

# AXL F BP SE6, AXL F BP SE4

## Axioline F, backplane, 6 or 4 slots for Axioline Smart Elements

Data sheet  
108759\_en\_12

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### 1 Description

The Axioline F backplane is intended for use in a station that is opened by an Axioline F bus coupler or an Axiocontrol.

Depending on type, the backplane has six or four “Smart Element Interface” slots for accepting Axioline Smart Elements.

#### Features

- Preparing the communications power supply for the plugged-in Axioline Smart Elements
- Supply feed-in for the peripheral supply  $U_p$  for the plugged in Axioline Smart Elements

#### Observe these notes



This data sheet is only valid in association with the UM EN AXL F SYS INST user manual.



Make sure you always use the latest documentation.  
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### 3 Ordering data

Description	Type	Item no.	Pcs./Pkt.
Axioline F, Backplane, 6 slots for Axioline Smart Elements, transmission speed in the local bus: 100 Mbps, degree of protection: IP20	AXL F BP SE6	1088136	1
Axioline F, Backplane, 4 slots for Axioline Smart Elements, transmission speed in the local bus: 100 Mbps, degree of protection: IP20	AXL F BP SE4	1088135	1
Accessories	Type	Item no.	Pcs./Pkt.
Axioline Smart Elements, Slot cover, Diagnostic function, degree of protection: IP20	AXL SE SC-A	1088134	1
Axioline Smart Elements, Slot cover, degree of protection: IP20	AXL SE SC	1167159	1
Quick mounting end clamp for NS 35/7,5 DIN rail or NS 35/15 DIN rail, with marking option, width: 9.5 mm, color: gray (Mounting)	CLIPFIX 35	3022218	50
End clamp, for end support of UKH 50 to UKH 240, is pushed onto DIN rail NS 35 and fixed with 2 screws, width: 10 mm, color: aluminum (Mounting)	E/AL-NS 35	1201662	10
Axioline shield connection set (contains 2 shield bus holders and 2 SK 5 shield connection clamps)	AXL SHIELD SET	2700518	1
Label, Roll, transparent/black, unlabeled, can be labeled with: THERMOFOX, THERMOMARK GO, THERMOMARK GO.K, mounting type: adhesive, lettering field size: continuous x 3.2 mm, Number of individual labels: 1 (Marking)	MM-TML (EX4,2)R C1 TR/BK	0803979	1
Marker strip, Roll, white, unlabeled, can be labeled with: THERMOMARK E.300 (D)/600 (D), THERMOMARK ROLL 2.0, THERMOMARK ROLL, THERMOMARK ROLL X1, THERMOMARK ROLLMARKER 300/600, THERMOMARK X1.2, mounting type: adhesive, lettering field size: continuous x 5 mm, Number of individual labels: 10 (Marking)	SK 5,0 WH:REEL	0805221	1
Marker for terminal blocks, Strip, white, unlabeled, can be labeled with: TOPMARK NEO, TOPMARK LASER, BLUEMARK ID COLOR, BLUEMARK ID, BLUEMARK CLED, THERMOMARK PRIME, THERMOMARK CARD 2.0, THERMOMARK CARD, mounting type: snapped, for terminal block width: 5 mm, lettering field size: 5 x 12 mm, Number of individual labels: 24 (Marking)	UM6M-TM (5X12)	0830928	10
Marker for terminal blocks, for marking ABB terminal blocks from the SNK series, Sheet, white, unlabeled, can be labeled with: THERMOMARK CARD, THERMOMARK CARD 2.0, THERMOMARK PRIME, BLUEMARK ID, BLUEMARK ID COLOR, TOPMARK LASER, TOPMARK NEO, mounting type: snapped, for terminal block width: 5.2 mm, lettering field size: 4.17 x 11.3 mm (Marking)	UCT6M-TM 5	0830756	10

Documentation	Type	Item no.	Pcs./Pkt.
User manual, English, Axioline F: System and installation	UM EN AXL F SYS INST	-	-
User manual, English, Axioline F: Diagnostic registers, and error messages	UM EN AXL F SYS DIAG	-	-

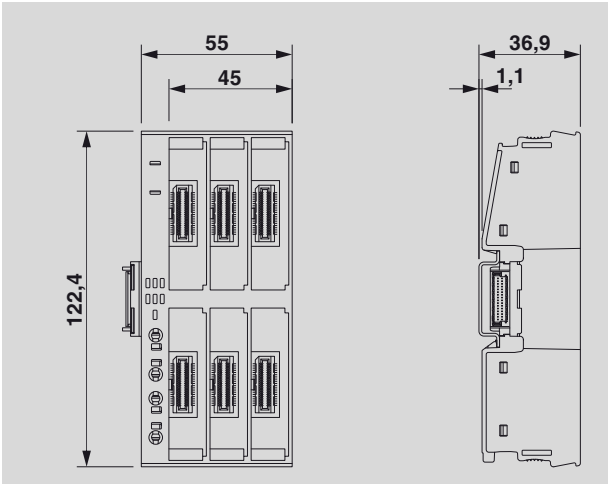
#### 4 Applicable Axioline Smart Elements and their $U_{BUS}$ current consumption

Type	Item no.	Current consumption from $U_{bus}$
AXL SE AI4 I 0-20	1296378	max. 46 mA
AXL SE AI4 I 4-20	1088062	max. 46 mA
AXL SE AI4 U 0-10	1088104	max. 46 mA
AXL SE AI4 U -10-10	1487836	max. 46 mA
AXL SE AO4 I 0-20	1296372	max. 46 mA
AXL SE AO4 I 4-20	1088123	max. 46 mA
AXL SE AO4 U 0-10	1088126	max. 46 mA
AXL SE AO4 U -10-10	1487835	max. 46 mA
AXL SE CNT1	1088131	max. 53 mA
AXL SE DI16/1	1088127	max. 41 mA
AXL SE DI16/1 NPN	1105559	max. 60 mA
AXL SE DI8/2 48	1438680	max. 60 mA
AXL SE DO16/1	1088129	max. 45 mA
AXL SE DO16/1 NPN	1105560	max. 79 mA
AXL SE DO4/2 2A EF	1181790	max. 42 mA
AXL SE DOR2 W 230	1105562	max. 47 mA
AXL SE INC1 ASYM	1182185	max. 60 mA
AXL SE INC1 SYM	1088130	max. 60 mA
AXL SE IOL4	1088132	max. 68 mA
AXL SE PD16 24V	1337223	max. 35 mA
AXL SE PD16 GND	1337224	max. 30 mA
AXL SE PD8/8 24V/GND	1337225	max. 35 mA
AXL SE PSDI8/3	1079241	max. 140 mA
AXL SE PSDO4/2 2A	1079231	max. 120 mA
AXL SE RS232	1181787	max. 51 mA
AXL SE RS232 EF	1507979	max. 51 mA
AXL SE RS485	1088128	max. 46 mA
AXL SE RS485 EF	1507978	max. 46 mA
AXL SE RTD4 PT100	1088106	max. 47 mA
AXL SE RTD4 PT1000	1182190	max. 49 mA
AXL SE SC	1167159	max. 30 mA
AXL SE SC-A	1088134	max. 30 mA
AXL SE SSDI8/3	1190012	max. 140 mA
AXL SE SSDO4/2 2A	1190017	max. 120 mA
AXL SE UTH4 EF	1182068	max. 49 mA

## 5 Technical data

### Dimensions (nominal sizes in mm): AXL F BP SE6

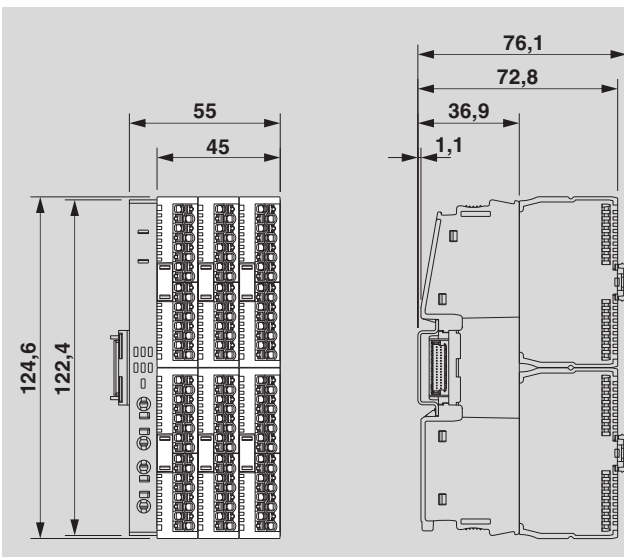
#### Axioline F backplane



Width	55 mm
Height	122.4 mm
Depth	36.9 mm

Note on dimensions The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

#### Axioline F backplane with Axioline Smart Elements plugged in

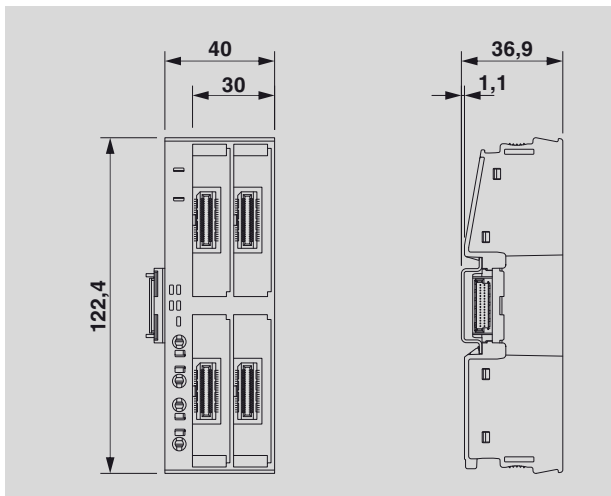


Width	55 mm
Height	124.6 mm
Depth	76.1 mm

Note on dimensions The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

# Dimensions (nominal sizes in mm): AXL F BP SE4

## Axioline F backplane

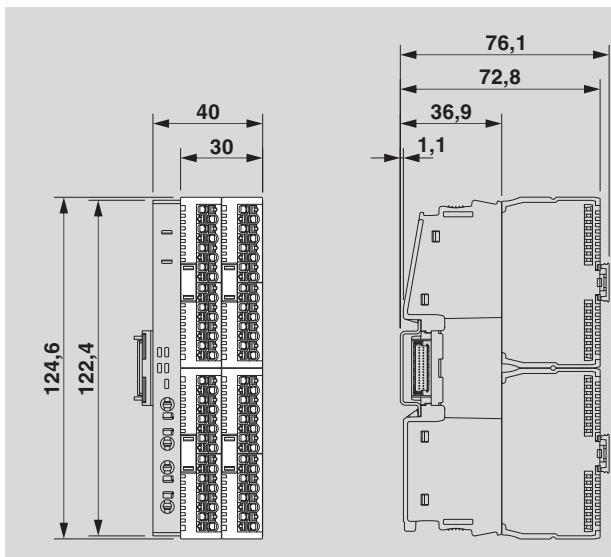


Width	40 mm
Height	122.4 mm
Depth	36.9 mm

### Note on dimensions

The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

## Axioline F backplane with Axioline Smart Elements plugged in



Width	40 mm
Height	124.6 mm
Depth	76.1 mm

### Note on dimensions

The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715).

**General data**

Color	Housing: traffic grey A (RAL 7042)
Weight	AXL F BP SE6: 112 g AXL F BP SE4: 87 g
Ambient temperature (operation)	-25 °C ... 60 °C
Ambient temperature (storage/transport)	-40 °C ... 85 °C
Permissible humidity (operation)	5 % ... 95 % (non-condensing)
Permissible humidity (storage/transport)	5 % ... 95 % (non-condensing)
Air pressure (operation)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Air pressure (storage/transport)	70 kPa ... 106 kPa (up to 3000 m above sea level)
Degree of protection	IP20
Protection class	III (IEC 61140, EN 61140, VDE 0140-1)
Overvoltage category	II (IEC 60664-1, EN 60664-1)
Degree of pollution	2 (IEC 60664-1, EN 60664-1)
Mounting type	DIN rail mounting
Mounting position	Wall mounting on horizontal or vertical DIN rail



Do not use the backplane in an atmosphere that contains corrosive gas.

**Connection data: I/O supply feed-in (U<sub>P</sub>)**

Connection method	Push-in connection
Conductor cross section, rigid	0.5 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section, flexible	0.5 mm <sup>2</sup> ... 2.5 mm <sup>2</sup>
Conductor cross section [AWG]	20 ... 14
Stripping length	8 mm



Please observe the information provided on conductor cross sections in the “Axioline F: system and installation” user manual.

**Interface: Axioline F local bus**

Number of interfaces	2
Connection method	Bus base module
Transmission speed	100 Mbps

**Interface: Smart Element interface**

Number of interfaces	AXL F BP SE6: 6 AXL F BP SE4: 4
Connection method	Card edge connector



**Axioline F local bus supply ( $U_{Bus}$ )**

Supply voltage	5 V DC
Current consumption of Axioline Smart Elements	See table "Applicable Axioline Smart Elements and their $U_{Bus}$ current consumption".

**Communications power supply of the Smart Elements ( $U_{SE}$ )**

Supply voltage	using card edge connectors
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**I/O supply feed-in ( $U_P$ )**

Nominal supply voltage	24 V DC
Supply voltage range	19.2 V DC ... 30 V DC (including all tolerances, including ripple)
Current consumption	min. 1.5 mA (without connected Smart Elements, with nominal voltage) max. 16 A (provide external protection) max. 12 A (Applications with UL approval, external fusing)
Surge protection	Suppressor diode
Protection	max. 16 A max. 12 A (Applications with UL approval)


**NOTE: Damage to the electronics**

Provide external protection for the module to ensure reverse polarity protection. If you use a fuse, the power supply unit must be capable of supplying four times the nominal current of the fuse. This ensures that the fuse trips reliably in the event of a fault.

In addition, observe the information on fuse protection in the data sheets for the Smart Element used.

**Power dissipation**

Maximum power dissipation for nominal condition	0.85 W
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**Electrical isolation/isolation of the voltage areas**

Test section	Test voltage
5 V supply of the local bus ( $U_{Bus}$ ) / 24 V supply (I/Os)	500 V AC, 50 Hz, 1 min.
5 V supply of the local bus ( $U_{Bus}$ ) / functional ground	500 V AC, 50 Hz, 1 min.
24 V supply (I/O) / functional ground	500 V AC, 50 Hz, 1 min.

**Mechanical tests**

Vibration resistance in accordance with EN 60068-2-6/IEC 60068-2-6	5g
Shock in accordance with EN 60068-2-27/IEC 60068-2-27	30g
Continuous shock in accordance with EN 60068-2-27/IEC 60068-2-27	10g

## Conformance with EMC Directive 2014/30/EU

### Immunity test in accordance with EN IEC 61000-6-2

Electrostatic discharge (ESD) IEC 61000-4-2	Criterion B, $\pm 6$ kV contact discharge, $\pm 8$ kV air discharge
Electromagnetic fields IEC 61000-4-3	Criterion A, Field intensity: 10 V/m
Fast transients (burst) IEC 61000-4-4	Criterion B, $\pm 2$ kV
Transient overvoltage (surge) IEC 61000-4-5	Criterion B, DC supply lines: $\pm 0.5$ kV/ $\pm 1.0$ kV (symmetrical/asymmetrical)
Conducted interference IEC 61000-4-6	Criterion A, Test voltage 10 V

### Noise emission test in accordance with EN IEC 61000-6-4

Class A



#### NOTE: Risk of damage to equipment due to noise emissions

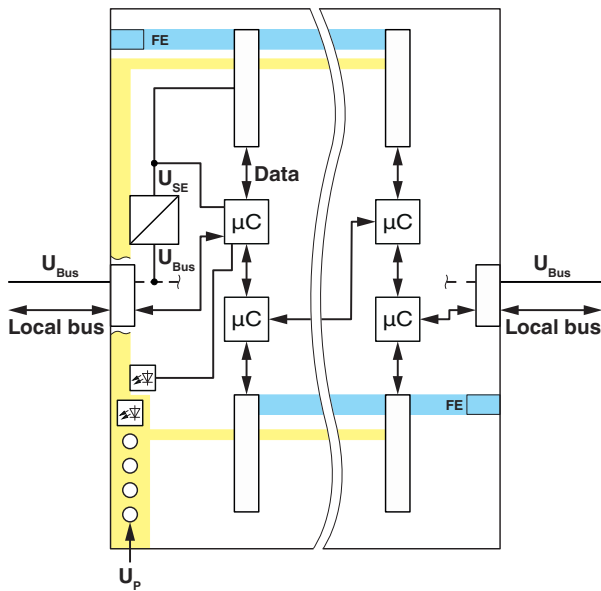
The backplane and Axioline Smart Elements to be plugged into the backplane are class A products. These can interfere with wireless reception in residential areas. The operator must observe the requirements for noise emission for electrical and electronic equipment (EN 61000-6-4). Where necessary, appropriate protective measures should be taken.

## Approvals and manufacturer's declarations

The latest documents can be found at: [www.phoenixcontact.com/product/1088136](http://www.phoenixcontact.com/product/1088136)  
[www.phoenixcontact.com/product/1088135](http://www.phoenixcontact.com/product/1088135)

## 6 Internal circuit diagram

Figure 1 Basic circuit diagram



Key:

Local bus Axioline F local bus

Data Data transmission

$U_{Bus}$  Supply of the Axioline F local bus

$U_{SE}$  Communications power supply of the Smart Element

FE Functional ground

$U_P$  I/O supply of the Smart Element



Power supply unit



Microcontroller



LED



Smart Element interface



Electrically isolated areas

## 7 For your safety

### 7.1 Intended use

Use the backplane exclusively in accordance with the specifications in the data sheet and the "Axioline F: System and Installation" user manual.

### 7.2 Qualification of users

The use of products described in this data sheet is oriented exclusively to electrically skilled persons or persons instructed by them. The users must be familiar with the relevant safety concepts of automation technology as well as applicable standards and other regulations.

### 7.3 Working on the backplane or on a Smart Element



#### **NOTE: Damage to contacts or malfunction**

Before performing any work on the backplane or on a Smart Element, disconnect the voltage on the backplane and the Smart Element.

This means:

- Disconnect the connected I/O devices from the power.
- Switch off the I/O supply voltage  $U_P$ !
- Switch off the  $U_{Bus}$  and  $U_{SE}$  communications power.

For the backplane, this means: switch off the voltage  $U_L$  for the Axioline F station. The communications power for the local bus ( $U_{Bus}$ ) and for the Smart Element ( $U_{SE}$ ) is generated from this.

### 7.4 Strain relief



#### **NOTE: damage to the contacts**

Physical overloads can result in damage to the terminal points.

- Relieve strain in the connected cables.

### 7.5 Applications with UL approval



#### **CAUTION!**

- The external circuits intended to be connected to this device shall be galvanically separated from the mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV (Class III) circuits of UL/CSA/IEC 61010-1, UL/CSA/IEC 61010-2-201.
- The device has to be installed in the final safety enclosure, which has adequate rigidity according to UL 61010-1, UL 61010-2-201 and meets the requirements with respect to spread of fire.



#### **Information:**

To install the device in accordance with UL/CSA/IEC standard, the following notes must be observed.

- Equipment shall be protected by fuses, circuit-breakers, thermal cut-outs, impedance limiting circuits or similar means, to provide protection against excessive current being drawn in case of a fault in the equipment.
  - a) Circuit breakers used as an overcurrent protective device shall meet the relevant requirements of UL Standard 489 / CSA Standard (C22.2) No. 5 / IEC 60947-2, be suitable for the application and installed near the equipment.
  - b) Fuses used as an overcurrent protective device shall meet the relevant requirements of UL Standard 248 / CSA Standard (C22.2) No. 248 / IEC 60127, be suitable for the application and installed near the equipment.
- If the equipment is not used in specified manner, the protection provided by the equipment may be impaired.
- Minimum temperature rating of the cables to be connected to the field wiring terminals:  
95 °C, AWG 12
- Use copper conductors only.

## 8 Terminal point assignment as well as diagnostics and status indicators

Figure 2 AXL F BP SE6

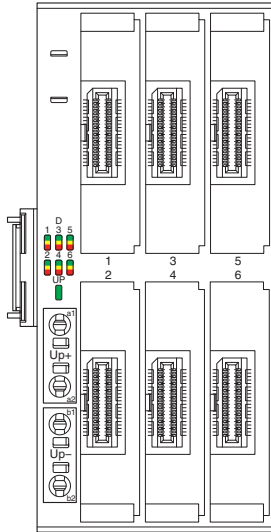
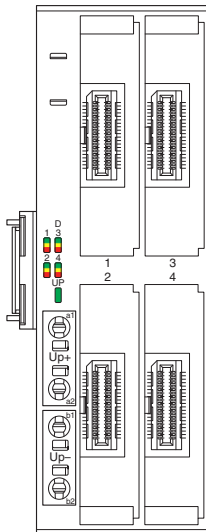


Figure 3 AXL F BP SE4



### 8.1 Terminal point assignment

Terminal point	Assignment	
Supply voltage input		
U <sub>P</sub> + (a1, a2)	24 V DC (U <sub>P</sub> )	Feed in the I/O supply voltage for the Axioline Smart Elements (bridged internally)
U <sub>P</sub> - (b1, b2)	GND	Reference potential of the supply voltage (bridged internally)

## 8.2 Local diagnostics and status indicators

Meaning in the following table:

- 1) The controller or bus coupler firmware does not support passive Smart Elements and empty slots.
- 2) The controller or bus coupler firmware supports passive Smart Elements.

A Smart Element is passive if it has no process data and no PDI objects are implemented.

Passive Smart Elements:

- AXL SE SC
- AXL SE PD 16 24V, AXL SE PD 16 GND, AXL SE PD8/8 24V/GND



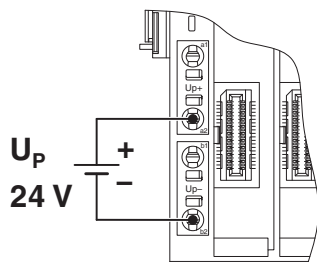
To find out which controllers and bus couplers support passive Smart Elements, refer to section “Controllers, bus couplers, and slot covers”.

Designation	Color	Meaning	State	Description
D (1 ... 4/6)	Red/ yellow/ green	Diagnostics		Diagnostics for local bus communication for each backplane slot
		Run	Green on	The Smart Element is ready to operate. Communication within the station is OK. The controller is providing <b>valid process data</b> . <b>No malfunctions</b> have occurred.
		Active	Flashing green	The Smart Element is ready to operate. Communication within the station is OK. The controller is <b>not</b> providing <b>valid process data</b> . <b>No malfunction</b> has occurred on the Smart Element. The backplane slot is configured for a passive Smart Element. <sup>2)</sup>
		Device application not active	Flashing green/yellow	The Smart Element is ready to operate. Communication within the station is OK. The controller is providing <b>valid process data</b> . There is a <b>malfunction on the I/O side</b> of the Smart Element. The process output data cannot be output and/or the process input data cannot be read in.
		Ready	Yellow on	The Smart Element is ready to operate, but has still not detected a valid local bus cycle after power up.
		Connected	Flashing yellow 1 Hz	The Smart Element is not (yet) part of the active configuration.
				On power up: The Smart Element that is configured for the backplane slot <b>before</b> the slot with the flashing yellow D LED is missing from this slot or it is passive. <sup>1)</sup>
			Flashing yellow 8 Hz	Configuration difference
				The Smart Element has lost the connection to the backplane or has been removed.
				An unconfigured Smart Element has been plugged into the slot.
			Flashing yellow/red <sup>1)</sup>	During operation: The Smart Element in the backplane slot <b>before</b> the slot with the flashing yellow/red D LED has lost the connection to the backplane.

Designation	Color	Meaning	State	Description
D (1 ... 4/6)	Red/ yellow/ green	Reset	Red on	The Smart Element is ready to operate, but has lost the connection to the head of the station (bus coupler or controller).
			Red on (one LED)	The local bus has been interrupted. The flashing red D LED indicates the location of the error in the station.
			Red on (all LEDs)	On power up: There is an unconfigured Axioline F module or Smart Element in the station.
		Not connected	Red flashing	The Smart Element is ready to operate, but there is no connection to the previous Smart Element or Axioline F module.
		Power down	Off	The Smart Element is in the (power) reset state.
				The supply voltage not present.
				Energy-saving mode is active.
UP	Green	U <sub>Peripherals</sub>		I/O supply voltage of the Smart Elements
			On	Supply voltage U <sub>P</sub> is present.
			Off	Supply voltage U <sub>P</sub> is not present.

## 9 Connection example

Figure 4 Connection of the cables



## 10 Slots for Axioline Smart Elements

Depending on type, the backplane has six or four “Smart Element Interface” slots for accepting Axioline Smart Elements.

Plug an Axioline Smart Element (AXL SE ...) with any function into every Smart Element Interface.

### Assignment of the slots for the Axioline Smart Elements

Figure 5 AXL F BP SE6

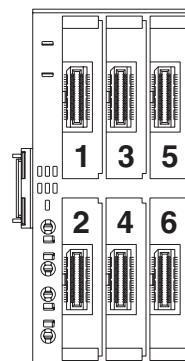
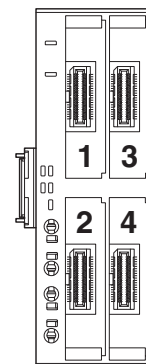


Figure 6 AXL F BP SE4



If you do not need all the slots, put a slot cover on each of the unused slots (AXL SE SC-A, Item No. 1088134 or AXL SE SC, Item No. 1167159).

Only then is the complete Axioline F station capable of running.



If you are using an engineering system and an AXL SE SC-A or AXL SE SC slot cover, configure the Smart Element accordingly.



## 11 Controllers, bus couplers, and slot covers

Note the special characteristics of individual controllers and bus couplers when using slot covers.

### 11.1 AXL SE SC, AXL SE PD ...

The following controllers and bus couplers support the passive AXL SE SC and AXL SE PD ... Smart Elements from the specified firmware version:

Type	Firmware version
<b>Controllers</b>	
AXC 1050	≥ 5.0
AXC 3050	≥ 6.3
AXC F 1152	≥ 2020.0
AXC F 2152	≥ 2020.0
AXC F 3152	≥ 2020.3
<b>Bus coupler</b>	
AXL F BK PN TPS (XC)	≥ 1.30
AXL F BK ETH (XC)	≥ 1.30
AXL F BK EIP	≥ 1.30
AXL F BK EIP EF	≥ 1.30
AXL F BK EC	≥ 1.30
AXL F BK S3	≥ 1.35
AXL F BK PB (XC)	≥ 2.20

Controllers and bus couplers not listed in the table do not support the passive Smart Elements.

If you need a slot cover, in this case use the AXL SE SC-A slot cover or a different Smart Element, such as the AXL SE DI16/1.

### 11.2 AXL SE SC-A



**Note when using bus couplers for PROFIBUS DP with the hardware and software (HW/SW) firmware version it runs:**

AXL F BK PB: HW/FW ≤ 05/2.13

AXL F BK PB XC: HW/FW ≤ 00/2.13

The bus coupler does not support AXL SE SC-A slot covers.

Use another Smart element to cover the unused slots, such as AXL SE DI16/1.