ABB wind turbine converters

Supplement to system description and start-up guide
ACS800-67 upgrade wind turbine converters

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List of related manuals

ACS800-67 manuals	Code (English)
ACS800-67 wind turbine converters for asynchronous slip ring generators hardware manual	*3AFE68392454*
ACS800-67 wind turbine converters system description and start-up guide	*3AUA0000095094*
ACS800-67 upgrade wind turbine converters supplement to system description and start-up guide	*3AXD50000131303*
ACS800-67 upgrade kits supplement to hardware manual	*3AXD50000226726*

Firmware manuals	
ACS800 IGBT supply control program firmware manual	*3AFE68315735*
ACS800 grid-side control program firmware manual	*3AUA0000075077*
ACS800-67(LC) doubly-fed induction generator control program firmware manual	*3AUA0000071689*

Option manuals
Manuals for fieldbus adapters, etc.

For manuals, contact your local ABB representative.

Supplement to system description and start-up guide

ACS800-67 upgrade wind turbine converters

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3AXD50000131303 Rev A
EN
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Further information

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About this manual

Contents of this chapter

This chapter describes the intended audience, purpose and contents of the manual. The chapter also contains information about contacting ABB.

Safety instructions

For safety instructions, see the hardware manual of the wind turbine converter. *S*afety instructions must be followed during installation, start-up, maintenance and use of the converter.

Target audience

This manual is intended for people who conduct start-ups and operate with the converter. Read the manual before working on the converter. You are expected to know the fundamentals of electricity, wiring, electrical components and electrical schematic symbols.

Purpose of the manual

This manual is a supplementary start-up guide on how to set the program parameters to achieve the optimal system operation.

The detailed information on the converter is divided into hardware, firmware and option manuals.

Applicability

This manual describes the ACS800-67 upgrade wind turbine converter.

The control programs referred to in this manual are

- grid-side control program IWXR74xx
- doubly-fed induction generator control program AJXC23xx.

Contents of this manual

The chapters of this manual are briefly described below.

About this manual introduces this manual.

Start-up gives instructions on how to start-up the ACS800-67 upgrade wind turbine converter.

DriveWindow

DriveWindow 2 user's manual (3BFE64560981 [English]) describes the use of the DriveWindow PC tool.

Further information

Address any inquiries about the product to your local ABB representative, quoting the type code and serial number of the unit. If the local ABB representative can not be contacted, address inquiries to nearest country that has support for wind turbine converters. See detailed contact information from the back cover of this manual.

In case of fault situations, ensure that the information stated below is available to get fast problem solving assistance:

- fault logger data
- data logger files (data logger 1 and data logger 2) from grid-side and rotor-side converter control programs
- parameter files from the grid-side and rotor-side converter control programs.

In DriveWindow,

- save the parameters with **File** / **Parameters** / **Save as** command to a .dwp file
- copy the fault data from the **Fault logger** view and paste it to a .txt file
- copy the graphs from the **Data logger** view.

Terms and abbreviations

Abbreviation	Explanation
ACBU	A protective device called crowbar that is used in DFIG converters. An active crowbar can keep the converter in operation through grid voltage dips.
AMC	The main control board located inside the NDCU control unit of the rotor-side converter.
APBU	Branching unit for dividing the RDCU/NDCU signals to the parallel power modules using the PPCS protocol. See *APBU-44C(E) PPCS branching and datalogger unit hardware manual* (3AFE68464251 [English]).
DFIG	Doubly-fed induction generator
Grid-side converter	The power electronics bridge that connects to the grid. Consists of one or several power modules.
MCB	Main circuit breaker. Electrically-controlled main switching and protecting device. A withdrawable breaker can also be used as the main disconnector.
NAMU	Measurement unit for grid voltage of the grid-side converter.
NDCU	Control unit of the rotor-side converter
NETA	Remote monitoring tool for maintenance and supervision
NUIM	Voltage and current measurement unit for the NDCU
PLC	Programmable logic controller
RDCU	Control unit of the grid-side converter
RMIO	Interface board. Located inside the RDCU control unit of the grid-side converter
Rotor-side converter	The power electronics bridge that connects to the rotor of the DFIG. Consists of one or several power modules.
RUSB-02	USB-DDCS adapter

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Start-up

Contents of this chapter

This chapter instructs in starting-up the converter, setting the start-up parameters and configuring the control signals of the system. The start-up procedure must be performed in local control mode by using DriveWindow PC tool.

General

The following actions need to be performed when the converter is commissioned for the first time or each time when updating the converter software:

- setting the language
- entering the generator data according to the generator nameplate.

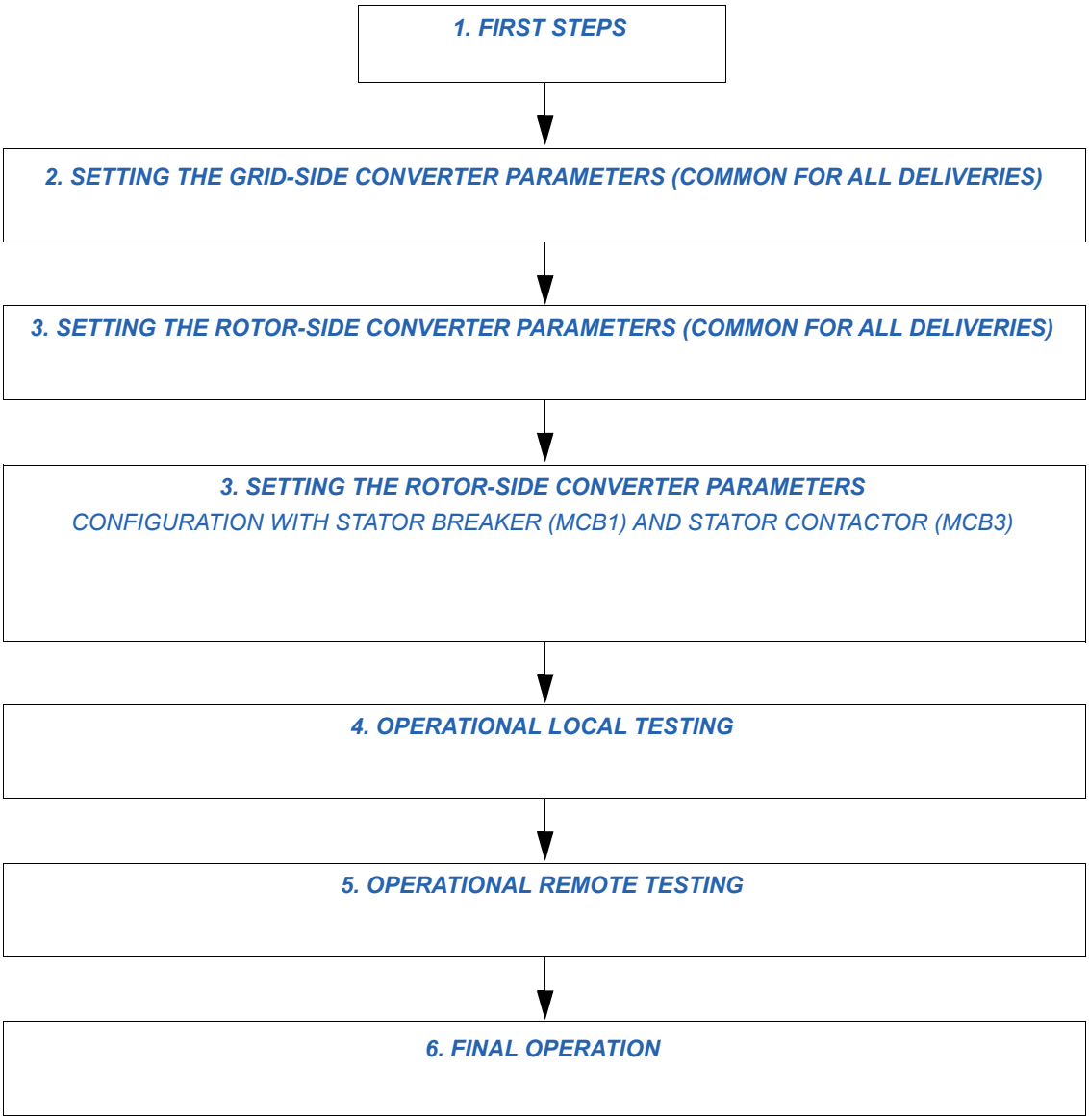
Note: It is not allowed to start the converter up more often than once in two minutes during commissioning. Avoid frequent start-ups not to damage charging circuit components.

For more information, see the following manuals:

Rotor-side converter (INU)	*ACS800-67(LC) doubly-fed induction generator control program firmware manual* (3AUA0000071689 [English])
Grid-side converter (ISU)	*Grid-side control program for ACS800 wind turbine converters firmware manual* (3AUA0000075077 [English])

Legend of the start-up procedure

This flowchart illustrates the start-up procedure.



Start-up procedure

The start-up procedure is described below. All selections available for a parameter or additional information on a parameter is marked with *. Parameter selection to be chosen or information on using DriveWindow PC tool is located in the most right-hand side column in the table.

1. FIRST STEPS

SAFETY

	**WARNING!** The safety instructions must be followed during the installation and start-up procedure. See the safety instructions in *ACS800-67 wind turbine converters for asynchronous slip ring generators hardware manual* (3AFE68392454 [English]).
☐	Only qualified electricians are allowed to install and start-up the converter.
☐	The generator shaft must be locked mechanically to ensure that the generator rotor does not rotate during the executing the commissioning.

INSTALLATION

Check and ensure that:

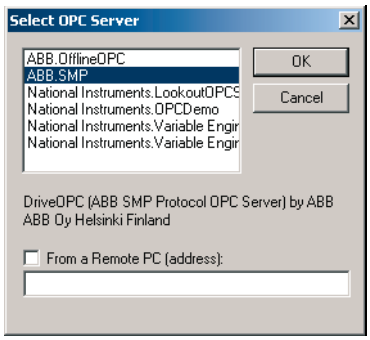
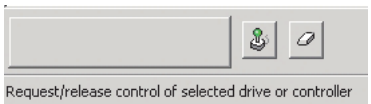
☐ ○	The mechanical installation is performed according to the instructions given in *ACS800-67 wind turbine converters for asynchronous slip ring generators hardware manual* (3AFE68392454 [English]).
☐ ○	The electrical installation is performed according to the instructions given in *ACS800-67 wind turbine converters for asynchronous slip ring generators hardware manual* (3AFE68392454 [English]).
☐ ○	The installation is checked according to the checklists in *ACS800-67 wind turbine converters for asynchronous slip ring generators hardware manual* (3AFE68392454 [English]).

POWER-UP AND DriveWindow CONNECTION

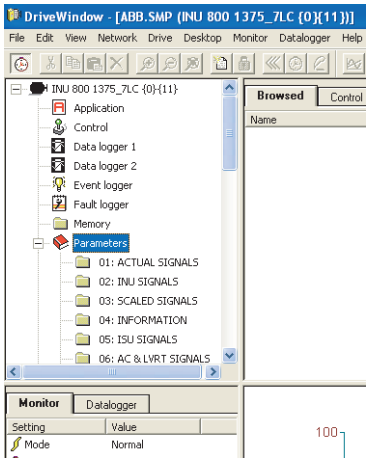
WARNING! Controlling a converter may cause personal injury or physical damage. You should have physical access to the converter, and you must be sure that the converter and the electromechanical system are clear to control (you can see the system, for example). Controlling a converter remotely may require extra precautions and is discouraged.

☐	Connecting voltage to the input terminals and auxiliary circuit • Make sure that it is safe to apply voltage. • Ensure that: - nobody is working on the unit or circuits that are wired from outside into the cabinet - covers of generator terminal boxes are in place. • Close the circuit breakers that connect the voltage to auxiliary devices, eg, fans, boards, main breaker/contactor control circuit, emergency stop circuit, 24 V DC power supply. • Check that cabinet covers are in place and close the doors. • Close the main switch disconnector (Q1). • Converter with grid-side air circuit breaker and stator contactor(s): Rack the withdrawable breaker in.	To locate the circuit breakers, see the delivery-specific circuit diagrams and the cubicle designations on cabinet doors.

1. FIRST STEPS

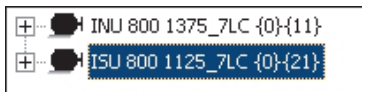
☐	Ensure that the grid and/or stator circuit switchgears is/are disabled and unintended connection is disabled (safety operation).	
☐	Check and make appropriate settings for the main circuit breaker. ○ Set the frequency of the main circuit breaker according to the grid frequency in use (50 or 60 Hz). Factory setting is 50 Hz.	
☐	Enable the memory backup battery on the PPCS branching units (APBU) by setting actuator 6 of switch S3 to ON.	The branching units are located in the sliding frame of the auxiliary control cubicle. By default, the memory backup is switched off to save the battery.
☐	Connect PC to the converter by unplugging the NETA-21 optic cables and connect them to DriveWindow. For instructions on DriveWindow use, see page *45*.	
☐	Start DriveWindow PC tool and make connection to the converter by choosing ABB.SMP server and pressing **OK** button.	
○	Check from browse tree pane that the connection to both converters is established properly. **Note:** If all connected converters are not seen through the optical ring, check that the node addresses of NDCU and RDCU control units are set properly: • Rotor-side converter (NDCU) AMC board node address 70.15 CH3 NODE ADDR should be 11 • Rotor-side converter (NDCU) AMC board node address 70.21 CH4 NODE ADDR should be 11 • Grid-side converter (RDCU) RMIO board node address 70.15 CH3 NODE ADDR should be 21. **Note:** A new node address becomes valid only after the next power-up of the NDCU/RDCU control unit.	
☐	Select and activate the rotor-side converter (INU) by clicking it in the browse tree pane.	
☐	Take local control by clicking the **Take/Release Control** button in the converter panel toolbar.	
○	Check that control is activated successfully. If control is taken successfully, status image, converter name, field for entering the reference value and command buttons are shown in the drive panel toolbar.	

1. FIRST STEPS

☐	Open the parameter window in DriveWindow PC tool.	

2. SETTING THE GRID-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)

Note: By double clicking a parameter you can enter to edit mode and change the value of the parameter.

☐	Select and activate the grid-side converter (ISU) by clicking it in the browse tree pane.	
	SYSTEM CONTROL INPUTS	
☐	Enable parameters for editing:	
○	16.02 PARAMETER LOCK * LOCKED/OPEN The lock is open. Parameter values can be changed.	OPEN
	REFERENCE SELECT	
☐	Choose the type for the used reactive power reference:	
○	11.02 Q REF SELECT * PARAM 24.01 / AI1 / AI2 / AI3 / PARAM 24.02 Defines the source for the reactive power reference.	PARAM 24.02
	REACTIVE POWER	
☐	Choose the type for the used reactive power reference:	
○	24.03 Q POWER REF2 SEL * PERCENT / kVAr / PHI / COSPHI / IQ REF / AC REF Selects the reference unit. Factory setting value is PERCENT.	**Note:** It is recommended to use the same reference value than in the rotor-side converter parameter 23.04 REACT POW REF SEL.
	WIND CONTROL	
☐	Check that RT function is disabled:	
○	40.01 RT ENABLE * OFF / ON The RT function is not active. Recommended during the commissioning.	OFF
☐	Check that the auxiliary measuring unit (NAMU-01) is enabled:	
○	40.02 NAMU BOARD ENABLE * ON / OFF Enables the NAMU-01 voltage measuring unit if the value in parameter 01.11 MAINS VOLTAGE is correct and the fault led of NAMU-01 unit is not blinking.	ON
	OPTION MODULES	
☐	Check that the grid-side converter system control inputs are selected as follows:	
○	98.02 COMM. MODULE * NO / FIELDBUS / ADVANT / N-FB / STD MODBUS / CACP / CASCADE / INU COM WIDE / INU COM LIM By activating this parameter the grid-side converter is controlled by the rotor-side converter as a cascade system.	CASCADE
○	98.11 AI/O EXT MODULE 1 * NOT IN USE / RAIO-SLOT1 / RAIO-SLOT2 / RAIO-DDCS	RAIO-SLOT1

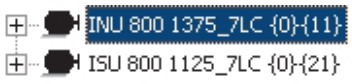
2. SETTING THE GRID-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)

START-UP DATA

☐	Check that the automatic grid-side converter identification run is activated:	
○	99.08 AUTO LINE ID RUN	
	* NO / YES	YES
	The identification run is requested automatically after the RMIO board power-up. The identification run starts automatically when the grid-side converter receives the start command.	

3. SETTING THE ROTOR-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)

Note: By double clicking a parameter you can enter to edit mode and change the value of the parameter.

☐	Select and activate the rotor-side converter by clicking it in the browse tree pane.	
	SYSTEM CONTROL INPUTS	
☐	Enable parameters for editing:	
○	16.01 PARAM LOCK * OFF / ON Editing certain parameters is disabled without opening the parameter lock.	OFF
○	16.02 PANEL PAR LOCK * OPEN / LOCKED The lock is open. Parameter values can be changed.	OPEN
☐	Check/Enter grid connection mode:	
○	16.20 GRID CONNECT MODE * MCB3 / MCB1+MCB3/A / MCB1+MCB3/B / MCB1+MCB3/C	MCB1+MCB3/C For ACS800-67-0480/0770-7 converter, select MCB1+MCB3/A.
	LIMITS	
☐	Enter the parameter values:	
○	20.05 USER POS TORQ LIM * maximum allowable motoring torque in % Factory setting value is 20.	
○	20.06 USER NEG TORQ LIM * minimum allowable generating torque in % Factory setting value is -20.	
○	20.21 SWITCH ON SPEED * speed level in rpm that enables the stator circuit synchronization and grid interconnection Factory setting value is 950 rpm.	
○	20.22 SWITCH OFF SPEED * speed level in rpm that forces the stator circuit disconnection from the grid Factory setting value is 925 rpm.	
	FIELDBUS REFERENCES	
☐	Select the reactive power reference type:	
○	23.04 REACT POW REF SEL * PERCENT / KVAR / PHII / COSPHII / U_AC REF / I_R REF Factory setting value is KVAR.	**Note:** It is recommended to use the same reference value than in the grid-side converter parameter 24.03 Q POWER REF2 SEL.

3. SETTING THE ROTOR-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)

TORQUE/POWER SELECTOR

☐	Select the torque or power reference type:	
○	27.01 TORQUE SELECTOR * ZERO / SPEED / TORQUE / MINIMUM / MAXIMUM / ADD / POWER Defines the reference source selector for the rotor-side converter torque controller.	**Note:** TORQUE or POWER is intended to be used in wind turbine applications.

FAULT FUNCTIONS

☐	Enter/Check FAULT FUNCTIONS parameter values:	
○	30.04 STATOR CURR TRIP * stator current trip level in A During commissioning, set parameter value to 500 A.	500 A
○	30.05 AC OVERVOLT TRIP * maximum allowable short-term grid overvoltage in V Factory setting value is 828 V.	
○	30.06 AC UNDERVOLT TRIP * minimum allowable short-term grid under voltage in V Factory setting value is 552 V.	
○	30.07 AC OVERFREQ TRIP * maximum allowable short-term over frequency in Hz Factory setting value is 65 Hz.	
○	30.08 AC UNDERFREQ TRIP * minimum allowable short-term under frequency in Hz Factory setting value is 45 Hz.	
○	30.09 OVERSPEED LIMIT * maximum allowable generator rotor mechanical speed in 2100 rpm	
○	30.10 UNDERSPEED LIMIT * minimum allowable generator rotor mechanical speed in 900 rpm	

CROWBAR

○	Check that the crowbar type is selected correctly: 31.01 CROWBAR HW TYPE * PASSIVE CB / ACTIVE CB / ONLY GRID SU / 2 ACTIVE CBs / 1 REV2 CB / 2 REV2 CBs / 3 REV2 CBs / 4 REV2 CBs	1 REV 2 CB

SPEED MEASUREMENT

☐	Check/Enter the SPEED MEASUREMENT parameters:	
○	50.01 SPEED SCALING * defines the speed reference that corresponds to integer value 20000 used in fieldbus control Factory setting value is 2000.	
○	50.04 PULSE NR * defines the number of the encoder pulses (eg, 1024 or 2048) Factory setting value is 2048.	

3. SETTING THE ROTOR-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)		
○	50.12 SP ACT FILT TIME * defines the time constant of the first order actual speed low pass filter in ms Factory setting value is 0 ms.	

3. SETTING THE ROTOR-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)

START-UP DATA

WARNING! Enter the start-up data exactly. Entering incorrect values results in wrong operation of the converter and/or entire system.

☐	Enter the START UP DATA parameters:	
○	99.02 MOTOR NOM VOLTAGE * rated stator voltage of the generator in V	
○	99.03 MOTOR NOM CURRENT * rated stator current of the generator A	
○	99.04 MOTOR NOM FREQ * rated stator frequency of the generator in Hz	
○	99.05 MOTOR NOM SPEED * rated speed of the generator in rpm	
○	99.06 MOTOR NOM POWER * rated speed of the system in rpm	
○	99.12 MOTOR NOM COSFII * rated power factor of the generator rotor	
○	99.14 MOTOR SYNC SPEED * rated synchronous speed of the generator in rpm	
○	99.15 MOTOR OPEN CKT V * rated open-circuit voltage of the generator rotor in V	
○	99.16 MOTOR NOM IM * rated magnetizing current of the generator rotor in A	
○	99.21 Rs * equivalent stator circuit resistance in stator reference frame in mOhm	
○	99.22 X1S * equivalent stator circuit leakage reactance in stator reference frame in mOhm	
○	99.23 X2S * equivalent rotor circuit leakage reactance in stator reference frame in mOhm	
○	99.24 XM * equivalent magnetizing reactance of the generator in stator reference frame in mOhm	
○	99.25 Rr * equivalent rotor circuit resistance in stator reference frame in mOhm	
○	99.27 MAX MEAS FLUX * maximum measurable grid and stator fluxes in Wb	
○	99.28 MAX MEAS IS * maximum measurable stator current in A	

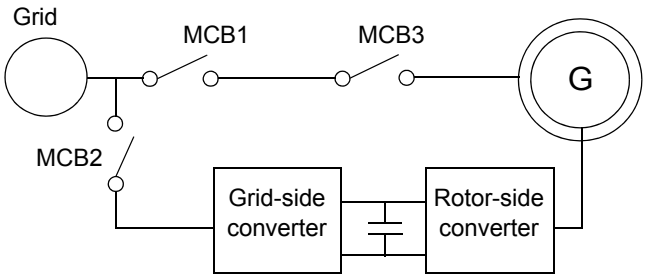
3. SETTING THE ROTOR-SIDE CONVERTER PARAMETERS (COMMON FOR ALL DELIVERIES)

DATE AND TIME SETTING

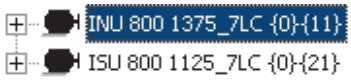
☐	Enter the correct date and time settings: **Note:** Settings for NDCU-33CX real-time clock are defined. Settings are used by the fault logger.	
○	95.07 RTC MODE * SHOW / SET Time/date can be set manually.	SET
○	95.01 YEAR * four-digit unsigned integer number (eg, 2017)	
○	95.02 MONTH * two-digit unsigned integer number (eg,12)	
○	95.03 DAY * two-digit unsigned integer number (eg, 15)	
○	95.04 HOUR * two-digit unsigned integer number (eg, 12)	
○	95.05 MINUTE * two-digit unsigned integer number (eg, 15)	
○	95.06 SECOND * two-digit unsigned integer number (eg, 12)	
○	95.07 RTC MODE * SHOW / SET Real-time clock runs.	SHOW

3. SETTING THE ROTOR-SIDE CONVERTER PARAMETERS

CONFIGURATION WITH STATOR BREAKER (MCB1) AND STATOR CONTACTOR (MCB3)

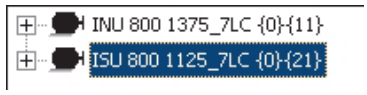
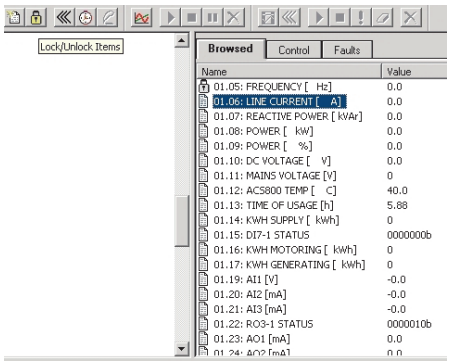
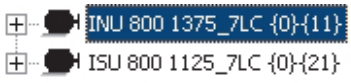


MCB1 = stator breaker
MCB2 = converter contactor
MCB3 = stator contactor

☐	Select and activate the rotor-side converter by clicking it in the browse tree pane.	
☐ ○	Check/Enter parameters: 20.27 CONT OPEN CUR * Defines the current limit and breaking device type for the grid connection: • 0 A = main circuit breaker or medium voltage circuit breaker MCB3 is used for disconnecting stator from grid • > 0 A = contactor MCB3 is used for disconnecting stator from grid. When parameter value [> 0 A] is selected, the converter can be disconnected from the grid in two ways depending on a parameter setting: • If measured current 06.29 STATOR IS NO FILT is below the parameter value, the converter uses the stator contactor only. • If measured current 06.29 STATOR IS NO FILT is above the parameter value, the converter first opens main breaker and, after a short time, the stator contactor. The parameter value is compared to unfiltered stator rms value. Since the unfiltered value always contains a certain amount of noise, it is recommended to set the parameter to a value of contactor nominal current +15%. See the delivery-specific circuit diagrams.	

4. OPERATIONAL LOCAL TESTING

PREPARATIONS

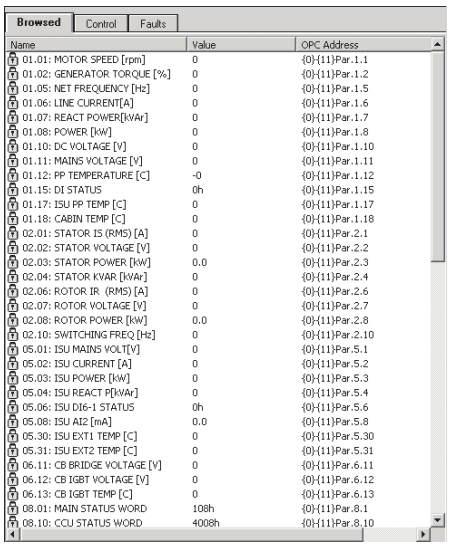
☐	Power down and power up the 230 V AC auxiliary supply to reboot all RDCU and NDCU control units.	F11 and F12 located in the auxiliary control unit
☐	Enable grid-side converter and rotor-side converter parameters for editing: ○ Grid-side converter: 16.02 PARAMETER LOCK ○ Rotor-side converter: 16.01 PARAM LOCK 16.02 PANEL PAR LOCK	 OPEN OFF OPEN
☐	Open the main circuit switchgear from the locked position.	
☐	Select and activate the grid-side converter by clicking it in the browse tree pane.	
☐	Select and lock-out the following grid-side converter signals and parameters to the DriveWindow screen by using **Lock/Unlock Items** button in the standard toolbar: 01.05 FREQUENCY 01.06 LINE CURRENT 01.10 DC VOLTAGE 01.11 MAINS VOLTAGE 01.20 AI2 [mA] 01.32 EXT TMP 1 [C] 01.33 EXT TMP 2 [C] 03.03 50 HZ IDENTIFICA 03.04 60 Hz IDENTIFICA 40.09 RT U/Un MOD STOP 99.08 AUTO LINE ID RUN **Note:** Parameters can be monitored actively in the window with the clock button.	
☐	Select and activate the rotor-side converter by clicking it in the browse tree pane.	

4. OPERATIONAL LOCAL TESTING

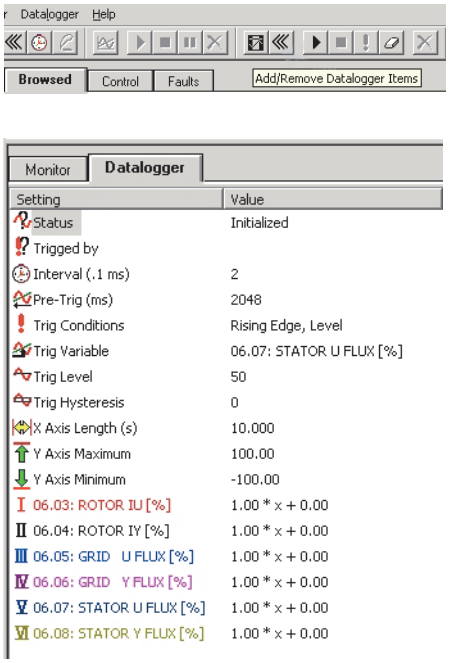
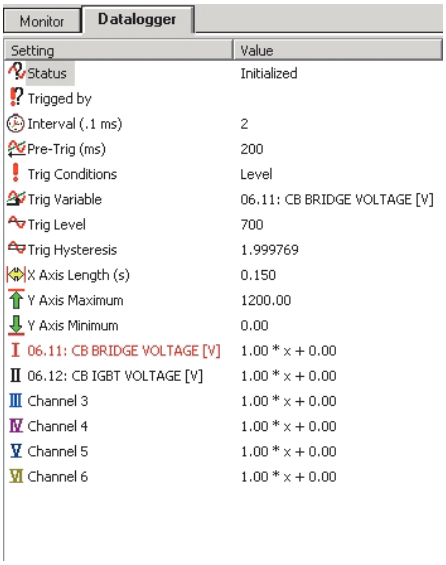
☐ Select and lock-out the following rotor-side converter signals and parameters to the DriveWindow Item sets panel by using **Lock/Unlock Items** button in the standard toolbar:

01.01 MOTOR SPEED
01.02 GENERATOR TORQUE
01.05 NET FREQUENCY
01.06 LINE CURRENT[A]
01.07 REACT POWER[kVAr]
01.08 POWER [kW]
01.10 DC VOLTAGE
01.11 MAINS VOLTAGE
01.12 PP TEMPERATURE
01.15 DI STATUS
01.17 ISU PP TEMP [C]
01.18 CABIN TEMP [C]
02.01 STATOR IS (RMS)
02.02 STATOR VOLTAGE
02.03 STATOR POWER
02.04 STATOR KVAR
02.06 ROTOR IR (RMS)
02.07 ROTOR VOLTAGE
02.08 ROTOR POWER
02.10 SWITCHING FREQ
05.01 ISU MAINS VOLT[V]
05.02 ISU CURRENT [A]
05.03 ISU POWER [kW]
05.04 ISU REACT P[kVAr]
05.06 ISU DI6-1 STATUS
05.08 ISU AI2 [mA]
05.30 ISU EXT1 TEMP [C]
05.31 ISU EXT2 TEMP [C]
06.11 CB BRIDGE VOLTAGE
06.12 CB IGBT VOLTAGE
06.13 CB IGBT TEMP
08.01 MAIN STATUS WORD
08.10 CCU STATUS WORD
08.11 ISU STATUS WORD
21.01 ISU LOCAL CTR WORD
21.08 MANUAL TRIGGER
99.24 XM
99.26 XM CALIBRATED

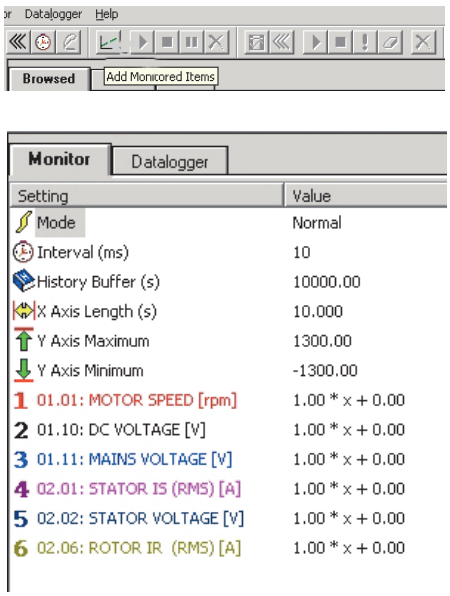
Note: Parameters can be monitored actively in the window with the clock button.



4. OPERATIONAL LOCAL TESTING

☐	Select/Set the following rotor-side converter signals and settings to the DriveWindow Trend Setting Pane's Datalogger 1 window: • 06.03 ROTOR IU • 06.04 ROTOR IY • 06.05 GRID U FLUX • 06.06 GRID Y FLUX • 06.07 STATOR U FLUX • 06.08 STATOR Y FLUX Select/Set the following settings to the Datalogger 1 window: • Interval = 2 • Pre-Trig = 50 • Trigg Conditions = Level, rising edge • Trig Variable = 06.07 STATOR U FLUX • Trigg Level = 50 • Trig Hysteresis = 0 • X Axis Length = 0.2 • Y Axis Maximum = 100 • Y Axis Minimum = -100 **Note:** To change the datalogger data, stop the datalogger first.	
☐	Select/Set the following rotor-side converter signals and settings to the DriveWindow Trend Setting Pane's Datalogger 2 window: In case of one ACBU crowbar unit: • 06.11 CB BRIDGE VOLTAGE • 06.12 CB IGBT VOLTAGE Select/Set the following settings to the Datalogger 2 window: • Interval = 2 • Pre-Trig = 200 • Trigg Conditions = Level, Falling edge • Trig Variable = 06.11 CB BRIDGE VOLTAGE • Trigg Level = 700 • Trig Hysteresis = 2 • X Axis Length = 0.150 • Y Axis Maximum = 1200 • Y Axis Minimum = 0	

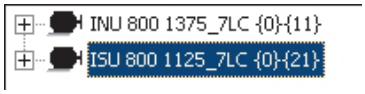
4. OPERATIONAL LOCAL TESTING

☐	Select/Set the following rotor-side converter signals and settings to the DriveWindow Trend Setting Pane's Monitor window: • 01.01 MOTOR SPEED [rpm] • 01.10 DC VOLTAGE [V] • 01.11 MAINS VOLTAGE [V] • 02.01 STATOR IS [RMS] • 02.02 STATOR VOLTAGE [V] • 02.06 ROTOR IR [RMS] Select/Set the following settings to the Monitor window: • Mode = Normal • Interval = 10 • History Buffer = 10000 • X Axis Length = 10 • Y Axis Maximum = 1300 (depends on the generator speed) • Y Axis Minimum = 0	

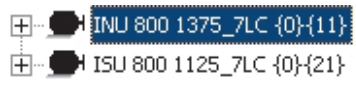
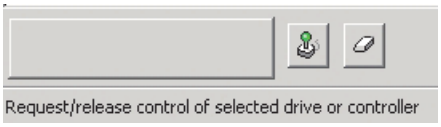
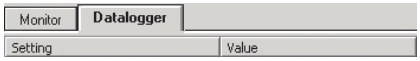
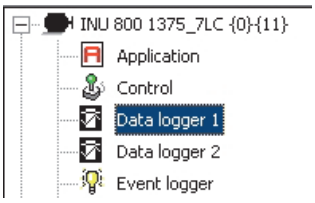
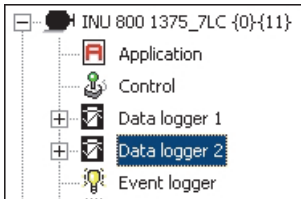
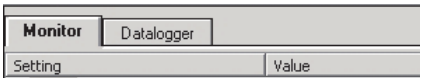
GRID-SIDE CONVERTER LOCAL TESTING

Internal communication between the grid-side converter and the rotor-side converter is checked by using the rotor-side converter parameters to start-up the grid-side converter.

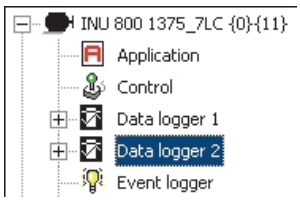
☐	Reset possible converter faults by clicking the **Reset Fault** button.	
☐	Check that the grid-side converter voltage measurement is adjusted correctly (NAMU-01 board):	
○	01.11 MAINS VOLTAGE * measurement is correct when the voltage corresponds to the level of the system phase-to-phase RMS voltage (eg, 690 V AC or 600 V AC)	~690 V AC or ~600 V AC
○	01.05 FREQUENCY * measurement is correct when the sign of the frequency is positive and it corresponds to the level of the system fundamental frequency (eg, 50 Hz or 60 Hz)	~50 Hz or ~60 Hz
☐	Start the grid-side converter by setting the rotor-side converter parameter:	
○	21.01 ISU LOCAL CTR WORD * If the converter is in local control mode and has not been started, grid-side converter can be controlled with this parameter.	9h (hex)
☐	Check by using DriveWindow's Item sets pane window that the following sequence is completed properly: • DC link is charged • Grid-side converter main contactor closed • Grid-side converter starts to modulate	
○	01.10 DC VOLTAGE * DC link is charged when the voltage level is approximately 980±10% V DC or 850±10% V DC. Typical DC link voltage equals to sqrt(2)×U_n	~ 980 V DC or ~850 V DC

4. OPERATIONAL LOCAL TESTING		
○	08.11 ISU STATUS WORD * Main contactor (MCB2) is closed and the grid-side converter is modulating when the status word equals to 27B7h (hex).	27B7h (hex)
○	01.06 LINE CURRENT * Modulation is active when the average line current is approximately 50 A	~ 15…50 A
☐	Stop the grid-side converter by setting the parameter: 21.01 ISU LOCAL CTR WORD * If the converter is in local control mode and has not been started, grid-side converter can be controlled with this parameter.	0h (hex)
☐	Check by using DriveWindow's Item sets pane window that the following sequence is completed properly: • Grid-side converter stops modulating • Grid-side converter main contactor opened • DC link is being discharged, which takes about 40 s.	
○	01.06 LINE CURRENT * Modulation is stopped when the average line current is 0 A.	0 A
○	08.11 ISU STATUS WORD * Main contactor (MCB2) is opened when the status word equals to 2B1h (hex).	2B1h (hex)
○	01.10 DC VOLTAGE * DC link is discharged when the voltage level is 0 V DC (this may take a couple of minutes).	0
☐	Select and activate the grid-side converter by clicking it in the browse tree pane.	
☐	Check that the grid-side converter is synchronized correctly to the grid:	
○	03.03 50 Hz IDENTIFIC * FALSE / TRUE If the nominal frequency is 50 Hz, the parameter 50 Hz IDENTIFIC is set to TRUE.	
○	03.04 60 Hz IDENTIFIC * FALSE / TRUE If the nominal frequency is 60 Hz, the parameter 60 Hz IDENTIFIC is set to TRUE.	
☐	Change the grid-side converter identification parameter: 99.08 AUTO LINE ID RUN * NO / YES Automatic identification is disabled.	NO
ROTOR-SIDE CONVERTER LOCAL TESTING AT ZERO SPEED		
The converter general functionality (grid-side converter and rotor-side converter) is checked by using the rotor-side converter parameters to start-up the grid-side converter and rotor-side converter at zero speed.		
☐	Ensure that the generator shaft is mechanically locked.	

4. OPERATIONAL LOCAL TESTING

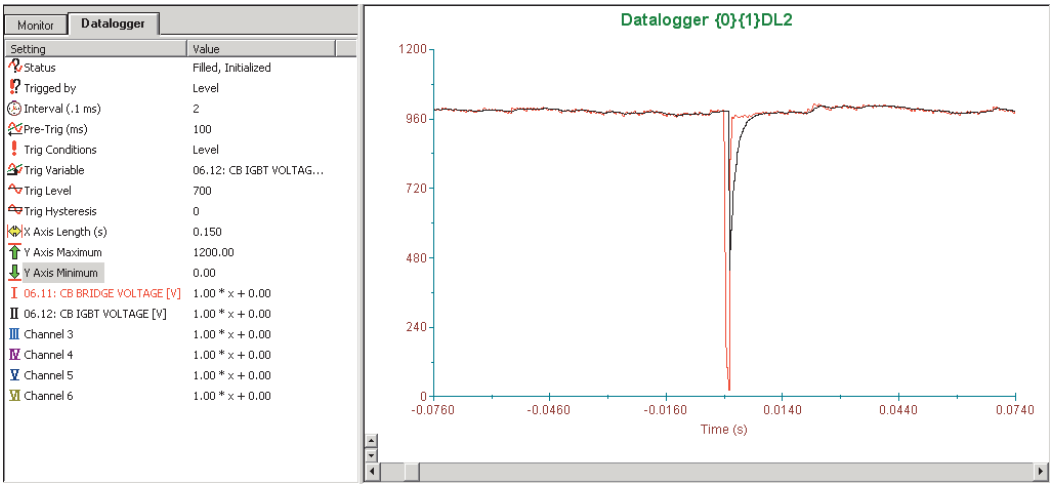
☐	Select and activate the rotor-side converter by clicking it in the browse tree pane.	
☐	Switch the rotor-side converter to local control mode by clicking the **Take/Release Control** button in the converter panel toolbar.	
☐	Reset possible converter faults by clicking the **Reset Fault** button.	
☐	Select dataloggers instead of monitor by clicking the **Datalogger** tab in the trend settings pane.	
☐	Select **Data logger 1** in the browse tree pane.	
○	Start the datalogger 1 by clicking the **Start Datalogger** button in the logger toolbar.	
○	Select Data logger 2 from the browse tree pane.	
○	Start the datalogger 2 by clicking the **Start Datalogger** button in the logger toolbar.	
☐	Select monitor instead of the dataloggers by clicking the **Monitor** tab in the trend settings pane.	
○	Clear the monitor window by clicking the **Clear Monitor** button in the monitor toolbar.	
○	Start the monitor window by clicking the **Start or Continue Monitoring** button in the monitor toolbar.	
☐	Disable the stator circuit switchgear (MCB3) interconnection function by setting parameter: 21.02 DISABLE MCB CLOSE * YES / NO	YES
☐	Click the **Stop** button.	
☐	Start the converter by clicking the **Start** button.	

4. OPERATIONAL LOCAL TESTING

☐	Check by using DriveWindow's Item sets pane window that the following sequence is completed properly: • DC link is charged • Grid-side converter starts to modulate • Rotor-side converter starts to modulate	
○	01.10 DC VOLTAGE	~ 980 V DC ± 10% or ~ 850 V DC ± 10%
○	05.02 ISU CURRENT [A] * Modulation is active when the average line current is approximately 50 A.	~ 15…50 A
○	02.06 ROTOR IR (RMS) * Modulation is active when the average rotor current is approximately 50 A.	~ 50 A
☐	Check by using DriveWindow's Item sets pane window that the crowbar is measuring the voltages correctly:	
○	In case of one ACBU crowbar unit: 06.11 CB BRIDGE VOLTAGE * The bridge voltage of the crowbar is correct when it is greater or equal than the DC link voltage (1.10 DC VOLTAGE). 06.12 CB IGBT VOLTAGE * IGBT voltage of the crowbar is correct when it is greater or equal than DC link voltage (1.10 DC VOLTAGE). 06.13 CB IGBT TEMP * Temperature of the crowbar IGBT is correct when it is approximately 25…40 °C.	
☐	Stop the monitoring by clicking **Stop Monitoring** button in the monitor toolbar.	
☐	Test the functionality of the crowbar by using automatic manual triggering function by setting the parameter:	
○	21.08 MANUAL TRIGGER * OFF / TRIGGER CB	TRIGGER CB
○	Select datalogger 2.	
○	Upload the current datalogger by clicking the **Upload Datalogger** button in the logger toolbar.	

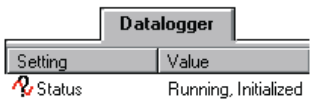
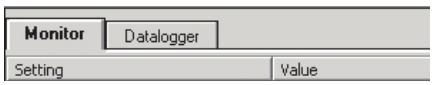
4. OPERATIONAL LOCAL TESTING

○	Check that the measured diode bridge voltage (6.11 CB BRIDGE VOLTAGE) drops for a short period of time when triggered.	



☐	Stop the converter with the **Stop** button.	

ROTOR-SIDE CONVERTER LOCAL TESTING: LOW-VOLTAGE STATOR CIRCUIT BREAKER

☐	Disable the stator circuit switchgear grid interconnection by setting parameter: 21.02 DISABLE MCB CLOSE	YES
☐	Check by using DriveWindow's Item sets pane window that the wind turbine rotates the rotor within acceptable speed range: 01.01 MOTOR SPEED * It is recommended to make local testing by using sub-synchronous speed area (eg, in case of 4-pole generator speed area is 1050...1300 rpm). If the wirings between the pulse encoder (NTAC, located in the auxiliary control unit) and generator speed sensor (tachometer) are done correctly the measured speed is positive.	
☐	Check that the dataloggers (datalogger 1 and datalogger 2) are in Running and Initialized mode.	
☐	Select monitor instead of the dataloggers by clicking the **Monitor** tab in the trend settings pane.	
○	Clear the monitor window by clicking the **Clear Monitor** button in the monitor toolbar.	
○	Start the monitor window by clicking the **Start or Continue Monitoring** button in the monitor toolbar.	

4. OPERATIONAL LOCAL TESTING

☐ Start the converter by clicking the **Start** button.

○ Check by using DriveWindow's Trend Setting Pane's Monitor window that the selected signals are behaving normally:

01.01 MOTOR SPEED [rpm]

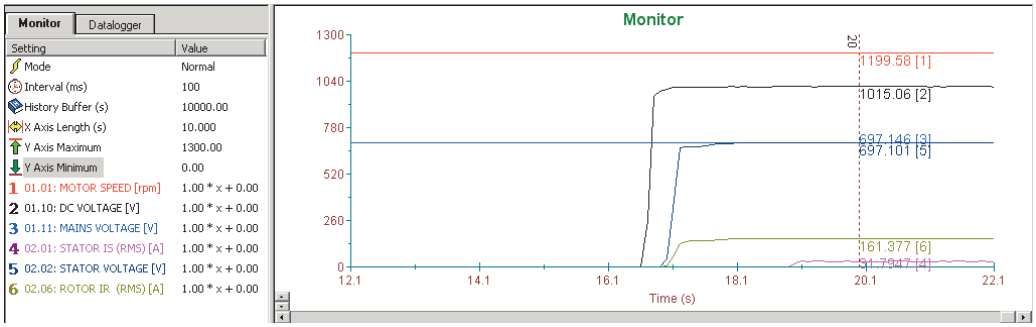
01.10 DC VOLTAGE [V]

01.11 MAINS VOLTAGE [V]

02.01 STATOR IS [RMS]

02.02 STATOR VOLTAGE [V]

02.06 ROTOR IR [RMS]



○ Stop the monitoring by clicking the **Stop Monitoring** button in the monitor toolbar.

○ Check by using DriveWindow's Item sets pane window that the following sequence is completed properly:

99.24 XM and 99.26 XM CALIBRATED

* If parameter values differ ±20%, stop the converter and calculate the correct value for the 99.24 XM. See *ACS800-67 wind turbine converters system description and start-up guide* (3AUA0000095094 [English]).

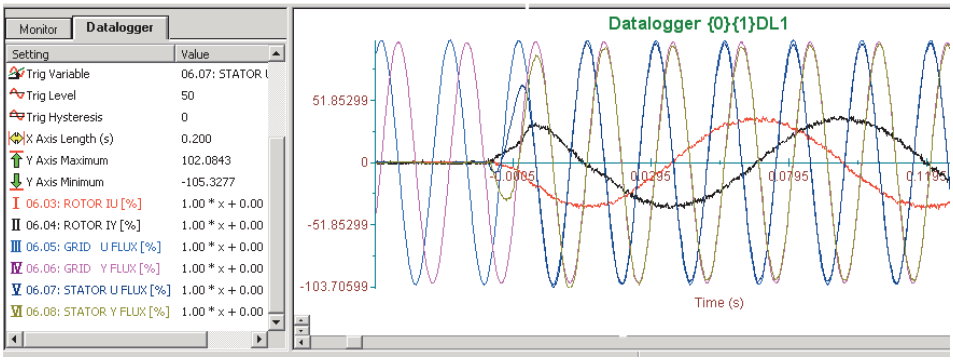
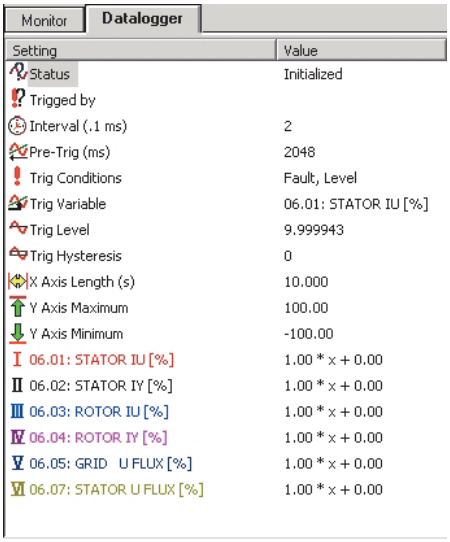
☐ Stop the converter with the **Stop** button.

☐ Upload datalogger 1 and check that the rotor-side converter measurements and cablings are done correctly:

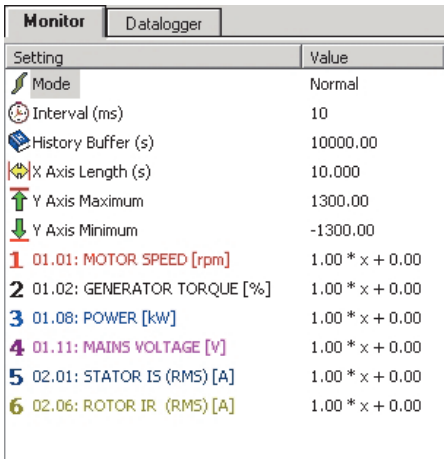
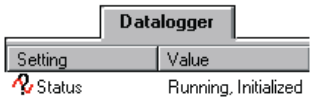
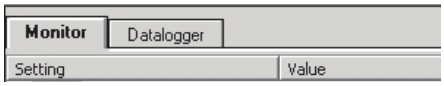
○ NUIM board measurement:

- Check that the amplitude values of 06.05 GRID U FLUX and 06.07 STATOR U FLUX are equal and in the same phase.
- Check that the amplitude values of 06.06 GRID Y FLUX and 06.08 STATOR Y FLUX are equal and in the same phase.
- Check that the phase angle displacement between X and Y FLUXES is in 90° (π/2 rad) and U FLUX is leading and Y FLUX is lagging.

4. OPERATIONAL LOCAL TESTING

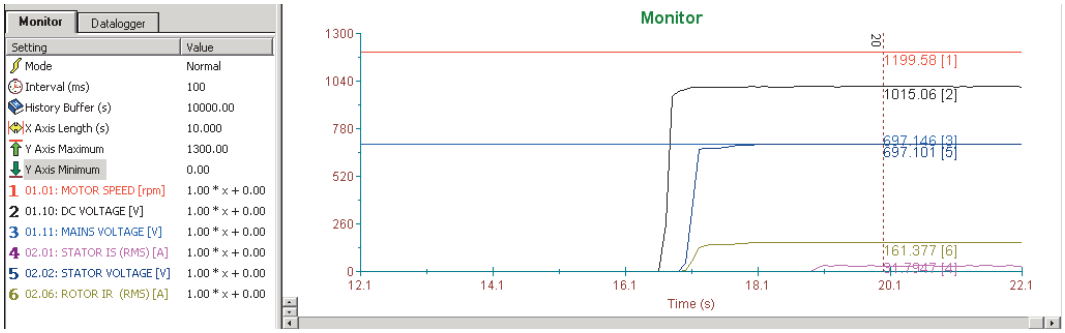
○	Rotor cabling: • Check that the amplitudes of 06.03 ROTOR IU and 06.04 ROTOR IY are equal. • Check that the phase angle displacement between 06.03 ROTOR IU and 06.04 ROTOR IY is 90° (TT/2 rad). * 06.03 ROTOR IU is leading and 06.04 ROTOR IY is lagging when operating in the sub-synchronous area. 06.03 ROTOR IU is lagging and 06.04 ROTOR IY is leading when operating in the super-synchronous area.	
		
☐ ○	Enable the stator circuit switchgear grid interconnection by setting parameter: 21.02 DISABLE MCB CLOSE * If grid synchronization proceeds properly, stator circuit switchgear stays closed.	NO
☐	Select/Set the following rotor-side converter signals and settings to the DriveWindow Trend Setting Pane's Datalogger 1 window: • 06.01 STATOR IU • 06.02 STATOR IY • 06.03 ROTOR IU • 06.04 ROTOR IY • 06.05 GRID U FLUX • 06.07 STATOR U FLUX Select/Set the following settings to the Datalogger 1 window: • Interval = 2 • Pre-Trig = 2048 • Trigg Conditions = Level, Fault • Trig Variable = 06.01 STATOR IU • Trigg Level = 10 • Trig Hysteresis = 0 • X Axis Length = 10 • Y Axis Maximum = 100 • Y Axis Minimum = -100	

4. OPERATIONAL LOCAL TESTING

☐	Select/Set the following rotor-side converter signals and settings to the DriveWindow Trend Setting Pane's Monitor window: • 01.01 MOTOR SPEED [rpm] • 01.02 GENERATOR TORQUE • 01.08 POWER [kW] • 01.11 MAINS VOLTAGE [V] • 02.01 STATOR IS [RMS] • 02.06 ROTOR IR [RMS] Select/Set the following settings for the Monitor window: • Mode = Normal • Interval = 10 • History Buffer = 10000 • X Axis Length = 10 • Y Axis Maximum = 1300 • Y Axis Minimum = -1300	
☐	Check that all dataloggers (datalogger 1 and datalogger 2 from the grid-side and rotor-side converters) are in Running and Initialized mode.	
☐	Select monitoring instead of the dataloggers by clicking the **Monitor** tab in the trend settings pane.	
○	Clear the monitor window by clicking the **Clear Monitor** button in the monitor toolbar.	
○	Start the monitor window by clicking the **Start or Continue Monitoring** button in the monitor toolbar.	
☐	Start the converter by clicking the **Start** button.	
☐	Check the system stability by entering a small torque/power reference, eg, 15%:	
○	In case of parameter 27.01 TORQUE SELECTOR set to TORQUE reference control mode: 25.04 TORQUE REF A * The system stability is correct if the actual torque value 01.02 GENERATOR TORQUE follows the given torque reference value.	15%
○	In case of parameter 27.01 TORQUE SELECTOR set to POWER reference control mode: 26.01 POWER REF * The system stability is correct if the actual power value 01.08 POWER [kW] follows the given power reference value.	15%
○	Stop the monitoring by clicking the **Stop Monitoring** button in the monitor toolbar.	

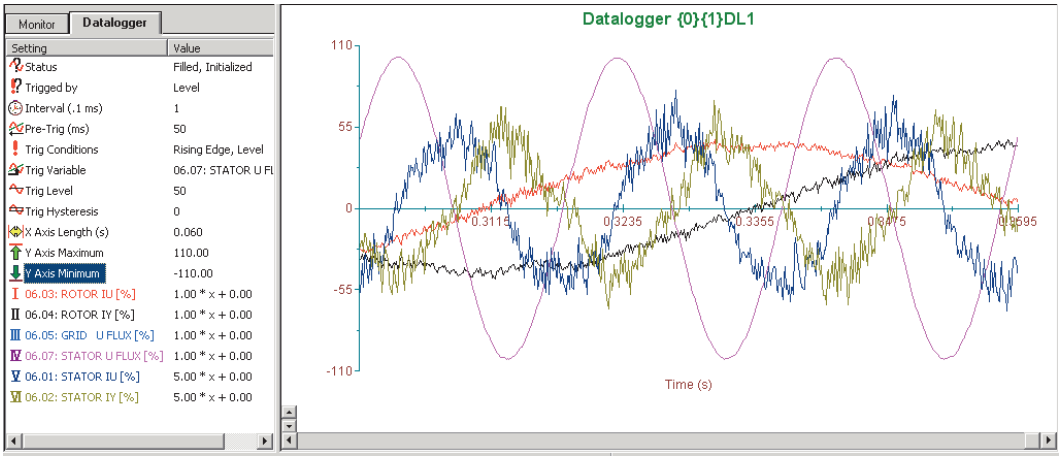
4. OPERATIONAL LOCAL TESTING

○	Check by using DriveWindow's Trend Setting Pane's Monitor window that the selected signals are behaving normally: 01.01 MOTOR SPEED [rpm] 01.10 DC VOLTAGE [V] 01.11 MAINS VOLTAGE [V] 02.01 STATOR IS [RMS] 02.02 STATOR VOLTAGE [V] 02.06 ROTOR IR [RMS]	



☐	Clear the torque/power reference set point value:	
○	In case of parameter 27.01 TORQUE SELECTOR set to TORQUE reference control mode: 25.04 TORQUE REF A * The system stability is correct if the actual torque value 01.02 GENERATOR TORQUE follows the given torque reference value.	0%
○	In case of parameter 27.01 TORQUE SELECTOR set to POWER reference control mode: 26.01 POWER REF * The system stability is correct if the actual power value 01.08 POWER [kW] follows the given power reference value.	0%
☐	Stop the converter with the **Stop** button.	
☐	Upload datalogger 1 and check that rotor-side converter measurements and cablings are done correctly:	
○	Stator cabling: • Check that the amplitudes of 06.01 STATOR IU and 06.02 STATOR IY are equal. • Check that the phase angle displacement between 06.01 STATOR IU and 06.02 STATOR IY is 90° (**π**/2 rad). * 06.01 STATOR IU is leading and 06.02 STATOR IY is lagging when operating in the sub-synchronous area. 06.01 STATOR IU is lagging and 06.02 STATOR IY is leading when operating in the super-synchronous area.	

4. OPERATIONAL LOCAL TESTING



☐	Disable the stator current fault trip limit by entering rotor-side converter parameter: 30.04 STATOR CURR TRIP * Stator overcurrent trip limit function is disabled.	0 A

GRID-SIDE CONVERTER AND DC CHOPPER LOCAL TESTING

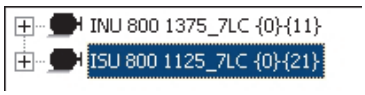
If the converter is not equipped with a DC chopper option (+D150 or +150/+151), continue to the next section.

☐	Configure the DC chopper option(s) according to the instructions given in *ACS800-67 wind turbine converters for asynchronous slip ring generators hardware manual* (3AFE68392454 [English]).	

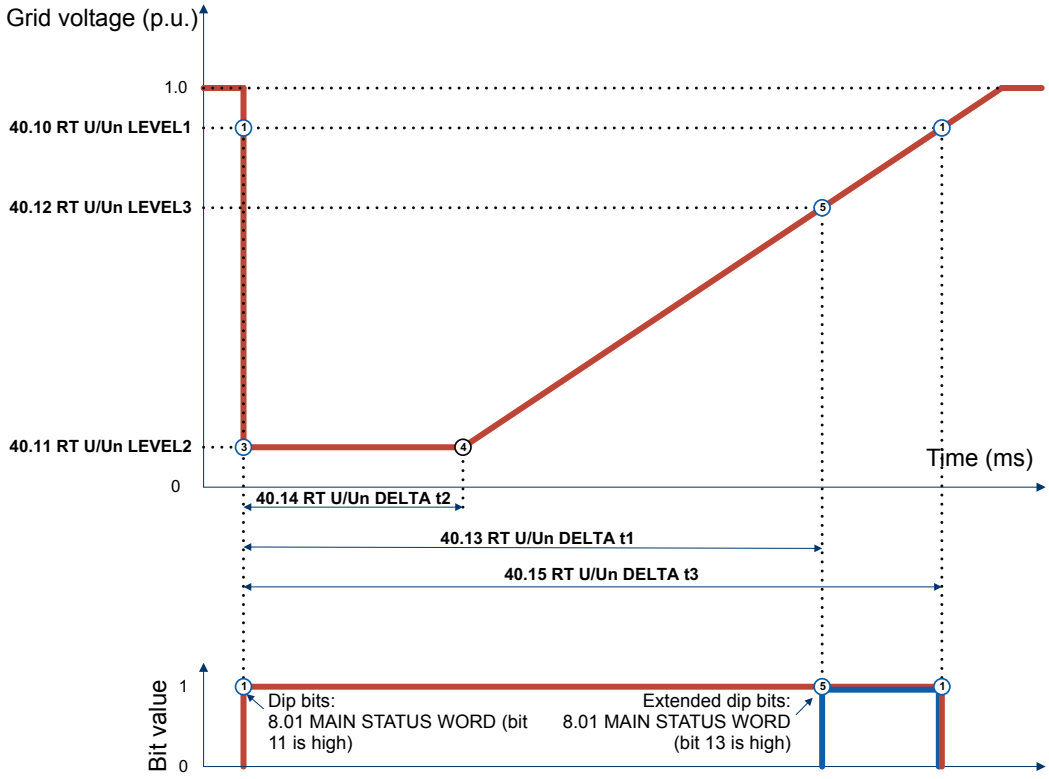
FINALIZING THE PARAMETERISATION

If there are no grid fault ride-through requirements for the wind turbine, continue to the next section.

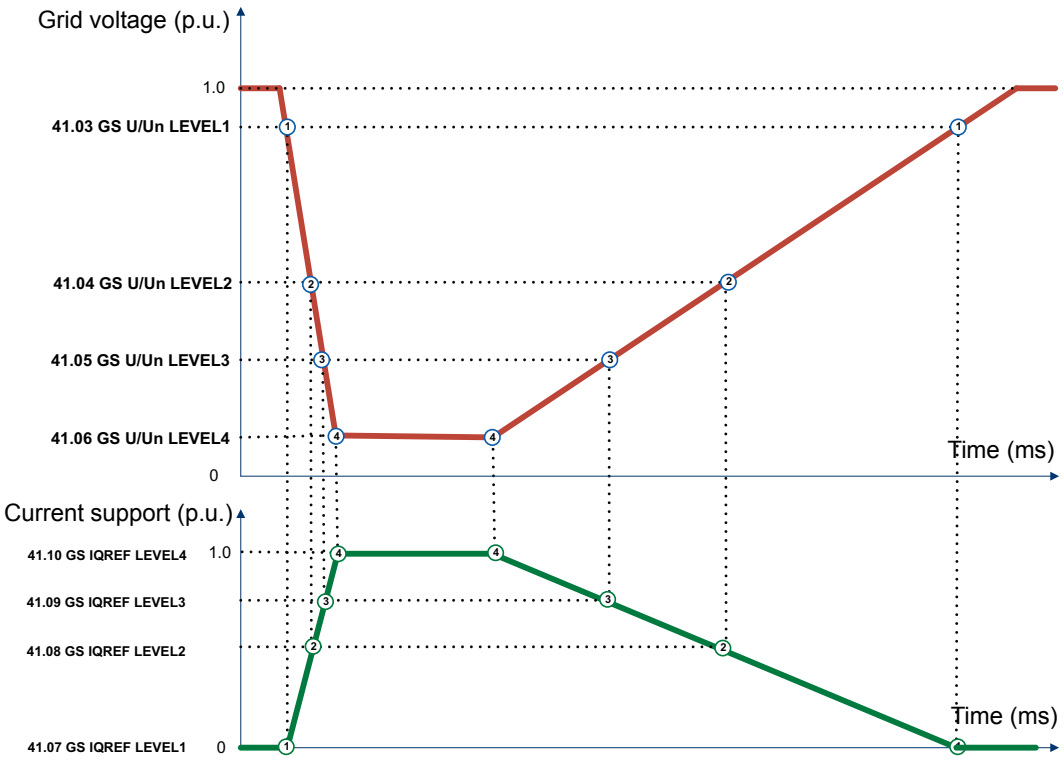
GRID-SIDE CONVERTER GRID FAULT RIDE-THROUGH PARAMETERISATION

☐	Select and activate the grid-side converter by clicking it in the browse tree pane.	
☐	Activate grid-side converter fault ride-through function by entering the parameter: 40.01 RT ENABLE * ON = ride-through function is activated.	ON
☐	Select the type of voltage that the grid fault ride-through functions are based on (grid code specific): 40.04 PHASE MEAS ENA * OFF / ON OFF = Phase-to-phase voltage measurement ON = Phase-to-ground voltage measurement Factory setting value is ON.	

4. OPERATIONAL LOCAL TESTING

☐	Check that the grid-side converter modulation stop parameter is adjusted correctly: 40.09 RT U/Un MOD STOP * Grid-side converter modulation stops since the value of 01.11 MAINS VOLTAGE falls below the adjusted value of this parameter. Factory setting value is 10%.	
☐	Configure the grid-side converter grid fault ride-through voltage tripping levels according to the applied requirements (grid code specific):	For further information, see *Grid-side control program for ACS800 wind turbine converters firmware manual* (3AUA0000075077 [English]).
		
	Enter the AC voltage tripping levels: 40.10 RT U/Un LEVEL1 40.11 RT U/Un LEVEL2 40.12 RT U/Un LEVEL3 Enter the AC voltage tripping time durations: 40.13 RT U/Un DELTA t1 40.14 RT U/Un DELTA t2 40.15 RT U/Un DELTA t3	
☐	Activate the grid-side converter grid support mode according to the applied requirements (grid code specific): 41.01 GRID SUPPORT MODE ON = grid support mode activated Grid support reference is used at normal voltage dip when 08.01 MAINS STATUS WORD bit 11 LEVEL1 DIP is set but bit 12 EXTENDED DIP is not set.	ON **Note:** If there is no grid support requirement during fault ride-through event, continue to the next section.

4. OPERATIONAL LOCAL TESTING

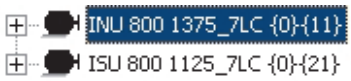
☐	Select the voltage method that the grid support is based on (grid code specific): 41.02 GS HIGHEST U ENA * If this parameter is enabled, converter uses highest RMS voltage for grid support instead of positive sequence voltage.	
☐	Configure the grid-side converter grid fault ride-through grid support parameters according to the applied requirements (grid code specific):  Enter the AC voltage levels for grid support function: 41.03 GS U/Un LEVEL 1 41.04 GS U/Un LEVEL 2 41.05 GS U/Un LEVEL 3 41.06 GS U/Un LEVEL 4 Enter the reactive current grid support levels: 41.07 GS IQREF LEVEL 1 41.08 GS IQREF LEVEL 2 41.09 GS IQREF LEVEL 3 41.10 GS IQREF LEVEL 4	
☐	42.11 PLIM DIP COEF	
☐	42.13 GS GAIN ENABLE	
☐	42.14 GRID SUPPORT LIM	
☐	42.15 IMAX DIP	

4. OPERATIONAL LOCAL TESTING

GRID-SIDE CONVERTER TRANSIENT OVERVOLTAGE PARAMETERISATION

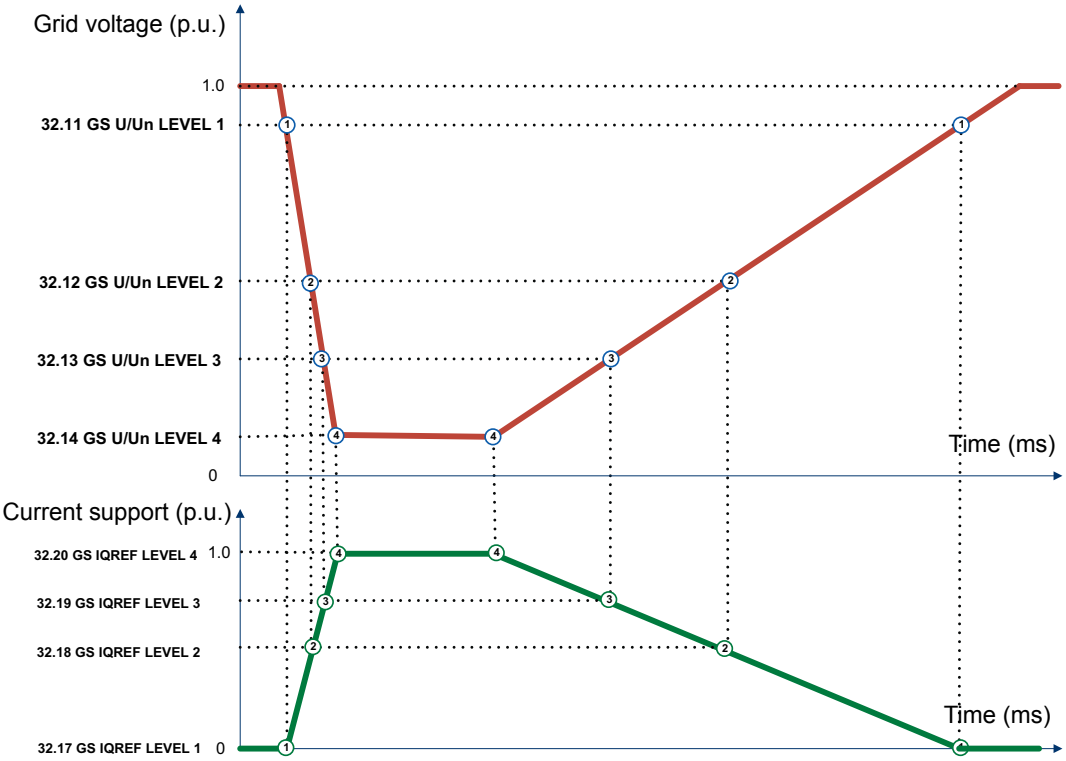
☐	Configure the transient overvoltage tripping levels according to the applied requirements (grid code specific). Enter the AC transient overvoltage tripping levels: 40.20 TRP VOLT PEAK 40.21 TRP VOLT LEV Enter the AC transient overvoltage tripping time duration: 40.22 TRP VOLT TIME	**Note:** If there are no grid transient overvoltage requirements, continue to the next section.
☐	Select the voltage method that the transient overvoltage protection is based on (grid code specific): 40.23 TRP VOLT SEL * POS SEQ / RMS VOLTAGE Factory setting value is RMS VOLTAGE.	

ROTOR-SIDE CONVERTER GRID FAULT RIDE-THROUGH PARAMETERISATION

☐	Select and activate the rotor-side converter by clicking it in the browse tree pane.	
☐	Configure rotor-side converter grid fault ride-through voltage tripping levels according to the applied requirements (grid code specific). Enter the AC voltage tripping levels: 32.03 RT U/Un LEVEL1 32.04 RT U/Un LEVEL2 32.05 RT U/Un LEVEL3 32.10 RT U/Un LEVELHYST Enter the AC voltage tripping time durations: 32.06 RT U/Un DELTA t1 32.07 RT U/Un DELTA t2 32.08 RT U/Un DELTA t3 32.09 RT U/Un DELTA t4	**Note:** If you set parameter 32.41 ENVELOPE PAR SEL to PAR2, DriveWindow must be reconnected to access to the new parameters 32.42…32.88. For further information, see *ACS800-67(LC) doubly-fed induction generator control program firmware manual* (3AUA0000071689 [English]).
☐	Activate the rotor-side converter grid support mode according to the applied requirements (grid code specific): 32.01 GRID SUPPORT MODE Factory setting value is OFF.	**Note:** If there is no grid support requirements during the grid fault ride-through event, continue to the next section.

4. OPERATIONAL LOCAL TESTING

☐	Configure the rotor-side converter grid fault ride-through grid support parameters according to the applied requirements (grid code specific):	



Enter the AC voltage levels for grid support function:
- 32.11 GS U/Un LEVEL 1
- 32.12 GS U/Un LEVEL 2
- 32.13 GS U/Un LEVEL 3
- 32.14 GS U/Un LEVEL 4

Enter the reactive current grid support levels:
- 32.17 GS IQREF LEVEL 1
- 32.18 GS IQREF LEVEL 2
- 32.19 GS IQREF LEVEL 3
- 32.20 GS IQREF LEVEL 4

☐	Configure the rotor-side converter grid support parameters during a fault clearance according to the applied requirements (grid code specific). Enter the AC voltage levels for grid support function during a fault clearance: 32.15 GS U/Un LEVEL 5 32.16 GS U/Un LEVEL 6 Enter the reactive current grid support levels during a fault clearance: 32.21 GS IQREF LEVEL 5 32.22 GS IQREF LEVEL 6 Set the current priority selectors: 32.35 PRIORITY t<t4 32.36 PRIORITY t>t4	

4. OPERATIONAL LOCAL TESTING		
☐	Configure the rotor-side converter grid support parameters after a fault clearance according to the applied requirements (grid code specific). Enter the AC voltage levels for grid support function after a fault clearance: 32.23 GS AFTER DIP Enter the reactive current grid support time duration after a fault clearance: 32.24 GS TIME AFTER DIP	**Note:** If there are no requirements concerning this event, continue to the next checkpoint.
☐	Enter the reactive current support restoring ramp time of the rotor-side converter: 32.25 KVAR RISE TIME * Defines the ramp time for the grid support reactive current reference starting from zero.	
☐	Enter the rotor-side converter torque restoring ramp time: 32.26 TORQUE RISE TIME * Defines the ramp time for the torque reference starting from zero.	
☐	Enter the maximum allowed active power of the rotor-side converter during a grid fault ride-through event: 32.29 RT MAX POWER * maximum allowed active power during the grid fault ride-through event.	
☐	In order to allow the stator circuit switchgear (MCB3) to open during a grid fault ride-through event, set the rotor-side converter parameter: 33.01 MCB CONTROL Factory setting value is NO = not activated.	

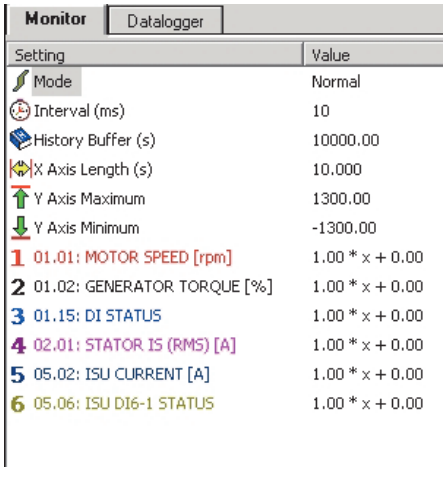
5. OPERATIONAL REMOTE TESTING

REMOTE TESTING WITH FIELDBUS COMMUNICATION

☐	Start the wind turbine system to a speed within its speed range using the wind turbine PLC. **Note:** The speed must be within the limits defined by parameters: • 20.21 SWITCH ON SPEED and 20.22 SWITCH OFF SPEED • 30.09 OVERSPEED LIMIT and 30.10 UNDERSPEED LIMIT	
☐	Start the converter with the PLC start command.	
☐	Check and ensure that: ○ Main Control Word sequences are working properly 07.01 MAIN CTRL WORD ○ Torque/Power reference is correct 25.04 TORQUE REF A or POWER REF ○ Reactive power/voltage reference is correct 23.05 REACT POW REF or UC REF ○ PLC measurement signals are read and scaled properly D SET 11 (VAL1…VAL3) D SET 13 (VAL1…VAL3) D SET 13 (VAL1…VAL3) D SET 17 (VAL1…VAL3)	

EXTERNAL SAFETY CIRCUIT TEST

WARNING! An emergency stop at full speed or torque stresses the wind turbine mechanically and can damage it.

☐	Start the wind turbine system to a speed within its speed range using the wind turbine PLC.	
☐	Select/Set the following rotor-side converter signals and settings to the DriveWindow Trend Setting Pane's Monitor window: • 01.01 MOTOR SPEED [rpm] • 01.02 GENERATOR TORQUE • 01.15 DI STATUS • 02.01 STATOR IS (RMS) • 05.02 ISU CURRENT [A] • 05.06 ISU DI6-1 STATUS Select/Set the following settings for the Monitor window: • Mode = Normal • Interval = 10 • History Buffer = 10000 • X Axis Length = 10 • Y Axis Maximum = 1300 • Y Axis Minimum = -1300	
☐	Open the wind turbine safety chain circuit eg, by pushing the emergency stop button anywhere in the wind turbine when the converter is running with small speed and torque.	

5. OPERATIONAL REMOTE TESTING		
☐	Stop the monitoring by clicking the **Stop Monitoring** button in the monitor toolbar.	
☐	Check that the main breakers are opened and the generator coasts to stop based on the wind turbine pitch system. ○ 01.15 DI STATUS ○ 05.06 ISU DI6-1 STATUS	
☐	Check that signal 01.02 GENERATOR TORQUE goes down to zero immediately.	

6. FINAL OPERATION

ETHERNET CONNECTION TEST

☐	Check and ensure that the wind turbine and converter starts are disabled.	
☐	Disconnect the PC from the converter and reconnect the optical fibers to NETA-21.	
☐	Configure the NETA-21 module according to the instructions given in *NETA-21 remote monitoring tool user's manual* (3AUA0000096939) [English]).	

STORING THE CONVERTER FIRMWARE TO PC

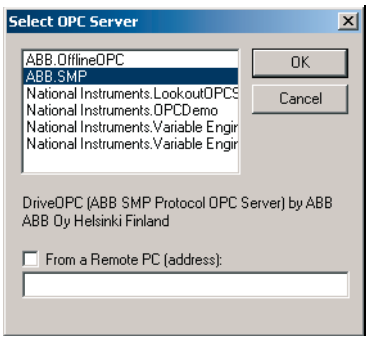
	After a start-up or any service operations, the new parameter values must always be documented:	
☐	Disable the grid-side converter and rotor-side converter parameters editing:	
	○ Grid-side converter:	
	16.02 PARAMETER LOCK	LOCKED
	○ Rotor-side converter:	
	16.01 PARAM LOCK	ON
	16.02 PANEL PAR LOCK	LOCKED
☐	Take a full backup file (.bpg) of the grid-side converter software:	
	○ Disconnect the optical fibers from the RDCU CH3, and connect PC optical fibers to the RDCU. Follow the instructions given in *ACS800-67 wind turbine converters system description and start-up guide* (3AUA0000095094 [English]).	
	○ Save the grid-side converter parameters in a parameter file (.dwp) by following the instructions given in *ACS800-67 wind turbine converters system description and start-up guide* (3AUA0000095094 [English]).	
☐	Take a full backup file (.bpg) of the rotor-side converter software:	
	○ Connect PC optical fibers to the NDCU CH3 and follow the instructions given in *ACS800-67 wind turbine converters system description and start-up guide* (3AUA0000095094 [English]).	
	○ Save the rotor-side converter parameters in a parameter file (.dwp) by following the instructions given *ACS800-67 wind turbine converters system description and start-up guide* (3AUA0000095094 [English]).	

STARTING DriveWindow AND TAKING/RELEASING CONVERTER LOCAL CONTROL

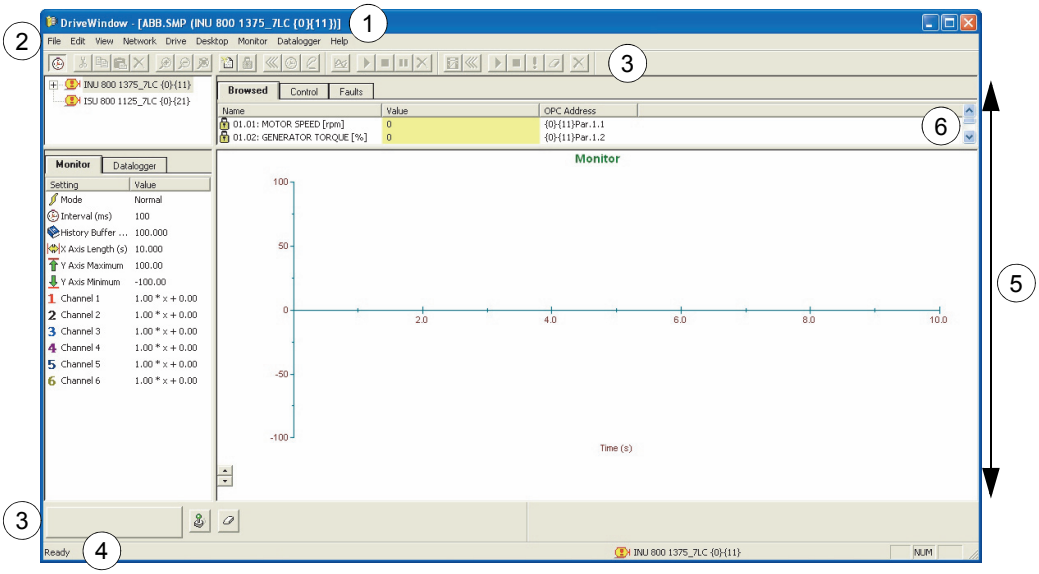
WARNING! Controlling a converter may cause personal injury or physical damage. You should have physical access to the converter, and you must be sure that the converter and the electromechanical system are clear to control (you can see the system, for example). Controlling a converter remotely may require extra precautions and is discouraged.

☐ Start DriveWindow PC tool.

○ Choose ABB.SMP and press **OK** button.



○ Short overview of the PC tool:

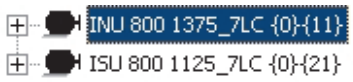


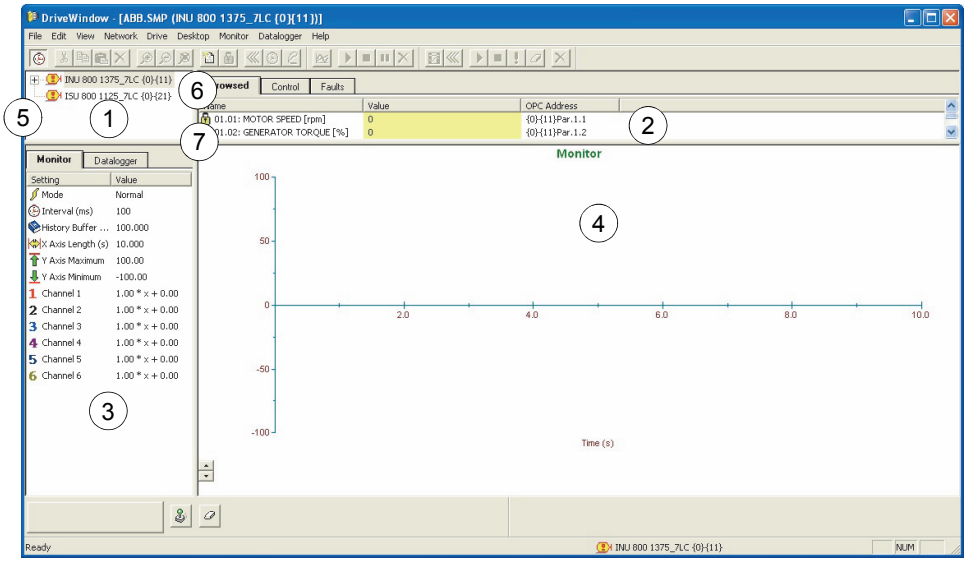
The user interface consists of the following parts:

1. Title bar
2. Menu bar
3. Toolbars
4. Status bar
5. Window area
6. Scrollbars are shown within the windows if scrolling is possible.

STARTING DriveWindow AND TAKING/RELEASING CONVERTER LOCAL CONTROL

☐ Check that both converters are connected:





The window area of DriveWindow is split by horizontal and vertical splitters into four panes:

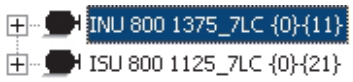
1. Browse tree pane
2. Item sets pane
3. Trend settings pane
4. Trend display pane.

Panes can be resized by:

5. dragging the horizontal splitter up or down
6. dragging the vertical splitter left or right
7. dragging the splitter cross-point to a new position.

☐ Take control of the converter:

○ Select and activate the rotor-side converter by clicking it in the browse tree pane.



○ Click the **Take/Release Control** button in the converter panel toolbar.

○ Check that the control is activated successfully.

* If control is taken successfully, status image, converter name, field for entering the reference value and command buttons are shown in the drive panel toolbar.

☐ Since you do not need to control the converter any more, release the control as follows:

- Check that the reference value is zero.
- Stop the converter.
- Release the control of the converter.

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 www.abb.com/searchchannels.

Product training

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

Providing feedback on ABB manuals

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

Contact us

www.abb.com/windconverters

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