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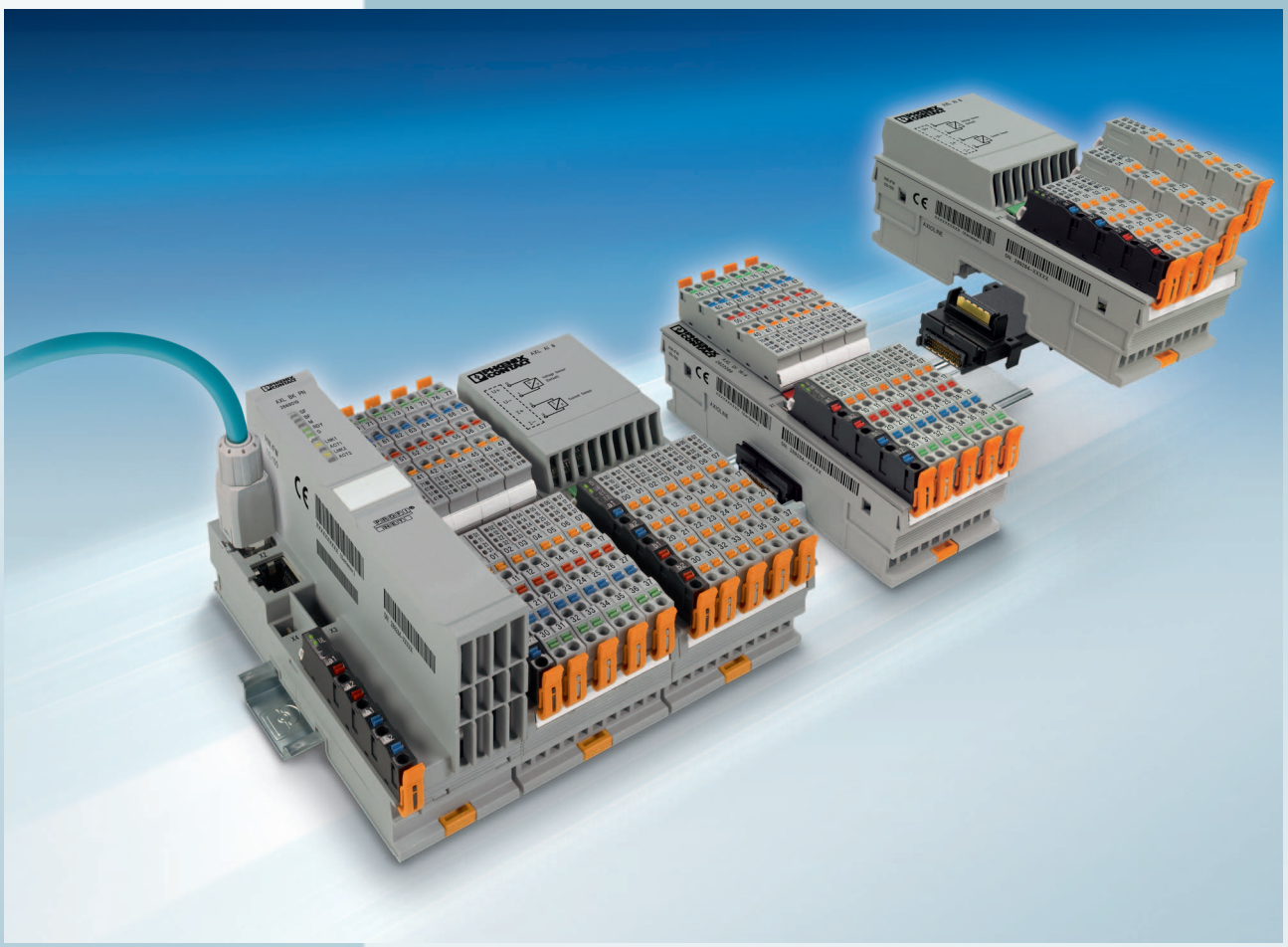

Axioline F: Diagnostic registers, and error messges

User manual

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User manual

Axioline F: Diagnostic registers, and error messges

2016-11-11

Designation: UM EN AXL F SYS DIAG

Revision: 03

Order No.: —

This manual is valid for:

Modules of the Axioline F product group

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Please observe the following notes

User group of this manual

The use of products described in this manual is oriented exclusively to qualified application programmers and software engineers, who are familiar with the safety concepts of automation technology and applicable standards.

Explanation of symbols used and signal words

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety measures that follow this symbol to avoid possible injury or death.

There are three different categories of personal injury that are indicated with a signal word.

DANGER This indicates a hazardous situation which, if not avoided, will result in death or serious injury.

WARNING This indicates a hazardous situation which, if not avoided, could result in death or serious injury.

CAUTION This indicates a hazardous situation which, if not avoided, could result in minor or moderate injury.

This symbol together with the signal word **NOTE** and the accompanying text alert the reader to a situation which may cause damage or malfunction to the device, hardware/software, or surrounding property.

This symbol and the accompanying text provide the reader with additional information or refer to detailed sources of information.

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1 Diagnostics in the Axioline F system

Terms used in the document:

Local bus	Axioline F local bus
Head of an Axioline F station	e.g., Axioline F bus coupler, Axioline F controller
Local bus master	Part of the head of the Axioline station that is responsible for the controller of the Axioline F local bus
Axioline F module	Any module of an Axioline F station, i. e., head of the Axioline F station or I/O module

The Axioline F modules indicate the errors that occur in different ways:

– About the local diagnostics indicators
– About the diagnostics object 0018_{hex} (DiagState)
– About the diagnostics register of the AXC ... controller
– About the diagnostics registers of the AXL F BK ... bus coupler

1.1 Local diagnostics and status indicators

All Axioline F modules are provided with diagnostic and status indicators for quick local error diagnostics. They enable the clear localization of system errors (bus errors) or I/O errors.

Diagnostics

The diagnostics indicators (red, yellow or green) provide information about the state of the module and, in the event of an error, provide information about the type and location of the error. The module is functioning correctly if all of the green LEDs are on.

Status

The status indicators (yellow) display the status of the relevant input/output and the connected I/O device.

Extended diagnostics

Some modules have extended diagnostics. For example, a short circuit or an overload of the sensor supply can be detected and reported. If a short circuit occurs at an output, some output modules can diagnose each channel individually. Information about the supply voltage is also reported. Information about I/O errors is sent to the controller with precise details of the error type and is displayed using status indicators.

The following only considers the LEDs D (diagnostics for local bus communication) and E (Error).

An overview of all main diagnostics and status indicators in the Axioline F system and their meaning can be found in the UM EN AXL F SYS INST user manual:

Refer to the module-specific documentation for information on the diagnostics and status indicators on each special module and their meaning.

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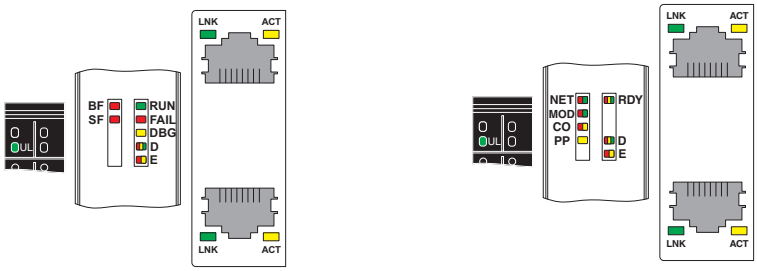
1.1.1 Indicators D and E on controllers and bus couplers



Example: AXC 1050 Example: AXL F BK EIP

Figure 1-1 Indicators on controllers and bus couplers

Tabelle 2 Indicators on controllers and bus couplers

Des.	Color	Meaning	State	Description
D	Red/ yellow/ green	Diagnostics for local bus communication		
		Power off	Off	The station coupler is in (power) reset.
		Ready	Yellow on	The station is ready for operation, no data exchange taking place.
		Ready + Bus error	Flashing red	Local bus error on startup
				Possible causes: – Configuration cannot be generated, information is missing from a device – Chip version of a device is <V1.1 – The desired and actual configuration are different – No local bus device connected – The maximum number of local bus devices is exceeded.
		Active	Flashing green	The station is ready for operation, communication within the station is OK. The data is **not** valid. Valid data from the controller/higher-level network is not available. There is no fault in the module.
		Active + Force	Flashing yellow	Access from Startup+ in I/O check mode
			Flashing yellow/red	Local bus error during active I/O check
		Active + Bus error	Red on	The station is ready for operation but has lost connection to at least one device.
				Possible causes: – Communication error – Local bus device has been removed or configured device is missing. – Reset at a local bus device – Serious device error at a local bus device (local bus device can no longer be accessed)
		Run	Green on	The bus coupler is ready for operation, communication within the station is OK. All data is valid. There are no faults.

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Tabelle 2 Indicators on controllers and bus couplers

Des.	Color	Meaning	State	Description
E	Yellow/ red	Error	Yellow on	I/O warning at a local bus device.
			Red on	I/O error at a local bus device.
			Off	No I/O messages present.

1.1.2 Indicators D and E on I/O modules

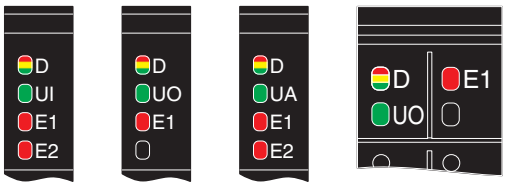

Figure 1-3 LEDs D and E on the power connectors of the I/O modules (examples)

Tabelle 4 LEDs D and E on the power connectors of the I/O modules

Designation	Color	Meaning	State	Description
D	Red/yellow/green	Diagnostics for local bus communication		
		Run	Green on	The device is ready for operation, communication within the station is OK. All data is valid. There are no faults.
		Active	Flashing green	The device is ready for operation, communication within the station is OK. The data is **not** valid. Valid data from the controller/higher-level network is not available. There is no fault in the module.
		Device application not active	Flashing green/yellow	The device is ready for operation, communication within the station is OK. Output data **cannot** be output and/or input data **cannot** be read. There is a fault on the I/O side of the module.
		Ready	Yellow on	The device is ready for operation but has still not detected a valid cycle after power-on.
		Connected	Flashing yellow	The device is not (yet) part of the active configuration.
		Reset	Red on	The device is ready for operation but has lost the connection to the bus head.
		Not connected	Flashing red	The device is ready for operation but there is no connection to the previously existing device.
		Power down	Off	Device is in (power) reset.
E1/E2	Red	Error	On	Error, see module-specific documentation.
			Off	No error.

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1.2 Diagnostics via object 0018_{hex} (DiagState)

In addition, each I/O module is equipped with object 0018_{hex} (DiagState) that serves the structured reporting of an error. The I/O module also makes its diagnostics state available.

The object is illustrated in the module-specific documentation of each I/O module.

Table 1-1 Diagnostics state (0018_{hex}: DiagState) (general representation)

0018_{hex}: DiagState (Read)					
Subindex	**Data type**	**Length in bytes**	**Meaning**	**Content**	
0	Record	6 entries	Diagnostic state	Complete diagnostic information	
1	Unsigned 16	2	Error number	Unique, consecutive number since the last power-up reset or the last reset of the diagnostics counter 0 ... 65535_{dec}	
2	Unsigned 8	1	Priority	00_{hex}	No error
				01_{hex}	Error
				02_{hex}	Warning
				03_{hex}	Information
				81_{hex}	Error eliminated
				82_{hex}	Warning eliminated
				83_{hex}	Information eliminated
3	Unsigned 8	1	Channel/group/module	Channel, group or module where the error occurred. Additional information under “Additional information”.	
				00_{hex}	No error
				xx_{hex}	Channel xx, groupxx or module xx
				FF_{hex}	Entire device
4	Unsigned 16	2	Error code	Error code	
5	Unsigned 8	1	Additional Information	00_{hex}	Subindex 3 refers to a channel number.
				04_{hex}	Subindex 3 refers to a group number.
				08_{hex}	Subindex 3 refers to a module number.
				Other	Currently not used.
6	Visible string	max. 51	Text	Plain text message of the error	

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Table 1-2 Classification of the error messages

Priority		Message type	Example	Note
01_{hex}	High	Error (fault, alarm)	Supply voltage faulty Parameter table invalid	An error is present, which must be responded to. A fault leads e.g., to an activity in the drive, but does not necessarily require the system to be stopped with immediate effect.
02_{hex}	Medium	Warning	Limit value not reached or exceeded	Risk of error. A warning does not require action to be taken in the device.
03_{hex}	Low	Information (message, notification)	General operating message: 10000 operating hours have elapsed.	General operating message: 10000 operating hours have elapsed.

Diagnostic object 0018_{hex} is implemented with a storage depth of 1.

This means that:

– A higher priority message overwrites a lower priority message.

– Lower priority messages are not indicated if a higher priority message is already present.

The message with the priority $8x_{hex}$ is a one-time internal message to the bus coupler or controller that is converted to the error mechanisms of the higher-level system by the bus coupler.

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1.3 Diagnostic registers of the local bus master

The errors reported to the local master by the I/O modules are mapped in the diagnostic registers of the local master.

A local bus master has three diagnostic registers:

– Diagnostic status register:
  Operating and error states of the Axioline F local bus
– Diagnostic parameter register 1:
  Returns the associated error code in the event of an error
– Diagnostic parameter register 2:
  Returns the error location for local bus or I/O errors (device number)

1.3.1 Diagnostic status register

Information on the operating state of the Axioline F local bus is stored in the diagnostic status register. Each bit in the diagnostic status register is assigned to a state of the Axioline F local bus.

The states in the error bits (F_PW_BIT, F_PF_BIT, F_BUS_BIT, F_CTRL_BIT) are described in greater detail using the two diagnostic parameter registers.

Table 1-3 Diagnostic status register

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

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Operating indicators

The Ready, Active and Run operating indicators show the current state of the system. The diagnostic parameter registers are not used.

After initialization the driver is ready for operation. The Ready indicator bit is set (F_READY_BIT = 1).

If the driver has been configured and a configuration frame has been activated without errors, the system indicates it is active. The Ready and Active indicator bits are set (F_READY_BIT = 1, F_ACTIVE_BIT = 1).

In addition the Run indicator bit is set (F_READY_BIT = 1, F_ACTIVE_BIT = 1 and F_RUN_BIT = 1) when data exchange is started.

Error indicators

The PF, BUS, CTRL, and SYNC error indicators report an error, PW a warning.

Errors which are indicated with BUS or CTRL will cause the bus to be disconnected. The Run indicator bit is reset (F_RUN_BIT = 0).

Further information on the error cause is provided by the two diagnostic parameter registers.

If several error bits are 1 at the same time, the values in the parameter registers represent the error with the highest priority.

Table 1-4 Priorities of the error messages

Message	Priority
CTRL	1 (Highest priority)
BUS	2
SYNC	3
PF	4
PW	5 (Lowest priority)

If there are I/O errors (PF) at several devices, the parameter registers show the message that occurred first. If this message has been removed, the next pending message with the lowest device number is shown.

If there are I/O warnings from several devices, the warnings are shown in the same way as the I/O errors.

After an error has been removed or disappears (e.g., elimination of an interrupt) the bus is started automatically and output data is enabled. The Run indicator bit is set again (F_RUN_BIT = 1).

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1.3.2 Diagnostic parameter register

The diagnostic parameter registers are always written to when a fault occurs and whenever one of the error bits is set (F_PW_BIT, F_PF_BIT, F_BUS_BIT, F_CTRL_BIT). Otherwise, the diagnostic parameter register has the value 0000_{hex}.

The diagnostic parameter registers provide additional information on the status indicated in the diagnostic status register when the error bits specified above are set.

The diagnostic parameter register 1 contains the error code.
An overview of the error codes can be found in Section 2, “Error codes”.

The diagnostic parameter register 2 contains additional information. For localized bus or I/O errors, this is the error location or the device number. The error location is stored as a slot number. This starts at 1 and corresponds to the sequential number of the Axioline F modules that are installed one after another.

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1.4 Diagnostics register of the AXC ... controller

With the help of the system variables, information on the diagnostic status register of an AXC ... controller can be read out.

Table 1-5 System variables of the diagnostic status register

System variable	Type	Meaning
AXIO_DIAG_STATUS_REG_HI	BYTE	Diagnostic status register (high byte)
AXIO_DIAG_STATUS_REG_LOW	BYTE	Diagnostic status register (low byte)
AXIO_DIAG_STATUS_REG_PF	BOOL	I/O error
AXIO_DIAG_STATUS_REG_PW	BOOL	I/O warning
AXIO_DIAG_STATUS_REG_BUS	BOOL	Bus error
AXIO_DIAG_STATUS_REG_RUN	BOOL	Data transmission is active
AXIO_DIAG_STATUS_REG_ACT	BOOL	Selected configuration is ready to operate
AXIO_DIAG_STATUS_REG_RDY	BOOL	Axioline F local bus is ready for operation
AXIO_DIAG_STATUS_REG_SYSFAIL	BOOL	The Axioline F local bus switches to the SYSFAIL state when the controller is in the STOP state or there is no program present on it.

Table 1-6 System variables of the diagnostic parameter register

System variable	Type	Meaning
AXIO_DIAG_PARAM_REG_HI	BYTE	Diagnostic parameter register 1 (high byte)
AXIO_DIAG_PARAM_REG_LOW	BYTE	Diagnostic parameter register 1 (low byte)
AXIO_DIAG_PARAM_2_REG_HI	BYTE	Diagnostic parameter register 2 (high byte)
AXIO_DIAG_PARAM_2_REG_LOW	BYTE	Diagnostic parameterregister 2 (low byte)

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1.5 Diagnostics register of the AXL F BK ... bus coupler

The diagnostic registers of the local bus master can be read via the diagnostic mechanisms of the higher-level system (see Table 1-7).

Table 1-7 Diagnostics mechanisms of the higher-level systems

Bus coupler	Higher-level system	Diagnostics mechanism	See	Web-based Management
AXL F BK PB	PROFIBUS	Diagnostics in common format, block 6, byte 9 ... 12	UM EN AXL F BK PB	No
AXL F BK EC	EtherCAT®	CoE object $F100_{hex}$: Axioline Bus Coupler Diag Info	DB EN AXL F BK EC	No
AXL F BK PN ...	PROFINET	Diagnostic alarms	DB EN AXL F BK PN ... UM EN PROFINET SYS	Yes
AXL F BK ETH ...	Ethernet	Modbus registers: Local bus diagnostics: 7997 diagnostic status register 7998 diagnostic status register 1 7999 diagnostic status register 2 I/O diagnostics: 1801 ... 1989 I/O diagnostics of local bus devices	DB EN AXL F BK ETH ...	Yes
AXL F BK EIP ...	EtherNet/IP™	Axioline F diagnostics object (class code 67hex)	UM EN AXL F BK EIP - OBJECTS	Yes
AXL F BK S3	Sercos	Diagnostics IDNs	DB EN AXL F BK S3	No
AXL F BK SAS	IEC 61850			Yes

Further options for diagnostics:

For devices with web-based management:

- Open the “Diagnostics” menu item.
  You can call the diagnostics for the bus coupler and local bus here.

When using the Startup+ software:

- Right-click on the bus coupler to open the context menu and select the “Diagnostics” menu item.
  You can call the diagnostics for the station and the individual devices here.

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2 Error codes

Problems when calling the firmware services or problems during operation are reported with error codes to determine the exact cause of the error. The following sections explain the meanings of the individual codes.

The code listed in the tables consists of Error Class and Error Code. The Additional Code parameter contains a detailed description of the error reason.

2.1 Error codes for user errors

Table 2-1 Error codes for user errors

Code (hex)	Additional code	Meaning	Remedy
0903		Memory problem (e.g., buffer too small)	Reduce the amount of data.
0904		Inconsistent parameters	Check the parameters.
0905		Invalid parameters	Check the parameters.
0908	Code of failed service	Maximum number of permitted parallel services exceeded (Processing conflict)	Wait for the service called previously to be completed, and then try again.
090A	Value transmitted in Parameter_Count	The number of parameters is inconsistent with the service. The Parameter_Count parameter does not agree with the number of subsequent words.	Match the number of parameters.
0913	Code of failed service	The service called is not supported.	Use a service that is supported.
0917	Code of failed service	Service decoding failed.	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0918	Code of the unknown service	Call of an unknown service code.	Check the call.
0928		An exclusive service was to be executed without the appropriate rights.	Wait for the exclusive rights to be enabled.
0932		Attempt to pass on the exclusive rights without having these rights.	
0933		Another node has currently the exclusive rights.	Wait for the exclusive rights to be enabled.
0934		The node already has the exclusive rights.	
0937	Faulty Variable_ID	Unknown Variable_ID component.	Check the call.
0938	Reserved Variable_ID	An internal Variable_ID was used.	Check the call.
0939	Variable_ID not enabled	The Variable_ID is not enabled. (Password protection)	Check the call.
093A	Incorrect Variable_ID	Length specification in the Variable_ID is 0 or incorrect.	Check the call.

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Table 2-1 Error codes for user errors [...]

Code (hex)	Additional code	Meaning	Remedy
093B	Incorrect Variable_Count	The number of variables has been calculated incorrectly.	Check the call.
0A01		A hardware or firmware error occurred.	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0A02	Current status of the local bus master	A service was called that is not permitted in the current status of the local bus master. Possible states: 0001 Ready (After restart or reset) 0002 Load Config (Configuration cannot be loaded) 0004 Config Ready (Configuration loaded successfully) 0008 Active (Configuration frame connected) 0010 Param Ready (Parameterization of modules completed) 0020 Run (Process data traffic running) 0080 Force Mode (Startup tool specifies outputs) 0100 Ready Fail (Communication abort in Ready) 0800 Active Fail (Communication abort in Active) 1000 Param Ready Fail (Communication abort in Ready parameter) 2000 Run Fail (Process data traffic with subsystem) 4000 Force Fail (Application timeout for all devices) 8000 Force Mode Fail (Communication abort in Force_Mode)	Set the local bus master to the required state.
0A03		Memory problem (e.g., buffer too small)	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0A04		Inconsistent parameters	Check the call.
0A05		Invalid parameters	Check the call.
0A06		Access not supported.	Check the call.
0A07		Object does not exist.	Check the call.
0A08	Code of failed service	Maximum number of permitted parallel SM services exceeded. (Processing conflict)	Wait for the service called previously to be completed, and then try again.
0A0C	Unknown Variable_ID	Call of Set_Value or Read_Value with a Variable_ID that contains an unknown code.	Check the call.

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Table 2-1 Error codes for user errors [...]

Code (hex)	Additional code	Meaning	Remedy
0A0D		A firmware error occurred.	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0A18	Invalid Used_Attributes parameter	A reserved bit is set in Used_Attributes.	Check the parameters.
0A19	Number of bus devices	The end of the frame was exceeded when accessing the configuration or line 0 was accessed.	Check the access.
0 A1 A	Invalid Frame_Reference (if specified)	The frame reference specified for the service does not exist.	Check the parameters.
0A1C	Number of connected devices	Maximum number of devices exceeded.	Reduce the bus configuration.
0A2F		Number of devices is zero.	Connect the device and check the connection.
0A51		A frame reference from 1 to 254 is permitted only.	Currently, the value 1 is permitted only.
0A54		The maximum number of I/O points was exceeded.	Reduce the number of I/O points to the maximum number. To obtain the exact number, please refer to the documentation for your controller.
0A60		No configuration frames could be assigned.	Create the configuration frame.
0A70		A reserved bit has been set in the *Diag_Info* attribute.	Check the parameters.
0A73	Device number	Device present with a chip version in the local bus that is not supported.	Replace the device.
0A74	Device number	Device of a manufacturer that is not supported present in the local bus.	Replace the device.
0A75	Device number	Device is indicating a serious error (e. g., faulty EEPROM).	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0A76	Device number	The topology used by the device is not supported by the master.	Replace the device.
0A77	Device number	Error at the interface.	Check the connection between the electronics module and bus base module.
0A7 A		Invalid Dev_Type specified during loading.	Check the parameters.
0A7B		Invalid Dev_ID specified during loading.	Check the parameters.
0A7C		Invalid Dev_Length specified during loading.	Check the parameters.
0A81	Object index	Service (e.g, Create_Configuration) could not be executed due to PDI communication malfunctions (timeout).	Restart the device. If the problem still occurs, please contact Phoenix Contact.

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Table 2-1 Error codes for user errors [...]

Code (hex)	Additional code	Meaning	Remedy
0A82	Object index	Service (e.g, Create_Configuration) could not be executed due to PDI communication malfunctions (number).	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0A83	Object index	Service (e.g, Create_Configuration) could not be executed due to PDI communication malfunctions (error).	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0A90	Device number	Device was selected for synchronization, however it does not support this.	Select a device that supports synchronization or change the selection.
0A91	Device number	Device was selected for synchronization, however it does not support the specified cycle time.	Select a different cycle time or a different device.
0A92	Device number	Device was selected for synchronization, but does not support the specified value for Input_Delay.	Select a different value for Input_Delay or a different device.
0A93	Device number	Device was selected for synchronization, but does not support the specified value for Output_Delay.	Select a different value for Output_Delay or a different device.
0A94	Device number	Device was selected for synchronization, but does not support the specified values for Input_Delay and Output_Delay.	Selected different values for Input_Delay and Output_Delay or a different device.
0AFF		Call of Reset_Driver during PDI communication.	Restart the device. If the problem still occurs, please contact Phoenix Contact.

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Table 2-1 Error codes for user errors [...]

Code (hex)	Additional code	Meaning	Remedy
0B01		A hardware or firmware error occurred.	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0B02		A hardware or firmware error occurred.	
0B03		A hardware or firmware error occurred.	
0B04		A hardware or firmware error occurred.	
0B05		Invalid parameters	Check the parameters.
0B06		Access not supported. (E.g., write protection)	Restart the device. If the problem still occurs, please contact Phoenix Contact.
0B07		Object does not exist.	
0B0C		A hardware or firmware error occurred.	
OBC1		Supply voltage not available for the local bus. Too many devices connected or the higher-level power supply unit is too weak.	Use a suitable power supply unit. Check the power consumption of the devices; if required, use a power module for communications power or install a further Axioline F station.
0BDE		Synchronization failed. Trigger signal does not correspond to the specification.	Check the synchronization signal of the higher-level system. Make sure that the cycle time specification is properly selected.

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2.2 Error codes for bus diagnostics

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.	

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2.3 Error codes when calling the PDI services

In Table 2-3, only specify the additional code if it contains a special value. Pleas obtain the standard values for the additional code from Table 2-4.

Table 2-3 Error codes when calling the PDI services

Code (hex)	Code (hex)	Additional code	Meaning	Remedy
2			Error in the communication relationship	Check the call.
	1		Unable to access the object. Possible causes: – Module not present – Incorrect module number	
	0		Other error	
5			Faulty service	Check the call.
	1		The current object state prevents the service from being executed.	
	2		Problem with the PDU size	
			Permissible length exceeded. Object cannot be read completely.	
	3		The service cannot be executed at present.	
	4		The service contains inconsistent parameters.	
	5		A parameter has an invalid value.	
	0		Other error	

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Table 2-3 Error codes when calling the PDI services [...]

Code (hex)	Code (hex)	Additional code	Meaning	Remedy
6			Faulty access	Check the call.
	1		Invalid object	
	2		Hardware fault	Eliminate the hardware error (e.g., I/O voltage not present). Restart the device. If the problem still occurs, please contact Phoenix Contact.
	3		Access to object denied	Check the call.
	4		Access to an invalid address	Check the call.
	5		Inconsistent object attributes	
	6		The service used cannot be applied to this object.	
	7		Object does not exist	
	8		Type conflict	
	A		Data not ready at present.	
	0		Other error	
8	0	xx30	A reserved bit or reserved code was used during parameterization. xx: Number of the affected elements 30: Value is out of range	Check the parameterization.
	1		Error writing the object	Check the call.
			Error reading the object	

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Table 2-3 Error codes when calling the PDI services [...]

Code (hex)	Code (hex)	Additional code	Meaning	Remedy
F	1		Hardware or firmware error	Restart the device. If the problem still occurs, please contact Phoenix Contact.
	2			
	3			
	4		Inconsistent parameters	Check the parameters.
	5	PDI object index	Invalid parameters	Check the parameters.
	6	PDI object index	Access not supported.	Check the call.
	8	PDI object index	Maximum number of permitted parallel PDI services exceeded	Wait until the services have been processed.
	C	Unknown Variable_ID	Incorrect variable ID for Set_Value or Read_Value.	Check the call.
	D		Internal error	Restart the device. If the problem still occurs, please contact Phoenix Contact.
	11		Device not accessible (bus error).	Check the bus configuration.
	12		Device cannot be reached (timeout).	Check the device.
	13		Device not accessible because it was removed.	Check the bus configuration.
	21	Invalid device number	Invalid slot number (Value is 0 or larger than the maximum number of devices)	Check the call.
	22	Invalid device number	Slot is not active.	Check the call.
	23	Invalid data length	Invalid data length.	Check the call.
	24	Invalid number of parameters	Invalid number of parameters.	Check the call.
	31		Internal error	Restart the device. If the problem still occurs, please contact Phoenix Contact.
	32			
	33			

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Table 2-4 Additional codes

Additional code (hex)	Meaning
0000	No detailed information on the cause of error.
0010	Service parameter with invalid value.
0011	Subindex not available
0012	Object access is not a request
0013	Service code is not supported
0014	Subslot is not supported
0015	Object access type not supported on this object.
0016	Object access request index for this AccessType does not equal 0000_{hex}.
0017	Object access request length for this AccessType does not equal zero.
0018	Object length for this object does not match
0019	Object is ReadOnly and cannot be overwritten.
001A	Object is WriteOnly and cannot be read.
001B	Write/read access to the object is not permitted.
001C	Access requires Upload-Read or Download-Write.
0020	Service cannot be executed at present.
0021	Due to local control, service cannot be executed at present.
0022	Service cannot be executed in current device state (device control).
0023	Service cannot be executed at present as no object dictionary is available.
0030	Value range of a parameter out of range.
0031	Parameter value too large
0032	Parameter value too small
0040	Collision with other values
0041	Communication object cannot be mapped to the process data.
0042	Process data length exceeded
0050	Firmware download rejected: general.
0051	Firmware download rejected: incorrect update version.
0052	Firmware download rejected: incorrect firmware version for the hardware.
0053	Firmware download rejected: identical firmware block.
0080	Hardware error
0081	Application failed
00A0	Invalid segment number, e.g., upload without initiation with subindex ==FF_{hex}.
00A1	Resource not available; No more resources (memory) available for download.
00A2	Incorrect CRC (checksum)
00A3	Error opening the file (if file system is available)
00A4	Error writing the file (if file system is available)
00A5	Error closing the file (if file system is available)

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Table 2-4 Additional codes [...]

Additional code (hex)	Meaning
00A6	Segment missing: Fewer data blocks were received than specified in the last segment.
00A7	Excess segment: More data blocks were received than specified in the last segment.
00A8	Error reading the file (if file system is available).
00A9	Segment number invalid or duplicated (segment ignored).
00B1	The password cannot be replaced (deleted).
00B2	The password cannot be added (too many passwords).
00B3	The password cannot be assigned for the desired type of access.

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2.4 Error codes of the I/O modules

If there is an error on an I/O module, the module reports this error to the local bus master.

Please refer to the module-specific data sheets for the error types that a module reports.

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	

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

Code (hex)	Meaning	Remedy
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	

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

Code (hex)	Meaning	Remedy
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	

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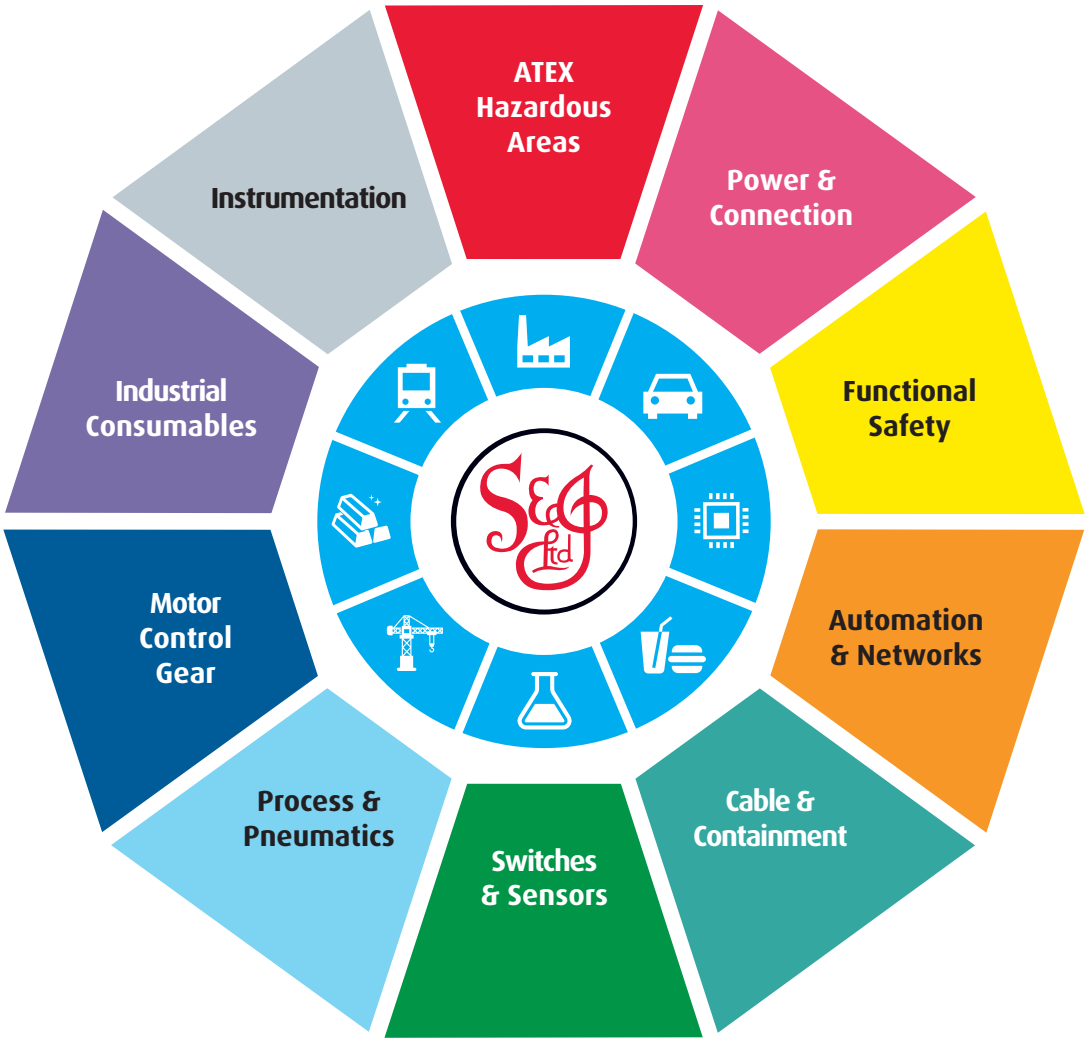

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