

ABB DRIVES FOR WATER

ACQ80-04 standard control program

Quick installation and start-up guide



List of related manuals

Drive hardware manuals and guides

ACQ80-04 drives (0.75 to 160 kW) hardware manual

Code (English)

3AXD50000170661

Drive firmware manuals and guides

ACQ80-04 drives quick installation and start-up guide (frames R0...R8)

3AXD50000170647

ACQ80-04 primary control program firmware manual

3AXD50000170654

Option manuals and guides

ACS-BP-S basic control panel user manual

3AXD50000032527

ACX-AP-x assistant control panels user's manual

3AUA0000085685

CDPI-0x communication adapter module user's manual

3AXD50000009929

DPMP-01 mounting platform for ACS-AP control panel

3AUA0000100140

DPMP-02/03 control panel mounting platform kit installation guide

3AUA0000136205

FPBA-01 PROFIBUS DP adapter module user's manual

3AFE68573271

FENA-01/-11/-21 Ethernet adapter module user's manual

3AUA0000093568

FECA-01 EtherCAT adapter module user's manual

3AFE68573360

FCAN-01 CANopen adapter module user's manual

3AFE68615500

FOCH du/dt filters hardware manual

3AFE68577519

FSCA-01 RS-485 adapter module user's manual

3AUA0000109533

Tool and maintenance manuals and guides

Drive composer PC tool user's manual

3AUA0000094606

Converter module capacitor reforming instructions

3BFE64059629

NETA-21 remote monitoring tool user's manual

3AUA0000096939

NETA-21 remote monitoring tool installation and startup guide

3AUA0000096881

You can find manuals and other product documents in PDF format on the Internet. See section Document library on the Internet on the inside of the back cover. For manuals not available in the Document library, contact your local ABB representative.

The code below opens an online listing of the manuals applicable to the product:



3AXD50000170647 Rev A

EN

EFFECTIVE: 2018-02-01

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EN - Quick installation and start-up guide

This guide briefly instructs how to install and start-up the ACQ80-04 drive of all frame sizes (R0...R8). For complete information, see ACQ80-04 hardware and firmware manuals.

General considerations

EN

■ Obey the safety instructions



WARNING! Obey these instructions. If you ignore them, injury or death, or damage to the equipment can occur:

- If you are not a qualified electrician, do not do electrical installation work.
 - Do not work on the drive, motor cable or motor when main power is applied. If the drive is already connected to the input power, wait for 5 minutes after disconnecting the input power.
 - Do not work on the control cables when power is applied to the drive or to the external control circuits.
 - Use the lifting eyes of the drive when you lift the drive. Do not tilt the drive. The drive is heavy and its center of gravity is high. An overturning drive can cause physical injury.
 - Make sure that debris from drilling, cutting and grinding does not enter the drive when installing.
 - Make sure that the floor below the drive and the wall where the drive is installed are non-flammable.
-

■ Reform the capacitors

Reform the capacitors if the drive is stored for a year or more.

The manufacturing time can be determined from the serial number on type designation label which is attached to the drive. The serial number format MYYWWRXXX represents the month, year and the week.

YY: 13, 14, 15, ... for 2013, 2014, 2015, ...

WW: 01, 02, 03, ... for week 1, week 2, week 3, ...

For information on reforming the capacitors, see *Converter module capacitor reforming instructions* (3BFE64059629 [English]).

■ Select the power cables

Size the power cables according to local regulations to carry the nominal current given on the type designation label of your drive. See [Ratings](#) on page 53.

■ Ensure the cooling

The maximum ambient temperature without derating is 40 °C (+104 °F). No condensation or frost is allowed. For more information on the ambient temperature, see *ACQ80-04 drives (0.75 to 160 kW) hardware manual (3AXD50000044998 [English])*.

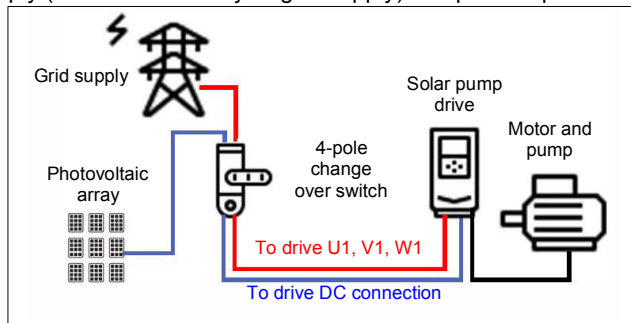
EN

■ Protect the drive and input power cable

If you use gG fuses, make sure that the operating time of the fuse is below 0.5 seconds. Follow the local regulations.

■ Dual supply mode

The solar pump drive operates in dual supply mode either with a three phase input supply from the grid or with DC input supply from photovoltaic array. A four-pole changeover switch enables switching between the two supply modes. At a given time only one supply (Photovoltaic array or grid supply) can provide power to the drive.



Note: Use two poles of the changeover switch in series to ensure that the voltage applied across each pole is half of the full DC voltage.

Install the drive

You can install the drive:

- to a DIN installation rail with integrated lock. Applies to frames R0...R2 only.
or
- with screws to a suitable surface (wall or assembly plate). Applies to all frames R0...R8.

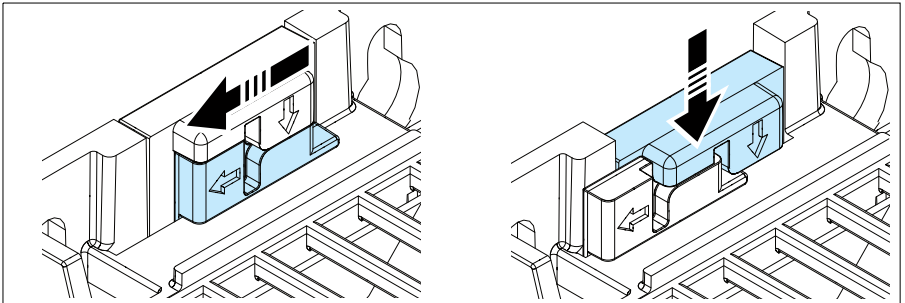
Required tools for installing the drive

To install the drive mechanically, you will need the following tools:

- A drill and suitable drill bits
- Screwdriver (Standard, Phillips head, and Torx) and wrench with a set of suitable bits and sizes (as appropriate for the installation hardware used). See [Standard frame sizes \(R0...R8\)](#) on page 58.
- A tape measure and spirit level
- Personal protective equipment.

Installing a drive to the DIN installation rail (frames R0...R2 only)

1. On the top center of the drive move the locking part to the left.
2. Push and hold the locking button down.
3. Put the top tabs on the drive onto the top edge of the DIN rail.
4. Put the drive against the bottom edge of the DIN installation rail.
5. Release the locking button.
6. Move the locking part to the right.
7. Make sure the drive is installed correctly.



Removing drive from the DIN installation rail (frames R0...R2 only)

To remove the drive, open the locking part using a flat-head screwdriver.

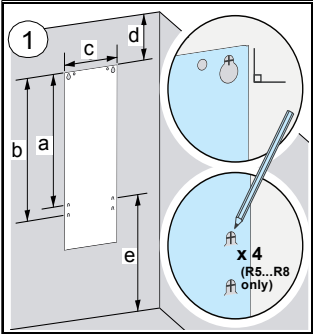
■ Installing a drive with screws (frames R0...R8)

All drives of frames R0...R8 can be installed on the wall with screws. See details of [Standard frame sizes \(R0...R8\)](#) on page 58.



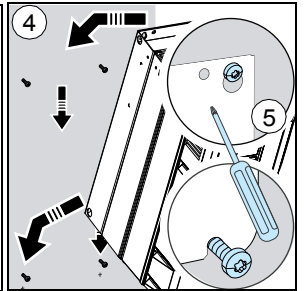
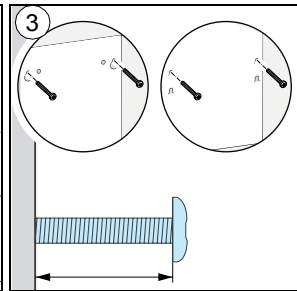
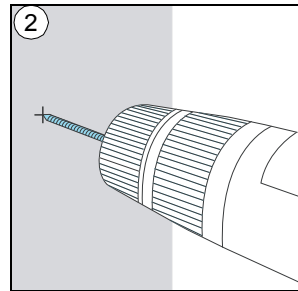
WARNING! The drive module (frames R6...R8) is heavy (45 to 70 kg). Use a suitable lifting device. Do not lift the module manually. Make sure that the wall and the fixing devices can carry the weight. See data in the table below.

1. Mark the mounting hole locations using the mounting template included in the package. See the mounting dimensions in the table below.

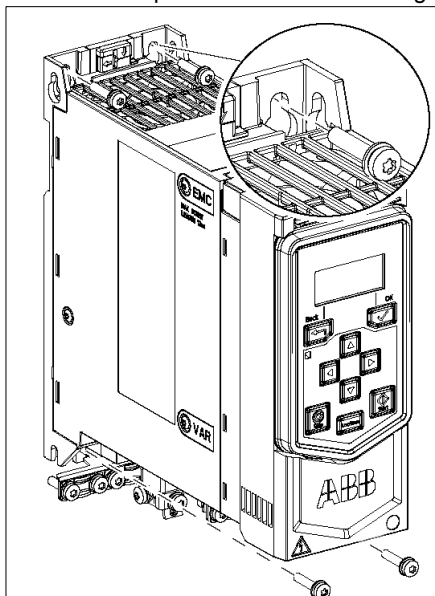


Frame s	R0	R1	R2	R3	R4	R5	R6	R7	R8
Screws	M5			M6		M8			
	mm								
a	191			473	619	581	531	583	658
b	-					612	571	623	701
c	50	75	148	160			213	245	263
d	75			200					
e	75			200			300		
	kg								
Weight	4.47	4.57	7.54	14.86	23.0	28	45	55	70

2. Drill the mounting holes.
3. Tighten the screws into the mounting holes.
4. Position the drive onto the screws on the wall.
5. Tighten the mounting screws.



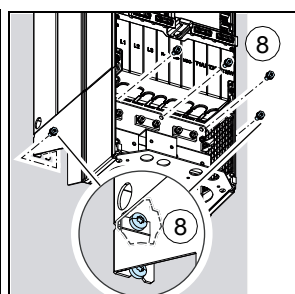
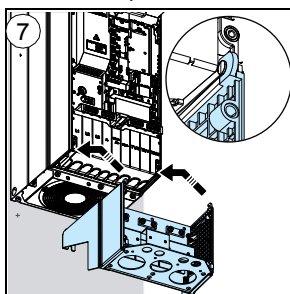
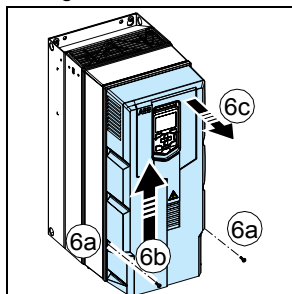
See the example below of the mounting screws in frame R0.



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Frames R5...R8 only:

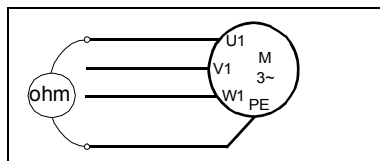
6. Remove the front cover with fastening screws (6a), move the cover to the top side (6b) and then up (6c).
7. Attach the cable entry box to the drive frame.
8. Tighten the box screws: two at the top and four at the bottom.



Check the insulation of the input and motor cables and the motor

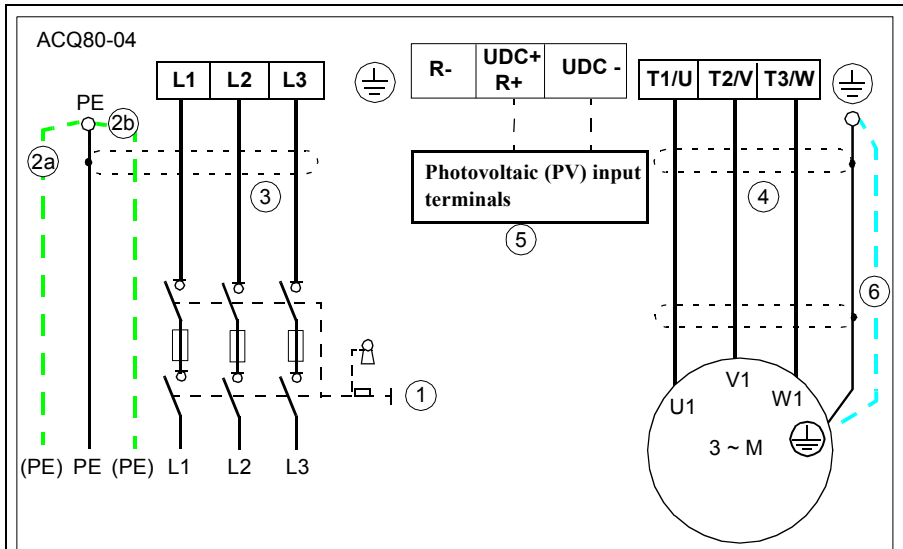
- Check the insulation of the input cable according to local regulations before connecting it to the drive.
- Check the insulation of the motor cable and motor before connecting it to the drive.
- Measure the insulation resistance between each phase conductor and the Protective Earth conductor using a measuring voltage of 1000 V DC. The insulation resistance of an ABB motor must exceed 100 Mohm (reference value at 25 °C or 77 °F). For the insulation resistance of other motors, see the manufacturer's instructions.

Note: Moisture inside the motor casing will reduce the insulation resistance. If moisture is suspected, dry the motor and repeat the measurement.



Connect the power cables

Connection diagram



1	For alternatives, see <i>ACQ80-04 hardware manual</i> .
2	Use a separate grounding PE cable (2a) or a cable with a separate PE conductor (2b) if the conductivity of the shield does not meet the requirements for the PE conductor.
3	360-degree grounding is recommended if shielded cable is used. Ground the other end of the input cable shield or PE conductor at the distribution board.
4	360-degree grounding is required.
5	PV input terminals. UDC-, UDC+ in frames R0...R2 and R-, UDC+ in frame R3. DC connection (UDC+, UDC-) in frames R4...R8.
6	Use a separate grounding cable if the shield does not meet the requirements of IEC 61439-1, there is no symmetrically constructed grounding conductor in the cable.

Note:

If there is a symmetrically constructed grounding conductor on the motor cable in addition to the conductive shield, connect the grounding conductor to the grounding terminal at the drive and motor ends.

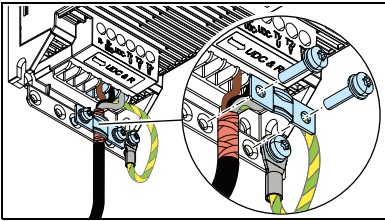
Do not use an asymmetrically constructed motor cable for motors above 30 kW. Earthing at the motor increases bearing current and power consumption, damages the motor bearing and even the motor.

■ Connection procedure: frames R0...R2



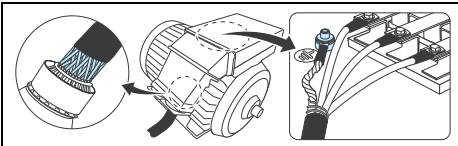
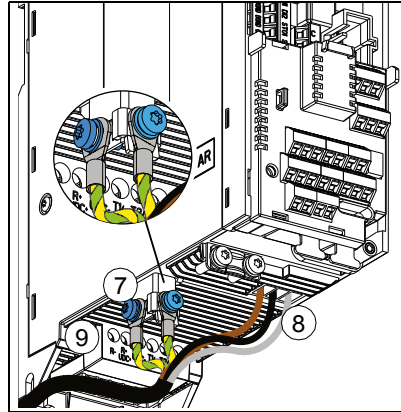
WARNING! If the drive is connected to an IT (non-grounded) system or to a corner-grounded TN system, disconnect the EMC filter grounding screw and varistor (VAR) grounding screw.

1. Remove the front cover. Loosen the retaining screw with a screwdriver, and lift the cover from bottom outwards.
2. Strip the motor cable.
3. Ground the motor cable shield under the grounding clamp.
4. Twist the motor cable shield into a bundle and put yellow-green insulation tape on it, fit a cable lug, and connect it to the grounding terminal.
5. Connect the phase conductors of the motor cable to the terminals of T1/U, T2/V and T3/W. Tighten the screws to the torque given in table below.



Connections	Frame	Tightening torque in Nm (lbf·ft)
T1/U, T2/V, T3/W	R0...R1	0.5...0.6 (0.4)
L1, L2, L3 UDC+, UDC-	R2	1.2...1.5 (0.9...1.1)

6. Strip the input power cable.
7. Twist the input power cable shield into a bundle and put yellow-green insulation tape on it, fit a cable lug, and connect it to the grounding terminal.
8. If the drive is connected to both grid and PV source, connect the grid phase conductors of input power cable to L1, L2 and L3 terminals. Tighten the screws to the torque given in the table in step 5.
9. Connect the PV input terminals to UDC+ and UDC-. Tighten the screws to the torque given in the table in step 5.
10. Ground the motor cable at the motor end.

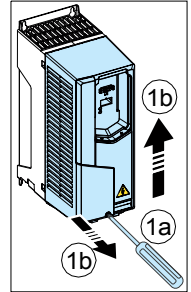


Connection procedure: frames R3...R4

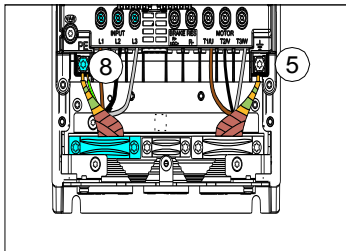


WARNING! If the drive is connected to an IT (non-grounded) system or to a corner-grounded TN system, disconnect the EMC filter grounding screw and varistor (VAR) grounding screw.

1. Remove the front cover. Loosen the retaining screw with screwdriver (1a) and lift the cover from the bottom outwards (1b).
2. Strip the motor cable.
3. Ground the motor cable shield under the grounding clamp.
4. Twist the motor cable shield into a bundle and put yellow-green insulation tape on it, fit a cable lug, and connect it to the grounding terminal.
5. Connect the phase conductors of the motor cable to the terminals of T1/U, T2/V and T3/W. Tighten the screws to the torque given in table below:



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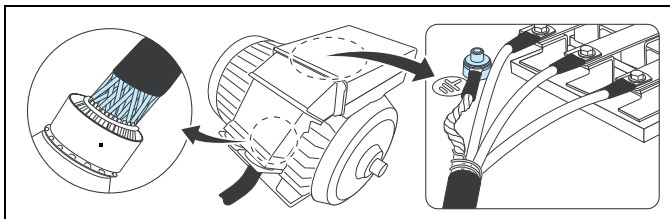


Connections	Frame	Tightening torque in Nm (lbf-ft)
T1/U, T2/V, T3/W L1, L2, L3, UDC+, R-	R3	2.5...4.5 (1.8...3.3)
T1/U, T2/V, T3/W L1, L2, L3	R4	4.0 (3.0)

6. Strip the input power cable.
7. Twist the input power cable shield into a bundle and put yellow-green insulation tape on it, fit a cable lug, and connect it to the grounding terminal.
8. Connect the phase conductors of the input power cable to L1, L2 and L3 terminals. Tighten the screws to the torque given in step 5.
9. For R3, connect the PV input terminals to UDC+ and R-. Tighten the screws to the torque given in step 5.

10. Install the grounding shelf for the control cables (included with the mounting screws in a plastic bag in the delivery) onto the grounding shelf for the power cables.

11. Ground the motor cable shield at the motor end.

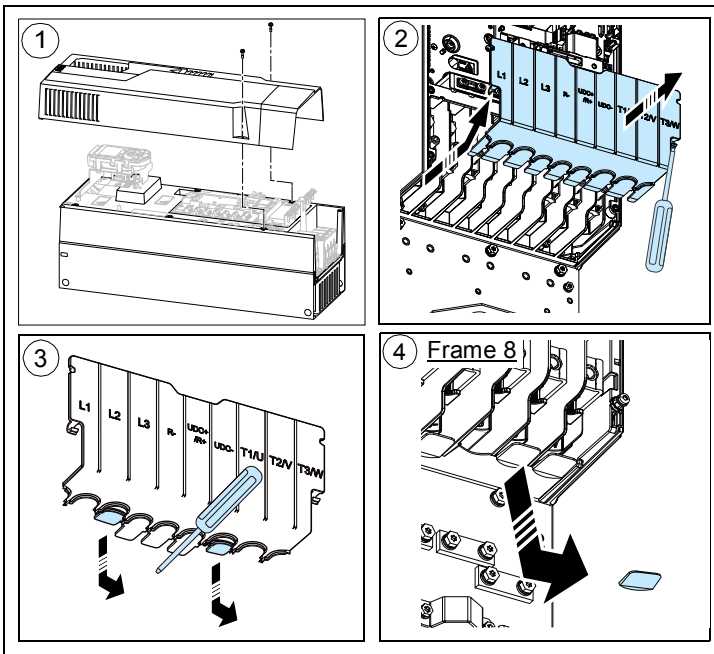


■ Connection procedure: frames R5...R8



WARNING! If the drive is connected to an IT (non-grounded) system or to a corner-grounded TN system, disconnect the EMC filter grounding screw and varistor (VAR) grounding screw.

1. Remove the front cover.
2. Remove the shroud on the power cable terminals by releasing the clips and lifting the shroud up from the sides with a screwdriver.
3. Knock out holes in the shroud for the cables to be installed.
4. Frame R8 only: If you install parallel cables, also knock out holes in the lower shroud for the cables to be installed.

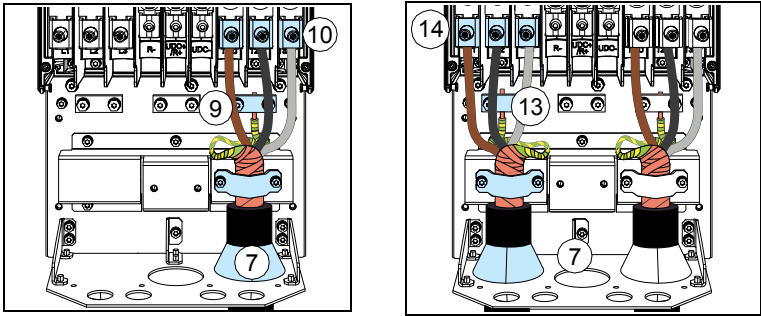


5. Cut an adequate hole into the rubber grommet. Slide the grommet onto the cable.
6. Strip the motor cable.
7. Slide the cables through the holes of the lead-through plate and attach the grommets to the holes (the motor cable to the right and the input power cable to the left).
8. Ground the motor cable shield under the grounding clamp.

9. Twist the motor cable shield into a bundle and put yellow-green insulation tape on it, fit a cable lug, and connect it to the grounding terminal. See figure below.
10. Connect the phase conductors of the motor cable to the terminals of T1/U, T2/V and T3/W. See figure below. Tighten the screws to the torque given in table below.

Frame R8 only:

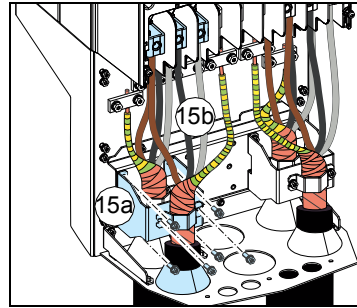
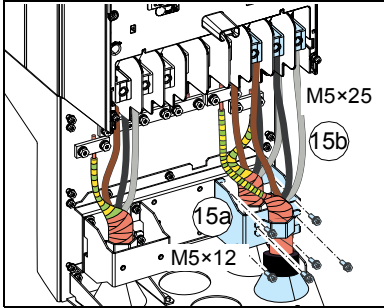
- If you connect only one conductor to the connector, we recommend that you put it under the upper pressure plate.
- The connectors are detachable but we do not recommend that you detach them. If you do, detach and reinstall the connectors as follows.



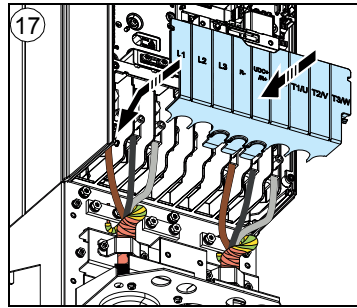
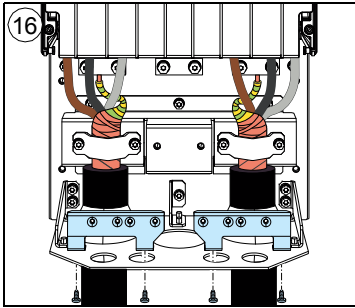
Frame	Tightening torque in Nm (lbf·ft)	
	T1/U, T2/V, T3/W, L1, L2, L3	PE, ⊕
R5	5.6 (4.1)	2.2 (1.6)
R6	30 (22.1)	9.8 (7.2)
R7, R8	40 (29.5)	

11. Strip the power cable.
12. Ground the motor cable shield under the grounding clamp.
13. Twist the motor cable shield into a bundle and put yellow-green insulation tape on it, fit a cable lug, and connect it to the grounding terminal.
14. Connect the phase conductors of the power cable to the terminals of L1, L2 and L3. Tighten the screws to the torque given. See step 10.

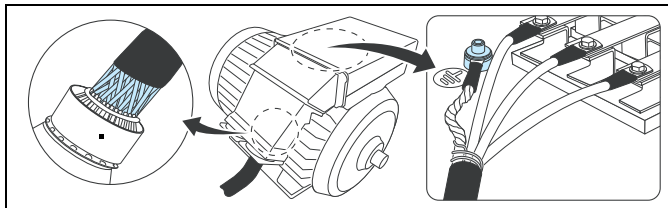
15. Frame R8 only: If you installed parallel cables, install the second grounding shelf for the parallel power cables (15a). Repeat steps 11...14 (15b).



16. Install the grounding shelf of the control cables.
17. Reinstall the shroud on the power terminals.
18. Secure the cables outside the unit mechanically.



19. Ground the motor cable shield at the motor end. For minimum radio frequency interference, ground the motor cable shield 360 degrees at the lead-through of the motor terminal box.



DC connection

The UDC+ and UDC- terminals in frames R4...R8 are for connecting photovoltaic (PV) panels.

Note: For R6...R8, PV array input terminals must be connected through external pre-charging circuit. For details on charging unit, contact your local ABB representative.

Connect the control cables

See section [Default I/O connections \(ABB standard macro\)](#) on page 17 for the default I/O connections of the ABB standard macro. For other macros, see *ACQ80-04 firmware manual* (3AXD50000042620 [English]).

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Connect the cables as described under in *ACQ80-04 firmware manual* (3AXD50000042620 [English]).

Default I/O connections (ABB standard macro)

 1...10 kohm Max. 500 ohm 7)	X1 Reference voltage and analog inputs			
	1	SCR	Signal cable shield (screen)	
	2	AI1	Open for configuration ¹⁾	
	3	AGND	Analog input circuit, common	
	4	+10V	10 V DC reference voltage	
	5	AI2	Open for configuration ²⁾	
	6	AGND	Analog input circuit, common	
	7	AO1	Output frequency, 0...20 mA⁹⁾ : see 13.12	
	8	AO2	Motor current⁹⁾ : see 13.22	
	9	AGND	Analog output circuit common	
 6)	X2, X3 Aux. voltage output and programmable digital inputs			
	10	+24V	Aux. voltage output +24 VDC, max. 250 mA ³⁾	
	11	DGND	Aux. voltage output common	
	12	DCOM	Digital input common for all	
	13	DI1	Start (0) / Stop (1): see 79.11 ⁸⁾	
	14	DI2	Open for configuration	
	15	DI3	Open for configuration	
	16	DI4	Open for configuration	
	17	DI5	Open for configuration	
	18	DI6	Open for configuration	
 5) 4)	X6, X7, X8 Relay outputs			
	19	RO1C	Ready Run⁹⁾ : see 10.24 250 V AC / 30 V DC 2 A	
	20	RO1A		
	21	RO1B		
	22	RO2C	Running⁹⁾ : see 10.27 250 V AC / 30 V DC 2 A	
	23	RO2A		
	24	RO2B		
	25	RO3C	Fault (-1)⁹⁾ : see 10.30 250 V AC / 30 V DC 2 A	
	26	RO3A		
	27	RO3B		
X5 Built-in fieldbus				
29	B+	Internal Modbus RTU (EIA-485)		
30	A-			
31	DGND			
(Frame R0~R2)				
	S100	TERM&BIAS	Termination resistor and bias resistor switch	
(Frame R3~R8)				
	S100	TERM	Termination resistor switch	
	S200	BIAS	Bias resistor switch	
X4 Safety torque off				
 R3~R8 4)	R0~R2	R3~R8		
	33	-	OUT1	Safety torque off function. Factory connection. Both circuits must be closed for the drive to start. See <i>Safe torque off function</i> in the drive hardware manual.
	34	SGND	OUT2	
	35	OUT1	SGND	
	36	⁵⁾ IN1	IN1	
	37	⁴⁾ IN2	IN2	
X10 24 V AC/DC (frames R6~R8 only)				
	40	24 V AC/DC- in	24V AC/DC input, for control unit power supply when external main power is disconnected.	
	41	24 V AC/DC+ in		
X11 Redundant auxiliary voltage output (frames R0~R2 only)				
	42	+24 V	Aux. voltage output +24 V DC, max. 250 mA ³⁾	
	43	DGND	Aux. voltage output common	
	44	DCOM	Digital input common for all	

Terminal sizes

- Frame sizes R0...R8: 0.14...1.5 mm² (all terminals)
- Tightening torques: 0.5...0.6 N·m (0.4 lbf·ft)

Notes

¹⁾ Current [0(4)...20 mA, $R_{in} < 500 \text{ ohm}$] or voltage [0(2)...10 V, $R_{in} > 200 \text{ kohm}$] input as selected with parameter 12.15 A11 unit selection.

²⁾ Current [0(4)...20 mA, $R_{in} = 100 \text{ ohm}$] or voltage [0(2)...10 V, $R_{in} > 200 \text{ kohm}$] input as selected with parameter 12.25 A12 unit selection.

EN ³⁾ Total load capacity of the auxiliary voltage output +24V (X2:10) = 6.0 W (250 mA / 24 V) - User can use this source for either of the I/O connections (DI1... DI2- RO1 or DI3...DI6 - RO2~RO3).

⁴⁾ Connected with jumpers at the factory.

⁵⁾ Applicable for R0~R2 frames only.

⁶⁾ Use shielded twisted-pair cables for digital signals.

⁷⁾ Ground the outer shield of the cable 360 degrees under the grounding clamp on the grounding shelf for the control cables.

⁸⁾ Input signal

⁹⁾ Output signal

For information on cable connection and drive operation, see *Control Connections* in the hardware manual (3AXD50000170661).

Install optional modules, if any

See chapter *Electrical installation* in ACQ80-04 hardware manual.

Check the compatibility with IT (ungrounded) system

The internal EMC filter is not suitable for use on an IT (ungrounded) system. Disconnect the EMC filter and varistor before connecting the drive to the supply network.



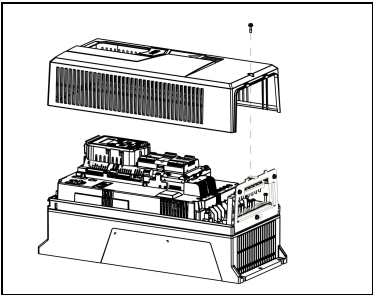
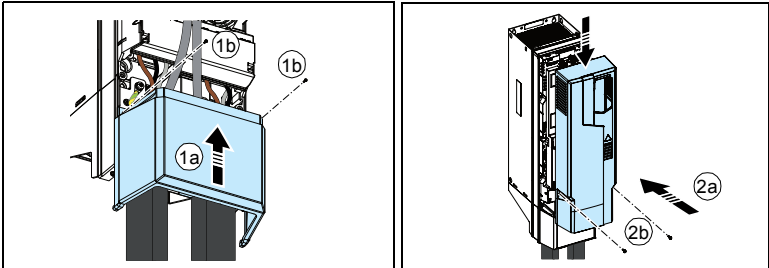
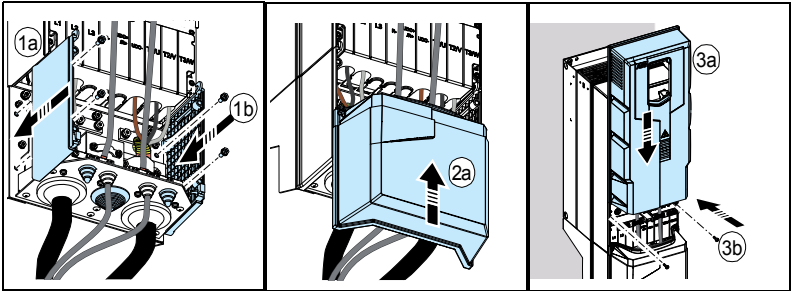
WARNING! Do not install the drive with the internal EMC filter connected on an IT system (an ungrounded power system or a high-resistance-grounded [over 30 ohms] power system), otherwise the system will be connected to ground potential through the EMC filter capacitors of the drive. This can cause danger, or damage the drive.

EN

Note:

- When the internal EMC filter is disconnected, the drive EMC compatibility is considerably reduced.
 - If you connect the drive to an IT (ungrounded) disconnect the internal EMC filter and varistor by removing the two screws.
-

Reinstall covers (frames R3...R8)

Frames	Action
R3, R4	1. Reinstall the cover: Put the tabs on the cover top in their counterparts on the housing and press the cover. 2. Tighten the retaining screw at the bottom with a screwdriver. 
R5	1. Slide the cover upwards (1a) and tighten the retaining screws (1b). 2. Reinstall the module cover (2a) and press the cover at bottom. Tighten the two retaining screws (2b) with a screwdriver. 
R6...R8	1. Install the side plates (1a) of the cable box. Tighten the retaining screws (1b) with a screw driver. 2. Slide the cover (2a) of the cable box on the module from below until the cover snaps into place. 3. Reinstall the module cover (3a). Tighten the two retaining screws (3b) with a screwdriver. 

Start up and use

This section describes how to install and start-up the drive using the basic control panel.

Only limited information may be available in this manual. For detailed information of all Menus and Sub menus, see the *ACS-BP-S basic control panel user manual* (3AXD50000032527 [English]).

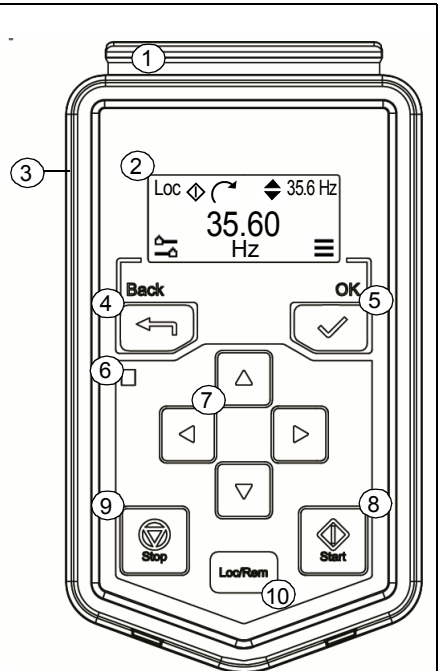
Before you start

Make sure that the drive is installed as described in chapter [EN - Quick installation and start-up guide](#) on page 3.

EN

Using the control panel

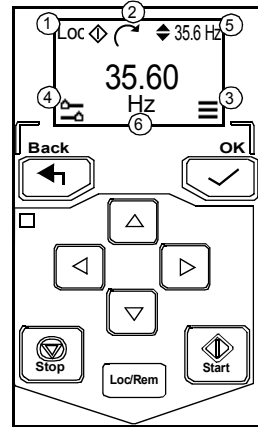
1. **Clip** – Press the clip downward to remove the panel from the drive.
2. **Display** – Shows the selected settings and menus.
3. **RJ-45 connector slot** – Located on the back side of the control panel.
4. **Back button** – Moves back to the previous menus. In the Home screen, this button navigates to the Options menu.
5. **OK button** – Confirms the selected action.
6. **Status LEDs** –
 - Continuous green – Indicates that drive is functioning normally.
 - Blinking green – Indicates an active warning in the drive.
 - Continuous red – Indicates an active fault in the drive.
7. **Arrow buttons** – Allows scrolling up/down/left/right on text pages. In the Home screen, the left and right arrow buttons navigate to different (default or user-defined) home screens.
8. **Start button** – Starts the drive.
9. **Stop button** – Stops the drive.
10. **Loc/Rem button** – Switches between Local/Remote controls. Local control is through control panel and Remote control is through PC or external devices.



Display

The control panel display shows the following elements:

1. **Control location and related icons:**
Indicates how the drive is controlled.
 - **Loc:** The drive is in local control, that is, controlled from the control panel.
 - **Rem:** The drive is in remote control, that is, controlled through I/O or fieldbus.
2. **Rotation direction:** Shows the forward (clockwise) or reverse (counter-clockwise) rotation of motor.
3. **Main:** Navigates to the Main menu. See description on page 23.
4. **Option:** Navigates to the Options menu. See description on page 26.
5. **Reference value:** Allows to define the reference value of speed, frequency or current and its unit using the Up/Down arrow buttons.
6. **Actual value:** Shows the actual value of speed, frequency or current and its unit.



Main menu ≡

The Main menu includes the following control panel elements:



1

Motor data (23)

2

Start stop control (24)

3

Connection macro (24)

4

Diagnostics (25)

5

Backup data (25)

6

Parameter settings (25)

EN

■ Sub menus

The sub-menu items allows you to change settings and set actions. Some sub menus also have menus and/or option lists. Each sub-menu item has access to frequently used parameters. For the complete parameter list, go to [Parameter settings](#) ⚙️.

Note: The content of the sub menu depend on the drive type.



Motor data

Values are based on the motor rating plate. See parameter group [98 User motor parameters](#) (page 50).

Note: Values cannot be changed while drive is running.

1) Motor type	1 AsynM 0.18kW	2) Motor nominal power
3) Motor control mode	3 Scalar 1.2A	4) Motor nominal current
5) Motor nominal voltage	5 230.0V 50.00Hz	6) Motor nominal frequency
7) Motor nominal speed	7 1360rpm 0.000Nm	8) Motor nominal torque
9) Motor phase order - UVW, UVV	9 UVW Cosφ 0.00	10) Motor nominal Cosφ



Start stop control

See parameter group [79 Start stop control](#) (page 46).

The selected option is Operating mode, MSTIn1.

1) **Operating mode** – Options available are Auto, Manual In1 Start; stop, ManualIn1P Start; In2 Stop, Timed function, Fieldbus A, and Embedded fieldbus.

3) **PV cell min voltage** - The minimum DC voltage at which the drive operates.

5) **Pump min speed** - The minimum motor speed at which the drive operates.

①	MSTIn1	StDCVolt	②
		225	
③	PVminV	PVmaxV	④
	225	225	
⑤	PminSpd	PmaxSpd	⑥
	1000	3000	

2) **Start DC voltage** – The minimum DC voltage required to start the drive.

4) **PV cell max voltage** - The maximum DC voltage at which the drive operates.

6) **Pump max speed** - The maximum motor speed at which the drive operates.



Connection macro

Values are based on drive type. See parameter [96.04 Macro select](#) (page 49).

1) **Macro** - Displays the selected macro name. For example, **ABB standard (2-wire)**.



2) **I/O Connections** - Displays the selected macro-specific I/O connections. See menu description below.



→ 1 2-wire

Selected macro is ABB standard (2-wire)

1) **ABB standard (2-wire)** - Default macro for general purpose.



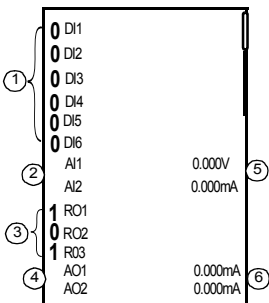
2) **PID** - Suitable for closed-loop control systems such as pressure control, flow control, etc.



→ I/O

Displays the selected macro-specific I/O connections. The below example is I/O connection of Pharma macro.

- 1) DI - Digital Inputs DI1...DI6
- 2) AI - Analog Inputs AI1...AI2
- 3) RO- Relay Outputs RO1...RO3
- 4) AO1-Analog Outputs AO1...AO2



- 5) AI1 and AI2 values
- 6) AO1 and AO2 values

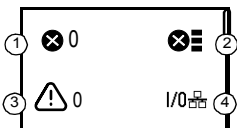


Diagnostics

Displays the active faults and warnings and how to fix and reset.

For information about fault and warning codes, see [Diagnostics](#) on page 57.

- 1) **Active Fault** - Displays active faults.
- 3) **Active Warnings** - Displays active warnings.



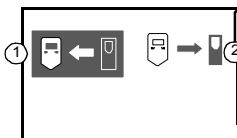
- 2) **Fault History** - Lists the fault history.
- 4) **I/O status** - I/O settings.



Backup data

Restore and Backup data between drive and panel.

- 1) Backup from the drive to the control panel.



- 2) Restore the back up from the panel to the drive.
A progress view appears during the backup.



Parameter settings

Contains the complete parameter list and modified parameter list. See [Parameters List](#) on page 29.

- 1) Complete parameter list.

- 3) Restore to default parameter values ([96.06](#) [8]).



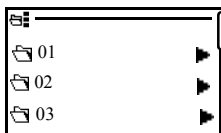
- 2) Modified parameters list.



Complete parameter list

Contains the complete parameter list. See [Parameters List](#) on page 29.

- 1) Complete parameter list.



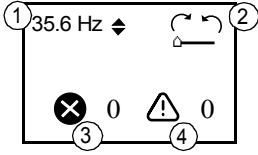
Options menu

In the home screen, press Back button to navigate to the Options menu. The menu includes the following control panel elements:

1) **Reference value:** Speed (rpm) or frequency (Hz).

NOTE: Speed reference can be provided only in local mode. In remote mode, reference is provided by MPPT and is not based on user input.

3) **Faults:** Active fault code.



2) **Rotation direction:** Forward  or reverse 

4) **Warnings:** Active warning code.

Setting speed or frequency reference

1. In the Options menu , move to the speed or frequency reference (1) item using the arrow buttons.

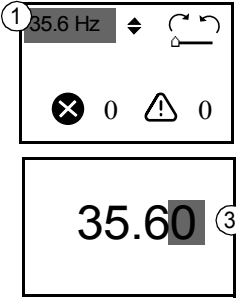
2. Press the OK button to open the item.

3. Use arrow buttons to set the speed or frequency value.

4. Press OK button to confirm the changes.

NOTES:

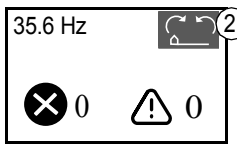
- Frequency reference can be provided only in local mode. In remote mode, reference is provided by MPPT internally and is not based on user input.
- Frequency/Speed value can be +ve or -ve and it indicates forward (clockwise) or reverse (counter-clockwise) rotation of the motor respectively.



Changing the rotation direction

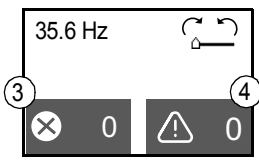
1. In the Options menu , move to the Rotational direction (2) item using the arrow buttons.

2. Press OK button to change the direction of motor (clockwise or counter-clockwise).

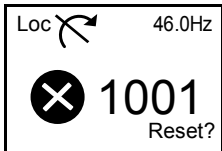


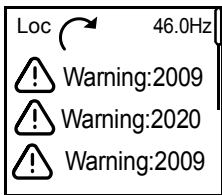
View active faults/warnings

In the Options menu , view active faults (3) or warnings (4). See the fault/warning codes on page 57.



Fault and warning messages

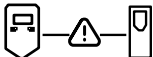
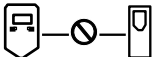
Fault messages	
The display shows the active fault message when a problem is detected. When a fault message code is displayed: 1. Identify and eliminate the cause. See list of Fault messages on page 63. 2. Press Reset in the Fault view.	

Warning messages	
The display shows warning message codes when a problem is detected. To view the warning messages list: 1. Open the Main menu ≡ . 2. Select Diagnostics  and open the Warning messages list. See list of Warning messages on page 57.	

EN

For more information on fault and warning messages, see the drive firmware manual.

Drive and panel communication failure

The drive does not respond to the panel commands during communication failure.	
The drive and the panel are not compatible.	

Status light

	Continuous green	Indicates that drive is functioning normally.
	Green, blinking	Indicates an active warning in the drive.
	Red, continuous	Indicates an active fault in the drive.

Parameters List

Index	Name	Range/List	Unit	Default
01 Actual values				
01.01	Motor speed used	-30000.00...30000.00	rpm	-
01.02	Motor speed estimated	-30000.00...30000.00	rpm	-
01.03	Motor speed%	-1000.00...1000.00	%	-
01.06	Output frequency	-500.00...500.00	Hz	-
01.07	Motor current	0...30000.00	A	-
01.08	Motor current% of motor nom	0...1000.0	%	-
01.09	Motor current% of drive nom	0...1000.0	%	-
01.10	Motor torque	-1600.0...1600.0	%	-
01.11	DC voltage;	0...2000.00	V	-
01.13	Output voltage	0...2000	V	-
01.14	Output power	-32768.00...32767.00	kW	-
01.15	Output power% of motor nom	-300.00...300.00	%	-
01.16	Output power% of drive nom	-300.00...300.00	%	-
01.17	Motor shaft power	-32768.00...32767.00	kW or hp	-
01.18	Inverter GWh motoring	0...65535	GWh	-
01.19	Inverter MWh motoring	0...1000	MWh	-
01.20	Inverter kWh motoring	0...1000	kWh	-
01.24	Flux actual%	0...200	%	-
01.30	Nominal torque scale	0...4000000.00	N·m	-
01.50	Current hour kWh	0...1000000.00	kWh	-
01.51	Previous hour kWh	0...1000000.00	kWh	-
01.52	Current day kWh	0...1000000.00	kWh	-
01.53	Previous day kWh	0...1000000.00	kWh	-
01.54	Cumulative inverter energy	-200000000.0...200000000.0	kWh	-
01.55	Inverter GWh counter (resettable)	0...65535	GWh	-
01.56	Inverter MWh counter (resettable)	0...1000	MWh	-
01.57	Inverter kWh counter (resettable)	0...1000	kWh	-
01.58	Cumulative inverter energy (resettable)	-200000000.0...200000000.0	kWh	-
01.61	Abs motor speed used	0...30000.00	rpm	-
01.62	Abs motor speed%	0...1000.00	%	-
01.63	Abs output frequency	0...500.00	Hz	-
01.64	Abs motor torque	0...1600.0	%	-
01.65	Abs output power	0...32767.00	kW	-
01.66	Abs output power% motor nom	0...300.00	%	-
01.67	Abs output power% drive nom	0...300.00	%	-
01.68	Abs motor shaft power	0.00...32767.00	kW or hp	-
03 Input references				
03.01	Panel reference	-100000.00...100000.00	-	0.00
03.02	Panel reference remote	-100000.00...100000.00	-	0.00
03.05	FB A reference 1	-100000.00...100000.00	-	0.00
03.06	FB A reference 2	-100000.00...100000.00	-	0.00
03.09	EFB reference 1	-30000.00...30000.00	-	0.00
03.10	EFB reference 2	-30000.00...30000.00	-	0.00

Index	Name	Range/List	Unit	Default		
04 Warnings and faults						
04.01	Tripping fault	0x0000...0xffff	-	0x0000		
04.02	Active fault 2	0x0000...0xffff	-	0x0000		
04.03	Active fault 3	0x0000...0xffff	-	0x0000		
04.06	Active warning 1	0x0000...0xffff	-	0x0000		
04.07	Active warning 2	0x0000...0xffff	-	0x0000		
04.08	Active warning 3	0x0000...0xffff	-	0x0000		
04.11	Latest fault	0x0000...0xffff	-	0x0000		
04.12	2nd latest fault	0x0000...0xffff	-	0x0000		
04.13	3rd latest fault	0x0000...0xffff	-	0x0000		
04.16	Latest warning	0x0000...0xffff	-	0x0000		
04.17	2nd latest warning	0x0000...0xffff	-	0x0000		
04.18	3rd latest warning	0x0000...0xffff	-	0x0000		
05 Diagnostics						
05.01	On-time counter	0...65535	days	0		
05.02	Run-time counter	0...65535	days	0		
05.03	Pump run hours	0.0...429496729.5	h	0.0		
05.04	Fan on-time counter	0...65535	days	0		
05.10	Control board temperature	-100...300	°C	0		
05.11	Inverter temperature	-40.0...160.0	%	0.0		
05.20	Diagnostic word 1	0b0000...0b1111	-	0b0000		
	Bit	Name	Bit	Name	Bit	Name
	0	Any warning or fault	4	Overcurrent fit	8	Reserved
	1	Any warning	5	Reserved	9	Device overtemp fit
	2	Any fault	6	DC overvoltage	10...15	Reserved
	3	Reserved	7	DC undervoltage		
05.21	Diagnostic word 2	0b0000...0b1111	-	0b0000		
	Bit	Name	Bit	Name	Bit	Name
	0...9	Reserved	10	Motor overtemp fit	11...15	Reserved
05.22	Diagnostic word 3	0b0000...0b1111	-	0b0000		
	Bit	Name	Bit	Name	Bit	Name
	0...8	Reserved	9	kWh pulse	10	Reserved
					11	Fan command
				12...15	Reserved	
05.80	Motor speed at fault	-30000.00...30000.00	rpm	0.00		
05.81	Output frequency at fault	-500.00...500.00	Hz	0.00		
05.82	DC voltage at fault	0.00...2000.00	V	0.00		
05.83	Motor current at fault	0.00...30000.00	A	0.00		
05.84	Motor torque at fault	-1600.00...1600.00	%	0.0		
05.85	Main status word at fault	See parameter 06.11 Main status word .	-	0x0000		
05.86	DI delayed status at fault	See parameter 10.02 DI delayed status .	-	0b0000		
05.87	Inverter temperature at fault	-40...160	°C	0		
05.88	Reference used at fault	-30000.00...30000.00	Hz	0.00		
06 Control and status words						
06.01	Main control word	0x0000...0xffff	-	0x0000		

Index	Name	Range/List		Unit	Default																																										
	<table><tr><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>Off1 control</td><td>6</td><td>Ramp in zero</td><td>12</td><td>User bit 0</td></tr><tr><td>1</td><td>Off2 control</td><td>7</td><td>Reset</td><td>13</td><td>User bit 1</td></tr><tr><td>2</td><td>Off3 control</td><td>8</td><td>Inching 1</td><td>14</td><td>User bit 2</td></tr><tr><td>3</td><td>Run</td><td>9</td><td>Inching 2</td><td>15</td><td>User bit 3</td></tr><tr><td>4</td><td>Ramp out zero</td><td>10</td><td>Remote cmd</td><td></td><td></td></tr><tr><td>5</td><td>Ramp hold</td><td>11</td><td>Ext ctrl loc</td><td></td><td></td></tr></table>	Bit	Name	Bit	Name	Bit	Name	0	Off1 control	6	Ramp in zero	12	User bit 0	1	Off2 control	7	Reset	13	User bit 1	2	Off3 control	8	Inching 1	14	User bit 2	3	Run	9	Inching 2	15	User bit 3	4	Ramp out zero	10	Remote cmd			5	Ramp hold	11	Ext ctrl loc						
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3	Run	9	Inching 2	15	User bit 3																																										
4	Ramp out zero	10	Remote cmd																																												
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06.11	Main status word		0x0000...0xffff		-	0x0000																																									
	<table><tr><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>Ready to switch ON</td><td>6</td><td>Switch-on inhibited</td><td>12</td><td>User bit 1</td></tr><tr><td>1</td><td>Ready run</td><td>7</td><td>Warning</td><td>13</td><td>User bit 2</td></tr><tr><td>2</td><td>Ready ref</td><td>8</td><td>At set point</td><td>14</td><td>User bit 3</td></tr><tr><td>3</td><td>Tripped</td><td>9</td><td>Remote</td><td>15</td><td>Reserved</td></tr><tr><td>4</td><td>Off 2 inactive</td><td>10</td><td>Above limit</td><td></td><td></td></tr><tr><td>5</td><td>Off 3 inactive</td><td>11</td><td>User bit 0</td><td></td><td></td></tr></table>	Bit	Name	Bit	Name	Bit	Name	0	Ready to switch ON	6	Switch-on inhibited	12	User bit 1	1	Ready run	7	Warning	13	User bit 2	2	Ready ref	8	At set point	14	User bit 3	3	Tripped	9	Remote	15	Reserved	4	Off 2 inactive	10	Above limit			5	Off 3 inactive	11	User bit 0						
	Bit	Name	Bit	Name	Bit	Name																																									
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	1	Ready run	7	Warning	13	User bit 2																																									
	2	Ready ref	8	At set point	14	User bit 3																																									
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06.16	Drive status word 1		0b0000...0b1111		-	0b0000																																									
	<table><tr><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>Not applicable.</td><td>5</td><td>Started</td><td>10</td><td>Ext1 active</td></tr><tr><td>1</td><td>Inhibited</td><td>6</td><td>Modulating</td><td>11</td><td>Ext2 active</td></tr><tr><td>2</td><td>DC charged</td><td>7</td><td>Limiting</td><td>12</td><td>Reserved</td></tr><tr><td>3</td><td>Ready to start</td><td>8</td><td>Local control</td><td>13</td><td>Start request</td></tr><tr><td>4</td><td>Following reference</td><td>9</td><td>Network control</td><td>14</td><td>Running</td></tr><tr><td></td><td></td><td></td><td></td><td>15</td><td>Reserved</td></tr></table>	Bit	Name	Bit	Name	Bit	Name	0	Not applicable.	5	Started	10	Ext1 active	1	Inhibited	6	Modulating	11	Ext2 active	2	DC charged	7	Limiting	12	Reserved	3	Ready to start	8	Local control	13	Start request	4	Following reference	9	Network control	14	Running					15	Reserved				
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	1	Inhibited	6	Modulating	11	Ext2 active																																									
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4	Following reference	9	Network control	14	Running																																										
				15	Reserved																																										
06.17	Drive status word 2		0b0000...0b111		-	0b0000																																									
	<table><tr><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>Identification run done</td><td>5</td><td>Safe reference active</td><td>10...12</td><td>Reserved</td></tr><tr><td>1</td><td>Magnetized</td><td>6</td><td>Last speed active</td><td>13</td><td>Start delay active</td></tr><tr><td>2</td><td>Reserved</td><td>7...8</td><td>Reserved</td><td>14...15</td><td>Reserved</td></tr><tr><td>3</td><td>Speed control</td><td>9</td><td>Jogging active</td><td></td><td></td></tr><tr><td>4</td><td>Reserved</td><td></td><td></td><td></td><td></td></tr></table>	Bit	Name	Bit	Name	Bit	Name	0	Identification run done	5	Safe reference active	10...12	Reserved	1	Magnetized	6	Last speed active	13	Start delay active	2	Reserved	7...8	Reserved	14...15	Reserved	3	Speed control	9	Jogging active			4	Reserved														
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4	Reserved																																														
06.18	Start inhibit status word		0b0000...0xffff		-	0b0000																																									
	<table><tr><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>Not ready run</td><td>6</td><td>Reserved</td><td>12</td><td>Em Off2</td></tr><tr><td>1</td><td>Ctrl location changed</td><td>7</td><td>STO</td><td>13</td><td>Em Off3</td></tr><tr><td>2</td><td>SSW inhibit</td><td>8</td><td>Current calibration ended</td><td>14</td><td>Auto reset inhibit</td></tr><tr><td>3</td><td>Fault reset</td><td>9</td><td>ID run ended</td><td>15</td><td>Jogging active</td></tr><tr><td>4</td><td>Lost start enable</td><td>10</td><td>Reserved</td><td></td><td></td></tr><tr><td>5</td><td>Lost run enable</td><td>11</td><td>Em Off1</td><td></td><td></td></tr></table>	Bit	Name	Bit	Name	Bit	Name	0	Not ready run	6	Reserved	12	Em Off2	1	Ctrl location changed	7	STO	13	Em Off3	2	SSW inhibit	8	Current calibration ended	14	Auto reset inhibit	3	Fault reset	9	ID run ended	15	Jogging active	4	Lost start enable	10	Reserved			5	Lost run enable	11	Em Off1						
	Bit	Name	Bit	Name	Bit	Name																																									
	0	Not ready run	6	Reserved	12	Em Off2																																									
	1	Ctrl location changed	7	STO	13	Em Off3																																									
	2	SSW inhibit	8	Current calibration ended	14	Auto reset inhibit																																									
	3	Fault reset	9	ID run ended	15	Jogging active																																									
4	Lost start enable	10	Reserved																																												
5	Lost run enable	11	Em Off1																																												
06.19	Speed control status word		0b0000...0b1111		-	0b0000																																									
	<table><tr><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th><th>Bit</th><th>Name</th></tr><tr><td>0</td><td>Zero speed</td><td>2...3</td><td>Reverse</td><td>7</td><td>Any constant speed request - Not applicable.</td></tr><tr><td>1</td><td>Forward</td><td>4...6</td><td>Reserved</td><td>8...15</td><td>Reserved</td></tr></table>	Bit	Name	Bit	Name	Bit	Name	0	Zero speed	2...3	Reverse	7	Any constant speed request - Not applicable.	1	Forward	4...6	Reserved	8...15	Reserved																												
	Bit	Name	Bit	Name	Bit	Name																																									
0	Zero speed	2...3	Reverse	7	Any constant speed request - Not applicable.																																										
1	Forward	4...6	Reserved	8...15	Reserved																																										

Index	Name	Range/List	Unit	Default				
06.29	MSW bit 10 selection	False[0], True[1], Above limit[2]	-	Above limit[2]				
06.30	MSW bit 11 selection	False[0], True[1], Ext ctrl loc[2]	-	Ext ctrl loc[2]				
06.31	MSW bit 12 selection	False[0], True[1], Ext run enable [2]	-	Ext run enable [2]				
06.32	MSW bit 13 selection	False[0], True[1]	-	False[0]				
06.33	MSW bit 14 selection	False[0], True[1]	-	False[0]				
07 System info								
07.03	Drive rating id	-	-	Not selected				
07.04	Firmware name	-	-	-				
07.05	Firmware version	0.00.0.0... 255.255.255.255	-	0.00.0.0				
07.06	Loading package name	-	-	-				
07.07	Loading package version	0.00.0.0... 255.255.255.255	-	0.00.0.0				
07.11	CPU usage	0...100	%	0				
10 Standard DI, RO								
10.02	DI delayed status		0b0000...0b1111	-	0b0000			
	Bit	Name	Bit	Name	Bit	Name	Bit	Name
	0	DI1	2	DI3	4	DI5	6...15	Reserved
	1	DI2	3	DI4	5	DI6		
10.03	DI force selection		See parameter 10.02 DI delayed status		-		0b00000b000 00b00000	
10.04	DI forced data		See parameter 10.02 DI delayed status		-		0b0000	
10.21	RO status		0b0000...0b1111		-		0b0000	
	Bit	Name	Bit	Name	Bit	Name	Bit	Name
	0	RO1	1	RO2	2	RO3	3...15	Reserved
10.22	RO force selection		See parameter 10.21 RO status		-		0b0000	
10.23	RO forced data		See parameter 10.21 RO status		-		0b0000	
10.24	RO1 source		0...2, 4...24, 27...35, 45...48		-		Ready run[2]	
	Not energized[0]		Above limit[12]		Remote control[24]		RO/DIO control word bit2[42]	
	Energized[1]		Warning[13]		Timed function 1[27] - Not applicable.		PFC1[45] - Not applicable	
	Ready run[2]		Fault[14]		Timed function 2[28] - Not applicable.		PFC2[46] - Not applicable	
	Enabled[4]		Fault (-1) [15]		Timed function 3[29] - Not applicable.		PFC3[47] - Not applicable	
	Started[5]		Fault/Warning[16]		Reserved[30...32]		PFC4[48] - Not applicable	
	Magnetized[6]		Overcurrent[17]		Supervision 1[33]		Event word 1[53]	
	Running [7]		Overvoltage[18]		Supervision 2[34]		User load curve[61]	
	Ready ref[8]		Drive temp[19]		Supervision 3[35]		RO/DIO control word[62]	
	At setpoint[9]		Undervoltage[20]		Start delay[39]		Other [bit]	
	Reverse[10]		Motor temp[21]		RO/DIO control word bit0[40]			
					RO/DIO control word			

Index	Name		Range/List			Unit		Default	
10.25	RO1 ON delay		0.0...3000.0			s		0	
10.26	RO1 OFF delay		0.0...3000.0			s		0	
10.27	RO2 source		See parameter 10.24 RO1 source			-		Running [7]	
10.28	RO2 ON delay		0.0...3000.0			s		0	
10.29	RO2 OFF delay		0.0...3000.0			s		0	
10.30	RO3 source		See parameter 10.24 RO1 source			-		Fault (-1) [15]	
10.31	RO3 ON delay		0.0...3000.0			s		0	
10.32	RO3 OFF delay		0.0...3000.0			s		0	
10.99	RO/DIO control word		0b0000...0b1111			-		0b0000	
	Bit	Name	Bit	Name	Bit	Name	Bit	Name	
	0	RO1	1	RO2	2	RO3	3...15	Reserved	
10.101	RO1 toggle counter		0...4294967000			-		-	
10.102	RO2 toggle counter		0...4294967000			-		-	
10.103	RO2 toggle counter		0...4294967000			-		-	
11 Standard DIO, FI, FO									
11.05	DIO1 configuration		Digital output[0], Input[], Frequency output [2]			-		Input[1]	
11.21	DI5 configuration		Digital input[0], Frequency input [1]			-		Digital input[0]	
11.38	Freq in 1 actual value		0...16000			Hz		-	
11.39	Freq in 1 scaled value		-32768.000...32767.000			-		-	
11.42	Freq in 1 Min		0...16000			Hz		0	
11.43	Freq in 1 Max		0...16000			Hz		16000	
11.44	Freq in 1 at scaled Min		-32768.000...32767.000			-		0.000	
11.45	Freq in 1 at scaled Max		-32768.000...32767.000			-		50.00	
12 Standard AI									
12.02	AI force selection		0b000...0b1111			-		0b0000	
	Bit	Name	Bit	Name	Bit	Name			
	0	AI1	1	AI2	2...15	Reserved			
12.03	AI supervision function		0...4			-		No action[0]	
	No action[0]		Warning [2]			Speed ref safe[4] - Not applicable.			
	Fault[1]		Last speed[3]						
12.04	AI supervision selection		0b000...0b1111			-		0b0000	
	Bit	Name	Bit	Name	Bit	Name			
	0	AI1 < MIN	2	AI2 < MIN	4...15	Reserved			
	1	AI1 > MAX	3	AI2 > MAX					
12.11	AI1 actual value		0.000...10.000			V		10.000	
12.12	AI1 scaled value		-32768.000...32767.000			-		50.000	
12.13	AI1 forced value		0.000...10.000			V		0	
12.15	AI1 unit selection		V[2], mA[10]			-		V[2]	
12.16	AI1 filter time		0.000...30.000			s		0.100	
12.17	AI1 Min		0.000...10.000			V		0.000	
12.18	AI1 Max		0.000...10.000			V		10.000	
12.19	AI1 scaled at AI1 Min		-32768.000...32767.000			-		0.000	

34 Parameters List

Index	Name	Range/List	Unit	Default
12.20	AI1 scaled at AI1 Max	-32768.000...32767.000	-	50.000
12.21	AI2 actual value	0.000...20.000	mA	0.000
12.22	AI2 scaled value	-32768.000...32767.000	-	0.000
12.23	AI2 forced value	0.000...20.000	mA	-
12.25	AI2 unit selection	V[2], mA[10]	-	mA
12.26	AI2 filter time	0.000...30.000	s	0.100
12.27	AI2 Min	0.000...20.000	mA	4.000
12.28	AI2 Max	0.000...20.000	mA	20.000
12.29	AI2 scaled at AI2 Min	-32768.000...32767.000	-	0.000
12.30	AI2 scaled at AI2 Max	-32768.000...32767.000	-	50.000
12.101	AI1 percent value	0.00...100.00	%	100.00
12.102	AI2 percent value	0.00...100.00	%	0.00
13 Standard AO				
13.02	AO force selection	0b0000...0b1111	-	0b0000
13.11	AO1 actual value	0.000...22.000	mA	-
13.12	AO1 source	0...1, 3...8, 12, 14, 16, 20, 21, 26...28, 30...32, 37, 38	-	Output frequency[3]
	Zero[0]	DC voltage[7]	Temp sensor 2 excitation[21]	Abs motor shaft power[32]
	Motor speed used[1]	Output power[8]	Abs motor speed used[26]	AO1 data storage[37]
	Output frequency[3]	Speed ref used[12]	Abs motor speed%[27]	AO2 data storage[38]
	Motorcurrent[4]	Freq ref used [14]	Abs output frequency[28]	Other...
	Motor current% of motor nominal[5]	Process PID out[16]	Abs motor torque[30]	-
	Motor torque[6]	Temp sensor 1 excitation[20]	Abs output power[31]	-
13.13	AO1 forced value	0.000...22.000	mA	0.000
13.15	AO1 unit selection	V[2], mA[10]	-	mA[10]
13.16	AO1 filter time	0.000...30.000	s	0.100
13.17	AO1 source Min	-32768.0...32767.0	-	0.0
13.18	AO1 source Max	-32768.0...32767.0	-	50.0
13.19	AO1 out at AO1 src min	0.000...22.000	mA	0.000
13.20	AO1 out at AO1 src Max	0.000...22.000	mA	20.000
13.21	AO2 actual value	0.000...22.000	mA	0.000
13.22	AO2 source	See parameter 13.12 AO1 source	-	Motor current[4]
13.23	AO2 forced value	0.000...22.000	mA	0.000
13.26	AO2 filter time	0.000...30.000	s	0.100
13.27	AO2 source min	-32768.0...32767.0	-	0.0
13.28	AO2 source Max	-32768.0...32767.0	-	3.2
13.29	AO2 out at AO2 src min	0.000...22.000	mA	0.000
13.30	AO2 out at AO2 src Max	0.000...22.000	mA	20.000
13.91	AO1 data storage	-327.68...327.67	-	0.00
13.92	AO2 data storage	-327.68...327.67	-	0.00
21 Start/stop mode				
21.01	Start mode	Fast[0], Const time[1], Automatic[2]	-	Automatic[2]
21.02	Magnetization time	0...10000	ms	500

Index	Name	Range/List	Unit	Default
21.19	Scalar start mode	0...4	-	Normal
	Normal[0]	Automatic[2]	Automatic+boost[4]	Flying start+boost[6]
	Const time[1]	Torque boost[3]	Flying start [5]	
21.22	Start delay	0.00...60.00	s	10.00
21.23	Smooth start	Disabled[0], Enabled always[1], Start only[2]	-	Disabled[0]
21.24	Smooth start current	10.0...100.0	%	50.0
21.25	Smooth start speed	2.0...100.0	%	10.0
23 Speed reference ramp				
23.01	Speed ref ramp input	-30000.00...30000.00	rpm	0.00
23.02	Speed ref ramp output	-30000.00...30000.00	rpm	0.00
23.12	Acceleration time 1	0.000...1800.000	rpm	20.000
23.13	Deceleration time 1	0.000...1800.000	rpm	0.000
24 Speed reference conditioning				
24.01	Used speed reference	-30000.00...30000.00	rpm	0.00
24.02	Used speed feedback	-30000.00...30000.00	rpm	0.00
24.03	Speed error filtered	-30000.0...30000.0	rpm	0.00
24.12	Speed error filter time	0...10000	ms	10
25 Speed control				
25.01	Torque reference speed control	-1600.0...1600.0	%	0.0
25.02	Speed proportional gain	0.00...250.00	-	5.00
25.03	Speed integration time	0.00...1000.00	s	0.50
25.04	Speed derivation time	0.000...10.000	s	0.000
25.05	Derivation filter time	0...10000	ms	8
25.30	Flux adaption enable	Disable[0], Enable[1]	-	Enable[1]
25.53	Torque prop reference	-30000.0...30000.0	%	0.0
25.54	Torque integral reference	-30000.0...30000.0	%	0.0
25.55	Torque derive reference	-30000.0...30000.0	%	0.0
28 Frequency reference chain				
28.01	Frequency ref ramp input	-500.00...500.00	Hz	0.00
28.02	Frequency ref ramp output	-500.00...500.00	Hz	0.00
28.72	Freq acceleration time 1	0.000...1800.000	s	20.000
28.73	Freq deceleration time 1	Not applicable.		
30 Limits				
30.01	Limit word 1	0b0000...0b1111	-	0b0000
	Bit	Name	Bit	Name
	0	Torq lim	8	Min speed ref lim
	1...6	Reserved	9	Max freq ref lim
	7	Max speed ref lim	10	Min freq ref lim
30.02	Torque limit status	0b0000...0b1111	-	0b0000
	Bit	Name	Bit	Name
	0	Undervoltage	4	Internal current
	1	Overvoltage	5	Load angle
	2	Minimum torque	6	Motor pullout
	3	Maximum torque	7	Reserved
11 Thermal IGBT				
*Only one out of bits 0...3, and one out of bits 9...11 can be on simultaneously. The bit typically indicates the limit that is exceeded first.				

Index	Name	Range/List	Unit	Default
30.09	Cur Lim Monitor Time	0.00...120.00	s	10.00
30.10	Current Limit Actions	No Action[0], Warning[1], Fault[2]	-	Warning[1]
30.11	Minimum speed	-30000.00...30000.00	rpm	-3000.00
30.12	Maximum speed	-30000.00...30000.00	rpm	3000.00
30.13	Minimum frequency	-500.00...500.00	Hz	-50.00
30.14	Maximum frequency	-500.00...500.00	Hz	50.00
30.17	Maximum current	0.00...3.24	A	3.24
30.19	Minimum torque 1	-1600.0...0.0	%	-300.0
30.20	Maximum torque 1	0.0...1600.0	%	300.0
30.31	Undervoltage control	Disable[0], Enable[1]	-	Enable[1]
30.35	Thermal current limitation	Disable[0], Enable[1]		Enable[1]
30.36	Speed limit selection		0...8	Not selected[0]
	Not selected[0]	Ext1 active[2]	Torque control[4]	DI2[6] DI4[8]
	Selected[1]	Ext2 active[3]	DI1[5]	DI3[7] Other...
30.37	Min speed source		-	Minimum speed[11]
	Zero[0]	AI1 scaled[1]	AI2 scaled[2]	Minimum speed[11] Other...
30.38	Min speed source		-	Minimum speed[11]
	Zero[0]	AI1 scaled[1]	AI2 scaled[2]	Maximum speed[11] Other...
31 Fault functions				
31.01	External event 1 source		0, 1, 3...8	Inactive (true)[1]
	Active (false)[0]	Inactive (true)[1]	DI1[3] DI2[4] DI3[5] DI4[6] DI5[7] DI6[8]	
31.02	External event 1 type	Fault[0], Warning[1]	-	Fault[0]
31.03	External event 2 source	See parameter 31.01 External event 1 source	-	Inactive (true)[1]
31.04	External event 2 type	Fault[0], Warning[1]	-	Fault[0]
31.05	External event 3 source	See parameter 31.01 External event 1 source	-	Inactive (true)[1]
31.06	External event 3 type	Fault[0], Warning[1]	-	Fault[0]
31.07	External event 4 source	See parameter 31.01 External event 1 source	-	Inactive (true)[1]
31.08	External event 4 type	Fault[0], Warning[1]	-	Fault[0]
31.09	External event 5 source	See parameter 31.01 External event 1 source	-	Inactive (true)[1]
31.10	External event 5 type	Fault[0], Warning[1]	-	Fault[0]
31.11	Fault reset selection		0...7, 18...20, 24...26	Not selected[0]
	Not selected[0]	DI2[3] DI5[6]	Timed function 2[19] - Not applicable.	Supervision 2[25]
	Selected[1]	DI3[4] DI6[7]	Timed function 3[20] - Not applicable.	Supervision 3[26]
	DI1[2]	DI4[5]	Timed function [18] - Not applicable.	Supervision 1[24] Other...

Index	Name	Range/List	Unit	Default		
31.12	Auto-reset selection		0x0000...0xffff	-	0x0000	
	Bit	Value	Bit	Value	Bit	Value
	0	Overcurrent	4...9	Reserved	13	External fault 3
	1	Overvoltage	10	Selectable fault	14	External fault 4
	2	Undervoltage	11	External fault 1	15	External fault 5
	3	AI supervision fault	12	External fault 2		
31.13	Selectable fault	0x0000...0xffff	-	0x0000		
31.14	Number of trials	0...5	-	0		
31.15	Total trials time	1.0...600.0	s	30.0		
31.16	Delay time	0.0...120.0	s	0.0		
31.19	Motor phase loss	No action[0], Fault[1]	-	Fault[1]		
31.20	Earth fault	No action[0], Warning[1], Fault[2]	-	Fault[2]		
31.21	Supply phase loss	No action[0], Fault[1]	-	Fault[1]		
31.22	STO indication run/stop		0...5	-	Fault/Fault [0]	
	Fault/Fault[0]	Fault/Event[2]	Event/Event[4]			
	Fault/Warning[1]	Warning/Warning[3]	No indication/No indication[5]			
31.23	Wiring or earth fault	No action[0], Fault[1]	-	Fault[1]		
31.24	Stall function	No action[0], Warning[1], Fault[2]	-	Fault[2]		
31.25	Stall current limit	0.0...1600.0	%	200.0		
31.26	Stall speed limit	0.00...10000.00	rpm	150.00		
31.27	Stall frequency limit	0.00...1000.00	Hz	10.00		
31.28	Stall time	0...3600	s	10		
31.30	Over-speed trip margin	0.00...10000.00	rpm	2000.00		
31.31	Frequency trip margin	0.00...10000.00	Hz	15.00		
32 Supervision						
32.01	Supervision status		0b0000...0b1111	-	0b0000	
	Bit	Name	Bit	Name	Bit	Name
	0	Supervision 1 active	3	Supervision 4 active	6...15	Reserved
	1	Supervision 2 active	4	Supervision 5 active		
	2	Supervision 3 active	5	Supervision 6 active		
32.05	Supervision 1 function		0...7	-	Disabled[0]	
	Disabled[0]	High[2]	Abs high[4]	Abs both[6]		
	Low[1]	Abs low[3]	Both[5]	Hysteresis[7]		
32.06	Supervision 1 action	No action[0], Warning[1], Fault[2], Fault if running[3]	-	No action[0]		

38 Parameters List

Index	Name		Range/List		Unit	Default
32.07	Supervision 1 signal		0, 1, 3, 4, 6...10, 23...27		-	Frequency[3]
	Zero[0]	Current[4]	Output power[8]	Freq ref used[22]	Process PID feedback[25]	
	Speed[1]	Torque[6]	AI1[9]	Inverter temperature[23]	Process PID setpoint[26]	
	Frequency[3]	DC voltage[7]	AI2[10]	Process PID output[24]	Process PID deviation[27]	
					Other...	
32.08	Supervision 1 filter time		0.000...30.000		s	0.000
32.09	Supervision 1 low		-21474836.00... 21474836.00		-	0.00
32.10	Supervision 1 high		-21474836.00... 21474836.00		-	0.00
32.11	Supervision 1 hysteresis		0.00...100000.00		-	0.00
32.15	Supervision 2 function		See parameter 32.05 Supervision 1 function		-	Disabled[0]
32.16	Supervision 2 action		No action[0], Warning[1], Fault[2], Fault if running[3]		-	No action[0]
32.17	Supervision 2 signal		See parameter 32.07 Supervision 1 signal		-	Current[4]
32.18	Supervision 2 filter time		0.000...30.000		s	0.000
32.19	Supervision 2 low		-21474836.00...21474836.00		-	0.00
32.20	Supervision 2 high		-21474836.00...21474836.00		-	0.00
32.21	Supervision 2 hysteresis		0.00...100000.00		-	0.00
32.25	Supervision 3 function		See parameter 32.05 Supervision 1 function		-	Disabled[0]
32.26	Supervision 3 action		No action[0], Warning[1], Fault[2], Fault if running[3]		-	No action[0]
32.27	Supervision 3 signal		See parameter 32.07 Supervision 1 signal		-	Torque[6]
32.28	Supervision 3 filter time		0.000...30.000		s	0.000
32.29	Supervision 3 low		-21474830.00... 21474830.00		-	0.00
32.30	Supervision 3 high		-21474836.00... 21474836.00		-	0.00
32.31	Supervision 3 hysteresis		0.00...100000.00		-	0.00
32.35	Supervision 4 function		See parameter 32.05 Supervision 1 function		-	Disabled[0]
32.36	Supervision 4 action		No action[0], Warning[1], Fault[2], Fault if running[3]		-	No action[0]
32.37	Supervision 4 signal		See parameter 32.07 Supervision 1 signal		-	Zero[0]
32.38	Supervision 4 filter time		0.000...30.000		s	0.000
32.39	Supervision 4 low		-21474836.00... 21474836.00		-	0.00
32.40	Supervision 4 high		-21474836.00...21474836.00		-	0.00
32.41	Supervision 4 hysteresis		0.00...100000.00		-	0.00
32.45	Supervision 5 function		See parameter 32.05 Supervision 1 function		-	Disabled[0]
32.46	Supervision 5 action		No action[0], Warning[1], Fault[2], Fault if running[3]		-	No action[0]
32.47	Supervision 5 signal		See parameter 32.07 Supervision 1 signal		-	Zero[0]
32.48	Supervision 5 filter time		0.000...30.000		s	0.000

EN

Index	Name	Range/List	Unit	Default
32.49	Supervision 5 low	-21474836.00... 21474836.00	-	0.00
32.50	Supervision 5 high	-21474836.00... 21474836.00	-	0.00
32.51	Supervision 5 hysteresis	0.00...100000.00	-	0.00
32.55	Supervision 6 function	See parameter 32.05 Supervision 1 function	-	Disabled[0]
32.56	Supervision 6 action	No action[0], Warning[1], Fault[2], Fault if running[3]	-	No action[0]
32.57	Supervision 6 signal	See parameter 32.07 Supervision 1 signal	-	Zero[0]
32.58	Supervision 6 filter time	0.000...30.000	s	0.000
32.59	Supervision 6 low	-21474836.00... 21474836.00	-	0.00
32.60	Supervision 6 high	-21474836.00... 21474836.00	-	0.00
32.61	Supervision 6 hysteresis	0.00...100000.00	-	0.00
35 Motor thermal protection				
35.01	Motor estimated temperature	-60...1000 °C	°C	0
35.02	Measured temperature 1	-60...5000 °C	°C	0
35.03	Measured temperature 2	-60...5000 °C	°C,	0
35.05	Motor overload level	0.0...300.0 %	%	0.0
35.11	Temperature 1 source	0, 1, 5...7, 11	-	Estimated temperature [1]
	Disabled[0]		2 × Pt100 analog I/O[6]	
	Estimated temperature[1]		3 × Pt100 analog I/O[7]	
	1 × Pt100 analog I/O[5]		Direct temperature[11]	
35.12	Temperature 1 fault limit	-60...5000 °C	°C	130 °C or 266 °F
35.13	Temperature 1 warning limit	-60...5000 °C	°C	110 °C
35.14	Temperature 1 AI source	0...2	-	Not selected[0]
	Not selected[0]	AI1 actual value[1]	AI2 actual value[2]	Other...
35.21	Temperature 2 source	See parameter 35.11 Temperature 1 source	-	Disabled[0]
35.22	Temperature 2 fault limit	-60...5000 °C	°C	130 °C
35.23	Temperature 2 warning limit	-60...5000 °C	°C	110 °C
35.24	Temperature 2 AI source	See parameter 35.14 Temperature 1 AI source	-	Not selected[0]
35.50	Motor ambient temperature	-60...100 °C	°C	20
35.51	Motor load curve	50...150	%	100
35.52	Zero speed load	50...150	%	100
35.53	Break point	1.00 ... 500.00	Hz	45.00
35.54	Motor nominal temperature rise	0...300 °C	°C	80
35.55	Motor thermal time constant	100...10000	s	256
35.56	Motor overload action	No action[0],Warning only[1], Warning and fault[2]	-	Warning and fault[2]
35.57	Motor overload class	Class 5[0], Class 10[1], Class 20[2], Class 30,[3] Class 40[4]	-	Class 20[2]

40 Parameters List

Index	Name	Range/List	Unit	Default
36 Load analyzer				
36.01	PVL signal source	-	-	Output power[8]
	Not selected[0]	Motor torque[6]	Speed ref used[12]	Reserved[15]
	Motor speed used[1]	DC voltage[7]	Torque ref used[13]	Process PID out[16]
	Output frequency[3]	Output power[8]	Freq ref used[14]	Other...
	Motor current[4]	Speed ref ramp ln[10]	Speed ref ramp out[11]	
36.02	PVL filter time	0.00...120.00	s	2.00
36.06	AL2 signal source	See parameter 36.01 PVL signal source .	-	Motor torque[6]
36.07	AL2 signal scaling	0.00...32767.00	-	100.0
36.09	Reset loggers	Done[0], All[1], PVL[2], Al2[3]	-	Done[0]
36.10	PVL peak value	-32768.00...32767.00	-	0.00
36.11	PVL peak date	1/1/1980...6/5/2159	-	1/1/1980
36.12	PVL peak time	-	-	00:00:00
36.13	PVL current at peak	-32768.00...32767.00	A	0.00
36.14	PVL DC voltage at peak	0.00...2000.00	V	0.00
36.15	PVL speed at peak	-30000... 30000	rpm	0.00
36.16	PVL reset date	1/1/1980...6/5/2159	-	1/1/1980
36.17	PVL reset time	-	-	00:00:00
36.20	AL1 0 to 10%	0.00...100.00	%	0.00
36.21	AL1 10 to 20%	0.00...100.00	%	0.00
36.22	AL1 20 to 30%	0.00...100.00	%	0.00
36.23	AL1 30 to 40%	0.00...100.00	%	0.00
36.24	AL1 40 to 50%	0.00...100.00	%	0.00
36.25	AL1 50 to 60%	0.00...100.00	%	0.00
36.26	AL1 60 to 70%	0.00...100.00	%	0.00
36.27	AL1 70 to 80%	0.00...100.00	%	0.00
36.28	AL1 80 to 90%	0.00...100.00	%	0.00
36.29	AL1 over 90%	0.00...100.00	%	0.00
36.40	AL2 0 to 10%	0.00...100.00	%	0.00
36.41	AL2 10 to 20%	0.00...100.00	%	0.00
36.42	AL2 20 to 30%	0.00...100.00	%	0.00
36.43	AL2 30 to 40%	0.00...100.00	%	0.00
36.44	AL2 40 to 50%	0.00...100.00	%	0.00
36.45	AL2 50 to 60%	0.00...100.00	%	0.00
36.46	AL2 60 to 70%	0.00...100.00	%	0.00
36.47	AL2 70 to 80%	0.00...100.00	%	0.00
36.48	AL2 80 to 90%	0.00...100.00	%	0.00
36.49	AL2 over 90%	0.00...100.00	%	0.00
36.50	AL2 reset date	1/1/1980...6/5/2159	-	1/1/1980
36.51	AL2 reset time	-	-	00:00:00
40 Process PID set 1				
40.01	Process PID output actual	-200000.00...200000.00	%	0.00
40.02	Process PID feedback actual	-200000.00...200000.00	PID unit 1	0.00
40.03	Process PID setpoint actual	-200000.00...200000.00	PID unit 1	0.00
40.04	Process PID deviation actual	-200000.00...200000.00	PID unit 1	0.00
40.06	Process PID status word	0b0000...0b1111	-	0b0000

Index	Name				Range/List			Unit		Default	
	Bit	Name	Bit	Name	Bit	Name	Bit	Name	Bit	Name	
	0	PID active	3	PID sleep mode	6	Tracking mode	9	Reserved	12	Internal setpoint active	
	1	Setpoint frozen	4	Sleep boost	7	Output limit high	10	PID set	13...15	Reserved	
	2	Output frozen	5	Reserved	8	Output limit low	11	Reserved			
40.07	Set 1 PID operation mode				0...2			-		Off[0]	
	Off[0]				On[1]			On when drive running[2]			
40.08	Set 1 feedback 1 source				0...3, 8...10			-		AI2 percent[9]	
	Not selected[0]		Freq in scaled[3]				Feedback data storage[10]				
	AI1 scaled[1]		AI1 percent[8]				Actual flow[11]				
	AI2 scaled[2]		AI2 percent[9]				Other...				
40.11	Set 1 feedback filter time				0.000...30.000			s		0.000	
40.14	Set 1 setpoint scaling				-200000.00...200000.00			-		100.00	
40.15	Set 1 output scaling				-200000.00...200000.00			-		100.00	
40.16	Set 1 setpoint 1 source				0, 2...4, 8, 10...16, 19, 20, 24			-		AI1 percent[11]	
	Not selected[0]		Motor potentiometer[8] - Not applicable.			Control panel (ref saved)[13]		EFB ref1[19]			
	Internal setpoint[2]		Freq in scaled[10]			Control panel (ref copied)[14]		EFB ref2[20]			
	AI1 scaled[3]		AI1 percent[11]			FB A ref1[15]		Setpoint data storage[24]			
	AI2 scaled[4]		AI2 percent[12]			FB A ref2[16]		Other...			
40.24	Set 1 internal setpoint 0				-200000.00...200000.00			PID unit 1		0.00	
40.26	Set 1 setpoint min				-200000.00...200000.00			PID unit 1		0.00	
40.27	Set 1 setpoint Max				-200000.00...200000.00			PID unit 1		200000.00	
40.28	Set 1 setpoint increase time				0.0...1800.0			s		0.0	
40.29	Set 1 setpoint decrease time				0.0...1800.0			s		0.0	
40.30	Set 1 setpoint freeze enable				0...7, 21...23			-		Not selected[0]	
	Not selected[0]		DI2[3]		DI5[6]			Supervision 2[22]			
	Selected[1]		DI3[4]		DI6[7]			Supervision 3[23]			
	DI1[2]		DI4[5]		Supervision 1[21]			Other...			
40.31	Set 1 deviation inversion				Not inverted (Ref - Fbk)[0], Inverted (Fbk - Ref)[1]			-		Not inverted (Ref - Fbk)[0]	
40.32	Set 1 gain				0.01...100.00			-		1.00	
40.33	Set 1 integration time				0.0...9999.0			s		60.0	
40.34	Set 1 derivation time				0.0...10.000			s		0.000	
40.35	Set 1 derivation filter time				0.0...10.0			s		0.0	
40.36	Set 1 output min				-100.00...100.00			-		0.00	
40.37	Set 1 output max				-100.00...100.00			-		100.00	
40.38	Set 1 output freeze enable				See parameter 40.30 Set 1 setpoint freeze enable			-		Not selected[0]	
40.39	Set 1 deadband range				0.0...200000.00			-		0.0	
40.40	Set 1 deadband delay				0.0...3600.0			s		0.0	
40.43	Set 1 sleep level				0.0...200000.00			-		0.0	

42 Parameters List

Index	Name	Range/List						Unit	Default																																							
40.44	Set 1 sleep delay	0.0...3600.0						s	60.0																																							
40.45	Set 1 sleep boost time	0.0...3600.0						s	0.0																																							
40.46	Set 1 sleep boost step	0.0...200000.0						PID unit 1	0.0																																							
40.47	Set 1 wake-up deviation	-200000.00...200000.00						PID unit 1	0.00																																							
40.48	Set 1 wake-up delay	0.00...60.00						s	0.50																																							
40.49	Set 1 tracking mode	See parameter 40.30 Set 1 setpoint freeze enable						-	Not selected[0]																																							
40.50	Set 1 tracking ref selection	0...4						-	Not selected[0]																																							
	<table><tr><td>Not selected[0]</td><td>AI1 scaled[1]</td><td>AI2 scaled[2]</td><td>FB A ref1[3]</td><td>FB A ref2[4]</td><td>Other...</td></tr></table>								Not selected[0]	AI1 scaled[1]	AI2 scaled[2]	FB A ref1[3]	FB A ref2[4]	Other...																																		
Not selected[0]	AI1 scaled[1]	AI2 scaled[2]	FB A ref1[3]	FB A ref2[4]	Other...																																											
40.58	Set 1 increase prevention	No[0], Limiting[1], Other...						-	No																																							
40.59	Set 1 decrease prevention	No[0], Limiting[1], Other...						-	No																																							
40.60	Set 1 PID activation source	0, 1, 3...8							On[1]																																							
	<table><tr><td>Off[0]</td><td>On[1]</td><td>DI1[3]</td><td>DI2[4]</td><td>DI3[5]</td><td>DI4[6]</td><td>DI5[7]</td><td>DI6[8]</td><td>DI01[9]</td></tr><tr><td>DI02[10]</td><td>Other...</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr></table>								Off[0]	On[1]	DI1[3]	DI2[4]	DI3[5]	DI4[6]	DI5[7]	DI6[8]	DI01[9]	DI02[10]	Other...																													
	Off[0]	On[1]	DI1[3]	DI2[4]	DI3[5]	DI4[6]	DI5[7]	DI6[8]	DI01[9]																																							
DI02[10]	Other...																																															
40.61	Setpoint scaling actual	-200000.00...200000.00						-	0.00																																							
40.62	PID internal setpoint actual	-200000.00...200000.00						Set 1 unit	0.00																																							
40.70	Compensated setpoint	-21474836.00...21474836.00						Set 1 unit	0.00																																							
40.71	Set 1 compensation input source	-						-	AI1 percent[11]																																							
	<table><tr><td colspan="2">Not selected[0]</td><td colspan="2">Reserved[5...6]</td><td colspan="2">AI2 percent[12]</td><td colspan="2">EFB ref1[19]</td></tr><tr><td colspan="2">Reserved[1]</td><td colspan="2">Motor potentiometer[8]</td><td colspan="2">Reserved[13...14]</td><td colspan="2">EFB ref2[20]</td></tr><tr><td colspan="2">Internal setpoint[2]</td><td colspan="2">Reserved[9]</td><td colspan="2">FB A ref1[15]</td><td colspan="2">Reserved[21...23]</td></tr><tr><td colspan="2">AI1 scaled[3]</td><td colspan="2">Freq in scaled[10]</td><td colspan="2">FB A ref2[16]</td><td colspan="2">Setpoint data storage[24]</td></tr><tr><td colspan="2">AI2 scaled[4]</td><td colspan="2">AI1 percent[11]</td><td colspan="2">Reserved</td><td colspan="2"></td></tr></table>								Not selected[0]		Reserved[5...6]		AI2 percent[12]		EFB ref1[19]		Reserved[1]		Motor potentiometer[8]		Reserved[13...14]		EFB ref2[20]		Internal setpoint[2]		Reserved[9]		FB A ref1[15]		Reserved[21...23]		AI1 scaled[3]		Freq in scaled[10]		FB A ref2[16]		Setpoint data storage[24]		AI2 scaled[4]		AI1 percent[11]		Reserved			
	Not selected[0]		Reserved[5...6]		AI2 percent[12]		EFB ref1[19]																																									
	Reserved[1]		Motor potentiometer[8]		Reserved[13...14]		EFB ref2[20]																																									
	Internal setpoint[2]		Reserved[9]		FB A ref1[15]		Reserved[21...23]																																									
	AI1 scaled[3]		Freq in scaled[10]		FB A ref2[16]		Setpoint data storage[24]																																									
AI2 scaled[4]		AI1 percent[11]		Reserved																																												
40.72	Set 1 compensation input 1	-200000.00...200000.00						-	0.00																																							
40.73	Set 1 compensated output 1	-200000.00...200000.00						Set 1 unit	0.00																																							
40.74	Set 1 compensation input 2	-200000.00...200000.00						-	0.00																																							
40.75	Set 1 compensated output 2	-200000.00...200000.00						Set 1 unit	0.00																																							
40.76	Set 1 compensation non-linearity	0...100						%	0																																							
40.79	Set 1 units	-						-	°C																																							
	User text[0]	Pa[4]	°C[8]	dm3/h[12]	m3/s[16]	ft3/s[20]	inHg[24]	gal/m[28]																																								
	%[1]	psi[5]	°F[9]	l/s[13]	m3/m[17]	ft3/m[21]	kCFM[25]	in wg[29]																																								
	bar[2]	CFM[6]	mbar[10]	l/min[14]	km3/h[18]	ft3/h[22]	inWC[26]	MPa[30]																																								
	kPa[3]	inH2O[	m3/h[11]	l/h[15]	gal/s[19]	ppm[23]	GPM[27]	ftWC[31]																																								
40.89	Set 1 setpoint multiplier	-200000.00...200000.00						-	1.00																																							
40.90	Set 1 feedback multiplier	-200000.00...200000.00						-	1.00																																							
40.91	Feedback data storage	-327.68...327.67						-	0.00																																							
40.92	Setpoint data storage	-327.68...327.67						-	0.00																																							
40.96	Process PID output%	-100.00...100.00						%	0.00																																							
40.97	Process PID feedback%	-100.00...100.00						%	0.00																																							
40.98	Process PID setpoint%	-100.00...100.00						%	0.00																																							
40.99	Process PID deviation%	-100.00...100.00						%	0.00																																							
46 Monitoring/scaling settings																																																
46.03	Torque scaling	0.1...1000.0						%	100.0																																							
46.04	Power scaling	0.10...30000.00						kW or hp	1000.00																																							

Index	Name	Range/List	Unit	Default
46.05	Current scaling	0...30000	A	10000
46.06	Speed ref zero scaling	0.00...30000.00	rpm	0.00
46.07	Frequency ref zero scaling	0.00...1000.00	Hz	0.00
46.11	Filter time motor speed	2...20000	ms	500
46.12	Filter time output frequency	2...20000	ms	500
46.13	Filter time motor torque	2...20000	ms	100
46.14	Filter time power	2...20000	ms	100
46.21	At speed hysteresis	0.00...30000.00	rpm	50.00
46.22	At frequency hysteresis	0.00...1000.00	Hz	2.00
46.31	Above speed limit	0.00...30000.00	rpm	1500.00
46.32	Above frequency limit	0.00...1000.00	Hz	50.00
46.41	kWh pulse scaling	0.001...1000.000	kWh	1.000
46.43	Power decimals	0...3	-	2
46.44	Current decimals	0...3	-	1
49 Panel port communication				
49.01	Node ID number	1...32	-	1
49.03	Baud rate	1...5	-	115.2 kbps[4]
		38.4 kbps[1] 57.6 kbps[2] 86.4 kbps[3] 115.2 kbps[4] 230.4 kbps[5]		
49.04	Communication loss time	0.3...3000.0	s	10.0
49.05	Communication loss action	0...3	-	Fault[1]
		No action[0] Fault[1] Last speed[2] Speed ref safe[3] - Not applicable.		
49.06	Refresh settings	Done[0], Configure[1]	-	Done[0]
50 Fieldbus adapter (FBA)				
50.01	FBA A enable	Disable[0], Enable[1]	-	Disable[0]
50.02	FBA A comm loss func	0...5	-	No action[0]
		No action[0] Fault[1] Last speed[2] Speed ref safe[3] Fault always[4] Warning[5]		
50.03	FBA A comm loss t out	0.3...6553.5	s	0.3
50.04	FBA A ref1 type	-	-	Speed or frequency[0]
		Speed or frequency[0] Transparent[1] General[2] Speed[4] Frequency[5]		
		Note: Applicable only when 79.40 MPPT reference is disabled. If parameter MPPT reference is enabled, then the parameter should be set to it's default value.		
50.05	FBA A ref2 type	Not applicable.		
50.06	FBA A SW sel	Auto[0], Transparent mode[1]	-	Auto[0]
50.07	FBA A actual 1 type	-	-	Speed or frequency[0]
		Speed or frequency[0] Transparent[1] General[2] Speed[4] Frequency[5]		
		Note: Applicable only when 79.40 MPPT reference is disabled. If parameter MPPT reference is enabled, then the parameter should be set to it's default value.		
50.08	FBA A actual 2 type	Not applicable		
50.09	FBA A SW transparent source	-	-	Not selected
50.10	FBA A act1 transparent source	-	-	Not selected
50.11	FBA A act2 transparent source	Not applicable.		
50.12	FBA A debug mode	Disable[0], Fast[1]	-	Disable
50.13	FBA A control word	0.0.0.0.0...FF.FF.FF.FF	-	0.0.0.0

44 Parameters List

Index	Name	Range/List	Unit	Default
50.14	FBA A reference 1	-2147483648...2147483647	-	0
	Note: Applicable only when 79.40 MPPT reference is disabled. If parameter MPPT reference is enabled, then the parameter should be set to it's default value.			
50.15	FBA A reference 2	Not applicable.		
50.16	FBA A status word	0.0.0.0...FF.FF.FF.FF	-	0.0.0.0
50.17	FBA A actual value 1	-2147483648...2147483647	-	0
50.18	FBA A actual value 2	Not applicable.		
51 FBA A settings				
51.01	FBA A type	0, 1, 32, 37, 101, 128, 132, 135, 136, 485, 47808	-	None[0]
	None[0]	Ethernet[128]	RS-485 comm[485]	
	PROFIBUS-DP[1]	PROFINet IO[132]	Modbus/TCp[502]	
	CANopen[32]	EtherCAT[135]	Ethernet/IP[2222]	
51.02	FBA A Par2	0...65535	-	0
...	...	...	...	...
51.26	FBA A Par26	0...65535	-	0
51.27	FBA A par refresh	Done[0], Configure[1]	-	Done[0]
51.28	FBA A par table ver	0x0000...0xffff	-	0x0000
51.29	FBA A drive type code	0...65535	-	0
51.30	FBA A mapping file ver	0...65535	-	0
51.31	D2FBAA comm status	0...6	-	Not configured [0]
	Not configured[0]	Time out[2]	Off-line[4]	Reset[6]
	Initializing[1]	Configuration error[3]	On-line[5]	
51.32	FBA A comm SW ver	0x0000...0xffff	-	0x0000
51.33	FBA A appl SW ver	0x0000...0xffff	-	0x0000
52 FBA A data in				
52.01	FBA A data in1	0...6, 11...16, 24	-	None
	None[0]	Ref2 16bit[3]	Act2 16bit[6]	Ref2 32bit[13]
	CW 16bit[1]	SW 16bit[4]	CW 32bit[11]	SW 32bit[14]
	Ref1 16bit[2]	Act1 16bit[5]	Ref1 32bit[12]	Act1 32bit[15]
				Other...
...	...	...	...	...
52.12	FBA A data in12	See parameter 52.01 FBA A data in1	-	None
53 FBA A data out				
53.01	FBA A data out1	0...3, 11...13, 21	-	None[0]
	None[0]	Ref1 16bit[2]	CW 32bit[11]	Ref2 32bit[13]
	CW 16bit[1]	Ref2 16bit[3]	Ref1 32bit[12]	CW2 16bit[21]
				Other...
...	...	...	...	...
53.12	FBA A data out12	See parameter 53.01 FBA A data out1	-	None
58 Embedded fieldbus				
58.01	Protocol	None[0], Modbus RTU[1]	-	None[0]
58.02	Protocol ID	0000h...FFFFh	-	0
58.03	Node address	0...255	-	0

Index	Name	Range/List	Unit	Default
58.04	Baud rate	0...7	-	19.2 kbps[3]
	Autodetect[0] 4.8 kbps[1]	9.6 kbps[2] 19.2 kbps[3]	38.4 kbps[4] 57.6 kbps[5]	38.4 kbps[4] 57.6 kbps[5]
58.05	Parity	0...3	-	8 EVEN 1[2]
	8 NONE 1[0]	8 NONE 2[1]	8 EVEN 1[2]	8 ODD 1[3]
58.06	Communication control	Enabled[0], Refresh settings[1], Silent mode[2]	-	Enabled[0]
58.07	Communication diagnostics	0000h...FFFFh	-	0b0000
	Bit	Name	Bit	Name
	0	Init failed	4	Wiring error
	1	Addr config err	5	Parity error
	2	Silent mode	6	Baud rate error
	3	Autobauding	7	No bus activity
	8	No packets	13	Protocol 1
	9	Noise or addressing error	14	Protocol 2
	11	CW/Ref loss	15	Internal error
	12	Not active		
58.08	Received packets	0...4294967295	-	0
58.09	Transmitted packets	0...4294967295	-	0
58.10	All packets	0...4294967295	-	0
58.11	UART errors	0...4294967295	-	0
58.12	CRC errors	0...4294967295	-	0
58.14	Communication loss action	Not applicable.		
58.15	Communication loss mode	Any message[1], Cw / Ref1 / Ref2[2]	-	Any message[1]
58.16	Communication loss time	0.0...6000.0	s	60.0
58.17	Transmit delay	0...65535	ms	0
58.18	EFB control word	0000h...FFFFh	-	0.0.0.0
58.19	EFB status word	0000h...FFFFh	-	0.0.0.0
58.25	Control profile	ABB Drives[0], DCU Profile[5]	-	ABB Drives[0]
58.26	EFB ref1 type	0...5	-	Speed or Frequency[0]
	Speed or frequency[0]	Transparent[1]	General[2]	Speed[4]
	Frequency[5]			
	Note: Applicable only when 79.40 MPPT reference is disabled. If parameter MPPT reference is enabled, then the parameter should be set to it's default value.			
58.27	EFB ref2 type	Not applicable.		
58.28	EFB act1 type	See parameter 58.26	-	Speed or frequency[0]
58.29	EFB act2 type	Not applicable		
58.31	EFB act1 transparent source	Not selected [0], Other	-	Not selected [0]
	Note: Applicable only when 79.40 MPPT reference is disabled. If parameter MPPT reference is enabled, then the parameter should be set to it's default value.			
58.32	EFB act2 transparent source	Not applicable		
58.33	Addressing mode	Mode 0[0], Mode 1[1], Mode 2[2]	-	Mode 0[0]
58.34	Word order	HI-LO[0], LO-HI[1]	-	LO-HI[1]

Index	Name	Range/List	Unit	Default		
58.101	Data I/O 1	0...6, 11...16, 21, 24, 31, 32, 33, 40, 41, Other...	-	CW 16bit[1]		
	None[0]	SW 16bit[4]	Ref1 32bit[12]	Act2 32bit[16]	AO1 data storage[32]	
	CW 16bit[1]	Act1 16bit[5]	Ref2 32bit[13]	CW2 16bit[21]	AO2 data storage[34]	
	Ref1 16bit[2]	Act2 16bit[6]	SW 32bit[14]	SW2 16bit[24]	Feedback data storage[40]	
	Ref2 16bit[3]	CW 32bit[11]	Act1 32bit[15]	RO/DIO control word[31]	Setpoint data storage[41]	
58.102	Data I/O 2	See parameter 58.101	-	Ref1 16bit[2]		
58.103	Data I/O 3	See parameter 58.101	-	Ref2 16bit[3]		
58.104	Data I/O 4	See parameter 58.101	-	SW 16bit[4]		
58.105	Data I/O 5	See parameter 58.101	-	Act1 16bit[5]		
58.106	Data I/O 6	See parameter 58.101	-	Ac;I2 16bit[6]		
58.107	Data I/O 7	See parameter 58.101	-	None[0]		
...						
58.114	Data I/O 14	See parameter 58.101	-	None[0]		
79 Start stop control						
1) Works only with assistant control panel.						
2) Timed function must be enabled to use this feature. See parameter 79.10 Operating mode.						
79.01	Solar status word1	0b0000...0b1111		0b0000		
	Bit	Name	Bit	Name	Bit	Name
	0	Ready ON	5	DC over volt	10	Motor phase loss
	1	Ready run	6	DC under volt	11	Supply phase loss
	2	Running	7	Minimum speed	12	Motor stall
	3	Fault	8	Short circuit	13	Over current
	4	Dry run	9	Earth fault	14	Ext fault1
				15	Start delay active	
79.02	Solar status word2	0b0000...0b1111		0b0000		
	Bit	Name	Bit	Name	Bit	Name
	0	Ext fault2	4	Device Overtemp	9	Start enable
	1	AI1 supervision	5	ID run failed	10	Run enable
	2	Reserved	6	Output wiring	11	Tank filling on
	3	Panel loss	7	Safe torque off	12	Cloud detected
			8	Motor overtemp	13...15	Reserved
79.10	Operating mode	0...5	-	Manual In 1 Start; stop[4]		
	Auto[0]	Manual In1P Start; In2 Stop[2]	Fieldbus A[4]			
	Manual In 1 Start; stop[1]	Timed function[3] 1)	Embedded fieldbus[5]			
79.11	Manual input source 1	0...7	-	DI1[2]		
	Not selected[0]	DI1[2]	DI3[4]	DI5[6]	Other...	
	Selected[1]	DI2[3]	DI4[5]	DI6[7]		
79.12	Manual input source 2	See parameter 79.11 Manual input source 1.	-	DI2[3]		

Index	Name	Range/List		Unit	Default
79.15	Enable tank level operation				Disable[0]
	Disable[0]	DI1[2]	DI3[4]	DI5[6]	Other...
	Enable[1]	DI2[3]	DI4[5]	DI6[7]	
79.17	Tank low sensor				DI5[6]
	Not selected[0]	DI1[2]	DI3[4]	DI5[6]	Other...
	Selected[1]	DI2[3]	DI4[5]	DI6[7]	
79.18	Tank high sensor	See parameter 79.17 Tank low sensor .			DI6[7]
79.31	Pump start time ²⁾	00:00:00...23:59:59		-	00:00:00
79.32	Pump stop time ²⁾	00:00:00...23:59:59		-	00:00:00
79.40	MPPT reference		0...6		Enable[1]
	Disable[0]	DI1[2]	DI3[4]	DI5[6]	Other...
	Enable[1]	DI2[3]	DI4[5]	DI6[7]	
79.41	Start DC voltage	225...800		V	225
79.42	PV cell min voltage	225...800		V	225
79.43	PV cell max voltage	225...800		V	800
79.51	Pump minimum speed	0...3000		rpm	500
79.52	Pump maximum speed	0...3000		rpm	3000
79.56	Boost voltage	225...600		V	450
79.57	Boost factor	0.75...1.50		-	1.00
79.61	Fault reset time	1.0...1200.0		s	120.0
79.71	Motor factor	Not applicable.			
80 Flow calculation					
80.01	Calculated flow	0.00...200000.00		m³/h	0.00
80.03	Total flow	0.00...21474836.00		m³	0.00
80.06	Today's flow	0.00...21474836.00		m³	0.00
80.07	Sensored flow	0...2147483648		-	0
80.13	Flow function	PQ curve[101], DI based[115]		-	PQ curve[101]
80.14	Flow calc gain	0.50...2.00		-	1.00
80.21	Pump nominal speed	0...30000		rpm	0
80.26	Calc low speed	0.00...32767.00		Hz	5.00
80.29	Reset flow	Not selected[0], Reset[1]		-	Not selected[0]
80.50	PQ curve P1	0.00...32767.00		kW	0.00
80.51	PQ curve P2	0.00...32767.00		kW	0.00
80.52	PQ curve P3	0.00...32767.00		kW	0.00
80.53	PQ curve P4	0.00...32767.00		kW	0.00
80.54	PQ curve P5	0.00...32767.00		kW	0.00
80.60	Q value Q1	0.00...200000.00		m³/h	0.00
80.61	Q value Q2	0.00...200000.00		m³/h	0.00
80.62	Q value Q3	0.00...200000.00		m³/h	0.00
80.63	Q value Q4	0.00...200000.00		m³/h	0.00
80.64	Q value Q5	0.00...200000.00		m³/h	0.00
82 Pump protections					
82.02	Dry run source	0...8		-	Min load current[8]

Index	Name		Range/List		Unit	Default
	Not selected[0]	DI1[2]	DI3[4]	DI5[6]	Min load current[8]	
	Selected[1]	DI2[3]	DI4[5]	DI6[7]	Other...	
82.46	Dry run current limit		0.00...3000.00		A	0.00
82.47	Dry run trip monitor time		1.0...300.0		s	120.0
82.48	Dry run reset time		1.0...18000.0		s	120.0
83 Pump cleaning						
83.01	Pump cleaning status		1...4		-	Disabled[0]
	Disabled[0]	Pump clean[1]	No triggers configured[3]	Waiting for triggering[2]	Triggered[4]	
83.02	Pump cleaning progress		0...100		%	0
83.03	Total cleaning count		0...1000000		-	0
83.12	Start pump cleaning		0...4		-	Not active[0]
	Not active[0]	Start cleaning now[1]	DI4[2]	DI5[3]	DI6[4]	Other...
83.16	Cycles in cleaning program		1...65535		-	3
83.20	Cleaning speed step		0...3000		rpm	2400
83.25	Time to cleaning speed		0.000...60.000		s	3.000
83.26	Time to zero-speed		0.000...60.000		s	3.000
83.27	Cleaning on time		0.000...1000.000		s	10.000
83.28	Cleaning off time		0.000...1000.000		s	5.000
95 HW configuration						
95.01	Supply voltage		Automatic/not selected[0], 380...415 V[2]		-	Automatic/ not selected [0]
95.02	Adaptive voltage limits		Disable[0], Enable[1]		-	Enable[1]
95.03	Estimated AC supply voltage		0...65535		V	0
95.04	Control board supply		Internal 24V[0], External 24V[1]		-	Internal 24V[0]
95.15	Special HW settings		0b0000...0b1111		-	0b0000
	Bit	Name	Bit	Name	Bit	Name
	0	Reserved	1	ABB Sine filter	2...15	Reserved
95.20	HW options word 1		0b0000...0b1111		-	0b0000
	Bit	Name		Bit	Name	
	0	Supply frequency 60 Hz		13	du/dt filter activation	
	1...12	Reserved		14...15	Reserved	
95.200	Cooling fan mode		Auto[0], Always on[1]		-	Auto[0]
96 System						
96.01	Language		[0]Not selected, [1033]English], [1040]Italiano, [3082]Español, [2070]Portugues, [1036]Français, [2052]Chinese (Simplified, PRC)		-	Not selected[0]
96.02	Pass code		-		-	0
96.03	Access levels active		0b0000...0b1111		-	0b0000

Index	Name		Range/List		Unit	Default
	Bit	Name	Bit	Name		
	0	End user	10	Override lock		
	1	Service	11	OEM access level 1		
	2	Advanced programmer	12	OEM access level 2		
	3	Reserved	13	OEM access level 3		
	4	Long menu	14	Parameter lock		
	5...9	Reserved	15	Reserved		
96.04	Macro select		0, 1, 14		-	Done[0]
	Done[0]		ABB standard[1]	PID[14]		
96.05	Macro active		See parameter 96.04 Macro select		-	ABB standard[1]
96.06	Parameter restore		0, 2, 8, 32, 62, 512, 1024, 34560		-	Done[0]
	Done[0]	Reset all fieldbus settings[32]		Reset end user texts[1024]		
	Reset motor data[2]	Clear all[62]		All to factory defaults[34560]		
	Restore defaults[8]	Reset home view[512]				
96.07	Parameter save manually		Done[0], Save[1]		-	Done[0]
96.08	Control board boot		No action[0], Reboot[1]		-	No action[0]
96.10	User set status		0...11		-	n/a[0]
	n/a[0]	Faulted[3]	User3 IO active[6]	User2 backup[9]		
	Loading[1]	User1 IO active[4]	User4 IO active[7]	User3 backup[10]		
	Saving[2]	User2 IO active[5]	User1 backup[8]	User4 backup[11]		
96.11	User set save/load		0...5, 18...21		-	No action[0]
	No action[0]	Load set 2[3]	Save to set 1[18]	Save to set 4[21]		
	User set I/O mode[1]	Load set 3[4]	Save to set 2[19]			
	Load set 1[2]	Load set 4[5]	Save to set 3[20]			
96.12	User set I/O mode in1		0...7, 18...20, 24...26		-	Not selected[0]
	Not selected[0]	DI2[3]	DI5[6]	Timed function 2[19] - Not applicable	Supervision 2[25]	
	Selected[1]	DI3[4]	DI6[7]	Timed function 3[20] - Not applicable	Supervision 3[26]	
	DI1[2]	DI4[5]	Timed function [18] - Not applicable	Supervision 1[24]	Other...	
96.13	User set I/O mode in2		See parameter 96.12 User set I/O mode in1		-	Not selected[0]
96.16	Unit selection		0b0000...0b1111		-	0b0000
	Bit	Name	Bit	Name	Bit	Name
	0	Power unit	1	Reserved	2	Temperature unit
	3	Reserved	4	Torque unit	5...15	Reserved
96.20	Time sync primary source		0, 3, 6, 8, 9		-	Panel link[8]
	Internal[0]	Fieldbus A[3]	Embedded FB[6]	Panel link[8]	Ethernet tool link[9]	
96.51	Clear fault and event logger		Done[0], Reset[1]		-	Done[0]
96.100	Change user pass code		10000000...99999999		-	-

50 Parameters List

Index	Name	Range/List	Unit	Default
96.101	Confirm user pass code	10000000...99999999	-	-
96.102	User lock functionality	0000h...FFFFh	-	0000h
97 Motor control				
97.01	Switching frequency reference	2 kHz[2], 4 kHz[4], 8 kHz[8], 16 kHz[16]	-	4 kHz[4]
97.02	Minimum switching frequency	1, 2, 4, 8, 12	-	1.5 kHz[1]
		1.5 kHz[1] 2 kHz[2] 4 kHz[4] 8 kHz[8] 12 kHz[12]		
97.13	IR compensation	0.00...50.00	%	3.50
97.20	U/F ratio	Linear[0], Squared[20]	-	Linear[0]
97.49	Slip gain for scalar	0...200	%	0
97.94	IR comp max frequency	1.0...200.0	%	50.0
98 User motor parameters				
98.01	User motor model mode	Not selected[0], Motor parameters[1]	-	Not selected[0]
98.02	Rs user	0.00000...0.50000	p.u.	0.00000 p.u
98.03	Rr user	0.00000...0.50000	p.u.	0.00000 p.u
98.04	Lm user	0.00000...10.00000	p.u.	0.00000 p.u
98.05	SigmaL user	0.00000...1.00000	p.u.	0.00000 p.u
98.06	Ld user	0.00000...10.00000	p.u.	100000 = 1 p.u.
98.07	Lq user	0.00000...10.00000	p.u.	100000 = 1 p.u.
98.08	PM flux user	0.00000...2.00000	p.u.	100000 = 1 p.u.
98.09	Rs user SI	0.00000...100.00000	ohm	0.00000 ohm
98.10	Rr user SI	0.00000...100.00000	ohm	0.00000 ohm
98.11	Lm user SI	0.00...100000.00	mH	0.00 mH
98.12	SigmaL user SI	0.00...100000.00	mH	0.00 mH
98.13	Ld user SI	0.00...100000.00	mH	0.00
98.14	Lq user SI	0.00...100000.00	mH	0.00
99 Motor data				
99.03	Motor type	Asynchronous motor[0], Permanent magnet motor[1]	-	Asynchronous motor[0]
99.04	Motor control mode	Vector[0], Scalar[1]	-	Scalar[1]
99.06	Motor nominal current	0.0...5.2	A	1.8
99.07	Motor nominal voltage	69.2...830.0	V	400.0
99.08	Motor nominal frequency	0.00...500.00	Hz	50.00
99.09	Motor nominal speed	0...30000	rpm	1430
99.10	Motor nominal power	0...10,000	kW or hp	0.75
99.11	Motor nominal cos?	0.00 ... 1.00	-	0.00
99.12	Motor nominal torque	0.000...4000000.000 N·m or 0.000...2950248.597 lb·ft	N·m	0.000
99.13	ID run requested	0...3, 5, 6	-	None[0]
		None[0] Reduced[2] Autophasing[4] Advanced[6]		
		Normal[1] Standstill[3] Current measurement calibration[5] Adaptive[7]		
	Note: Adaptive ID run is applicable for R0...R5 frames and Advanced ID run is applicable for R6...R8 frames.			
99.14	Last ID run performed	See parameter 99.13 ID run requested	-	None[0]

Index	Name	Range/List	Unit	Default
99.15	Motor polepairs calculated	0...1000	-	0
99.16	Motor phase order	U V W[0], U W V[1]	-	U V W[0]

Technical data

What this chapter contains

This chapter contains the following technical specifications of the drive:

Specifications	See page...
Ratings	53
Fuses	54
Note: For DC power cable specifications are based on the PV manufacturer	57
Standard frame sizes (R0...R8)	58

EN

Ratings

Drive Type ACQ80-04	Nominal In	DC Input current	Max. current	Output ratings			Frame size
				Nominal use			
	I_{1N}	A	$I_{\max}$	I_N	P_N		
	A		A	A	kW	Hp	
3 phases $U_N = 400\text{ V (380...480 V)}$							
0kW75-4	2.6	2.12	3.2	2.6	0.75	1	R0
01kW1-4	3.3	2.7	4.7	3.3	1.1	1.5	R0
01kW5-4	4	3.27	5.9	4	1.5	2	R0
02kW2-4	5.6	4.58	7.2	5.6	2.2	3	R0
03kW0-4	7.2	5.88	10.1	7.2	3	4	R0
04kW0-4	9.4	7.68	13	9.4	4	5	R0
05kW5-4	12.6	10.29	16.9	12.6	5.5	7.5	R1
07kW5-4	17	13.89	22.7	17	7.5	10	R2
011kW-4	25	20.43	30.6	25	11	15	R2
015kW-4	33	26.96	44.3	33	15	20	R3
18kW5-4	39	31.86	56.9	39	18.5	25	R3
022kW-4	46	37.58	67.9	46	22	30	R3
030kW-4	62	50.65	76	62	30	40	R4
037kW-4	73	59.64	104	73	37	50	R4
045kW-4	88	71.9	122	88	45	60	R5
055kW-4	106	86.60	148	106	55	75	R5
075kW-4 ¹⁾	145	118.47	178	145	75	100	R6
090kW-4 ¹⁾	169	138.07	247	169	90	120	R7
110kW-4 ¹⁾	206	168.30	287	206	110	150	R7
132kW-1 ¹⁾	246	200.98	350	246	132	180	R8
160kW-4 ¹⁾	293	239.38	418	293	160	215	R8

¹⁾ External charging circuit required. For details on charging unit, contact your local ABB representative.

Fuses

■ uR and aR fuse

Drive type ACQ80-04	Minimum short circuit current ¹⁾	Input current	uR and aR				
			Rated current I _N	I ² t	Rated voltage	Bussmann designation type	IEC 60269 size
	A	A	A	A ² s	V		
3 phases U _N = 400 V (380...480 V)							
0kW75-4	48	4.2	25	125	690	170M2694	00
01kW1-4	48	5.3	25	125	690	170M2694	00
01kW5-4	80	6.4	32	275	690	170M2695	00
02kW2-4	80	9.0	32	275	690	170M2695	00
03kW0-4	128	11.5	40	490	690	170M2696	00
04kW0-4	128	15.0	40	1000	690	170M2696	00
05kW5-4	200	20.2	50	1800	690	170M2697	00
07kW5-4	256	27.2	63	3600	690	170M2698	00
011kW-4	400	40.0	80	1450	690	170M2699	00
015kW-4	170	33.0	63	1450	690	170M1565	000
18kW5-4	170	39.0	63	2550	690	170M1565	000
022kW-4	280	45.0	80	4650	690	170M1566	000
030kW-4	380	62.0	100	8500	690	170M1567	1
037kW-4	480	73.0	125	16000	690	170M1568	000
045kW-4	480	88.0	160	15000	690	170M1569	1
055kW-4	700	106.0	200	28500	690	170M3815	1
075kW-4	1000	145.0	250	46500	690	170M3816	1
090kW-4	1280	169.0	315	68500	690	170M3817	1
110kW-4	1520	206.0	350	105000	690	170M3818	1
132kW-4	2050	246.0	450	145000	690	170M5809	2
160kW-4	2200	293.0	500	275000	690	170M5810	2

¹⁾ minimum short-circuit current of the device.

EN

■ gG fuses

Drive type ACQ80-04	Minimum short circuit current ¹⁾	Input current	gG (IEC 60269)				
			Rated current I _N	I ² t	Rated voltage	ABB designation type	IEC 60269 size
	A	A	A	A ² s	V		
3 phases U _N = 400 V (380...480 V)							
0kW75-4	48	4.2	6	110	500	OFAF000H6	000
01kW1-4	48	5.3	6	110	500	OFAF000H6	000
01kW5-4	80	6.4	10	360	500	OFAF000H10	000
02kW2-4	80	9.0	10	360	500	OFAF000H10	000
03kW0-4	128	11.5	16	740	500	OFAF000H16	000
04kW0-4	128	15.0	16	740	500	OFAF000H16	000
05kW5-4	200	20.2	25	2500	500	OFAF000H25	000
07kW5-4	256	27.2	32	4500	500	OFAF000H32	000
011kW-4	320	40.0	50	15500	500	OFAF000H50	000
015kW-4	320	33.0	40	7700	500	OFAF000H40	000
18kW5-4	400	39.0	50	16000	500	OFAF000H50	000
022kW-4	500	45.0	63	20100	500	OFAF000H63	000
030kW-4	800	62.0	80	37500	500	OFAF000H80	000
037kW-4	1000	73.0	100	65000	500	OFAF000H100	000
045kW-4	1000	88.0	100	65000	500	OFAF000H100	000
055kW-4	1300	106.0	125	103000	500	OFAF000H125	00
075kW-4	1700	145.0	160	185000	500	OFAF000H160	00
090kW-4	3300	169.0	250	600000	500	OFAF000H250	0
110kW-4	5500	206.0	315	710000	500	OFAF000H315	1
132kW-4	6400	246.0	355	920000	500	OFAF000H355	1
160kW-4	7800	293.0	425	1300000	500	OFAF000H425	2

EN

■ gR fuses

Drive type ACQ80-04	Minimum short circuit current ¹⁾	Input current	gG (IEC 60269)				
			Rated current I _N	I ² t	Rated voltage	ABB designation type	IEC 60269 size
			A	A ² s	V		
3-phase U _N = 380...480 V							
0kW75-4	48	4.2	25	125	690	170M2694	00
01kW1-4	48	5.3	25	125	690	170M2694	00
01kW5-4	80	6.4	32	275	690	170M2695	00
02kW2-4	80	9.0	32	275	690	170M2695	00
03kW0-4	128	11.5	40	490	690	170M2696	00
04kW0-4	128	15.0	40	490	690	170M2696	00
05kW5-4	200	20.2	50	1000	690	170M2697	00
07kW5-4	256	27.2	63	1800	690	170M2698	00
011kW-4	400	40.0	80	3600	690	170M2699	00
015kW-4	170	33.0	63	1450	690	170M1565	000
18kW5-4	170	39.0	63	1450	690	170M1565	000
022kW-4	280	45.0	80	2550	690	170M1566	000
030kW-4	380	62	100	4650	690	170M1567	000
037kW-4	480	73	125	8500	690	170M1568	000
045kW-4	480	88	160	16000	690	170M1569	000
055kW-4	700	106	200	15000	690	170M3815	1
075kW-4	1000	145	250	28500	690	170M3816	1
090kW-4	1280	169	315	46500	690	170M3817	1
110kW-4	1520	206	350	68500	690	170M3818	1
132kW-4	2050	246	450	105000	690	170M5809	2
160kW-4	2200	293	500	145000	690	170M5810	2

¹⁾ minimum short-circuit current of the device

DC fuses

Drive type ACQ80-04-	Fuse (A)	Drive type ACQ80-04-	Fuse (A)
3-phase $U_N = 380...480$ V			
0kW75-4	10	022kW-4	100
01kW1-4	10	030kW-4	125
01kW5-4	10	037kW-4	160
02kW2-4	10	045kW-4	160
03kW0-4	16	055kW-4	200
04kW0-4	20	075kW-4	315
05kW5-4	25	090kW-4	315
07kW5-4	32	110kW-4	400
011kW-4	50	132kW-4	450
015kW-4	63	160kW-4	550
18kW5-4	80		
Note: ABB recommends to use above fuses for reverse polarity protection between ACQ80 drive and solar array/solar string.			

EN

Typical AC input power cable specifications

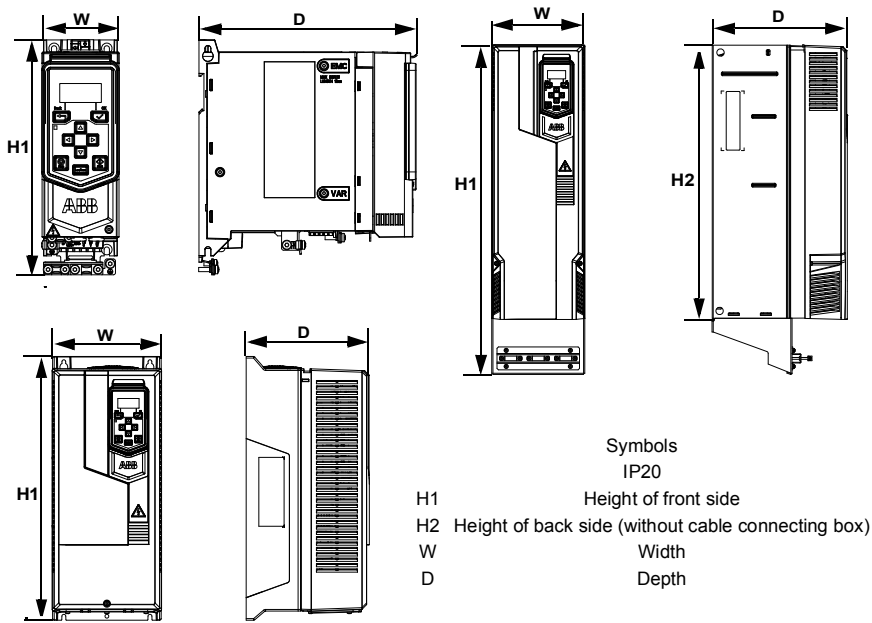
Drive type ACQ80-04	IEC	
	Copper wire cable mm ²	Aluminum wire cable mm ²
0kW75-4	3 x 1.5 + 1.5	-
01kW1-4	3 x 1.5 + 1.5	-
01kW5-4	3 x 1.5 + 1.5	-
02kW2-4	3 x 1.5 + 1.5	-
03kW0-4	3 x 1.5 + 1.5	-
04kW0-4	3 x 2.5 + 2.5	-
05kW5-4	3 x 2.5 + 2.5	-
07kW5-4	3 x 2.5 + 2.5	-
011kW-4	3 x 6.0 + 6.0	-
015kW-4	3 x 10 + 10	-
18kW5-4	3 x 10 + 10	-
022kW-4	3 x 16 + 16	-
030kW-4	3 x 25 + 16	3 x 35
037kW-4	3 x 35 + 16	3 x 50
045kW-4	3 x 35 + 16	3 x 70
055kW-4	3 x 50 + 25	3 x 70
075kW-4	3 x 95 + 50	-
090kW-4	3 x 120 + 70	-
110kW-4	3 x 150 + 70	-
132kW-4	2 x (3 x 70 + 35)	-
160kW-4	2 x (3 x 95 + 50)	-

Note: For DC power cable specifications are based on the PV manufacturer

Dimensions, weights, free space, and screw sizes

Frame size	ACQ80-04 Dimensions and weight IP20					Free space		Screw sizes
	W	D	H1	H2	Weight	Above	Below	
	mm	mm	mm	mm	kg	mm	mm	
R0	73	207	223	x	1.6	75	75	M5
R1	95	207	223	x	1.9			
R2	172	207	220	x	2.9			
R3	203	229	490	x	14.9	200	200	M6
R4	203	257	636	x	19.0			
R5	203	296	719	600	28.0			
R6	252	369	722	548	45.0	200	200	M8
R7	284	371	839	600	55.0			
R8	300	394	943	680	70.0			

Standard frame sizes (R0...R8)



See the detailed dimension drawings in the drive hardware manual.

Diagnostics

Warning messages

Code (hex)	Warning/Aux code (<i>aux code visible only on assistant control panel and drive composer</i>)	Cause	What to do
64FF	Fault reset	A fault has been reset.	Event. Informative only.
A2B1	Overcurrent	Output current exceeded internal fault limit.	Check motor load, acceleration times, earth fault in motor or motor cables, contactors opening and closing, start-up data, power factor correction in capacitors or surge absorbers in motor cable.
A2B3	Earth leakage	Load unbalance typically due to earth fault in motor or motor cable.	Check for no power factor correction capacitors or surge absorbers in motor cable, and no earth fault in motor or motor cables.
A2B4	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable for cabling errors, no earth fault in motor or motor cables, no power factor correction capacitors or surge absorbers in motor cable.
A2BA	IGBT overload	Excessive IGBT junction to case temperature.	Check motor cable, ambient conditions, air flow and fan operation, heatsink fins for dust pick-up, motor power against drive power.
A3A1	DC link overvoltage	Intermediate circuit DC voltage too high.	Check Overvoltage control parameter, no static or transient overvoltage in mains voltage, brake chopper/resistor, and deceleration time. Use coast-to-stop. Retrofit drive with chopper and resistor.
A3A2	DC link undervoltage	Intermediate circuit DC voltage too low (when the drive is stopped).	Check the supply voltage setting and fuses.
A3AA	DC not charged	The voltage of the intermediate DC circuit has not rose to operating level.	Check the supply voltage and supply voltage setting.
A490	Incorrect temperature sensor setup	Sensor type mismatch	Check the temperature setting parameters.
A491	External temperature 1	Measured temperature 1 exceeded warning limit.	Check the parameter 35.02 Measured temperature 1 , cooling of the motor, value of 35.13 Temperature 1 warning limit .
A492	External temperature 2	Measured temperature 2 exceeded warning limit.	Check the parameter 35.03 Measured temperature 2 , cooling of the motor, value of 35.23 Temperature 2 warning limit .
A4A0	Control board temperature.	Control board temperature is excessive. 1 – Sensor fault.	Check the sensor and change the control board.

Code (hex)	Warning/Aux code (aux code visible only on assistant control panel and drive composer)	Cause	What to do
A4A1	IGBT overtemperature	Estimated drive IGBT temperature is excessive.	Check ambient condition, air flow and fan operation, heatsink fins for dust pick-up, motor power against drive power.
A4A9	Cooling	Drive module temperature is excessive.	Check ambient temperature, drive module cooling air flow and fan operation, dust pick-up in the inside of cabinet and heatsink of drive module. Clean whenever necessary.
A4B0	Excess temperature	Power unit module temperature is excessive.	Check ambient conditions, air flow and fan operation, dust pick-up in heatsink fins, motor power against drive power.
A4B1	Excess temperature difference	High temperature difference between the IGBTs of different phases.	Check motor cabling and drive module(s) cooling.
A4F6	IGBT temperature	Drive IGBT temperature is excessive.	Check ambient conditions, air flow and fan operation, dust pick-up in heatsink fins and motor power against drive power.
A580	PU communication	Communication errors between drive control unit and power unit.	Check connections between drive control unit and power unit and value of parameter 95.04 Control board supply .
A581	Fan	Cooling fan feedback missing.	Check the auxiliary code to identify the fan. Code 0 denotes main fan 1. Other codes (format XYZ): "X" specifies state code (1: ID run, 2: normal). "Y" = 0, "Z" specifies the index of the fan (1: Main fan 1, 2: Main fan 2, 3: Main fan 3). Check fan operation and connection. Replace fan if faulty.
A582	Auxiliary fan missing	An auxiliary cooling fan is stuck or disconnected. 1 – Auxiliary fan 1 missing 2 – Auxiliary fan 2 missing	Check connection(s). Replace faulty fan.
A590	Drive HW initialization.	Drive hardware setup is initializing. 1 - Initializing HW settings for the first time.	See auxiliary code.
A591	Drive HW initialization	Initialization of the drive hardware.	Check the auxiliary code. See actions for each code below.
		0000 Drive hardware setup is initializing.	Wait for the setup to initialize.
		0001 Initializing HW settings for the first time.	Wait for the setup to initialize.
A5A0	Safe torque off	Safe torque off function is active.	Check safety circuit connections and parameter 95.04 Control board supply .
A5EA	Measurement circuit temperature	Fault in drive internal temperature measurement.	Contact your local ABB representative.
A5EB	PU board powerfail	Power unit power supply failure.	Contact your local ABB representative.
A5ED	Measurement circuit ADC	Measurement circuit fault.	Contact your local ABB representative.

Code (hex)	Warning/Aux code (aux code visible only on assistant control panel and drive composer)	Cause	What to do
A5EE	Measurement circuit DFF	Measurement circuit fault.	Contact your local ABB representative.
A5EF	PU state feedback	State feedback from output phases not matching with control signals.	Contact your local ABB representative.
A5F0	Charging feedback	Charging feedback signal missing.	Check the feedback signal coming from the charging system.
A5F1	Redundant measurement	Duplicated measurements are beyond limits.	Contact your local ABB representative.
A5F2	Overttemperature hw	Excessive hardware temperature.	Contact your local ABB representative.
A682	Flash erase speed	Flash erase speed exceeded.	Avoid forcing unnecessary parameter saves by parameter 96.07 Parameter save manually or cyclic parameter writes (such as user logger triggering through parameters). Check the auxiliary code (format XXXYYYZZZ). "X" specifies the source of warning (1: generic flash erase supervision). "ZZZ" specifies the flash subsector number that generated the warning.
A6A4	Motor nominal value	The motor parameters are set incorrectly. The drive is not dimensioned correctly.	Check the settings of motor configuration in parameter groups 98 and 99 and check if drive is sized correctly for the motor.
	1 – Slip frequency is too small		5 – Nominal voltage is outside limits
	2 – Synchronous and nominal speeds differ too much		6 – Nominal power is higher than apparent power.
	3 – Nominal speed is higher than synchronous speed with 1 pole pair		7 – Nominal power not consistent with nominal speed and torque
	4 – Nominal current is outside limits		
A6A5	No motor data	Parameters in group 99 are not set.	Set the required parameters in group 99.
A6A6	Voltage category unselected	Voltage category is not defined.	Set voltage category in parameter 95.01 Supply voltage .
A7AC	I/O Module internal error	Calibration data is not stored in the I/O module. Analog signals are not working with full accuracy.	Replace I/O module.
AFF8	Motor heating active	Pre-heating is being performed	Informative warning. Motor pre-heating is active. Current specified by parameter 21.16 Pre-heating time delay is being passed through the motor.
A6A7	System time not set	System time is not set.	
A6B0	User lock is open	The user lock is open, ie. user lock configuration parameters 96.100...96.102 are visible.	Close the user lock by entering an invalid pass code in parameter 96.02 Pass code .
A6B1	User pass code not confirmed	New pass code is entered in parameter 96.100 and not confirmed in 96.101 .	Confirm the new pass code by entering the same code in 96.101 .
A6D1	FBA A parameter conflict	PLC requested functionality is not activated.	Check PLC programming.

Code (hex)	Warning/Aux code (aux code visible only on assistant control panel and drive composer)	Cause	What to do
A6E5	AI parametrization	Current/voltage hardware setting of an analog input does not correspond to parameter settings.	Adjust the hardware setting on the drive control unit or the parameter 12.15/12.25 .
A780	Motor stall (Programmable warning: 31.24 Stall function)	Motor is operating in stall region.	Check motor load, drive ratings and fault function parameters.
A783	Motor overload	Motor current is too high.	Check for overloaded motor Adjust the parameters used for the motor overload function. (35.51...35.53 , 35.55 , 35.56)
A791	Brake resistor	Brake resistor fault.	Check brake resistor.
A792	Brake resistor wiring	Brake resistor short circuit or fault in brake chopper.	Check brake chopper and brake resistor connections.
A793	BR excess temperature	Brake resistor temperature exceeded warning limit.	Stop the drive. Let resistor cool down. Check resistor overload protection function settings, warning limits, resistor dimensioning and braking cycle limits.
A794	BR data	No brake resistor data.	Check resistor data settings.
	1 – Resistance value too low 2 – Thermal time constant not given	3 – Maximum continuous power not given	
A79C	BC IGBT excess temperature	Brake chopper IGBT temperature exceeded internal warning limit.	Let chopper cool down. Check ambient temperature, cooling fan, air flow, cabinet cooling, resistor overload protection function settings, chopper resistor value, braking cycle and supply voltage.
A7A2	Mechanical brake opening	Mechanical brake control error.	Check mechanical brake connection, parameter settings and brake acknowledgment signal.
A7AB	Built in/Extension I/O configuration failure	The I/O built in/extension module is not connected to the device properly.	Make sure that the I/O built in/extension module is connected to the device.
A7C1	FBAA communication	Cyclical communication between drive and fieldbus adapter module A or between PLC and fieldbus adapter module A is lost.	Check the status of fieldbus communication and cable connections.
A7CE	EFB comm loss	Communication lost in embedded fieldbus (EFB).	Check the status of the fieldbus master and cable connections to the EIA-485/X5 terminals 29, 30 and 31 on the control unit.
A7EE	Panel loss	Communication lost between control panel or PC tools and drive.	Check PC tool or control panel connection. Disconnect and reconnect the control panel.
A88F	Cooling fan		Replace the drive cooling fan.
	1 – On-time 1 counter 2 – On-time 2 counter 3 – Edge 1 counter 4 – Edge 2 counter	5 – Value 1 integrator 6 – Value 2 integrator 7 – Fan on time counter	

Code (hex)	Warning/Aux code (<i>aux code visible only on assistant control panel and drive composer</i>)	Cause	What to do
A8A0	AI supervision	Analog signal is beyond limits.	Check the signal level, input wiring, and the defined limits.
	1 – AI1 less minimum 2 – AI1 greater maximum	3 – AI2 less minimum 4 – AI2 greater maximum	
A8A1	RO life warning	The relay has changed states more than the recommended number of times.	Change the control board or stop using the relay output.
	1 – Relay output 1 2 – Relay output 2	3 – Relay output 3	
A8A2	RO toggle warning	The relay output is changing states faster than recommended.	Replace the signal connected to the relay output source with a less frequently changing signal.
	1 – Relay output 1 2 – Relay output 2	3 – Relay output 3	
A8B0	Signal supervision 1	Warning generated by the signal supervision function 1.	Check the source of the warning (parameter 32.07 Supervision 1 signal).
A8B1	Signal supervision 2	Warning generated by the signal supervision function 2.	Check the source of the warning (parameter 32.17 Supervision 2 signal).
A8B2	Signal supervision 3	Warning generated by the signal supervision function 3.	Check the source of the warning (parameter 32.27 Supervision 3 signal).
A8B3	Signal supervision 4	Warning generated by the signal supervision function 4.	Check the source of the warning (parameter 32.37 Supervision 4 signal).
A8B4	Signal supervision 5	Warning generated by the signal supervision function 5.	Check the source of the warning (parameter 32.47 Supervision 5 signal).
A8B5	Signal supervision 6	Warning generated by the signal supervision function 6.	Check the source of the warning (parameter 32.57 Supervision 6 signal).
A8B6	Current limit warning	Motor actual current exceeded the limit defined in parameter 30.17 Maximum current .	Reduce the motor load. Check for any jam or stall in motor.
A981	External warning 1	Fault in external device 1.	Check external device and parameter 31.01 External event 1 source .
A982	External warning 2	Fault in external device 2.	Check external device and parameter 31.03 External event 2 source .
A983	External warning 3	Fault in external device 3.	Check external device and parameter 31.05 External event 3 source .
A984	External warning 4	Fault in external device 4.	Check external device and parameter 31.07 External event 4 source .
A985	External warning 5	Fault in external device 5.	Check external device and parameter 31.09 External event 5 source .
AF8C	Process PID sleep mode	The drive is entering sleep mode.	Informative warning.

Code (hex)	Warning/Aux code (aux code visible only on assistant control panel and drive composer)	Cause	What to do
AFAA	Autoreset	A fault is about to be autoreset.	Informative warning.
AFE1	Emergency stop (off2)	Emergency stop (mode selection off2) command.	Check that it is safe to continue operation. Then return emergency stop push button to normal position. Restart drive.
AFE2	Emergency stop (off1 or off3)	Emergency stop (mode selection off1 or off3) command.	
AFE9	Start delay	Start delay is active and the drive will start the motor after a predefined delay.	Informative warning.
AFEC	External power signal missing	95.04 Control board supply is set to <i>External 24V</i> but no voltage is connected to the control unit.	Check the external 24 V DC power supply to the control unit, or change the setting of parameter 95.04 .
AFF5	Override new start required	Override new start required	The safe torque off function was active and has been reset while in Override. A new start signal is required in order to start the drive again.
AFF6	Identification run	Motor ID run will occur at next start.	Informative warning.
B5F6	Identification run	Motor ID run completed successfully.	Informative warning.
D506	Pump cleaning not possible	Pump cleaning not started as the drive is not in remote control.	Set the drive to remote control mode.
D5B0	Pump min speed	This alarm occurs when the start command is provided and the actual speed of the motor (01.01) is not increasing above 79.51 Pump minimum speed within the time calculated by the drive software internally. The warning resets automatically after the time defined in 79.61 Fault reset time elapses and if start command is active, the drive restarts automatically.	Check the pump minimum speed defined in parameter 79.51 Pump minimum speed .
D5B1	Start delay active	This alarm occurs if more than three start occurs within one minute.	This warning resets automatically after five minutes and if start command is active, drive starts automatically.
FA90	STO diagnostics failure	The software is not working properly.	Restart the control unit.

Fault messages

Code (hex)	Fault / Aux. code <i>aux code visible only on assistant control panel and drive composer</i>	Cause	What to do
1080	Backup/Restore timeout	During backup/restore, communication is lost between panel/PC tool and drive.	Request backup or restore again.
1081	Rating ID fault	Drive software is not able to read the drive rating ID.	Reset the fault or cycle the power to the drive. If the fault persists, contact your local ABB representative.
2281	Calibration	Measured offset of output phase current measurement or difference between output phase U2 and W2 current measurement is too great (the values are updated during current calibration).	Try performing the current calibration again. If the fault persists, contact your local ABB representative.
2310	Overcurrent	Output current exceeded the internal fault limit.	Check the motor load, acceleration times, motor and motor cable, encoder cable and there are no power factor correction capacitors in motor cable.
2330	Earth leakage	Load unbalance typically due to earth fault in motor or motor cable.	Check there are no power factor correction capacitors or surge absorbers in motor cable and there is no earth fault in motor or motor cables.
2340	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable and there are no power factor correction capacitors or surge absorbers in motor cable.
2381	IGBT overload	Excessive IGBT junction to case temperature.	Check motor cable.
2392	BU earth leakage	Total earth leakage of inverter modules is excessive.	Check there are no power factor correction capacitors or surge absorbers in motor cable. Measure insulation resistances of motor cables and motor. Contact your local ABB representative.
3130	Input phase loss	Intermediate circuit DC voltage is oscillating due to missing input power line phase or blown fuse.	Check input power line fuses and there is no input power supply imbalance.
3181	Wiring or earth fault	Incorrect input power and motor cable connection.	Check input power connections.
3210	DC link overvoltage	Excessive intermediate circuit DC voltage.	Check overvoltage control is on, supply voltage matches the nominal input voltage of the drive. Check supply line for static or transient overvoltage, brake chopper, brake resistor and deceleration time. Use coast-to-stop function (if applicable).
3220	DC link undervoltage	Intermediate circuit DC voltage is not sufficient.	Check supply cabling, fuses and switchgear.

Code (hex)	Fault / Aux. code aux code visible only on assistant control panel and drive composer)	Cause	What to do
3291	BU DC link difference	Difference in DC voltages between parallel-connected inverter modules.	Check the auxiliary code (format XXXY YYZZ). "XXX" specifies the source of the first error (see "YYY"). "YYY" specifies the module through which BCU control unit channel the fault was received (1: Channel 1, 2: Channel 2, 4: Channel 3, 8: Channel 4, ..., 800: Channel 12).
3381	Output phase loss	Motor circuit fault due to missing motor connection (any of the three phases not connected). In scalar control mode, the drive detects fault only when the output frequency is above 10% of the motor nominal frequency.	Connect motor cable. If the drive is in scalar mode and nominal current of the motor is less than 1/6 of the nominal output current of the drive, set parameter 31.19 Motor phase loss to No action [0].
3381	Output phase loss	Motor circuit fault due to missing motor connection.	Connect motor cable.
4110	Control board temperature	Control board temperature is too high.	Check proper cooling of the drive and auxiliary cooling fan.
4210	IGBT overtemperature	Estimated drive IGBT temperature is excessive.	Check ambient conditions, air flow and fan, dust pick-up in heatsink fins and motor power.
4290	Cooling	Drive module temperature is excessive.	Check ambient temperature, air flow and fan operation, dust pick-up in heatsink. Clean whenever necessary.
42F1	IGBT temperature	Drive IGBT temperature is excessive.	Check ambient conditions, air flow and fan, dust pick-up in heatsink fins and motor power.
4310	Excess temperature	Power unit module temperature is excessive.	Check ambient conditions, air flow and fan, dust pick-up in heatsink fins and motor power.
4380	Excess temperature difference	High temperature difference between the IGBTs of different phases.	Check motor cabling and drive module(s) cooling.
4981	External temperature 1	Measured temperature 1 has exceeded fault limit.	Check parameter 35.02 Measured temperature 1 , motor cooling and fault limit for measured temperature 1.
4982	External temperature 2	Measured temperature 2 has exceeded fault limit.	Check parameter 35.03 Measured temperature 2 , motor cooling and fault limit for measured temperature 1.
4991	Safe motor temperature	The CPTC-02 module indicates overtemperature: - motor temperature is too high, or - the thermistor is in short circuit.	Check the cooling of the motor. Check the motor load and drive ratings. Check the wiring of the temperature sensor. Repair wiring if faulty. Measure the resistance of the sensor. Replace the sensor if faulty.
5080	Fan	Cooling fan is stuck or disconnected.	Check fan operation and connection. Replace fan if faulty.
5081	Auxiliary fan broken	An auxiliary cooling fan is stuck or disconnected. 1 – Auxiliary fan 1 broken 2 – Auxiliary fan 2 broken	Check auxiliary fan(s) and connection(s). Replace fan if faulty.
5091	Safe torque off	Safe torque off function is active.	Check safety circuit connections parameter 95.04 Control board supply .
5092	PU logic error	Power unit memory is cleared.	Contact ABB.

Code (hex)	Fault / Aux. code aux code visible only on assistant control panel and drive composer)	Cause	What to do
5093	Rating ID mismatch	Mismatch of drive hardware and memory information.	Cycle power to the drive. You may have to repeat this.
5094	Measurement circuit temperature	Fault in internal temperature measurement.	Contact ABB.
5095	Redundant measurement	Duplicated measurements are beyond limits.	Contact ABB.
5096	Overtemperature hw	Excessive hardware temperature.	Contact your local ABB representative.
5098	I/O communication loss	Communication failure to standard I/O.	Try resetting the fault or cycle the power to the drive.
5681	PU communication	Communication errors between drive control unit and power unit.	Check connections and parameter 95.04 Control board supply .
5682	Power unit lost	Connection lost between drive control unit and power unit.	Check connections.
5690	PU communication internal	Internal communication error.	Contact ABB.
5691	Measurement circuit ADC	Measurement circuit fault.	Contact ABB.
5692	PU board powerfail	Power unit power supply failure.	Contact ABB.
5693	Measurement circuit DFF	Measurement circuit fault.	Contact ABB.
5695	Reduced run	Configured power units not found.	Configure the power units.
5696	PU state feedback	State feedback from output phases does not match control signals.	Contact ABB.
5697	Charging feedback	Charging feedback signal missing.	Check feedback signal from charging system
5698	Unknown PU fault	The power unit logic generated a fault which is not known by software.	Check the logic and software compatibility.
50A0	Fan	Cooling fan stuck or disconnected.	Check fan operation and connection. Replace fan if faulty.
6181	FPGA version incompatible	Firmware and FPGA versions are incompatible.	Reboot the control unit with parameter 96.08 Control board boot or by cycling power. If the problem persists, contact ABB.
6306	FBA A mapping file	Fieldbus adapter A mapping file read error.	Contact ABB.
6481	Task overload	Internal fault. Note: This fault cannot be reset.	Reboot the control unit using parameter 96.08 Control board boot or by cycling power. If the problem persists, contact ABB.
6487	Stack overflow	Internal fault.	Reboot the control unit. If the problem persists, contact ABB.
64A1	Internal file load	File read error.	Reboot the control unit. If the problem persists, contact ABB.
64A3	Application loading	Application file incompatible or corrupted.	Check the auxiliary code. See actions for each code below.
	8006	Not enough memory for the application.	Reduce the size of the application. Reduce the number of parameter mappings. See the drive-specific log generated by Automation Builder.

Code (hex)	Fault / Aux. code <i>aux code visible only on assistant control panel and drive composer</i>	Cause	What to do		
	8007	The application contains the wrong system library version.	Update the system library or reinstall Automation Builder. See the drive-specific log generated by Automation Builder.		
	8008	The application is empty.	In Automation Builder, give a "Clean" command and reload the application.		
	8009	The application contains invalid tasks.	In Automation Builder, check application task configuration, give a "Clean all" command, and reload the application.		
	800A	The application contains an unknown target (system) library function.	Update the system library or reinstall Automation Builder. See the drive-specific log generated by Automation Builder.		
64A4	Rating ID fault	Rating ID load error.	Contact ABB.		
64A6	Adaptive program	Fault in adaptive program.	Check the fault code extension.		
64B1	Internal SSW fault	A fatal error in the power-up phase of System Software (SSW).	SSW runs in partial functionality mode.		
				1 – Starting OS time tick failed	5 – Initializing WoRm volumes failed
				2 – Creating system tasks failed	6 – Loading FPGA configuration failed
				3 – Initializing file system failed	7 – Loading application program failed
				4 – Checking file system failed	
64B2	User set fault	Loading user parameter set failed.	Make sure a valid user parameter set exists. Reload if uncertain.		
64B3	Macro parameterization error	Macro parameterization failed, eg. Parameter default value that cannot be changed has been attempted to write.			
64E1	Kernel overload	Operating system error. Note: This fault cannot be reset.	Reboot the control unit using parameter 96.08 Control board boot or by cycling power. If the problem persists, contact ABB.		
6581	Parameter system	Parameter load or save failed.	Try forcing a save using parameter 96.07 Parameter save manually .		
65A1	FBA A parameter conflict	Requested functionality is not activated.	Check PLC programming. Check parameter groups 50 Fieldbus adapter (FBA) and 51 FBA A settings .		
6681	EFB communication loss (Programmable fault: 58.14 Communication loss action)	Communication failed in embedded fieldbus (EFB) communication.	Check the status of the fieldbus master (online/offline/error etc.). Check cable connections to the EIA-485/X5 terminals 29, 30 and 31 on the control unit.		
6591	Backup/Restore timeout	During backup creating or restoring operation a panel or PC-tool has failed to communicate with the drive as part of this operation.	Check panel or PC-tool communication and if it is still in backup or restore state.		
6682	EFB configuration file	Embedded fieldbus (EFB) configuration file could not be read.	Reload the firmware or replace the unit. Contact ABB.		
6683	EFB invalid parameterization	Embedded fieldbus (EFB) parameter settings inconsistent or not compatible with selected protocol.	Check parameter group 58 Embedded fieldbus .		

Code (hex)	Fault / Aux. code aux code visible only on assistant control panel and drive composer)	Cause	What to do
6684	EFB load fault	Embedded fieldbus (EFB) protocol firmware could not be loaded. Version mismatch between EFB protocol firmware and drive firmware.	Reload the firmware or replace the unit. Contact ABB.
6685	EFB fault 2	Fault reserved for the EFB protocol application.	Check the documentation of the protocol.
6686	EFB fault 3		
6882	Text 32-bit table overflow	Internal fault.	Reset fault. If fault persists, contact ABB.
6885	Text file overflow	Internal fault. The table size is too short for opening language file.	Reset the fault. If fault persists, contact ABB.
7081	Control panel loss	Control panel or PC tool ceased communicating.	Check connections. Disconnect and reconnect the control panel.
7085	Incompatible option module	Fieldbus option module not supported.	Replace the module with a supported type.
7121	Motor stall	Motor is operating in stall region.	Check motor load, drive ratings and fault function parameters.
7122	Motor overload	Motor current is too high.	Check for overloaded motor Adjust the parameters used for the motor overload function. (35.51...35.53, 35.55, 35.56)
7181	Brake resistor	Brake resistor broken or not connected.	Check connections and brake resistor dimensioning.
7183	BR excess temperature	Brake resistor temperature has exceeded the limit.	Stop drive. Let resistor cool down. Check resistor overload protection function settings and fault limit settings. Check braking cycle limits.
7184	Brake resistor wiring	Brake resistor short circuit or brake chopper control fault.	Check connections.
7191	BC short circuit	Short circuit in brake chopper IGBT.	Check the electrical specifications. Replace brake chopper.
7192	BC IGBT excess temp	Brake chopper IGBT temperature exceeded internal fault limit.	Let chopper cool down. Check ambient temperature, cooling fan, air flow, resistor overload protection function settings, braking cycle limits and supply voltage.
71A3	Mech brake opening failed	Mechanical brake control is faulty. Brake open acknowledgment is not matching the actual status.	Check connections, brake settings and brake acknowledgment signal.
73B0	Emergency ramp failed	Emergency stop did not finish within expected time.	Check predefined ramp times (23.11...23.15 for mode Off1, 23.23 for mode Off3).
73F0	Overfrequency	Maximum allowed output frequency exceeded.	Check the auxiliary code.
	00FA	Motor is turning faster than the highest allowed frequency due to incorrectly set minimum/maximum frequency or the motor rushes because of too high supply voltage or incorrect supply voltage selection in parameter 95.01 Supply voltage.	Check minimum/maximum frequency settings, parameters 30.13 Minimum frequency and 30.14 Maximum frequency. Check used supply voltage and voltage selection parameter 95.01 Supply voltage.
	Other	-	Contact your local ABB representative, quoting the auxiliary code.

Code (hex)	Fault / Aux. code aux code visible only on assistant control panel and drive composer)	Cause	What to do		
7310	Overspeed	Motor is turning faster than highest allowed speed.	Check the minimum/maximum speed settings, parameters 30.11 Minimum speed and 30.12 Maximum speed , motor braking torque, torque control, brake chopper and resistor(s).		
7510	FBA A communication (Programmable fault: 50.02 FBA A comm loss func)	Cyclical communication between drive and fieldbus adapter module A or between PLC and fieldbus adapter module A is lost.	Check the status of fieldbus communication. Check parameter groups 50 Fieldbus adapter (FBA) , 51 FBA A settings , 52 FBA A data in and 53 FBA A data out . Check cable connections and communication of master.		
8000	Unicos system error	System fault.	Power cycle.		
8009	Current limit	Motor actual current exceeded the limit defined in parameter 30.17 Maximum current .	Reduce the motor load. Check for any jam or stall in motor. See parameter 30.17 Maximum current .		
80A0	AI supervision	An analog signal is outside the limits specified for the analog input.	Check signal level, auxiliary code, wiring connected to the input and the minimum/maximum limits of the input in parameter group 12 Standard AI .		
				1 – AI1LessMIN	3 – AI2LessMIN
				2 – AI1GreaterMAX	4 – AI2GreaterMAX
80B0	Signal supervision 1	Fault generated by the signal supervision function 1.	Check the source of the fault (parameter 32.07 Supervision 1 signal).		
80B1	Signal supervision 2	Fault generated by the signal supervision function 2.	Check the source of the fault (parameter 32.17 Supervision 2 signal).		
80B2	Signal supervision 3	Fault generated by the signal supervision function 3.	Check the source of the fault (parameter 32.27 Supervision 3 signal).		
80B3	Signal supervision 4	Fault generated by the signal supervision function 4.	Check the source of the fault (parameter 32.37 Supervision 4 signal).		
80B4	Signal supervision 5	Fault generated by the signal supervision function 5.	Check the source of the fault (parameter 32.47 Supervision 5 signal).		
80B5	Signal supervision 6	Fault generated by the signal supervision function 6.	Check the source of the fault (parameter 32.57 Supervision 6 signal).		
9081	External fault 1	Fault in external device 1.	Check external device and parameter 31.01 External event 1 source .		
9082	External fault 2	Fault in external device 2.	Check external device and parameter 31.03 External event 2 source .		
9083	External fault 3	Fault in external device 3.	Check external device and parameter 31.05 External event 3 source .		
9084	External fault 4	Fault in external device 4.	Check external device and parameter 31.07 External event 4 source .		
9085	External fault 5	Fault in external device 5.	Check external device and parameter 31.09 External event 5 source .		
A2A1	Current calibration	Current offset and gain measurement calibration will occur at next start.	Informative warning. (See parameter 99.13 ID run requested)		

Code (hex)	Fault / Aux. code aux code visible only on assistant control panel and drive composer)	Cause	What to do
D4B0	Running dry	Dry run protection is activated.	Check the pump inlet for sufficient water level. Check dry run protection settings in parameter group 82 Pump protections .
D4B1	PV max volt	The DC bus voltage in the inverter is above the voltage set in 79.43 PV cell max voltage .	- Check the number of PV cells connected in series. - Ensure that voltage is less than the voltage set in 79.43 PV cell max voltage.
FF61	ID run	Motor ID run was not completed successfully.	Check - nominal motor values in parameter group 98 User motor parameters. - that no external control system is connected to the drive. - that no operation limits prevent the completion of the ID run. Restore parameters to default settings and try again. - that the motor shaft is not locked. Cycle the power to the drive (and its control unit, if powered separately).
			1 – Maximum current limit too low
			2 – Maximum speed limit or calculated field weakening point too low
			3 – Maximum torque limit too low
			4 – Current measurement calibration not finished within reasonable time
			5...8 – Internal error
			9 – (Asynchronous motors only). Acceleration not finished within reasonable time.
			A – (Asynchronous motors only). Deceleration not finished within reasonable time.
FF63	STO diagnostics failure.	SW internal malfunction.	Reboot the control unit (using parameter 96.03 Control board boot or by cycling power.
FF81	FB A force trip	A fault trip command through fieldbus adapter A.	Check the fault information provided by the PLC.
FF8E	EFB force trip	A fault trip command through embedded fieldbus interface.	Check the fault information provided by the PLC.



Further information

Product and service inquiries

Address any inquiries about the product to your local ABB representative, quoting the type designation and serial number of the unit in question. A listing of ABB sales, support and service contacts can be found by navigating to abb.com/searchchannels.

Product training

For information on ABB product training, navigate to new.abb.com/service/training.

Providing feedback on ABB Drives manuals

Your comments on our manuals are welcome. Navigate to new.abb.com/drives/manuals-feedback-form.

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