AXL F BP SE6, AXL F BP SE4

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



Data sheet
108759_en_14

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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.
This is available for downloading at the following addresses:
phoenixcontact.com/product/1088136
phoenixcontact.com/product/1088135

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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

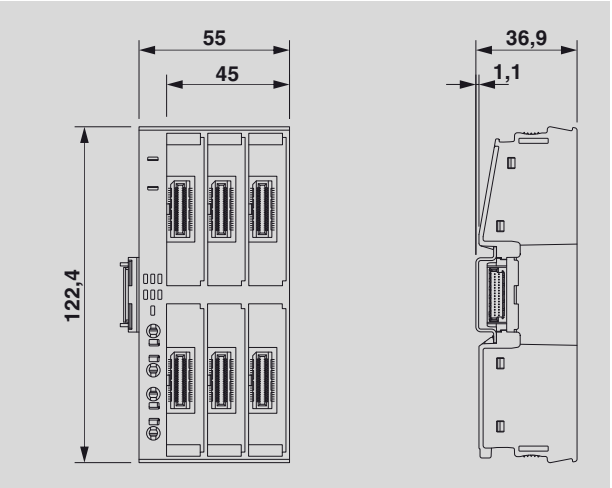
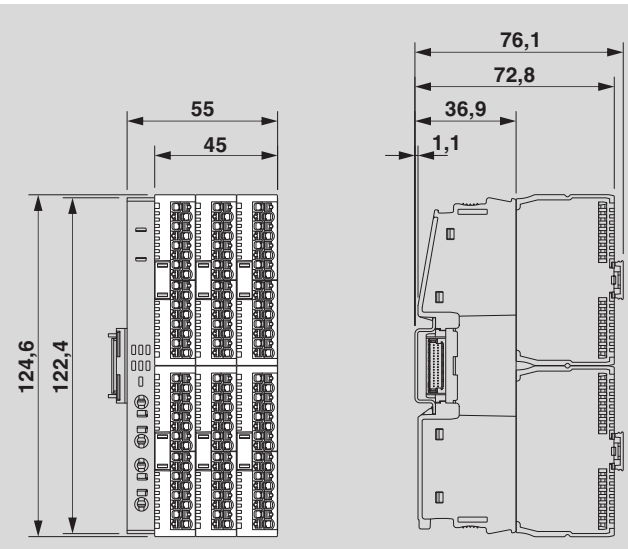
Documentation	Type	Item no.	Pcs./Pkt.
User manual, English, Axioline F: System and installation	UM EN AXL F SYS INST	-	-
User manual, English, Axioline F: Diagnostic registers, and error messages	UM EN AXL F SYS DIAG	-	-

Additional ordering data	
For additional ordering data (accessories), go to:	www.phoenixcontact.com/product/1088136 www.phoenixcontact.com/product/1088135

4 Applicable Axioline Smart Elements and their U_{Bus} current consumption

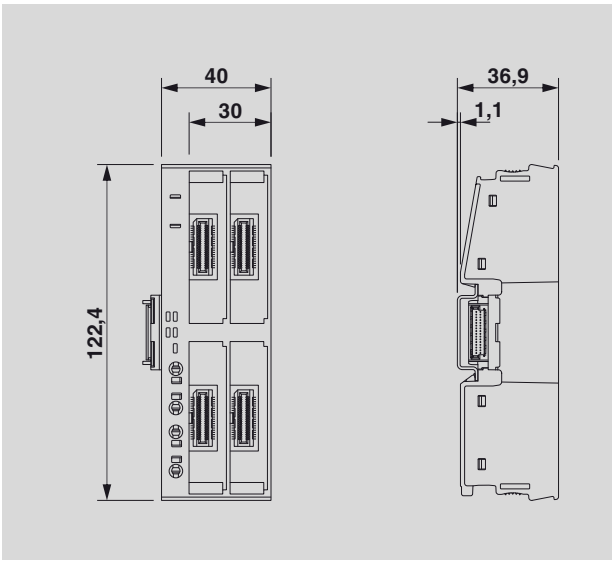
Type	Item no.	Current consumption from U_{bus}
AXL SE AI4 I 0-20	1296378	max. 46 mA
AXL SE AI4 I 4-20	1088062	max. 46 mA
AXL SE AI4 U 0-10	1088104	max. 46 mA
AXL SE AI4 U -10-10	1487836	max. 46 mA
AXL SE AO4 I 0-20	1296372	max. 46 mA
AXL SE AO4 I 4-20	1088123	max. 46 mA
AXL SE AO4 U 0-10	1088126	max. 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 DIO16/1	1745229	max. 38 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 PM	1768313	max. 137 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. 47 mA
AXL SE SC	1167159	max. 30 mA
AXL SE SC-A	1088134	max. 30 mA
AXL SE SC-F	1745227	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).

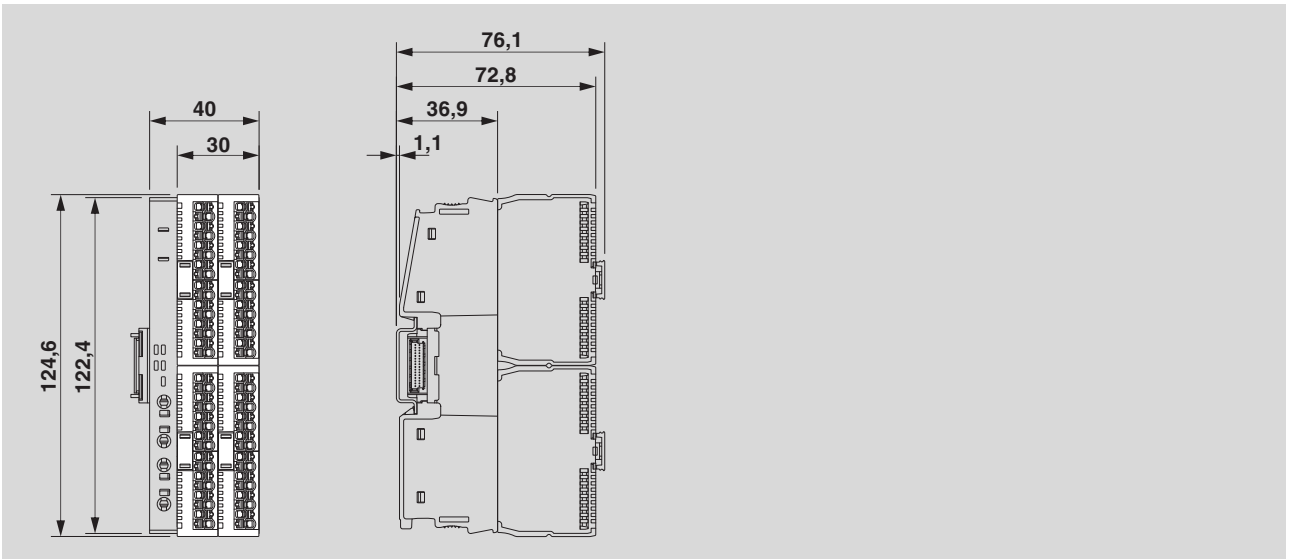
Dimensions (nominal sizes in mm): AXL F BP SE4

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 gray 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	Panel 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_P)	
Connection method	Push-in connection
Conductor cross-section, rigid	0.5 mm² … 2.5 mm²
Conductor cross-section, flexible	0.5 mm² … 2.5 mm²
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

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

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, ±6 kV contact discharge, ±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, ±2 kV
Transient overvoltage (surge) IEC 61000-4-5	Criterion B, DC supply lines: ±0.5 kV/±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

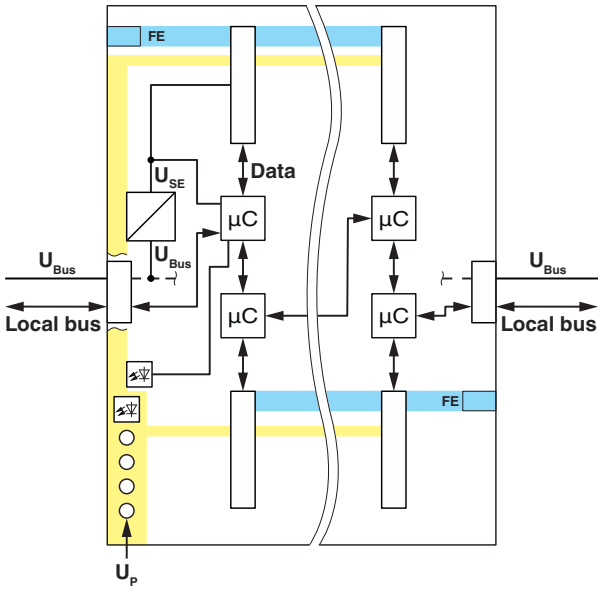
NOTE: Risk of damage to equipment due to noise emissions

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 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.

If the equipment is used in a manner not specified, the protection provided by the equipment may be impaired.

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 Installation

CAUTION: Fire hazard

– The device must be installed in the final protective housing, which provides sufficient resistance to mechanical strain and protection against the spreading of fire in accordance with the standards UL/IEC/EN 61010-1 and UL/IEC/EN 61010-2-201.

– The external circuits intended to be connected to this device must be galvanically separated from mains supply or hazardous live voltage by reinforced or double insulation and meet the requirements of SELV/PELV (Class III) circuits in accordance with UL/CSA/IEC/EN 61010-1, UL/CSA/IEC/EN 61010-2-201.

7.4 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.

7.5 Strain relief

NOTE: Damage to the contacts

Physical overloads can result in damage to the terminal points.

- Relieve strain in the connected cables.

7.6 Applications with UL approval

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.
- 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

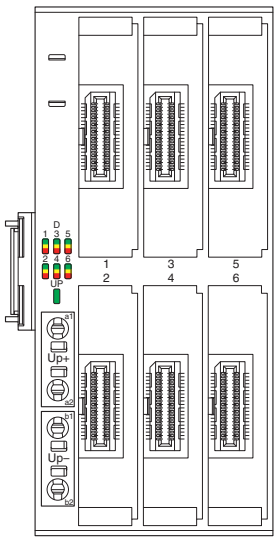
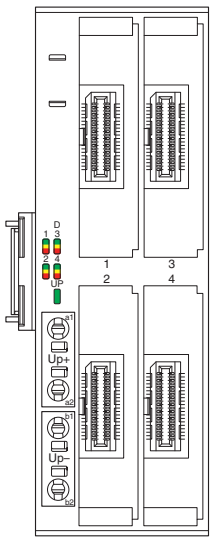


Figure 3 AXL F BP SE4



8.1 Terminal point assignment

Terminal point	Assignment	
Supply voltage input		
U_P+ (a1, a2)	24 V DC (U_P)	Feed in the I/O supply voltage for the Axioline Smart Elements (bridged internally)
U_P- (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 SC-F
- AXL SE PD 16 24V, AXL SE PD 16 GND, AXL SE PD8/8 24V/GND

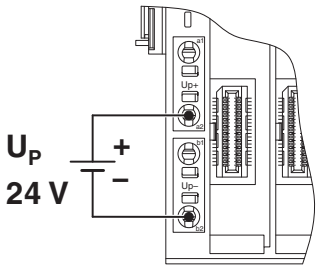
To find out which controllers and bus couplers support passive Smart Elements, refer to section “Controllers, bus couplers, and slot covers”.

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 **valid process data**. **No malfunctions** have occurred.
		Active	Flashing green	The Smart Element is ready to operate. Communication within the station is OK. The controller is **not** providing **valid process data**. **No malfunction** has occurred on the Smart Element.
				The backplane slot is configured for a passive Smart Element.[2)]
		Device application not active	Flashing green/yellow	The Smart Element is ready to operate. Communication within the station is OK. The controller is providing **valid process data**. There is a **malfunction on the I/O side** 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 **before** the slot with the flashing yellow D LED is missing from this slot or it is passive.[1)]
			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[1)]	During operation: The Smart Element in the backplane slot **before** 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.
					The backplane slot is empty or the inserted Smart Element is passive.[1)]
UP	Green	$U_{Peripherals}$		I/O supply voltage of the Smart Elements	
			On	Supply voltage U_P is present.	
			Off	Supply voltage U_P 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

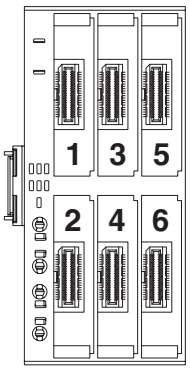
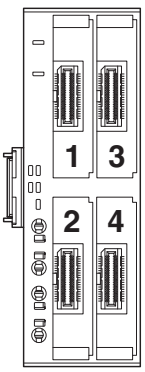


Figure 6 AXL F BP SE4



If you do not need all the slots, put a slot cover on each of the unused slots.

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

Slot cover for unused slot	
Type	**Item No.**
AXL SE SC-A	1088134
AXL SE SC	1167159
AXL SE SC-F	1745227

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

11 Controllers, bus couplers, and passive Smart Elements

Note the special characteristics of individual controllers and bus couplers when using slot covers and Smart Elements for potential distribution.

11.1 AXL SE SC(-F), AXL SE PD ...

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

Type	Firmware version
Controllers	
AXC 1050	≥ 5.0
AXC F 1152	≥ 2020.0
AXC F 1252	≥ 2025.6.1
AXC F 2152	≥ 2020.0
AXC F 3152	≥ 2020.3
Bus coupler	
AXL F BK PN TPS (XC)	≥ 1.30
AXL F BK ETH (XC)	≥ 1.30
AXL F BK EIP (XC)	≥ 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.