10 FAULT TRACING

When the control diagnostics of the AC drive find an unusual condition in the operation of the drive, the drive shows this information:

- This information shows on the display (see *7.7 Using the Active faults menu (M4)*):
  - the location indication F1
  - the fault code (see Chapter *10.2 Fault codes*)
  - a short description of the fault
  - the fault type symbol (see)
  - the FAULT or ALARM symbol
- The red LED on the keypad starts to blink (only when a fault shows).

If many faults show at the same time, you can examine the list of active faults with the Browser buttons.

In the NX AC drives, there are 4 different types of faults.

Table 61: Fault types

Fault type symbol	Description
A (Alarm)	The type A fault (Alarm) tells you about unusual operation on the drive. It does not stop the drive. The 'A fault' stays in the display for about 30 seconds.
F (Fault)	The type 'F fault' stops the drive. To start the drive again, you must find a solution to the problem.
AR (Fault Autoreset)	The type 'AR fault' stops the drive. The fault is reset automatically and the drive tries to start the motor again. If it cannot the start the motor again, a fault trip (FT, see below) shows.
FT (Fault Trip)	If the drive cannot start the motor after an AR fault, an FT fault shows. The type 'FT fault' stops the AC drive.

The fault stays active until it is reset, see Chapter *10.1 Resetting a fault*. The memory of active faults can keep the maximum of 10 faults in the order in which they were shown.

Reset the fault with the Reset button on the keypad, or through the control terminal, fieldbus or the PC tool. The faults stay in the Fault history where you can go and examine them. See the different fault codes in Chapter *10.2 Fault codes*.

Before you ask help from the distributor or the factory because of unusual operation, prepare some data. Write down all the texts on the display, the fault code, the source information, the Active Faults list and the Fault History.

10.1 RESETTING A FAULT

1 Remove the external Start signal before you reset the fault to prevent that the drive starts again without a note.
2 You have 2 options to reset a fault:

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- Push the Reset button on the keypad for 2 seconds.
- Use a reset signal from the I/O terminal or fieldbus.

The display goes back to the same state it was before the fault.

10.2 FAULT CODES

Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
1	Overcurrent	S1 = Hardware trip S2 = Reserved S3 = Current controller supervision	There is too high a current (>4*I H) in the motor cable. Its cause can be 1 of these. • a sudden heavy load increase • a short circuit in the motor cables • the motor is not the correct type	Do a check of the loading. Do a check of the motor. Do a check of the cables and connections. Make an identification run.
2	Overvoltage	S1 = Hardware trip S2 = Overvoltage control supervision	The DC-link voltage is higher than the limits. • too short a deceleration time • high overvoltage spikes in the supply • Start/Stop sequence too fast	Set the deceleration time longer. Use the brake chopper or the brake resistor. They are available as options. Activate the overvoltage controller. Do a check of the input voltage.
3 *	Earth fault		The measurement of current tells that the sum of the motor phase current is not zero. • an insulation malfunction in the cables or the motor	Do a check of the motor cables and the motor.
5	Charging switch		The charging switch is open, when the START command is given. • operation malfunction • defective component	Reset the fault and start the drive again. If the fault shows again, ask instructions from the distributor near to you.
6	Emergency stop		Stop signal has been given from the option board.	Do a check of the emergency stop circuit.
7	Saturation trip		• defective component • brake resistor short-circuit or overload	This fault cannot be reset from the control panel. Switch off the power. DO NOT RESTART THE DRIVE or CONNECT THE POWER! Ask instructions from the factory. If this fault shows at the same time with Fault 1, do a check of the motor cable and the motor.

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Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
8	System fault	S1 = Reserved	• operation malfunction • defective component	Reset the fault and start the drive again. If the fault shows again, ask instructions from the distributor near to you.
		S2 = Reserved		
		S3 = Reserved		
		S4 = Reserved		
		S5 = Reserved		
		S6 = Reserved		
		S7 = Charging switch		
		S8 = No power to driver card		
		S9 = Power unit communication (TX)		
		S10 = Power unit communication (Trip)		
		S11 = Power unit comm. (Measurement)		
9 *	Undervoltage	S1 = DC-link too low during run	The DC-link voltage is lower than the limits. • too low a supply voltage • AC drive internal fault • a defective input fuse • the external charge switch is not closed	If there is a temporary supply voltage break, reset the fault and start the drive again. Do a check of the supply voltage. If the supply voltage is sufficient, there is an internal fault. Ask instructions from the distributor near to you.
		S2 = No data from power unit		
		S3 = Undervoltage control supervision		

Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
10 *	Input line supervision		The input line phase is missing.	Do a check of the supply voltage, the fuses and supply cable.
11 *	Output phase supervision		The measurement of current tells that there is no current in 1 motor phase.	Do a check of the motor cable and the motor.
12	Brake chopper supervision		There is no brake resistor. The brake resistor is broken. A defective brake chopper.	Do a check of the brake resistor and the cabling. If they are in good condition, there is a fault in the resistor or the chopper. Ask instructions from the distributor near to you.
13	Frequency converter undertemperature		Too low a temperature in the heatsink of the power unit or in the power board. The heatsink temperature is below -10 °C (14 °F).	
14	Frequency converter overtemperature		Heatsink temperature is over 90 °C (194 °F) (or 77 °C (170.6 °F), NX_6, FR6). Overtemperature alarm is issued when the heatsink temperature goes over 85 °C (185 °F) (72 °C (161.6 °F)).	Do a check of the actual amount and flow of cooling air. Examine the heatsink for dust. Do a check of the ambient temperature. Make sure that the switching frequency is not too high in relation to the ambient temperature and the motor load.
15 *	Motor stalled		The motor stalled.	Do a check of the motor and the load.
16 *	Motor overtemperature		There is too heavy a load on the motor.	Decrease the motor load. If there is no motor overload, do a check of the temperature model parameters.
17 *	Motor underload		Motor underload protection has tripped.	Do a check of the load.
18 **	Unbalance	S1 = Current unbalance S2 = DC voltage unbalance	Unbalance between power modules in parallelled power units.	If the fault occurs again, ask instructions from the distributor near to you.
22	EEPROM checksum fault		Parameter save fault. • operation malfunction • defective component	If the fault occurs again, ask instructions from the distributor near to you.

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Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
24 **	Counter fault		Values displayed on counters are incorrect	
25	Microprocessor watchdog fault		• operation malfunction • defective component	Reset the fault and start the drive again. If the fault shows again, ask instructions from the distributor near to you.
26	Start-up prevented		Start-up of the drive has been prevented. Run request in ON when new application is downloaded to the drive.	Cancel prevention of start-up if this can be done safely. Remove Run request
29 *	Thermistor fault		The thermistor input of option board has detected increase of the motor temperature.	Do a check of the motor cooling and loading. Do a check of the thermistor connection. (If thermistor input of the option board is not in use it has to be short circuited).
30	Safe disable		The input on OPTAF board has opened,	Cancel Safe Disable if this can be done safely.
31	IGBT temperature (hardware)		IGBT Inverter Bridge overtemperature protection has detected too high a short term overload current	Do a check of the loading. Do a check of the motor size. Make an identification run.
32	Fan cooling		Cooling fan of the AC drive does not start, when ON command is give.	Ask instructions from the distributor near to you.
34	CAN bus communication		Sent message not acknowledged.	Make sure that there is another device on the bus with the same configuration.
35	Application		Problem in application software.	Ask instructions from the distributor near to you. If you are an application programmer, do a check of the application program.
36	Control unit		NXS Control Unit can not control NXP Power Unit and vice versa	Change the control unit.
37 **	Device changed (same type)		The option board was replaced by a new one that you have used before in the same slot. The parameters are available in the drive.	Reset the fault. The device is ready for use. The drive starts to use the old parameter settings.

Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
38 **	Device added (same type)		The option board was added. You have used the same option board before in the same slot. The parameters are available in the drive.	Reset the fault. The device is ready for use. The drive starts to use the old parameter settings.
39 **	Device removed		An option board was removed from the slot.	The device is not available. Reset the fault.
40	Device unknown	S1 = Unknown device	An unknown device was connected (the power unit/ option board)	Ask instructions from the distributor near to you.
		S2 = Power1not same type as Power2		
41	IGBT temperature		IGBT Inverter Bridge overtemperature protection has detected too high a short term overload current.	Do a check of the loading. Do a check of the motor size. Make an identification run.
42	Brake resistor overtemperature		Brake resistor overtemperature protection has detected too heavy braking.	Set the deceleration time longer. Use external brake resistor.
43	Encoder fault	1 = Encoder 1 channel A is missing	Problem detected in encoder signals.	Do a check of the encoder connections. Do a check of the encoder board. Do a check of the encoder frequency in the open loop.
		2 = Encoder 1 channel B is missing		
		3 = Both encoder 1 channels are missing		
		4 = Encoder reversed		
		5 = Encoder board missing		

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Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
44 **	Device changed (different type)		Option board or power unit changed. New device of different type or different power rating.	Reset. Set the option board parameters again if option board was changed. Set converter parameters again if power unit was changed.
45 **	Device added (different type)		Option board of different type added.	Reset. Set the power unit parameters again.
49	Division by zero in application		Division by zero has occurred in application program.	If the fault shows again while the AC drive is in run state, ask instructions from the distributor near to you. If you are an application programmer, do a check of the application program.
50 *	Analogue input I_{in} < 4mA (sel. signal range 4 to 20 mA)		Current at the analogue input is < 4mA. control cable is broken or loose signal source has failed.	Do a check of the current loop circuitry.
51	External fault		Digital input fault.	Remove fault situation on external device.
52	Keypad communication fault		The connection between the control panel (or NCDrive) and the drive is defective.	Do a check of the control panel connection and the control panel cable.
53	Fieldbus fault		The data connection between the fieldbus master and the fieldbus board is defective.	Do a check of the installation and fieldbus master. If the installation is correct, ask instructions from the distributor near to you.
54	Slot fault		Defective option board or slot	Do a check of the board and slot. Ask instructions from the distributor near to you.
56	Over Temp.		Temperature exceeded set limit. Sensor disconnected. Short circuit.	Find the cause of temperature rise.
57 **	Identification		Identification run has failed.	Run command was removed before completion of identification run. The motor is not connected to the AC drive. There is load on motor shaft.
58 *	Brake		Actual status of the brake is different from the control signal.	Do a check of the mechanical brake state and connections.

Fault code	Fault	Subcode in T.14	Possible cause	How to correct the fault
59	Follower communication		SystemBus or CAN communication is broken between Master and Follower.	Do a check of the option board parameters. Do a check of the optical fibre cable or CAN cable.
60	Cooling		Coolant circulation on liquid-cooled drive has failed.	Do a check of the reason for the failure on the external system.
61	Speed error		Motor speed is unequal to reference.	Do a check of the encoder connection. PMS motor has exceeded the pull out torque.
62	Run disable		Run enable signal is low.	Do a check of the reason for the Run enable signal.
63 **	Emergency stop		Command for emergency stop received from digital input or fieldbus.	New run command is accepted after reset.
64 **	Input switch open		Drive input switch is open.	Do a check of the main power switch of the drive.
65	Over Temp.		Temperature exceeded set limit. Sensor disconnected. Short circuit.	Find the cause of temperature rise.
74	Follower fault		When using normal Master Follower function this fault code is given if one or more follower drives trip to fault.	

* = You can set different responses in the application for these faults. See parameter group Protections.

** = A faults (alarms) only.

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