than those written) in a server device.
2Bh/0Eh	Encapsulated Interface Transport.	 Supported sub codes: OEh Read Device Identification: Allows reading the identification and other information. Supported ID codes (access type): O0h: Request to get the basic device identification (stream access). O4h: Request to get one specific identification object (individual access). Supported Object IDs: O0h: Vendor Name ("ABB"). O1h: Product Code (for example "S02-0025-04"). O2h: Major Minor Revision (combination of contents of 07.05 Firmware version and 58.02 Protocol ID). O3h: Vendor URL ("www.abb.com/dc-drives"). O4h: Product name (for example "DCS880").

Exception codes

The table below shows the Modbus exception codes supported by the embedded fieldbus interface.

Code	Name	Description
01h	ILLEGAL FUNCTION.	The function code received in the query is not an allowable action for the server.
02h	ILLEGAL DATA ADDRESS.	The data address received in the query is not an allowable address for the server.
03h	ILLEGAL DATA VALUE.	The requested Quantity of Registers is larger than the drive can manage. Note: This error does not mean that a value written to a drive parameter is outside the valid range.

04h	The value written to a drive parameter is outside the valid range. See chapter <u>Error code registers (holding registers 400090</u> 400100).
06h	The server is engaged in processing a long-duration program command.

Coils (0xxxx reference set)

Coils are 1-bit read/write values. Control word bits are exposed with this data type. The table below summarizes the Modbus coils (0xxxx reference set).

Reference	ABB drives profile	Transparent profile
00001	On/Off1 control.	Control word bit 0.
00002	Off2 control.	Control word bit 1.
00003	Off3 control.	Control word bit 2.
00004	Run.	Control word bit 3.
00005	Ramp out zero.	Control word bit 4.
00006	Ramp halt.	Control word bit 5.
00007	Ramp in zero.	Control word bit 6.
80000	Reset.	Control word bit 7.
00009	Inching 1.	Control word bit 8.
00010	Inching 2.	Control word bit 9.
00011	Remote command.	Control word bit 10.
00012	reserved.	Control word bit 11
00013	Main control 12.	Control word bit 12.
00014	Main control 13.	Control word bit 13.
00015	Main control 14.	Control word bit 14.
00016	Main control 15.	Control word bit 15.
00017	reserved.	Control word bit 16.
00018	reserved.	Control word bit 17.
00019	reserved.	Control word bit 18.
00020	reserved.	Control word bit 19.
00021	reserved.	Control word bit 20.
00022	reserved.	Control word bit 21.
00023	reserved.	Control word bit 22.
00024	reserved.	Control word bit 23.
00025	reserved.	Control word bit 24.
00026	reserved.	Control word bit 25.
00027	reserved.	Control word bit 26.
00028	reserved.	Control word bit 27.
00029	reserved.	Control word bit 28.
00030	reserved.	Control word bit 29.
00031	reserved.	Control word bit 30.
00032	reserved.	Control word bit 31.
00033	reserved.	10.99.b00 RO/DIO control word.

00034	reserved.	10.99.b01 RO/DIO control word.
00035	reserved.	10.99.b02 RO/DIO control word.
00036	reserved.	10.99.b03 RO/DIO control word.
00037	reserved.	10.99.b04 RO/DIO control word.
00038	reserved.	10.99.b05 RO/DIO control word.
00039	reserved.	10.99.b06 RO/DIO control word.
00040	reserved.	10.99.b07 RO/DIO control word.
00041	reserved.	10.99.b08 RO/DIO control word.
00042	reserved.	10.99.b09 RO/DIO control word.

Discrete inputs (1xxxx reference set)

Discrete inputs are 1-bit read-only values. Status word bits are exposed with this data type. The table below summarizes the Modbus discrete inputs (1xxxx reference set).

Reference	ABB drives profile	Transparent profile
00001	Ready on.	Status word bit 0.
00002	Ready run.	Status word bit 1.
00003	Ready reference.	Status word bit 2.
00004	Tripped.	Status word bit 3.
00005	Off2 inactive.	Status word bit 4.
00006	Off3 inactive.	Status word bit 5.
00007	Switch-on inhibited.	Status word bit 6.
80000	Warning.	Status word bit 7.
00009	At setpoint.	Status word bit 8.
00010	Remote.	Status word bit 9.
00011	Above level.	Status word bit 10.
00012	Status control 11.	Status word bit 11
00013	Status control 12.	Status word bit 12.
00014	Status control 13.	Status word bit 13.
00015	Status control 14.	Status word bit 14.
00016	reserved.	Status word bit 15.
00017	reserved.	Status word bit 16.
00018	reserved.	Status word bit 17.
00019	reserved.	Status word bit 18.
00020	reserved.	Status word bit 19.
00021	reserved.	Status word bit 20.
00022	reserved.	Status word bit 21.

reserved.	Status word bit 22.
reserved.	Status word bit 23.
reserved.	Status word bit 24.
reserved.	Status word bit 25.
reserved.	Status word bit 26.
reserved.	Status word bit 27.
reserved.	Status word bit 28.
reserved.	Status word bit 29.
reserved.	Status word bit 30.
reserved.	Status word bit 31.
reserved.	10.02.b00 DI delayed status.
reserved.	10.02.b01 DI delayed status.
reserved.	10.02.b02 DI delayed status.
reserved.	10.02.b03 DI delayed status.
reserved.	10.02.b04 DI delayed status.
reserved.	10.02.b05 DI delayed status.
reserved.	10.02.b06 DI delayed status.
reserved.	10.02.b07 DI delayed status.
reserved.	10.02.b08 DI delayed status.
reserved.	10.02.b09 DI delayed status.
reserved.	10.02.b10 DI delayed status.
reserved.	10.02.b11 DI delayed status.
reserved.	10.02.b12 DI delayed status.
reserved.	10.02.b13 DI delayed status.
reserved.	10.02.b14 DI delayed status.
reserved.	10.02.b15 DI delayed status.
	reserved. reserved.

Error code registers (holding registers 400090 ... 400100)
These registers contain information about the last query. The error register is cleared when a query has finished successfully.

Reference	Name	Description
89	Reset Error Registers.	1 = Reset internal error registers (91 95).
90	Error Function Code.	Function code of the failed query.
91	Error Code.	 Set when exception code 04h is generated (see table above). 00h No error. 02h Low/High limit exceeded. 03h Faulty Index: Unavailable index of an array parameter. 05h Incorrect Data Type: Value does not match the data type of the parameter. 65h General Error: Undefined error when managing query.
92	Failed Register.	The last register (discrete input, coil, or holding register) that failed to be read or written.
93	Last Register Written Successfully.	The last register that was written successfully.
94	Last Register Read Successfully	The last register that was read successfully.

Fieldbus control via fieldbus adapter

What this chapter contains

This chapter describes how the drive can be controlled via a fieldbus through a fieldbus adapter.

System overview

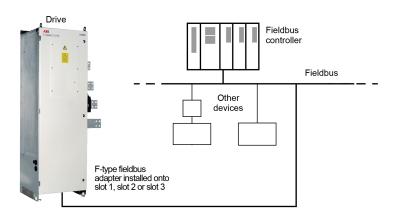
The drive can be connected to an external control system through a fieldbus adapter mounted onto the electronic unit of the drive. The drive has two independent interfaces for fieldbus connection, called FieldBus Adapter A (FBA A) and FieldBus Adapter B (FBA B). The drive can be configured to receive all control information either through fieldbus interface A, fieldbus interface B or local I/O such as digital and analog inputs.

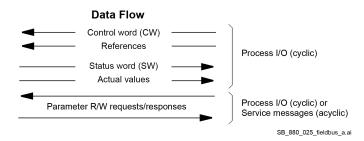
Note: The text and examples in this chapter describe the configuration of FieldBus Adapter A (FBA A) by parameters 50.01 ... 50.29 and parameter groups 51 ... 53.

FieldBus Adapter B (FBA B), if present, is configured in a similar fashion by parameters 50.31 ... 50.59 and parameter groups 54 ... 56. It is recommended that the FBA B interface is only used for monitoring. Fieldbus adapters are available for various communication systems and protocols, for example:

- FCAN-01 for CANopen[®].
- FCNA-01 for ControlNet[™].
- FDNA-01 for DeviceNet™.
- FECA-01 for EtherCAT[®].
- FENA-21 for EtherNet/IP™, Modbus TCP and PROFINET IO.
- FEIP-21 for EtherNet/IP™.
- FMBT-21 for Modbus TCP.
- FPNO-21 for PROFINET IO.
- FSCA-01 for Modbus RTU.
- FEPL-02 for PowerLink.
- FPBA-01 for PROFIBUS DP, DPV0/DPV1.
- FSPS-21 for PROFIsafe via PROFINET IO.

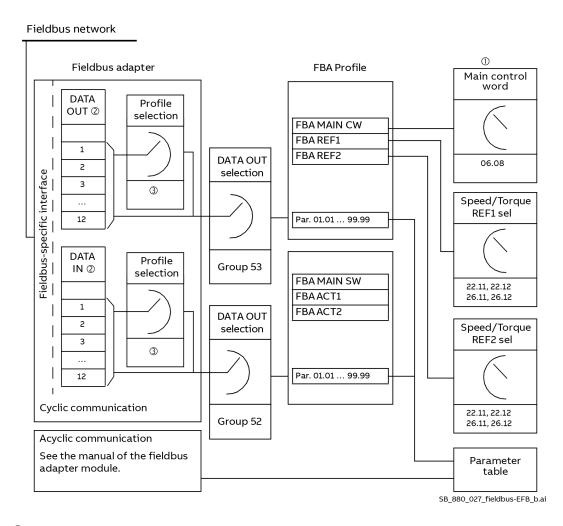
Note: Fieldbus adapters with the suffix "M", e.g., FPBA-01-M, are not supported.





Basics of the fieldbus control interface

The cyclic communication between a fieldbus system and the drive consists of 16-bit or 32-bit input and output data words. The drive can support a maximum of 12 data words of 16 bits in each direction. Data transmitted from the drive to the fieldbus controller is defined by 52.01 FBA A data in1 ... 52.12 FBA A data in12. The data transmitted from the fieldbus controller to the drive is defined by 53.01 FBA A data out1 ... 53.12 FBA A data out12.



- ① See also other parameters which can be controlled from the fieldbus.
- ② The maximum number of data words used is protocol dependent.
- ③ Profile/Instance selection parameters. Fieldbus module specific parameters. For more information, see the User's Manual of the appropriate fieldbus adapter module.
- ④ With DeviceNet, the control part is transmitted directly.
- (5) With DeviceNet, the actual value part is transmitted directly.

Control word (CW) and status word (SW)

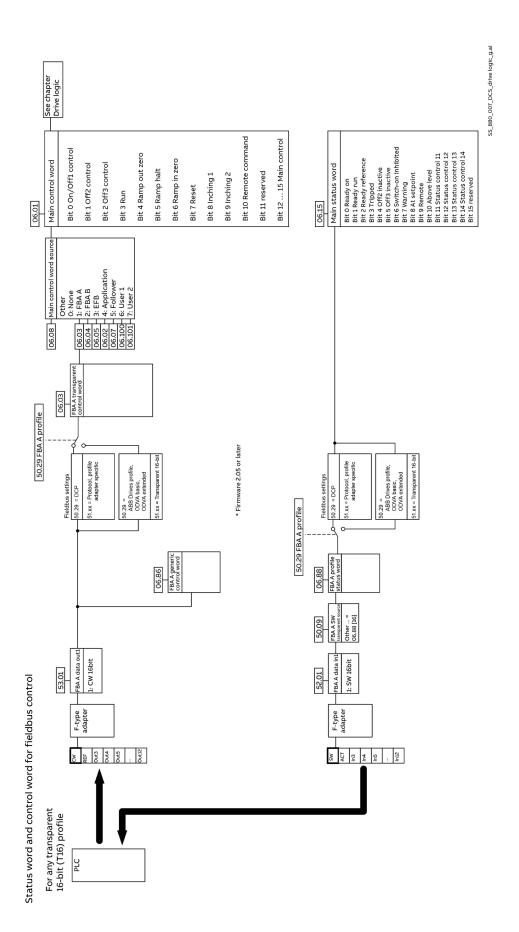
The control word is a 16-bit or 32-bit packed boolean word. It is the principal means for controlling the drive from a fieldbus system. It is sent by the fieldbus controller to the drive through the adapter module. The drive switches between its states according to the bit-coded instructions in the control word and returns status information to the fieldbus controller in the status word.

For the ABB drives profile, the bit assignment of the control word and the status word are detailed in 06.01 Main control word and 06.15 Main status word. The drive states are presented in chapter Statt/Stop sequences and in chapter State machine (ABB Drives profile).

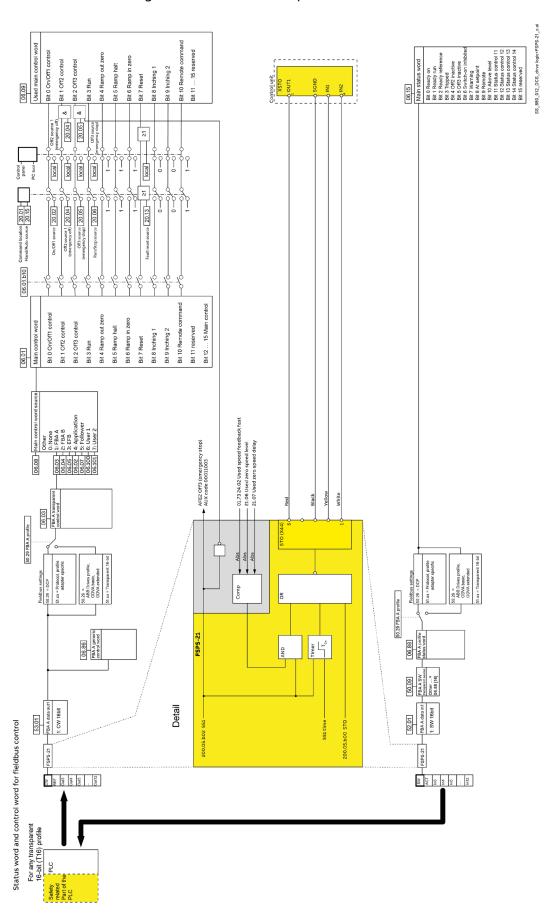
For the DCS880 always select 50.29 FBA A profile = DCP.

Profile conversion, control word (CW) and status word (SW) handling

Profile conversion using a standard fieldbus adapter.



Profile conversion using a FSPS-21 fieldbus adapter.



Debugging the network (control word and status word)

The control word received from the fieldbus is shown in 06.86 FBA A generic control word, and the status word sent to the fieldbus is shown in 06.88 FBA A profile status word.

Additionally, if 50.12 FBA A debug mode is set to Enable, the control word received from the fieldbus is shown in 50.13 FBA A control word, and the status word sent to the fieldbus in 50.16 FBA A status word. This data is useful to determine if the fieldbus master is transmitting the correct data before handing control to the fieldbus network.

References

References are 16-bit words containing a sign bit and a 15-bit integer.

→ Drive

ABB drives can receive control information from multiple sources including analog- and digital inputs, the control panel, and a fieldbus adapter module. To control the drive via the fieldbus, the module must be defined as the source of control information such as references. This is done using the source selection parameters in groups 22 Speed reference selection and 26 Torque reference chain.

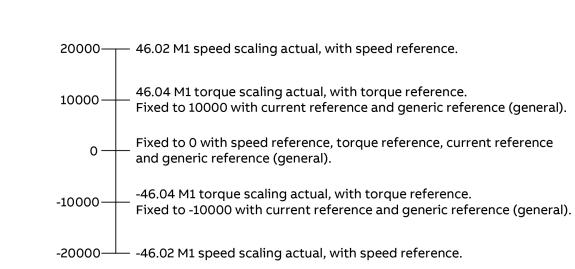
Debugging the network (references)

If 50.12 FBA A debug mode is set to Enable, the references received from the fieldbus are displayed in 50.14 FBA A reference 1 and 50.15 FBA A reference 2.

Scaling of references

Fieldbus -

Note: The scaling described below are for the ABB Drives profile. Fieldbus-specific communication profiles may use different scaling. For more information, see the manual of the fieldbus adapter. The references are scaled as defined by parameters 46.01 ... 46.04; which scaling is in use depends on the setting of 50.04 FBA A ref1 type and 50.05 FBA A ref2 type.



DZ_LIN_065_fieldbus-drive_b.ai

The scaled references are shown in 03.05 FBA A reference 1 and 03.06 FBA A reference 2.

Actual values

Actual values are 16-bit words containing information on the operation of the drive. Selection is done by 50.10 FBA A act1 transparent source and 50.11 FBA A act2 transparent source.

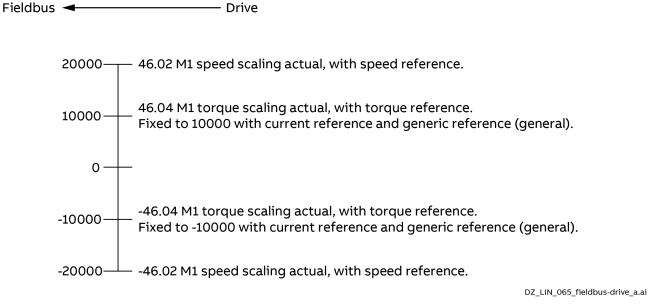
Debugging the network (actual values)

If 50.12 FBA A debug mode is set to Enable, the actual values sent to the fieldbus are displayed in 50.17 FBA A actual value 1 and 50.18 FBA A actual value 2.

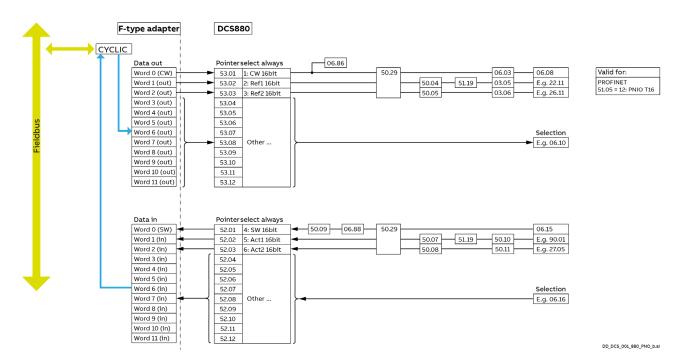
Scaling of actual values

Note: The scaling described below are for the ABB Drives profile. Fieldbus-specific communication profiles may use different scaling. For more information, see the manual of the fieldbus adapter.

The actual values are scaled as defined by parameters 46.01...46.04; which scaling is in use depends on the setting of 50.07 FBA A actual 1 type and 50.08 FBA A actual 2 type.



Configuration using CW 16bit, Ref1 16bit, Ref2 16bit and Other

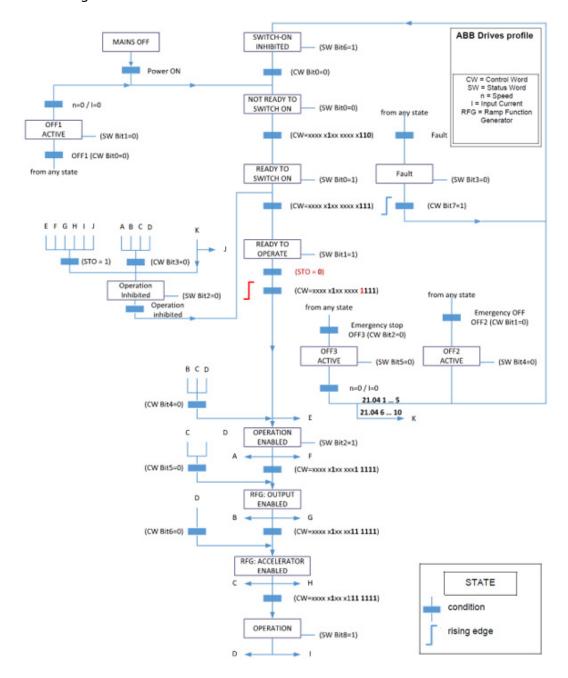


The ABB Drives profile

06.01 Main control word shows the contents of the fieldbus control word for the ABB Drives profile. The fieldbus converts this word to the form in which it is used in the drive. The state machine is shown below. 06.15 Main status word shows the fieldbus status word for the ABB Drives profile. The embedded fieldbus converts the drive status word into this form for the fieldbus. The state machine is shown below.

State machine

The diagram below shows the state transitions in the drive when the drive is using the ABB Drives profile and configured to follow the commands of the control word from the fieldbus.



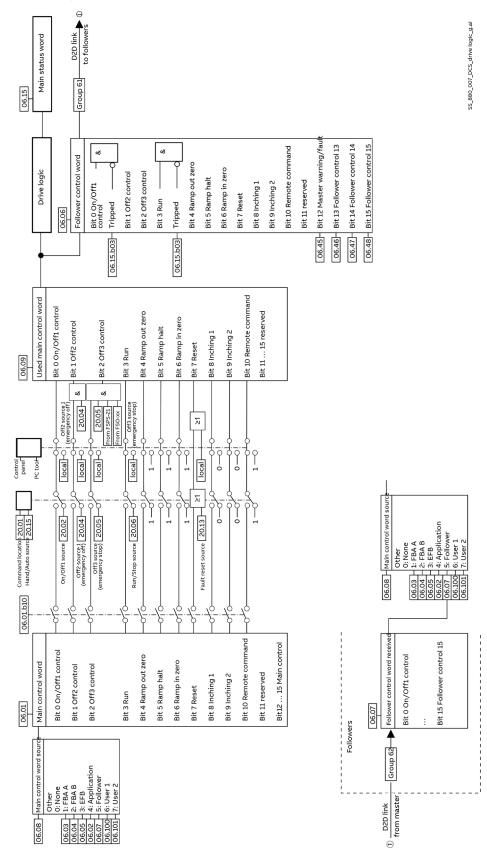
Additional information can be found in chapter Start/Stop sequences.

Setting up the drive for fieldbus control

Setup information can be found in the Quick commissioning instructions of the different fieldbus types.

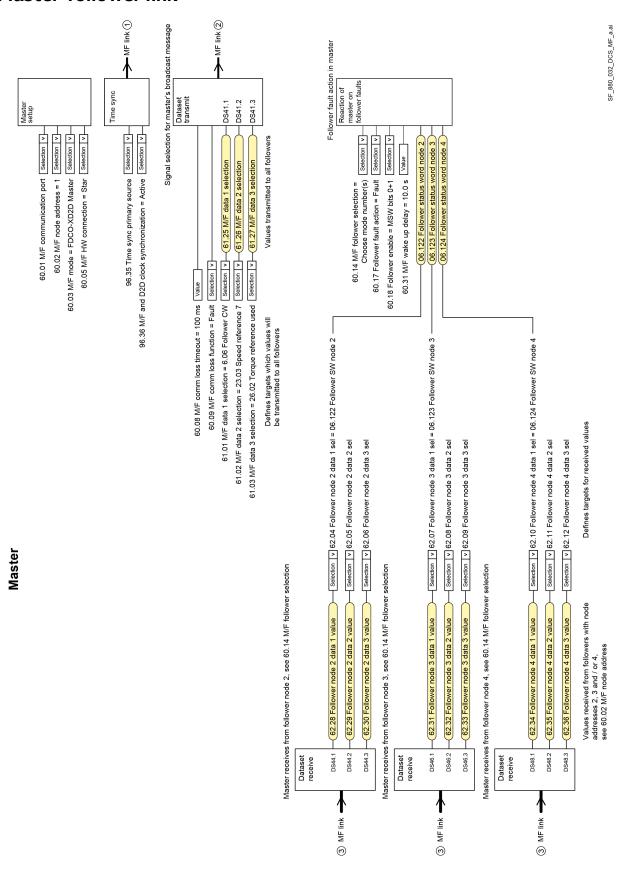
Firmware structure diagrams

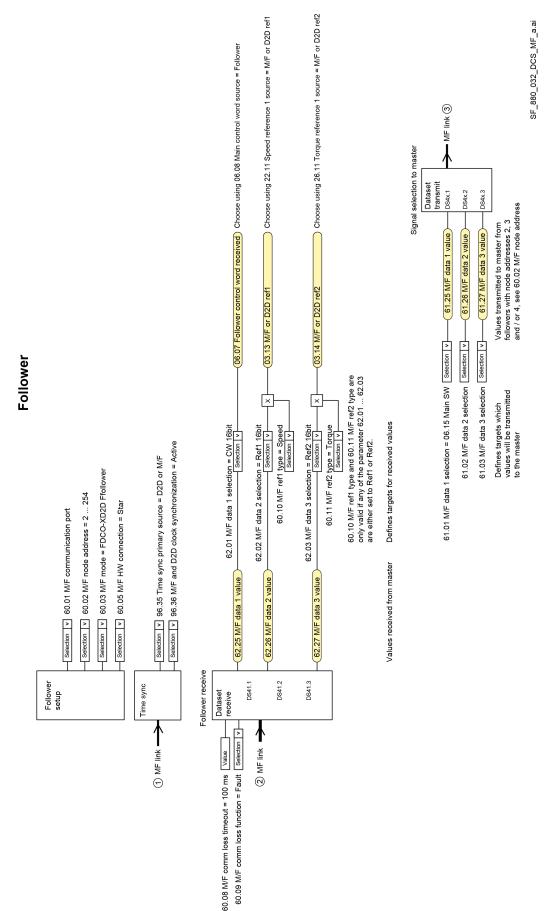
Drive logic



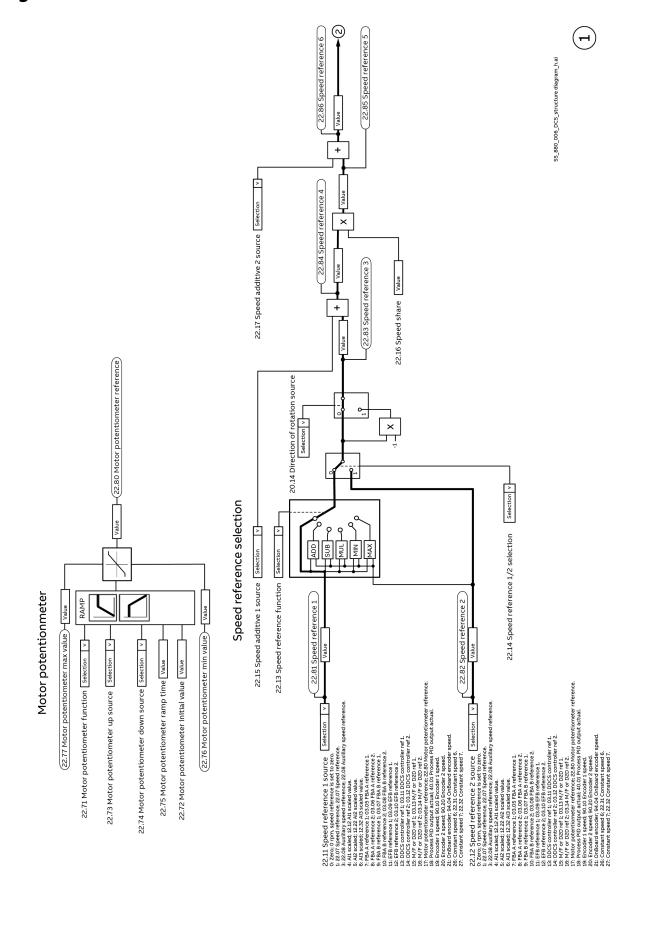
Master-follower link

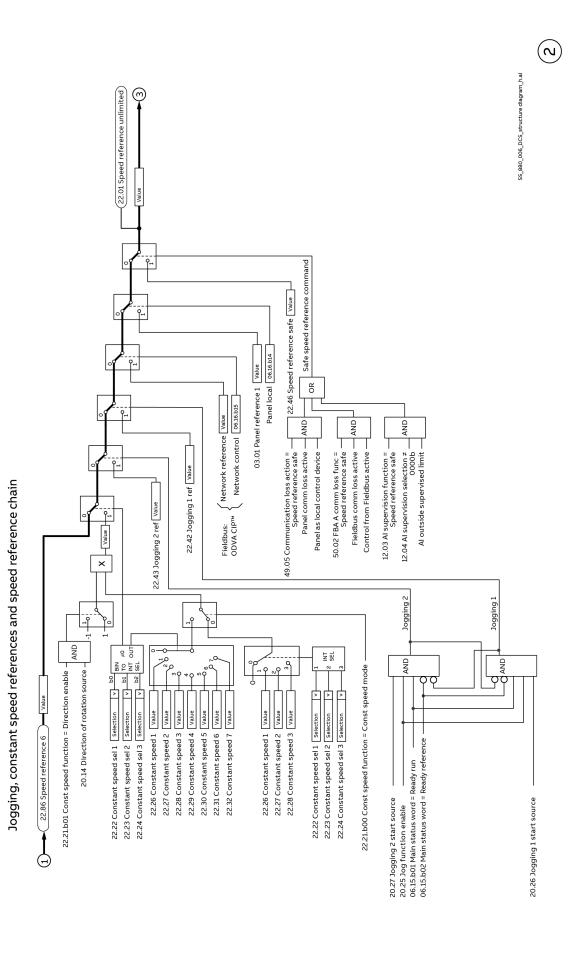
Master-follower link





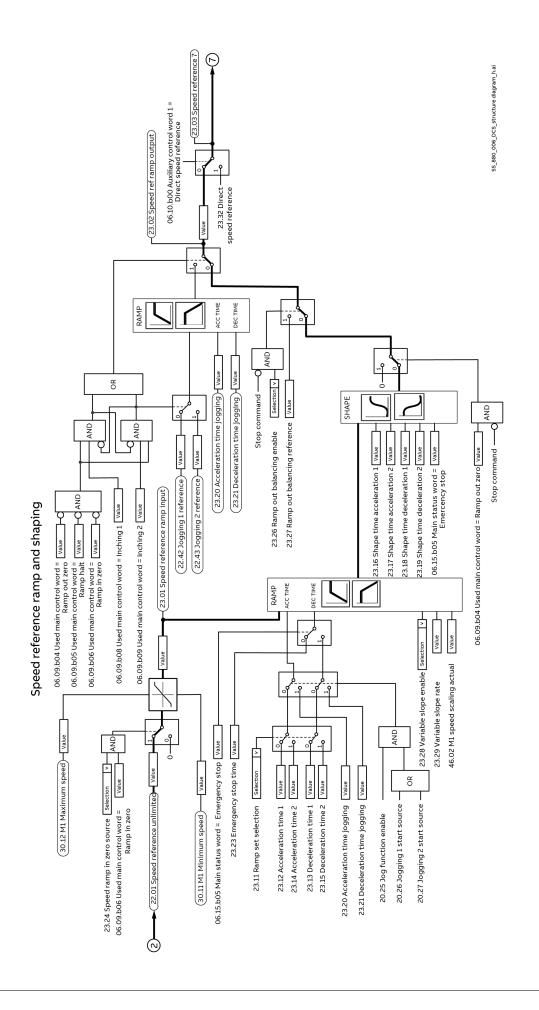
Diagrams

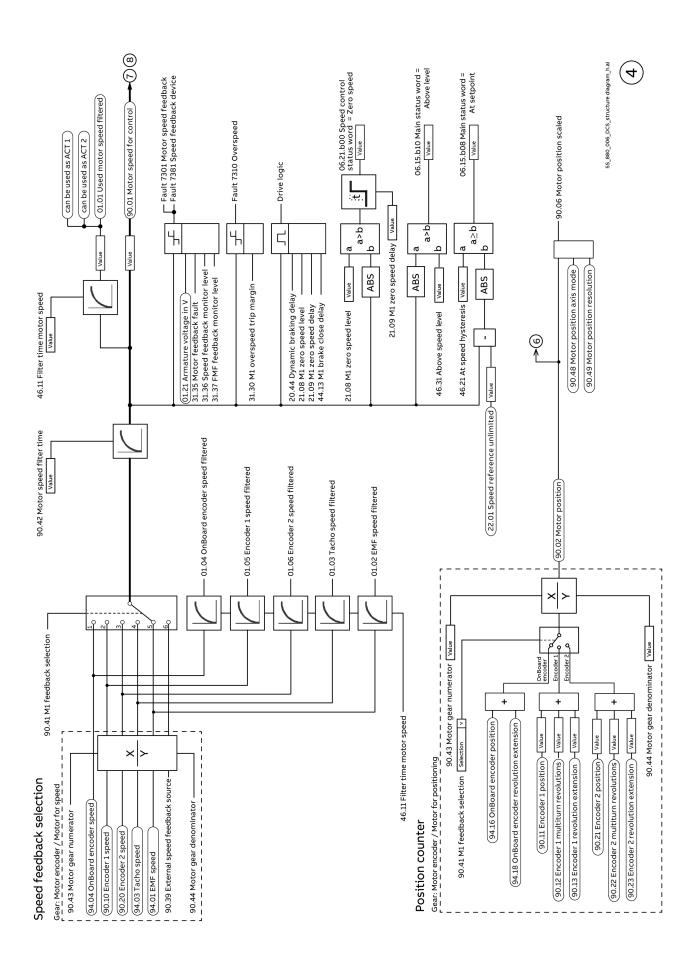


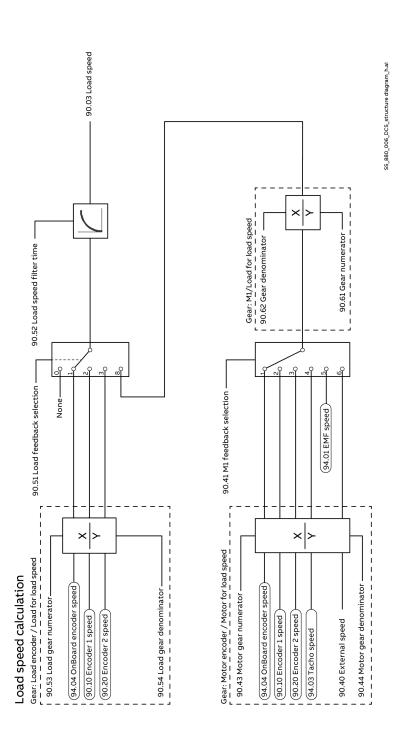


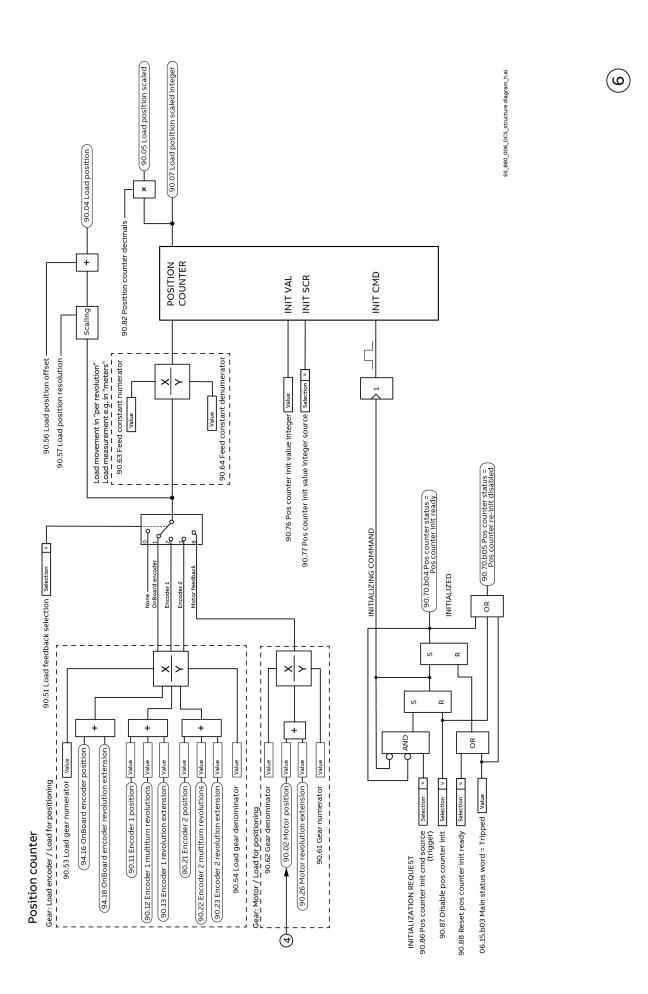
Firmware structure diagrams

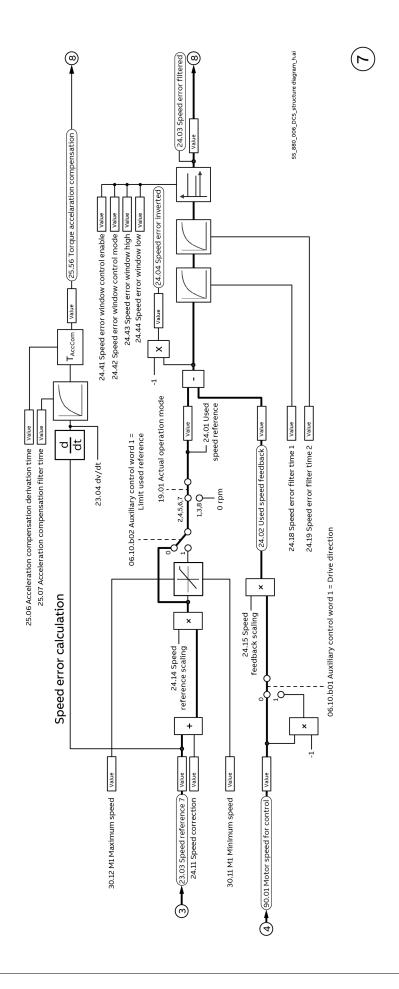
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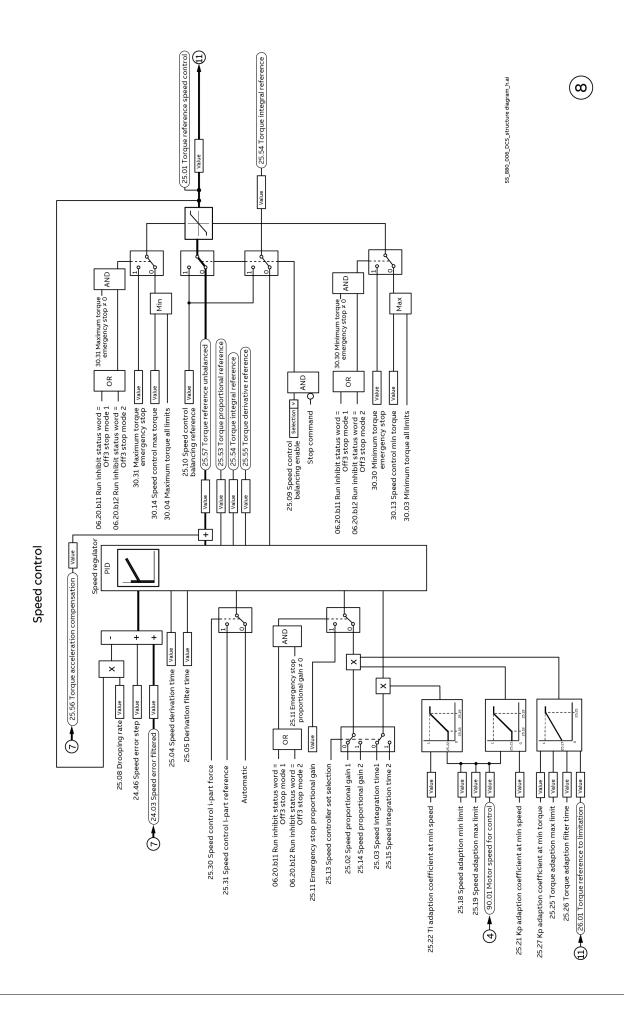


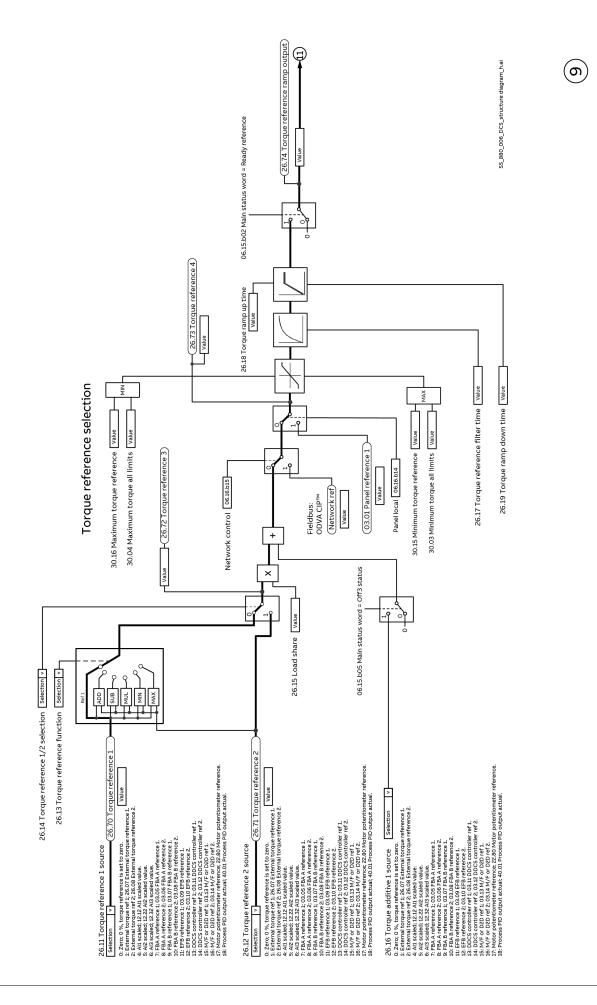


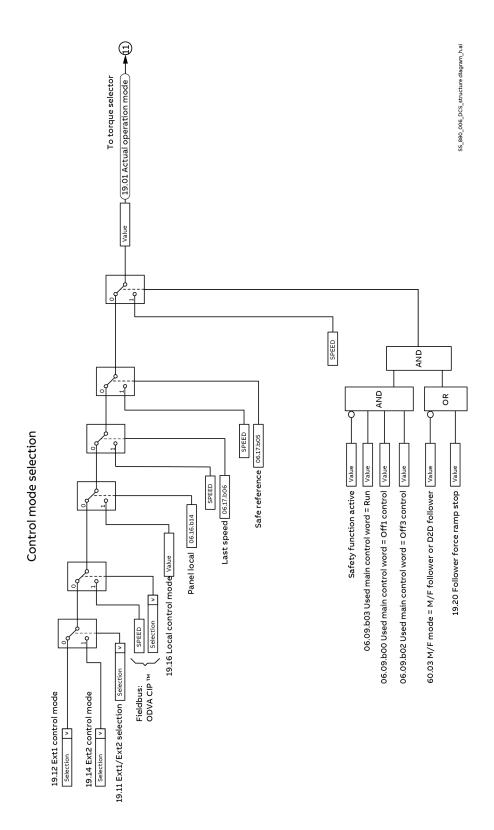




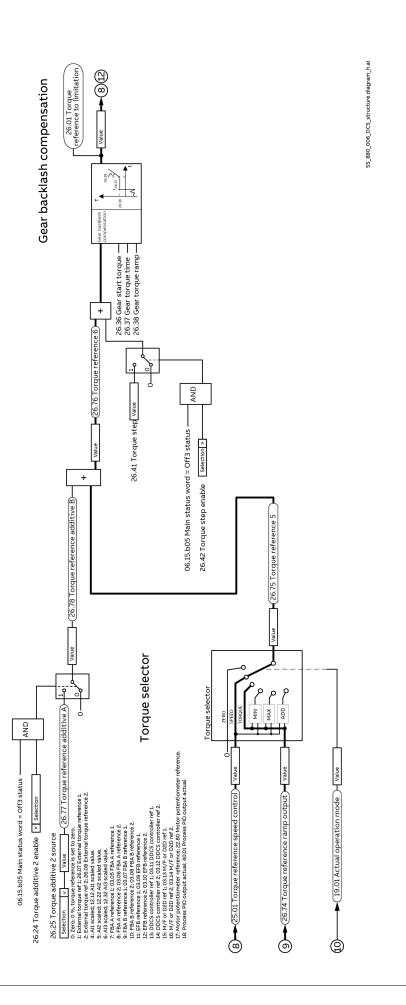


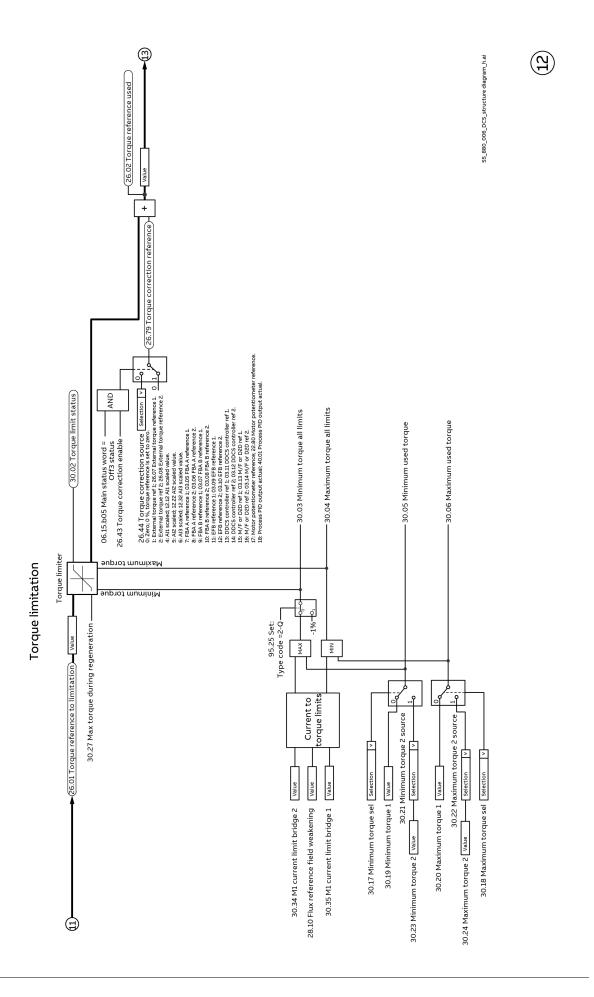






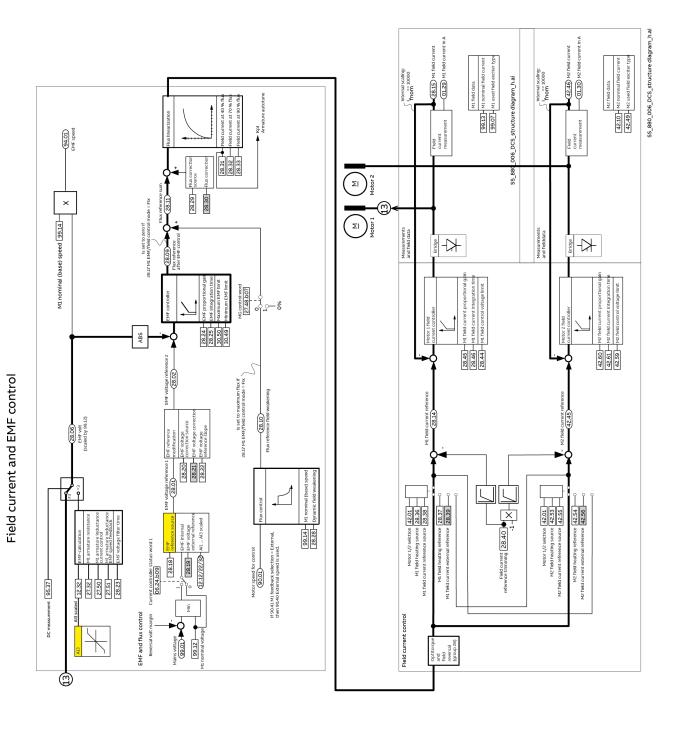
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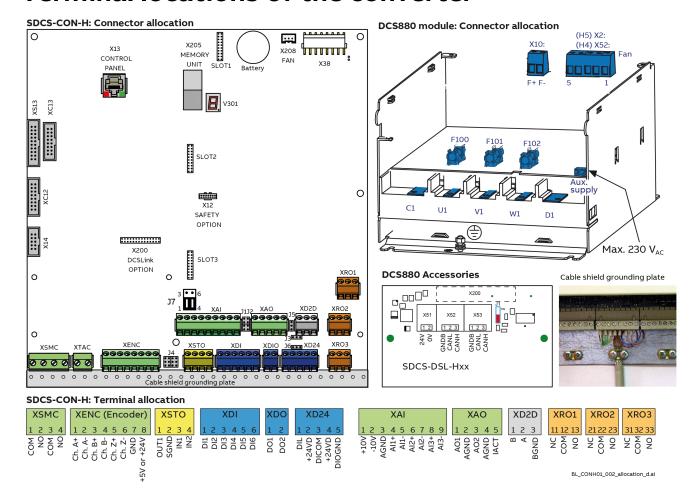


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Armature current control



Terminal locations of the converter



DCS Family



DCS550-S modules The compact drive for machinery application

20 ... 1,000 A_{DC} 0 ... 610 V_{DC} 230 ... 525 V_{AC}

- Compact
- · Robust design
- Adaptive and winder program
- High field exciter current



DCS880 modules For safe productivity

20 ... 5,200 A_{DC} 0 ... 1,500 V_{DC} 230 ... 1,200 V_{AC}

IP00

- · Safe torque off (STO) built in as standard
- Compact and robust
- Single drives, 20 $\rm A_{DC}$ to 5,200 $\rm A_{DC}$, up to 1,500 $\rm V_{DC}$
- IEC 61131 programmable
- Intuitive control panel and PC tool with USB connection and start up assistant
- Wide range of options to serve any DC motor application



DCS880-A enclosed converters Complete drive solutions

 $\begin{array}{cccc} 20 & \dots & 20,000 \; A_{_{DC}} \\ 0 & \dots & 1,500 \; V_{_{DC}} \\ 230 & \dots & 1,200 \; V_{_{AC}} \end{array}$

IP21 - IP54

- Suitable for motoric and non motoric applications (e.g. electrolysis & hydrogen production)
- Individually adaptable to customer requirements
- User-defined accessories like external PLC or automation systems can be included
- + High power solutions in 6- and 12-pulse up to 20,000 $\rm A_{DC}$ 1,500 $\rm V_{DC}$
- In accordance to usual standards
- · Individually factory load tested
- Detailed documentation



DCT880 modules Thyristor power controller

20 ... 4,200 A_{AC} 110 ... 990 V_{AC} IPOO

- Precise power control in industrial heating applications
- Two or three phase devices
- Power optimizer for peak load reduction
- Built on ABB's all-compatible drives architecture
- Intuitive control panel and PC tool with USB connection and start up assistant
- Application control programs and drive application programming with IEC 61131 programming



ABB Automation Products Wallstadter-Straße 59 68526 Ladenburg • Germany

Tel: +49 (0) 6203-71-0

Mail: dc-drives@de.abb.com

Web: new.abb.com/drives/dc