Diagnostics and Troubleshooting

11

What's in this Chapter?

This chapter contains the following topics:

⚡⚠ **DANGER**
HAZARD OF ELECTRIC SHOCK, EXPLOSION OR ARC FLASH
Read and understand the instructions in "Safety Information" chapter before performing any procedure in this chapter.
Failure to follow these instructions will result in death or serious injury.

Error code

- If the display does not light up, check the power supply to the drive.
- The assignment of the Fast stop or Freewheel functions will help to prevent the drive starting if the corresponding logic inputs are not powered up. The ATV320 then displays **[Freewheel]** ($n 5 t$) in freewheel stop and **[Fast stop]** ($F 5 t$) in fast stop. This is normal since these functions are active at zero so that the drive will be stopped if there is a wire break.
- Check that the run command input is activated in accordance with the selected control mode (**[2/3 wire control]** ($t C C$) and **[2 wire type]** ($t C t$) parameters, page 85).
- If an input is assigned to the limit switch function and this input is at zero, the drive can only be started up by sending a command for the opposite direction (see page 224).
- If the reference channel or command channel is assigned to a communication bus, when the power supply is connected, the drive will display **[Freewheel]** ($n 5 t$) and remain in stop mode until the communication bus sends a command.

Code	Name / Description
$d C t -$	**[DIAGNOSTICS]** This menu can only be accessed with the graphic display terminal. It displays detected faults and their cause in plain text and can be used to carry out tests, see page 64.

Clearing the detected fault

In the event of a non resettable detected fault:

- Disconnect all power, including external control power that may be present.
- Lock all power disconnects in the open position.
- Wait 15 minutes to allow the DC bus capacitors to discharge (the drive LEDs are not indicators of the absence of DC bus voltage).
- Measure the voltage of the DC bus between the PA/+ and PC/– terminals to ensure that the voltage is less than 42 Vdc.
- If the DC bus capacitors do not discharge completely, contact your local Schneider Electric representative. Do not repair or operate the drive.
- Find and correct the detected fault.
- Restore power to the drive to confirm the detected fault has been rectified.

In the event of a resettable detected fault, the drive can be reset after the cause is cleared:

- By switching off the drive until the display disappears completely, then switching on again.
- Automatically in the scenarios described for the **[AUTOMATIC RESTART]** ($A t r -$) function, page 252.
- By means of a logic input or control bit assigned to the **[FAULT RESET]** ($r 5 t -$) function, page 251.
- By pressing the STOP/RESET key on the graphic display keypad if the active channel command is the HMI (see **[Cmd channel 1]** ($C d 1$) page 155).

Fault detection codes which require a power reset after the detected fault is cleared

The cause of the detected fault must be removed before resetting by turning off and then back on.

ASF, brF, SoF, SPF and tnF detected faults can also be cleared remotely by means of a logic input or control bit ([Fault reset] (rSF) parameter, page 251).

Detected Fault	Name	Probable cause	Remedy
AnF	[Load slipping]	• The difference between the output frequency and the speed feedback is not correct.	• Check the motor, gain and stabillity parameters. • Add a braking resistor. • Check the size of the motor/drive/load. • Check the encoder's mechanical coupling and its wiring. • Check the setting of parameters
ASF	[Angle Error]	• This occurs during the phase-shift angle measurement, if the motor phase is disconnected or if the motor inductance is too high.	• Check the motor phases and the maximum current allowed by the drive.
brF	[Brake feedback]	• The brake feedback contact does not match the brake logic control. • The brake does not stop the motor quickly enough (detected by measuring the speed on the "Pulse input" input).	• Check the feedback circuit and the brake logic control circuit. • Check the mechanical state of the brake. • Check the brake linings.
$CrF1$	[Precharge]	• Charging relay control detected fault or charging resistor damaged.	• Turn the drive off and then turn on again. • Check the internal connections. • Contact Schneider Electric Product Support.
$EEF1$	[Control Eeprom]	• Internal memory detected fault, control block.	• Check the environment (electromagnetic compatibility). • Turn off, reset, return to factory settings. • Contact Schneider Electric Product Support.
$EEF2$	[Power Eeprom]	• Internal memory detected fault, power card.	
$FCF1$	[Out. contact. stuck]	• The output contactor remains closed although the opening conditions have been met.	• Check the contactor and its wiring. • Check the feedback circuit.
HdF	[IGBT desaturation]	• Short-circuit or grounding at the drive output.	• Check the cables connecting the drive to the motor, and the motor insulation.
iLF	[internal com. link]	• Communication interruption between option card and drive.	• Check the environment (electromagnetic compatibility). • Check the connections. • Replace the option card. • Contact Schneider Electric Product Support.
$inF1$	[Rating error]	• The power card is different from the card stored.	• Check the reference of the power card.
$inF2$	[Incompatible PB]	• The power card is incompatible with the control block.	• Check the reference of the power card and its compatibility.
$inF3$	[Internal serial link]	• Communication interruption between the internal cards.	• Check the internal connections. • Contact Schneider Electric Product Support.
$inF4$	[Internal-mftg zone]	• Internal data inconsistent.	• Recalibrate the drive (performed by Schneider Electric Product Support).
$inF6$	[Internal - fault option]	• The option installed in the drive is not recognized.	• Check the reference and compatibility of the option. • Check that the option is well inserted into the ATV320.
$inF9$	[Internal- I measure]	• The current measurements are incorrect.	• Replace the current sensors or the power card. • Contact Schneider Electric Product Support.
$inFA$	[Internal-mains circuit]	• The input stage is not operating correctly.	• Contact Schneider Electric Product Support.
$inFb$	[Internal- th. sensor]	• The drive temperature sensor is not operating correctly.	• Replace the drive temperature sensor. • Contact Schneider Electric Product Support.
$inFE$	[internal- CPU]	• Internal microprocessor detected fault.	• Turn off and reset. • Contact Schneider Electric Product Support.
$SAFF$	[Safety fault]	• Debounce time exceeded. • SS1 threshold exceeded. • Wrong configuration. • SLS type overspeed detected.	• Check the safety functions configuration. • Check the ATV320 Integrated safety Functions manual • Contact Schneider Electric Product Support.

Detected Fault	Name	Probable cause	Remedy
⁵ ᵒ ᶠ	**[Overspeed]**	• Instability or driving load too high.	• Check the motor, gain and stability parameters. • Add a braking resistor. • Check the size of the motor/drive/load. • Check the parameters settings for the **[FREQUENCY METER]** (F9F-) function page 266, if it is configured.
⁵ ᴾ ᶠ	**[Speed fdback loss]**	• Signal on "Pulse input" missing, if the input is used for speed measurement. • Encoder feedback signal missing	• Check the wiring of the input cable and the detector used. • Check the configuration parameters of the encoder. • Check the wiring between the encoder and the drive. • Check the encoder.

Fault detection codes that can be cleared with the automatic restart function after the cause has disappeared

These detected faults can also be cleared by turning on and off or by means of a logic input or control bit ([Fault reset] (⟨r 5 F⟩) parameter page 251).

Detected Fault	Name	Probable cause	Remedy
b L F	[Brake control]	• Brake release current not reached. • Brake engage frequency threshold [Brake engage freq] (b E n) only regulated when brake logic control is assigned.	• Check the drive/motor connection. • Check the motor windings. • Check the [Brake release I FW] (⟨ b r⟩) and [Brake release I Rev] (⟨ r d⟩) settings page 194. • Apply the recommended settings for [Brake engage freq] (b E n).
C n F	[Com. network]	• Communication interruption on communication card.	• Check the environment (electromagnetic compatibility). • Check the wiring. • Check the time-out. • Replace the option card. • Contact Schneider Electric Product Support.
C o F	[CANopen com.]	• Communication interruption on the CANopen® bus.	• Check the communication bus. • Check the time-out. • Refer to the CANopen® User's manual.
E P F 1	[External flt-LI/Bit]	• Event triggered by an external device, depending on user.	• Check the device which caused the triggering and reset.
E P F 2	[External fault com.]	• Event triggered by a communication network.	• Check for the cause of the triggering and reset.
F b E 5	[FB stop flt.]	• Function blocks have been stopped while motor was running.	• Check [Stop FB Stop motor] (F b 5 Π) configuration.
F C F 2	[Out. contact. open.]	• The output contactor remains open although the closing conditions have been met.	• Check the contactor and its wiring. • Check the feedback circuit.
L C F	[input contactor]	• The drive is not turned on even though [Mains V. time out] (L C t) has elapsed.	• Check the contactor and its wiring. • Check the time-out. • Check the supply mains/contactor/drive connection.
L F F 3	[AI3 4-20mA loss]	• Loss of the 4-20 mA reference on analog input AI3.	• Check the connection on the analog inputs.
o b F	[Overbraking]	• Braking too sudden or driving load. • Supply voltage too high.	• Increase the deceleration time. • Install a braking resistor if necessary. • Activate the [Dec ramp adapt.] (b r A) function page 172, if it is compatible with the application. • Check the supply voltage.
o C F	[Overcurrent]	• Parameters in the [SETTINGS] (5 E t -) and [MOTOR CONTROL] (d r C -) menus are not correct. • Inertia or load too high. • Mechanical locking.	• Check the parameters. • Check the size of the motor/drive/load. • Check the state of the mechanism. • Decrease [Current limitation] (C L ı). • Increase the switching frequency.
o H F	[Drive overheat]	• Drive temperature too high.	• Check the motor load, the drive ventilation and the ambient temperature. Wait for the drive to cool down before restarting.
o L C	[Proc. overload flt]	• Process overload.	• Check and remove the cause of the overload. • Check the parameters of the [PROCESS OVERLOAD] (o L d -) function, page 272.
o L F	[Motor overload]	• Triggered by excessive motor current.	• Check the setting of the motor thermal protection, check the motor load. Wait for the motor to cool down before restarting.
o P F 1	[1 output phase loss]	• Loss of one phase at drive output.	• Check the connections from the drive to the motor.

Detected Fault	Name	Probable cause	Remedy
o P F 2	[3 motor phase loss]	• Motor not connected or motor power too low. • Output contactor open. • Instantaneous instability in the motor current.	• Check the connections from the drive to the motor. • If an output contactor is being used, set [Output Phase Loss] (o P L) to [Output cut] (o A C), page 256. • Test on a low power motor or without a motor: In factory settings mode, motor phase loss detection is active [Output Phase Loss] (o P L) = [Yes] (Y E S). To check the drive in a test or maintenance environment, without having to use a motor with the same rating as the drive (in particular for high power drives), deactivate motor phase loss detection [Output Phase Loss] (o P L) = [No] (n o), see instructions given page 256. • Check and optimize the following parameters: [IR compensation] (u F r) page 90, [Rated motor volt.] (u n S) and [Rated mot. current] (n C r) page 86 and perform [Auto tuning] (t u n) page 87.
o S F	[Mains overvoltage]	• Supply voltage too high. • Disturbed mains supply.	• Check the supply voltage.
o t F L	[LI6=PTC overheat]	• Overheating of PTC probes detected on input LI6.	• Check the motor load and motor size. • Check the motor ventilation. • Wait for the motor to cool before restarting. • Check the type and state of the PTC probes.
P t F L	[LI6=PTC probe]	• PTC probe on input LI6 open or short-circuited.	• Check the PTC probe and the wiring between it and the motor/drive.
S C F 1	[Motor short circuit]	• Short-circuit or grounding at the drive output.	• Check the cables connecting the drive to the motor, and the motor insulation. • Reduce the switching frequency. • Connect chokes in series with the motor. • Check the adjustment of speed loop and brake. • Increase the [Time to restart] (t t r), page 101. • Increase the switching frequency.
S C F 3	[Ground short circuit]	• Significant earth leakage current at the drive output if several motors are connected in parallel.	• Check the cables connecting the drive to the motor, and the motor insulation. • Reduce the switching frequency. • Connect chokes in series with the motor. • Check the adjustment of speed loop and brake. • Increase the [Time to restart] (t t r), page 101. • Reduce the switching frequency.
S C F 4	[IGBT short circuit]	• Power component detected fault.	• Contact Schneider Electric Product Support.
S C F 5	[Motor short circuit]	• Short-circuit at drive output.	• Check the cables connecting the drive to the motor, and the motor's insulation. • Contact Schneider Electric Product Support.
S L F 1	[Modbus com.]	• Communication interruption on the Modbus bus.	• Check the communication bus. • Check the time-out. • Refer to the Modbus User's manual.
S L F 2	[PC com.]	• Communication interruption with PC Software.	• Check the PC Software connecting cable. • Check the time-out.
S L F 3	[HMI com.]	• Communication interruption with the graphic display terminal or remote display terminal.	• Check the terminal connection • Check the time-out.
S S F	[Torque/current lim]	• Switch to torque or current limitation.	• Check if there are any mechanical problems. • Check the parameters of [TORQUE LIMITATION] (t o L -) page 216 and the parameters of the [TORQUE OR I LIM. DETECT.] (t i d -), page 264.
t J F	[IGBT overheat]	• Drive overheated.	• Check the size of the load/motor/drive. • Reduce the switching frequency. • Wait for the motor to cool before restarting.

Detected Fault	Name	Probable cause	Remedy
tnF	[Auto-tuning]	• Special motor or motor whose power is not suitable for the drive. • Motor not connected to the drive. • Motor not stopped	• Check that the motor/drive are compatible. • Check that the motor is present during auto-tuning. • If an output contactor is being used, close it during auto-tuning. • Check that the motor is stopped during tune operation.
uLF	[Proc. underload Flt]	• Process underload.	• Check and remove the cause of the underload. • Check the parameters of the [PROCESS UNDERLOAD] ($uLd-$) function, page 270.

Fault detection codes that are cleared as soon as their cause disappears

Detected Fault	Name	Probable cause	Remedy
C F F	**[Incorrect config.]**	• Option card changed or removed. • Control block replaced by a control block configured on a drive with a different rating. • The current configuration is inconsistent.	• Check that there are no card errors. • In the event of the option card being changed/removed deliberately, see the remarks below. • Check that there are no card errors. • In the event of the control block being changed deliberately, see the remarks below. • Return to factory settings or retrieve the backup configuration, if it is valid (see page 81).
C F ı *C F ı2*	**[Invalid config.]**	• Invalid configuration. The configuration loaded in the drive via the bus or communication network is inconsistent.	• Check the configuration loaded previously. • Load a compatible configuration.
C 5 F	**[Ch. Sw. fault]**	• Switch to not valid channels.	• Check the function parameters.
d L F	**[Dynamic load fault]**	• Abnormal load variation.	• Check that the load is not blocked by an obstacle. • Removal of a run command causes a reset.
F b E	**[FB fault]**	• Function blocks error.	• See **[FB Fault]** (*F b F t*) for more details.
H C F	**[Cards pairing]**	• The **[CARDS PAIRING]** (*P P ı -*) function page 269 has been configured and a drive card has been changed.	• In the event of a card error, reinsert the original card. • Confirm the configuration by entering the **[Pairing password]** (*P P ı*) if the card was changed deliberately.
P H F	**[Input phase loss]**	• Drive incorrectly supplied or a fuse blown. • One phase missing. • 3-phase ATV320 used on a single-phase supply mains. • Unbalanced load. This protection only operates with the drive on load.	• Check the power connection and the fuses. • Use a 3-phase supply mains. • Disable the detected fault by **[Input phase loss]** (*ı P L*) = **[No]** (*n o*) page 86.
u 5 F	**[Undervoltage]**	• Supply mains too low. • Transient voltage dip.	• Check the voltage and the parameters of **[UNDERVOLTAGE MGT]** (*u 5 b -*), page 259.

Option card changed or removed

When an option card is removed or replaced by another, the drive locks in **[Incorrect config.]** (*C F F*) fault mode on power-up. If the card has been deliberately changed or removed, the detected fault can be cleared by pressing the ENT key twice, which causes the factory settings to be restored (see page 81) for the parameter groups affected by the card. These are as follows:

Card replaced by a card of the same type

• Communication cards: only the parameters that are specific to communication cards

Control block changed

When a control block is replaced by a control block configured on a drive with a different rating, the drive locks in **[Incorrect config.]** (*C F F*) fault mode on power-up. If the control block has been deliberately changed, the detected fault can be cleared by pressing the ENT key twice, which **causes all the factory settings to be restored.**

Fault detection codes displayed on the remote display terminal

Code	Name	Description
ɪ n ɪ Ł	[Initialization in progress]	The microcontroller is initializing. Search underway for communication configuration.
�C o Π.E (1)	[Communication error]	Time out detected fault (50 ms). This message is displayed after 20 attempts at communication.
A - I 7 (1)	[Alarm button]	A key has been held down for more than 10 seconds. The keypad is disconnected. The keypad wakes up when a key is pressed.
C L r (1)	[Confirmation of detected fault reset]	This is displayed when the STOP key is pressed once if the active command channel is the remote display terminal.
d E u.E (1)	[Drive disparity]	The drive brand does not match that of the remote display terminal.
r o Π.E (1)	[ROM anomaly]	The remote display terminal detects a ROM anomaly on the basis of checksum calculation.
r A Π.E (1)	[RAM anomaly]	The remote display terminal detects a RAM anomaly.
C P u.E (1)	[Other detected faults]	Other detected faults.

(1) Flashing