

14

Fault tracing

What this chapter contains

The chapter tells how to reset faults and view fault history. It also lists all alarm and fault messages including the possible cause and corrective actions.

Safety



WARNING! Only qualified electricians are allowed to maintain the drive. Read the safety instructions in chapter [Safety](#) on page [15](#) before you work on the drive.



Alarm and fault indications

Fault is indicated with a red LED. See section [LEDs](#) on page [323](#).

An alarm or fault message on the panel display indicates abnormal drive status. Using the information given in this chapter most alarm and fault causes can be identified and corrected. If not, contact an ABB representative.

The four digit code number in parenthesis after the fault is for the fieldbus communication. See chapter [Fieldbus control with the embedded fieldbus](#) on page [277](#).

How to reset

The drive can be reset either by pressing the keypad key  (Basic control panel) or  (Assistant control panel), through digital input or fieldbus, or by switching the supply voltage off for a while. The source for the fault reset signal is selected by

parameter [1604 FAULT RESET SEL](#). When the fault has been removed, the motor can be restarted.

Fault history

When a fault is detected, it is stored in the fault history. The latest faults are stored together with the time stamp.

Parameters [0401 LAST FAULT](#), [0412 PREVIOUS FAULT 1](#) and [0413 PREVIOUS FAULT 2](#) store the most recent faults. Parameters [0404...0409](#) show drive operation data at the time the latest fault occurred. The Assistant control panel provides additional information about the fault history. See section [Fault logger mode](#) on page [94](#) for more information.

Alarm messages generated by the drive

| CODE | ALARM | CAUSE | WHAT TO DO |
|------|---|---|---|
| 2001 | OVERCURRENT <i>0308</i> bit 0 (programmable fault function <i>1610</i>) | Output current limit controller is active. | Check motor load. Check acceleration time (<i>2202</i> and <i>2205</i>). Check motor and motor cable (including phasing). Check ambient conditions. Load capacity decreases if installation site ambient temperature exceeds 40 °C. See section <i>Derating</i> on page <i>327</i> . |
| 2002 | OVERVOLTAGE <i>0308</i> bit 1 (programmable fault function <i>1610</i>) | DC overvoltage controller is active. | Check deceleration time (<i>2203</i> and <i>2206</i>). Check input power line for static or transient overvoltage. |
| 2003 | UNDERVOLTAGE <i>0308</i> bit 2 (programmable fault function <i>1610</i>) | DC undervoltage controller is active. | Check input power supply. |
| 2004 | DIR LOCK <i>0308</i> bit 3 | Change of direction is not allowed. | Check parameter <i>1003 DIRECTION</i> settings. |
| 2005 | IO COMM <i>0308</i> bit 4 (programmable fault function <i>3018</i> , <i>3019</i>) | Fieldbus communication break | Check status of fieldbus communication. See chapter <i>Fieldbus control with the embedded fieldbus</i> on page <i>277</i> . Check fault function parameter settings. Check connections. Check if master can communicate. |
| 2006 | AI1 LOSS <i>0308</i> bit 5 (programmable fault function <i>3001</i> , <i>3021</i>) | Analog input AI1 signal has fallen below limit defined by parameter <i>3021 AI1 FAULT LIMIT</i> . | Check fault function parameter settings. Check for proper analog control signal levels. Check connections. |
| 2007 | AI2 LOSS <i>0308</i> bit 6 (programmable fault function <i>3001</i> , <i>3022</i>) | Analog input AI2 signal has fallen below limit defined by parameter <i>3022 AI2 FAULT LIMIT</i> . | Check fault function parameter settings. Check for proper analog control signal levels. Check connections. |

| CODE | ALARM | CAUSE | WHAT TO DO |
|------------|---|---|--|
| 2008 | PANEL LOSS <i>0308</i> bit 7 (programmable fault function <i>3002</i>) | Control panel selected as active control location for drive has ceased communicating. | Check panel connection. Check fault function parameters. Check control panel connector. Refit control panel in mounting platform. If drive is in external control mode (REM) and is set to accept start/stop, direction commands or references through control panel: Check group <i>10 START/STOP/DIR</i> and <i>11 REFERENCE SELECT</i> settings. |
| 2009 | DEVICE OVERTEMP <i>0308</i> bit 8 | Drive IGBT temperature is excessive. Alarm limit is 120 °C. | Check ambient conditions. See also section <i>Derating</i> on page <i>327</i> . Check air flow and fan operation. Check motor power against drive power. |
| 2010 | MOTOR TEMP <i>0308</i> bit 9 (programmable fault function <i>3005...3009 / 3503</i>) | Motor temperature is too high (or appears to be too high) due to excessive load, insufficient motor power, inadequate cooling or incorrect start-up data. | Check motor ratings, load and cooling. Check start-up data. Check fault function parameters. |
| | | Measured motor temperature has exceeded alarm limit set by parameter <i>3503 ALARM LIMIT</i> . | Check value of alarm limit. Check that actual number of sensors corresponds to value set by parameter <i>3501 SENSOR TYPE</i> . Let motor cool down. Ensure proper motor cooling: Check cooling fan, clean cooling surfaces, etc. |
| 2012 | MOTOR STALL <i>0308</i> bit 11 (programmable fault function <i>3010...3012</i>) | Motor is operating in stall region due to eg excessive load or insufficient motor power. | Check motor load and drive ratings. Check fault function parameters. |
| 2013 1) | AUTORESET <i>0308</i> bit 12 | Automatic reset alarm | Check parameter group <i>31 AUTOMATIC RESET</i> settings. |
| 2014 1) | AUTOCHANGE <i>0308</i> bit 13 | PFC Autochange function is active. | See parameter group <i>81 PFC CONTROL</i> , section <i>PFC control macro</i> on page <i>110</i> and section <i>SPFC control macro</i> on page <i>111</i> . |
| 2015 | PFC I LOCK <i>0308</i> bit 14 | PFC Interlocks are active. | Drive cannot start <ul style="list-style-type: none"> any motor (when Autochange is used) the speed regulated motor (when Autochange is not used). See parameter group <i>81 PFC CONTROL</i> . |
| 2018 1) | PID SLEEP <i>0309</i> bit 1 | Sleep function has entered sleeping mode. | See parameter groups <i>40 PROCESS PID SET 1... 41 PROCESS PID SET 2</i> . |

| CODE | ALARM | CAUSE | WHAT TO DO |
|------|---|---|---|
| 2021 | START ENABLE 1 MISSING <i>0309</i> bit 4 | No Start enable 1 signal received | Check parameter <i>1608 START ENABLE 1</i> settings. Check digital input connections. Check fieldbus communication settings. |
| 2022 | START ENABLE 2 MISSING <i>0309</i> bit 5 | No Start enable 2 signal received | Check parameter <i>1609 START ENABLE 2</i> settings. Check digital input connections. Check fieldbus communication settings. |
| 2023 | EMERGENCY STOP <i>0309</i> bit 6 | Drive has received emergency stop command and ramps to stop according to ramp time defined by parameter <i>2208 EMERG DEC TIME</i> . | Check that it is safe to continue operation. Return emergency stop push button to normal position. |
| 2025 | FIRST START <i>0309</i> bit 8 | Motor identification magnetization is on. This alarm belongs to normal start-up procedure. | Wait until drive indicates that motor identification is completed. |
| 2026 | INPUT PHASE LOSS <i>0309</i> bit 9 (programmable fault function <i>3016</i>) | Intermediate circuit DC voltage is oscillating due to missing input power line phase or blown fuse. Alarm is generated when DC voltage ripple exceeds 14% of nominal DC voltage. | Check input power line fuses. Check for input power supply imbalance. Check fault function parameters. |
| 2027 | USER LOAD CURVE <i>0309</i> bit 10 | Condition defined by <i>3701 USER LOAD C MODE</i> has been valid longer than half of the time set by <i>3703 USER LOAD C TIME</i> . | See parameter group <i>37 USER LOAD CURVE</i> . |
| 2028 | START DELAY <i>0309</i> bit 11 | Start delay in progress | See parameter <i>2113 START DELAY</i> . |
| 2030 | INLET LOW <i>0309</i> bit 13 | Pressure at pump/fan inlet too low | Check for a closed valve on the inlet side of the pump/fan. Check piping for leaks. See parameter group <i>44 PUMP PROTECTION</i> . |
| 2031 | OUTLET HIGH <i>0309</i> bit 14 | Pressure at pump/fan outlet too high | Check piping for blocks. See parameter group <i>44 PUMP PROTECTION</i> . |
| 2032 | PIPE FILL <i>0309</i> bit 15 | Pipe fill in progress | See parameters <i>4421...4426</i> . |

| CODE | ALARM | CAUSE | WHAT TO DO |
|-------------|---------------------------------------|--------------------------------------|---|
| 2033 | INLET VERY LOW <i>0310</i> bit 0 | Pressure at pump/fan inlet too low | Check for a closed valve on the inlet side of the pump/fan. Check piping for leaks. See parameter group <i>44 PUMP PROTECTION</i> . |
| 2034 | OUTLET VERY HIGH <i>0310</i> bit 1 | Pressure at pump/fan outlet too high | Check piping for blocks. See parameter group <i>44 PUMP PROTECTION</i> . |

¹⁾ Even when the relay output is configured to indicate alarm conditions (eg parameter *1401 RELAY OUTPUT 1* = 5 (*ALARM*) or 16 (*FLT/ALARM*)), this alarm is not indicated by a relay output.

Alarms generated by the Basic control panel

The Basic control panel indicates control panel alarms with a code, A5xxx.

| ALARM CODE | CAUSE | WHAT TO DO |
|------------|---|--|
| 5001 | Drive is not responding. | Check panel connection. |
| 5002 | Incompatible communication profile | Contact your local ABB representative. |
| 5010 | Corrupted panel parameter backup file | Retry parameter upload. Retry parameter download. |
| 5011 | Drive is controlled from another source. | Change drive control to the local control mode. |
| 5012 | Direction of rotation is locked. | Enable change of direction. See parameter 1003 DIRECTION . |
| 5013 | Panel control is disabled because start inhibit is active. | Start from the panel is not possible. Reset the emergency stop command or remove the 3-wire stop command before starting from the panel. See section 3-wire macro on page 105 and parameters 1001 EXT1 COMMANDS , 1002 EXT2 COMMANDS and 2109 EMERG STOP SEL . |
| 5014 | Panel control is disabled because of drive fault. | Reset drive fault and retry. |
| 5015 | Panel control is disabled because the local control mode lock is active. | Deactivate the local control mode lock and retry. See parameter 1606 LOCAL LOCK . |
| 5018 | Parameter default value is not found. | Contact your local ABB representative. |
| 5019 | Writing non-zero parameter value is prohibited. | Only parameter reset is allowed. |
| 5020 | Parameter or parameter group does not exist or parameter value is inconsistent. | Contact your local ABB representative. |
| 5021 | Parameter or parameter group is hidden. | Contact your local ABB representative. |
| 5022 | Parameter is write protected. | Parameter value is read-only and cannot be changed. |
| 5023 | Parameter change is not allowed, when drive is running. | Stop drive and change parameter value. |
| 5024 | Drive is executing a task. | Wait until task is completed. |
| 5025 | Software is being uploaded or downloaded. | Wait until upload/download is complete. |
| 5026 | Value is at or below minimum limit. | Contact your local ABB representative. |
| 5027 | Value is at or above maximum limit. | Contact your local ABB representative. |
| 5028 | Invalid value | Contact your local ABB representative. |

| ALARM CODE | CAUSE | WHAT TO DO |
|-------------------|---|--|
| 5029 | Memory is not ready. | Retry. |
| 5030 | Invalid request | Contact your local ABB representative. |
| 5031 | Drive is not ready for operation, eg due to low DC voltage. | Check input power supply. |
| 5032 | Parameter error | Contact your local ABB representative. |
| 5040 | Parameter download error. Selected parameter set is not in current parameter backup file. | Perform upload function before download. |
| 5041 | Parameter backup file does not fit into memory. | Contact your local ABB representative. |
| 5042 | Parameter download error. Selected parameter set is not in current parameter backup file. | Perform upload function before download. |
| 5043 | No start inhibit | |
| 5044 | Parameter backup file restoring error | Check that file is compatible with drive. |
| 5050 | Parameter upload aborted | Retry parameter upload. |
| 5051 | File error | Contact your local ABB representative. |
| 5052 | Parameter upload has failed. | Retry parameter upload. |
| 5060 | Parameter download aborted | Retry parameter download. |
| 5062 | Parameter download has failed. | Retry parameter download. |
| 5070 | Panel backup memory write error | Contact your local ABB representative. |
| 5071 | Panel backup memory read error | Contact your local ABB representative. |
| 5080 | Operation is not allowed because the drive is not in the local control mode. | Switch to the local control mode. |
| 5081 | Operation is not allowed because of active fault. | Check cause of fault and reset fault. |
| 5083 | Operation is not allowed because parameter lock is on. | Check parameter 1602 PARAMETER LOCK setting. |
| 5084 | Operation is not allowed because drive is performing a task. | Wait until task is completed and retry. |
| 5085 | Parameter download from source to destination drive has failed. | Check that source and destination drive types are same, ie ACS310. See the type designation label of the drive. |
| 5086 | Parameter download from source to destination drive has failed. | Check that source and destination drive type designations are the same. See type designation labels of the drives. |

| ALARM CODE | CAUSE | WHAT TO DO |
|-------------------|---|--|
| 5087 | Parameter download from source to destination drive has failed because parameter sets are incompatible. | Check that source and destination drive information are same. See parameters in group 33 INFORMATION . |
| 5088 | Operation has failed because of drive memory error. | Contact your local ABB representative. |
| 5089 | Download has failed because of CRC error. | Contact your local ABB representative. |
| 5090 | Download has failed because of data processing error. | Contact your local ABB representative. |
| 5091 | Operation has failed because of parameter error. | Contact your local ABB representative. |
| 5092 | Parameter download from source to destination drive has failed because parameter sets are incompatible. | Check that source and destination drive information are same. See parameters in group 33 INFORMATION . |

Fault messages generated by the drive

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|---|--|---|
| 0001 | OVERCURRENT (2310) <i>0305</i> bit 0 | Output current has exceeded trip level. | Check motor load. Check acceleration time (<i>2202</i> and <i>2205</i>). Check motor and motor cable (including phasing). Check ambient conditions. Load capacity decreases if installation site ambient temperature exceeds 40 °C. See section <i>Derating</i> on page <i>327</i> . |
| 0002 | DC OVERVOLT (3210) <i>0305</i> bit 1 | Excessive intermediate circuit DC voltage. DC overvoltage trip limit is 420 V for 200 V drives and 840 V for 400 V drives. | Check that overvoltage controller is on (parameter <i>2005 OVERVOLT CTRL</i>). Check input power line for static or transient overvoltage. Check deceleration time (<i>2203</i> , <i>2206</i>). |
| 0003 | DEV OVERTEMP (4210) <i>0305</i> bit 2 | Drive IGBT temperature is excessive. Fault trip limit is 135 °C. | Check ambient conditions. See also section <i>Derating</i> on page <i>327</i> . Check air flow and fan operation. Check motor power against drive power. |
| 0004 | SHORT CIRC (2340) <i>0305</i> bit 3 | Short circuit in motor cable(s) or motor | Check motor and motor cable. |
| 0006 | DC UNDERVOLT (3220) <i>0305</i> bit 5 | Intermediate circuit DC voltage is not sufficient due to missing input power line phase, blown fuse, rectifier bridge internal fault or too low input power. | Check that undervoltage controller is on (parameter <i>2006 UNDERVOLT CTRL</i>). Check input power supply and fuses. |
| 0007 | AI1 LOSS (8110) <i>0305</i> bit 6 (programmable fault function <i>3001</i> , <i>3021</i>) | Analog input AI1 signal has fallen below limit defined by parameter <i>3021 AI1 FAULT LIMIT</i> . | Check fault function parameter settings. Check for proper analog control signal levels. Check connections. |
| 0008 | AI2 LOSS (8110) <i>0305</i> bit 7 (programmable fault function <i>3001</i> , <i>3022</i>) | Analog input AI2 signal has fallen below limit defined by parameter <i>3022 AI2 FAULT LIMIT</i> . | Check fault function parameter settings. Check for proper analog control signal levels. Check connections. |

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|--|---|--|
| 0009 | MOT OVERTEMP (4310) <i>0305</i> bit 8 (programmable fault function <i>3005...3009 / 3504</i>) | Motor temperature is too high (or appears to be too high) due to excessive load, insufficient motor power, inadequate cooling or incorrect start-up data. | Check motor ratings, load and cooling. Check start-up data. Check fault function parameters. |
| | | Measured motor temperature has exceeded fault limit set by parameter <i>3504 FAULT LIMIT</i> . | Check value of fault limit. Check that actual number of sensors corresponds to value set by parameter <i>3501 SENSOR TYPE</i> . Let motor cool down. Ensure proper motor cooling: Check cooling fan, clean cooling surfaces, etc. |
| 0010 | PANEL LOSS (5300) <i>0305</i> bit 9 (programmable fault function <i>3002</i>) | Control panel selected as active control location for drive has ceased communicating. | Check panel connection. Check fault function parameters. Check control panel connector. Refit control panel in mounting platform. If drive is in external control mode (REM) and is set to accept start/stop, direction commands or references through control panel: Check group <i>10 START/STOP/DIR</i> and <i>11 REFERENCE SELECT</i> settings. |
| 0012 | MOTOR STALL (7121) <i>0305</i> bit 11 (programmable fault function <i>3010...3012</i>) | Motor is operating in stall region due to eg excessive load or insufficient motor power. | Check motor load and drive ratings. Check fault function parameters. |
| 0014 | EXT FAULT 1 (9000) <i>0305</i> bit 13 (programmable fault function <i>3003</i>) | External fault 1 | Check external devices for faults. Check parameter <i>3003 EXTERNAL FAULT 1</i> setting. |
| 0015 | EXT FAULT 2 (9001) <i>0305</i> bit 14 (programmable fault function <i>3004</i>) | External fault 2 | Check external devices for faults. Check parameter <i>3004 EXTERNAL FAULT 2</i> setting. |
| 0016 | EARTH FAULT (2330) <i>0305</i> bit 15 (programmable fault function <i>3017</i>) | Drive has detected earth (ground) fault in motor or motor cable. | Check motor. Check motor cable. Motor cable length must not exceed maximum specifications. See section <i>Motor connection data</i> on page <i>334</i> . Note: Disabling earth fault (ground fault) may void the warranty. |

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|---|--|---|
| 0018 | THERM FAIL (5210) 0306 bit 1 | Drive internal fault. Thermistor used for drive internal temperature measurement is open or short circuited. | Contact your local ABB representative. |
| 0021 | CURR MEAS (2211) 0306 bit 4 | Drive internal fault. Current measurement is out of range. | Contact your local ABB representative. |
| 0022 | SUPPLY PHASE (3130) 0306 bit 5 | Intermediate circuit DC voltage is oscillating due to missing input power line phase or blown fuse. Trip occurs when DC voltage ripple exceeds 14% of nominal DC voltage. | Check input power line fuses. Check for input power supply imbalance. Check fault function parameters. |
| 0024 | OVERSPEED (7310) 0306 bit 7 | Motor is turning faster than highest allowed speed due to incorrectly set minimum/maximum speed. Operating range limits are set by parameters 2007 MINIMUM FREQ and 2008 MAXIMUM FREQ . | Check minimum/maximum frequency settings. Check adequacy of motor braking torque. |
| 0026 | DRIVE ID (5400) 0306 bit 9 | Internal drive ID fault | Contact your local ABB representative. |
| 0027 | CONFIG FILE (630F) 0306 bit 10 | Internal configuration file error | Contact your local ABB representative. |
| 0028 | SERIAL 1 ERR (7510) 0306 bit 11 (programmable fault function 3018 , 3019) | Fieldbus communication break | Check status of fieldbus communication. See chapter Fieldbus control with the embedded fieldbus on page 277 . Check fault function parameter settings. Check connections. Check if master can communicate. |
| 0029 | EFB CON FILE (6306) 0306 bit 12 | Configuration file reading error | Contact your local ABB representative. |
| 0030 | FORCE TRIP (FF90) 0306 bit 13 | Trip command received from fieldbus | See appropriate communication module manual. |

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|---|--|---|
| 0031 | EFB 1 (FF92) <i>0307</i> bit 0 | Error from the embedded fieldbus (EFB) protocol application. The meaning is protocol dependent. | See chapter <i>Fieldbus control with the embedded fieldbus</i> on page 277. |
| 0032 | EFB 2 (FF93) <i>0307</i> bit 1 | | |
| 0033 | EFB 3 (FF94) <i>0307</i> bit 2 | | |
| 0035 | OUTP WIRING (FF95) <i>0306</i> bit 15 (programmable fault function <i>3023</i>) | Incorrect input power and motor cable connection (ie, input power cable is connected to drive motor connection). The fault can be erroneously declared if the drive is faulty or the input power is a delta grounded system and the motor cable capacitance is large. | Check input power connections. |
| 0036 | INCOMPATIBLE SW (630F) <i>0307</i> bit 3 | Loaded software is not compatible. | Contact your local ABB representative. |
| 0038 | USER LOAD CURVE (FF6B) <i>0307</i> bit 4 | Condition defined by <i>3701 USER LOAD C MODE</i> has been valid longer than the time set by <i>3703 USER LOAD C TIME</i> . | See parameter group <i>37 USER LOAD CURVE</i> . |
| 0039 | UNKNOWN EXTENSION (7086) <i>0307</i> bit 5 | Option module not supported by the drive firmware is connected to the drive. | Check connections. |
| 0040 | INLET VERY LOW (8A81) <i>0307</i> bit 6 | Pressure at pump/fan inlet too low | Check for a closed valve on the inlet side of the pump/fan. Check piping for leaks. See parameter group <i>44 PUMP PROTECTION</i> . |
| 0041 | OUTLET VERY HIGH (8A83) <i>0307</i> bit 7 | Pressure at pump/fan outlet too high | Check piping for blocks. See parameter group <i>44 PUMP PROTECTION</i> . |
| 0042 | INLET LOW (8A80) <i>0307</i> bit 8 | Pressure at pump/fan inlet too low | Check for a closed valve on the inlet side of the pump/fan. Check piping for leaks. See parameter group <i>44 PUMP PROTECTION</i> . |

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|---|---|---|
| 0043 | OUTLET HIGH (8A82) <i>0307</i> bit 9 | Pressure at pump/fan outlet too high | Check piping for blocks. See parameter group <i>44 PUMP PROTECTION</i> . |
| 0101 | SERF CORRUPT (FF55) <i>0307</i> bit 14 | Drive internal error | Write down fault code and contact your local ABB representative. |
| 0103 | SERF MACRO (FF55) <i>0307</i> bit 14 | | |
| 0201 | DSP T1 OVERLOAD (6100) <i>0307</i> bit 13 | | |
| 0202 | DSP T2 OVERLOAD (6100) <i>0307</i> bit 13 | | |
| 0203 | DSP T3 OVERLOAD (6100) <i>0307</i> bit 13 | | |
| 0204 | DSP STACK ERROR (6100) <i>0307</i> bit 12 | | |
| 0206 | CB ID ERROR (5000) <i>0307</i> bit 11 | | |
| 1000 | PAR HZRPM (6320) <i>0307</i> bit 15 | Incorrect frequency limit parameter setting | Check parameter settings. Check that following applies: <ul style="list-style-type: none"> • <i>2007 MINIMUM FREQ</i> < <i>2008 MAXIMUM FREQ</i> • <i>2007 MINIMUM FREQ</i> / <i>9907 MOTOR NOM FREQ</i> and <i>2008 MAXIMUM FREQ</i> / <i>9907 MOTOR NOM FREQ</i> are within range. |
| 1001 | PAR PFC REF NEG (6320) <i>0307</i> bit 15 | Incorrect PFC parameters | Check parameter group <i>81 PFC CONTROL</i> settings. Check that following applies: <ul style="list-style-type: none"> • <i>2007 MINIMUM FREQ</i> > 0 when <i>8123</i> is <i>ACTIVE</i> or <i>SPFC ACTIVE</i>. |
| 1003 | PAR AI SCALE (6320) <i>0307</i> bit 15 | Incorrect analog input AI signal scaling | Check parameter group <i>13 ANALOG INPUTS</i> settings. Check that following applies: <ul style="list-style-type: none"> • <i>1301 MINIMUM AI1</i> < <i>1302 MAXIMUM AI1</i> • <i>1304 MINIMUM AI2</i> < <i>1305 MAXIMUM AI2</i>. |

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|--|--|--|
| 1004 | PAR AO SCALE (6320) <i>0307</i> bit 15 | Incorrect analog output AO signal scaling | Check parameter group <i>15 ANALOG OUTPUTS</i> settings. Check that following applies: <ul style="list-style-type: none"> • <i>1504 MINIMUM AO1</i> < <i>1505 MAXIMUM AO1</i>. |
| 1006 | PAR EXT RO (6320) <i>0307</i> bit 15 | Incorrect extension relay output parameters | Check parameter settings. Check that following applies: <ul style="list-style-type: none"> • MREL relay output extension module is connected to the drive. • <i>1402...1403 RELAY OUTPUT 2 ... RELAY OUTPUT 3</i> and <i>1410 RELAY OUTPUT 4</i> have non-zero values. See <i>MREL-01 relay output extension module user's manual</i> (3AUA0000035974 [English]). |
| 1012 | PAR PFC IO 1 (6320) <i>0307</i> bit 15 | I/O configuration for PFC not complete | Check parameter settings. Following must apply: <ul style="list-style-type: none"> • There are enough relays parameterized for PFC. • No conflict exists between parameter group <i>14 RELAY OUTPUTS</i>, parameter <i>8117 NR OF AUX MOT</i> and parameter <i>8118 AUTOCHNG INTERV</i>. |
| 1013 | PAR PFC IO 2 (6320) <i>0307</i> bit 15 | I/O configuration for PFC not complete | Check parameter settings. Following must apply: <ul style="list-style-type: none"> • The actual number of PFC motors (parameter <i>8127 MOTORS</i>) matches the PFC motors in parameter group <i>14 RELAY OUTPUTS</i> and parameter <i>8118 AUTOCHNG INTERV</i>. |
| 1014 | PAR PFC IO 3 (6320) <i>0307</i> bit 15 | I/O configuration for PFC not complete. The drive is unable to allocate a digital input (interlock) for each PFC motor. | See parameters <i>8120 INTERLOCKS</i> and <i>8127 MOTORS</i> . |
| 1015 | PAR USER U/F (6320) <i>0307</i> bit 15 | Incorrect voltage to frequency (U/f) ratio voltage setting. | Check parameter <i>2610 USER DEFINED U1...2617 USER DEFINED F4</i> settings. |
| 1017 | PAR SETUP 1 (6320) <i>0307</i> bit 15 | It is not allowed to use frequency input signal and frequency output signal simultaneously. | Disable frequency output or frequency input: <ul style="list-style-type: none"> • change transistor output to digital mode (value of parameter <i>1804 TO MODE = DIGITAL</i>), or • change frequency input selection to other value in parameter groups <i>11 REFERENCE SELECT</i>, <i>40 PROCESS PID SET 1</i>, <i>41 PROCESS PID SET 2</i> and <i>42 EXT / TRIM PID</i>. |

| CODE | FAULT | CAUSE | WHAT TO DO |
|------|--|---|--|
| 1026 | PAR USER LOAD C (6320) 0307 bit 15 | Incorrect user load curve parameter setting | Check parameter settings. Following must apply: <ul style="list-style-type: none"> • 3704 LOAD FREQ 1 < $\frac{V}{V}$ • 3707 LOAD FREQ 2 < $\frac{V}{V}$ • 3710 LOAD FREQ 3 < $\frac{V}{V}$ • 3713 LOAD FREQ 4 < $\frac{V}{V}$ • 3716 LOAD FREQ 5 < $\frac{V}{V}$ • 3705 LOAD TORQ LOW 1 < • 3706 LOAD TORQ HIGH 1 • 3708 LOAD TORQ LOW 2 < • 3709 LOAD TORQ HIGH 2 • 3711 LOAD TORQ LOW 3 < • 3712 LOAD TORQ HIGH 3 • 3714 LOAD TORQ LOW 4 < • 3715 LOAD TORQ HIGH 4 • 3717 LOAD TORQ LOW 5 < • 3718 LOAD TORQ HIGH 5. |

Embedded fieldbus faults

Embedded fieldbus faults can be traced by monitoring group [53 EFB PROTOCOL](#) parameters. See also fault/alarm [SERIAL 1 ERR](#).

■ No master device

If there is no master device on line, parameter [5306 EFB OK MESSAGES](#) and [5307 EFB CRC ERRORS](#) values remain unchanged.

What to do:

- Check that the network master is connected and properly configured.
- Check the cable connection.

■ Same device address

If two or more devices have the same address, parameter [5307 EFB CRC ERRORS](#) value increases with every read/write command.

What to do:

- Check the device addresses. No two devices on line may have the same address.

■ Incorrect wiring

If the communication wires are swapped (terminal A on one device is connected to terminal B on another device), parameter [5306 EFB OK MESSAGES](#) value remains unchanged and parameter [5307 EFB CRC ERRORS](#) increases.

What to do:

- Check the EIA-485/RS-232 interface connection.
-

15

Maintenance and hardware diagnostics

What this chapter contains

The chapter contains preventive maintenance instructions and LED indicator descriptions.

Maintenance intervals

If installed in an appropriate environment, the drive requires very little maintenance. The table lists the routine maintenance intervals recommended by ABB.

| Maintenance | Interval | Instruction |
|---|------------------------|--|
| Reforming of capacitors | Every year when stored | See Capacitors on page 321. |
| Check of dustiness, corrosion and temperature | Every year | |
| Replacement of the cooling fan (frame sizes R1...R4) | Every three years | See Cooling fan on page 320. |
| Check and tightening of the power terminals | Every six years | See Power connections on page 322. |
| Replacement of the battery in the Assistant control panel | Every ten years | See Changing the battery in the Assistant control panel on page 322. |

Consult your local ABB Service representative for more details on the maintenance. On the Internet, go to <http://www.abb.com/drives> and select *Drive Services – Maintenance and Field Services*.

Cooling fan


The life span of the drive's cooling fan depends on the drive usage and ambient temperature.

When the Assistant control panel is in use, the Notice handler assistant informs when the definable value of the operating hour counter is reached (see parameter [2901 COOLING FAN TRIG](#)). This information can also be passed to the relay output (see group [14 RELAY OUTPUTS](#)) regardless of the used panel type.

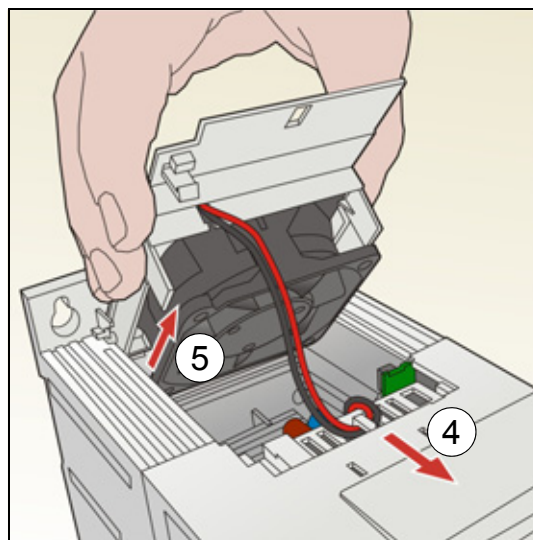
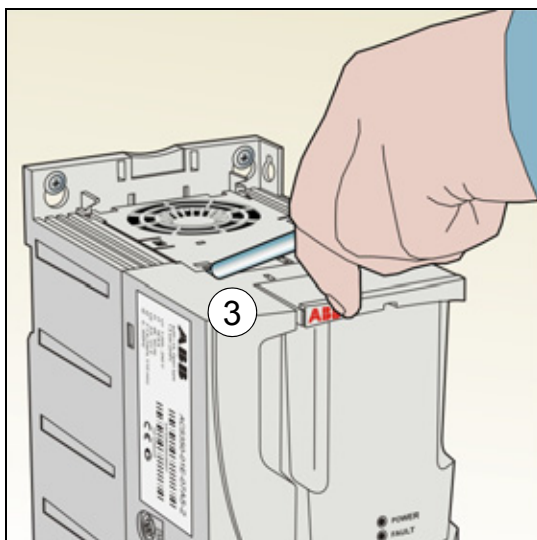
Fan failure can be predicted by the increasing noise from the fan bearings. If the drive is operated in a critical part of a process, fan replacement is recommended once these symptoms start appearing. Replacement fans are available from ABB. Do not use other than ABB specified spare parts.

■ Replacing the cooling fan (frame sizes R1...R4)

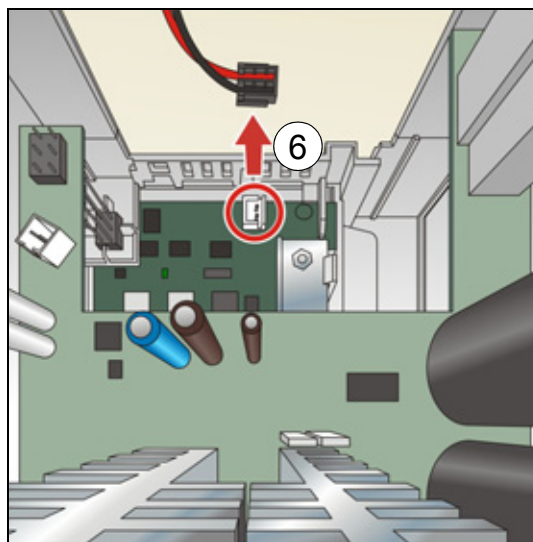
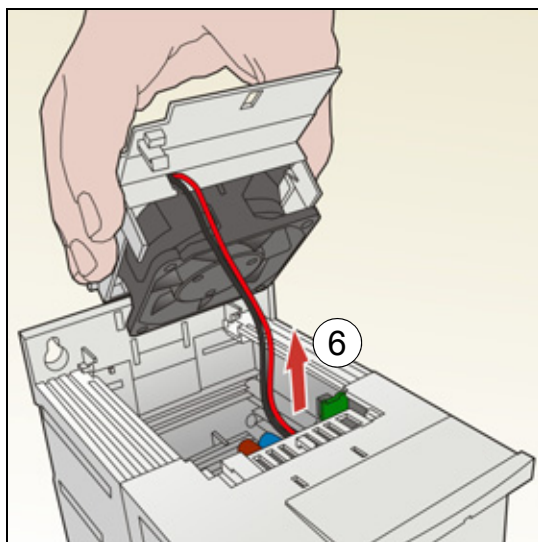
Only frame sizes R1...R4 include a fan; frame size R0 has natural cooling.

 **WARNING!** Read and follow the instructions in chapter [Safety](#) on page [15](#). Ignoring the instructions can cause physical injury or death, or damage to the equipment.

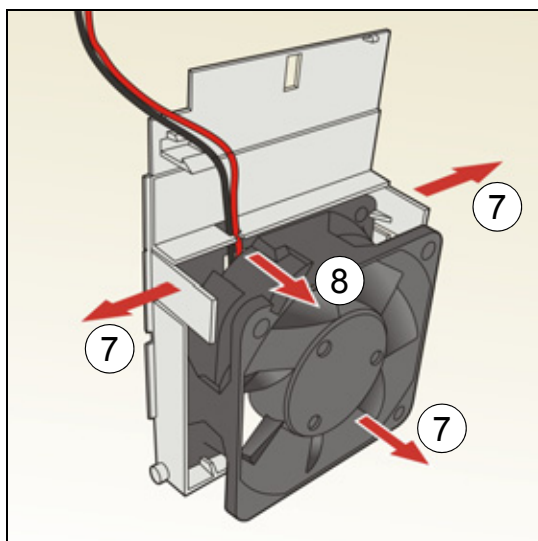
1. Stop the drive and disconnect it from the power line. Wait for five minutes to let the drive DC capacitors discharge. Ensure by measuring with a multimeter (impedance at least 1 Mohm) that there is no voltage present.
2. Remove the hood if the drive has the NEMA 1 option.
3. Lever the fan holder off the drive frame with, for example, a screwdriver.
4. Free the fan cable from the clip in the drive frame.
5. Lift the holder from the hinges.



6. Disconnect the fan cable. The figure below on the right shows the location of the fan cable connector in frame size R2. The inside views in different frame sizes are not identical, but the fan cable connector is always on the control board that is against the front of the drive.



7. Free the fan cable from the clip in the fan holder.
8. Remove the fan from the holder.



9. Install the new fan in reverse order.
10. Restore power.

Capacitors

■ Reforming the capacitors

The capacitors must be reformed if the drive has been stored for a year. See section [Type designation label](#) on page 26 for how to find out the manufacturing time from the serial number. For information on reforming the capacitors, refer to *Guide for capacitor reforming in ACS50, ACS55, ACS150, ACS310, ACS350, ACS355,*

ACS550 and ACH550 (3AFE68735190 [English]), available on the Internet (go to <http://www.abb.com> and enter the code in the Search field).

Power connections



WARNING! Read and follow the instructions in chapter [Safety](#) on page 15. Ignoring the instructions can cause physical injury or death, or damage to the equipment.

1. Stop the drive and disconnect it from the power line. Wait for five minutes to let the drive DC capacitors discharge. Ensure by measuring with a multimeter (impedance at least 1 Mohm) that there is no voltage present.
2. Check the tightness of the power cable connections. Use the tightening torques given in section [Terminal and lead-through data for the power cables](#) on page 333.
3. Restore power.

Control panel

■ Cleaning the control panel

Use a soft damp cloth to clean the control panel. Avoid harsh cleaners which could scratch the display window.

■ Changing the battery in the Assistant control panel

A battery is only used in Assistant control panels that have the clock function available and enabled. The battery keeps the clock operating in memory during power interruptions.

The expected life for the battery is greater than ten years. To remove the battery, use a coin to rotate the battery holder on the back of the control panel. Replace the battery with type CR2032.

Note: The battery is NOT required for any control panel or drive functions, except the clock.

LEDs

There is a green and a red LED on the front of the drive. They are visible through the panel cover but invisible if a control panel is attached to the drive. The Assistant control panel has one LED. The table below describes the LED indications.

| Where | LED off | LED lit and steady | | LED blinking | |
|---|--|--------------------|---|--------------|---|
| On the front of the drive. If a control panel is attached to the drive, switch to remote control (otherwise a fault is generated), and then remove the panel to be able to see the LEDs. | No power | Green | Power supply on the board OK | Green | Drive in an alarm state |
| | | Red | Drive in a fault state. To reset the fault, press RESET from the control panel or switch off the drive power. | Red | Drive in a fault state. To reset the fault, switch off the drive power. |
| At the top left corner of the Assistant control panel | Panel has no power or no drive connection. | Green | Drive in a normal state | Green | Drive in an alarm state |
| | | Red | Drive in a fault state. To reset the fault, press RESET from the control panel or switch off the drive power. | Red | - |