PLCNext

Interpreting Diagnostic Information in Web Server

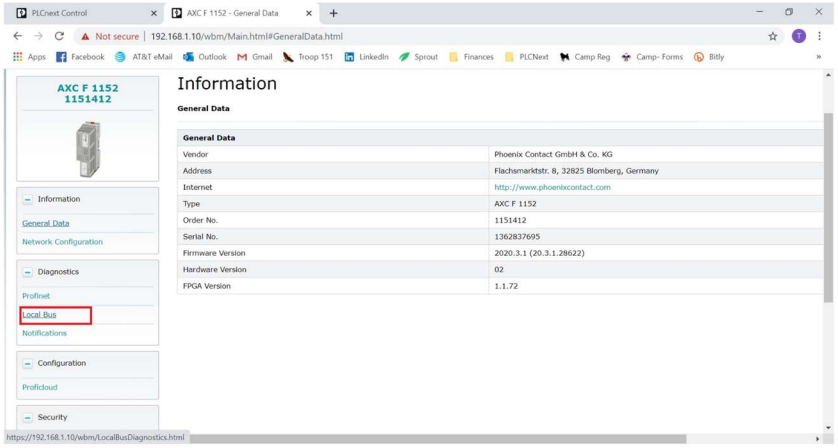
1. Introduction

When the PLCNext experiences faults, either in the processor/program or in the connected I/O, fault codes are generated that are displayed in the web browser. This manual is intended to help interpret those codes beyond what is presented in the web browser. Information on various codes is presented across several manuals, and this tech note is intended to consolidate key information in one place. While key information is condensed in this note, please refer to the other manuasl for greater detail if necessary

2. Diagnostic Information

A) Open browser (Chrome, Firefox, etc) and enter the IP address of the CPU, along with user name and password

B) Find the Diagnostics section and Click “Local Bus”



C) There can be up to 3 Diagnostic codes.

a) Diagnostic Status Register is actually a composite value based on a series of bits which is described in b).

Diagnostic Parameter Register 1 is an error code – the table is in section c).

Diagnostic Parament Register 2 holds the number of the I/O module that has an error. Modules start at 1, so 0x0001 is the first I/O module, 0x0002 is the second I/O module, etc

Local Bus Module List

No.	Module type	Function	Location	Diagnostics	Details
0	AXC F 2152	-	-	-	-

Diagnostic Registers	
Diagnostic Status Register	0x0280
Diagnostic Parameter Register 1	0x0000
Diagnostic Parameter Register 2	0x0000

b) *The Diagnostic Status Register* is comprised of the bits shown below. The correspond to Table 1-3 in the "UM EN AXL F SYS DIAG" manual

Bit Number															
First Digit				Second Digit				Third Digit				Fourth Digit			
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Unused	Unused	Unused								Unused					

Bit	Designation	Meaning	
00	F_PW_BIT	I/O warning	At least one device indicates an I/O warning.
01	F_PF_BIT	I/O error	At least one device indicates an I/O error.
02	F_BUS_BIT	Bus error	A bus error occurred.
03	F_CTRL_BIT	Controller error	The driver detected an internal error.
04	-		Reserved
05	F_RUN_BIT	Run	Data cycles are being exchanged, output data is enabled.
06	F_ACTIVE_BIT	Active	Configuration is active, PDI to the devices is possible, data exchange with invalid/non-enabled process data.
07	F_READY_BIT	Ready	The local bus master is ready for operation, no data exchange over the bus.
08	F_BD_BIT	Bus different	A device which does not belong to the current configuration has been detected at the last interface.
09	F_BASP_BIT	SYS_FAIL	The controller is in the STOP state or no application program has been loaded. Output data is blocked (substitute value behavior is active)
10	F_FORCE_BIT	Force mode	Force mode (startup tool/I/O check) is active.
11	F_SYNC_BIT	Synchronization	Synchronization between higher-level system and local bus master has failed.
12	F_PARA_REQ	Module parameter	At least one device is requesting parameters.
13 ...15	-		Reserved

Examples

Code 0x280 shown above

Bit Number															
First Digit				Second Digit				Third Digit				Fourth Digit			
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Unused	Unused	Unused				X		X			Unused				

07	F_READY_BIT	Ready	The local bus master is ready for operation, no data exchange over the bus.	**Hardware is ready, but there is no data**
09	F_BASP_BIT	SYS_FAIL	The controller is in the STOP state or no application program has been loaded. Output data is blocked (substitute value behavior is active)	**Controller is stopped or has no program**

Diagnostic Registers	
Diagnostic Status Register	0x00e2
Diagnostic Parameter Register 1	0x3130
Diagnostic Parameter Register 2	0x0005

Bit Number

First Digit				Second Digit				Third Digit				Fourth Digit			
15	14	13	12	11	10	09	08	07	06	05	04	03	02	01	00
Unused	Unused	Unused						X	X	X	Unused			X	

02	F_BUS_BIT	Bus error	A bus error occurred.
05	F_RUN_BIT	Run	Data cycles are being exchanged, output data is enabled.
06	F_ACTIVE_BIT	Active	Configuration is active, PDI to the devices is possible, data exchange with invalid/non-enabled process data.
07	F_READY_BIT	Ready	The local bus master is ready for operation, no data exchange over the bus.

There is an I/O module with an error. Check Diagnostic Parameter Register 2
PLC is in run mode
I/O Configuration is active and pinging modules, but there is a problem with a module
Hardware is ready, but there is no data

c) The *Diagnostic Parameter Register 1* can refer to 1 of 3 tables. First, check Table 2-2 – the code will be here if the fault is on the bus. If the code doesn't appear here, then the error is in the I/O modules. If the module location refers to a standard AXL I/O module, then refer to Table 2-5 in the "UM EN AXL F SYS DIAG" manual. If the I/O module is an AXL Smart Element I/O, then refer to Table 16.1 in any Smart Elements manual. The tables are below - just compare the codes in the web browser to the table.

Table 2-2 Error codes for bus diagnostics

Code (hex)	Additional code	Meaning	Remedy
0BD1		The bus could not be activated due to bus malfunctions.	Check the bus configuration.
0BF1			
0BF2			
0BF3			
0C01	Device number	The configured module is not accessible. A device present in the configuration frame has been removed from the physical bus structure after the configuration frame has been connected.	Check the configuration. Adapt the configuration frame if the modification was done on purpose.
0C02		A module has been detected that was not configured. An additional device was added at the end of the physical bus structure after the configuration frame was connected.	
0C11		The module is not located in the configured slot. An active device was inserted at the different location of the physical bus structure after the configuration frame was connected.	
0C12		The module is accessible but was not put into operation due to missing parameters. An active device was replaced by an unknown device in the physical bus structure after the configuration frame was connected (wrong instance ID).	
0C13		The process data length does not correspond to the configured value. The process data width of an active device was changed after the configuration frame was connected.	
0C14		The module type does not correspond to the configured value.	
0C15		The module ID does not correspond to the configured value.	

Table 2-5 Error codes of the I/O modules

Code (hex)	Meaning	Remedy
0000	**No error**	
1000	**General fault**	
2000	**Current**	
2130	Short circuit	Check the wiring.
	Overload of the analog output or short circuit	
2211	Overload at an input	
	Sensor supply overload for the inputs	
2344	Overload at an output	
	Short circuit/overload of an output	
2345	Sensor supply overload	
3000	**Voltage**	
3300	Output voltage	
	Short circuit or overload at the output	
3400	I/O supply voltage failure	Check the I/O supply.
3412	Sensor supply not present	
	I/O supply voltage failure	
3422	Actuator supply not present	
4000	**Temperature**	
5000	**Device hardware**	
5112	Faulty 24 V supply	Check the I/O supply.
	Short circuit or overload at the 24 V supply	
	24 V encoder supply for channel x faulty	
5113	Short circuit or overload of the 5 V supply	
5120	Cold junction invalid	Check the cold junction.
5160	Supply voltage faulty	Check the I/O supply.
	I/O supply overload	
6000	**Device software**	
6300	Parameter set faulty	Check the parameterization of the specified device.
6301	Device error	Restart the device. Replace the device if the error still occurs.
6302	Device error	
6310	Gerätefehler: Parameterverlust	Parametrieren Sie den angegebenen Teilnehmer. Führen Sie einen Neustart aus. Wenn der Fehler weiterhin auftritt, tauschen Sie das Gerät aus.
6320	Parameter table invalid	Check the parameterization of the specified device.
7000	**Additional modules**	
7300	Encoder error	Check the encoder.
7305	Encoder error	Check the encoder.
7610	Receive buffer full	Read the receive buffer.
7611	Transmit buffer full	Check the handshake.
7620	EPROM (device error)	Restart the device. Replace the device if the error still occurs.
7710	Open circuit at sensor cable	Remove the open circuit.
	Open circuit	
8000	**Monitoring**	
8600	Input error of incremental encoder	– Check the input signal. – Remove the short circuit. – Connect the sensor.
8910	Overrange	– Adapt the range. – Check the wiring.
8920	Underrange	
A000	**Modular devices, lower-level bus (sub-bus)**	
A001	Lower-level bus: no module present	Check the connected lower-level bus and its power supply.
A002	Lower-level bus: incorrect module present	Check the specified device and its power supply.
A003	Lower-level bus: module replaced with compatible one	
A004	Lower-level bus: more modules than expected	
A005	Lower-level bus: residual system operated	
A010	Lower-level bus: module error	
A012	Lower-level bus: application on the module not ready	
A013	Lower-level bus: device reset	
A020	Lower-level bus: communication error	Check the specified device in the lower-level bus or in the part of the system for the following aspects: – Missing or incorrect shielding of the bus line (connector) – Missing or incorrect grounding, missing or incorrect equipotential bonding – Faulty connections in the connector – Voltage dips on the power supply
A021	Lower-level bus: timeout	
A022	Lower-level bus: multiple transmission errors	
A023	Lower-level bus: I/O data communication error	
A024	Lower-level bus: management data communication error	Check the specified device and its power supply.
A030	Lower-level bus: configuration error	Check the parameterization of the specified device.
A041	Lower-level bus: hardware fault	Restart the device. Replace the device if the error still occurs.
A042	Lower-level bus: firmware error	Check the parameterization of the specified device.
A043	Lower-level bus is asynchronous to the higher-level system	

16.1 Diagnostics state (0018_{hex}: DiagState)

Error	Error code hex	Text	Corrective
No error	0000	Status OK	
I/O supply voltage (U_P) is not present.	3130	Supply missing (U_P)	Check the supply voltage.
Error in the Smart Element firmware	6100	Firmware error, update required	Replace the Smart Element.
Problem communicating with the Smart Element	6130	Smart Element missing	Check whether the Smart Element has been plugged in correctly. If the error is still present, replace the Smart Element.
Fault in the Smart Element firmware	6302	Firmware defect	Replace the Smart Element.
Error in the parameter memory	6320	Parameter error, repeat parameterization	Error in the parameter memory. Parameterize the Smart Element.
Open circuit of the signal line	7710	Open circuit	Check the connected components and wiring.
Measuring range violated (overrange)	8910	Overrange	Check the wiring.
Measuring range violated (underrange)	8920	Underrange	

Examples

Diagnostic Registers	
Diagnostic Status Register	0x00e2
Diagnostic Parameter Register 1	0x3130
Diagnostic Parameter Register 2	0x0005

In this hardware set-up, Register 2 is pointing to a Smart Elements Module. Going to Table 16.1, error 3130 indicates that supply power is missing. Checking the hardware, the wire to the +24VDC terminal of the SE backplane is loose

Diagnostic Registers	
Diagnostic Status Register	0x00e1
Diagnostic Parameter Register 1	0x8920
Diagnostic Parameter Register 2	0x0005

In this hardware set-up, Register 2 is pointing to a Smart Elements Module. Going to Table 16.1, error 8920 indicates that the input is underrange. Checking the hardware - an RTD - the temperature sensor was miswired