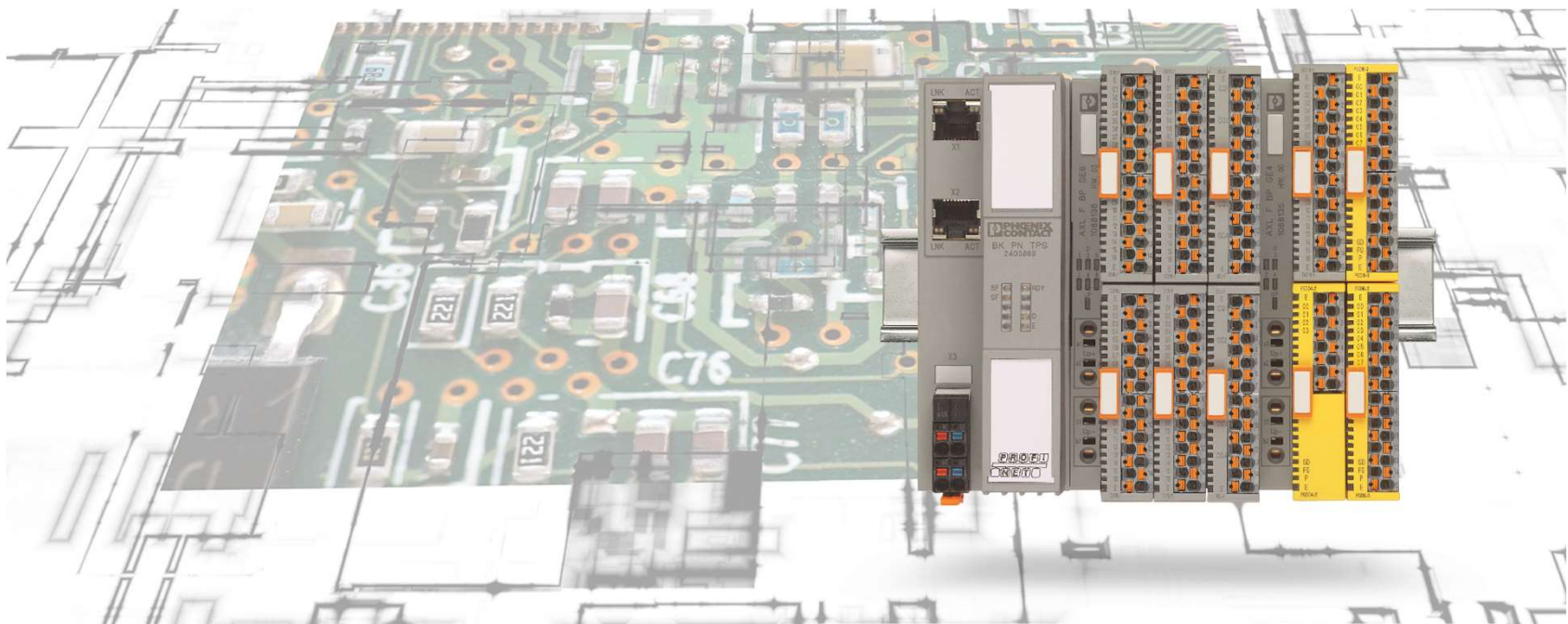# Modular System Axioline SE Smart Elements

Antonio Gordillo   PM IMA Marketing   October 2020

PHŒNIX CONTACT

Axioline Smart Elements

Contents

- Overview Axioline SE Smarte Elements summary

- Axioline Smart Elements

- Axioline F backplane

- Axioline Smart Elements in the AXL F system

- Axioline Smart Elements portfolio

- Axioline Smart Elements in comparison with AXL F and Inline

Axioline Smart Elements
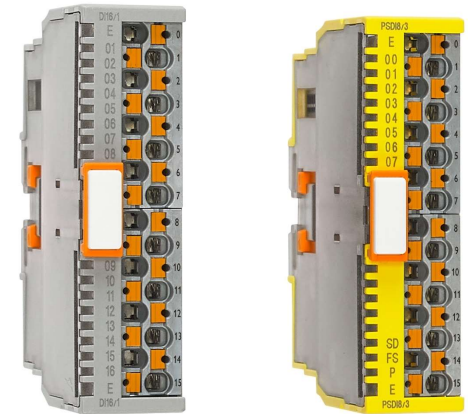

Axioline Smart Elements

MORE SPACE FOR
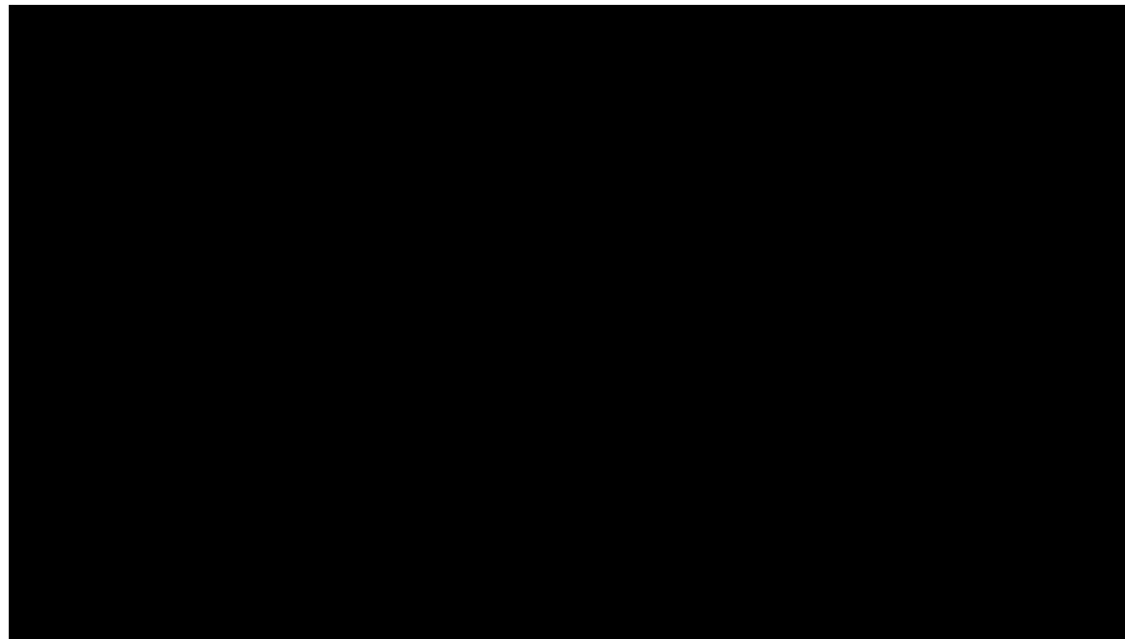YOUR CREATIVITY

PHŒNIX CONTACT

Axioline Smart Elements

New compact and pluggable I/Os

" Axioline Smart Elements are new I/Os which are extremely
compact, pluggable and system-independent modules
without bus communication.
Together with a backplane system they form a complete
I/O. "

Axioline SE Smart Elements

Thightes of space

Axioline Smart Elements
Automate smart and economically

READY FOR AUTOMATION

- Initial portfolio with all major I/Os

- All necessary functionalities incl. Safety and IO-Link

DI	SDI	AI	IO-Link	INC
DO	SDO	AO	RS485	CNT

PHŒNIX CONTACT

Axioline Smart Elements
Compact and flexible

COMPACT	SYSTEM-INDEPENDENT	EASY HANDLING	FAST START-UP
8 or 16 connection points on a small footprint of 15 mm x 62 mm	Due to the system-independent interface the elements can be used universally with specific backplanes	Push-in technology and the toolfree unlook-mechanism reduce installation afforts	One function per module and few parameters to be set guarantee fast commissioning

PHŒNIX CONTACT

Axioline Smart Elements

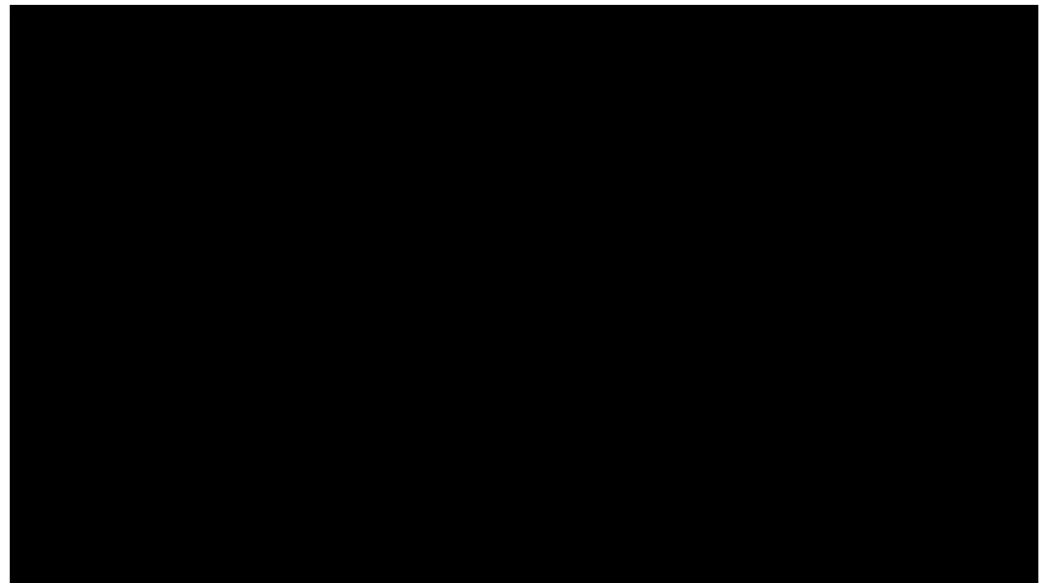# Just like an Axioline F I/O

PLUGGABLE INTO AXIOLINE F BACKPLANES

Without any rules - plug the Axioline Smart Elements into any position in the Axioline F backplane

Axioline SE Smart Elements
Efficient and Smart Handling

Axioline Smart Elements

Portfolio

ANALOG INPUT		ANALOG OUTPUT		DIGITAL INPUT		DIGITAL OUTPUT		FUNCTION MODULES		SAFETY MODULES		SYSTEM MODULES	
	AI4 I		AO4 I		DI16		DO16		IOL4		PSDI		SC-A
	AI4 U		AO4 U						CNT1		PSDO		
	RTD4								RS485				AXL F-BACKPLANE
									INC1				BP 4
													BP 6

PHŒNIX CONTACT

Axioline Smart Elements

Compact and flexible I/O solution

15 mm

Up to
32
I/O channels
in ONE column

EXTREMLY COMPACT

Less space required on the DIN rail
enables compact control cabinet
solutions

PHŒNIX CONTACT

Axioline Smart Elements

Compact and flexible I/O solution
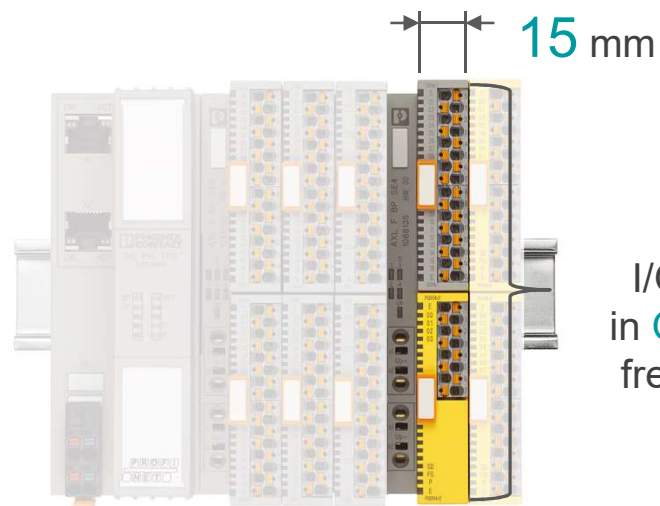
15 mm

TWO
I/O functions
in ONE column
freely mixable

YOU HAVE THE CHOICE

TWO different I/O functions freely
selectable over a width of 15 mm
enable a flexible and needs-based
I/O concept.

Axioline Smart Elements

Compact and flexible I/O solution
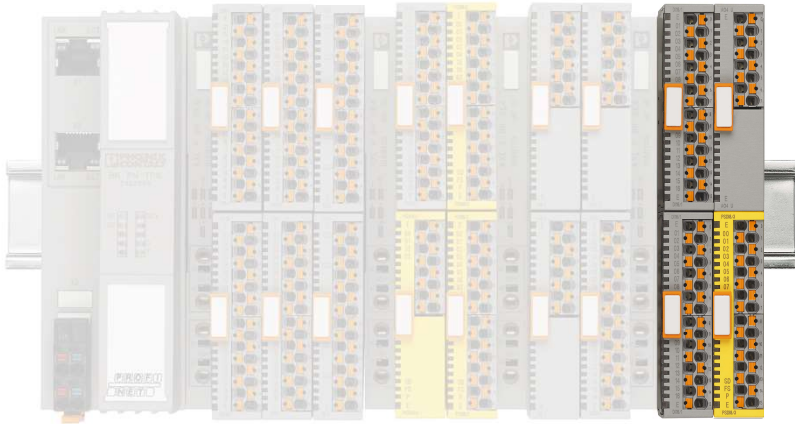
MORE FUNCTION, SAME WIDTH

Simple functional expansion of the I/O
station by exchanging the slot cover
elements with I/O elements –
without increase in width.

PHŒNIX
CONTACT

Axioline Smart Elements
Full compatibility

All Axiocontrols

All bus couplers
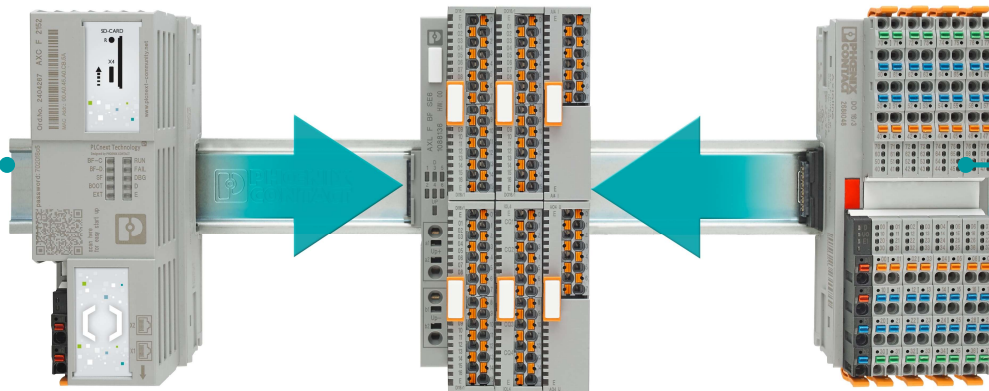
All Axioline F I/Os

Choose out of a portfolio of more than <u>80</u> I/Os, bus couplers
and controls

PHŒNIX
CONTACT

Axioline Smart Elements & PLCnext Controls

IoT ready

OPEN and FUTURE PROOF

Axioline Smart Elements are the optimal supplement for the PLCnext Controls .

PLCnext Technology
Designed by PHOENIX CONTACT

PHŒNIX CONTACT
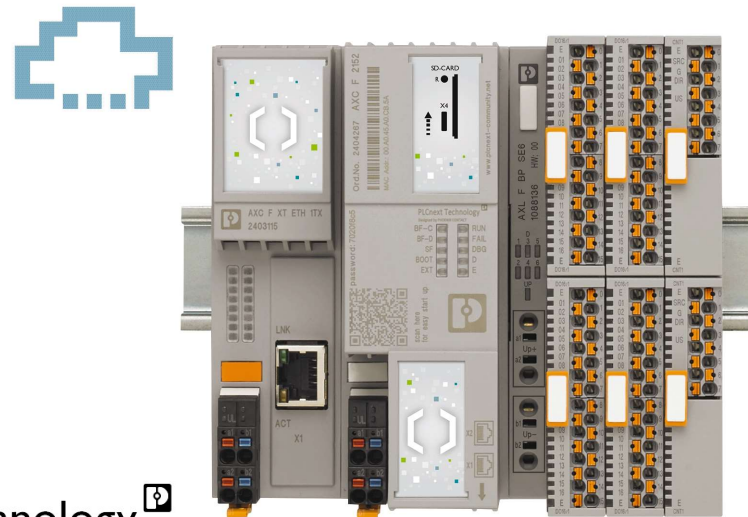
Axioline Smart Elements

I/Os as part of the modular automation system

CONTROLS &
BUS COUPLERS

WIDE RANGE
OF I/Os

✓ Scalable automation system for simple to complex complex assignments

✓ Large selection of modules according to the modular system principle

✓ Optimal complement to PLCnext Controls

✓ All components are part of the COMPLETE line system

PLCnext Technology
Designed by PHOENIX CONTACT

COMPLETE line

PHŒNIX CONTACT

Axioline SE Smart Elements

Space optimized Automation Systems
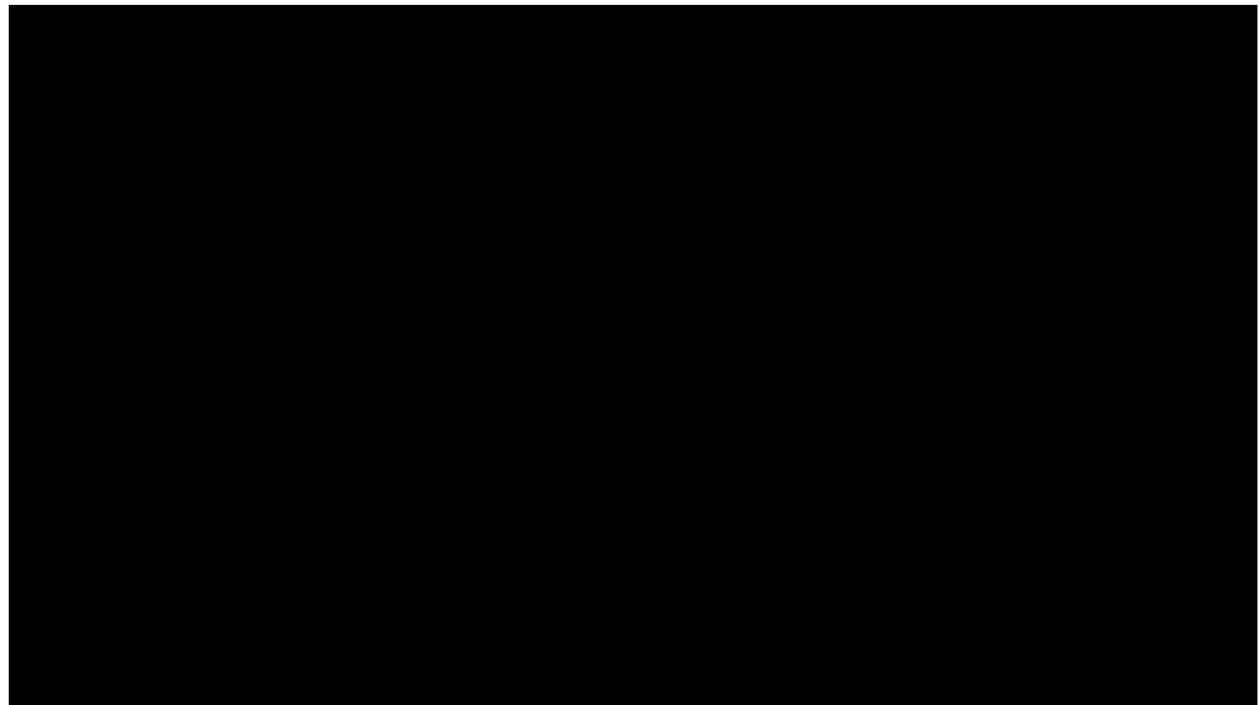
Axioline Smart Elements
Properties

Marking
Adhesive label or marker

Release mechanism
Mounting: locking mechanism in slot
Removal: release and pull-out aid

Smart Element interface
- Communications power U_{SE}
- 24 V DC I/O supply U_P
- Communication with Smart Element slot

I/O connection
8 or 16 alternately arranged terminal points with Push-in connection technology

Diagnostic and status indicators
- Two redundant red error LEDs
- Status LEDs (depending on the version)

Dimensions
62 mm x 15 mm x 62 mm (L x W X H)

PHŒNIX CONTACT

Axioline Smart Elements

Conductor cross sections

- **Without using the spring lever** to insert the conductor

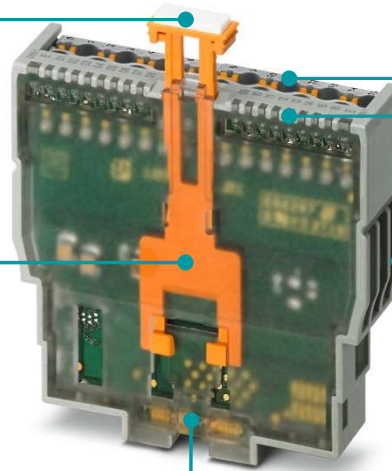| Conductor	Cross section
Rigid	0.5 mm^2 .... 1.5 mm^2 (AWG 20 ... 16)
Flexible with ferrule without insulating collar (A ...) or with insulating collar (AI ...)	

ℹ️ Flexible cables without ferrules are only suitable for Push-in connection technology **when using the spring lever**.

- **When using the spring lever** to insert the conductor

Conductor	Cross section
Rigid	0.25 mm^2 .... 1.5 mm^2 (AWG 24 ... 16)
Flexible with ferrule without insulating collar (A ...) or with insulating collar (AI ...)	
Flexible without ferrule	

- Stripping lengths and ferrule lengths

Cross section	Length
0.25 mm^2 .... 1.5 mm^2 (AWG 24 ... 16)	8 mm

PHŒNIX CONTACT
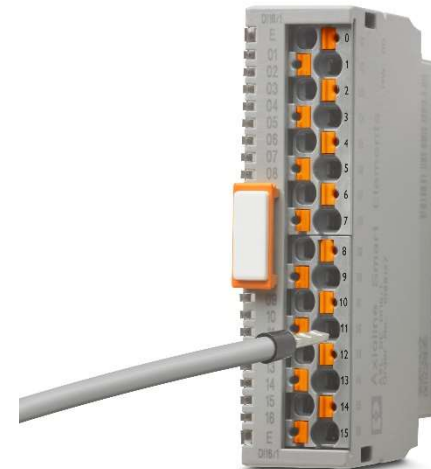
Axioline Smart Elements

Mounting and removal
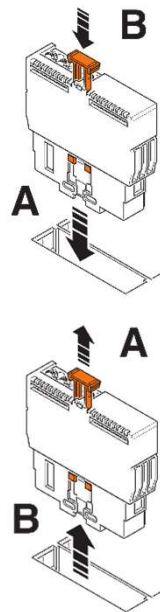
- Mounting the Smart Element

A: Inserting the Smart Element in the Smart Element slot

B: Locking the Smart Element in place

- Removing the Smart Element

A: Releasing the Smart Element

B: Removing the Smart Element

Axioline Smart Elements
Supply concept

Smart Element interface
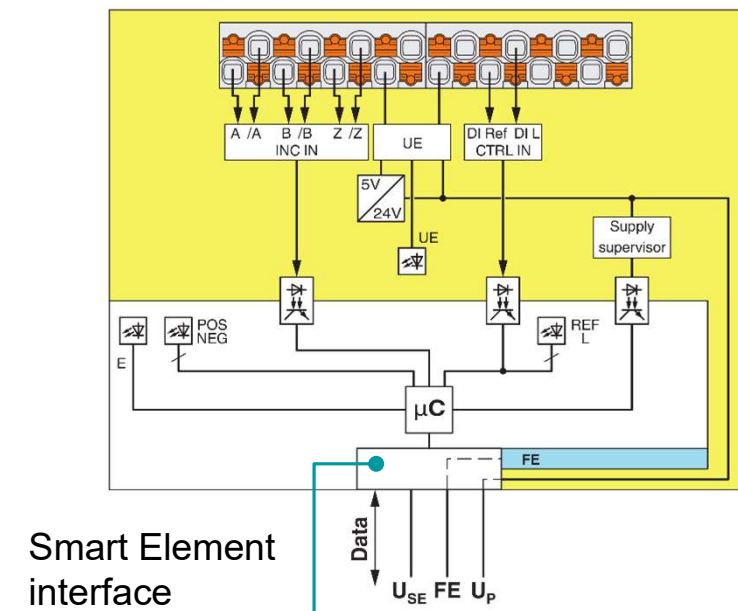
- The Smart Element is supplied with the following via the Smart Element interface:

  - Communications power U_{SE}

  - 24 V DC I/O supply U_P with max. 6 A per Smart Element

Axioline Smart Elements

Diagnostic and status indicators

- Status LEDs

  - Up to 16 status LEDs

  - Number and assignment depends on the I/O function

- E LED

  - Off   No error

  - Flashing (0.5 Hz)   Smart Element faulty

  - Flashing (4 Hz)   Communication error

  - On   I/O error

E LED

Status LED 1

Status LED 16

E LED
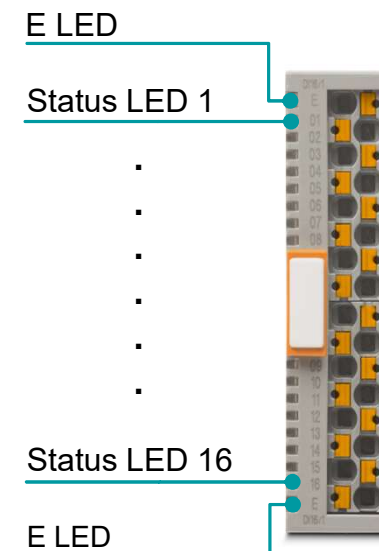
Axioline Smart Elements
Marking

Function identification

Marking of status LEDs

Function identification

Terminal point assignment

Designation

Order number

QR code
(link to product in Eshop)

Terminal point numbering
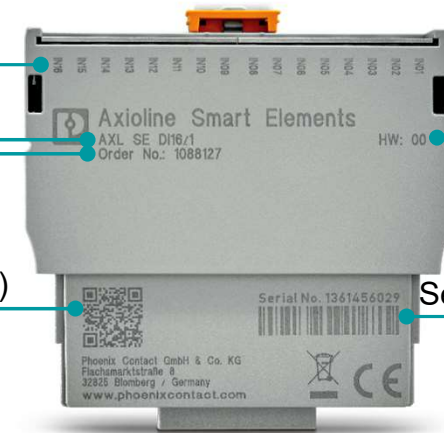
HW version

Serial number

Axioline Smart Elements
Marking

- The following can be included on the release mechanism (1) for marking purposes:
  - Adhesive label (2)
    - SK 5,0 WH:REE   (Order No. 0805221)
    - MM-TML (EX4,2)R C1 TR/BK   (Order No. 0803979)
  - Snap-on marker (3)
    - UCT6M-TM 5   (Order No. 0830756)
    - UM6M-TM (5X12)   (Order No. 0830928)

Axioline F backplane

Contents

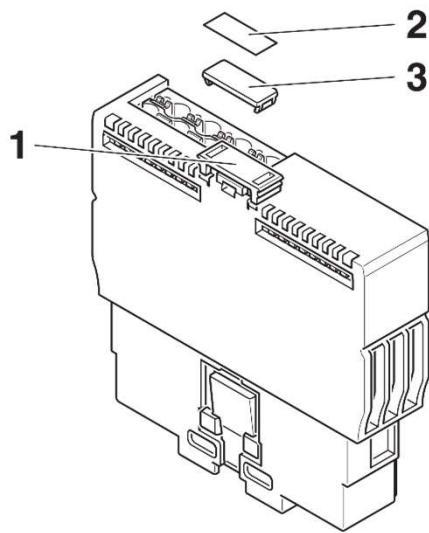- Axioline Smart Elements
- Axioline F backplane
- Axioline Smart Elements in the AXL F system
- Axioline Smart Elements portfolio
- Axioline Smart Elements in comparison with AXL F and Inline

Axioline F backplane
Properties

Axioline Smart Element slots
4 or 6 slots for Smart Elements
AXL F BP SE4: 1088135
AXL F BP SE6: 1088136

Marking
Using adhesive label or
marking label

Feed-in (Push-in Technology)
24 V DC I/O supply U_P
Up to 16 A
0.5 mm² … 2.5 mm²

Diagnostic and status LEDs
- Power supply (U_P)
- Local bus diagnostics (D1 … D6)

Axioline F local bus
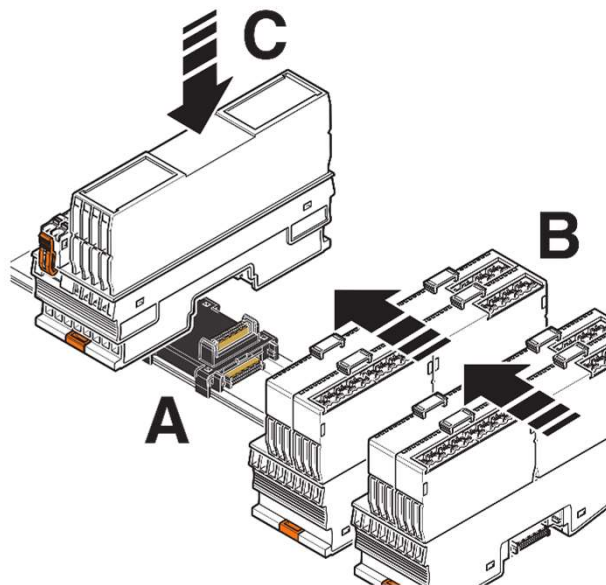Can be combined with all Axioline
F controllers and bus couplers

Base latch
To release the backplane from the
DIN rail

Axioline F backplane

Mounting

A: Mounting the bus base module
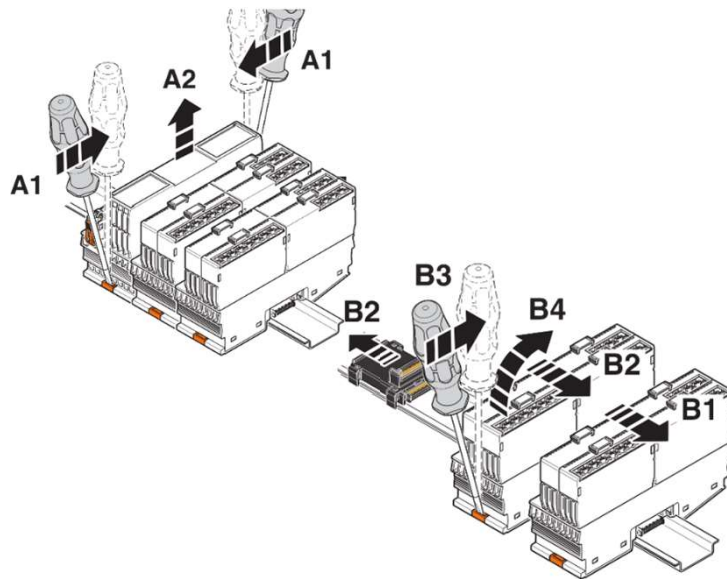(for bus coupler or AXL F module)

B: Snapping on and aligning the
backplanes by pushing them together

C: Mounting the AXL F bus coupler or
the AXL F module

→ With step C, the backplane is locked in
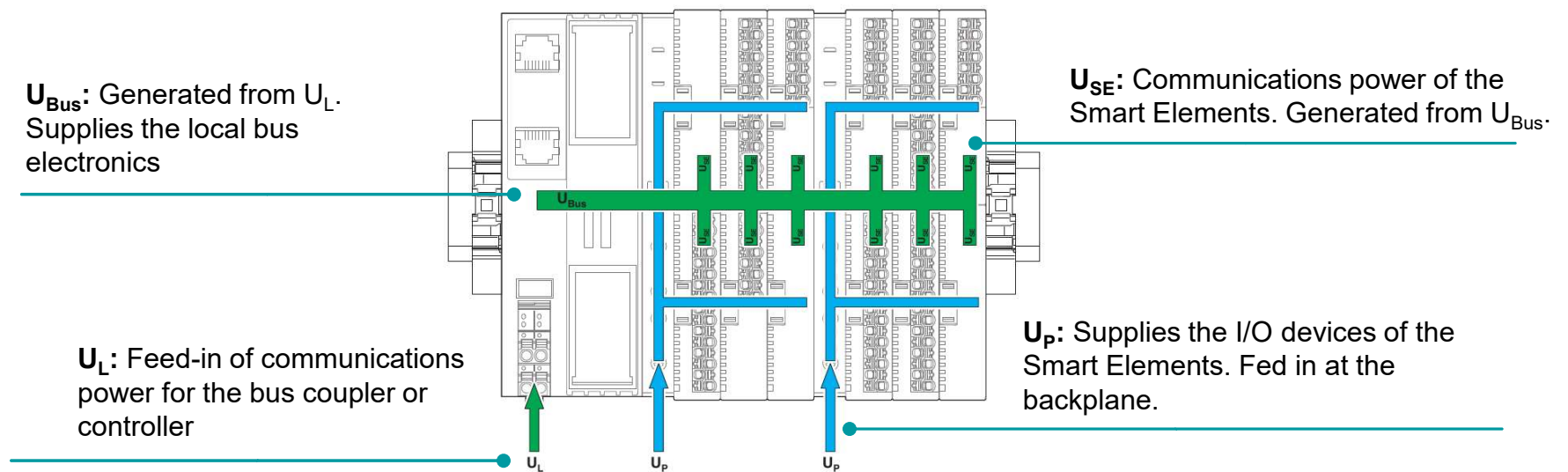place with the AXL F module

Axioline F backplane

Removal

A1,2: Removing the bus coupler
(or the AXL F module)

B1,2: Disengaging (pushing apart) the
backplanes

B3,4: Releasing and removing the
backplanes

Axioline F backplane
Supply concept

U_{Bus}: Generated from U_L. Supplies the local bus electronics

U_L: Feed-in of communications power for the bus coupler or controller

U_{SE}: Communications power of the Smart Elements. Generated from U_{Bus}.

U_P: Supplies the I/O devices of the Smart Elements. Fed in at the backplane.

PHŒNIX CONTACT

Axioline F backplane
Marking

Order designation/number
HW version

Local bus diagnostics
D 1 … 6

Status LED
I/O supply U_P

Marking for I/O supply
feed-in

Slot numbering

Order designation/
number

Serial number

PHŒNIX CONTACT

Axioline F backplane
# Marking

(1)

- The following can be included on the backplane (1) for marking purposes:
  - Adhesive label
    - SK 5,0 WH:REE   (Order No. 0805221)
    - MM-TML (EX4,2)R C1 TR/BK   (Order No. 0803979)
  - Snap-on marker
    - UCT6M-TM 5   (Order No. 0830756)
    - UM6M-TM (5X12)   (Order No. 0830928)

Axioline F backplane

Diagnostic and status indicators

D 1 … 6	Status of the local bus and I/O devices
Green on	- Controller is providing valid data - No error
Flashing green	- Internal communication OK - Controller is not providing valid data
Flashing yellow/red	- Smart Element(s) before the slot flashing yellow/red is no longer connected to the slot
Flashing yellow	- Smart Element(s) before the slot flashing yellow/red <u>after power-up</u> is not connected to the slot
Red on	- Smart Element of next slot is not plugged in
Red on (all)	- At least one slot has an unconfigured Smart Element or an AXL F module
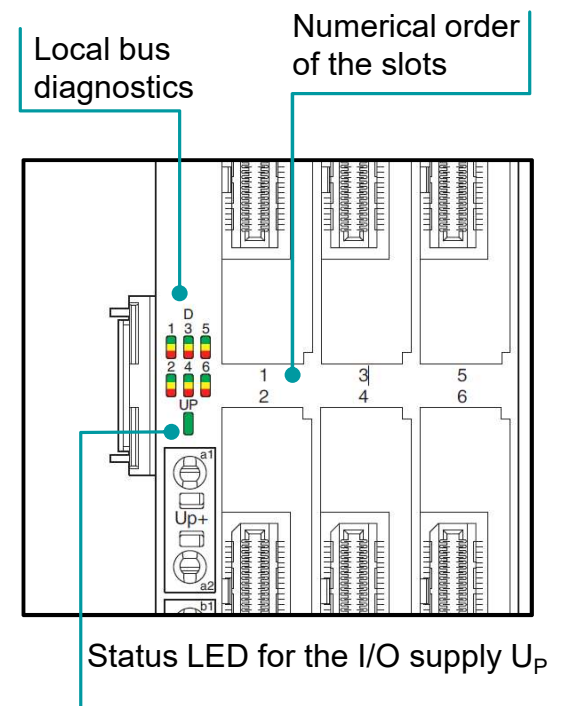
Local bus diagnostics

Numerical order of the slots

Status LED for the I/O supply U_P

Axioline Smart Elements in the AXL F system

Contents

- Axioline Smart Elements

- Axioline F backplane

- Axioline Smart Elements in the AXL F system

- Axioline Smart Elements portfolio

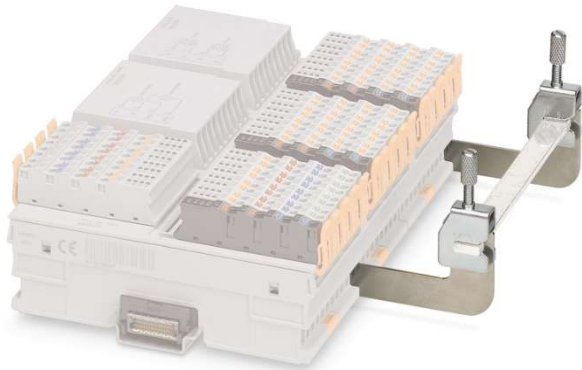- Axioline Smart Elements in comparison with AXL F and Inline

Axioline Smart Elements in the AXL F system

Backplane dimensions incl. Smart Elements
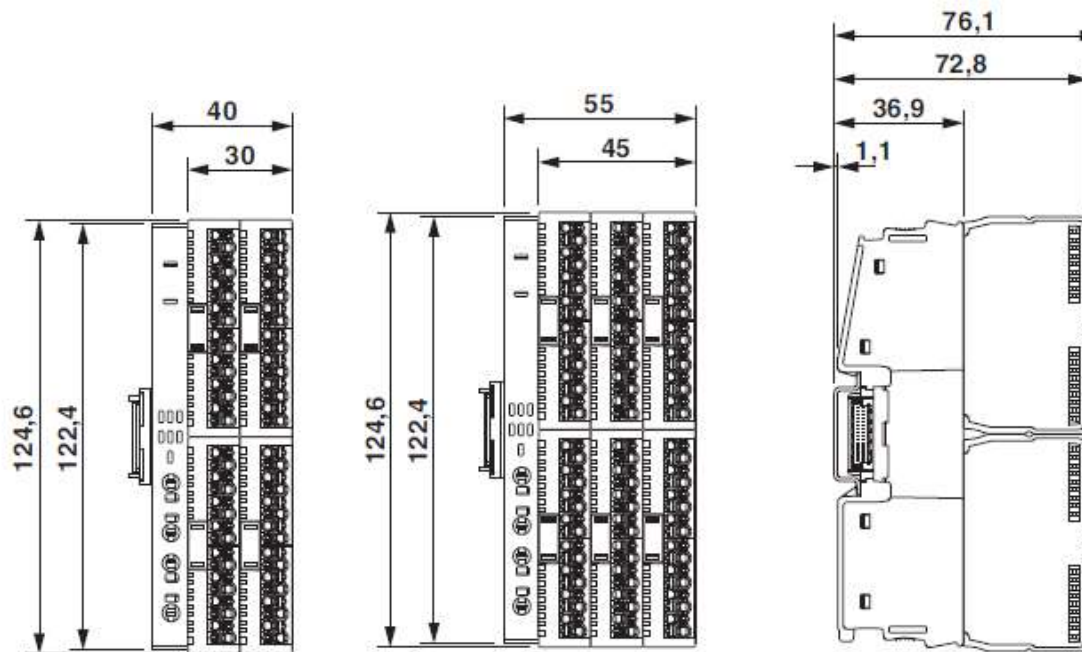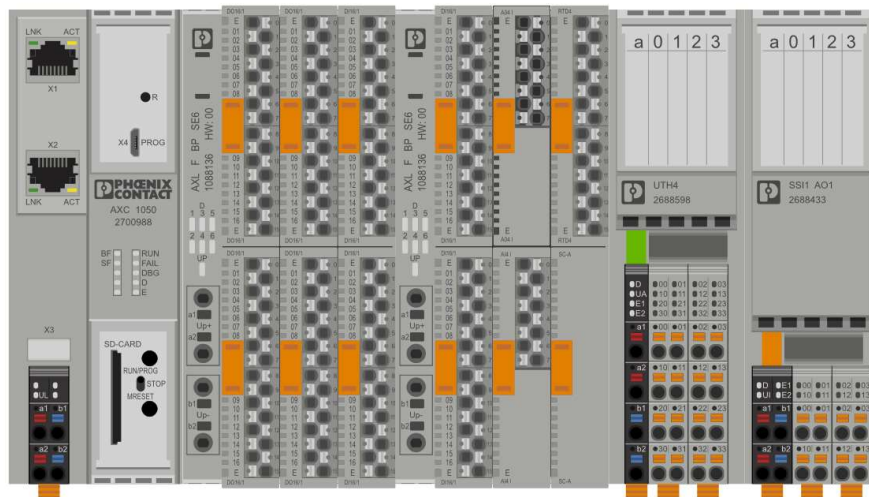
Axioline Smart Elements in the AXL F system

Shielding concept

- Axioline F shielding set can be used (AXL F AXL SHIELD SET – 2700518)
  - Holder cannot be installed between backplanes

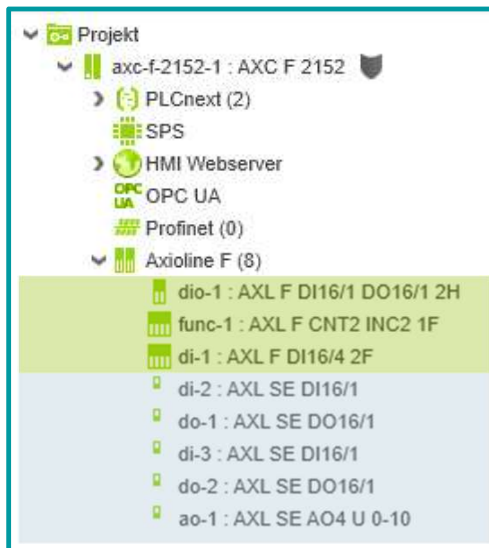Axioline Smart Elements in the AXL F system

Synergy of AXL F and AXL SE

- Axioline F and Axioline Smart Elements can be combined
- Functions can be combined as required

Axioline Smart Elements in the AXL F system

System image

- Plugging a Smart Element into an AXL F backplane transforms the Smart Element into an Axioline F device

- Handling and using the Smart Element like an AXL F module

- Mixed stations are also possible

- Backplanes do not need to be configured

- An AXL SE SC-A (slot cover) must be placed on an unused slot

Axioline Smart Elements in the AXL F system

Diagnostics concept

- Integration of Axioline Smart Elements in Axioline F system diagnostics

- Error codes

- Plain text diagnostics (system-dependent)

- HW and FW version can be read

- Additional information available, such as equipment ID, location, etc.

No.	Product Name	Product Text
0	AXL F BK ETH	Ethernet bus terminal
1	AXL F DO16/2 2H	16 digital outputs
2	AXL SE AO4 U 0-10	4 analog output channels
3	AXL SE DO16/1	16 digital outputs
4	AXL SE SC-A	Slot Cover Active

Code	0x 23 44
SubModNo	dec 0
FunctionGroup	DO
AddValue	0x 00 00
TextLength	dec 51
Text	Overload or short circuit (output)

PHŒNIX CONTACT

Axioline Smart Elements in the AXL F system

Contents

- Axioline Smart Elements

- Axioline F backplane

- Axioline Smart Elements in the AXL F system

  - Project+

- Axioline Smart Elements portfolio

- Axioline Smart Elements in comparison with AXL F
  and Inline

Axioline Smart Elements in the AXL F system

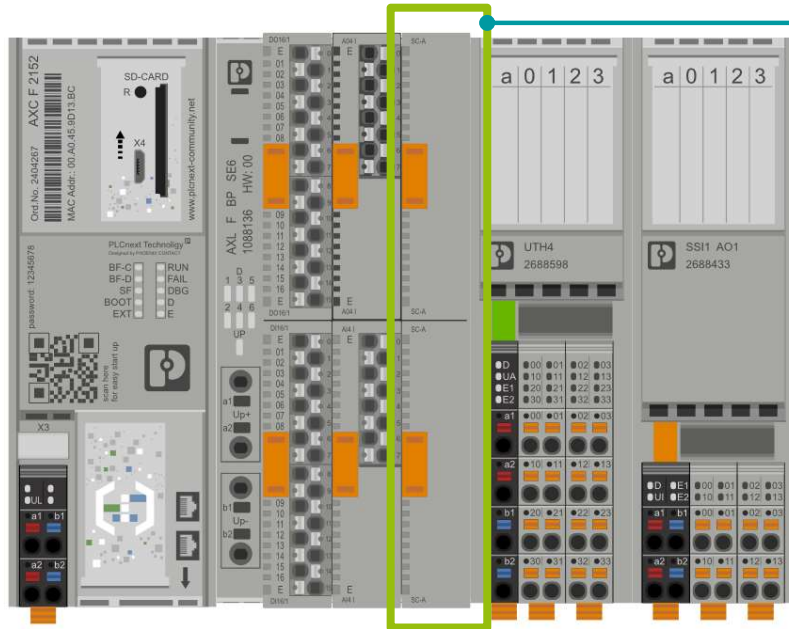# Project+

Axioline Smart Elements in the AXL F system
AXL F and AXL SE
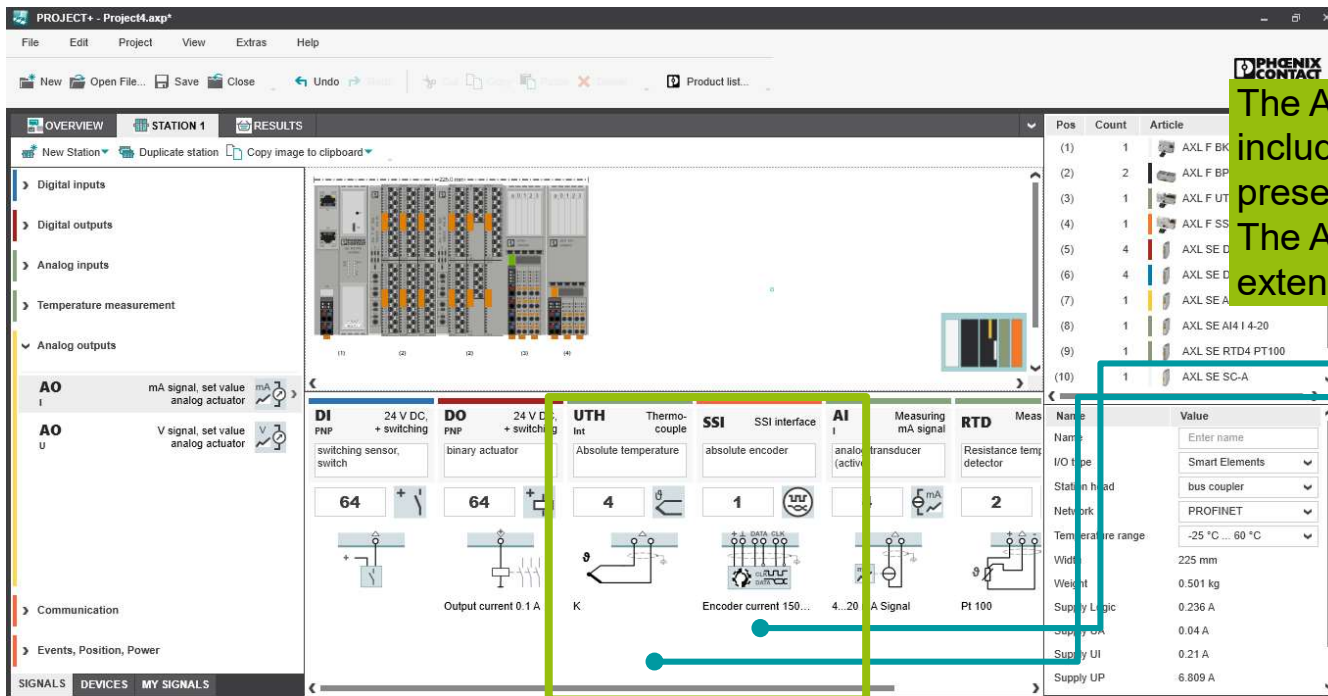
The AXL SE portfolio does not include SSI and UTH at present.
The AXL SE station can be extended with AXL F modules.
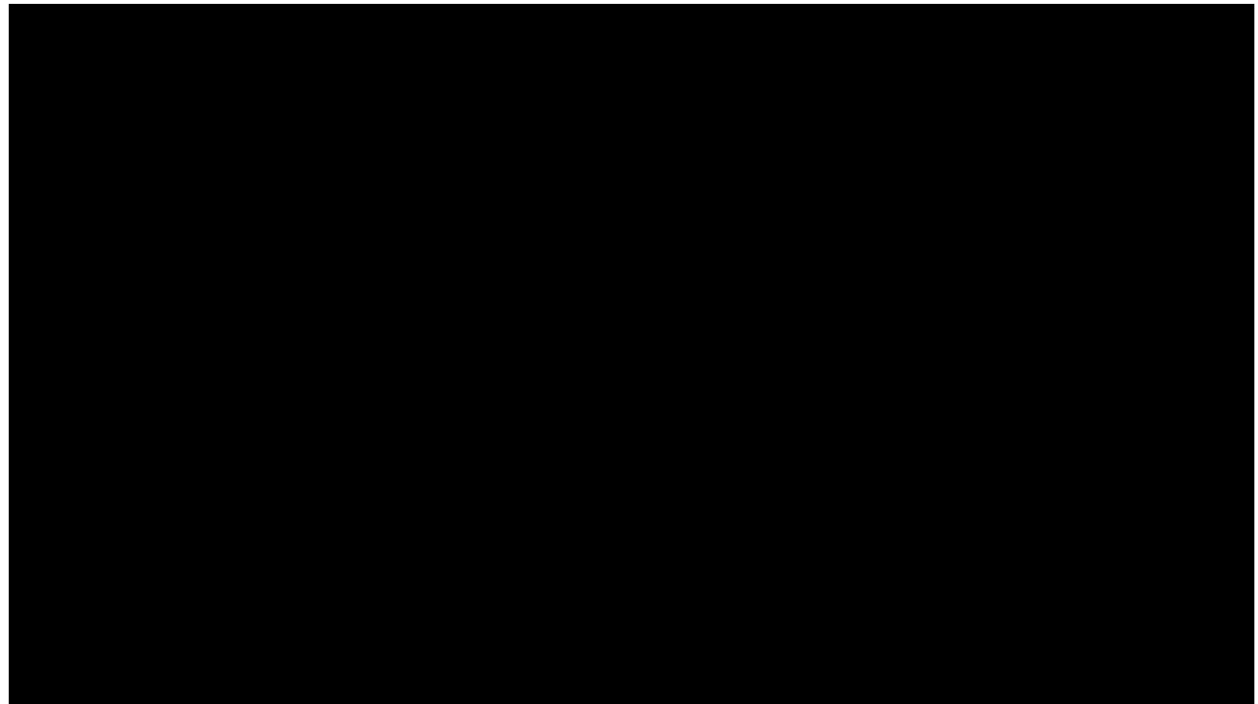
Axioline Smart Elements in the AXL F system

Project+ machine options

Slot covers can be used to reserve slots in an I/O station. This means that depending on the machine design, different I/O station versions can be created without changing the physical and logical position of the other Smart Elements.

Axioline SE Smart Elements
Flexible and expandable design

Axioline Smart Elements portfolio

Contents

- Axioline Smart Elements

- Axioline F backplane

- Axioline Smart Elements in the AXL F system

- Axioline Smart Elements portfolio

- Axioline Smart Elements in comparison with AXL F
  and Inline

Axioline Smart Elements portfolio

Portfolio

Analog input	Analog output	Digital input	Digital output	Function modules	Safety modules	System modules
AI4 I	AO4 I	DI16	DO16	IOL4	PSDI	SC-A
AI4 U	AO4 U			CNT1	PSDO	
RTD4				RS485		**AXL F backplane**
				INC1		BP 4
						BP 6

PHŒNIX CONTACT

Axioline Smart Elements portfolio

Analog input

AXL SE AI4 I 4-20
Order No. 1088062

AXL SE AI4 U 0-10
Order No. 1088104

- 4 analog inputs per Smart Element

- Measuring range: 4 mA … 20 mA or 0 V … 10 V

- Resolution: 12 bits

- 2-conductor connection technology (single-ended)

- No parameterization required

Axioline Smart Elements portfolio

Analog input

AXL SE RTD4 PT100
Order No. 1088106

- 4 analog inputs to record from Pt 100 temperature sensors

- Resolution: 16 bits

- 3-conductor connection technology

- No parameterization required

Axioline Smart Elements portfolio

Analog output

AXL SE AO4 I 4-20
Order No. 1088123

AXL SE AO4 U 0-10
Order No. 1088126

- 4 analog outputs per Smart Element

- Output range: 4 mA … 20 mA or 0 V … 10 V

- Resolution: 12 bits

- 2-conductor connection technology (single-ended)

- No parameterization required

Axioline Smart Elements portfolio

Digital input

AXL SE DI16/1
Order No. 1088127

- 16 digital inputs

- 1-conductor connection technology

Axioline Smart Elements portfolio

Digital output

AXL SE DO16/1
Order No. 1088129

- 16 digital outputs

- 500 mA

- 1-conductor connection technology

PHŒNIX CONTACT

Axioline Smart Elements portfolio

Functions

AXL SE IOL4
Order No. 1088132

- IO-Link master
- 4 IO-Link A ports (spec. 1.1.2)

AXL SE CNT1
Order No. 1088131

- Counter
- 24 V counter input (type 1)
- Input frequency: 0 kHz … 150 kHz

PHŒNIX CONTACT

Axioline Smart Elements portfolio

Functions

AXL SE INC1 SYM
Order No. 1088130

- 1 symmetrical incremental encoder input
- Electrical encoder monitoring
- Z signal with 24 V/5 V supply

AXL SE RS485
Order No. 1088128

- RS-485
- Half duplex transmission
- 4 kB receive buffer
- 1 kB send buffer

PHŒNIX CONTACT

Axioline Smart Elements portfolio

Safety

AXL SE PSDI8/3
Order No. 1079241

- 8 safe inputs, single-channel
- 3-conductor connection
- Addressing via lateral DIP switches

AXL SE PSDO4/2
Order No. 1079231

- 4 safe outputs, single-channel
- 2 A per output
- 6 A maximum total current
- 2-conductor connection

Axioline SE Smart Elements

Modules and Safety Modules

Axioline Smart Elements portfolio
Safety

- Addressing via lateral DIP switches

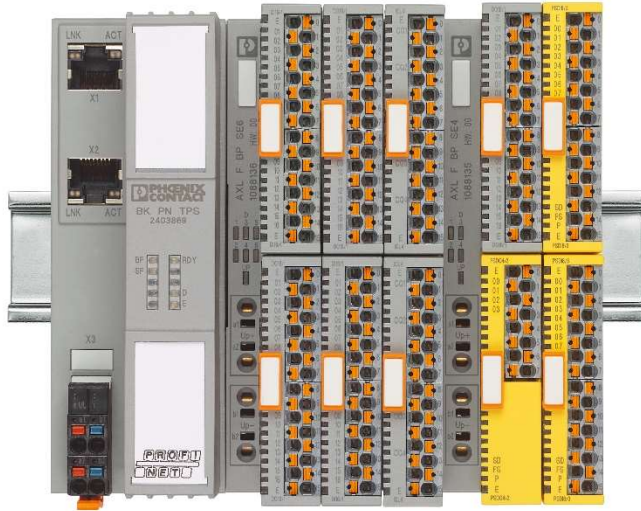- AXL SE PSDO4/2 2A
  - 4 safe outputs, single-channel
  - 2 A per output
  - 6 A maximum total current
  - 2-conductor connection

- AXL SE PSDI8/3
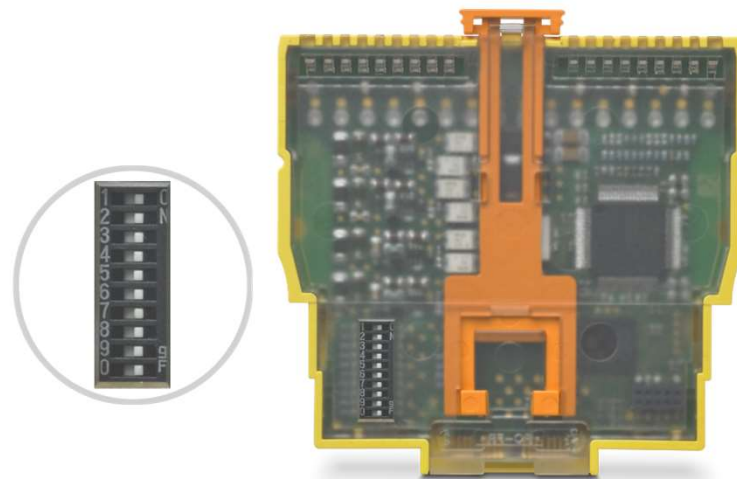 - 8 safe inputs, single-channel
  - 3-conductor connection

Axioline Smart Elements portfolio

System

AXL SE SC-A
Order No. 1088134

- Dummy module for empty backplane slots
- Protects an unused Smart Element slot

Axioline Smart Elements portfolio

Backplane

AXL F BP SE4
Order No. 1088135

- Backplane modules for operating the Smart Elements within an AXL F station

- 4 slots for Axioline Smart Elements

AXL F BP SE6
Order No. 1088136

- 6 slots for Axioline Smart Elements

Axioline Smart Elements in comparison with AXL F and Inline

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- Axioline Smart Elements
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Axioline Smart Elements in comparison with AXL F and Inline

IP20 I/O systems

	AXL SE	AXL F	Inline
Design	Highly modular	Block modular	Modular system
Temperature	-25°C … 60°C	-25°C … 60°C	-25°C … 55°C
Vibration / shock / continuous shock	5g / 30g / 10g	5g / 30g / 10g	5g / 25g / -
Maximum operation above sea level	3000 m	3000 m	3000 m
Push-in Technology	Yes	Yes	No
Plug-in wiring level	No	Yes	Yes
Hot swappable	No	No	No

Axioline Smart Elements in comparison with AXL F and Inline

IP20 I/O systems

|	AXL SE	AXL F	Inline
Parameter level	Low	Medium	Low to medium
Synchronicity	Prepared	Prepared	No
Parameter backup to I/O	Yes	Yes	No
Analog resolution	12 bits 15 bits planned	15 bits	12/15 bits
SafetyBridge	Planned	Yes	Yes
PROFIsafe	Yes	Yes	Yes
Approvals	UL (in preparation)	UL, shipbuilding*, ATEX*	UL, shipbuilding*, ATEX*

* Subportfolio

Axioline SE

Combination of I/O Axioline System
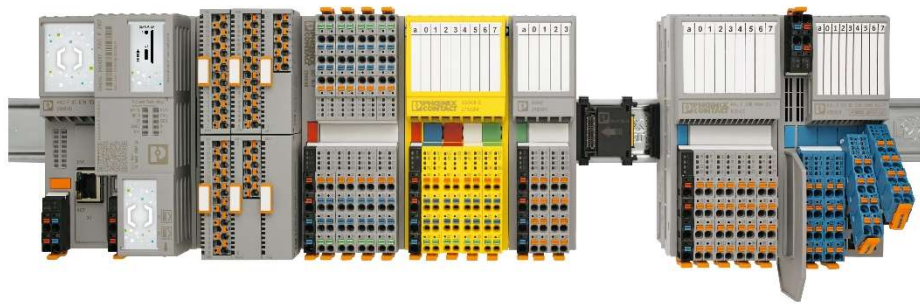
Axioline SE Smart Elements

Future proof
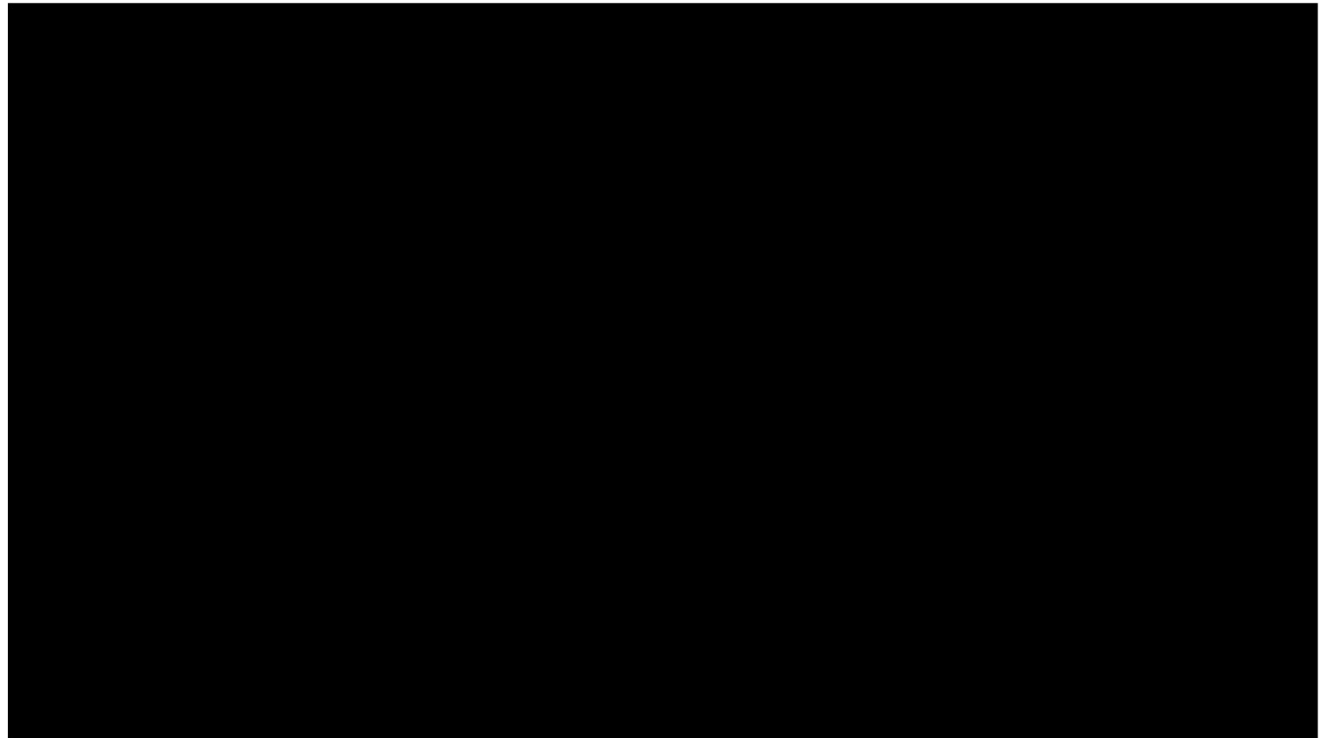
Axioline Smart Elements

Your advantages at a glance

- ☑ Axioline Smart Elements are FREELY pluggable

- ☑ Very COMPACT I/O solution

- ☑ TWO different I/O functions freely selectable over a width of 15 mm

- ☑ Compatible with ALL Axiocontrol, Axioline F bus couplers, and I/O modules

- ☑ Future proof in connectivity, digitalization, cloud, IIoT

- ☑ Improvement in Production of Cabinets

- ☑ Protection of I/O Installed Base with high quality products

PHŒNIX CONTACT