

ABB industrial drives

Troubleshooting manual

ACS580MV primary control program



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List of related manuals and documents

Drive hardware manuals and guides

Code (English)

<i>ACS580MV hardware manual</i>	2UBB004520
<i>ACS-AP-X assistant control panels user's manual</i>	3AUA0000085685
<i>ACS580MV Engineering Guideline</i>	2UBB013672
<i>ACS580MV Wiring Diagram</i>	2UBB004441
<i>Warranty directive</i>	3BHS104420

Drive firmware manuals and guides

<i>ACS580MV primary control program firmware manual</i>	3BHS811381
<i>CPU Firmware Update Description AC500 / AC500-eCo</i>	3ADR025122M0205
<i>ACS580MV SW compatibility table</i>	2UBB017471

PC tools manuals and guides

<i>User's manual Start-up and maintenance PC tool Drive composer</i>	3AUA0000094606
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Option manuals and guides

Manuals and quick guides for I/O extension modules, fieldbus adapters, etc.

You can find manuals and other product documents in PDF format on the Internet. See <http://www.abb.com/motors&drives>. For manuals not available in the Document library, contact your local ABB representative.

Troubleshooting manual

ACS580MV primary control program

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1

Introduction to the Manual

What this chapter contains

This chapter describes the contents of the manual. It also contains information on the compatibility, safety and intended audience.

Applicability

This manual applies to the ACS580MV primary control program version:

- **MHDRE 2.70.0.0**

(or newer). The loading packages are available in the [Medium Voltage Drives Portal](#).

The firmware version of the control program is visible in parameter *07.05 Firmware version*, or in the System info in the main menu on the control panel.

Safety instructions

Follow all safety instructions delivered with the drive.

- **Only ABB Service and ABB certified service partners are allowed to service the drive and change any of the parameters described in this manual.**
 - Read the **complete safety instructions** before you install, commission, or use the drive. The complete safety instructions are delivered with the drive as part of the [ACS580MV hardware manual](#).
 - Read the **firmware function-specific warnings and notes** before changing parameter values. These warnings and notes are included in the parameter descriptions presented in chapters [Fault Tracing](#) and [Service Level Parameters](#), as well as in the Parameters chapter of the [ACS580MV primary control program firmware manual](#).
-

Target audience

This manual is intended for ABB Service and ABB certified service partner personnel who commission and troubleshoot the drives.

Contents of the manual

This manual contains the following chapters:

- *Loading of the Control Software*: describes procedures for loading the software/firmware to all parts of control hardware.
- *Fault Tracing*: lists the warning and fault messages with possible causes and actions to remove the source of the fault.
- *Service Level Parameters*: describes all parameters that require service access level. This chapter is an addition to the description of End user level parameters provided in the *ACS580MV primary control program firmware manual*.
- *Using ACS580MV Data Analyzer*: short guidelines for using the ACS580MV data analyzer PC tool. This tool can be used to analyze diagnostic data that are continuously stored on SD card in BCU.
- *Drive Composer Support Package*: describes creating and using the Support package functionality of the PC tool Drive composer. This option is typically used for fast collection of a short history data from a drive.
- *POF Link Test*: describes a procedure to test the communication between control hub and power modules.
- *Inspecting Power Modules*: describes procedure for inspection of power modules to determine potential malfunction.

Related documents

A list of related manuals is printed on the inside of the front cover.

Terms and abbreviations

Term/abbreviation	Definition
AC500 or AC500eco	Type of PLC used as IO controller in ACS580MV drives
ACS-AP-S	Type of control panel used with ACS580MV drives
AI	Analog input; interface for analog input signals
AO	Analog output; interface for analog output signals
BCU	BCON Control Unit - The control unit used in ACS580MV drives
DC link	DC circuit in the Power module between rectifier and inverter
DDCS	Distributed drives communication system; a protocol used in optical fiber communication
DI	Digital input; interface for digital input signals
DIIL	Digital input interlock
DIO	Digital input/output; interface that can be used as a digital input or output
DO	Digital output; interface for digital output signals
Drive	Frequency converter for controlling AC motors. The drive consists of a several power modules which are connecting the grid side to the inverter side.
FAIO-01	Optional analog I/O extension module
FBA	Fieldbus adapter
FENA-11	Optional Ethernet/IP adapter
FIO-01	Optional digital I/O extension module
FIO-11	Optional digital and analog I/O extension module
FPBA-0x	Optional PROFIBUS DP adapter
FSCA-0x	Optional Modbus adapter
HTL	High-threshold logic
IGBT	Insulated gate bipolar transistor; a voltage-controlled semiconductor type widely used in inverters and IGBT supply units due to their easy controllability and high switching frequency.
I/O	Input/Output
Network control	<p>With fieldbus protocols based on the Common Industrial Protocol (CIP™), such as DeviceNet and Ethernet/IP, denotes the control of the drive using the Net Ctrl and Net Ref objects of the ODVA AC/DC Drive Profile. For more information, see www.odva.org, and the following manuals:</p> <ul style="list-style-type: none"> • <i>FDNA-01 DeviceNet adapter module User's manual</i> (3AFE68573360 [English]), and • <i>FENA-01/-11 Ethernet adapter module User's manual</i> (3AUA0000093568 [English]).
Parameter	User-adjustable operation instruction to the drive, or signal measured or calculated by the drive

Term/abbreviation	Definition
PID controller	Proportional–integral–derivative controller
PM	Power module (semiconductor stack)
PLC	Programmable logic controller
Power unit	Contains the power electronics and power connections of the drive (or inverter module). The drive control unit is connected to the power unit.
PTC	Positive temperature coefficient
RFG	Ramp function generator
RO	Relay output; interface for a digital output signal. Implemented with a relay.
TTL	Transistor-transistor logic
UPS	Uninterrupted power supply; power supply equipment with battery to maintain output voltage during power failure.

Cybersecurity disclaimer

This product is designed to be connected to and to communicate information and data via a network interface. It is Customer's sole responsibility to provide and continuously ensure a secure connection between the product and Customer network or any other network (as the case may be). Customer shall establish and maintain any appropriate measures (such as but not limited to the installation of firewalls, application of authentication measures, encryption of data, installation of anti-virus programs, etc) to protect the product, the network, its system and the interface against any kind of security breaches, unauthorized access, interference, intrusion, leakage and/or theft of data or information. ABB and its affiliates are not liable for damages and/or losses related to such security breaches, any unauthorized access, interference, intrusion, leakage and/or theft of data or information.

2

Loading of the Control Software

What this chapter contains

This chapter contains the description of equipment, tools and procedures for downloading software to all parts of control hardware in the ACS580MV converter.

Warnings



WARNING! Only ABB Service and ABB certified service partners are allowed to service the drive. Obey the safety instructions in chapter [Introduction to the Manual](#) on page 9. If you ignore them, injury or death, or damage to the equipment can occur.

Preparing the SW loading

■ Equipment checklist

<input checked="" type="checkbox"/>	Following equipment should be prepared before SW download can start:
<input type="checkbox"/>	SD Memory Card adapter for AC500eco MC503 (Art. Nr.: 1TNE968901R0100)
<input type="checkbox"/>	SD Memory Card MC502 (Art. Nr. : 1SAP180100R0001)
<input type="checkbox"/>	XILINX platform cable USB II for programming control hub
<input type="checkbox"/>	USB to mini USB cable for programming BCON SW (USB 2.0 Cable Type A - Mini-B, m-m)
<input type="checkbox"/>	USB to FO serial cable for programming Power modules (needed in case there are problems with normal SW download procedure)

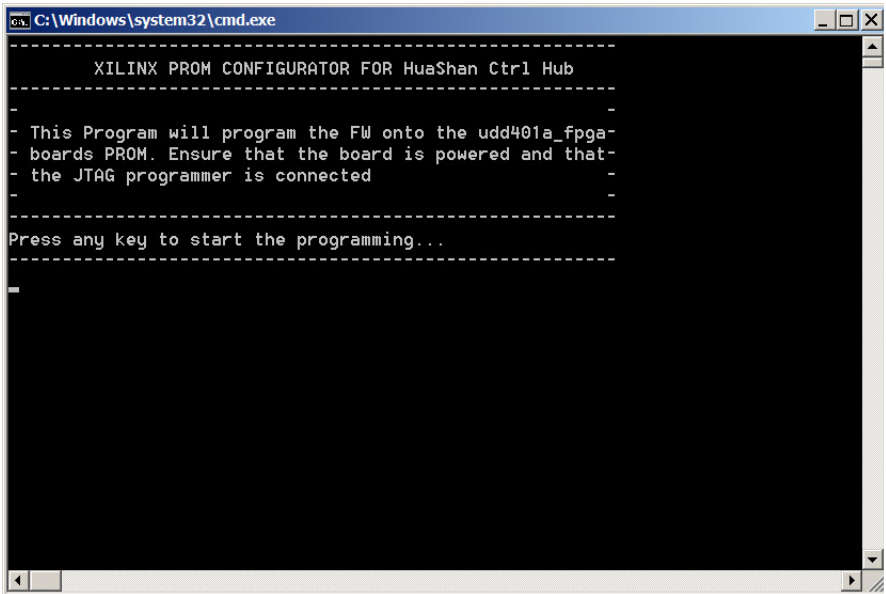
■ Software checklist

<input type="checkbox"/>	The latest MHDRE loading package (available in Medium Voltage Drives Portal .)
<input type="checkbox"/>	Drive loader 2 (available in ABB intranet)
<input type="checkbox"/>	Drive composer pro ver. 1.9 or newer
<input type="checkbox"/>	DriveStartup ver. 5.0 or newer (recommended ver. is 5.2 or newer available in DriveStartup installer)
<input type="checkbox"/>	DriveStartup step definitions for ACS580MV (contained in the MHDRE loading package)
<input type="checkbox"/>	Tera Term PC tool (available at TeraTerm)

Software loading to ACS580MV converter

■ Loading control hub firmware

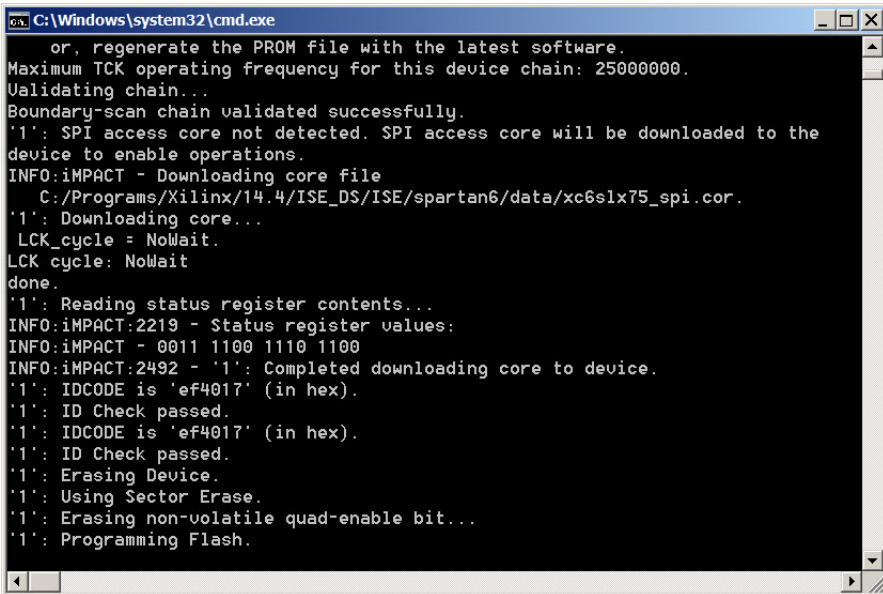
1. Switch off the control power
2. Remove the daughter boards DB2 and DB3 to get access the X5 connector on control hub
3. Connect XILINX platform cable USB II to X5 connector on control hub
4. Switch on the control power
5. Run PROG_MHDCH.bat batch file to program the control hub. Following window will open:



```
C:\Windows\system32\cmd.exe
-----
XILINX PROM CONFIGURATOR FOR HuaShan Ctrl Hub
-----
- This Program will program the Fw onto the udd401a_fpga-
- boards PROM. Ensure that the board is powered and that-
- the JTAG programmer is connected
-----
Press any key to start the programming...
```

6. After pressing Enter many messages will be shown on screen and finally the

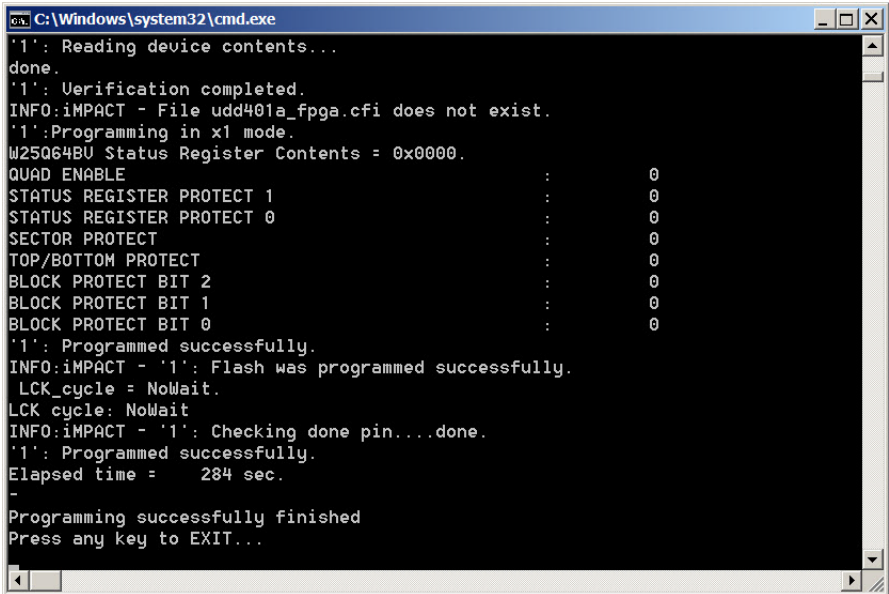
screen will stay longer with the following message:



```
C:\Windows\system32\cmd.exe
or, regenerate the PROM file with the latest software.
Maximum TCK operating frequency for this device chain: 25000000.
Validating chain...
Boundary-scan chain validated successfully.
'1': SPI access core not detected. SPI access core will be downloaded to the
device to enable operations.
INFO:iMPACT - Downloading core file
C:/Programs/Xilinx/14.4/ISE_DS/ISE/spartan6/data/xc6s1x75_spi.cor.
'1': Downloading core...
LCK_cycle = NoWait.
LCK cycle: NoWait
done.
'1': Reading status register contents...
INFO:iMPACT:2219 - Status register values:
INFO:iMPACT - 0011 1100 1110 1100
INFO:iMPACT:2492 - '1': Completed downloading core to device.
'1': IDCODE is 'ef4017' (in hex).
'1': ID Check passed.
'1': IDCODE is 'ef4017' (in hex).
'1': ID Check passed.
'1': Erasing Device.
'1': Using Sector Erase.
'1': Erasing non-volatile quad-enable bit...
'1': Programming Flash.
```

Programming of the control hub takes 3-4 minutes.

7. When the programming is over following screen will show:



```

C:\Windows\system32\cmd.exe
'1': Reading device contents...
done.
'1': Verification completed.
INFO:iMPACT - File udd401a_fpga.cfi does not exist.
'1': Programming in x1 mode.
W25Q64BU Status Register Contents = 0x0000.
QUAD ENABLE                : 0
STATUS REGISTER PROTECT 1  : 0
STATUS REGISTER PROTECT 0  : 0
SECTOR PROTECT             : 0
TOP/BOTTOM PROTECT         : 0
BLOCK PROTECT BIT 2        : 0
BLOCK PROTECT BIT 1        : 0
BLOCK PROTECT BIT 0        : 0
'1': Programmed successfully.
INFO:iMPACT - '1': Flash was programmed successfully.
  LCK_cycle = NoWait.
LCK cycle: NoWait
INFO:iMPACT - '1': Checking done pin....done.
'1': Programmed successfully.
Elapsed time = 284 sec.
-
Programming successfully finished
Press any key to EXIT...

```

press any key to exit.

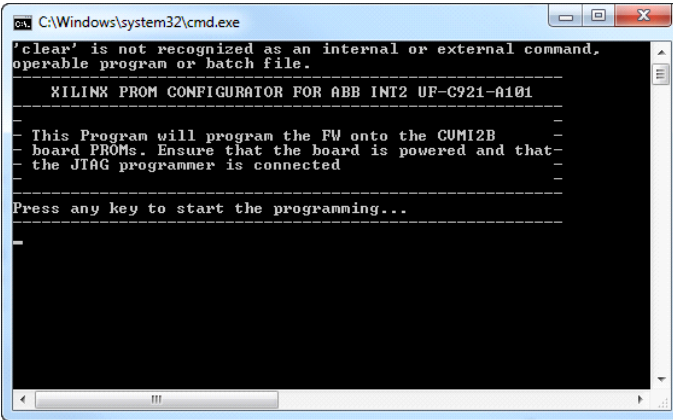
8. Turn off the control power.
9. Remove the XILINX platform cable USB II.
10. Restore all daughter boards on control hub.

■ Loading CVM12 firmware

CVM12 firmware version can be checked in parameter 07.17 CVM12 FW version. To upgrade the CVM12 firmware, follow the steps below:

18 Loading of the Control Software

1. Switch off the control power.
2. Connect XILINX platform cable USB II to X1301 connector on CVM12.
3. Switch on the control power.
4. Run PROG_LXES.bat batch file to program the CVM12. Following window will open:



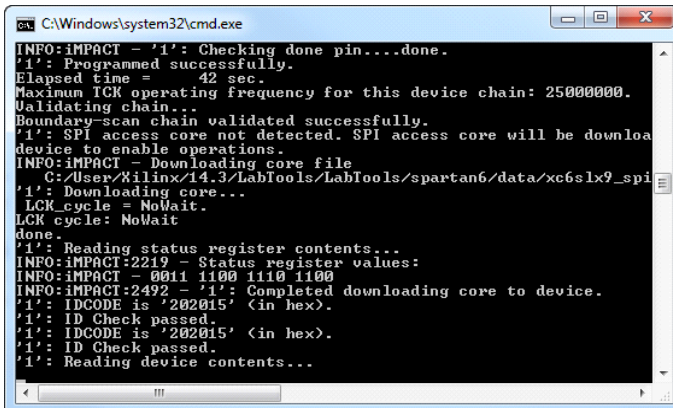
```
C:\Windows\system32\cmd.exe
'clean' is not recognized as an internal or external command,
operable program or batch file.

-----
XILINX PROM CONFIGURATOR FOR ABB INT2 UF-C921-A101
-----
- This Program will program the FW onto the CVM12B
- board PROMs. Ensure that the board is powered and that
- the JTAG programmer is connected
-----

Press any key to start the programming...

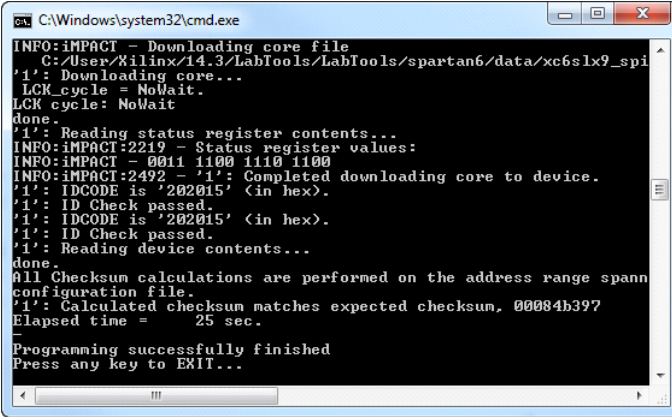

```

5. After pressing Enter many messages will be shown on screen and finally the screen will stay longer with the following message:



```
C:\Windows\system32\cmd.exe
INFO:IMPACT - '1': Checking done pin...done.
'1': Programmed successfully.
Elapsed time = 42 sec.
Maximum TCK operating frequency for this device chain: 25000000.
Validating chain...
Boundary-scan chain validated successfully.
'1': SPI access core not detected. SPI access core will be download
device to enable operations.
INFO:IMPACT - Downloading core file
C:\User\Xilinx\14.3\LabTools\LabTools\spartan6\data\xc6slx9_spi
'1': Downloading core...
LCK cycle = NoWait.
LCK cycle: NoWait
done.
'1': Reading status register contents...
INFO:IMPACT:2219 - Status register values:
INFO:IMPACT: 0011 1100 1110 1100
INFO:IMPACT:2492 - '1': Completed downloading core to device.
'1': IDCODE is '202015' (in hex).
'1': ID Check passed.
'1': IDCODE is '202015' (in hex).
'1': ID Check passed.
'1': Reading device contents...
```

6. When the programming is over following screen will show:



```

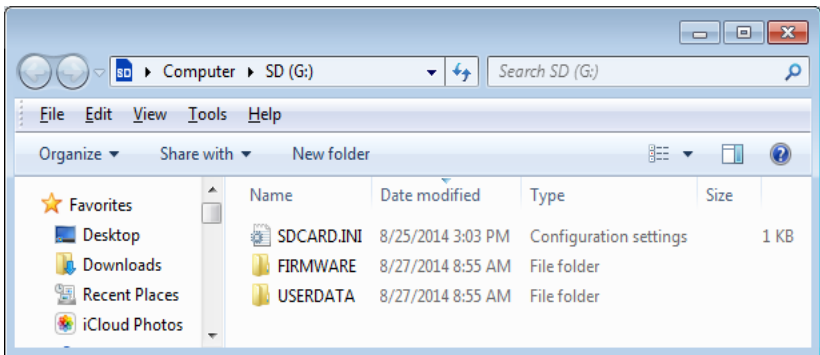
C:\Windows\system32\cmd.exe
INFO:IMPACT - Downloading core file
C:\User\Xilinx\14.3\LabTools\LabTools\spartan6\data\xc6s1x9_spi
'1': Downloading core...
LCK_cycle = NoWait.
LCK_cycle: NoWait
done.
'1': Reading status register contents...
INFO:IMPACT:2219 - Status register values:
INFO:IMPACT - 0011 1100 1110 1100
INFO:IMPACT:2492 - '1': Completed downloading core to device.
'1': IDCODE is '202015' (in hex).
'1': ID Check passed.
'1': IDCODE is '202015' (in hex).
'1': ID Check passed.
'1': Reading device contents...
done.
All Checksum calculations are performed on the address range spann
configuration file.
'1': Calculated checksum matches expected checksum, 00084b397
Elapsed time = 25 sec.
-
Programming successfully finished
Press any key to EXIT...
  
```

Press any key to exit.

7. Turn off the control power .
8. Remove the XILINX platform cable USB II.

■ Loading IO controller (AC500eco) software

1. Save the following files and folders to the SD card (MC502) root folder. Files can be found in the MHDRE release package (folder \04_IOController SW):



Note: Only MC502 SD card can be used. This is not the same SD card which is plugged into the BCU.

2. Switch off the control power
3. Install SD card adapter (MC503) into CPU PM55x
4. Insert SD memory card (MC502) into adapter MC503
5. Switch on the control power. Update operation starts. Observe the LEDs on PM55x:

RUN LED flashing	= reading from SD memory card
RUN and ERR LED flashing fast	= programing in progress
RUN LED flashing slowly	= SW download successful
ERR LED flashing slowly	= Error

6. After SW update operation finishes, switch off the control power and remove SD card and the adapter. New SW is activated after IO controller AC500eco CPU is restarted.

■ Loading IO controller (AC500eco) firmware

For instructions on loading the IO controller (AC500eco) firmware refer to the document [CPU Firmware Update Description AC500 / AC500-eCo](#).

Note: Normally the AC500eco PLC delivered with the converter has the correct firmware version and firmware does not need to be updated. Only in case of some faults related to the IO controller the firmware version of the AC500eco PLC should be checked and updated if needed. The BCON software version [MHDRE 2.70.0.0](#) is compatible with the AC500eco firmware version **v 2.3.3.** and newer.

PLC firmware version can be identified from the PLC HW revision that is shown on the PLC nameplate. The following table relates the HW revision to the firmware version:

Index Version in Production	FW		
	CPU	Bootcode	ONB_IO
A1	V2.2.0	V1.3.0	ONB_IO FW V1.1.4
A2	V2.2.0	V1.3.0	ONB_IO FW V1.1.4
A3	V2.3.0	V1.3.0	ONB_IO FW V1.1.4
A4	V2.3.1	V1.3.0	ONB_IO FW V1.1.4
A5	V2.3.3	V1.3.0	ONB_IO FW V1.1.4
A6	V2.3.3	V1.3.0	ONB_IO FW V1.1.4
A7	V2.4.2	V1.3.0	ONB_IO FW V1.1.6
A8	V2.4.2	V1.3.0	ONB_IO FW V1.1.6
A9	V2.5.1	V1.3.0	ONB_IO FW V1.1.6

Table: AC500eco HW revisions and corresponding firmware versions

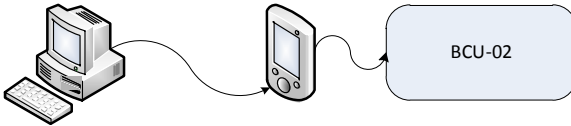
As it can be seen from the table, the BCON SW version [MHDRE 2.70.0.0](#) is compatible with AC500eco HW revision **A5** and newer.

The AC500eco PLC HW revision can be read out from the nameplate sticker on the right side of the PLC CPU module. To read the HW revision, disconnect the cables from the PLC and separate it from the extension modules.

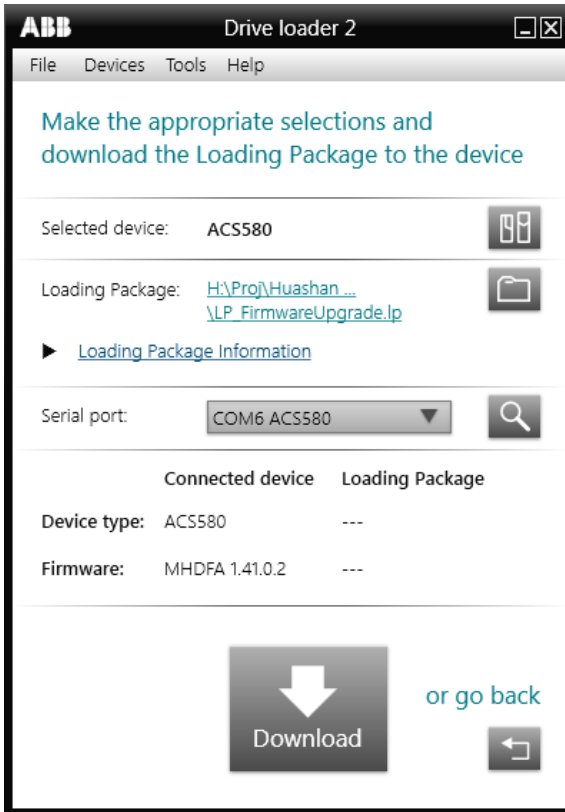
The firmware version of the PLC can also be read out directly using the Automation Builder PC tool as described in the document [CPU Firmware Update Description AC500 / AC500-eCo](#).

■ Loading BCON software

1. Connect PC to the assistant control panel (ACS-AP-S) with USB to mini USB cable.



2. Start Drive loader 2 and select the file LP_FirmwareUpgrade.lp from the MHDRE release package (folder \01_BCON SW). Select ACS580 for the drive type and wait until the tool identifies the connection to the drive. Click “Download” button when ready:



Note: Drive composer and DriveStartup PC tools must be closed to enable connection to the drive.

3. Downloading of a loading package lasts approximately 10 minutes. If download is successful close the Drive loader 2 tool.

Note: If the BCON SW version [MHDRE 2.70.0.0](#) or newer has never been loaded to a BCON before, a ZMU-02 already containing the new software will not work. In other words, on a new drive it is not possible to simply insert the ZMU-02 containing new software but the software must be loaded using Drive loader tool as described above.

■ Loading the ACS-AP-S assistant panel firmware

The instructions for download of the ACS-AP-S firmware are available in the document “ACS-AP_ControlPanelUpdateInstructions.pdf” that is available with the MHDRE loading package in [Medium Voltage Drives Portal](#) (folder: \05_ControlPanel FW). Panel type and revision can be checked from the bar code sticker. HW version is defined by the first letter of serial number in the bar code sticker. Other way to check panel type and revision is to hold down the “?” key in panel power up. Appropriate info with mentioned information appears then. Refer to the [ACS580MV SW compatibility table](#) for the compatibility between BCON software and panel firmware. Update the panel firmware if not compatible.

■ Loading the DSP software manually to power modules

The software of power module DSP is contained in the BCON software. After the drive is charged and power modules DSPs are turned on, BCON software is checking if all the power modules have the correct software version. Only one DSP software version is compatible with one version of BCON software. If one or more power modules report different software version than the one that is required by BCON, the DSP software download from BCON is started. See description of the fault [607E PM Software update in progress](#) for more details.

In some exceptional cases the DSP software download from BCON might not succeed. The following cases might lead to unsuccessful software download:

- Power modules have incompatible DSP SW version (see the note below).
- One or more power modules have no SW programmed.
- There is a fault activated on one or more power modules before the software download could start.

Note: BCON SW version [MHDRE 2.70.0.0](#) is not compatible with the DSP SW version 01.00.02 (2015-A release) and older.

In case of unsuccessful DSP software download from BCON, the DSP software must be downloaded directly to all power modules. The instructions how to download the DSP software directly to power modules is given in the remainder of this chapter.



DANGER

High voltage!

Loading of the DSP software directly to power modules requires opening the inverter unit cabinet and accessing the power modules!

ObeY the instructions given in chapter 1 **Safety instruction** and chapter 12 **Maintenance** of the [ACS580MV hardware manual](#). If you ignore them, injury or death, or damage to the equipment can occur.

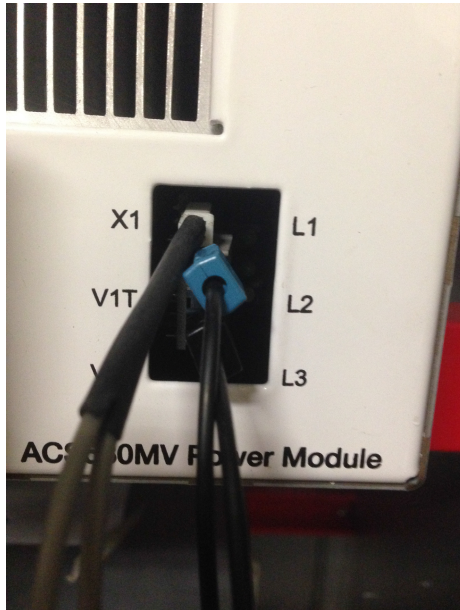
Before starting to work on the drive, make sure:

- that the main and auxiliary power supply to the drive is switched off, locked out, and tagged out
- that the drive is dead
- that safety ground connections are in place
- that personal protective equipment is provided and used when required
- that everyone involved is informed.

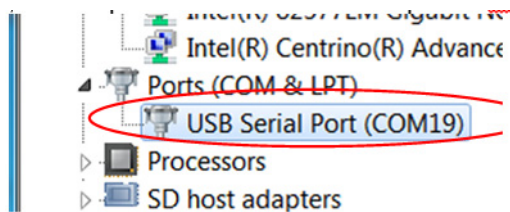
Before energizing the drive, make sure:

- that all foreign objects are removed from the drive
- that all internal and external covers are securely fastened and all doors are closed, locked and / or bolted
- that the release dials of safety switches are in the locked position.

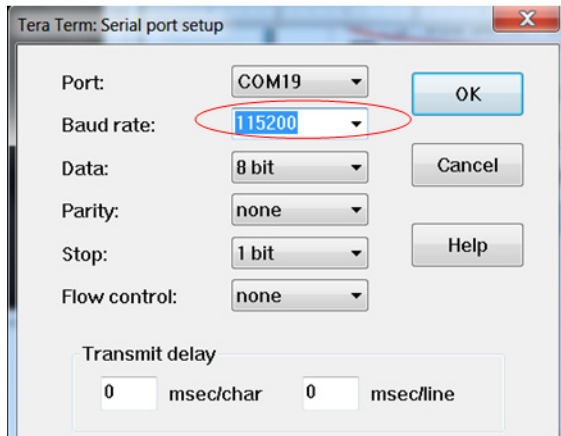
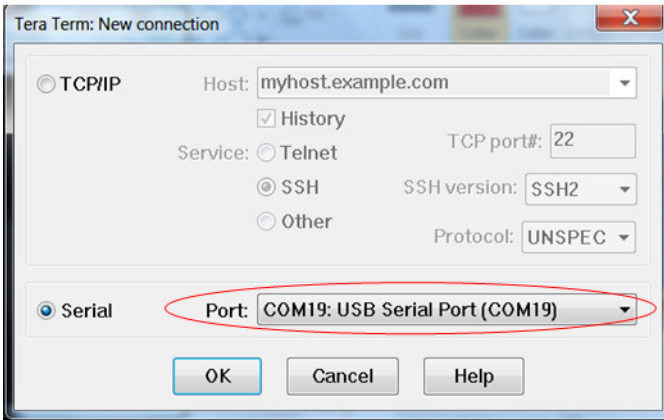
1. Disconnect the original POF links from the first power module. Disconnect the original +5.5V power supply cable from the first power module. Connect the USB to FO serial cable to power module's POF links. Make sure that the correct POF link is connected to TX and RX channel by obeying the color of the POF link cable and POF link connectors on power module.
-



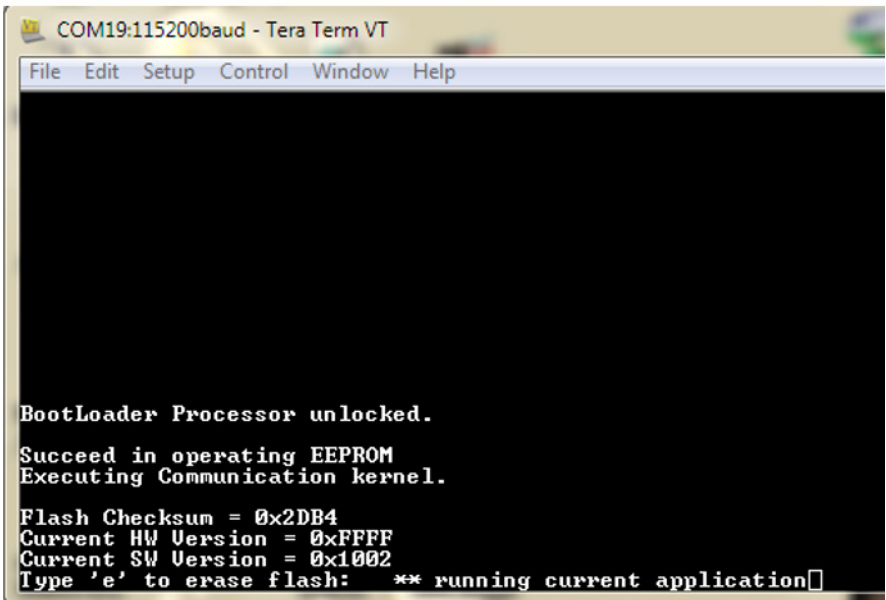
2. Check the port of the USB to FO serial cable on your PC (Control panel -> System -> Device Manager):



3. Open the "Tera Term" PC tool and set the serial port to the one where Serial to POF link cable is connected (COM19 in the example here). Set the baud rate to 115200.
-



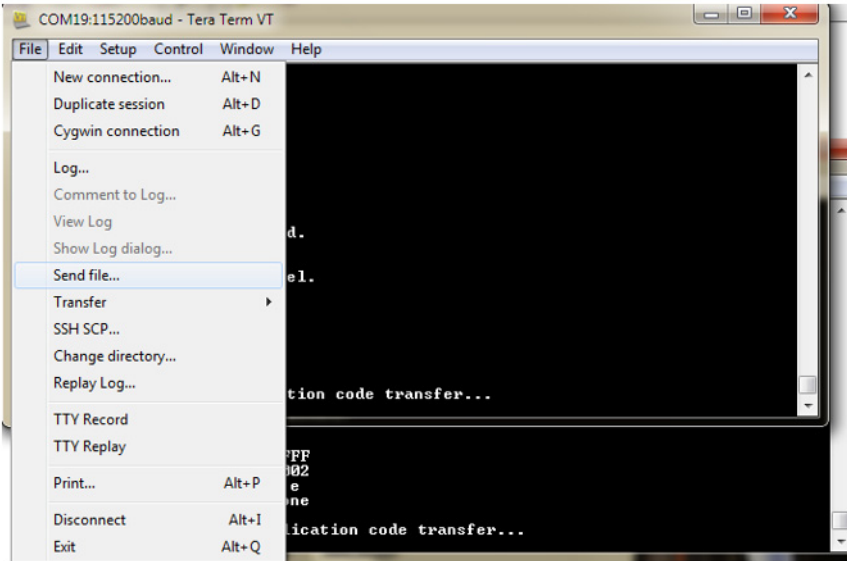
4. Connect the auxiliary +5.5V power supply cable (part of the USB-POF link cable) to +5.5V power supply connector on the power module. After that the DSP of the power module will boot up. After the DSP boots up the Tera Term receives information from DSP:



The image shows a screenshot of a Tera Term VT terminal window. The title bar reads "COM19:115200baud - Tera Term VT". The menu bar includes "File", "Edit", "Setup", "Control", "Window", and "Help". The terminal output is as follows:

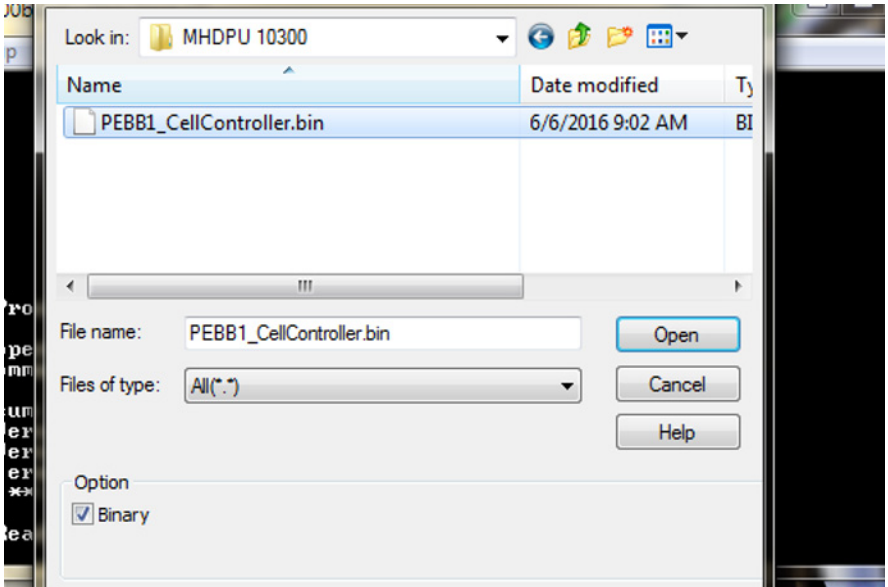
```
BootLoader Processor unlocked.  
Succeed in operating EEPROM  
Executing Communication kernel.  
Flash Checksum = 0x2DB4  
Current HW Version = 0xFFFF  
Current SW Version = 0x1002  
Type 'e' to erase flash:  ** running current application
```

5. After Tera Term displays the text "Type 'e' to erase flash:" just press letter "e" on the keyboard.
6. Open the File menu and chose "Send file":

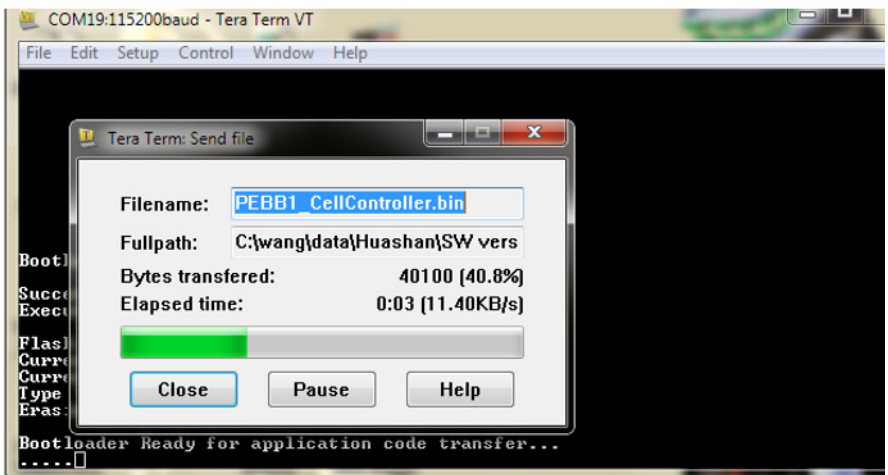


Select the PEBB1_CellController.bin file from the MHDRE loading package (folder \02_PowerModule SW).

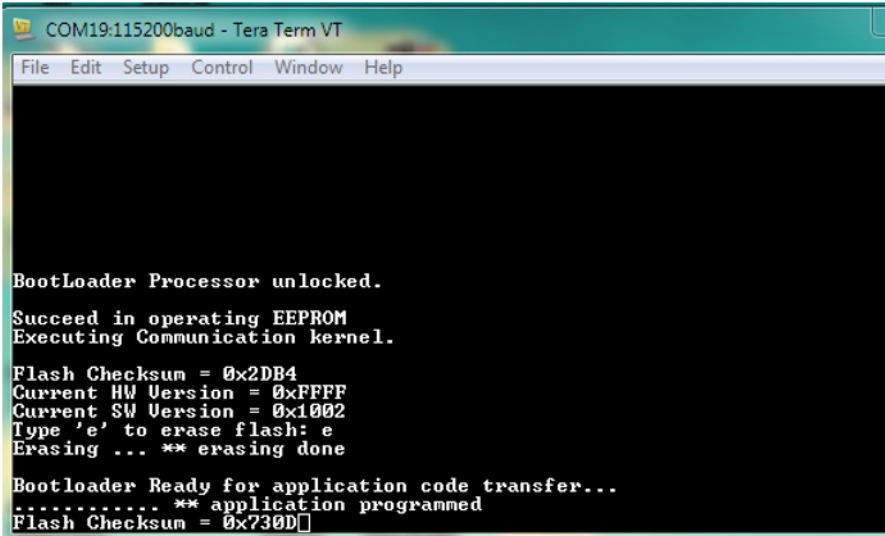
Important: Make sure to select the option “Binary”! If not selected, the software download will fail.



7. Press “Open” to start the download:



8. Once the download is successfully finished the following message will be shown:



The image shows a screenshot of a Tera Term VT terminal window. The title bar reads "COM19:115200baud - Tera Term VT". The menu bar includes "File", "Edit", "Setup", "Control", "Window", and "Help". The terminal output is as follows:

```
BootLoader Processor unlocked.
Succeed in operating EEPROM
Executing Communication kernel.

Flash Checksum = 0x2DB4
Current HW Version = 0xFFFF
Current SW Version = 0x1002
Type 'e' to erase flash: e
Erasing ... ** erasing done

Bootloader Ready for application code transfer...
..... ** application programmed
Flash Checksum = 0x730D
```

9. Close the Tera Term PC tool. Disconnect the USB-POF link cable and reconnect the original POF link and +5.5V power supply cable. Proceed to the next power module.
-

3

Fault Tracing

What this chapter contains

The chapter lists the warning and fault messages including possible causes and corrective actions. The causes of most warnings and faults can be identified and corrected using the information in this chapter. The basic procedures for troubleshooting that can be carried out by End user are already described in [ACS580MV primary control program firmware manual](#) and are repeated here. In addition to that, troubleshooting procedures that are only allowed for ABB Service or ABB certified service partners are described in this chapter. If it is not possible to resolve a problem using information from this chapter, the ABB support line should be contacted.

Warnings and faults are listed below in separate tables. Each table is sorted by warning/fault code.

Safety



WARNING! Only ABB Service and ABB certified service partners are allowed to service the drive. Obey the safety instructions in chapter [Introduction to the Manual](#) on page 9. If you ignore them, injury or death, or damage to the equipment can occur.

Indications

■ Warnings and faults

Warnings and faults indicate an abnormal drive status. The codes and names of active warnings/faults are displayed on the control panel of the drive as well as the

Drive composer PC tool. Only the codes of warnings/faults are available over fieldbus.

Warnings do not need to be reset; they stop showing when the cause of the warning ceases. Warnings do not latch and the drive will continue to operate the motor.

Faults do latch inside the drive and cause the drive to trip. When a fault is activated the modulation is stopped and the MCB contacts are opened. After the cause of a fault has been removed, the fault can be reset from a selectable source such as the control panel, Drive composer PC tool, the digital inputs of the drive or fieldbus (see parameter *31.11 Fault reset selection*). After the fault is reset, the drive can be restarted. Note that some faults require a reboot of the control unit either by switching the control power off and on, or using parameter *96.08 Control board boot* – this is mentioned in the fault listing wherever appropriate.

■ Pure events

In addition to warnings and faults, there are pure events that are only recorded in the event log of the drive. The codes of these events are included in the [Warning messages](#) table.

■ Editable messages

For some warnings and faults, the message text can be edited and instructions and contact information added. To edit these messages, choose **Menu - Settings - Edit texts** on the control panel.

Warning/fault history and analysis

■ Event log

All indications are stored in the event log with a time stamp and other information. The event log stores information on the last 5 faults that tripped the drive, and the last 20 secondary events that occurred. The event log can be accessed from the main Menu on the control panel. It can also be accessed (and reset) using the Drive composer PC tool.

Auxiliary codes

Some events generate an auxiliary code that often helps in pinpointing the problem. On the control panel, the auxiliary code is stored as part of the details of the event; in the Drive composer PC tool, the auxiliary code is shown in the event listing.

Fault data logger

The drive has a preset fault data logger that samples preselected drive values at 500-microsecond intervals. Approximately 22000 samples recorded 400ms before and 100ms after the tripping fault are saved into the memory unit of the drive. The fault data is accessible in the event log when viewed in the Drive composer PC tool. (The

fault data is not accessible through the control panel). All fault data loggers are copied to the SD card and can be analyzed later using ACS50MV Data analyzer PC tool (see [Using ACS580MV Data Analyzer](#)).

The values that are recorded in the fault data log are *01.07 Motor current, 01.10 Motor torque %, 01.11 DC voltage, 01.24 Flux actual %, 01.40 Phase U2 motor current, 01.41 Phase V2 motor current, 01.42 Phase W2 motor current, 01.43 Phase U2 motor voltage, 01.44 Phase V2 motor voltage, 01.45 Phase W2 motor voltage, 01.46 Phase A average DC voltage, 01.47 Phase B average DC voltage, 01.48 Phase C average DC voltage, 01.49 Phase U1 grid current, 01.50 Phase V1 grid current, 01.51 Phase W1 grid current, 01.52 Phase A average secondary voltage, 01.53 Phase B average secondary voltage, 01.54 Phase C average secondary voltage, 24.01 Used speed reference, 30.01 Limit word 1 and 90.01 Motor speed for control*. The selection of parameters cannot be changed by the user.

■ Other data loggers

User data logger

A custom data logger can be configured using the Drive composer PC tool. This functionality enables the free selection of up to eight drive parameters to be sampled at selectable intervals. The triggering conditions and the length of the monitoring period can also be defined by the user within the limit of approximately 8000 samples. The collected data is not automatically saved. Minimum sampling time for User data logger is 500ms.

■ Parameters that contain warning/fault information

The drive is able to store a list of the active faults actually causing the drive to trip at the present time. The faults are displayed in parameter group *04 Warnings and faults*. The parameter group also displays a list of faults and warnings that have previously occurred.

■ Warning messages


Note: The list also contains Pure events that only appear in the Event log.

Code (hex)	Warning	Cause	What to do
64FF	Fault reset	Fault reset has been demanded.	<p>If the root cause for some of the active faults is still present after the reset, those faults will remain active. Root cause for the faults should be removed before reset is attempted.</p> <p>Important: Resetting of the active faults should be attempted only after action has been taken to remove the suspected root cause for the faults. Pressing reset with faults still active will cause those faults to reappear in the Event logger. This reduces the number of relevant information in the Event logger and makes the later troubleshooting more difficult.</p>
A186	PM states mismatch	Control hub has detected a combination of power modules' (PM) states that is not valid.	<p>Check POF wiring to PMs (or replace). Check control hub daughter boards (or replace). Check PM SW version and update if required.</p>
A283	Motor overload alarm	Motor average current exceeds the internal alarm limit (Par. 34.30).	<p>Check that the motor parameters in group <i>99 Motor data</i> correspond to the motor rating plate. Check for proper delta/star connection of the motor. Check the settings of the alarm threshold (Par. 34.30) and of the motor overloadability (Par. 34.49 - 34.52).</p>
A2B1	Overcurrent	Output current has exceeded internal alarm limit.	<p>Check motor load. Check acceleration times in parameter group <i>23 Speed reference ramp</i> (rpm operation mode) or <i>28 Frequency reference chain</i> (Hz operation mode). Also check parameters <i>46.01 Speed scaling</i> and <i>46.02 Frequency scaling</i>. Check motor and motor cable (including phasing and delta/star connection). Check there are no contactors opening and closing in motor cable. Check that the data in parameter group <i>99 Motor data</i> corresponds to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable.</p>
A2B3	Earth leakage	Drive has detected load unbalance typically due to earth fault in motor or motor cable.	<p>Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. If no earth fault can be detected, contact the ABB support line.</p>

Code (hex)	Warning	Cause	What to do
A2B4	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable for cabling errors. Check that there are no power factor correction capacitors or surge absorbers in motor cable.
A480	Motor cable overload (Editable message text)	Calculated motor cable temperature has exceeded warning limit.	Check the dimensioning of the motor cable in regard to required load. Check the settings in parameter group 35 <i>Motor thermal protection</i> .
A490	Incorrect temperature sensor setup	Sensor type mismatch	Check the settings of parameters 35.11 <i>Temperature 1 source</i> and 35.21 <i>Temperature 2 source</i>
			Check the wiring of the sensor. The auxiliary code (see the event log) identifies the interface module. (0 = Module 1, 1 = Module 2).
A491	External temperature 1 (Editable message text)	Measured temperature 1 has exceeded warning limit.	Check the value of parameter 35.02 <i>Measured temperature 1</i> . Check the cooling of the motor (or other equipment whose temperature is being monitored). Check the setting of parameter 35.13 <i>Temperature 1 warning limit</i> .
A492	External temperature 2 (Editable message text)	Measured temperature 2 has exceeded warning limit.	Check the value of parameter 35.03 <i>Measured temperature 2</i> . Check the cooling of the motor (or other equipment whose temperature is being monitored). Check the setting of parameter 35.23 <i>Temperature 2 warning limit</i> .
A4A0	Control board temperature	Control unit temperature (seen in Par. 5.10) has exceeds internal alarm level (Par. 5.48).	Check the auxiliary code. See actions for each code below.
	Aux code: 1	Temperature above warning limit	Check ambient conditions.
	Aux code: 2	Thermistor damaged	Replace the BCU control unit.
A5EA	Measurement circuit temperature	Problem with internal temperature measurement of the drive.	Contact the ABB support line. For software version 2.00.0.3 and older it is recommended to load the newest software package.
A5ED	Measurement circuit ADC	Measurement circuit problem.	Contact the ABB support line.
A5EE	Measurement circuit DFF	Measurement circuit problem.	Contact the ABB support line.
A5F4	Control unit battery	The battery of the control unit is low.	Replace control unit battery. Refer to the ACS580MV hardware manual for instructions on the battery replacement. This warning can be suppressed using parameter 31.40.
A682	Flash erase speed exceeded	Internal warning.	Can be ignored.

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Code (hex)	Warning	Cause	What to do
A684	SD card	Error related to SD card used to store data on BCU	Check the auxiliary code. See actions for all the codes below.
		1 No SD card	Insert a compatible, writable SD card into the SD CARD slot of the BCU. Note: Only 4 GB SD cards are supported with SW versions <i>MHDRE 2.70.0.0</i> and older.
		2 SD card write-protected	
		3 SD card unreadable	
A690	SD card write failed	Error happened while writing data to SD card located in BCON.	Customer should change a new SD card.
		0x01 change directory fail	
		0x02 make directory fail	
		0x04 open file fail	
		0x08 write file fail	
		0x10 read space fail	
		0x20 seek file current writing position fail	
		0x40 remove file fail	
		0x80 remove directory fail	
A6A4	Motor nominal value	The motor parameters are set incorrectly. The drive is not dimensioned correctly.	Check the settings of the motor parameters in parameter group <i>99 Motor data</i> . Check that the drive is sized correctly for the motor.
A6A5	No motor data	Parameters in group 99 have not been set.	Check that all the required parameters in parameter group <i>99 Motor data</i> have been set. Note: It is normal for this warning to appear during the start-up and continue until the motor data is entered.
A6A6	Supply voltage unselected	The supply voltage has not been defined.	Set supply voltage parameter (contact the ABB support line).
A6D1	FBA A parameter conflict	The drive does not have a functionality requested by a PLC (overriding system), or requested functionality has not been activated.	Check PLC (overriding system) programming. Check settings of parameter groups <i>50 Fieldbus adapter (FBA)</i> and <i>51 FBA A settings</i> .

Code (hex)	Warning	Cause	What to do
A6D2	FBA B parameter conflict	The drive does not have a functionality requested by a PLC AC500, or requested functionality has not been activated.	<ul style="list-style-type: none"> - Reboot the BCU control unit to load the default values for the communication parameters. - Make sure that following parameters are set correctly: <ul style="list-style-type: none"> 54.1 FBA B type = RS-485 comm 54.2 Profile = ABB Enhanced - Refresh the Modbus settings by setting the parameter: <ul style="list-style-type: none"> 54.27 FBA B par refresh = Refresh <p> WARNING! FBA B communication is reserved for drive internal communication and should not be changed by End user.</p>
A6E5	AI parametrization	The current/voltage hardware setting of an analog input does not correspond to parameter settings.	<p>Check the event log for an auxiliary code. The code identifies the analog input whose settings are in conflict. Adjust either the hardware setting (dip switches on BCU) or parameter 12.15/12.25.</p> <p>Note: Control board reboot (either by cycling the power or through parameter 96.08 <i>Control board boot</i>) is required to validate any changes in the hardware settings.</p>
A6FA	Trial mode active	The drive is running in trial mode. After the trial mode has expired the drive will trip immediately and license update shall not be possible.	<p>Contact ABB support line to get a valid license key.</p> <p>Enter a valid license key in parameters 96.71 <i>License key part 1</i>, 96.72 <i>License key part 2</i>, 96.73 <i>License key part 3</i>, 96.74 <i>License key part 4</i> and then set the parameter 96.75 <i>License key refresh</i> to "Refresh".</p>
A6FB	Trial mode expires soon	The trial mode expires soon. After the trial mode has expired the drive will trip immediately and license update shall not be possible.	<p>Contact ABB support line to get a valid license key.</p> <p>Enter a valid license key in parameters 96.71 <i>License key part 1</i>, 96.72 <i>License key part 2</i>, 96.73 <i>License key part 3</i>, 96.74 <i>License key part 4</i> and then set the parameter 96.75 <i>License key refresh</i> to "Refresh".</p>

Code (hex)	Warning	Cause	What to do
A6FD	Rating parametrization failed	When the drive is modulating, it is not possible to change some parameters.	<p>Check the auxiliary code. The code identifies the parameter whose writing was not possible. The format of the code is 0x0GGG 0III."GGG" represents the parameter group in decimal representation."III" represents the parameter index in decimal representation.</p> <p>This warning indicates that the entered license key has a different setting in a very important parameter. The parametrization is successful only if the drive is not modulating. If you are sure that the settings in the license key are correct, you can apply the changes by stopping the drive and refreshing the license key. If you are not sure if the settings in the license key are correct contact the ABB support line and provide the auxiliary code.</p>
A6FE	Rating not valid	The entered license key provides an invalid setting.	<p>Check the auxiliary code. The code identifies the parameter whose setting was not valid. The format of the code is 0x0GGG 0III."GGG" represents the parameter group in decimal representation."III" represents the parameter index in decimal representation.</p> <p>Contact the ABB support line and provide the auxiliary code.</p>
A780	Motor stall Programmable warning: <i>31.24 Stall function</i>	Motor is operating in stall region because of e.g. excessive load or insufficient motor power.	<p>Make sure that the motor is not mechanically blocked from rotating. Check motor load and drive ratings. Check fault function parameters <i>31.24...31.28</i> (see the description of those parameters in ACS580MV primary control program firmware manual for more details).</p>
A781	Motor fan Programmable warning: <i>35.106 DOL starter event type</i>	No feedback received from external fan.	<p>Check external fan (or other equipment controlled) by the logic. Check settings of parameters <i>35.100...35.106</i> (see the description of those parameters in ACS580MV primary control program firmware manual for more details).</p>
A797	Speed feedback configuration	The warning is related to encoder feedback that is not supported in ACS580MV.	<p>Restore all parameters in groups 90, 92 and 93 to their default values. Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power.</p>
A798	Encoder Option Comm Loss	The warning is related to encoder feedback that is not supported in ACS580MV.	<p>Restore all parameters in groups 90, 92 and 93 to their default values. Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power.</p>

Code (hex)	Warning	Cause	What to do
A7AA	Extension AI parameterization	The hardware current/voltage setting of an analog input (on an I/O extension module) does not correspond to parameter settings.	<p>Check the event log for an auxiliary code (format 0000 XYYY). "XX" specifies the number of the I/O extension module (01: parameter group <i>14 I/O extension module 1</i>, 02: <i>15 I/O extension module 2</i>, 03: <i>16 I/O extension module 3</i>). "YY" specifies the analog input on the module. For example, in case of I/O extension module 1, analog input AI1 (auxiliary code 0000 0101), the hardware current/voltage setting on the module is shown by parameter <i>14.29</i>. The corresponding parameter setting is <i>14.30</i>. Adjust either the hardware setting on the module or the parameter to solve the mismatch.</p> <p>Note: Control board reboot (either by cycling the power or through parameter <i>96.08 Control board boot</i>) is required to validate any changes in the hardware settings.</p>
A7AB	Extension I/O configuration failure	The I/O extension module types and locations specified by parameters do not match the detected configuration.	<p>Check the event log for an auxiliary code. The code indicates which I/O extension module is affected.</p> <p>Check the type and location settings of the modules (parameters <i>14.01</i>, <i>14.02</i>, <i>15.01</i>, <i>15.02</i>, <i>16.01</i> and <i>16.02</i>).</p> <p>Check that the modules are properly installed.</p>
A7C1	FBA A communication Programmable warning: <i>50.02 FBA A comm loss func</i>	Cyclical communication between drive and fieldbus adapter module A or between PLC (overriding system) and fieldbus adapter module A is lost.	<p>Check status of fieldbus communication. See user documentation of fieldbus interface.</p> <p>Check settings of parameter groups <i>50 Fieldbus adapter (FBA)</i>, <i>51 FBA A settings</i>, <i>52 FBA A data in</i> and <i>53 FBA A data out</i>.</p> <p>Check cable connections.</p> <p>Check if communication master is able to communicate.</p>
A7C2	FBA B communication Programmable warning: <i>50.32 FBA B comm loss func</i>	Cyclical communication between drive and fieldbus adapter module B or between AC500 PLC and fieldbus adapter module B is lost.	<p>- Check settings of parameter groups <i>50 Fieldbus adapter (FBA)</i>, <i>54 FBA B settings</i>, <i>55 FBA B data in</i> and <i>56 FBA B data out</i>.</p> <p>- Reboot the BCU control unit to load the default values for the communication parameters.</p>

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Code (hex)	Warning	Cause	What to do
A7EE	Panel loss Programmable warning: <i>49.05 Communication loss action</i>	Control panel or PC tool selected as active control location for drive has ceased communicating.	Check PC tool or control panel connection. Check control panel connector. Check BCON X13 connector pins. Disconnect and reconnect the control panel. Replace control panel in mounting platform. For software versions 2.00.0.3 and older please check SD card for damage if panel loss is detected. If SD card is damaged, return it back to factory for analysis (without formatting). Caution! In case of software version 1.41.0.2 or older, change parameter 49.05 to <i>No action</i> to avoid nuisance alarms.
A7F0	FSCA-01 firmware incompatible	FSCA-01 firmware version is incompatible with the drive software. Fieldbus communication will not be stable.	The warning is active if any of the FSCA-01 modules (used for FBA A and/or for FBA B communication) have incompatible FW version. Check parameter 54.33 FBA B appl SW ver to determine if the FSCA-01 module used for internal communication is having an incompatible FW version. Refer to the release notes for the list of compatible FW versions. If second FSCA-01 module is used for FBA A communication, check parameter 51.33 FBA A appl SW ver. Replace all FSCA-01 modules that have incompatible FW version with compatible ones.
A880	Motor bearing Programmable warnings: <i>33.14 On-time 1 warn message</i> <i>33.24 On-time 2 warn message</i> <i>33.55 Value counter 1 warn message</i> <i>33.65 Value counter 2 warn message</i>	Warning generated by an on-time timer or a value counter	Check the event log for an auxiliary code. Check the source of the warning corresponding to the code: 0: <i>33.13 On-time 1 source</i> 1: <i>33.23 On-time 2 source</i> 4: <i>33.53 Value counter 1 source</i> 5: <i>33.63 Value counter 2 source</i> .
A881	Output relay	Warning generated by an edge counter Programmable warnings: <i>33.35 Edge counter 1 warn message</i> <i>33.45 Edge counter 2 warn message</i>	Check the event log for an auxiliary code. Check the source of the warning corresponding to the code: 2: <i>33.33 Edge counter 1 source</i> 3: <i>33.43 Edge counter 2 source</i> .
A882	Motor starts		
A883	Power ups		
A884	Main contactor		
A885	DC charge		
A886	On-time 1 (Editable message text) Programmable warning: <i>33.14 On-time 1 warn message</i>	Warning generated by on-time timer 1	Check the source of the warning (parameter <i>33.13 On-time 1 source</i>).

Code (hex)	Warning	Cause	What to do
A887	On-time 2 (Editable message text) Programmable warning: 33.24 <i>On-time 2 warn message</i>	Warning generated by on-time timer 2	Check the source of the warning (parameter 33.23 <i>On-time 2 source</i>).
A888	Edge counter 1 (Editable message text) Programmable warning: 33.35 <i>Edge counter 1 warn message</i>	Warning generated by edge counter 1	Check the source of the warning (parameter 33.33 <i>Edge counter 1 source</i>).
A889	Edge counter 2 (Editable message text) Programmable warning: 33.45 <i>Edge counter 2 warn message</i>	Warning generated by edge counter 2	Check the source of the warning (parameter 33.43 <i>Edge counter 2 source</i>).
A88A	Value integrator 1 (Editable message text) Programmable warning: 33.55 <i>Value counter 1 warn message</i>	Warning generated by value counter 1	Check the source of the warning (parameter 33.53 <i>Value counter 1 source</i>).
A88B	Value integrator 2 (Editable message text) Programmable warning: 33.65 <i>Value counter 2 warn message</i>	Warning generated by value counter 2	Check the source of the warning (parameter 33.63 <i>Value counter 2 source</i>).
A88C	Device clean	Warning generated by an on-time timer Programmable warnings: 33.14 <i>On-time 1 warn message</i> 33.24 <i>On-time 2 warn message</i>	Check the event log for an auxiliary code. Check the source of the warning corresponding to the code: 0: 33.13 <i>On-time 1 source</i> 1: 33.23 <i>On-time 2 source</i>
A88D	DC capacitor		
A88E	Cabinet fan		
A88F	Cooling fan		
A890	Additional cooling fan		
A8A0	AI supervision Programmable warning: 12.03 <i>AI supervision function</i>	An analog signal is outside the limits specified for the analog input.	Check signal level at the analog input. Check the wiring connected to the input. Check the minimum and maximum limits of the input in parameter group 12 <i>Standard AI</i> .
A8B0	Signal supervision 1 (Editable message text) Programmable warning: 32.06 <i>Supervision 1 action</i>	Warning generated by the signal supervision 1 function	Check the source of the warning (parameter 32.07 <i>Supervision 1 signal</i>).
A8B1	Signal supervision 2 (Editable message text) Programmable warning: 32.16 <i>Supervision 2 action</i>	Warning generated by the signal supervision 2 function	Check the source of the warning (parameter 32.17 <i>Supervision 2 signal</i>).
A8B2	Signal supervision 3 (Editable message text) Programmable warning: 32.26 <i>Supervision 3 action</i>	Warning generated by the signal supervision 3 function	Check the source of the warning (parameter 32.27 <i>Supervision 3 signal</i>).
A981	External warning 1 (Editable message text) Programmable warning: 31.01 <i>External event 1 source</i> 31.02 <i>External event 1 type</i>	Fault in external device 1	Check the external device. Check setting of parameter 31.01 <i>External event 1 source</i> .

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Code (hex)	Warning	Cause	What to do
A982	External warning 2 (Editable message text) Programmable warning: <i>31.03 External event 2 source</i> <i>31.04 External event 2 type</i>	Fault in external device 2	Check the external device. Check setting of parameter <i>31.03 External event 2 source</i> .
A983	External warning 3 (Editable message text) Programmable warning: <i>31.05 External event 3 source</i> <i>31.06 External event 3 type</i>	Fault in external device 3	Check the external device. Check setting of parameter <i>31.05 External event 3 source</i> .
A984	External warning 4 (Editable message text) Programmable warning: <i>31.07 External event 4 source</i> <i>31.08 External event 4 type</i>	Fault in external device 4	Check the external device. Check setting of parameter <i>31.07 External event 4 source</i> .
A985	External warning 5 (Editable message text) Programmable warning: <i>31.09 External event 5 source</i> <i>31.10 External event 5 type</i>	Fault in external device 5	Check the external device. Check setting of parameter <i>31.09 External event 5 source</i> .
AF8C	Process PID sleep mode	The drive is entering sleep mode.	Informative warning. See section <i>Sleep function for process PID control</i> (page 32), and parameters <i>40.41...40.48</i> .
AFAA	Autoreset	A fault is about to be autoreset.	Informative warning. See the settings in parameter group <i>31 Fault functions</i> .
AFE1	Emergency stop (off2)	Drive has received an 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)	Drive has received an emergency stop (mode selection off1 or off3) command.	If the emergency stop was unintentional, check the source selected by parameter <i>21.05 Emergency stop source</i> .
AFEA	Enable start signal missing (Editable message text)	No enable start signal received	Some condition prevent the drive from starting.
C6A3	Notice	This notice is shown when changing language. This notice can be observed in SD card log.	This is an information and has no effect of drive operation. Nothing need to do.
C6B3	Notice	This notice is shown when parameter refreshment occurs. This notice can be observed in SD card log.	This is an information and has no effect of drive operation. Nothing need to do.

Code (hex)	Warning	Cause	What to do
E200	Control supply failure	Control supply failure has been detected based on monitoring of the digital signal. Alarm is activated according to selection in <i>81.10 Control supply monitoring</i> .	Check the control supply failure signal. Check setting of the parameter <i>81.10 Control supply monitoring</i> . Note: if the drive is equipped with CPR 1 option (600ms buffer) the parameter <i>81.10 Control supply monitoring</i> should be set to "Alarm low active". With this setting it is still expected to see this warning if the control power supply is switched off by user.
E201	Trafo phase U1 temperature high	The winding temperature of the indicated transformer primary phase is approaching temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for transformer (internally set - contact the ABB support line for more details).
E202	Trafo phase V1 temperature high	The winding temperature of the indicated transformer primary phase is approaching temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for transformer (internally set - contact the ABB support line for more details).
E203	Trafo phase W1 temperature high	The winding temperature of the indicated transformer primary phase is approaching temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). (internally set - contact the ABB support line for more details).
E204	Ambient temperature high	The air inlet temperature of the inverter unit is approaching the maximum converter ambient temperature.	Check and improve the cooling of the electric room where converter is placed.
E205	INU air pressure high	The air pressure drop across the inverter unit is approaching the limit value.	Check PM heatsinks for dust pick up and clean if required. Check pressure drop sensor on control hub and replace control hub if required.
E206	Redundant fan running	Redundant fan group is active.	Redundant fan group is activated in case one of the standard fan group has a failure or there is high temperature or low pressure warning. See <i>83.11 Redundant fan control</i> for more details on redundant fan operation. After fixing the root cause that resulted in redundant cooling fan activation, reset the warning with parameter <i>83.15 Fan alarm reset</i> (reset can be done while the drive is running).

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Code (hex)	Warning	Cause	What to do
E208	AC500 communication alarm	The watchdog supervision of the communication link between BCU and AC500eco has detected a communication failure. Alarm is activated according to selection in parameter <i>50.32 FBA B comm loss func.</i>	<p>It is normal to see this alarm sometimes during charging and discharging of the drive as well as in case another MCB is closed near the drive. These events can introduce the short term disturbance to the communication line that can be ignored.</p> <p>If the alarm is repeatedly shown do the following:</p> <ul style="list-style-type: none"> - Check the connection between BCU and AC500eco PLC. - Check FSCA-01 module. - Check that termination of the Modbus line in the module FSCA-01 is done properly (refer to the FSCA-01 manual). - Reboot the BCU control unit to load the default values for the communication parameters. - Make sure that following parameters are set correctly: <ul style="list-style-type: none"> 54.1 FBA B type = RS-485 comm 54.2 Profile = ABB Enhanced - Refresh the Modbus settings by setting the parameter: <ul style="list-style-type: none"> 54.27 FBA B par refresh = Refresh
E209	MCB not available	MCB available signal is missing.	<ul style="list-style-type: none"> - Check MCB available signal. - Check setting of parameters: <ul style="list-style-type: none"> <i>82.40 MCB available monitoring,</i> <i>82.42 MCB available Grp+Indx,</i> <i>82.43 MCB available BitNum.</i> - Check that the selected input for MCB available signal is not forced (e.g. in parameters <i>87.11 AC500 CPU DI force selection</i> and <i>87.12 AC500 CPU DI force data</i>).
E20A	MCB external protection	MCB external protection active	<ul style="list-style-type: none"> - Check MCB external protection signal. - Check setting of parameters: <ul style="list-style-type: none"> <i>82.50 MCB external protection monitoring,</i> <i>82.52 MCB external protection Grp+Indx,</i> <i>82.53 MCB external protection BitNum.</i> - Check that the selected input for MCB external protection signal is not forced (e.g. in parameters <i>87.11 AC500 CPU DI force selection</i> and <i>87.12 AC500 CPU DI force data</i>).

Code (hex)	Warning	Cause	What to do
E20B	MCB ON inhibited	MCB ON inhibition active.	<ul style="list-style-type: none"> - Check MCB ON inhibition signal. - Check setting of parameters: <i>82.45 MCB ON inhibition monitoring</i>, <i>82.47 MCB ON inhibition Grp+Indx</i>, <i>82.48 MCB ON inhibition BitNum</i>. - Check that the selected input for MCB ON inhibited signal is not forced (e.g. in parameters <i>87.11 AC500 CPU DI force selection</i> and <i>87.12 AC500 CPU DI force data</i>).
E20C	Ambient temperature sensor failure	The air inlet temperature of the inverter unit has exceeded internal warning level.	Check air inlet temperature sensor wiring of the inverter unit.
E20D	TRU air filter dirty	Transformer unit air filter has been detected dirty.	Check air inlet filter pads on the transformer unit cabinet.
E20E	INU cooling fan 1 overload	Temperature relay integrated in INU cooling fan 1 has opened. A redundant fan group is activated.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E20F	INU cooling fan 2 overload	Temperature relay integrated in INU cooling fan 2 has opened. A redundant fan group is activated.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E210	INU cooling fan 3 overload	Temperature relay integrated in INU cooling fan 3 has opened. A redundant fan group is activated.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E211	INU cooling fan 4 overload	Temperature relay integrated in INU cooling fan 4 has opened. A redundant fan group is activated.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E212	INU air pressure low	The air pressure drop across inverter unit is approaching lower limit value.	Check or replace inverter unit air inlet filter pads. Check pressure drop sensor and measuring tube on control hub and replace control hub or tube if required.
E213	INU air pressure sensor failure	The air pressure drop across the inverter unit has exceeded internal fault level.	Check pressure drop sensor and measuring tube on control hub and replace control hub or tube if required.
E214	TRU cooling fan 1 overload	Temperature relay integrated in TRU cooling fan 1 has opened. A redundant fan group is activated.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).

Code (hex)	Warning	Cause	What to do
E215	TRU cooling fan 2 overload	Temperature relay integrated in TRU cooling fan 2 has opened. A redundant fan group is activated.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E216	TRU cooling fan 3 overload	Temperature relay integrated in TRU cooling fan 3 has opened. A redundant fan group is activated.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E217	DC link not discharged	DC link voltage is still high although the MCB open command was given 15 minutes ago.	Check the MCB. It might happen that one or more MCB contacts are stuck in closed position.  WARNING! In this case it cannot be assumed that the converter is disconnecter from the grid! Obey all safety procedures to remove risk of injury or death.
E21B	TRU cooling fan 4 overload	Temperature relay integrated in TRU cooling fan 4 has opened. A redundant fan group is activated.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E21D	Cooling fan test run	Cooling fans are operated in the test mode independent of drive state.	The fan test mode is controlled by parameter <i>83.12 Fan control</i> . As soon as this parameter is set to "Auto run" the test run is ended and the alarm is removed.
E21E	Control backup supply failure	Control backup supply failure has been detected based on monitoring of the digital signal.	Check the control backup supply failure signal. Check setting of the parameter <i>81.11 Control backup supply monitoring</i> .
E229	Inductor temperature high	Inductor temperature is approaching the temperature limit.	Check cooling of the inductor.
E230	Inductor temperature rising high	Inductor temperature rising relative to ambient temperature is approaching the temperature rising limit.	Check cooling of the inductor.
E231	Incorrect operation	Customer gives Sync to mains and Sync to VSD command together.	Correct operation command.
E232	Inductor bypassed	Synchronize command is inhibited by inductor bypassed.	Stop the drive and open the inductor bypass contactor.
E233	Sync to mains not finished	Cannot exit Sync to mains mode if it is not finished when drive is running.	Stop the drive or wait until synchronize to mains is finished then exit Sync to mains mode.
E234	MB not closed	Sync to VSD mode command is inhibited by MB open status.	MB has already opened and motor can be controlled on VSD mode directly.

Code (hex)	Warning	Cause	What to do
E235	Sync to VSD not support	Sync to VSD functionality isn't supported currently.	Contact your local ABB representative and pay attention to ABB latest released version.
E237	Phase angle sync overtime	1 minutes after synchronization is started, RSYC-01 board still doesn't send the sync signal.	Check wiring of the RSYC-01 board meets the specification. Check the RSYC-01 board.
E238	RMS sync overtime	1 minutes after synchronization is started, voltage RMS deviation is still out of the limit.	Check the actual voltage of grid is high or not. Check RMS transducer measurement error.

■ Fault messages

Code (hex)	Fault	Cause	What to do
1010	Power module fault	A general PM fault has tripped the drive. A more detailed fault message with indication of which PM has a fault is followed to this message.	Check the more detailed fault message with the auxiliary code followed to this fault message. The code indicates which PM is affected.
1011	Control hub fault	Control hub detects a power fail or a pressure sensor error. Connection between BCON and control hub is lost.	Check the control power supply. The fault may happen in case control power is lost. Check the FO connection between BCON and control hub. If no problem is identified with the power supply and connection to BCON replace the control hub.
1012	PM states mismatch	Control hub has detected a combination of PMs' states that is not valid.	Check POF wiring to PMs (or replace). Check control hub daughter boards (or replace). Check PM SW version and update if required. Contact the ABB support line.

Code (hex)	Fault	Cause	What to do
2110	Trafo overcurrent	The transformer primary current has exceeded the trip threshold.	<p>Check the event log for an auxiliary code. The code indicates the threshold which has been exceeded:</p> <ul style="list-style-type: none"> 1 - Hardware overcurrent (95% of maximum measurable current) 2 - Transformer overcurrent <p>See the description of parameter 34.03 Grid overcurrent trip level for more details on the calculation of the trip threshold.</p> <ul style="list-style-type: none"> - Check the setting in 34.03 Grid overcurrent trip level. - Check the transformer rated current shown in parameter 30.41 Rated input current. If it does not match the drive ratings, check that the correct license code has been entered in parameters 96.71 - 96.74). - Check the primary cabling. - Check the transformer. <p>Note: If the Trafo overcurrent happens during charging on a de-rated R4 drive then the 34.03 Grid overcurrent trip level can be increased above the default value. Contact the ABB support line for the exact settings. This is only valid for de-rated R4 drives!</p>
2113	Trafo no-load overcurrent	Transformer primary current has exceeded the fault limit (parameter 34.05 Trafo over curr no load trip level) while converter is not modulating and the inrush current has declined after MCB has been closed (the fault is blanked for 300 ms after the MCB has been open).	<p>Check the settings of the parameter 34.05 Trafo over curr no load trip level. Check the transformer rated current shown in parameter 30.41 Rated input current. If it does not match the drive ratings, check that the correct license code has been entered in parameters 96.71 - 96.74).</p> <ul style="list-style-type: none"> - If parameters are set correctly, it means that there is a short circuit on the secondary side of the transformer => check transformer secondaries, wiring and PMs input main power circuit. - If no HW problem on the transformer secondaries and no faulty PMs can be identified it might mean that the fault has activated because the transformer inrush current has not yet declined during the blanking time. In this case fine tuning of the inrush current blanking time is needed. Inrush current blanking time is internally set to 300ms and cannot be changed by Service engineer. In this case contact the ABB support line for more details.

Code (hex)	Fault	Cause	What to do
2116	Trafo current sense fault phase U1	Transformer primary current in phase U1 has exceeded the fault limit (parameter 34.07 Trafo current sensor offset) with open MCB. This occurrence indicates a potential problem with transformer current measurement chain.	Check the setting in parameter 34.07 Trafo current sensor offset . For R1 and R2 drives the settings of parameter 34.07 needs to be changed as follows: <ul style="list-style-type: none"> • R1: 0.2 • R2: 0.1 - Check transformer current sensor. - Check the CVM12 measurement board. For software versions 2.1.0.2 and older, check whether MCB has been unintentionally closed or not. If no problem with the measurement chain can be detected and the fault still cannot be reset do the following: <ul style="list-style-type: none"> - increase the value of parameter 34.07 to make the fault reset possible. - after the fault reset, restore the parameter 34.07 to its default value. If the problem persists contact the ABB support line.
2117	Trafo current sense fault phase V1	Transformer primary current in phase V1 has exceeded the fault limit (parameter 34.07 Trafo current sensor offset) with open MCB.	See the instructions in fault 2116 .
211B	Grid current asymmetry	The difference between measured transformer primary currents has exceeded the fault limit (parameter 34.12 Grid current asymmetry trip level) for longer than 30s.	Check for grid voltage asymmetry. Check the fault limit settings in parameter 34.12 Grid current asymmetry trip level . For software versions 2.00.0.3 and older, check parameter 34.12 Grid current asymmetry trip level and set it to 0.2 p.u. for SYS0. For SY1 & SYS2 parameter 34.12 shall remain set at 0.1 p.u.
2281	Calibration	Measured offset of output phase current measurement or difference between output phase U2 and W2 current measurement is too big (the values are updated during current calibration).	Reboot the BCU control unit. If the problem persists try performing the current calibration again (contact the ABB support line for the procedure description).
2310	Overcurrent	Output current has exceeded internal fault limit.	Check motor load. Check acceleration times in parameter group 23 Speed reference ramp for rpm operation mode or in group 28 Frequency reference chain for Hz operation mode. Check motor and motor cable (including phasing and delta/star connection). Check that the start-up data in parameter group 99 Motor data corresponds to the motor rating plate. Check that there are no power factor correction capacitors or surge absorbers in motor cable.

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Code (hex)	Fault	Cause	What to do
2330	Earth leakage	Drive has detected load unbalance typically due to earth fault in motor or motor cable.	Check that there are no power factor correction capacitors or surge absorbers in motor cable. Check for an earth fault in motor or motor cables by measuring the insulation resistances of motor and motor cable. If no earth fault can be detected, contact the ABB support line.
2340	Short circuit	Short-circuit in motor cable(s) or motor.	Check motor and motor cable. Check that there are no power factor correction capacitors or surge absorbers in motor cable.

Code (hex)	Fault	Cause	What to do
2350	Motor overcurrent phase U2	The instantaneous motor current in phase U2 has exceeded the trip threshold.	<p>Check the event log for an auxiliary code. The code indicates the threshold which has been exceeded:</p> <ol style="list-style-type: none"> 1 - Inverter overcurrent 2 - Hardware overcurrent (95% of maximum measurable current) 3 - Motor overcurrent <p>See the description of parameter 34.17 Motor overcurrent trip level for more details on the calculation of the trip threshold.</p> <ul style="list-style-type: none"> - Check the setting in 34.17 Motor overcurrent trip level. - Check the converter rated current shown in parameter 30.40 Rated output current. If it does not match the drive ratings, check that the correct license code has been entered in parameters 96.71 - 96.74). - Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. - Check the settings of the parameter 30.17 Maximum current and the parameters controlling the motor overloadability (par. 34.49 - 34.52). Those parameters, together with 30.40 Rated output current, determine the drive continuous operation limits and should be set lower than the motor overcurrent threshold. - Check that the ramp up time set in group 23 (rpm mode) or in group 28 (Hz mode) is big enough for the process at hand. If the problem persists, try increasing the ramp up time. - Check for motor cable phase to phase short circuit. - Check for motor winding phase to phase short circuit. - Check for proper delta/star connection of the motor. - Check that there are no power factor correction capacitors or surge absorbers in motor cable. - Check that "Automatic" is selected in parameter 21.19 Scalar start mode if a start into rotating motor is attempted. - Check that restart after a fault is not requested too soon - while motor is still magnetized. At least 5-10 seconds should be allowed before a new start attempt. - Check if P30.11 minimum speed is set to a positive value. If yes, set 30.11 to 0 or a negative value instead and use critical speed function.

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Code (hex)	Fault	Cause	What to do
2351	Motor overcurrent phase V2	The instantaneous motor current in phase V2 has exceeded the trip threshold.	See the instructions in fault 2350 .
2352	Motor overcurrent phase W2	The instantaneous motor current in phase W2 has exceeded the trip threshold.	See the instructions in fault 2350 .
2353	Motor current sense fault phase U2	<p>Measured motor phase current in phase U2 is exceeding the fault limit (parameter 34.24 Mot current sensor offset) even though the modulation has been stopped for longer than blanking time (parameter 34.23 Motor curr sense fault ena delay).</p> <p>This occurrence indicates a potential problem with motor current measurement chain.</p>	<p>Check the settings in parameters 34.23 Motor curr sense fault ena delay and 34.24 Mot current sensor offset.</p> <ul style="list-style-type: none"> - Check the setting in 34.17 Motor overcurrent trip level. - Check the converter rated current shown in parameter 30.40 Rated output current. If it does not match the drive ratings, check that the correct license code has been entered in parameters 96.71 - 96.74). - Check that the motor parameters in group 99 <i>Motor data</i> correspond to the motor rating plate. - Check the motor current sensor. - Check the Check CVM12 measurement board. <p>If no problems with the measurement chain can be detected, increase the value of parameter 34.24 to make the fault reset possible. After the fault reset, restore the parameter 34.24 to its default value. If the problem persists contact the ABB support line.</p>
2354	Motor current sense fault phase V2	Measured motor phase current in phase V2 is exceeding the fault limit (parameter 34.24 Mot current sensor offset) even though the modulation has been stopped for longer than blanking time (parameter 34.23 Motor curr sense fault ena delay).	See the instructions in fault 2353 .
2355	Motor phase U2 lost	The converter is operated at greater than 5% rated speed and motor current in phase U2 is smaller than the fault limit (parameter 34.26 Motor phase loss trip level).	<p>Check the settings in parameter 34.26 Motor phase loss trip level.</p> <ul style="list-style-type: none"> - Check motor terminals and cabling for weak contact or open circuit.
2356	Motor phase V2 lost	The converter is operated at greater than 5% rated speed and motor current in phase V2 is smaller than the fault limit (parameter 34.26 Motor phase loss trip level).	See the instructions in fault 2355 .

Code (hex)	Fault	Cause	What to do
2357	Motor phase W2 lost	The converter is operated at greater than 5% rated speed and motor current in phase W2 is smaller than the fault limit (parameter 34.26 Motor phase loss trip level).	See the instructions in fault 2355 .
2358	Motor overload trip	Motor average current exceeds the fault limit (parameter 34.29 Motor overload trip level).	Check that the motor parameters in group 99 Motor data correspond to the motor rating plate. - Check for proper delta/star connection of the motor. - Check the settings of the fault threshold (Par. 34.29) and of the motor overloadability (Par. 34.49 - 34.52).
3230	PM DC link overvoltage	The measured DC link voltage of a PM exceeds the maximum level (preset to 1250 V).	Check the event log for an auxiliary code. The code indicates which PM is affected. - Check the converter primary voltage. - Check the deceleration times in parameter group 23 Speed reference ramp for rpm operation mode or in group 28 Frequency reference chain for Hz operation mode. If needed, increase the deceleration times. - Use coast-to-stop function (if applicable). - Use S curves to achieve smooth motor speed response without overshoot. - Reduce transformer primary tapping one step (if available). - Reduce the overvoltage limit for control (parameter 30.54 Overvoltage Limit). - Replace the PM (if always the same PM gives the fault).
3231	PM DC link undervoltage	The measured DC link voltage of a PM is smaller than the minimum level (preset to 400 V).	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules . - Replace the faulty PM.
3233	PM +5V power supply fault	The +5V power supply of a PM has failed.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
3234	PM +5V power supply regulation fault	The measured +5V power supply voltage of a PM is out of tolerance.	Check the event log for an auxiliary code. The code indicates which PM is affected. Replace the faulty PM.
3236	PM DC link capacitors not balanced	The series connected capacitors in the DC link of a PM are heavily unbalanced.	- Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules . - Replace the faulty PM.

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Code (hex)	Fault	Cause	What to do
3237	PM input voltage deviation	The input voltage measurement of a PM has a large deviation compared to the average input voltages of all PMs.	<p>Check the event log for an auxiliary code. The code indicates which PM is affected.</p> <p>Note: This fault is sometimes reported on more power modules, even though the actual problem is really present on only one. Most often the first power module reported in the event logger (the one tripping the converter) is the actually the affected one. However, it might happen that more power modules are actually having a failure (e.g. short circuit) or that the power module that tripped the converter is not the one with the real failure. To exclude any risk, all reported modules and corresponding secondary windings of the transformer should be analyzed according to the below listed steps:</p> <ul style="list-style-type: none"> - Check PM input fuses. - Examine the affected power module according to description given in chapter Inspecting Power Modules. - Replace the faulty PM. - Check transformer secondary voltage - the fault might indicate short circuit on transformer secondary side.
3238	PM input overvoltage	The measured input voltage of a PM has exceeded the fault threshold.	<p>This protection function is obsolete. Upgrade to newest SW version.</p> <p>If the fault still appears with the newest version of BCON SW it means that there is incompatibility between new BCON SW and old DSP SW on power modules. In this case DSP SW needs to be loaded manually to each of the power modules according to instructions given in section Loading the DSP software manually to power modules on page 23).</p>
3239	PM diode open circuit	PM rectifier's diode open circuit is detected.	<ul style="list-style-type: none"> - Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules. - Replace the faulty PM. <p>For software versions 2.00.0.3 and older, check parameter 95.82 PM diode open circuit threshold and change from -50v to -200v. Additionally also change parameter 95.83 PM diode open circuit qualifier from 1ms to 4ms.</p>

Code (hex)	Fault	Cause	What to do
3280	Standby timeout	Drive start is requested but the DC link voltage is too low.	<ul style="list-style-type: none"> - Check that the drive start signal (defined in Group 20) is not active before the drive is charged. If parameters <i>20.02 Ext1 start trigger type</i> and/or <i>20.07 Ext2 start trigger type</i> are set to "Level" this fault might activate immediately after closing the MCB. Use "Edge" trigger type instead. - If the drive is controlled over fieldbus check the corresponding settings for fieldbus control.
3330	Motor voltage sense fault phase U2	<p>The measured motor phase to ground voltage exceeds the fault level (parameter <i>34.34 Motor volt sense fault trip level</i>).</p> <p>This occurrence indicates a potential problem with motor voltage measurement chain.</p>	<ul style="list-style-type: none"> - Check the settings of parameter <i>34.34 Motor volt sense fault trip level</i>. - Check voltage divider resistance value. - Check CVMI2 board and wiring to it.
3331	Motor voltage sense fault phase V2	See the description of fault <i>3330</i> .	See the instructions in fault <i>3330</i> .
3332	Motor voltage sense fault phase W2	See the description of fault <i>3330</i> .	See the instructions in fault <i>3330</i> .
3333	Ground fault	The amplitude of the fundamental component in the motor common mode voltage exceeds the fault level (parameter <i>34.36 Ground fault trip level</i>).	<ul style="list-style-type: none"> - Check for drive internal ground faults (secondary cabling, PMs, transformer, terminal unit). - Check for drive external ground faults (motor cable, motor windings). - Check the HVD board.
3381	Output phase loss	Motor circuit fault due to missing motor connection (all three phases are not connected).	Connect motor cable.
4110	Control board temperature	Control unit temperature (Par. 5.10) exceeds internal fault level (Par. 5.49).	Check for proper cooling of the control unit cabinet.
4220	PM heatsink overtemperature	Measured IGBT heatsink temperature of a PM has exceeded the maximum level.	<ul style="list-style-type: none"> Check the event log for an auxiliary code. The code indicates which PM is affected. - Check the heatsink fins for dust pick-up. - Check PM to air channel gasket. - Check the door air inlet filter pads.
4221	PM HCB overtemperature	Measured charging relay temperature on Heavy Copper Board (HCB) of a PM has exceeded the maximum level.	<ul style="list-style-type: none"> Check the event log for an auxiliary code. The code indicates which PM is affected. - Check the heatsink fins for dust pick-up. - Check PM to air channel gasket. - Check the door air inlet filter pads.
4981	External temperature 1 (Editable message text)	Measured temperature 1 has exceeded fault limit.	<ul style="list-style-type: none"> Check the value of parameter <i>35.02 Measured temperature 1</i>. Check the cooling of the motor (or other equipment whose temperature is being measured). Check the value of parameter <i>35.12 Temperature 1 fault limit</i>.

Code (hex)	Fault	Cause	What to do
4982	External temperature 2 (Editable message text)	Measured temperature 2 has exceeded fault limit.	Check the value of parameter 35.03 <i>Measured temperature 2</i> . Check the cooling of the motor (or other equipment whose temperature is being measured). Check the value of parameter 35.22 <i>Temperature 2 fault limit</i> .
5001	Control board power fail	The power supply voltage of the BCON control board was below the internal fault limit.	This fault is shown in the event logger whenever the control power of the BCON is switched off. This can be in a normal situation, when the BCON is powered off intentionally, but also in the case of an auxiliary (control) power loss. If the BCON was not powered off intentionally, check the auxiliary (control) power supply. Note: Control board power fail event can be seen in the event logger but is not copied to the SD card.
5010	PM HB1 short circuit turn off	The desaturation detection of the IGBTs in HB1 (half bridge 1) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules . - Replace the faulty PM.
5011	PM HB2 short circuit turn off	The desaturation detection of the IGBTs in HB2 (half bridge 2) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules . - Replace the faulty PM.
5012	PM HB1 or HB2 short circuit turn off	The desaturation detection of the IGBTs in HB1 (half bridge 1) or HB2 (half bridge 2) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules . - Replace the faulty PM.
5013	PM charging relay not closed	The voltage across the charging relay contact of a PM is larger than it would be expected if the contact was closed.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter Inspecting Power Modules . - Replace the faulty PM.

Code (hex)	Fault	Cause	What to do
5014	PM rating incompatibility	One or more power modules have different rating than specified for the converter. The expected rating of PMs is defined by the drive license key and can be seen in Par. 7.19. The converter can only operate if all power modules have the correct rating.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Replace the PM(s) that have wrong rating. - Check that the expected power module rating (Par. 7.19) corresponds to the converter type code. If the rating specified in Par. 7.19 is not as expected from the type code, check that the correct license key has been entered (in Par. 96.71 - 96.74.) and that license key has been refreshed (Par. 96.75).
5015	PM DC voltage sense fault	The DC link voltage measurement of a PM is out of range during self test.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter <i>Inspecting Power Modules</i> . - Replace the faulty PM.
5016	PM heatsink temperature sense fault	The heatsink temperature measurement of a PM is out of range during self test.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Replace the faulty PM.
5017	PM HB1 and HB2 short circuit turn off	The desaturation detection of the IGBTs in HB1 (half bridge 1) and HB2 (half bridge 2) of a PM has detected a short circuit.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Examine the affected power module according to description given in chapter <i>Inspecting Power Modules</i> . - Replace the faulty PM.
5094	Measurement circuit temperature	Problem with internal temperature measurement of the drive.	Contact the ABB support line.
50A1	Emergency OFF button pressed	Emergency OFF button on the cabinet door has been pressed.	Check that it is safe to release the emergency OFF button on the front door and if it is, release the emergency OFF button. If the emergency OFF button is released but the fault is still active, check the wiring of the signals from the emergency OFF button.
5691	Measurement circuit ADC	Measurement circuit fault.	Contact the ABB support line.
5693	Measurement circuit DFF	Measurement circuit fault.	Contact the ABB support line.
6000	Internal SW error	Internal software error	Contact the ABB support line. Quote the auxiliary code (check the event details in the event log).
607A	Trial mode expired	The entered license key of the drive is not valid and the trial mode time has expired.	Contact ABB support line to get a valid license key. Enter a valid license key in parameters 96.71 License key part 1, 96.72 License key part 2, 96.73 License key part 3, 96.74 License key part 4 and then set the parameter 96.75 License key refresh to "Refresh".

Code (hex)	Fault	Cause	What to do
607C	License key missing	License key for the drive has not been entered.	Contact the ABB support line to get a valid license key. Enter a valid license key in parameters <i>96.71 License key part 1</i> , <i>96.72 License key part 2</i> , <i>96.73 License key part 3</i> , <i>96.74 License key part 4</i> and then set the parameter <i>96.75 License key refresh</i> to "Refresh".
607D	Control hub version incompatibility	Incompatible version of the control hub firmware has been detected.	Check the actual control hub firmware version in parameter <i>07.16 Control hub FW version</i> . If this version is older (smaller) than the version defined in parameter <i>07.18 Control hub FW version required</i> , this fault is active. - Upgrade the control hub firmware to the version required by BCON SW (shown in Par 07.18). For the control hub FW upgrade procedure refer to chapter Loading of the Control Software .
607E	PM Software update in progress	An incorrect software version on the power modules was identified and a software update is in progress. This fault is active due to safety reasons to keep the MCB open until valid SW is downloaded to all Power modules. SW download to Power modules lasts 4 minutes.	The fault cannot be reset until the SW download is finished. When the SW download is finished a fault <i>607F PM Software update done</i> will be shown. - Wait for the fault <i>607F PM Software update done</i> to show up. Then it is possible to reset the fault and to re-charge the drive. - If the SW download keeps happening after charging of the drive it might indicate that communication between PMs and control hub is disturbed so control hub receives wrong information about PMs SW version or that some of the PMs don't have any SW programmed. In this case: - Check the POF links between PMs and control hub. - Check if any SW is installed on all PMs (by connecting directly to PMs) and download SW manually if it is missing.
607F	PM Software update done	An incorrect software version on the power modules was identified and a software update was done.	Reset the fault.
6110	PM configuration fail	An undefined fault code from a PM has been received.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Check PM SW version and update if required. - Replace the PM (if always the same PM gives the fault).

Code (hex)	Fault	Cause	What to do
6111	PM undefined fault	An undefined fault code from a PM has been received.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Check PM SW version and update if required. - Replace the PM (if always the same PM gives the fault).
6112	PM undefined state	Control hub has detected an undefined PM state.	Note: It is normal for this fault to appear after drive discharge. If the fault reappears after reset: - Check PM SW version and update if required. - Check the communication between the control hub and PMs by performing tests described in chapter <i>POF Link Test</i> . Refer to the actions described there in case communication problems are discovered.
6120	CVMI2 configuration fault	During initialization of the CVMI2 measurement board a fault was detected.	- Replace the CVMI2 board.
6182	Unrecoverable SW Error	An unrecoverable error has occurred.	Check the event log for the fault code and auxiliary code and report those to the ABB support line. Cycle the control power to reboot control boards.
6306	FBA A mapping file	Fieldbus adapter A mapping file read error.	Contact the ABB support line.
6307	FBA B mapping file	Fieldbus adapter B mapping file read error.	Contact the ABB support line.
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 the ABB support line.
6487	Stack overflow	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 the ABB support line.
64A1	Internal file load	File read 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 the ABB support line.
64A2	Internal record load	Internal record load error	Contact the ABB support line.
64A3	Application loading	Application file incompatible or corrupted	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 the ABB support line.

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Code (hex)	Fault	Cause	What to do
64B0	Memory unit detached	The memory unit (ZMU-02) was detached when the control unit was powered.	Switch off the power to the control unit and reinstall the memory unit. In case the memory unit was not actually removed when the fault occurred, check that the memory unit is properly inserted into its connector and its mounting screw is tight. Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power. If the problem persists, contact the ABB support line.
64B1	Internal SSW fault	Internal fault	Reboot the control unit (using parameter 96.08 Control board boot) or by cycling power. If the problem persists contact the ABB support line.
64B2	User set fault	Loading of user parameter set failed because <ul style="list-style-type: none"> • requested set does not exist • set is not compatible with control program • drive was switched off during loading. 	Make sure that a valid user parameter set exists. Reload if uncertain.
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 the ABB support line.
6581	Parameter system	Parameter load or save failed	Try forcing a save using parameter 96.07 <i>Parameter save manually</i> . Retry.
6591	Backup/Restore Timeout	Backup or restore action takes too long.	Check panel / PC-tool connection to BCU. Abort current backup / restore and retry.
65A1	FBA A parameter conflict	The drive does not have a functionality requested by PLC (overriding system), or requested functionality has not been activated.	Check PLC (overriding system) programming. Check settings of parameter groups 50 <i>Fieldbus adapter (FBA)</i> and 51 <i>FBA A settings</i> .
65A2	FBA B parameter conflict	The drive does not have a functionality requested by PLC AC500, or requested functionality has not been activated.	- Reboot the BCU control unit to load the default values for the communication parameters. - Make sure that following parameters are set correctly: 54.1 FBA B type = RS-485 comm 54.2 Profile = ABB Enhanced - Refresh the Modbus settings by setting the parameter: 54.27 FBA B par refresh = Refresh
6881	Text data overflow	Internal fault	Reset the fault. If the fault persists contact the ABB support line.
6882	Text 32-bit table overflow	Internal fault	Reset the fault. If the fault persists contact the ABB support line.

Code (hex)	Fault	Cause	What to do
6883	Text 64-bit table overflow	Internal fault	Reset the fault. If the fault persists contact the ABB support line.
6885	Text file overflow	Internal fault	Reset the fault. If the fault persists contact the ABB support line.
7080	Encoder option module comm loss	The fault is related to encoder feedback that is not supported in ACS580MV.	Restore all parameters in groups 90, 92 and 93 to their default values. Reset the fault. If not possible to reset, reboot the control unit (using parameter 96.08 Control board boot) or by cycling power.
7081	Panel loss Programmable fault: 49.05 Communication loss action	Control panel or PC tool selected as active control location for drive has ceased communicating.	Check the PC tool or control panel connection. Check control panel connector. Check BCON X13 connector pins. Upgrade the control panel to the latest firmware version (stated in the release notes for ACS580MV SW). Refer to the section Loading the ACS-AP-S assistant panel firmware for instructions on control panel firmware upgrade. Disconnect and reconnect the control panel. If the problem persist, replace control panel in mounting platform. For software versions 2.00.0.3 and older please check SD card for damage if panel loss is detected. If SD card is damaged, return it back to factory for analysis (without formatting). Caution! In case of software version 1.41.0.2 or older, change parameter 49.05 to <i>No action</i> to avoid nuisance alarms.
7082	Ext I/O comm loss	The I/O extension module types specified by parameters do not match the detected configuration.	Check the event log for an auxiliary code (format XXYY YYYY). "XX" specifies the number of the I/O extension module (01 : parameter group 14 <i>I/O extension module 1</i> , 02 : 15 <i>I/O extension module 2</i> , 03 : 16 <i>I/O extension module 3</i>). "YY YYYY" indicates the problem (see actions for each code below).
	00 0001	Communication with module failed.	Check that the module is properly seated in its slot. Check that the module and the slot connector is not damaged. Try installing the module into another slot.

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Code (hex)	Fault	Cause	What to do
	00 0002	Module not found.	Check the type and location settings of the modules (parameters <i>14.01/14.02</i> , <i>15.01/15.02</i> or <i>16.01/16.02</i>). Check that the module is properly seated in its slot. Check that the module and the slot connector is not damaged. Try installing the module into another slot.
	00 0003	Configuration of module failed.	
	00 0004	Configuration of module failed.	
7121	Motor stall Programmable fault: <i>31.24 Stall function</i>	Motor is operating in stall region because of e.g. excessive load or insufficient motor power.	Make sure that the motor is not mechanically blocked from rotating. Check motor load and drive ratings. Check fault function parameters <i>31.24...31.28</i> (see the description of those parameters in <i>ACS580MV primary control program firmware manual</i> for more details).
71B1	Motor fan Programmable fault: <i>35.106 DOL starter event type</i>	No feedback received from external fan.	Check external fan (or other equipment controlled) by the logic. Check settings of parameters <i>35.100...35.106</i> (see the description of those parameters in Firmware manual for more details).
7310	Overspeed	Motor is turning faster than highest allowed speed due to incorrectly set minimum/maximum speed, insufficient braking torque or changes in load when using torque reference.	Check minimum/maximum speed settings, parameters <i>30.11 Minimum speed</i> and <i>30.12 Maximum speed</i> for rpm operation mode or <i>30.13 Minimum frequency</i> and <i>30.14 Maximum frequency</i> for Hz operation mode. Check the adequacy of motor braking torque for the applied load.
73B0	Emergency ramp failed	Emergency stop did not finish within expected time.	Check the settings of parameters <i>31.32 Emergency ramp supervision</i> and <i>31.33 Emergency ramp supervision delay</i> . Check the predefined ramp times (<i>23.11...23.19</i> for mode Off1, <i>23.23</i> for mode Off3).
73F0	Overfrequency	Motor is turning faster than highest allowed speed due to incorrectly set minimum/maximum frequency, insufficient braking torque or changes in load when using torque reference.	Check minimum/maximum frequency setting in parameters <i>30.13 Minimum frequency</i> and <i>30.14 Maximum frequency</i> . Check the adequacy of motor braking torque for the applied load.

Code (hex)	Fault	Cause	What to do
7510	FBA A communication Programmable fault: 50.02 <i>FBA A comm loss func</i>	Cyclical communication between drive and fieldbus adapter module A or between PLC (overriding system) and fieldbus adapter module A is lost.	Check status of fieldbus communication. See user documentation of fieldbus interface. Check settings of parameter groups 50 <i>Fieldbus adapter (FBA)</i> , 51 <i>FBA A settings</i> , 52 <i>FBA A data in</i> and 53 <i>FBA A data out</i> . Check cable connections. Check if communication master is able to communicate.
7520	FBA B communication Programmable fault: 50.32 <i>FBA B comm loss func</i>	Cyclical communication between drive and fieldbus adapter module B or between AC500 PLC and fieldbus adapter module B is lost.	- Check settings of parameter groups 50 <i>Fieldbus adapter (FBA)</i> , 54 <i>FBA B settings</i> , 55 <i>FBA B data in</i> and 56 <i>FBA B data out</i> . - Reboot the BCU control unit to load the default values for the communication parameters.
7530	PM RX link overrun	PM internal error.	Contact the ABB support line.
7531	PM RX link break	PM internal error.	Contact the ABB support line.
7532	PM RX link parity error	PM internal error.	Contact the ABB support line.
7533	PM RX link address error	PM internal error.	Contact the ABB support line.
7534	PM Rx link fault	A communication fault on the Rx communication channel of a PM has been detected. This fault typically indicates error in communication from control hub to PMs.	Check the event log for an auxiliary code. The code indicates which PM is affected. - Check the communication between the control hub and PMs by performing tests described in chapter POF Link Test . Refer to the actions described there in case communication problems are discovered.
7535	PM RX link CRC error	PM internal error.	Contact the ABB support line.
7536	PM RX link stop error	PM internal error.	Contact the ABB support line.
7537	Hub communication lost	Control hub has detected an Rx error from BCON control unit.	Check POF links between control hub and the BCON control unit.
7538	Control hub missing PM	A PM in the converter does not send data to the control hub. This fault can be caused by a faulty Tx channel of a PM and/or by a bad fiber optic connection from the PM to the control hub.	Check the event log for an auxiliary code. The code indicates which PM is affected. For affected PM position, please refer to electric diagram or labels in drive cabinet. - Inspect corresponding power module (PEBBs). - Check the communication between the control hub and PMs by performing tests described in chapter POF Link Test . Refer to the actions described there in case communication problems are discovered.

64 Fault Tracing

Code (hex)	Fault	Cause	What to do
7539	Hub RX comm err	A communication error was detected in the control hub on the receiver from one power module (PM). This can be caused by a malfunction on the PM or by a bad fiber optic connection from the PM to the control hub.	Check the event log for an auxiliary code. The code indicates which PM is affected. For affected PM position, please refer to electric diagram or labels in drive cabinet. - Check the communication between the control hub and PMs by performing tests described in chapter <i>POF Link Test</i> . Refer to the actions described there in case communication problems are discovered.
7540	CVMI2 communication lost	There is no communication to the CVMI2 board.	Check communication wiring from BCU to CVMI2 board. Check power supply wiring of CVMI2 board. Replace the CVMI2 board.
80A0	AI supervision Programmable fault: <i>12.03 AI supervision function</i>	An analog signal is outside the limits specified for the analog input.	Check signal level at the analog input. Check the wiring connected to the input. Check the minimum and maximum limits of the input in parameter group <i>12 Standard AI</i> .
80B0	Signal supervision (Editable message text) Programmable fault: <i>32.06 Supervision 1 action</i>	Fault generated by the signal supervision 1 function.	Check the source of the fault (parameter <i>32.07 Supervision 1 signal</i>).
80B1	Signal supervision 2 (Editable message text) Programmable fault: <i>32.16 Supervision 2 action</i>	Fault generated by the signal supervision 2 function.	Check the source of the fault (parameter <i>32.17 Supervision 2 signal</i>).
80B2	Signal supervision 3 (Editable message text) Programmable fault: <i>32.26 Supervision 3 action</i>	Fault generated by the signal supervision 3 function.	Check the source of the fault (parameter <i>32.27 Supervision 3 signal</i>).
9081	External fault 1 (Editable message text) Programmable fault: <i>31.01 External event 1 source</i> <i>31.02 External event 1 type</i>	Fault in external device 1. Conditions to activate External fault 1 (set in <i>31.01 External event 1 source</i>) have been met.	Check the external device. Check setting of parameter <i>31.01 External event 1 source</i> .
9082	External fault 2 (Editable message text) Programmable fault: <i>31.03 External event 2 source</i> <i>31.04 External event 2 type</i>	Fault in external device 2. Conditions to activate External fault 2 (set in <i>31.03 External event 2 source</i>) have been met.	Check the external device. Check setting of parameter <i>31.03 External event 2 source</i> .
9083	External fault 3 (Editable message text) Programmable fault: <i>31.05 External event 3 source</i> <i>31.06 External event 3 type</i>	Fault in external device 3. Conditions to activate External fault 3 (set in <i>31.05 External event 3 source</i>) have been met.	Check the external device. Check setting of parameter <i>31.05 External event 3 source</i> .
9084	External fault 4 (Editable message text) Programmable fault: <i>31.07 External event 4 source</i> <i>31.08 External event 4 type</i>	Fault in external device 4. Conditions to activate External fault 4 (set in <i>31.07 External event 4 source</i>) have been met.	Check the external device. Check setting of parameter <i>31.07 External event 4 source</i> .

Code (hex)	Fault	Cause	What to do
9085	External fault 5 (Editable message text) Programmable fault: 31.09 External event 5 source 31.10 External event 5 type	Fault in external device 5. Conditions to activate External fault 5 (set in 31.09 <i>External event 5 source</i>) have been met.	Check the external device. Check setting of parameter 31.09 <i>External event 5 source</i> .
E100	Trafo phase U1 overtemperature	The winding temperature of the indicated transformer primary phase has exceeded the temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for the transformer (contact your local ABB representative).
E101	Trafo phase V1 overtemperature	The winding temperature of the indicated transformer primary phase has exceeded the temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for the transformer (contact your local ABB representative).
E102	Trafo phase W1 overtemperature	The winding temperature of the indicated transformer primary phase has exceeded the temperature limit.	Check cooling of the transformer (door air inlet filter pads, fan operation). Check overload settings for the transformer (contact your local ABB representative).
E103	Ambient overtemperature	The air inlet temperature of the inverter unit has exceeded the maximum converter ambient temperature.	Check and improve the cooling of the electric room where converter is placed.
E105	AC500 communication error	AC500 has detected a communication errors between BCU and AC500 communication link.	Check the connection between BCU and AC500eco PLC. Check FSCA-01 module. Check that termination of the Modbus line in the module FSCA-01 is done properly (refer to the FSCA-01 manual).

Code (hex)	Fault	Cause	What to do
E108	AC500 communication fault	The watchdog supervision of the communication link between BCU and AC500 has detected a communication failure.	<ul style="list-style-type: none"> - Check the connection between BCU and AC500eco PLC. - Check FSCA-01 module. - Check that termination of the Modbus line in the module FSCA-01 is done properly (refer to the FSCA-01 manual). - Reboot the BCU control unit to load the default values for the communication parameters. - Make sure that following parameters are set correctly: <ul style="list-style-type: none"> 54.1 FBA B type = RS-485 comm 54.2 Profile = ABB Enhanced - Refresh the Modbus settings by setting the parameter: <ul style="list-style-type: none"> 54.27 FBA B par refresh = Refresh - Check that up to maximum of two fieldbus extension modules are used on the BCU. <p>If the fault happens always after the control power cycle, check the AC500eco PLC firmware (refer to the section Loading IO controller (AC500eco) firmware on page 20) and update if it is outdated.</p>
E109	MCB not available	MCB available signal is missing.	<ul style="list-style-type: none"> - Check MCB available signal. - Check setting of parameters: <ul style="list-style-type: none"> <i>82.40 MCB available monitoring,</i> <i>82.42 MCB available Grp+Indx,</i> <i>82.43 MCB available BitNum.</i> - Check that the selected input for MCB available signal is not forced (e.g. in parameters 87.11 AC500 CPU DI force selection and 87.12 AC500 CPU DI force data).
E10A	MCB external protection	MCB external protection is active.	<ul style="list-style-type: none"> - Check MCB external protection signal. - Check setting of parameters: <ul style="list-style-type: none"> <i>82.50 MCB external protection monitoring,</i> <i>82.52 MCB external protection Grp+Indx,</i> <i>82.53 MCB external protection BitNum.</i> - Check that the selected input for MCB external protection signal is not forced (e.g. in parameters 87.11 AC500 CPU DI force selection and 87.12 AC500 CPU DI force data).

Code (hex)	Fault	Cause	What to do
E10B	MCB ON inhibited	MCB ON inhibition is active.	<ul style="list-style-type: none"> - Check MCB ON inhibition signal. - Check setting of parameters: 82.45 MCB ON inhibition monitoring, 82.47 MCB ON inhibition Grp+Indx, 82.48 MCB ON inhibition BitNum. - Check that the selected input for MCB ON inhibition signal is not forced (e.g. in parameters 87.11 AC500 CPU DI force selection and 87.12 AC500 CPU DI force data).
E10C	TRU cooling fan 1 overload	Temperature relay integrated in TRU cooling fan 1 has opened.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E10D	TRU cooling fan 2 overload	Temperature relay integrated in TRU cooling fan 2 has opened.	Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E10E	TRU cooling fan 3 overload	Temperature relay integrated in TRU cooling fan 3 has opened.	Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E10F	Control supply failure	Control supply failure has been detected based on monitoring of the digital signal.	<p>Check the control supply failure signal. Check setting of the parameter 81.10 Control supply monitoring.</p> <p>Note: if the drive is equipped with CPR 1 option (600ms buffer) the parameter 81.10 Control supply monitoring should be set to "Alarm low active". If it is set to "Fault low active" this fault will activate every time the control power supply is switched off by user.</p>
E110	DC link charging timeout	DC link voltage has not reached the expected value after MCB has been closed.	<ul style="list-style-type: none"> - Check fuses on all PMs. - Check transformer connection to the grid. - Check PM SW version and update if required.
E111	TRU cooling fan 4 overload	Temperature relay integrated in TRU cooling fan 4 has opened.	Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).
E113	INU cooling fan 1 overload	Temperature relay integrated in INU cooling fan 1 has opened.	Check wiring of fan 1 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).

Code (hex)	Fault	Cause	What to do
E114	MCB control fault	MCB close command and MCB close feedback do not match.	<p>Check if the MCB has tripped on its own, by means of short circuit protection relay or overload protection relay. In case of some serious faults, like e.g. transformer primary winding short circuit, the MCB protection will react faster than the protection of the drive. In this case the MCB control fault will be active.</p> <ul style="list-style-type: none"> - Check the transformer for any damage. - If there was no damage (MCB opened by mistake) do the following: <ul style="list-style-type: none"> - Check MCB control wiring between ACS580MV and MCB. - Check that Modbus communication between BCU and AC500eco is working. - Check the settings of MCB protection and adapt if needed (refer to ACS580MV Engineering Guideline for MCB protection settings).
E115	INU cooling fan 2 overload	Temperature relay integrated in INU cooling fan 2 has opened.	<p>Check wiring of fan 2 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).</p>
E116	INU cooling fan 3 overload	Temperature relay integrated in INU cooling fan 3 has opened.	<p>Check wiring of fan 3 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).</p>
E118	INU door not closed	During charging or operation of the drive, the inverter unit door lock sensor has reported that the door is not closed.	<p>Close the inverter unit door. Check internal wiring of the door lock signals (open circuits, loose terminals). Check that Modbus communication between BCU and AC500 is working.</p>
E119	MCB discrepancy	MCB open feedback signal and MCB close feedback signal are active at the same time.	<p>Check MCB control feedback signals wiring (open circuit, loose terminals).</p>
E11A	INU cooling fan 4 overload	Temperature relay integrated in INU cooling fan 4 has opened.	<p>Check wiring of fan 4 temperature contacts (open circuit, loose terminals). Check if fan is mechanically blocked or makes excessive noise (bearing problem).</p>
E11C	INU door not locked	During charging or operation of the drive, the inverter unit door lock has reported that the door is not locked.	<p>Lock the inverter unit door. Check internal wiring of the door lock signals (open circuits, loose terminals). Check that Modbus communication between BCU and AC500 is working.</p>

Code (hex)	Fault	Cause	What to do
E11D	Transformer temperature sensor failure	The winding temperature of the indicated transformer primary phase shows extremely high values or it's value is 0 all the time. This indicates that there is a PT100 temperature sensor failure.	Check the auxiliary code. The code specifies the affected transformer primary phase as follows: 01: U1 02: V1 03: W1 04: U1 and V1 05: V1 and W1 06: U1 and W1 07: U1, V1 and W1. Check the wiring of the indicated PT100 temperature sensor.
E121	IO Controller version incompatible	IO Controller (AC500eco) SW version (shown in parameter <i>81.07 IO Controller version</i>) is lower than the required value (shown in parameter <i>81.08 IO Controller version required</i>).	Upgrade IO Controller SW to the required version (shown in parameter <i>81.08 IO Controller version required</i>). For the IO Controller SW upgrade procedure refer to chapter Loading of the Control Software .
E140	MSS control fault	MSS command and MSS feedback do not match.	Check if MSS has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt MSS protection relay settings if required. Check MB control wiring between ACS580MV and MSS.
E141	MB control fault	MB command and MB feedback do not match.	Check if MB has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt MB protection relay settings if required. Check MB control wiring between ACS580MV and MB.
E143	Bypass contactor control fault	Command and feedback of contactor do not match.	Check if contactor has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt contactor protection relay settings if required. Check contactor control wiring between ACS580MV and contactor.
E144	Inductor overtemperature	The inductor temperature has exceeded the temperature limit.	Check cooling of the inductor.
E145	Inductor overtemperature	Inductor temperature rising relative to ambient temperature has exceeded the temperature rising limit.	Check cooling of the inductor.
E146	Voltage RMS sensor failure	The measured voltage of the grid and drive output for SBU has exceeded internal fault level.	Check the auxiliary code, the code specifies affected measuring sensor as follows: 01: Grid voltage 02: Drive output voltage 04: Grid and drive output voltages Check the voltage sensor wiring for the indicated place.

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Code (hex)	Fault	Cause	What to do
E147	Inductor temperature sensor failure	The temperature of the inductor has exceeded internal fault level.	Check the wiring of the inductor temperature sensor.
FF81	FB A force trip	A fault trip command has been received through fieldbus adapter A.	Check the fault information provided by the PLC (overriding system).

4

Service Level Parameters

What this chapter contains

The chapter describes all parameters that require Service access level. The parameters at End user access level are not listed in this manual, although some of them are referenced. For more details on the End user level parameters refer to [ACS580MV primary control program firmware manual](#). Parameters can be viewed and edited using operator panel ACS-AP-S or Drive composer PC tool. To access parameters described in this chapter the service level password must be entered in the parameter *96.02 Pass code*. When service access level is active the parameter *96.3 Access level active* will have value 0b0011.

Safety



WARNING! Most of service level parameters are safety relevant, such as Protection settings (Group [34 Protections](#)). Wrong setting of such parameters might cause damage to the drive!

Terms and abbreviations

Term	Definition
Actual signal	Type of parameter that is the result of a measurement or calculation by the drive, or contains status information. Most actual signals are read-only, but some (especially counter-type actual signals) can be reset.
Def	(In the following table, shown on the same row as the parameter name) The default value of a parameter for the Factory macro. For information on macro-specific parameter values, see chapter Application macros in ACS580MV primary control program firmware manual .
FbEq16	(In the following table, shown on the same row as the parameter range, or for each selection) 16-bit fieldbus equivalent: The scaling between the value shown on the panel and the integer used in fieldbus communication when a 16-bit value is selected in parameter group 52 <i>FBA A data in</i> or 53 <i>FBA A data out</i> . A dash (-) indicates that the parameter is not accessible in 16-bit format.
Other [bit]	The value is taken from a specific bit in another parameter. The source is selected from a parameter list.
Parameter	Either a user-adjustable operating instruction for the drive, or an actual signal.
p.u.	Per unit

Summary of groups containing service level parameters

Group	Contents	Page
05 Diagnostics	Various run-time-type counters and measurements related to drive maintenance.	73
17 Control Hub IO	Monitoring of control hub input/output signals.	73
21 Start/stop mode	Start and stop modes; emergency stop mode and signal source selection; DC magnetization settings; flystart settings.	73
30 Limits	Drive operation limits.	76
34 Protections	Drive protection functions.	78
60 DDCS communication	DDCS communication configuration.	82
79 TC Vector control	PI-Control, filter and configuration settings for vector control mode. Note: Vector control mode is released from SW version MHDRE 2.70.0.0 , some parameters from this group are also used by scalar control mode.	83
81 System control and monitoring	Application software parameters used for system control and monitoring.	83
82 Charging, MCB control	MCB control (drive charging control).	84
83 Cooling system	Control of the converter cooling system.	85
87 AC500 I/O interface	Configuration of IO controller (AC500eco) digital inputs, relay / transistor outputs and analog inputs.	88
95 HW configuration	Various hardware-related settings.	90
96 System	Language selection; parameter save and restore; user parameter sets; control unit reboot.	91
97 Motor control	Voltage reserve; flux braking; IR compensation.	91

99 Motor data	Motor configuration settings.	92
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Parameter listing

No.	Name/Value	Description	Def/FbEq16
05 Diagnostics			
		Various run-time-type counters and measurements related to drive maintenance. All parameters in this group are read-only unless otherwise noted.	
05.10	Control board temperature	Measured BCON control board temperature.	-
	-50 ... 150 °C		1 = 1 °C
05.48	Control board temperature warning	Control board temperature warning threshold. If the control board temperature exceeds this value the alarm <i>A4A0 Control board temperature</i> will be activated.	0 (=disabled)
	-		1 = 1 °C
05.49	Control board temperature fault	Control board temperature fault threshold. If the control board temperature exceeds this value the drive trips on fault <i>4110 Control board temperature</i> .	0 (=disabled)
	-		1 = 1 °C
17 Control Hub IO			
Monitoring of control hub input/output signals.			
17.03	Control hub DO force selection	Selects the control hub digital outputs whose electrical values are replaced by forced values from parameter 17.04.	0b0000
		Bit / Name / Information	
		0: DO1	
		1: DO2	
		2: DO3	
		3: DO4	
		4 ... 15: Reserved	
17.04	Control hub DO force data	Forces control hub digital outputs to the set value if selected in parameter 17.03. Bit 0 is the forced value for control hub DO1.	0b0000
		Bit / Name / Information	
		0: DO1	
		1: DO2	
		2: DO3	
		3: DO4	
		4 ... 15: Reserved	
17.06	Control hub DI force selection	Selects the control hub digital inputs whose electrical values are replaced by forced values from parameter 17.07.	0b00000
		Bit / Name / Information	
		0: DI1	

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No.	Name/Value	Description	Def/FbEq16
		1: DI2	
		2: DI3	
		3: DI4	
		4: DI5	
		5 ... 15: Reserved	
17.07	Control hub DI force data	Contains the values of digital inputs that are used instead of the electrical statuses if selected in parameter 17.06. Bit 0 is the forced value for control hub DI1.	0b00000
		Bit / Name / Information	
		0: DI1	
		1: DI2	
		2: DI3	
		3: DI4	
		4: TRIP LINE CLOSED	
		5 ... 15: Reserved	
17.08	INU air pressure drop	Inverter unit cabinet pressure drop (raw value).	-
	-		-
21 Start/stop mode		Start and stop modes; emergency stop mode and signal source selection; DC magnetization settings; flystart settings.	
21.23	DC magn. ctrl P-gain	Proportional gain of the PI controller used for DC magnetization. Note: This parameter should be modified only by expert personnel.	10 %
	0 ... 1000 %		0.01 = 1 %
21.24	DC magn. ctrl time constant	Integral time constant of the PI controller used for DC magnetization. Note: This parameter should be modified only by expert personnel.	10 ms
	0 ... 10000 ms		0.001 = 1 ms
21.25	DC magn. ctrl max limit	Limit value for the PI controller used for DC magnetization. Note: This parameter should be modified only by expert personnel.	1000 %
	0 ... 1000 %		0.01 = 1 %
21.30	Flystart current level	Defines the initial current level to be used during speed scan process. The p.u. refers to the motor current base (motor nominal current defined in parameter 99.6).	0.4 p.u.
	0 ... 1 p.u.		1 = 1 p.u.
21.31	Flystart flux ramp time	Defines the flux ramp up time (from 0 to 1 p.u.) during flystart.	10 s
	1 ... 50 s		1 = 1 s

No.	Name/Value	Description	Def/FbEq16
21.32	Flystart frequency min	<p>Minimum frequency/speed used during speed scan in flystart.</p> <p>If the motor speed is still not found when the frequency reference gets smaller than this parameter, the flystart continues the speed scan with negative sign or ends the speed scan depending on the option selected in parameter 21.34:</p> <p>21.34 Flystart reverse enable = 1:</p> <p>(Motor can rotate in both directions)</p> <p>If the motor speed is still not found when the frequency reference gets smaller than this parameter, the flystart continues the speed scan with negative sign. If the negative motor speed is still not found when the speed reference (its absolute value) gets smaller than this parameter, it is concluded that the motor speed equals 0 and DC magnetization is performed.</p> <p>21.34 Flystart reverse enable = 0:</p> <p>(Motor can rotate only in one direction)</p> <p>If the motor speed is still not found when the frequency reference gets smaller than this parameter it is concluded that the motor speed equals 0 and DC magnetization is performed.</p>	0.1 p.u.
	0 ... 1 p.u.		1 = 1 p.u.
21.33	Flystart frequency ramp time	Defines the time to ramp the scan frequency from nominal to zero.	10 s
	0 ... 50 s		1 = 1 s
21.34	Flystart reverse enable	<p>If this parameter is set to 1 the flystart algorithm performs the speed scan over positive and negative speeds.</p> <p>If this parameter is set to 0 the flystart algorithm performs the speed scan only over positive speeds.</p> <p>See parameter 21.32 for more details.</p>	1 NoUnit
	0 ... 1 NoUnit		1 = 1 NoUnit
21.35	Flystart speed detect curr level	<p>When the motor current in d axis falls below this value the motor speed is considered found. After that the flux is ramped up to the rated value.</p> <p>Important: The current level for finding the motor speed is defined by multiplying this parameter by the parameter <i>21.30 Flystart current level</i>. In other words, the p.u. for this parameter does not refer to the motor current base (motor nominal current) but to the initial current level used in flystart algorithm (parameter <i>21.30 Flystart current level</i>).</p>	0.5 p.u.
	0 ... 1 p.u.		1 = 1 p.u.
21.37	Flystart Iq ctrl filt time	Filter time constant in ms for the Iq current to be fed to the Iq current controller.	20 ms
	0.25 ... 100 ms		1 = 1 ms
21.38	Flystart Iq ctrl Kp	Proportional gain of the PI controller used to control Iq current during flystart.	0.075 NoUnit
	0 ... 10 NoUnit		1 = 1 NoUnit

No.	Name/Value	Description	Def/FbEq16
21.39	Flystart Iq ctrl Ki	Integral gain of the PI controller used to control Iq current during flystart.	0.05 NoUnit
	0 ... 1 NoUnit		1 = 1 NoUnit
	21.204 Starting freeze time	Starting inhibit time from last stop or fault to make motor fully demagnetized.	5000 ms
	0...10000 ms		1 = 1ms
30 Limits		Drive operation limits.	
30.54	Overvoltage Limit	Maximum value of DC link voltage for control. DC link voltage is limited to this value during braking.	1140 V
	0 ... 1200 V		1 = 1 V
30.57	Ridethrough DC link control level	Ridethrough DC Link control level [V]. During the ridethrough the DC Link is controlled to this level.	900 V
	0 ... 1200 V		1 = 1 V
31Fault functions		Configuration of external events; selection of behavior of the drive upon fault situations.	
31.32	<i>Emergency ramp supervision</i>	<p>Parameters 31.32 Emergency ramp supervision and 31.33 Emergency ramp supervision delay, together with 01.29 Speed change rate, provide a supervision function for emergency stop modes Off1 and Off3.</p> <p>The supervision is based on either</p> <ul style="list-style-type: none"> observing the time within which the motor stops, or comparing the actual and expected deceleration rates. <p>If this parameter is set to 0%, the maximum stop time is directly set in parameter 31.33. Otherwise, 31.32 defines the maximum allowed deviation from the expected deceleration rate, which is calculated from parameters 23.11...23.19 (Off1) or 23.23 Emergency stop time (Off3). If the actual deceleration rate (01.29) deviates too much from the expected rate, the drive trips on 73B0 Emergency ramp failed, sets bit 8 of 06.17 Drive status word 2, and coasts to a stop.</p> <p>If 31.32 is set to 0% and 31.33 is set to 0 s, the emergency stop ramp supervision is disabled.</p> <p>See also parameter 21.04 Emergency stop mode.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p>	0%
	0...300%	Maximum deviation from expected deceleration rate.	1 = 1%
31.33	<i>Emergency ramp supervision delay</i>	<p>If parameter 31.32 Emergency ramp supervision is set to 0%, this parameter defines the maximum time an emergency stop (mode Off1 or Off3) is allowed to take. If the motor has not stopped when the time elapses, the drive trips on 73B0 Emergency ramp failed, sets bit 8 of 06.17 Drive status word 2, and coasts to a stop.</p> <p>If 31.32 is set to a value other than 0%, this parameter defines a delay between the receipt of the emergency stop command and the activation of the supervision. It is recommended to specify a short delay to allow the speed change rate to stabilize.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p>	0 s
	0...32767 s	Maximum ramp-down time, or supervision activation delay.	1 = 1 s

No.	Name/Value	Description	Def/FbEq16
31.37	<i>Ramp stop supervision</i>	<p>Parameters <i>31.37 Ramp stop supervision</i> and <i>31.38 Ramp stop supervision delay</i>, together with <i>01.29 Speed change rate</i>, provide a supervision function for normal (ie. non-emergency) ramp stopping.</p> <p>The supervision is based on either</p> <ul style="list-style-type: none"> observing the time within which the motor stops, or comparing the actual and expected deceleration rates. <p>If this parameter is set to 0%, the maximum stop time is directly set in parameter <i>31.38</i>. Otherwise, <i>31.37</i> defines the maximum allowed deviation from the expected deceleration rate, which is calculated from parameters <i>23.11...23.19</i>. If the actual deceleration rate (<i>01.29</i>) deviates too much from the expected rate, the drive trips on <i>73B1 Stop failed</i>, sets bit 14 of <i>06.17 Drive status word 2</i>, and coasts to a stop.</p> <p>If <i>31.37</i> is set to 0% and <i>31.38</i> is set to 0 s, the ramp stop supervision is disabled.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p>	0%
	0...300%	Maximum deviation from expected deceleration rate.	1 = 1%
31.38	<i>Ramp stop supervision delay</i>	<p>If parameter <i>31.37 Ramp stop supervision</i> is set to 0%, this parameter defines the maximum time a ramp stop is allowed to take. If the motor has not stopped when the time elapses, the drive trips on <i>73B1 Stop failed</i>, sets bit 14 of <i>06.17 Drive status word 2</i>, and coasts to a stop.</p> <p>If <i>31.37</i> is set to a value other than 0%, this parameter defines a delay between the receipt of the stop command and the activation of the supervision. It is recommended to specify a short delay to allow the speed change rate to stabilize.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p>	0 s
	0...32767 s	Maximum ramp-down time, or supervision activation delay.	1 = 1 s

No.	Name/Value	Description	Def/FbEq16
	34 Protections	<p>Drive protection functions.</p> <p>Note: For motor related quantities specified in p.u., if no special note is given, the base value is Motor nominal current defined in parameter 99.6. For grid related quantities specified in p.u., if no special note is given, the base value is Rated input current defined by license key (can be seen in parameter 30.41). Any deviation from the above described standard base system is explicitly mentioned in the parameter description.</p> <p>Note: All protection functions use qualifier times that are internally set in software and cannot be changed by Service level parameters. The below described parameters that can be set with Service access level specify the threshold value for faults (except Par 34.01 and 34.23). A fault is activated when the particular drive value exceeds its threshold for longer than qualifier time.</p> <p>Parameters 31.32 Emergency ramp supervision and 31.33 Emergency ramp supervision delay, together with 01.29 Speed change rate, provide a supervision function for emergency stop modes Off1 and Off3.</p> <p>The supervision is based on either</p> <ul style="list-style-type: none"> • observing the time within which the motor stops, or • comparing the actual and expected deceleration rates. <p>If this parameter is set to 0%, the maximum stop time is directly set in parameter 31.33. Otherwise, 31.32 defines the maximum allowed deviation from the expected deceleration rate, which is calculated from parameters 23.11...23.19 (Off1) or 23.23 Emergency stop time (Off3). If the actual deceleration rate (01.29) deviates too much from the expected rate, the drive trips on 73B0 Emergency ramp failed, sets bit 8 of 06.17 Drive status word 2, and coasts to a stop.</p> <p>If 31.32 is set to 0% and 31.33 is set to 0 s, the emergency stop ramp supervision is disabled.</p> <p>See also parameter 21.04 Emergency stop mode.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p> <p>If parameter 31.32 Emergency ramp supervision is set to 0%, this parameter defines the maximum time an emergency stop (mode Off1 or Off3) is allowed to take. If the motor has not stopped when the time elapses, the drive trips on 73B0 Emergency ramp failed, sets bit 8 of 06.17 Drive status word 2, and coasts to a stop.</p> <p>If 31.32 is set to a value other than 0%, this parameter defines a delay between the receipt of the emergency stop command and the activation of the supervision. It is recommended to specify a short delay to allow the speed change rate to stabilize.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p>	

No.	Name/Value	Description	Def/FbEq16
		<p>Parameters 31.37 Ramp stop supervision and 31.38 Ramp stop supervision delay, together with 01.29 Speed change rate, provide a supervision function for normal (ie.nonemergency) ramp stopping.</p> <p>The supervision is based on either</p> <ul style="list-style-type: none"> • observing the time within which the motor stops, or • comparing the actual and expected deceleration rates. <p>If this parameter is set to 0%, the maximum stop time is directly set in parameter 31.38. Otherwise, 31.37 defines the maximum allowed deviation from the expected deceleration rate, which is calculated from parameters 23.11...23.19. If the actual deceleration rate (01.29) deviates too much from the expected rate, the drive trips on 73B1 Stop failed, sets bit 14 of 06.17 Drive status word 2, and coasts to a stop.</p> <p>If 31.32 is set to 0% and 31.33 is set to 0 s, the ramp stop supervision is disabled.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p> <p>If parameter 31.37 Ramp stop supervision is set to 0%, this parameter defines the maximum time a ramp stop is allowed to take. If the motor has not stopped when the time elapses, the drive trips on 73B1 Stop failed, sets bit 14 of 06.17 Drive status word 2, and coasts to a stop.</p> <p>If 31.37 is set to a value other than 0%, this parameter defines a delay between the receipt of the stop command and the activation of the supervision. It is recommended to specify a short delay to allow the speed change rate to stabilize.</p> <p>Note: This parameter is only applied to vector mode (99.04 Motor control mode = Vector).</p>	
34.01	PM charging base time	Internally used to force/reset the communication watchdog timer for monitoring communication between control hub and power modules.	2 s
	0 ... 10 s		1 = 1 s

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No.	Name/Value	Description	Def/FbEq16
34.03	Grid overcurrent trip level	<p>Grid overcurrent protection trip level. The parameter is defined in [p.u.] with base value defined in parameter 30.41 Rated input current. Grid overcurrent protection reacts on the instantaneous values of the measured transformer primary current. Therefore the absolute value of the grid overcurrent trip threshold is calculated as:</p> <p>Par 34.03 x Par 30.41 * sqrt(2).</p> <p>If the instantaneous transformer primary current exceeds the calculated limit in any condition, the drive trips on fault 2110 Trafo overcurrent.</p> <p>Note: If the calculated grid overcurrent trip threshold exceeds 95% of the maximum measurable transformer current (defined by the license key) the grid overcurrent trip threshold is set to 95% of the maximum measurable transformer current regardless of the setting in this parameter.</p> <p>Note: If the Trafo overcurrent happens during charging on a de-rated R4 drive then this parameter can be increased above the default value. Contact the ABB support line for the exact settings. This is only valid for de-rated R4 drives!</p>	1.5 p.u.
	0 ... 5 p.u.		1 = 1 p.u.
34.05	Trafo over curr no load trip level	<p>If the transformer primary current exceeds this limit during charging the drive trips on fault 2113 Trafo no-load overcurrent.</p> <p>This condition is only checked after MCB has been closed until all power modules are ON (before the time defined in parameter 34.01 is elapsed).</p>	0.5 p.u.
	0 ... 1 p.u.		1 = 1 p.u.
34.07	Trafo current sensor offset	<p>Maximum expected (allowed) measurement offset of the transformer current sensor. From this value the maximum expected (allowed) current measurement error is calculated in the software. If a measured transformer phase current exceed this maximum allowed measurement error when the MCB is open, the drive trips on fault 2116 Trafo current sense fault phase U1 or 2117 Trafo current sense fault phase V1 depending on the phase that is affected. This occurrence indicates a potential problem with transformer current measurement chain.</p> <p>Note: When MCB is open and the drive is fault free, the current calibration is active. The current calibration algorithm removes any current measurement offset from the measurement. Therefore with MCB open and drive fault free, the displayed transformer measured currents are always equal 0 (parameters 1.49 - 1.51). However, the above described current measurement check is done internally. In other words, if the removed offset becomes bigger than the calculated maximum allowed current measurement error, the drive trips on the current sense fault.</p>	0.4 mA
	0.0 ... 100.0 mA		1 = 1 mA

No.	Name/Value	Description	Def/FbEq16
34.12	Grid current asymmetry trip level	If at least one of the differences between any 2 transformer phase currents (U1-V1, U1-W1, V1-W1) exceeds this limit the drive trips on fault 211B Grid current asymmetry .	0.1 p.u.
	0 ... 1 p.u.		1 = 1 p.u.
34.17	Motor overcurrent trip level	The parameter is defined in [p.u.] with base value defined as smaller value between: - Motor nominal current (parameter 99.6) - Rated converter output current (parameter 30.40) This is done to prevent a damage to a weaker component in case converter and motor ratings are different. Motor overcurrent protection reacts on the instantaneous values of the measured motor phase currents. Therefore the absolute value of the motor overcurrent trip threshold is calculated as: $\text{Par 34.17} \times \min(\text{Par 99.6}, \text{Par 30.40}) \times \text{sqrt}(2)$. If the instantaneous value of a measured motor phase current exceeds the calculated threshold, the drive trips on fault 2350 Motor overcurrent phase U2 , 2351 Motor overcurrent phase V2 or 2352 Motor overcurrent phase W2 depending on the phase that is affected. Note: If the calculated motor overcurrent trip threshold exceeds 95% of the maximum measurable motor current (defined by the license key) the motor overcurrent trip threshold is limited to 95% of the maximum measurable motor current regardless of the settings in this parameter.	1.3 p.u.
	0 ... 3 p.u.		1 = 1 p.u.
34.23	Motor curr sense fault ena delay	Time delay after modulation stop before motor current measurement supervision is enabled. During this time after modulation stop the Motor current sense fault is not checked (see Par 34.24 for more details on Motor current sense fault).	5 s
	0 ... 30 s		1 = 1 s
34.24	Mot current sensor offset	Maximum expected (allowed) measurement offset of the motor current sensor. From this value the maximum expected (allowed) current measurement error is calculated in the software. If a measured motor phase current exceed this limit when the drive is not modulating the drive trips on fault 2353 Motor current sense fault phase U2 or 2354 Motor current sense fault phase V2 , depending on the phase that is affected. This occurrence indicates a potential problem with motor current measurement chain. For more details see also parameter 34.7.	0.4 mA
	0.0 ... 100.0 mA		1 = 1 mA
34.26	Motor phase loss trip level	If the absolute value of any of motor phase currents is smaller than this limit and the motor speed is higher than 5% motor nominal speed the drive trips on fault 2355 Motor phase U2 lost , 2356 Motor phase V2 lost or 2357 Motor phase W2 lost , depending on the phase that is affected.	0.1 p.u.
	0 ... 1 p.u.		1 = 1 p.u.

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No.	Name/Value	Description	Def/FbEq16
34.34	Motor volt sense fault trip level	If the measured motor phase-to-ground voltage exceeds this limit the drive trips on fault 3330 Motor voltage sense fault phase U2 , 3331 Motor voltage sense fault phase V2 or 3332 Motor voltage sense fault phase W2 , depending on the phase that is affected. This occurrence indicates a potential problem with motor voltage measurement chain.	1.9 p.u.
	0 ... 2 p.u.		1 = 1 p.u.
34.36	Ground fault trip level	Maximum allowed amplitude of the motor common mode voltage fundamental component. If the amplitude of the fundamental component in the motor common mode voltage exceeds this limit the drive trips on fault 3333 Ground fault .	500 V
	0 ... 3000 V		1 = 1 V
60 DDCS communication		DDCS communication configuration. The DDCCS protocol is used to connect to BCON with the R&D PC tool "Drive Tool" (DT) that is used for some special tests. Note: DT is not a service tool and shall not be used for commissioning of the drive.	
60.41	Extension adapter com port	Selects the channel used for connecting an optional FEA-xx extension adapter. Note: FEA-xx extension adapter is not supported in SW versions MHDRE 2.70.0.0 and older.	Not in use
	Not in use; Slot 1A ... Slot 3B		-
60.56	DDCS controller baud rate	Not applicable for ACS580MV.	-
	-		-
60.100	DT node address	Target BCON address for connection to DT. Note: When using a table emulator this parameter must be set to 2.	1
	1 ... 254		-
60.101	DT baud rate	Baud rate for communication with DT.	1 mbps
	-		-
60.102	DT HW connection	Connection configuration between BCON and the PC running DT.	Star
	Star	PC is connected directly to only one BCON. This setting shall be used when connecting to the BCON on a drive.	
	Ring	PC is connected to more BCONs connected in a communication ring. This setting shall be used when connecting to the BCON on table emulator.	
60.103	DT link control	Link control between PC and BCON.	10
	1 ... 15		-

No.	Name/Value	Description	Def/FbEq16
60.104	DT com port	Selects the slot on BCON where FDCO-02 extension module (for connection to DT) is installed.	No connect
	No connect; Slot 1A ... Slot 3B		-
79 TC Vector control		PI-Control, filter and configuration settings for vector control mode. Note: Vector control mode is released from SW version <i>MHDRE 2.70.0.0</i> , some parameters from this group are also used by scalar control mode.	
79.61	Energy balancing gain	Energy balancing algorithm helps to keep the converter three phases balanced even in case of existing unbalance in transformer. Setting 0 to this parameter disables energy balancing. Warning: The energy balancing can be disabled only for testing. Operating a drive with energy balancing disabled can lead to trips.	10 p.u.
	0 ... 1000 p.u.		1 = 1 p.u.
81 System control and monitoring		Application software parameters used for system control and monitoring.	
81.60	FBA communication error counter	Internal Modbus communication between BCON and IO controller is monitored. All lost communication messages are counted and total count is stored in this parameter. The communication error counter is stored on the SD card and can be viewed using ACS580MV data analyzer tool. Some lost messages can be expected in any communication chain and do not indicate any problem. If more consecutive messages are lost, the drive will trip on fault <i>E105 AC500 communication error</i> . However, a constantly increasing error count can point to a potential problem in the Modbus communication that is not yet causing drive to trip but might result in bigger communication errors (trips) in the future. If constant increase in this parameter value is observed, conduct the actions described in the fault <i>E105 AC500 communication error</i> . Note: In case of control power loss (BCON shut down), the last value of the error counter might not get properly stored on the SD card. Therefore the values on the SD card might have sudden drops. However, the overall trend of the parameter value will be either constant or increasing. This small drops in the value can be ignored and overall trend should be examined. Note: The counter will wrap around - if the maximum value of the parameter is reached, the counting will reset to 0 and continue counting up from 0.	0 NoUnit
	0 ... 4294967295 NoUnit		1 = 1 NoUnit

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No.	Name/Value	Description	Def/FbEq16
81.61	FBA PLC module error counter	<p>Internal warnings and low priority errors on the IO controller (AC500 PLC) are counted and sent to BCON over internal Modbus communication. The total count is stored in this parameter. The PLC error counter is stored on the SD card and can be viewed using ACS580MV data analyzer tool. Internal PLC warnings and errors do not indicate any serious problem with PLC and are reset automatically. However, a constantly increasing error count can point to a problem in the PLC. In that case examine the PLC and its extension modules. Connect to the PLC and read out the fault data loggers. Report your findings to ABB support line.</p> <p>Note: In case of control power loss (BCON shut down), the last value of the error counter might not get properly stored on the SD card. Therefore the values on the SD card might have sudden drops. However, the overall trend of the parameter value will be either constant or increasing. This small drops in the value can be ignored and overall trend should be examined.</p> <p>Note: The counter will wrap around - if the maximum value of the parameter is reached, the counting will reset to 0 and continue counting up from 0.</p>	0 NoUnit
	0 ... 4294967295 NoUnit		1 = 1 NoUnit
82 Charging, MCB control		MCB control (drive charging control).	
82.32	Unlock door after discharged	<p>Force to unlock the inverter cabinet door immediately after converter is discharged. Function is activated only once. It will change back to Disabled automatically.</p> <p>Note: Without forcing, the inverter cabinet door will be locked for 15 minutes after MCB opens. During this 15minutes, Supply OFF Led on control cabinet front door blinks once per second if DC link is higher than the discharged level, and blinks once every two seconds if DC link is lower than the discharged level.</p> <p>WARNING! Make sure that all safety measures are in place when opening inverter cabinet door! Refer to ACS580MV hardware manual for instructions on safe handling.</p>	Disabled
	Disabled		0
	Enabled		1

No.	Name/Value	Description	Def/FbEq16
82.80	Ride through test	<p>This parameter enables the ride-through test. After setting this parameter to <i>Enabled</i>, the MCB open command will be sent. When ride-through time (defined in parameter 82.81) elapses, MCB close command will be sent, and this parameter will be set to <i>Disabled</i>.</p> <p>During the time defined in Par 82.81 plus the time defined in parameter 82.28 <i>MCB closing time limit</i>, the <i>MCB open</i> status feedback is internally forced to <i>FALSE</i>, and the <i>MCB closed</i> status feedback is internally forced to <i>TRUE</i>. In this way the protection system will not react during the test time allowing for tests with drive disconnected from the grid.</p> <p>Ride-through test can only be performed when MCB is closed, both in Local and Remote mode.</p>	Disabled
	Disabled		0
	Enabled		1
82.81	Ride through test time	<p>This parameter defines ride-through test time. After this time elapses, the MCB close command will be sent and the parameter 82.80 <i>Ride through test</i> will be set to <i>Disabled</i> automatically.</p>	5.00 s
	1 ... 60 s		1 = 1 s
83 Cooling system		Control of the converter cooling system.	
83.10	Standard fan amount	<p>Selects the number of cooling fans for inverter (INU) and transformer (TRU) unit.</p> <p>Note: To reduce the starting current, selected fan groups are switched on one after another every 2 seconds.</p>	1 INU fan and 1 TRU fan
	1 INU fan and 1 TRU fan		0
	1 INU fan and 2 TRU fans		1
	2 INU fans and 2 TRU fans		2
	2 INU fans and 3 TRU fans		3
	3 INU fans and 2 TRU fans		4
	3 INU fans and 3 TRU fans		5

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No.	Name/Value	Description	Def/FbEq16
83.11	Redundant fan control	<p>Selects redundancy of cooling fans. If redundant fan is selected the continuous operation of the drive is guaranteed even in case when one fan group has fan failure. Switching on the redundant fan group takes place automatically. Fan failure in one group will result in an alarm message and redundant cooling fan group will be started. If two fan groups have failure, including redundant fan group, a fault will be generated.</p> <p>Note: If redundant fan control is enabled, fan group 1 is assigned to redundant fan.</p> <p>Redundant fans will be started in case of following events (warnings):</p> <p><i>E201 Trafo phase U1 temperature high ...E203 Trafo phase W1 temperature high,</i></p> <p><i>E204 Ambient temperature high, E212 INU air pressure low,</i></p> <p><i>E20E INU cooling fan 1 overload ...E211 INU cooling fan 4 overload,</i></p> <p><i>E214 TRU cooling fan 1 overload ...E21B TRU cooling fan 4 overload.</i></p>	Disabled
	Disabled		0
	Enabled		1
83.16	Fan power supply selection	Cooling fan power supply can be selected from internal TRU integrated transformer or external custom interface	Internal
	Internal	<p>Cooling fans are supplied form the integrated transformer</p> <p>Note: in this configuration the cooling fans are only active when the MCB is closed.</p>	0
	External	Cooling fans are supplied form external AC power supply. In this configuration fans can run even if the MCB is open.	1
83.31	INU air pressure monitoring delay time	<p>Time delay for monitoring of the air pressure (drop) inside inverter unit cabinet.</p> <p>Different actions will apply in case of low and high pressure and depending on the availability of the redundant fans:</p> <p>1. If INU cabinet air pressure after cooling starts (MCB closed) is lower than the value set in parameter 83.32 for longer than time set in this parameter, the alarm message <i>E212 INU air pressure low</i> is shown. If redundant fan(s) are selected in parameter 83.11, redundant fan group is activated.</p> <p>2. If INU cabinet air pressure is higher than the value set in parameter 83.34 for longer than time set in this parameter, the alarm message <i>E205 INU air pressure high</i> is shown.</p>	40 s
	0 ... 300 s		1 = 1 s

No.	Name/Value	Description	Def/FbEq16
83.32	INU air pressure low limit	<p>Inverter unit air pressure lower limit. For use explanation see parameter 83.31.</p> <p>Note: This parameter is set in DriveStartup to a value 80 Pa lower than the air pressure measured during commissioning. This setting is enabled only if the air pressure measured during commissioning does not deviate from the air pressure that has been measured during routine testing by more than +/- 50 Pa.</p> <p>If the deviation between INU air pressure measured during commissioning and the same pressure measured during routine testing is bigger than 50 Pa do the following:</p> <ul style="list-style-type: none"> • check the fan operation • check the filter pads on the INU cabinet door • check the pressure sensor • check the air duct (if present) 	125 Pa
	-1000 ... 1000 Pa		1 = 1 Pa
83.34	INU air pressure high limit	<p>Inverter unit air pressure high limit. For use explanation see parameter 83.31.</p> <p>Note: This parameter is set in DriveStartup to a value 80 Pa higher than the air pressure measured during commissioning. This setting is enabled only if the air pressure measured during commissioning does not deviate from the air pressure that has been measured during routine testing by more than +/- 50 Pa.</p> <p>If the deviation between INU air pressure measured during commissioning and the same pressure measured during routine testing is bigger than 50 Pa do the following:</p> <ul style="list-style-type: none"> • check the fan operation • check the filter pads on the INU cabinet door • check the pressure sensor • check the air duct (if present) 	425 Pa
	-1000 ... 1000 Pa		1 = 1 Pa
83.50	INU fan reference	<p>Speed reference for the inverter unit cooling fans given in percentage of the maximum fan speed.</p> <p>Note: This parameter is effective only if the drive is equipped with EC cooling fans.</p>	100%
	0 ... 100 %		1 = 1%
83.51	TRU fan reference	<p>Speed reference for the transformer unit cooling fans given in percentage of the maximum fan speed.</p> <p>Note: This parameter is effective only if the drive is equipped with EC cooling fans</p>	100%
	0 ... 100 %		1 = 1%
85.31	Inductor temperature fault limit	A fault will be generated, if actual temperature of inductor rises above this limit	45°C
	0 ... 500°C		10 = 1°C
85.32	Inductor temperature warning limit	An alarm will be generated, if scaled actual temperature rises above this limit.	55°C
	0 ... 500°C		10 = 1°C

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No.	Name/Value	Description	Def/FbEq16
85.33	Inductor temp rising fault limit	A fault will be generated, if the difference of actual temperature of inductor and ambient temperature rises above this limit	20°C
	0 ... 500°C		10 = 1°C
85.34	Inductor temp rising warning limit	A alarm will be generated, if the difference of actual temperature of inductor and ambient temperature rises above this limit	15°C
	0 ... 500°C		10 = 1°C
87 AC500 I/O interface		Configuration of AC500 digital inputs, relay / transistor outputs and analog inputs.	
87.11	AC500 CPU DI force selection	Electrical status of digital inputs can be overridden, for example during testing. A bit in parameter 87.12 is provided for each digital input, and its value is applied whenever the corresponding bit in this parameter is set to 1. Example: 000000000001001b = The electrical status of digital inputs DI4 and DI1 will be overridden with values supplied in bits 3 and 0 of parameter 87.12. The electrical status of all other digital inputs on AC500 CPU remains unchanged.	0b00000000
		Bit / Name / Information	
		0: CPU-DI1 External ON request	
		1: CPU-DI2 External OFF request	
		2: CPU-DI3 Local OFF command (push button)	
		3: CPU-DI4 Local ON command (push button)	
		4: CPU-DI5 MCB feedback status OPEN	
		5: CPU-DI6 Converter space heater tripped	
		6: CPU-DI7 Motor space heater tripped	
		7: CPU-DI8 INU door locked	
		8 ... 15: Reserved	
87.12	AC500 CPU DI force data	Values for overridden digital inputs (0 or 1; bitwise). It is only possible to override the electrical status of digital inputs that have been selected in parameter 87.11. Bit 0 is the overriding value for DI1.	0b00000000
	0000h...FFFFh		-
87.14	AC500 CPU DO force selection	Electrical status of digital outputs can be forced, for example during testing. A bit in parameter 87.15 is provided for each digital output. A digital output is forced to this value whenever the corresponding bit in this parameter is set to 1. Example: 0000000000001001b = Digital outputs DO4 and DO1 will be forced to the values supplied in bits 3 and 0 of parameter 87.15.	0b0000000
		Bit / Name / Information	
		0: CPU-DO1 MCB CLOSE command	
		1: CPU-DO2 /MCB OPEN command	
		2: CPU-DO3 LED activation (Main supply ON indication)	
		3: CPU-DO4 LED activation (Main supply OFF indication)	

No.	Name/Value	Description	Def/FbEq16
		4: CPU-DO5 System alarm	
		5: CPU-DO6	
		6 ... 15: Reserved	
87.15	AC500 CPU DO force data	Values for forced digital outputs (0 or 1; bitwise). It is only possible to force digital outputs that have been selected in parameter 87.14. Bit 0 is the forced value for DO1.	0b000000
	0000h...FFFFh		-
87.41	AC500 E P2 DI force selection	Electrical status of digital inputs can be overridden, for example during testing. A bit in parameter 87.42 is provided for each digital input, and its value is applied whenever the corresponding bit in this parameter is set to 1. Example: 0000000000001001b = The electrical status of digital inputs DI4 and DI1 will be overridden with values supplied in bits 3 and 0 of parameter 87.42. The electrical status of all other digital inputs on AC500 P2 extension module remains unchanged.	0b00000000
		Bit / Name / Information	
		0: E_P2-DI1 Control supply failure	
		1: E_P2-DI2 Control backup supply failure	
		2: E_P2-DI3 TRU fan1 status OK	
		3: E_P2-DI4 TRU fan2 status OK	
		4: E_P2-DI5 TRU fan3 status OK	
		5: E_P2-DI6 TRU fan4 status OK	
		6: E_P2-DI7	
		7: E_P2-DI8 INU door closed	
		8 ... 15: Reserved	
87.42	AC500 E P2 DI force data	Values for overridden digital inputs (0 or 1; bitwise). It is only possible to override electrical status of digital inputs that have been selected in parameter 87.41. Bit 0 is the overriding value for DI1.	0b00000000
	0000h...FFFFh		-
87.44	AC500 E P2 DO force selection	Electrical status of digital outputs can be forced, for example during testing. A bit in parameter 87.45 is provided for each digital output. A digital output is forced to this value whenever the corresponding bit in this parameter is set to 1. Example: 0000000000001001b = Digital outputs DO4 and DO1 will be forced to the values supplied in bits 3 and 0 of parameter 87.45.	0b00000000
		Bit / Name / Information	
		0: E_P2-DO1 fan group 1 ON	
		1: E_P2-DO2 fan group 2 ON	
		2: E_P2-DO3 fan group 3 ON	
		3: E_P2-DO4 fan group 4 ON	
		4: E_P2-DO5 fan group 5 ON	
		5: E_P2-DO6 space heater OFF	

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No.	Name/Value	Description	Def/FbEq16
		6: E_P2-DO7 INU door unlock	
		7: E_P2-DO8 alarm fault LED	
		8 ... 15: Reserved	
87.45	AC500 E P2 DO force data	Values for forced digital outputs (0 or 1; bitwise). It is only possible to force digital outputs that have been selected in parameter 87.44. Bit 0 is the forced value for DO1.	0b00000000
	0000h...FFFFh		-
87.50	Fan EMP force selection	Cooling fan speed reference can be forced using parameter 87.52 and 87.54 if corresponding bits in this parameter are set to 1. Example: 0000000000000010b = Fan EMP AO2 (transformer unit fan) speed reference will be forced to the value supplied in parameter 87.54 while Fan EMP AO1 (Inverter unit fan) speed reference will not be forced and will be equal to the value specified in parameter 83.50. Note: This parameter is effective only if the drive is equipped with EC cooling fans	0b00000000
		Bit / Name / Information	
		0: Fan_EMP_A01 = INU fan	
		1: Fan_EMP_A02 = TRU fan	
87.51	Fan EMP AO1 actual value	Actual speed reference for the inverter unit cooling fan. Note: This parameter is read only.	100%
	0 ... 100 %		1 = 1%
87.52	Fan EMP AO1 force data	Forcing value for the speed reference of the inverter unit cooling fan. The value specified in this parameter will be forced as the reference for the inverter unit cooling fan (EC fan only) if the bit 0 of the parameter 87.50 is set to 1.	100%
	0 ... 100 %		1 = 1%
87.53	Fan EMP AO2 actual value	Actual speed reference for the transformer unit cooling fan. Note: This parameter is read only.	100%
	0 ... 100 %		1 = 1%
87.54	Fan EMP AO2 force data	Forcing value for the speed reference of the transformer unit cooling fan. The value specified in this parameter will be forced as the reference for the transformer unit cooling fan (EC fan only) if the bit 1 of the parameter 87.50 is set to 1.	100%
	0 ... 100 %		1 = 1%
95 HW configuration		Various hardware-related settings	
95.55	Control hub half optical power	If this parameter is set to <i>Enable</i> , the power of the optical transmitters in control hub will be reduced by half. Used to diagnose communication problems from control hub to power modules as described in POF Link Test on page 111.	Disable
	Disable	Optical transmitter full power.	
	Enable	Optical transmitter half power.	

No.	Name/Value	Description	Def/FbEq16
95.70	PM half optical power	If this parameter is set to <i>Enable</i> , the power of the optical transmitter in power modules will be reduced by half. Used to diagnose communication problems from power modules to control hub as described in POF Link Test on page 111 .	Disable
	Disable	Optical transmitter full power.	
	Enable	Optical transmitter half power.	
95.85	Grid frequency sel	Selection of grid frequency.	50 Hz
	50 Hz	Grid frequency is 50Hz.	
	60 Hz	Grid frequency is 60Hz.	
95.100	Trafo Prim current filter cutoff freq	Transformer primary current filter cut-off frequency.	1 Hz
	1 ... 20 Hz		1 = 1 Hz
96 System		Language selection; access levels; macro selection; parameter save and restore; control unit reboot; user parameter sets; unit selection.	
96.21	Time sync secondary source	Defines the first priority source for drive's date and time synchronization from an external source.	Panel link
	Internal		0
	Fieldbus A		3
	Panel link		8
	Ethernet tool link		9
96.40	Internal SW error supervision	Enables internal SW error supervision.	Enable
	Disable		0
	Enable		1
96.51	Clear fault and event logger	Any non zero value set in this parameter clears the fault and event logger.	-
	0 ... 65535		1 = 1
96.60	Power fail Udc level	If DC voltage decreases below the power fail limit then power fail situation is triggered, meaning that some crucial data is saved immediately before power goes completely down. Normally power fail limit is determined automatically according to drive type and supply voltage range. The non-zero value of this parameter overrides the internal limit. This allows tuning of the power fail limit when necessary. Warning: Too high limit may decrease lifetime of the flash memory if power fail savings are done too often! This parameter should be modified only by expert personnel.	0 V
	0 ... 2000 V		10 = 1 V
97 Motor control		Voltage reserve; flux braking; IR compensation.	
97.14	Internal ramp time	Defines minimum ramp time for the scalar control, that will be used only internally to prevent stepwise reference changes to torque control.	0.2 s
	0 ... 100 s		1 = 1 s

No.	Name/Value	Description	Def/FbEq16																
97.40	Output choke inductance	Define the inductance of the output choke. Below is the typical values. Pilot projects may have different value, please check at site. <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th>Frame size</th> <th>Inductance (mH)</th> </tr> </thead> <tbody> <tr> <td>R3</td> <td>11</td> </tr> <tr> <td>R4</td> <td>7.4</td> </tr> <tr> <td>R5</td> <td>5.6</td> </tr> <tr> <td>R6</td> <td>3.7</td> </tr> <tr> <td>R7</td> <td>2.8</td> </tr> <tr> <td>R8</td> <td>2.0</td> </tr> <tr> <td>R9</td> <td>1.4</td> </tr> </tbody> </table>	Frame size	Inductance (mH)	R3	11	R4	7.4	R5	5.6	R6	3.7	R7	2.8	R8	2.0	R9	1.4	1.48mH
Frame size	Inductance (mH)																		
R3	11																		
R4	7.4																		
R5	5.6																		
R6	3.7																		
R7	2.8																		
R8	2.0																		
R9	1.4																		
	0 ... 100mH		100 = 1mH																
97.41	SBU max adjust voltage	Maximum allowed voltage adjusting during synchronizing bypass process.	0.15 p.u.																
	0 ... 0.3 p.u.		1 = 1 p.u.																
97.42	SBU min adjust voltage	Minimum allowed negative voltage adjusting during synchronizing bypass process.	-0.15 p.u.																
	-0.3 ... 0 p.u.		1 = 1 p.u.																
97.43	SBU stop modulation current	During synchronizing bypass process, if output current is higher than this value, converter stops modulation.	2 p.u.																
	0 ... 10 p.u.		1 = 1 p.u.																
97.44	SBU motor overcurrent trip level	During synchronizing bypass process, SBU motor overcurrent trip level will replace motor overcurrent trip level.	2.5 p.u.																
	0 ... 10 p.u.		1 = 1 p.u.																
97.45	SBU motor phase loss trip level	During synchronizing bypass process, SBU motor phase pahse loss trip level will replace motor phase pahse loss trip level.	0.05 p.u.																
	0 ... 10 p.u.		1 = 1 p.u.																
97.46	SBU current control gain	Gain of SBU current controller.	0.25 p.u.																
	-1000 ... 1000 p.u.		100 = 1 p.u.																
99 Motor data		Motor configuration settings.																	
99.04	Motor ctrl mode	Selects the motor control mode.	Scalar																
	Vector	Warning: Vector control mode is only officially released from SW version MHDRE 2.70.0.0 , any versions older than MHDRE 2.70.0.0 can only be used for internal testing!	0																
	Scalar	Scalar control - the switching of the output semiconductors is controlled to achieve the constant ratio between motor voltage and frequency (V/f) thus achieving constant flux. With scalar control the motor can be controlled in frequency (Hz) or speed (rpm) mode. The reference value for the motor frequency (or speed) can be set by various sources and the voltage is adjusted accordingly.	1																

Parameter listing default values



Using ACS580MV Data Analyzer

What this chapter contains

This chapter contains short guideline for using the ACS580MV data analyzer PC tool. This tool can be used to analyze diagnostic data that are continuously stored on SD card in BCU.

ACS580MV data analyzer

ACS580MV data analyzer allows the user to view event logger, fault data logger and continuous monitoring logger files stored in SD card. The SD card installed in BCU allows for storing of big amount of data, so the records of drive operation over its entire lifetime can be collected.

ACS580MV data analyzer allows the following functionalities:

- View the Event logger (long term chronological list of all events that happened on the drive).
- Display of information (helptext) for an event when it is selected in the event logger view.
- Export the event logger in .txt or .csv format.
- Plot the fault data logger if it is attached to a fault. A fault data logger is always attached to the tripping fault - the first fault that is activated after the drive has been error free.
- View time plot information by placing the cursor on the time plot.
- Customize the time plots using settings option.
- Export the fault data logger in .txt or .csv format.
- Align the parameter information displayed in the time plots using Settings -> Parameters Alignment drop-down.
- Zoom the time plot by selecting the required area.
- Synchronize zooming and cursor position.
- Plot the continuous monitoring logger. Continuous monitoring logger contains the slowly sampled drive parameters that are collected continuously.
- Export of continuous monitoring logger in .txt and ,csv format.

In the remainder of the chapter a description of different tools options is given.

Menu bar

The Menu bar includes the following main menus:

- File
 - View
 - Help
-

■ File menu

File menu allows to open a data folder and to exit the ACS580MV data analyzer session. File menu consists of the following commands:

- **Select Data Folder:** Allows the user to open a top folder containing all logged data.
- **Exit:** Ends ACS580MV data analyzer session.

■ View menu

View menu allows to change the font size of the user interface. View menu consists of the following commands:

- **Normal:** Changes the text font size of the user interface to normal text.
- **Large:** Changes the text font size of the user interface to large text.
- **The largest:** Changes the text font of the user interface to the largest text.

■ Help menu

Help menu allows to view the product information and the manual. The Help menu consists of the following commands:

- **About product:** Displays the version number and copyright information.
 - **Manual:** Displays ACS580MV data analyzer user manual as a PDF.
-

Event logger

To open data folder, proceed as follows:

1. In the ACS580MV data analyzer main menu, click **File** and then click **Select Data Folder**.

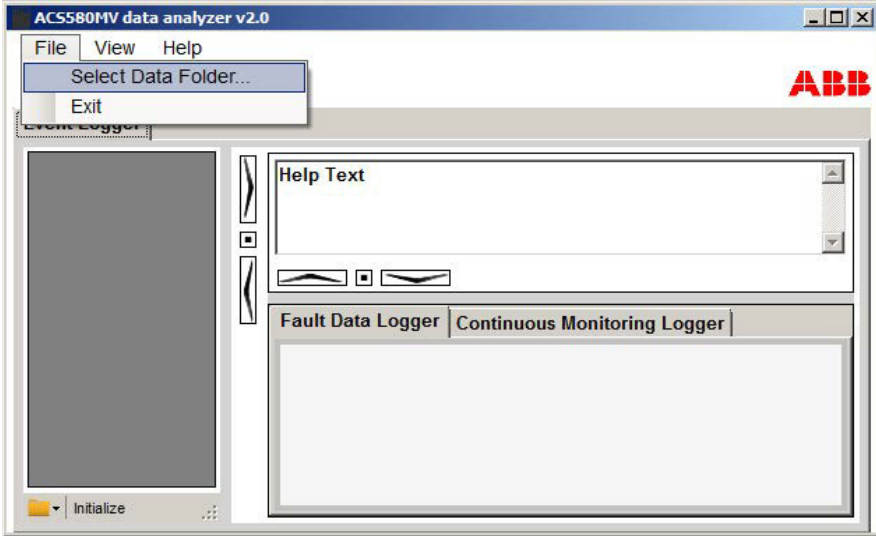


Figure: ACS580MV data analyzer

2. Select the data folder in the file system and click **Open**.

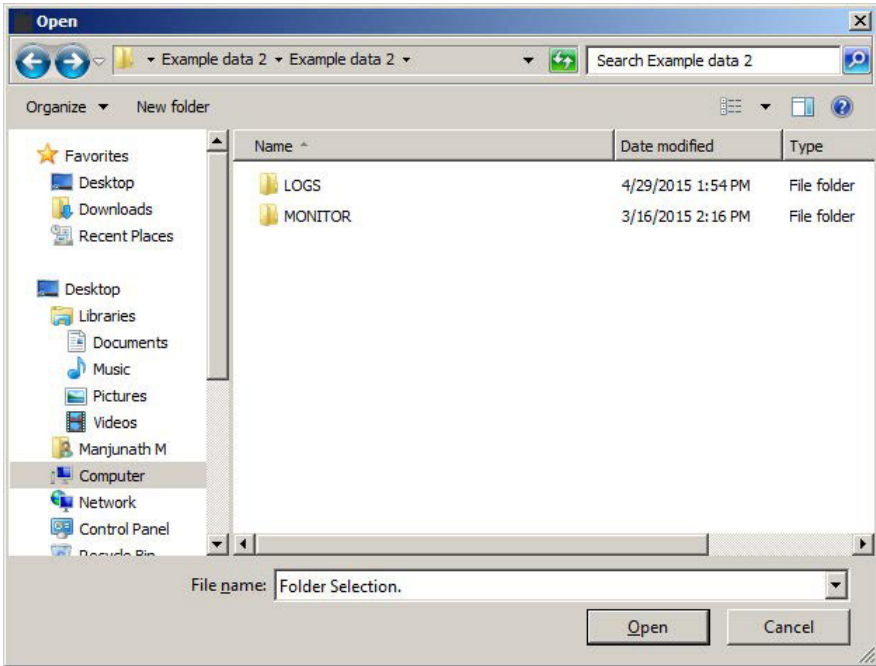


Figure: Folder selection

Note: The user must select the top folder that contains LOGS and MONITOR folders with event logs, fault data logger and continuous monitor logger files. The ACS580MV data analyzer processes all the files in the selected folder and its sub-folders and extract all the information.

ACS580MV data analyzer displays all the events in a form of chronological list containing the icon, time stamp, event code, event name and event aux code. Additionally, for each tripping fault (i.e. the first fault that activated after a drive was error free), the following data is available:

- Initial values: values of certain important drive parameters at the instant of fault activation.
- Fault data logger that can be plotted as a time plot.

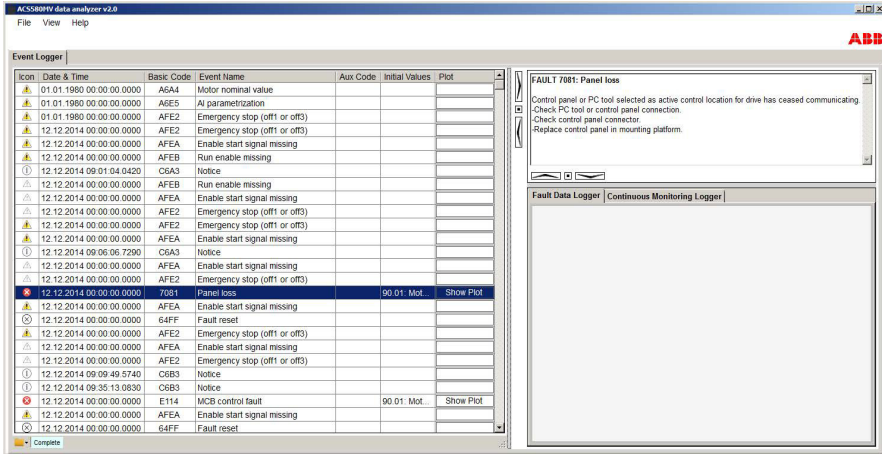


Figure: ACS580MV data analyzer

When the user selects an event in a list, the event type (fault or alarm), code and name with related help text are displayed in the top right pane.

3. In the status strip, click **Export All** in the drop-down list to export the event logger to the file system in .txt or .csv format.

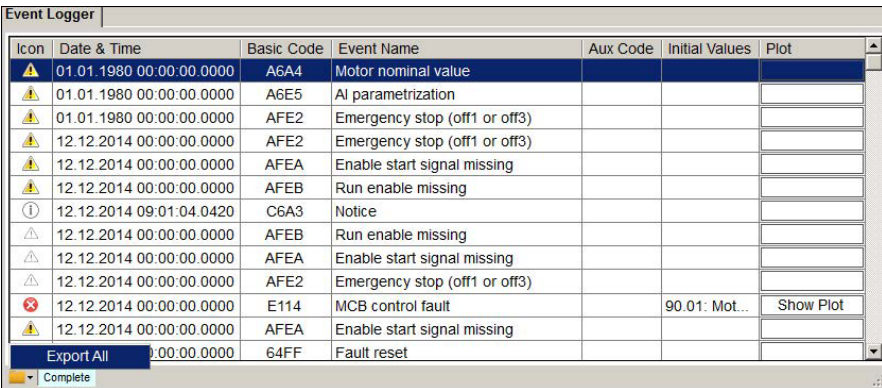


Figure: Export event logger

Fault data logger

Fault data logger displays the time plots of corresponding fault data logger. The user can select parameters to be displayed on graphs by checking and unchecking the check box next to parameter.

- Click **Show Plot** in the Event logger to view the time plot of the fault data logger on the right pane.

Icon	Date & Time	Basic Code	Event Name	Aux Code	Initial Values	Plot
🚫	12.12.2014 00:00:00.0000	7081	Panel loss		90 01 Mot...	Show Plot
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
🔄	12.12.2014 00:00:00.0000	64FF	Fault reset			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
🔔	12.12.2014 09:09:49.5740	C6B3	Notice			
🔔	12.12.2014 09:35:13.0830	C6B3	Notice			
🚫	12.12.2014 00:00:00.0000	E114	MCB control fault		90 01 Mot...	Show Plot
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
🔄	12.12.2014 00:00:00.0000	64FF	Fault reset			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
🔔	12.12.2014 09:37:33.4110	C6B3	Notice			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
🚫	12.12.2014 00:00:00.0000	1010	PEBB fault		90 01 Mot...	Show Plot
🚫	12.12.2014 00:00:00.0000	6112	PEBB undefined state		90 01 Mot...	Show Plot
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
⚠️	12.12.2014 00:00:00.0000	AFEB	Run enable missing			
⚠️	12.12.2014 00:00:00.0000	AFE2	Emergency stop (off1 or off3)			
⚠️	12.12.2014 00:00:00.0000	AFEA	Enable start signal missing			
⚠️	12.12.2014 00:00:00.0000	AFEB	Run enable missing			
🔔	12.12.2014 10:24:20.3520	C6A3	Notice			

FAULT E114: MCB control fault

MCB close command and MCB close feedback do not match.
 Check if MCB has tripped on its own, by means of short circuit protection relay or overload protection relay and adapt MCB protection relay settings if required.
 Check MCB control wiring between ACS580MV and MCB.

Fault Data Logger | Continuous Monitoring Logger

Time Plot 01: Voltage (V) vs Time (s). Y-axis: 0 to 6. X-axis: 0 to 0.5. Legend: 4.0V, 4.0V, 4.0V, 4.0V, 4.0V.

Time Plot 02: Voltage (V) vs Time (s). Y-axis: 0 to 50. X-axis: 0 to 0.5. Legend: 1.43, 1.44, 1.45.

Figure: Time plot

Note: Time plots are applicable for fault events only.

Fault data logger contains Settings, Alignment, Sync plots and Export options in the status strip drop-down list.

Settings

1. In the status strip, click **Settings** in the drop-down list to change the settings of the time plot.

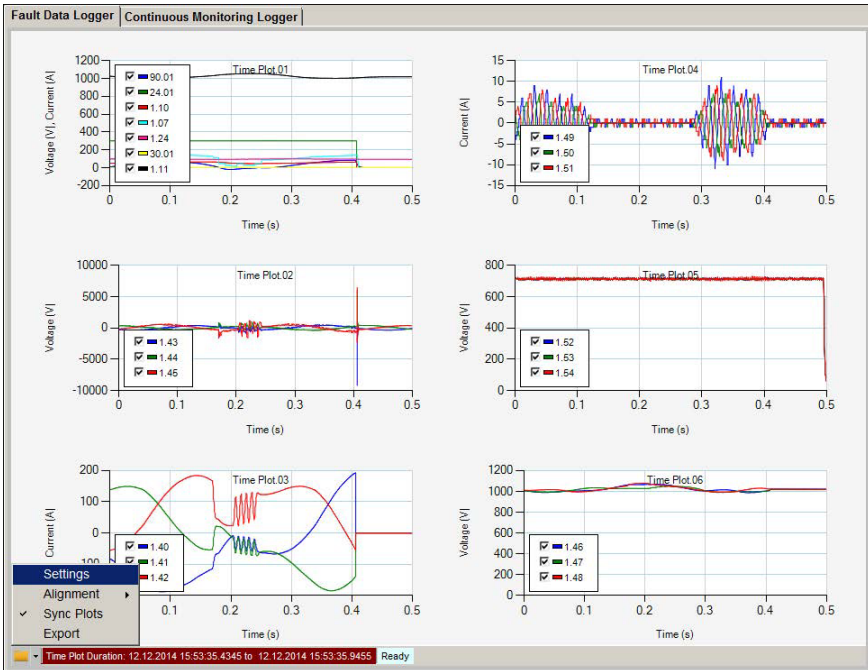


Figure: Time plot settings

2. In the Settings window, select the required time plots by selecting the check box.

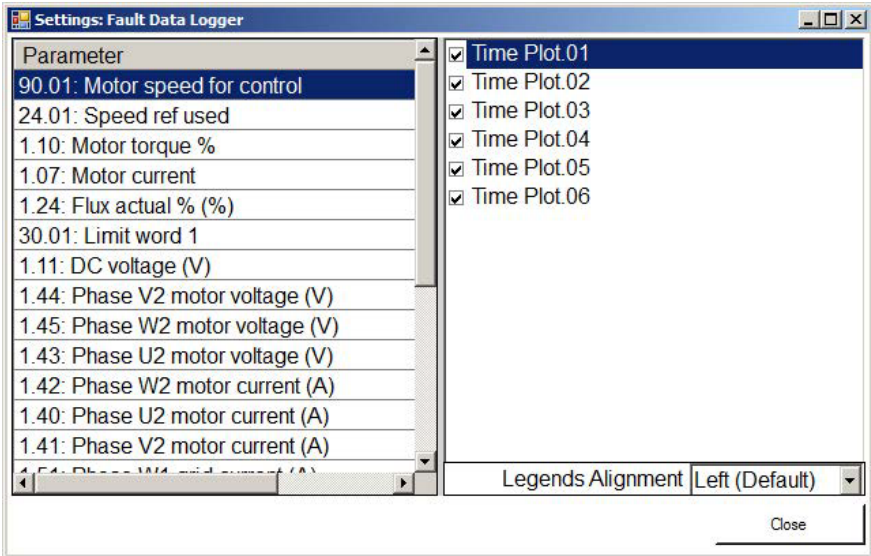


Figure: Settings

3. Select the desired option in **Legends Alignment** drop-down list to align the time plot parameter signals.

Alignment

Alignment allows the user to align the parameter signal list in the time plot data logger. The user can select the desired option in the Alignment option.

Sync plots

Sync plots allows the user to sync the time plot zoom and cursor position across all time plots.

Export

Export allows the user to export the time plot data logger to the file system in .txt or .csv format.

■ Continuous monitoring logger

Continuous monitoring logger collects the predefined drive data with slow sample time (10s to 500s, depending on particular drive parameter). Data collected in the Continuous monitoring logger are intended for analysis of the drive operation over longer periods of time. The user can select start and end date to view the time plot. All monitored drive parameters are grouped in several groups (called CML plots) that can be selected by right clicking on the graph area. To display or hide some of the parameters in the graph, check boxes next to parameter numbers can be used. Hovering with the mouse pointer over the parameter signal in the graph displays parameter name, sample time, sample value, average, minimum and maximum value.

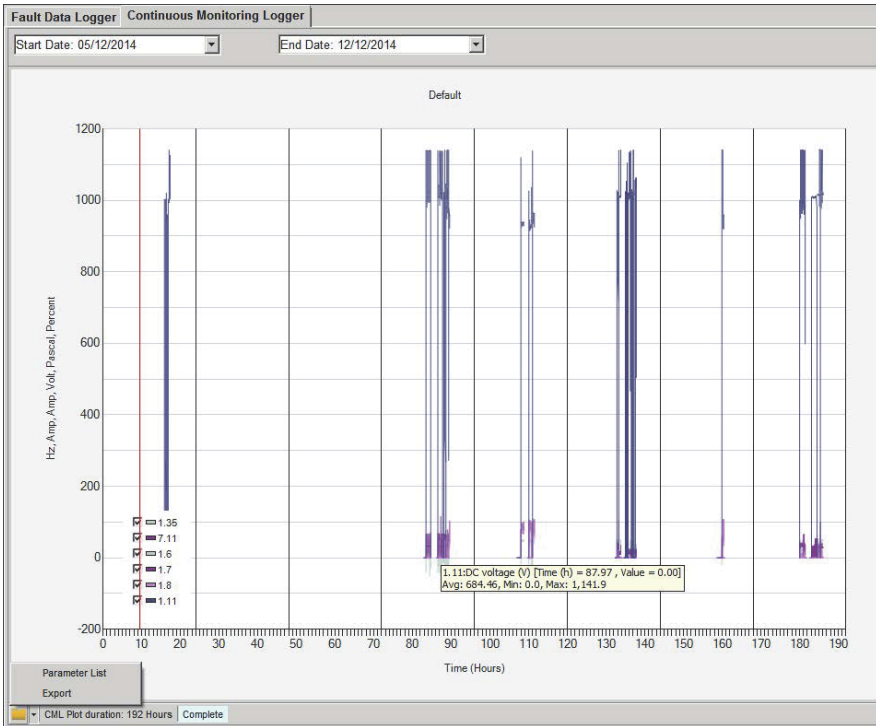


Figure: Continuous monitoring logger

Continuous monitoring logger allows to align the legends, parameter signal lists and to select the parameter groups (CML plots) by right-clicking on the graph area.

Continuous monitoring logger contains **Parameter list** and **Export** options in the status strip drop-down list.

Parameter list

Parameter list shows which drive parameters are contained in each of the CML plots. Following CML plots are available:

- Default
- Transformer temperatures
- IGBT temperatures (3 temperatures are measured)
- Charging relay temperatures
- Power module communication error counters
- Control hub communication error counters
- Power modules operating hours and total run time of the drive

Export

Export allows the user to export the time plot data logger to the file system in `.txt` and `.csv` format.

6

Drive Composer Support Package

Contents of this chapter

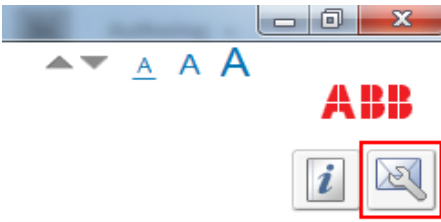
This chapter describes how to quickly collect data from a drive using the Support package functionality of Drive composer PC tool and how to analyse the data.

Support package

Support package collects the data stored in the event logger on BCU's memory unit. The event logger on the BCU's memory unit has very limited capacity and gets cyclically overwritten as new events happen. It can store information about the last 5 faults that tripped the drive, and the last 20 secondary events that occurred. Therefore, it cannot provide long term monitoring functionality that is described in chapter [Using ACS580MV Data Analyzer](#). Nevertheless, if collected immediately after an event that needs troubleshooting, the support package can collect valuable data from the drive. The support package can be created by the user of the drive and emailed to ABB Support line for investigation.

Support package is created in Drive composer PC tool by clicking on the icon in the top right corner of the tool window. By clicking on the icon shown in the figure below,

a file SupportFiles.dcsupport is created and attached to the default email program installed in the PC. The file can also be saved manually.



The support package contains following information from the drive:

- Parameter backup
- Event logger (including fault data loggers for tripping faults)
- System info.

The support package file can be opened in Drive composer PC tool (ver. 1.10 or newer):

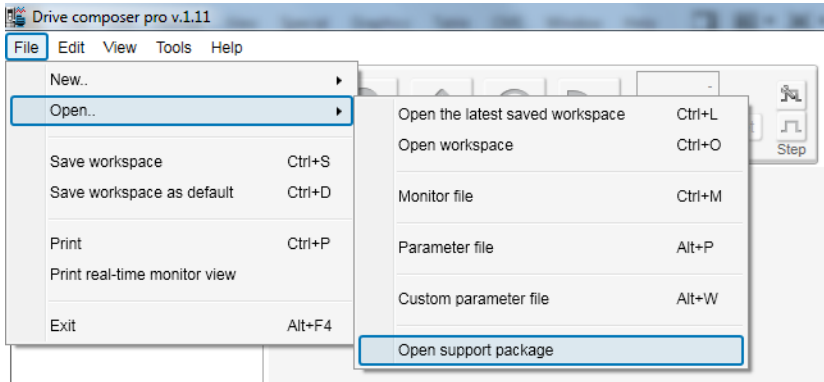


Figure: Opening the support package file in Drive composer

In Drive composer the data from support package are available in the “File drives” section:

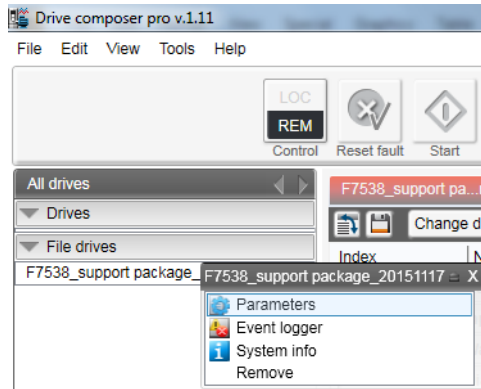


Figure: Drive data available in support package

Tripping faults in the event logger have a fault data logger attached (see chapter [Fault Tracing](#) for more details on the event logger and fault data logger). Fault data loggers can be seen in Online Monitor section of Drive composer. Just click on the plot icon next to a tripping fault in the event logger. This will open the data in graphical form in the Online Monitor section of Drive composer (lower part of Drive composer window). Opening the fault data logger will change the title of Online Monitor to “Data logger”:

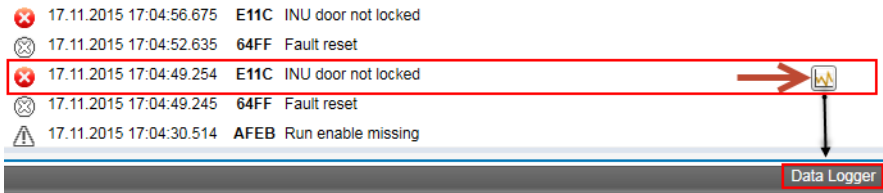


Figure: Plotting the fault data logger

For further analysis the fault data logger data can be exported in textual format that can be further processed in e.g. Matlab. The fault data logger data can be exported from Online Monitor / Data Logger section of Drive composer by selecting option “Export graph” and setting signals and samples to “All”:

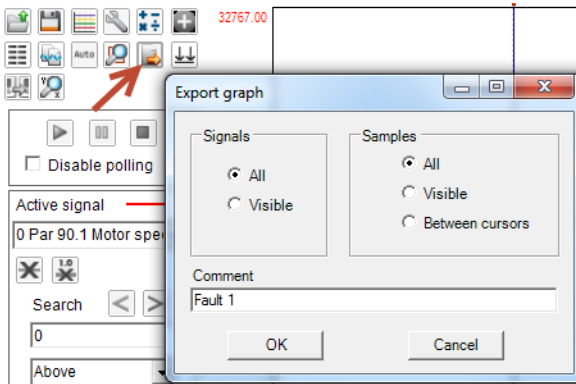


Figure: Exporting the fault data logger

The data from the fault data logger are exported in .dexp format. If Matlab is available, the data can be imported using ABB in-house script in the following way: `log_data = read_dexp('FileName.dexp')`. The script will plot the data in predefined format, like in the following figure. If Matlab is not available, the .dexp file can be imported and analyzed in Excel.

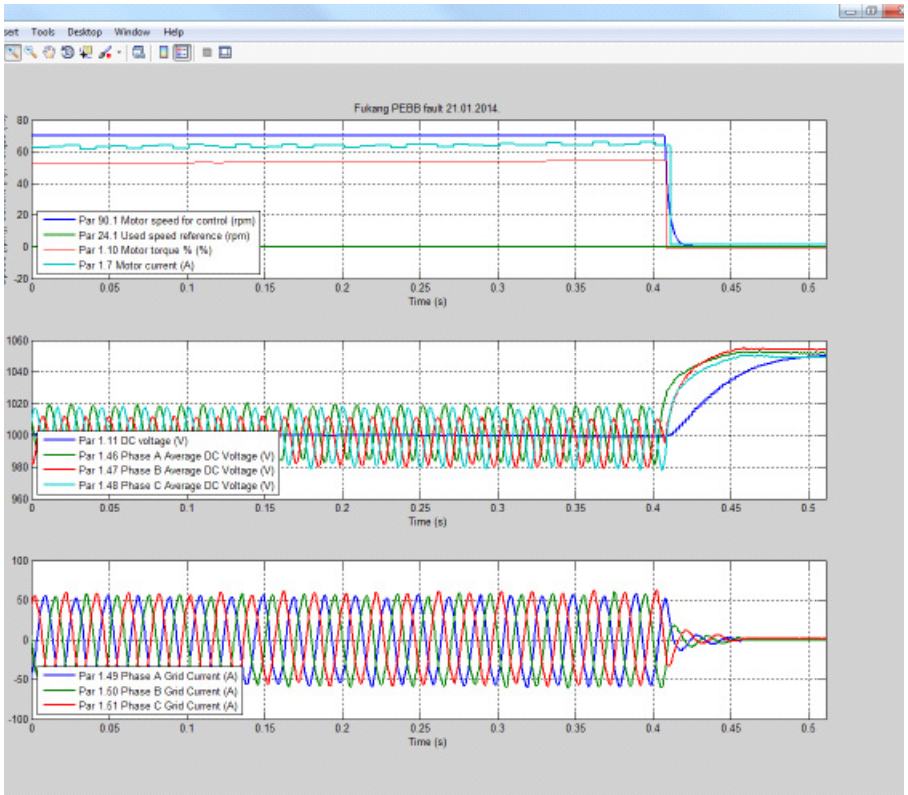
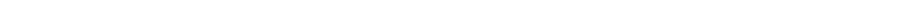


Figure: Example of fault data logger data plotted using Matlab script



7

POF Link Test

Contents of this chapter

This chapter describes how to use the parameters that control the POF link power between Control Hub and Power Modules, in order to early detect communication problems. The service pass-code is required to have access to these parameters in parameter group [95 HW configuration](#).

It is important to mention that, by enabling the half optical power, a degradation of – **3dBm** is introduced in the optical link. According to previous tests performed on one drive, the transmitter optical power is **-15.7dBm**, at full power, 25°C and 10m cable, resulting in **-18.7dBm** at half power. However, the communication problems experienced on one drive were correlated to POF cables with an optical power of **-30dBm**. That means that results of the test described in this chapter might not be conclusive.

Communication problems are observed through the parameters:

- 70.12/32/52..., Hub RX comm err count A1/A2/A3 ...
- 71.12/32/52..., Hub RX comm err count B1/B2/B3 ...
- 72.12/32/52..., Hub RX comm err count C1/C2/C3 ...

and

- 70.5/25/45..., PM RX comm err count A1/A2/A3 ...
- 71.5/25/45..., PM RX comm err count B1/B2/B3 ...
- 72.5/25/45..., PM RX comm err count C1/C2/C3 ...

Note the normal behavior of these counters is to jump to an initial value that is different from 0, after the drive is charged. The parameter “Hub RX comm err count XX” can have an initial value in the range of 5 to 10 and the parameter “PM RX comm err count XX” can have an initial value in the range of 50 to 100. So for the tests

described in this chapter the counters should be observed only after completing the charging sequence of the drive.

Link from power modules (TX) to control hub (RX)

The POF transmitter power on the Power Module is controlled with the parameter [95.70 PM half optical power](#).

■ Test POF-1: PM TX Full Power

Test steps

Charge the drive.

Set parameter [95.55 Control hub half optical power](#) to **Disable** to have the full power on the Control Hub TX POF link.

Set parameter [95.70 PM half optical power](#) to **Disable** to have the full power on the PM TX POF link.

Observe the following parameters:

- 70.12/32/52..., Hub RX comm err count A1/A2/A3 ...
- 71.12/32/52..., Hub RX comm err count B1/B2/B3 ...
- 72.12/32/52..., Hub RX comm err count C1/C2/C3 ...

Test results

PASS: the observed Hub RX comm err counters can have an initial value different from 0, but **DO NOT** have variation for more than 10 minutes. → In this case, execute the test [Test POF-2: PM Tx Half Power](#).

FAIL: the observed Hub RX comm err counters have **ANY** variation during 10 minutes. This indicates that the PM transmitter is not delivering the data as expected → In this case, skip the test [Test POF-2: PM Tx Half Power](#) and follow the instructions given in section [What to do in case tests POF-1 or POF-2 fail](#).

■ Test POF-2: PM Tx Half Power

Test steps

Charge the drive.

Set parameter [95.55 Control hub half optical power](#) to **Disable** to have the full power on the Control Hub TX POF link.

Set parameter [95.70 PM half optical power](#) to **Enable** to have the half power on the PM TX POF link.

Observe the following parameters:

- 70.12/32/52..., Hub RX comm err count A1/A2/A3
- 71.12/32/52..., Hub RX comm err count B1/B2/B3 ...
- 72.12/32/52..., Hub RX comm err count C1/C2/C3 ...

Test results

PASS: the observed Hub RX comm err counters can have an initial value different from 0, but **DO NOT** have variation for more than 10 minutes → In this case, execute the test [Test POF-3: Hub TX Full Power](#).

FAIL: the observed Hub RX comm err counters have **ANY** variation during 10 minutes. This indicates that the PM transmitter is not delivering the data as expected → In this case, skip the test [Test POF-3: Hub TX Full Power](#) and follow the instructions given in section [What to do in case tests POF-1 or POF-2 fail](#).

■ What to do in case tests POF-1 or POF-2 fail

In case tests [Test POF-1: PM TX Full Power](#) or [Test POF-2: PM Tx Half Power](#) fail, the following steps can be executed:

1. Check/exchange the POF link cable between the Control Hub receiver and the PM transmitter of the failed Hub RX comm err counter. Repeat the failed tests.
 2. In case point 1 does not solve the problem, exchange the PM connected to the failed Hub RX comm err counter. Repeat the failed tests.
-

Link from control hub (TX) to power modules (RX)

The POF transmitter power on the Control Hub is controlled with the parameter [95.55 Control hub half optical power](#).

■ Test POF-3: Hub TX Full Power

Test steps

Charge the drive.

Set parameter [95.55 Control hub half optical power](#) to **Disable** to have the full power on the Control Hub TX POF link.

Set parameter [95.70 PM half optical power](#) to **Disable** to have the full power on the PM TX POF link.

Observe the following parameters:

- 70.5/25/45..., PM RX comm err count A1/A2/A3 ...
- 71.5/25/45..., PM RX comm err count B1/B2/B3 ...
- 72.5/25/45..., PM RX comm err count C1/C2/C3 ...

Test results

PASS: the observed PM RX comm err counters can have an initial value different from 0, but **DO NOT** have variation for more than 10 minutes → In this case, execute the test [Test POF-4: Hub Tx Half Power](#).

FAIL: the observed PM RX comm err counters have **ANY** variation during 10 minutes. This indicates that the Control Hub transmitter, placed on the daughter board, is not delivering the data as expected → In this case, skip the test [Test POF-4: Hub Tx Half Power](#) and follow the instructions given in section [What to do in case tests POF-3 or POF-4 fail](#).

■ Test POF-4: Hub Tx Half Power

Test steps

Charge the drive.

Set parameter [95.55 Control hub half optical power](#) to **Enable** to have the half power on the Control Hub TX POF link.

Set parameter [95.70 PM half optical power](#) to **Disable** to have the full power on the PM TX POF link.

Observe the following parameters:

- 70.5/25/45..., PM RX comm err count A1/A2/A3 ...
 - 71.5/25/45..., PM RX comm err count B1/B2/B3 ...
 - 72.5/25/45..., PM RX comm err count C1/C2/C3 ...
-

Test results

PASS: the observed PM RX comm err counters can have an initial value different from 0, but **DO NOT** have variation for more than 10 minutes → In this case, the test is finished.

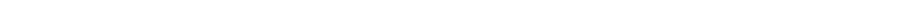
FAIL: the observed PM RX comm err counters have **ANY** variation during 10 minutes. This indicates that the Control Hub transmitter, placed on the daughter board, is not delivering the data as expected → In this case, follow the instructions given in section [What to do in case tests POF-3 or POF-4 fail](#).

Second FAIL criteria: By using the Hub TX half power, it can happen that the drive trips with the message “Control hub missing PM” indicating already the POF link that has a problem → In this case, the respective communication error counter does not need to be observed, and the instructions given in section [What to do in case tests POF-3 or POF-4 fail](#) can be directly applied.

■ What to do in case tests POF-3 or POF-4 fail

In case the test fail the following steps can be executed:

1. Check/exchange the POF link cable between the Control Hub transmitter and the PM Receiver of the failed PM RX comm err counter. Repeat the failed test.
 2. In case point 1 does not solve the problem, exchange the Control Hub daughter board connected to the failed PM RX comm err counter. Repeat the failed test.
-





Inspecting Power Modules

Contents of this chapter

In order to detect a malfunction or a failed component in a power module, the tests described in this chapter shall be carried out. If tests identify a failure in the power module, perform investigation steps to solve the problems as recommended.

ABB will also do further analysis and repair.

Safety



DANGER

High voltage!

Obey the instructions given in chapter 1 **Safety instruction** and chapter 12 **Maintenance** of the [ACS580MV hardware manual](#). If you ignore them, injury or death, or damage to the equipment can occur.

Before starting to work on the drive, make sure:

- that the main and auxiliary power supply to the drive is switched off, locked out, and tagged out
- that the drive is dead
- that safety ground connections are in place
- that personal protective equipment is provided and used when required
- that everyone involved is informed.

Before energizing the drive, make sure:

- that all foreign objects are removed from the drive
- that all internal and external covers are securely fastened and all doors are closed, locked and / or bolted
- that the release dials of safety switches are in the locked position.

Process

To detect a faulty power module, proceed with

- Visual inspection
- Measure the resistance of fuses
- Measure if DC link is short circuited
- Measure the diodes of rectifier and IGBT

Additional Notes:

- Tests are intended to verify malfunction.
 - Upload measurements to MoR after all tests specified in section [Measurement steps](#) are performed.
 - Refer to [Warranty directive](#) when sending failed power modules back.
 - If failure can still not be identified, do analysis according [Known Problems](#).
-

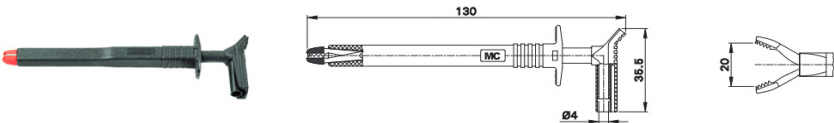
Required tools and equipment

Besides the tools required in chapter 12 in [ACS580MV hardware manual](#), below equipment is required for measuring.

1. Multi-meter, for example, Fluke 87, which can measure diode turn-on voltage and resistance.



2. Test clip, MINIGRIP-XCI from Multi-Contact is recommended which can be used on R1-R9 power modules.



Measurement steps

Disconnect 3 phase inputs (U/V/W) and 2 outputs (VAC1/VAC2) cables from the power module. To make it easier to connect test clip for DC+, slide the power module out properly.

To do this, follow the instructions of [ACS580MV hardware manual](#) chapter 12: Maintenance - replacing the power modules.

■ Visual inspection

Take pictures if there is any finding during visual inspection.

1. Check visually if there is any serious mechanical deformation.
2. Check visually if the heatsink is dirty.
3. Check visually if there is any arcing mark between input busbars and housing. If there is an arcing mark, this power module is faulty and there was short circuit. In

this case replace it with a new power module and send the failed power module back to ABB for further analysis.

4. Check visually if the fuses (phase V and W if power module is R1-R6, Phase U and V if power module is R7-R9) on front side of power module are open. If the fuse is open, please continue with measurement as described in sections [Measure the resistance of fuses](#) (page 120), [Measure if DC link is short circuited](#) (page 120) and [Measuring the diodes of rectifier and IGBT](#) (page 121). For location of different measuring points refer to pictures given in section [Measuring points](#).

■ Measure the resistance of fuses

Measure the resistance of the fuses using the multi-meter in resistor test mode.

Fuses resistance measurements - Healthy Power Module			
Test item	Plus probe	Minus probe	Allowed values
1	Fuse1_1	Fuse1_2	<0.5 Ohm
2	Fuse2_1	Fuse2_2	<0.5 Ohm

Table 1 Fuse resistance measurements - Healthy Power Module

If the measured values differ from the allowed values in Table 1, continue with the measurements as described in section [Measure if DC link is short circuited](#) and [Measuring the diodes of rectifier and IGBT](#). If the power module passed all tests in section [Measure if DC link is short circuited](#) and [Measuring the diodes of rectifier and IGBT](#) replace the fuse with a new one (refer to [ACS580MV hardware manual](#) chapter 12: Maintenance - replacing the power module fuse) and start the drive again.

■ Measure if DC link is short circuited

Measure the resistance of DC link using the multi-meter in resistor test mode.

DC link short circuit measurement - Healthy Power Module			
Test item	Plus probe	Minus probe	Allowed values
3	DC +	DC -	>0.5 Ohm

Table 2 DC link resistance measurements - Healthy Power Module

If the measured values differ from the allowed values in Table 2, replace with a new power module and send failed power module back to ABB for further analysis.

■ Measuring the diodes of rectifier and IGBT

Measure the diode turn-on voltage across the measuring points shown in section [Measuring points](#) using the multi-meter in diode test mode.

Diodes measurements - Healthy Power Module			
Test item	Plus probe	Minus probe	Allowed values
4	DC -	U	0.2V~0.8V
5	DC -	V	0.2V~0.8V
6	DC -	W	0.2V~0.8V
7	U	DC+	0.2V~0.8V
8	V	DC+	0.2V~0.8V
9	W	DC+	0.2V~0.8V
10	DC -	VAC1	0.2V~0.8V
11	DC -	VAC2	0.2V~0.8V
12	VAC1	DC+	0.2V~0.8V
13	VAC2	DC+	0.2V~0.8V

Table 3 Diodes measurements - Healthy Power Module

If the measured values differ from the allowed values in Table 3, replace with a new power module and send failed power module back to ABB for further analysis.

■ Measuring points

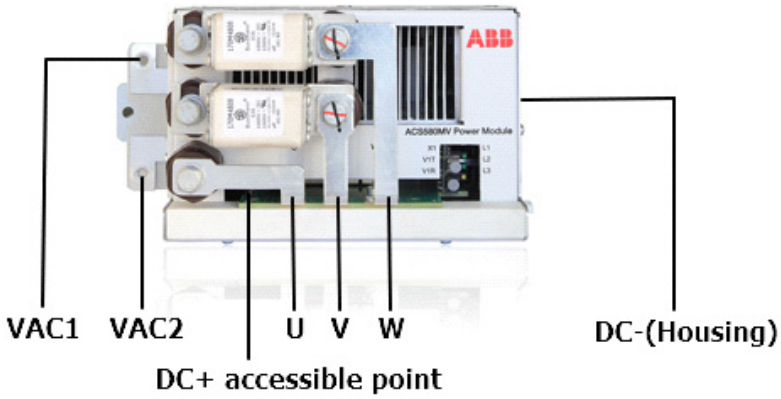


Figure 1: R1-R3 power module – Measuring points

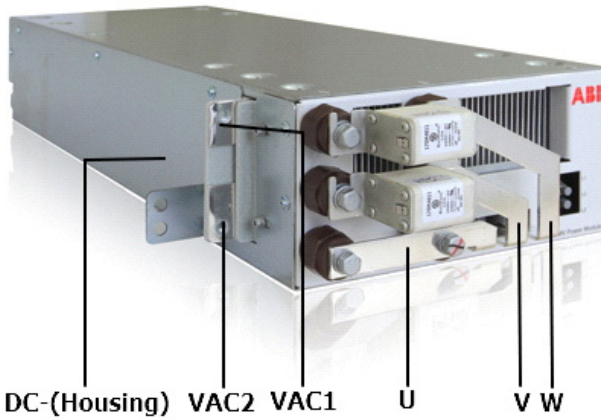


Figure 2: R4-R6 power modules – Measuring points 1



Figure 3: R4-R6 power modules – Measuring points 2

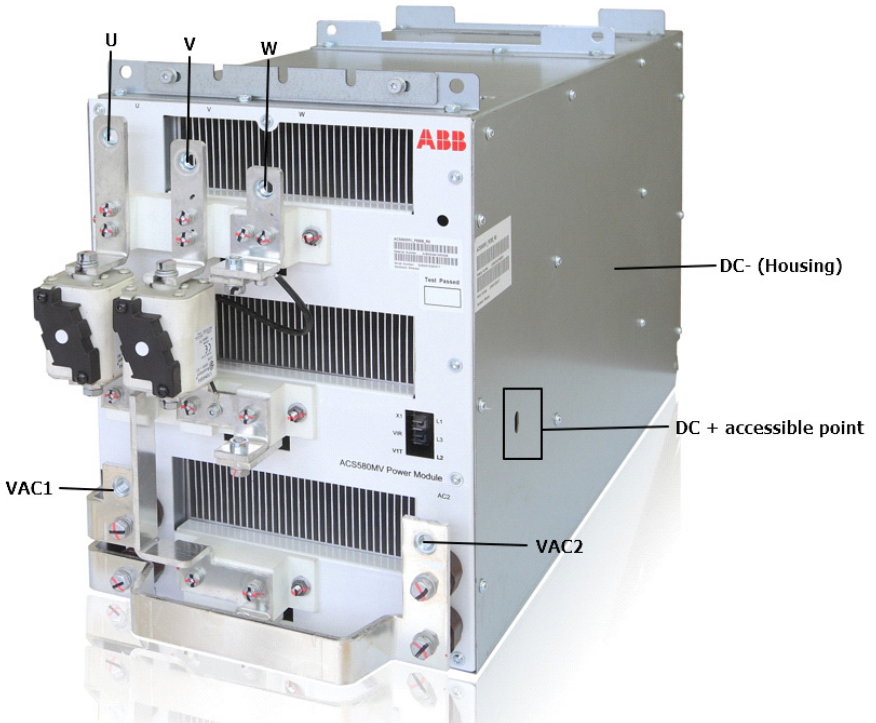


Figure 4: R7-R9 power modules – Measuring points

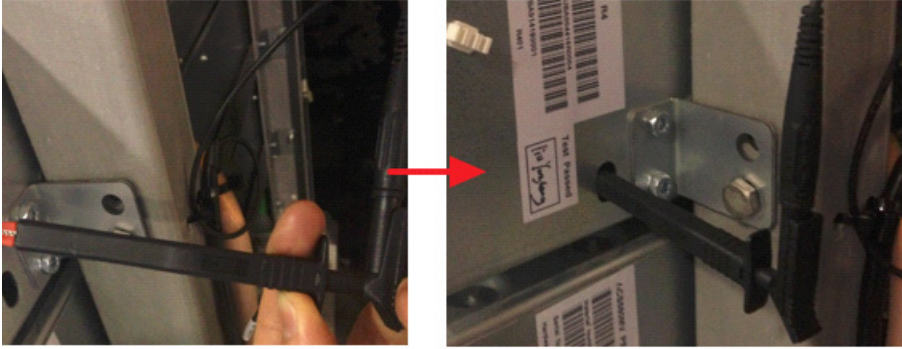


Figure 5: How to use the clip to access DC+ point (R1-R9)

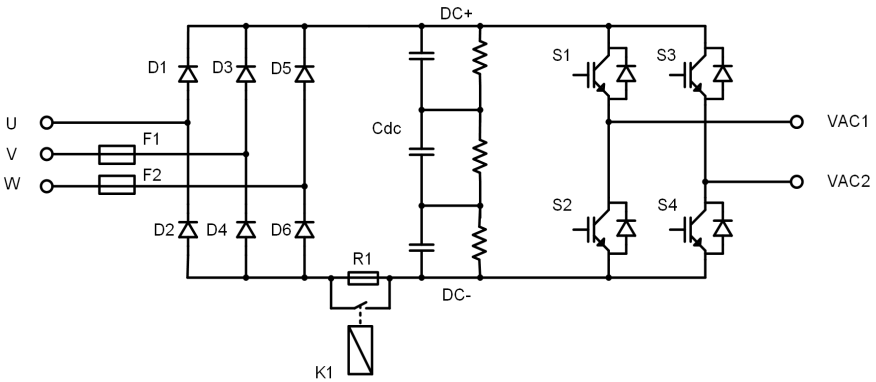


Figure 6: R1-R6 power modules main circuit diagram

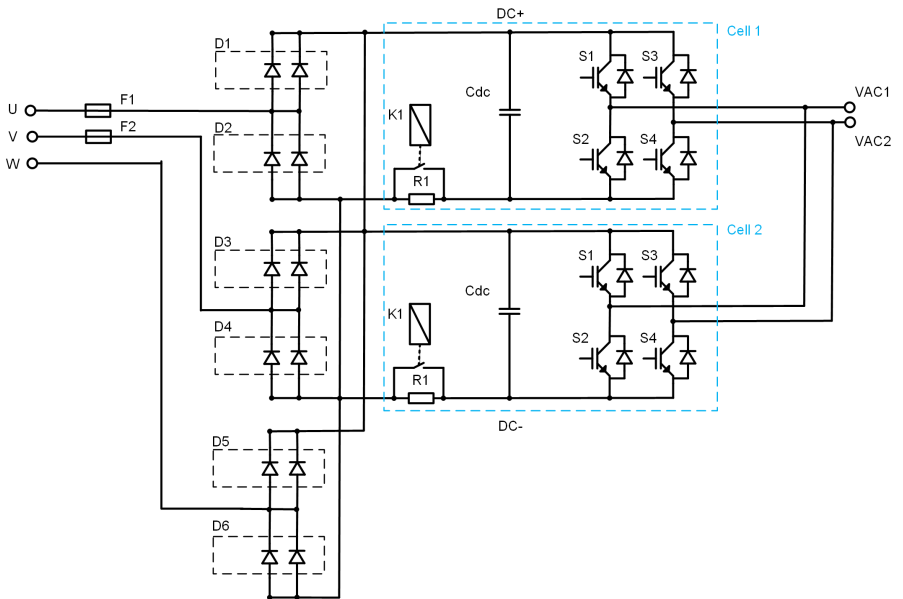


Figure 7: R7 power module main circuit diagram

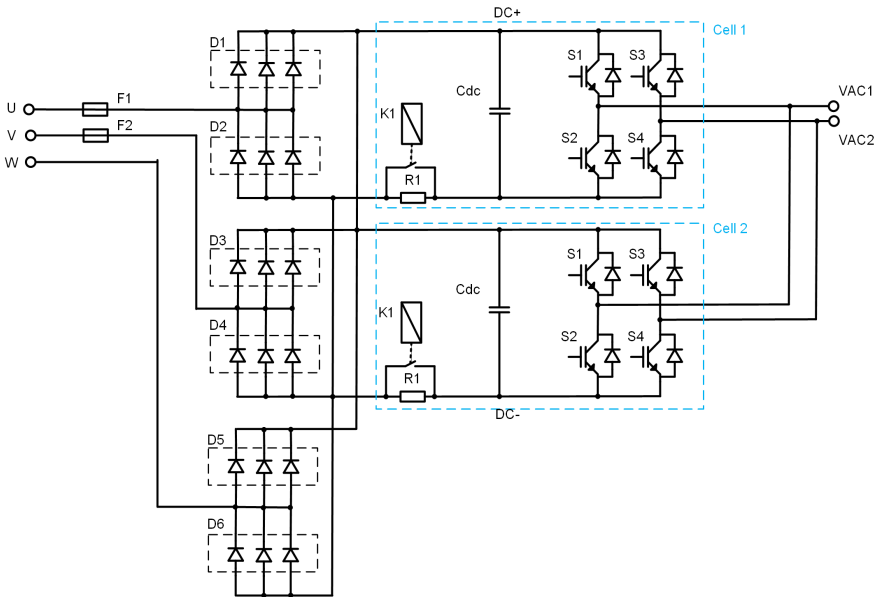


Figure 8: R8 power module main circuit diagram

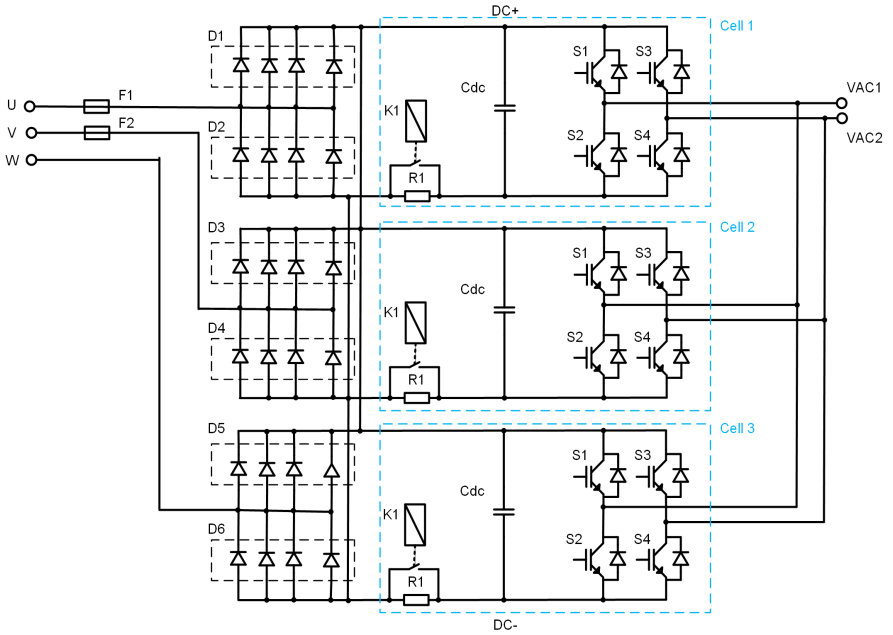


Figure 9: R9 power module main circuit diagram

Record Table

Measurements - Healthy Power Module				
Converter serial number:				
Power module serial number:				
Power module material number:				
Power module HW release:				
Power module position:				
Visual Inspection			YES	NO
1 Warranty sticker is complete.				
2 Serious mechanical deformation is observed.				
3 Heatsink is dirty.				
4 Arcing mark is observed.				
5 Fuse indicator is open.				
Test item	Plus probe	Minus probe	Allowed values	Measured values
1	Fuse1 1	Fuse1 2	<0.5 Ohm	
2	Fuse2 1	Fuse2 2	<0.5 Ohm	
3	DC+	DC-	>0.5 Ohm	
4	DC -	U	0.2V~0.8V	
5	DC -	V	0.2V~0.8V	
6	DC -	W	0.2V~0.8V	
7	U	DC+	0.2V~0.8V	
8	V	DC+	0.2V~0.8V	
9	W	DC+	0.2V~0.8V	
10	DC -	VAC1	0.2V~0.8V	
11	DC -	VAC2	0.2V~0.8V	
12	VAC1	DC+	0.2V~0.8V	
13	VAC2	DC+	0.2V~0.8V	

How to open the power module (PEBB)

■ Preparation

Before starting any work on the PEBB, please make sure safety rules have been applied, see as chapter [Safety](#).

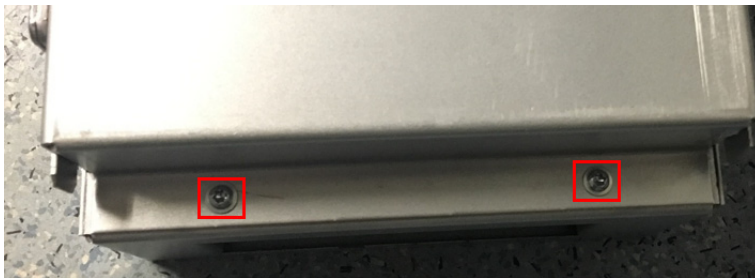
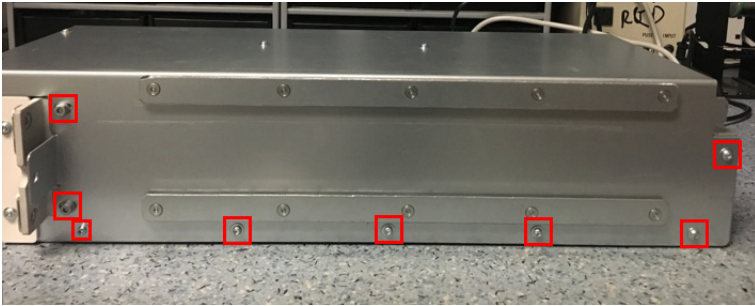
Necessary tools:

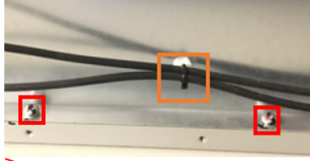


Index	Tool Type
1	Cable cutter
2	Sharp-nose plier
3	Combination screwdriver
4	T25 torx bit
5	Protective gloves
6	Auto screwdriver

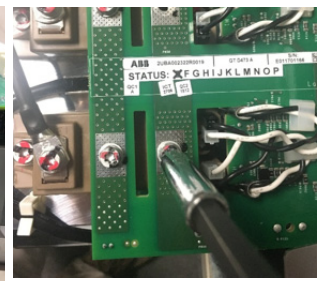
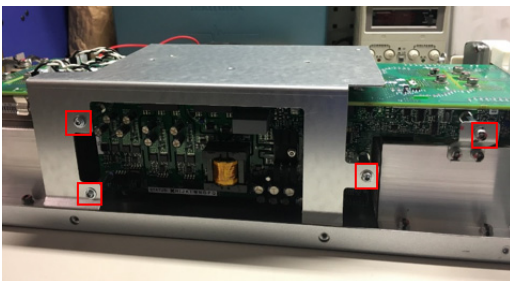
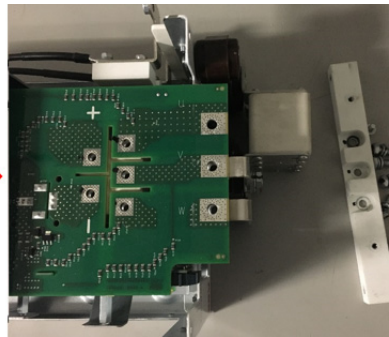
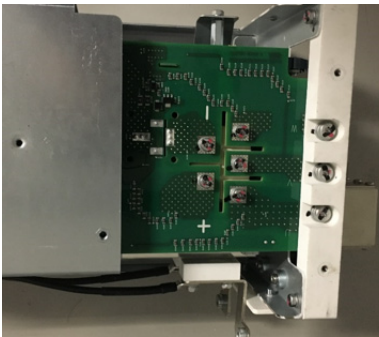
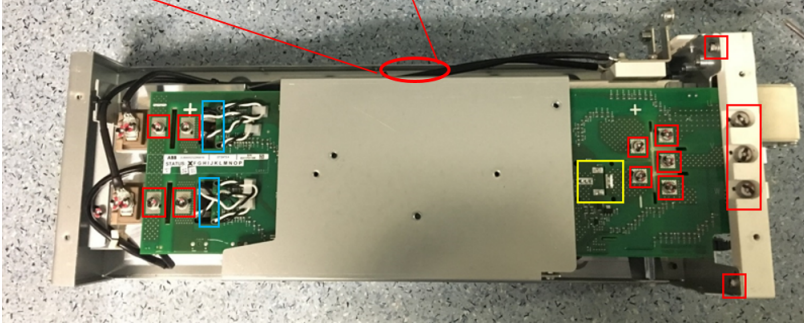
■ **Open the Power Module**

Step 1: remove red marked screws and open the PEBB.



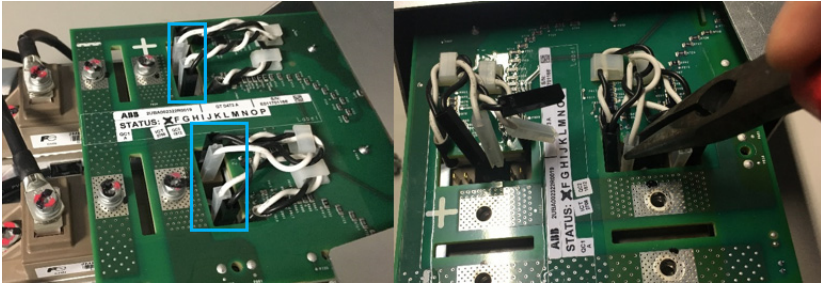


Side plate of the PEBB;
Remove red marked screws;
Open orange marked cable strap

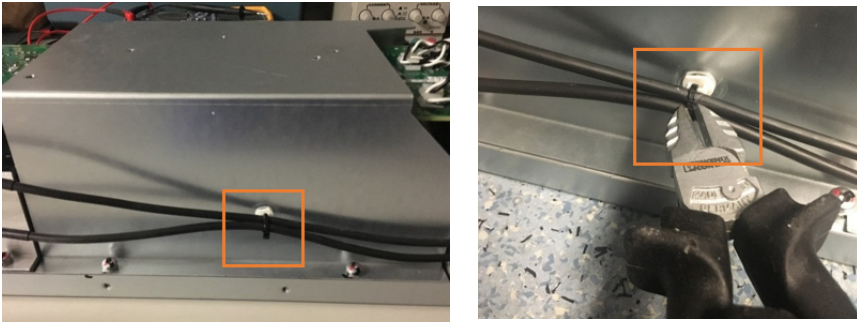


Unscrew all red marked screws.

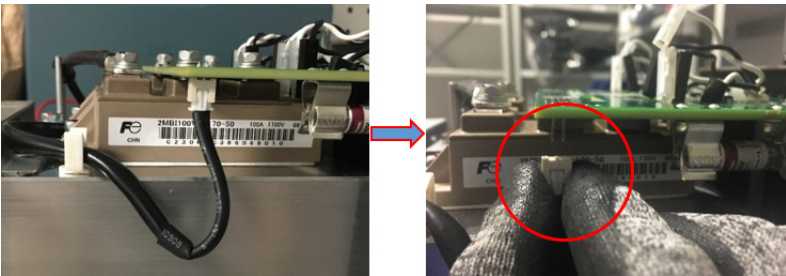
Step 2. Unplug the gate emitter connection.



Step 3. Release output voltage cable from cable clamp.

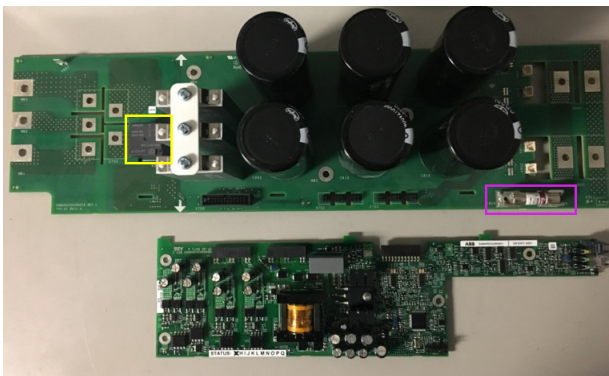
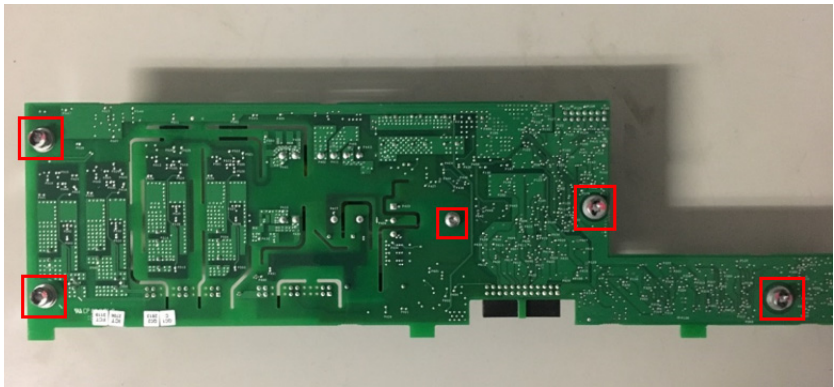
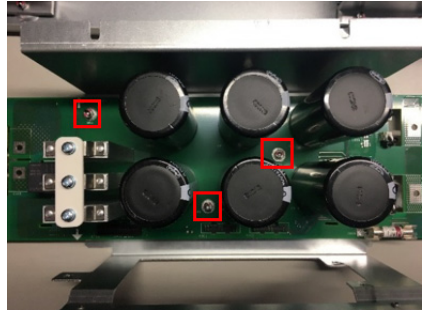
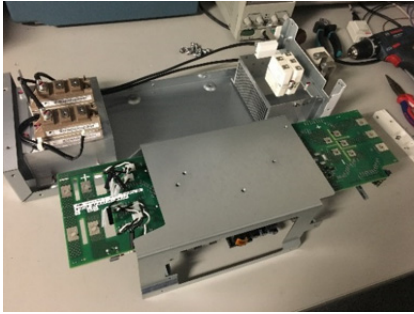


Step 4. Remove cable.



Step 5. Separate HCB board and CB board from holder.

Remove screws marked in red



Yellow:charging relay
Pink internal fuse: shall be always checked with multimeter for resistance; If fuse is open, needs to be reported to support line.

Known Problems

Should help field service engineer to diagnose some ACS580MV top known problems on site so that ABB can provide customers with faster resolutions and better experiences.

■ KP1252 Arc inside charging relay causes power module fault

Description of the problem

At the very beginning of charging, full voltage (about more than 1000V DC) applied on charging resistor R1 (also between one main contact and coil of K1), somehow the insulation breaks down inside K1 (the arc we found inside charging relay). High voltage goes to relay control circuit and causes some visible damage on Heavy Copper Board (HCB) or on Control Board (CB).

The reason why there is an arc inside relay is that liquid goes onto the sealed relay during manufacturing. New produced boards are free of the problem.

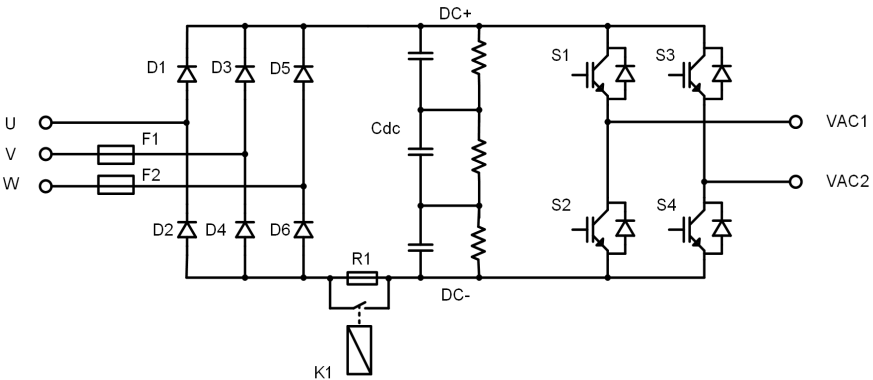


Figure 10: Main Circuit of Power Module

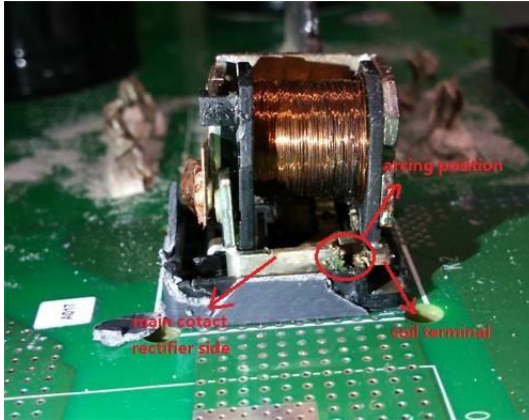


Figure 11: Arc inside relay

How to identify the problem on site

Fault Messages

This failure happens at the very beginning of charging, but you may not detect the failure during charging phase sometimes. Because there is no feedback from relay, it really depends on how severe the arcing is. You may get this fault when running the motor (at the beginning), large voltage dropping on charging resistor (relay is open) causes “diode fault” or “input voltage deviation”. Possible fault message:

- A.3234 PM +5V power supply regulation fault (usually on R4 - R6)
- B.3237 PM input voltage deviation (usually on R1 - R3)
- C.3239 PM diode open circuit (usually on R1 – R3)

Hardware Failure

If you observe one of below phenomenon, charging relay failure probably is the root cause.

1. Q802 on HCB board is exploded, which is close to relay area and could be observed after removing the cover of power module. (usually on R1 – R3, fuse on front face may open)

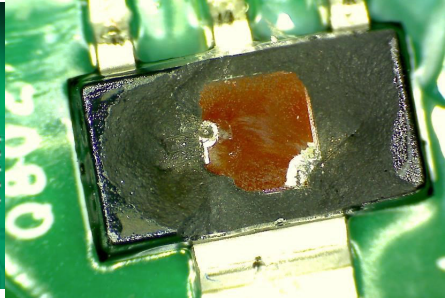
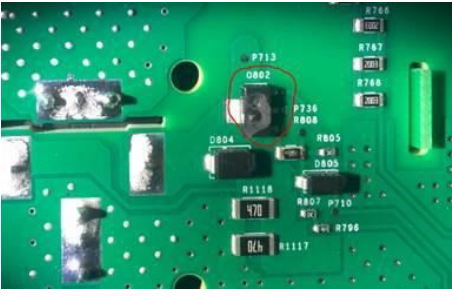


Figure 12: Q802 position

Figure 13: Q802 exploded

2. U605 or Q603 on control board burned, which is close to material label areas and could be observed after removing the cover of power module. (usually on R4 – R6)

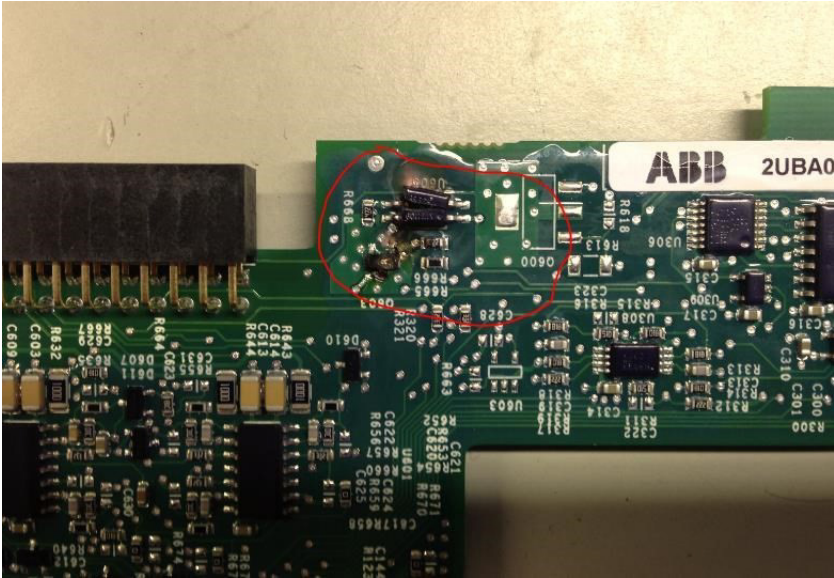


Figure 14: U605 burned on control board



Figure 15: Q603 burned on control board

How to solve the problem on site

After identifying the problem, we suggest that:

1. Send all available failure information (plus serial number of failed PCBA and power module) to support line for further double check. ABB can recheck if this power module is within the affected batch.
2. No repair is required and wait for instructions from support line.

■ KP1299 De-lamination of fiber optic cause communication failure

Description of the problem

Fiber optic is MSD (Moisture Sensitive Device), it can absorb moisture in high humidity environment and lead to delamination at period of mounting.

Delamination is a failure mechanism which affects the interfacial bond between two different material systems. Delamination occurs when an external force was put on two different materials with diverse coefficient of thermal expansion. For plastic packages, delamination usually happen when fiber optic is exposed to high humidity environment. When fiber optic's moisture sensitive part is soldering, high temperature vaporizes moisture rapidly which causes enormous pressure between the interface of two materials, and lead to delamination of fiber optic.

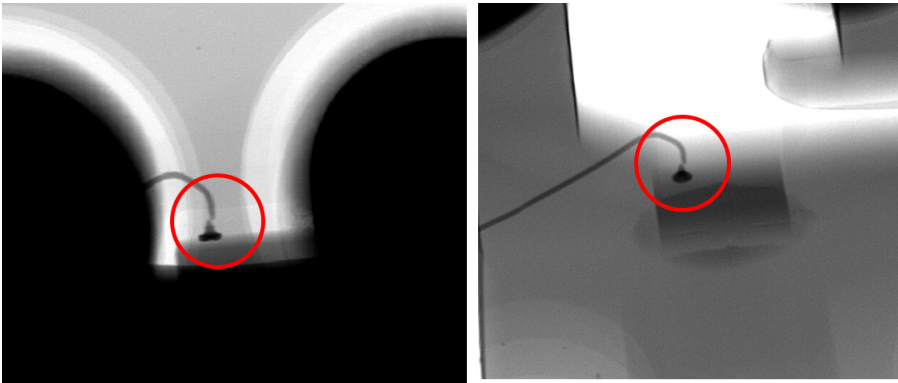


Figure 16: Delamination of fiber optic under X-ray

How to identify the problem on site

Fault Message

Delamination of fiber failure always happens with communication failure, below message can indicate that problem:

1. Control hub missing PM
2. Program download failed

How to analyze Failure

Quick verification with a cable, SAP number tbd can be done on field if FOR still ok or not.

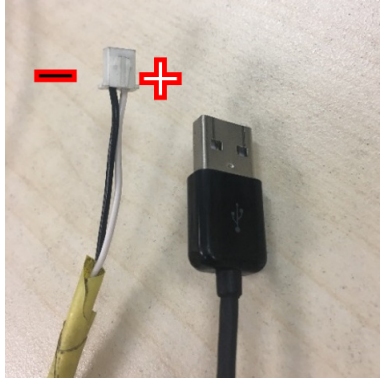
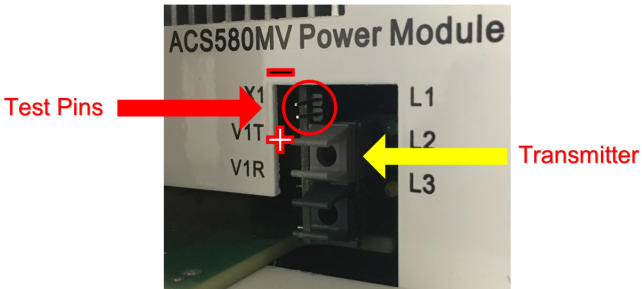


Figure 17: USB-5V power cable

Figure 18 shows, the interface of test pins which can be accessed from outside the PEBB to connect the USB cable for verification.



If there is no red light after connecting the pins correctly to the USB cable, the fiber optic sender is damaged.

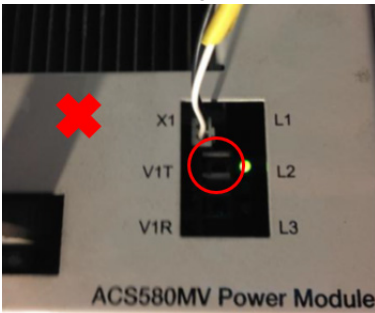


Figure 19: Fiber optic is damaged

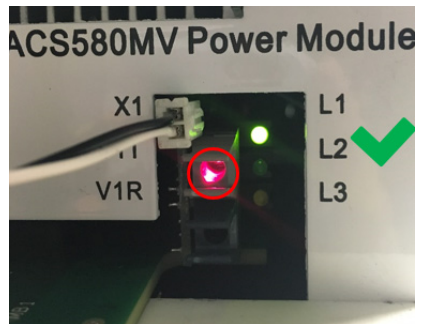


Figure 20: Fiber optic is ok

How to solve the problem on site

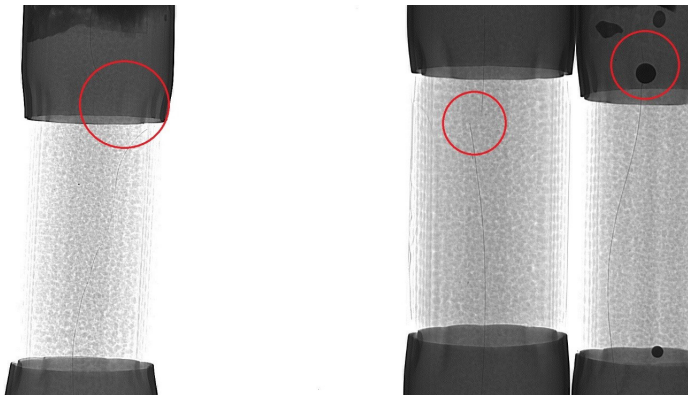
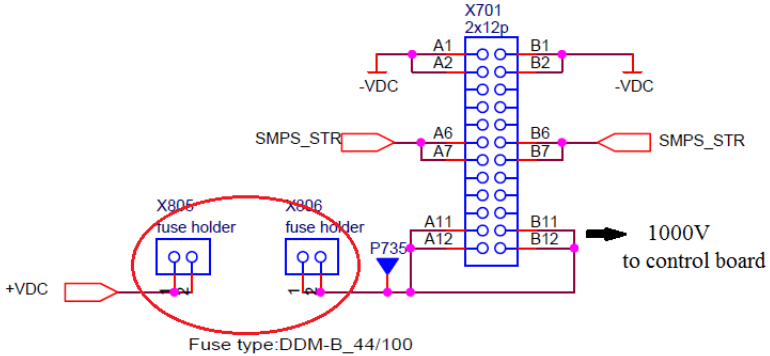
After identifying the problem, we suggest that:

Send all available failure information (plus serial number of failed PCBA and power module) to support line.

KP1249 Fuse of PM control power loop failure causes control hub missing power module fault

Description of the problem

Fuse on HCB of power module open and cause control board cannot work.



How to identify the problem on site

Fault Messages

Fuse on HCB was broken usually invite Control Hub Missing PM on site. Because of control board doesn't work, so power module cannot communicate with control hub.

To identify this fault we can use USB-5V cable, if control hub missing happened and fiber optic is work well, fuse on HCB should be checked.

How to analyze Failure

Please refer section [Open the Power Module](#) to open the PEBB first. And you can find fuse link following photos.



Left photos are PEBB0 frame, right photos are PEBB1 frames.

Use multimeter plus and minus probes test two holders of fuse, the value should lower than 1 ohm.



How to solve the problem on site

If the fuse on HCB broken was the root cause, we suggest replace broken fuse and send all available failure information (plus serial number of failed PCBA and power module) to support line.

Contact us

www.abb.com/drives

www.abb.com/drivespartners

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