



Chipsmall Limited consists of a professional team with an average of over 10 year of expertise in the distribution of electronic components. Based in Hongkong, we have already established firm and mutual-benefit business relationships with customers from,Europe,America and south Asia,supplying obsolete and hard-to-find components to meet their specific needs.

With the principle of “Quality Parts,Customers Priority,Honest Operation,and Considerate Service”,our business mainly focus on the distribution of electronic components. Line cards we deal with include Microchip,ALPS,ROHM,Xilinx,Pulse,ON,Everlight and Freescale. Main products comprise IC,Modules,Potentiometer,IC Socket,Relay,Connector.Our parts cover such applications as commercial,industrial, and automotives areas.

We are looking forward to setting up business relationship with you and hope to provide you with the best service and solution. Let us make a better world for our industry!



## Contact us

Tel: +86-755-8981 8866 Fax: +86-755-8427 6832

Email & Skype: info@chipsmall.com Web: www.chipsmall.com

Address: A1208, Overseas Decoration Building, #122 Zhenhua RD., Futian, Shenzhen, China





## Axioline F safety module with safe digital inputs

User manual

## User manual

### Axioline F safety module with safe digital inputs

2016-11-10

---

Designation: UM EN AXL F SSDI8/4 1F

Revision: 01

This user manual is valid for:

Designation	From HW/FW revision	Order No.
AXL F SSDI8/4 1F	01/220	2702263



---

## Please observe the following notes

### User group of this manual

The use of products described in this manual is oriented exclusively to:

- Qualified electricians or persons instructed by them, who are familiar with applicable standards and other regulations regarding electrical engineering and, in particular, the relevant safety concepts.
- 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.

### How to contact us

#### Internet

Up-to-date information on Phoenix Contact products and our Terms and Conditions can be found on the Internet at:

[phoenixcontact.com](http://phoenixcontact.com)

Make sure you always use the latest documentation.

It can be downloaded at:

[phoenixcontact.net/products](http://phoenixcontact.net/products)

#### Subsidiaries

If there are any problems that cannot be solved using the documentation, please contact your Phoenix Contact subsidiary.

Subsidiary contact information is available at [phoenixcontact.com](http://phoenixcontact.com).

#### Published by

PHOENIX CONTACT GmbH & Co. KG  
Flachsmarktstraße 8  
32825 Blomberg  
GERMANY

Should you have any suggestions or recommendations for improvement of the contents and layout of our manuals, please send your comments to:

[tecdoc@phoenixcontact.com](mailto:tecdoc@phoenixcontact.com)

**Please observe the following notes**

---

**General terms and conditions of use for technical documentation**

Phoenix Contact reserves the right to alter, correct, and/or improve the technical documentation and the products described in the technical documentation at its own discretion and without giving prior notice, insofar as this is reasonable for the user. The same applies to any technical changes that serve the purpose of technical progress.

The receipt of technical documentation (in particular user documentation) does not constitute any further duty on the part of Phoenix Contact to furnish information on modifications to products and/or technical documentation. You are responsible to verify the suitability and intended use of the products in your specific application, in particular with regard to observing the applicable standards and regulations. All information made available in the technical data is supplied without any accompanying guarantee, whether expressly mentioned, implied or tacitly assumed.

In general, the provisions of the current standard Terms and Conditions of Phoenix Contact apply exclusively, in particular as concerns any warranty liability.

This manual, including all illustrations contained herein, is copyright protected. Any changes to the contents or the publication of extracts of this document is prohibited.

Phoenix Contact reserves the right to register its own intellectual property rights for the product identifications of Phoenix Contact products that are used here. Registration of such intellectual property rights by third parties is prohibited.

Other product identifications may be afforded legal protection, even where they may not be indicated as such.

---

# Table of contents

1	For your safety .....	9
1.1	General safety notes.....	9
1.2	Electrical safety .....	10
1.3	Safety of the machine or system.....	11
1.4	Directives and standards .....	11
1.5	Intended use .....	11
1.6	Documentation .....	12
1.7	Abbreviations used .....	12
1.8	Safety hotline.....	12
2	Product description.....	13
2.1	Short description of the module .....	13
2.2	Structure of the module .....	14
2.3	Housing dimensions .....	14
2.4	Safe digital inputs .....	15
2.5	Clock outputs T1 and T2.....	16
2.6	Connection options for sensors depending on the parameterization .....	18
2.7	Local diagnostics and status indicators .....	19
2.8	Safe state .....	21
2.8.1	Operating state .....	21
2.8.2	Error detection in I/O devices .....	21
2.8.3	Device errors .....	22
2.8.4	Parameterization errors .....	22
2.9	Process data words .....	23
2.10	Programming data/configuration data.....	23
3	Integration of the Axioline F local bus .....	25
3.1	Supply voltage of the module logic .....	25
3.2	Supply voltage $U_1$ .....	25
3.3	DC distribution network according to IEC 61326-3-1 .....	26
3.4	Terminal point assignment.....	27

4	Assembly, removal, and electrical installation .....	29
4.1	Assembly and removal .....	29
4.1.1	Unpacking the module .....	29
4.1.2	Preparation and assembly .....	29
4.1.3	Setting the DIP switch .....	30
4.1.4	Mounting and removing modules .....	31
4.2	Electrical installation .....	33
4.2.1	Electrical installation of the Axioline F station .....	33
4.2.2	Electrical installation of the module .....	33
5	Parameterization of the module .....	35
5.1	Parameterization in a SafetyBridge system .....	35
5.2	Parameterization of the safe inputs.....	36
6	Duration of a safety demand .....	39
7	Connection examples for safe inputs .....	41
7.1	Explanation of the examples.....	41
7.2	Measures to achieve a specific safety integrity.....	42
7.3	Single-channel assignment of safe inputs .....	44
7.3.1	Notes .....	44
7.3.2	Cross-circuit monitoring enabled .....	44
7.3.3	Cross-circuit monitoring disabled, supply through T1 .....	46
7.3.4	Supply through OSSD .....	48
7.4	Two-channel equivalent assignment of safe inputs .....	50
7.4.1	Notes on errors .....	52
7.4.2	Cross-circuit monitoring enabled, supply through T1 and T2 .....	53
7.4.3	Cross-circuit monitoring disabled, supply through a clock output or external supply .....	55
7.4.4	External supply (OSSD) .....	58
7.5	Two-channel non-equivalent assignment of safe inputs .....	60
7.5.1	Notes on errors .....	62
7.5.2	Cross-circuit monitoring enabled, supply through T1 and T2 .....	63
7.5.3	Cross-circuit monitoring disabled, supply through a clock output or external supply .....	64

8	Startup and validation .....	67
	8.1 Initial startup .....	67
	8.1.1 Startup mode .....	68
	8.2 Restart after replacing a module.....	69
	8.2.1 Replacing a module .....	69
	8.2.2 Restart .....	69
	8.3 Validation.....	69
9	Errors: messages and removal .....	71
	9.1 Displaying and reading errors.....	71
	9.2 Acknowledging an error.....	71
	9.3 Module replacement following an error.....	71
	9.4 Note about the error codes .....	72
	9.5 Error codes.....	73
10	Maintenance, repair, decommissioning, and disposal .....	77
	10.1 Maintenance.....	77
	10.2 Repair.....	77
	10.3 Decommissioning and disposal.....	77
11	Technical data and ordering data .....	79
	11.1 SafetyBridge system data.....	79
	11.2 AXL F SSDI8/4 1F module data.....	79
	11.3 Conformance with EMC Directive.....	83
	11.4 Ordering data: module.....	83
	11.5 Download data: software .....	83
	11.6 Download data: documentation.....	84
A	Appendix: checklists.....	85
	A 1 Planning .....	86
	A 2 Assembly and electrical installation .....	87
	A 3 Startup and parameterization .....	88
	A 4 Validation .....	89
B	Appendix: index.....	91
C	Appendix: revision history.....	93





# 1 For your safety

## Purpose of this user manual

This user manual provides information about how the module works, its operating and connection elements, and its parameter settings.

## Validity of the user manual

This user manual is valid for the AXL F SSDI8/4 1F module in the version indicated on the inner cover page, as well as for the same or later versions if replaced with devices of the same type.

## 1.1 General safety notes



### WARNING: Risk of injury

Depending on the application, inappropriate use of the module may result in serious injury.

- Observe all the safety notes and warning instructions provided in this section and elsewhere in this user manual.

### Qualified personnel

In terms of this user manual, qualified personnel are persons who, because of their education, experience and instruction, and their knowledge of relevant standards, regulations, accident prevention, and service conditions, have been authorized to carry out any required operations, and who are able to recognize and avoid any possible dangers.

Furthermore, knowledge of the following topics and products is required:

- Non-safety-related target system (e.g., PROFIBUS, PROFINET, EtherCAT®)
- SafetyBridge system
- Components used
- Axioline F product range
- Operation of the software tools
- Safety regulations in the field of application

In the context of the use of the system, the following operations must only be carried out by qualified personnel:

- Planning
- Configuration, parameterization, programming
- Installation, startup, servicing
- Maintenance, decommissioning

### Documentation

Observe all information in this user manual and the accompanying documents: see Section 1.6 “Documentation” on page 12.

### Safety of personnel and equipment

The safety of personnel and equipment can only be assured if the module is used correctly: see Section 1.5 “Intended use” on page 11.

### Error detection

Depending on the wiring and the parameterization, the module detects errors within the safety equipment.

**Do not carry out any repairs or modifications**

It is prohibited for the user to carry out repair work or make modifications to the module. The housing must not be opened. The module is protected against tampering by means of security labels. The security label is damaged in the event of unauthorized repairs or opening of the housing. In this case, the correct operation of the safety module can no longer be ensured.

In the event of an error, send the module to Phoenix Contact or contact Phoenix Contact immediately and engage a service engineer.

**Mismatching and polarity reversal of connections**

Take care to avoid the mismatching, polarity reversal or tampering of connections. For increased protection against mismatching, connectors and slot markings are color coded.

## 1.2 Electrical safety



**WARNING: Loss of safety function/hazardous shock currents**

Incorrect installation can result in the loss of the safety function as well as hazardous shock currents.

- Observe the notes on electrical safety.
- Plan the modules used and their installation in the system according to the specific requirements.
- Recheck plants and systems retrofitted with SafetyBridge.

**Direct/indirect contact**

Protection against direct and indirect contact according to VDE 0100 Part 410 must be ensured for all components connected to the system. In the event of an error, parasitic voltages must not occur (single-fault tolerance).

Measures required:

- Using power supply units with safe isolation (PELV).
- Decoupling circuits, which are not PELV systems, using optocouplers, relays, and other components which meet the requirements of safe isolation.

**Power supply units for 24 V supply**

Only use power supply units with safe isolation and PELV according to EN 50178/VDE 0160 (PELV). These power supply units prevent short circuits between the primary and secondary side.

Make sure that the output voltage of the power supply does not exceed 32 V even in the event of an error.

**Insulation rating**

When selecting the equipment, please take into consideration the dirt and surge voltages which may occur during operation.

The module is designed for overvoltage category II (according to DIN EN 60664-1). If you expect surge voltages in the system, which exceed the values defined in overvoltage category II, implement additional measures for voltage limitation.

## 1.3 Safety of the machine or system

The machine/system manufacturer and the operator are responsible for the safety of the machine or system and the application in which the machine or system is used.

### Draw up and implement a safety concept

In order to use the module, a safety concept is required for your machine or system. This includes a hazard and risk analysis as well as a test report (checklist) for validating the safety function: see Section 1.4 “Directives and standards” on page 11 and see Section A “Appendix: checklists” on page 85.

The target safety integrity (SIL according to IEC 61508, SILCL according to EN 62061 or performance level and category according to EN ISO 13849-1) is ascertained on the basis of the risk analysis. The safety integrity ascertained determines how to connect and parameterize the module within the safety function.

### Validate hardware and parameterization

Carry out a validation every time you make a safety-related modification to your overall system.

Use your test report to ensure that:

- The safe modules are connected to the correct sensors and actuators
- The safe input and output channels have been parameterized correctly
- The variables have been linked to the safe sensors and actuators (single-channel or two-channel) correctly

## 1.4 Directives and standards

The standards to which the module conforms are listed in the certificate issued by the approval body and in the EC declaration of conformity (see: [phoenixcontact.net/products](http://phoenixcontact.net/products)).

## 1.5 Intended use

The AXL F SSDI8/4 1F module is designed exclusively for use in a SafetyBridge system. It can only perform its tasks in the system if it is used according to the specifications in this document.

Only use the module according to the defined technical data and ambient conditions: see Section 11 “Technical data and ordering data” on page 79.

The module is designed for connecting single-channel or two-channel sensors, which can be used in association with safety technology.

Examples of use for the module:

- Single or two-channel emergency stop equipment or safety door equipment
- Applications with enable button
- Applications with two-hand control devices
- Applications with mode selector switches
- As secondary switchgear for safety-related photoelectric barriers
- Safety circuits according to EN 60204, Part 1

## 1.6 Documentation

### Currentness and availability of documentation

Always use the latest documentation. Changes or additions to documentation can be found on the Internet (see: [phoenixcontact.net/products](http://phoenixcontact.net/products)).

### SafetyBridge user manuals

User manuals:

- For the controller used
- For the logic module of the SafetyBridge system
- For the SafetyBridge system I/O modules used
- For the SafetyBridge system function blocks

Please also observe the information on the bus system used.

### Documentation for the Axioline F product range

Axioline F: system and installation user manual, UM EN AXL F SYS INST

Documentation for the bus coupler used

## 1.7 Abbreviations used

Table 1-1 Abbreviations for safety requirements

Abbreviation	Meaning	Standard	Example
SIL	Safety integrity level	IEC 61508	SIL 2, SIL 3
SILCL	SIL claim limit	EN 62061	SILCL 3
Cat.	Category	EN ISO 13849-1	Cat. 2, Cat. 4
PL	Performance level	EN ISO 13849-1	PL e, PL d

Table 1-2 General abbreviations

Abbreviation	Meaning
PELV	Protective extra-low voltage according to EN 50178/VDE 0160
EUC	Equipment under control

## 1.8 Safety hotline

Should you have any technical questions, please contact our 24-hour hotline.

Phone: + 49 5281 9-46277, e-mail: [safety-service@phoenixcontact.com](mailto:safety-service@phoenixcontact.com)

## 2 Product description

### 2.1 Short description of the module

The AXL F SSDI8/4 1F module is an input module for use at any point in an Axioline F station.

The module is designed for use in the SafetyBridge system. The SafetyBridge address is set via a DIP switch.

The module has four safe digital inputs for two-channel assignment or eight safe digital inputs for single-channel assignment.

The inputs can be parameterized according to the specific application and enable the integration of sensors in the safe SafetyBridge system.

In the SafetyBridge system, the module can be used to achieve safety functions with the following requirements depending on the operating conditions:

- Up to SIL 3 according to IEC 61508
- Up to SILCL 3 according to EN 62061
- Up to Cat. 4/PL e according to EN ISO 13849-1



## 2.2 Structure of the module

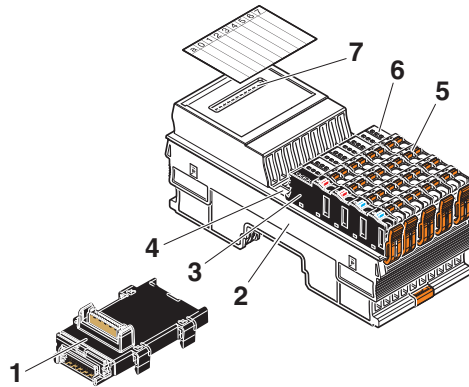


Figure 2-1 Structure of the module

- 1 Bus base module
- 2 Electronics module
- 3 Connector for connecting the supply voltage
- 4 Function identification
- 5 I/O connector
- 6 Diagnostics and status indicators
- 7 DIP switch



More detailed information on setting the switch: see Section 4.1.3 “Setting the DIP switch” on page 30.

## 2.3 Housing dimensions

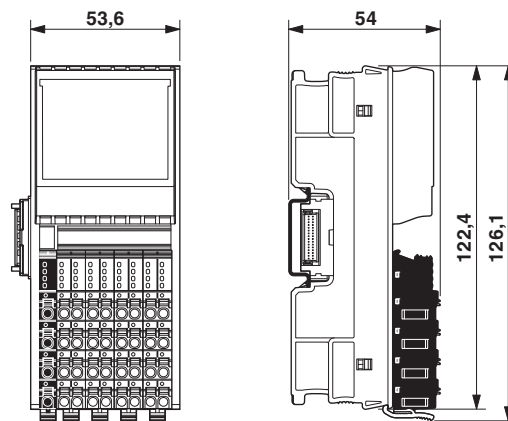


Figure 2-2 Housing dimensions (in mm)

## 2.4 Safe digital inputs

The module has safe digital inputs which can be used as follows:

- For two-channel assignment: four two-channel inputs
- For single-channel assignment: eight single-channel inputs

Technical data for the safe inputs: see “Safe digital inputs” on page 81. The supply voltage for the inputs can be provided externally or via the clock outputs.

### Parameterization

The safe digital inputs of the module can be parameterized in pairs. This means that the inputs can be adapted to various operating conditions and different safety integrity levels can be implemented (SIL, SILCL, Cat., PL).



The safety integrity (SIL, SILCL, Cat., PL) and error detection that can be achieved depend on the parameterization, the structure of the sensor, and the cable installation: see Section 7 “Connection examples for safe inputs” on page 41.

Information on the parameterization of the inputs: see Section 5.2 “Parameterization of the safe inputs” on page 36.

### Diagnostics

Diagnostics are provided via both the local diagnostics indicators and the diagnostic messages which are transmitted to the logic module.

Information on the diagnostic messages of the inputs: see Section 9 “Errors: messages and removal” on page 71.



#### **WARNING: Loss of safety function**

Using diagnostic data for safety-related functions can result in the loss of the safety function as diagnostic data is not safety-related.

- Do not use the diagnostic data for safety-related functions or actions.

### Requirements for sensors/controlling devices

Functional safety places requirements on the design of sensors/controlling devices.

- Use suitable sensors/controlling devices which are described in the applicable safety standards, for example.

The module's ability to detect errors depends on the parameterization.

- Adapt the module parameterization to the relevant sensor/controlling device: see Section 5 “Parameterization of the module” on page 35.

## 2.5 Clock outputs T1 and T2

The module has two independent clock outputs. These clock outputs provide the supply voltage for the safe inputs. Both clock outputs provide a pulse pattern to detect cross-circuits in the external wiring of the inputs if cross-circuit monitoring has been activated for at least one input pair.

### Typical pulse pattern

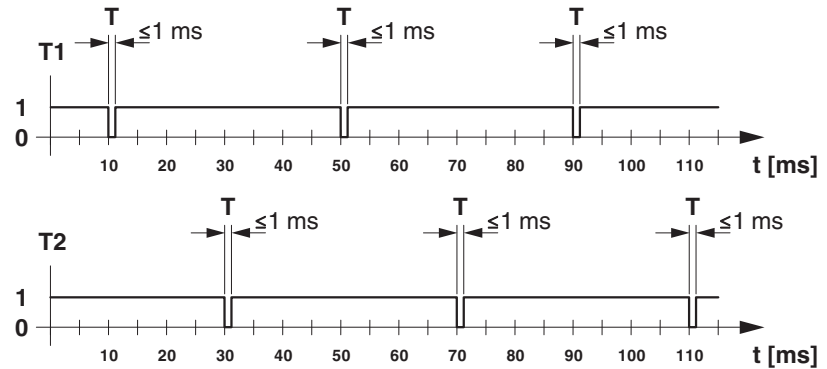


Figure 2-3 Typical pulse pattern

Key:

- T Test pulse
- Pulse width  $\leq 1$  ms
- Period length  $\leq 40$  ms



The clock outputs are also switched on and monitored when the module is not parameterized. If a short circuit occurs at a clock output when it is in this state, the clock output is switched off.

Technical data for the clock outputs: see "Clock outputs" on page 82.

### Behavior in the event of an error

In the event of short circuit to GND or overload of the clock outputs, the clock outputs are switched off. A diagnostic message is generated and the message is indicated via the SD LED. This error must be acknowledged so that the system can be started up again following error removal, see "Errors: messages and removal" on page 71.

As there are two clock outputs for eight inputs, there may be reciprocal effects between the inputs.

## Diagnostics

**WARNING: Loss of safety function**

Using diagnostic data for safety-related functions can result in the loss of the safety function as diagnostic data is not safety-related.

- Do not use the diagnostic data for safety-related functions or actions.

Diagnostics are provided via both the local diagnostics indicators and the diagnostic messages which are transmitted to the logic module.

Information on the diagnostic messages: see Section 9 “Errors: messages and removal” on page 71.

## Cross-circuit monitoring

If all inputs are parameterized without cross-circuit monitoring, a DC voltage can be tapped at the clock outputs without clock pulses. As soon as cross-circuit monitoring has been parameterized for at least one input pair, pulses are output at clock outputs T1 and T2.

For inputs that are parameterized with cross-circuit monitoring, the assignment is as follows:

- Inputs for channel 1 (INx\_CH1) are assigned to clock output T1.
- Inputs for channel 2 (INx\_CH2) are assigned to clock output T2.

Observe the information on error detection according to clocking: see Section 2.5 “Clock outputs T1 and T2” on page 16.

## 2.6 Connection options for sensors depending on the parameterization

Sensors that meet various safety requirements depending on the parameterization can be connected to the inputs.

The maximum achievable SIL/SILCL/Cat./PL is specified in the table.

In order to meet the safety requirements:

- Observe the information in the connection examples: see Section 7 “Connection examples for safe inputs” on page 41.
- Observe the requirements of the standards with regard to the external wiring and the sensors to be used to achieve a SIL/SILCL/Cat./PL: see Section 7.2 “Measures to achieve a specific safety integrity” on page 42.

Connection to the Axioline F connectors		Input							
		Single-channel sensor or redundant sensor			Two-channel redundant controlling device/sensor				
Input signal					Equivalent			Non-equivalent	
Cross-circuit monitoring		With	Without		With	Without		With	Without
Sensors that can be connected:									
– Contact-based		Yes	Yes	-	Yes	Yes	-	Yes	Yes
– With OSSD outputs		No	-	Yes	No	-	Yes	No	No
Achievable safety integrity	SIL	2	2	2	3	3	3	3	3
	SILCL	2	2	2	3	3	3	3	3
	Cat.	3*	2	2	4	3	4**	4	3
	PL	d	d	d	e	d	e	e	d
For connection example, see page		44	46	48	53	55	58	63	64

\* Cat. 3 can only be achieved with a redundant sensor.

\*\* The category that can be achieved depends on the sensor used.

## 2.7 Local diagnostics and status indicators

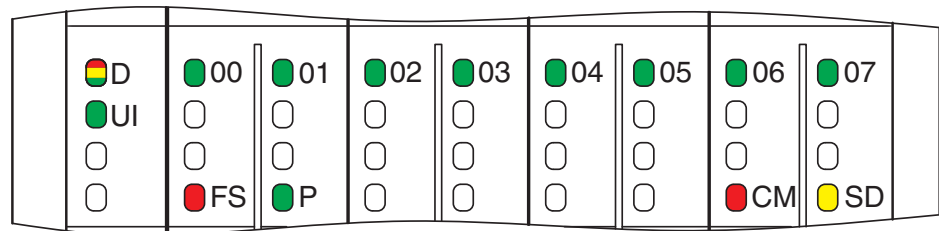


Figure 2-4 Local diagnostics and status indicators

Table 2-1 Overview of diagnostics LEDs

Des.	Color	State	Description
D	Red/yellow/ green	<b>Diagnostics for local bus communication</b>	
		Green on	The device is ready for operation, communication within the station is OK. All data is valid. There is no error.
		Flashing green	The device is ready for operation, communication within the station is OK. The data is <b>not</b> valid. Valid data from the controller/higher-level network not available. There is no error on the module.
		Flashing green/yellow	The device is ready for operation, communication within the station is OK. Output data <b>cannot</b> be output and/or input data <b>cannot</b> be read. There is an error on the I/O side of the module.
		Yellow on	The device is ready for operation, but has still not detected a valid cycle after power on.
		Flashing yellow	The device is not (yet) part of the active configuration.
		Red on	The device is ready for operation, but has lost the connection to the bus head.
		Flashing red	The device is ready for operation, but there is no connection to the previous device.
		Off	Device is in (power) reset.
UI	Green	<b>Diagnostics for digital input supply</b>	
		Green on	Supply for the digital inputs is present and is > around 17 V DC.
		Flashing green	Supply for the digital inputs is not present or is < around 17 V DC.
FS	Red	<b>Diagnostics for failure state</b>	
		Off	The safety application has a valid parameterization. (Only applies if UI is on or flashing at the same time.)
		Red on	Hardware fault. Communication to the higher-level controller is disabled. The module has entered the safe state (failure state).
		Flashing red	The module is not parameterized.



Table 2-1 Overview of diagnostics LEDs [...]

Des.	Color	State	Description
P	Green	<b>Diagnostics for safe communication protocol</b>	
		Off	No safe communication.
		Green on	Safe communication is running without errors.
		Flashing green	Safe communication is running. The SafetyBridge system is requesting an acknowledgment.
CM	Red	<b>Startup mode</b>	
		Off	SafetyBridge mode.
		Red on	Startup mode. ⚠ <b>WARNING:</b> In startup mode, the device is in <b>standard</b> operation. Startup mode: see Section 8.1.1 "Startup mode" on page 68.
SD	Yellow	<b>Acknowledgment request</b>	
		Off	No diagnostic message present that needs to be acknowledged.
		Yellow on	A diagnostic message is present that needs to be acknowledged for safe digital input errors, supply voltage errors or general errors. Acknowledgment: see Section 9.2 "Acknowledging an error" on page 71.
00 - 07	Green	<b>Status of each input from 0 - 7</b>	
		Off	Input at logic "0".
		Green on	Input at logic "1".

## 2.8 Safe state

The safe state for the module is the transmission of the value “0” in the image of the inputs to the logic module.

The safe state can be entered in the following cases:

1. Operating state
2. Error detection in I/O devices
3. Device errors
4. Parameterization errors
5. Error detection during safe communication

### 2.8.1 Operating state

In the operating state, the inputs can enter states “1” or “0”. State “0” is the safe state.

### 2.8.2 Error detection in I/O devices

#### Inputs

If an error is detected at an input, the safe state is set at this input and a “0” is represented in the process image of the input (“0” = safe state).

#### Operating time in the error state

**WARNING: Loss of the safe state in the failure state**

In the failure state, internal module tests are no longer run and it is possible that the safe state may be exited due to an accumulation of errors.

- If the module enters an error state, assess, acknowledge or remove the error within 72 hours.

Depending on the parameterization, the following errors can be detected at inputs:

- Short circuit
- Cross-circuit
- Overload/short circuit of the clock outputs

The diagnostic message is transmitted to the logic module: see Section 9 “Errors: messages and removal” on page 71. Information on which errors occur and when: see Section 7 “Connection examples for safe inputs” on page 41.

### 2.8.3 Device errors

Device errors can stop safe communication.

**Inputs**

If a hardware fault in the internal circuit is detected at an input, **all** module inputs enter the safe state. The value “0” is represented in the process image of the inputs (“0” = safe state).

The diagnostic message is transmitted to the logic module: see Section 9 “Errors: messages and removal” on page 71.

**Failure state: serious errors**

Serious errors that can result in the loss of or adversely affect the safety function cause the entire module to enter the safe state. The FS LED on the module is permanently on. The failure state can only be exited by means of a power up.

**The following serious errors result in the safe state:**

- Serious hardware faults in the internal circuit
- User errors
- Module overload
- Module overheating
- Incorrect supply

The diagnostic message is transmitted to the logic module: see Section 9 “Errors: messages and removal” on page 71.



**WARNING: Loss of safety function**  
 Sequential errors can result in the loss of the safety function.

- In the event of a device error, the module should be completely disconnected from the power supply and replaced so as to prevent sequential errors.

### 2.8.4 Parameterization errors

The module switches to the safe state following parameterization errors. The FS LED on the module flashes.

In the event of faulty parameterization, a diagnostic message is transmitted to the logic module: see Section 9 “Errors: messages and removal” on page 71.

## 2.9 Process data words

The module occupies four words in the Axioline F system.



Access the process data words via the “Operate” function block.

## 2.10 Programming data/configuration data

Phoenix Contact provides device description files for various control systems.



The programming data/configuration data is defined in the device description (FDCML, GSD, GSDML, etc.) according to the bus or network used.



## 3 Integration of the Axioline F local bus

The module is integrated for operation in an Axioline F station.



More detailed information on the structure of an Axioline F station: see UM EN AXL F SYS INST user manual.

### 3.1 Supply voltage of the module logic

The supply voltage for the module logic is generated in the bus coupler and led to the Axioline F module via the bus base module.



**WARNING: Loss of safety function**

The use of unsuitable power supplies can result in the loss of the safety function.

- Only use power supplies according to EN 50178/VDE 0160 (PELV) for the voltage supply at the bus coupler.
- Observe the general safety notes: see Section 1.2 “Electrical safety” on page 10.

Technical data for the supply voltage: see Section “Supply voltage  $U_{BUS}$  (logic)” on page 81.

The current carrying capacity for supply voltage  $U_{BUS}$  depends on the bus coupler used.

- Observe the technical data and information in the documentation for the bus coupler.

### 3.2 Supply voltage $U_I$



**WARNING: Loss of safety function**

The use of unsuitable power supplies can result in the loss of the safety function.

- Observe the general safety notes: see Section 1.2 “Electrical safety” on page 10.

Supply voltage  $U_I$  supplies the input circuits, the clock outputs, and the switching elements on the I/O side. Technical data for supply voltage  $U_I$ : see “Supply voltage  $U_I$  (sensors, clock outputs, I/O)” on page 81.