Welcome

Webinar

Panorama y guía de selección

Sistema de Entradas / Salidas

Antonio Gordillo IMA Septiembre 2020

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INSPIRING INNOVATIONS

Agenda

- Panorama General
- Sistema Inline
- Sistema Inline ECO
- Sistema Axioline E
- Sistema IO-LINK
- The modular automation system: basic idea
- Controls
- Bus couplers

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Agenda

- Axioline Smart Elements
- Axioline F: standard modules
- Axioline F: modules for special environments
- The modular automation system: solutions
- Scope of applications
- Axioline P modules for process applications redundancy

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I/O-Systems

Panorama General

Inline
- The fine-modular entry I/O with high functionality

Axioline F
- The fast and robust solution for every application and EX applications

Axioline SE
- The new solution for compactness applications

Axioline E
- The versatile solution for applications outside the cabinet

Axioline P
- The new system for Profibus PA applications in process

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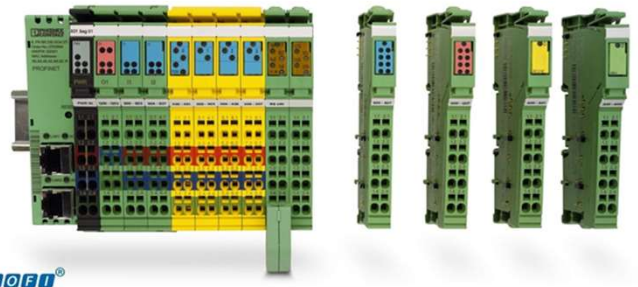
Inline

General data

- 10 networks
- More than 250 modules
- Profisafe & SafetyBridge
- Intrinsic safe modules
- Compact PLCs
- fine-modular setup
- -25°C … 55°C
- -40°C … 70°C (XC)

according IEC 61131-2 from -40 °C to +70 °C successfully tested



Inline

Features

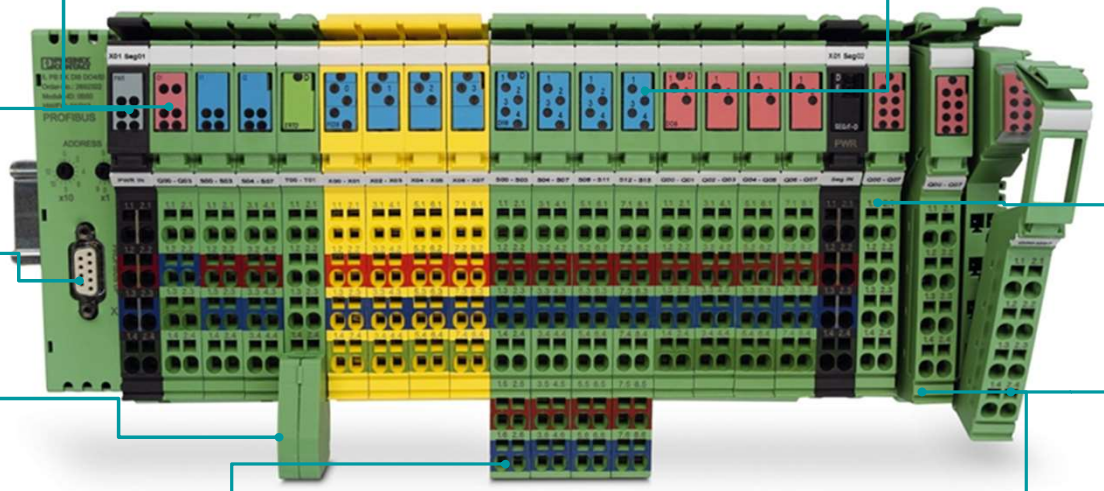
Colored mark for easy identification

Network and local bus diagnostics LEDs

Network or bus interface

Integrated shielding concept

Colored marks for every connection point



Status and diagnostics LEDs on every local bus node

Unique numbering of connection points

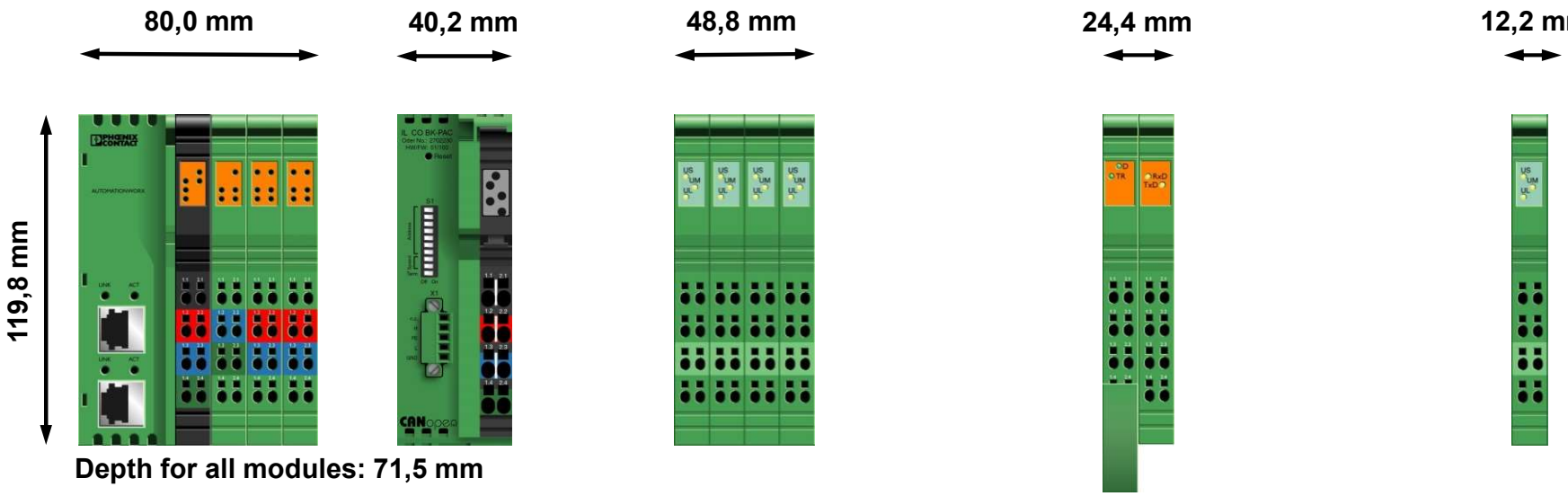
Codeable connectors

Pluggable connections

Inline

Housings

BKs	I/Os up to 32 Signals	I/Os up to 16 Signals	I/Os up to 8 Signals
Network interface	In- or output modules	Serial- / function module	In- or output modules



Depth for all modules: 71,5 mm

Inline

Portfolio

Bus Coupler

PROFIBUS | PROFINET | EtherNet/IP | DeviceNet | ModbusTCP | Modbus RTU | sercos the automation bus | EtherCAT | CANopen | INTERBUS

Power, Segment-, Accessory Terminals

Power terminals		Boost terminals		Segment terminals	power distribution	
24V DC	120V AC	230V AC	24V DC	24V DC	24VDC	GND

Digital In- and Output Terminals

Digital inputs					
1 channel	2 channel	4 channel	8 channel	16 channel	32 channel
Digital outputs					
1 channel	2 channel	4 channel	8 channel	16 channel	32 channel

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Inline

Portfolio

Analogue In- and Output Terminals

Analogue inputs			SGI	Analogue outputs		
2 channel	4 channel	8 channel	2 channel	1 channel	2 channel	8 channel
Temperature measurement						
1 channel (TC)	2 channel (UTH/RTD)	4/8 channel (UTH/RTD)				

Communication terminals

Serial communication		Master terminals			System-bus	
RS-232	RS-485	CAN	Profibus	IO-Link	INTERFACE	Fieldline

Control and measurement terminals

Position	Temperature control		Function		Position control	
INC	RTD	UTH	Count	PWM	INC	SSI

Inline

Portfolio

Drives				
	DC Servo controller		AC motor starter	
	EC-AR		ELR	MLR

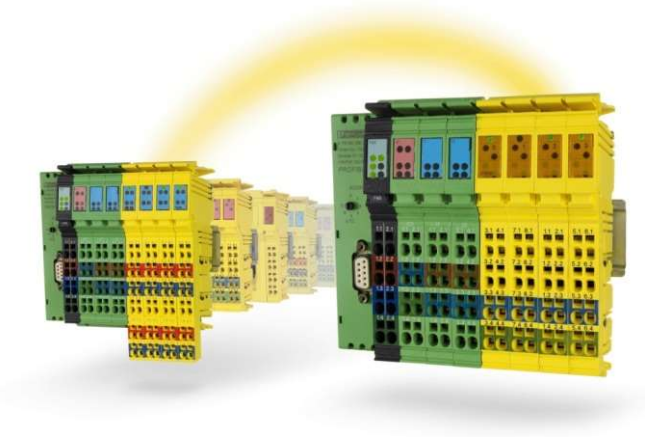
Intrinsic Safe Terminals				
	Power	DI/DO	AI/AO	TEMP
	24V DC	4/4 channel	4/4 channel	4 channel (RTD/TC)

Safety Terminals					
	Logic module	Safe I/Os			
	8 outputs	16 inputs	8 inputs	4 relays	4 / 8 outputs

Inline

Safety Bridge

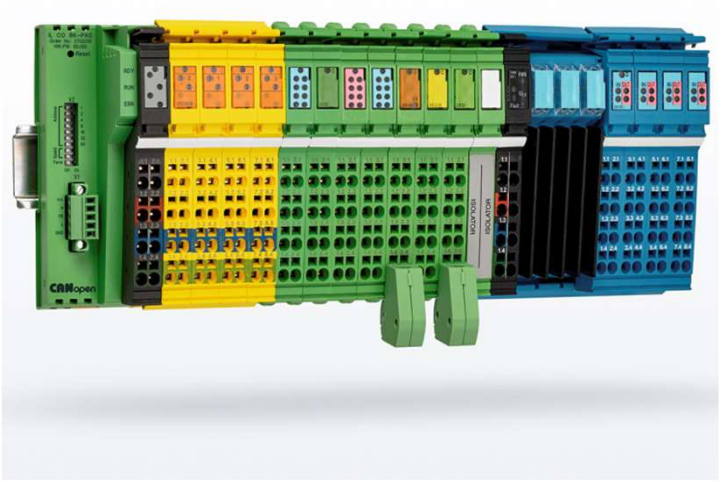
- Safe I/Os and safe logic inside the I/O station
- Network and PLC independent
- Direct access to all data from PLC



Inline

Intrinsic safe I/Os

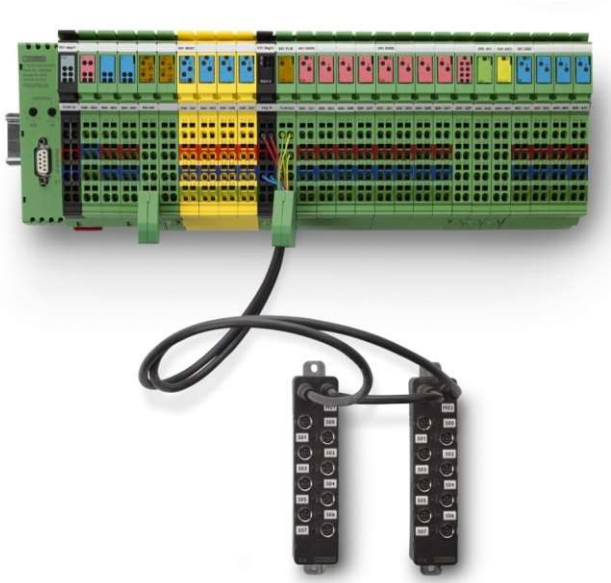
- Digital inputs
- Support of NAMUR sensors (EN 60947-5-6)
- Analogue outputs: 0/4... 20 mA
- Analogue inputs: 0... 10 V; 0/4... 20 mA
- RTD-inputs: Pt 100, etc.
- TC-inputs: J, K, E, etc.
- For sensors in Zone 2, Zone1 and Zone 0



Inline

Local bus extensions

- Extension for up to 16 simple IP65 / IP67 I/O modules outside the cabinet
- Flexible extension inside the cabinet with line skip terminal



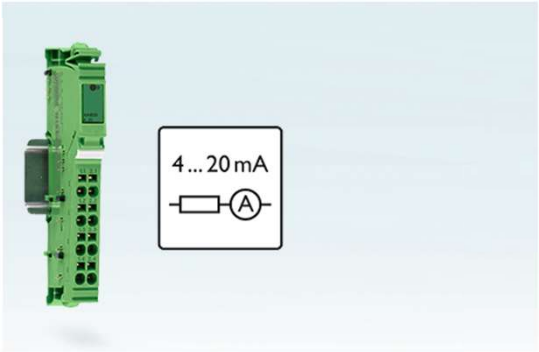
Inline

Inline ECO terminals at a glance

- Ready to use:
  no parametrization necessary
- Easy to order:
  one functionality, one article
- Competitive in price:
  very cost effective terminals
- Easy safety integration

Inline ECO

Automation without parameterization



One terminal, one functionality

- Easy handling
- No parameterization required
- Easy exchange

Compatible with all terminals

- Can be combined with standard Inline terminals
- High flexibility
- Easy expansion of existing Inline stations

Safety solution

- Easy handling
- No parameterization required
- No safe controller required
- No (safety) software required

Inline ECO

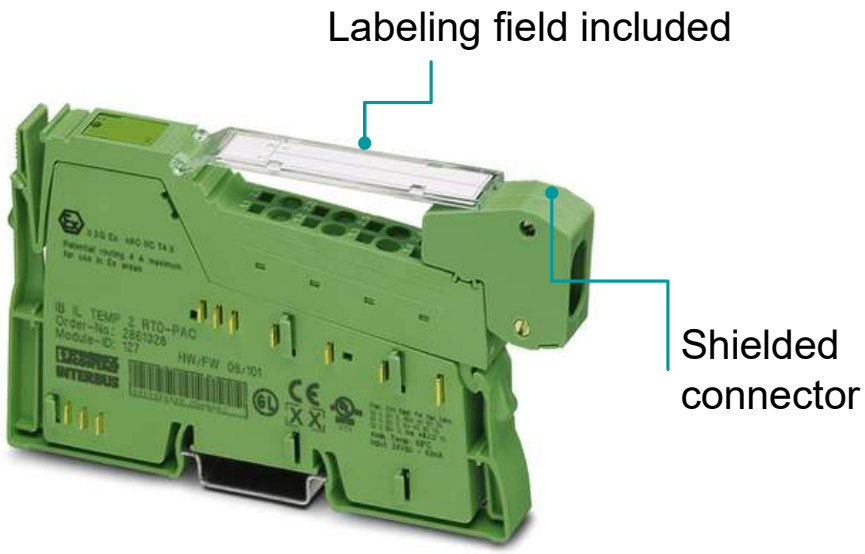
Common features

- Standard connector
- 12,2 mm width (except IB IL SAFE 2-ECO)
- Temperature range **0°C to 55°C**
- Diagnostic and status indicators
- Without labeling fields
- Standard UL approval (UL 61010-2-201)

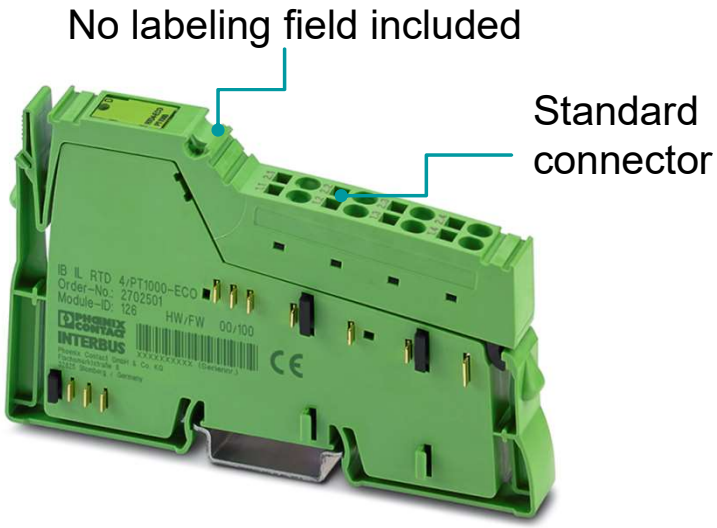
Inline ECO

Visible differences

Standard Inline terminal



Inline ECO terminal



Inline ECO

Digital in- and output terminals

- 8 digital inputs and outputs
- Outputs with 500 mA
- 1-, 2- or 3-wire technology
- …/EF-ECO approved for safety-related segment circuit

IB IL 24 DI 8/HD-ECO
2702792

IB IL 24 DO 8/HD-ECO
2702793

IB IL 24 DO 4/EF-ECO
2702825

Inline ECO

Analog in- and output terminals

- 4 analog inputs or outputs
- 2-wire Technology, single ended
- Variants:
  - 4…20mA
  - 0…10V
- 12 bit resolution analog/digital converter
- Data format: standardized representation
- Process data (16 bit) → Voltage value
  - 1695 hex →5781dec → 5,781 V

IB IL AI 4/I/4-20-ECO
2702495

IB IL AI 4/U/0-10-ECO
2702496

IB IL AO 4/I/4-20-ECO
2702497

IB IL AO 4/U/0-10-ECO
2702498

Temperature measurement UTH

- 4 inputs for thermocouples
- 2-wire technology
- Variants:
  - J: -210 °C ... +1200 °C
  - K: 270 °C ... +1372 °C
  - L: -200 °C ... +900 °C

IB IL UTH 4/J-ECO
2702502

IB IL UTH 4/K-ECO
2702503

IB IL UTH 4/L-ECO
2702504

Temperature measurement UTH

- 24 bit resolution analog/digital converter
- Data format: standardized representation
- Process data (15 bit + sign bit)
  → Temperature value
  - 03C5 hex → 965 dec → 96,5°C

IB IL UTH 4/J-ECO
2702502

IB IL UTH 4/K-ECO
2702503

IB IL UTH 4/L-ECO
2702504

Temperature measurement RTD

- 4 analog inputs
- 2-wire technology
- Variants:
  - Pt 100
  - Pt 1000
- 24 bit resolution analog/digital converter
- Data format: standardized representation
- Process data (15 bit + sign bit) →Temperature value 03C5 hex → 965 dec → 96,5°C

IB IL RTD 4/PT100-ECO
2702499

IB IL RTD 4/PT1000-ECO
2702501

Inline ECO

Serial communication

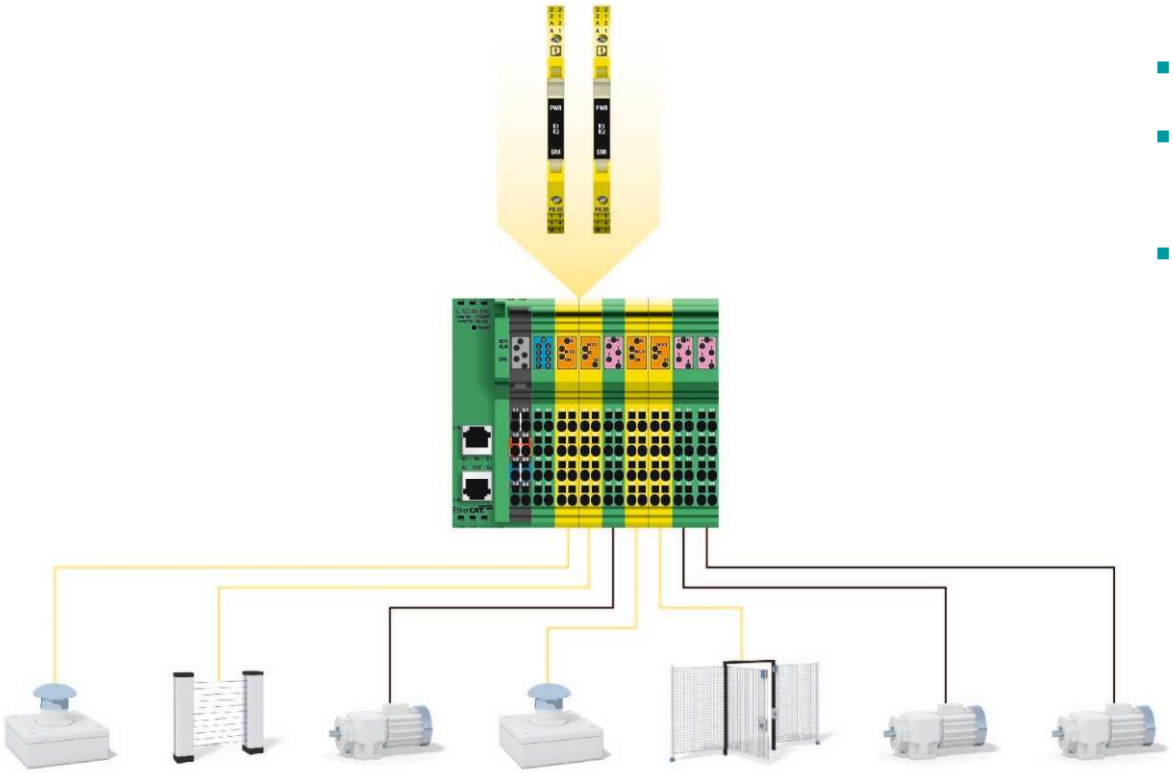
- RS-232 Communication
- RS-485 Communication
- Up to 38,4 kBaud
- Handshake RTS and CTS
- Transparent mode

IB IL RS 232-ECO
2702795

IB IL RS 485-ECO
2702141

Inline ECO

IB IL SAFE 2-ECO



- Functionality like 2 PSR Relay´s
- Completly based on hardware components
- Cascadable, for safe segment shutdown

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Inline ECO

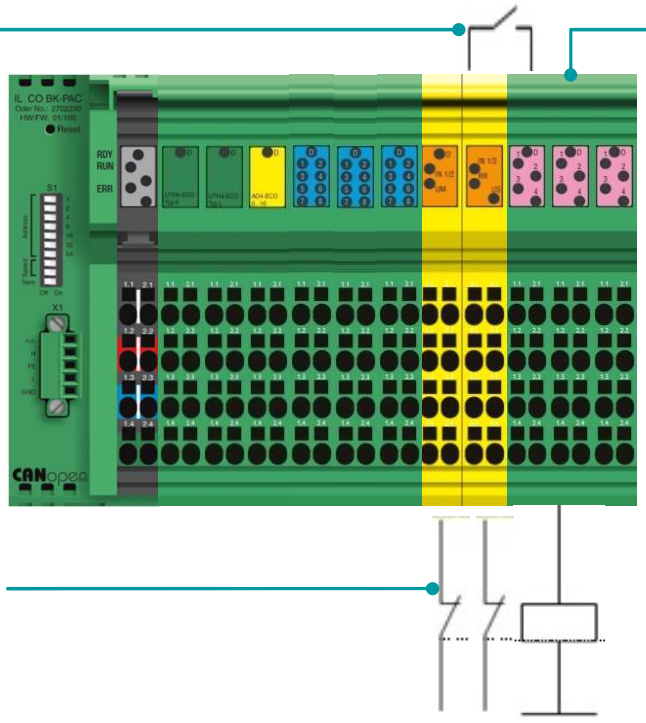
IB IL SAFE 2-ECO

- Two safety sensors
- No software required
- Switches off U_S
- Diagnostic informations in the PLC (it´s as DI4)
- Diagnostic and status indicators
- Temperature range 0°C to 55°C

Inline ECO

IB IL SAFE 2-ECO

Switches off U_S of the following Inline terminals

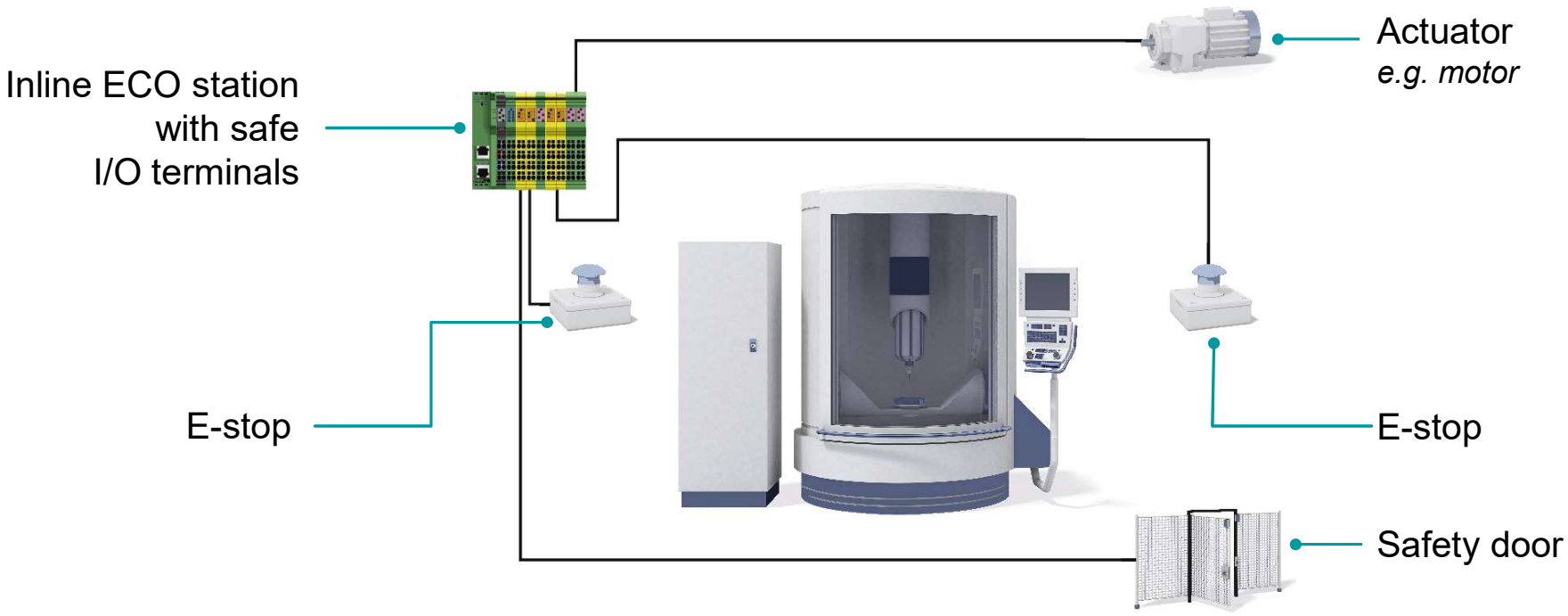


The DO 4/EF-ECO has to be installed to the right of the Safety terminal

Two dual-channel sensor circuits can be connected to one safe I/O terminal.

Inline ECO

IB IL SAFE 2-ECO



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Portfolio

Digital in- and output terminals & Safe I/O

IB IL 24 DI 8/HD-ECO 2702792	IB IL 24 DO 8/HD-ECO 2702793	IB IL 24 DO 4/EF-ECO 2702825	IB IL SAFE 2-ECO 2702446
new 	new 	new 	new 
8 digital inputs	8 digital outputs, 500 mA	4 digital outputs, 500 mA	2 safety sensors
1-wire technology	1-wire technology	2 and 3-wire technology	No software required
		Approved for safety-related segment circuit	Diagnostic infomations
			Up to PL e

Portfolio

Analog in- and output terminals

IB IL AI 4/I/4-20-ECO 2702495	IB IL AI 4/U/0-10-ECO 2702496	IB IL AO 4/I/4-20-ECO 2702497	IB IL AO 4/U/0-10-ECO 2702498
 new	 new	 new	 new
4 analog inputs	4 analog inputs	4 analog outputs	4 analog outputs
2-wire technology	2-wire technology	2-wire technology	2-wire technology
4 mA ... 20 mA	0 V ... 10 V	4 mA ... 20 mA	0 V ... 10 V
Data format: standardized representation	Data format: standardized representation	Data format: standardized representation	Data format: standardized representation
Resolution A/D: 12 bits	Resolution A/D: 12 bits	Resolution A/D: 12 bits	Resolution A/D: 12 bits

Technical details

Temperature measurement (RTD)

IB IL RTD 4/PT100-ECO 2702499	IB IL RTD 4/PT1000-ECO 2702501
new 	new 
4 analog inputs	4 analog inputs
2-wire technology	2-wire technology
Supported sensors: Pt 100	Supported sensors: Pt 1000
Data format: standardized representation	Data format: standardized representation

Portfolio

Temperature measurement (UTH)

IB IL UTH 4/J-ECO 2702502	IB IL UTH 4/K-ECO 2702503	IB IL UTH 4/L-ECO 2702504
new 	new 	new 
4 differential inputs for thermocouples	4 differential inputs for thermocouples	4 differential inputs for thermocouples
Supports type J thermocouples	Supports type K thermocouples	Supports type L thermocouples
2-wire technology	2-wire technology	2-wire technology
Measuring range: -210 °C ... +1200 °C	Measuring range: -270 °C ... +1372 °C	Measuring range: -200 °C ... +900 °C

Portfolio

Serial communication

IB IL RS 232-ECO 2702795	IB IL RS 485-ECO 2702141
new 	new 
RS-232 Communication	RS-485 Communication
Up to 38,4 kBaud	Up to 38,4 kBaud
Handshake RTS & CTS	Handshake RTS & CTS
Tranparent mode	Tranparent mode

Axioline E

General data

- 6 networks
- More than 70 modules
- Plastic and metal housings
- Protection rating: IP65 / IP67
- -25°C … 60°C

Axioline E

Features

Power M12 for 2x24V DC

Network or bus interface

Network diagnostics LEDs

Color coded connector inserts

Different mounting options

Various marking options

Status and diagnostics LEDs

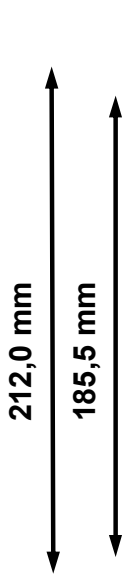
Unique numbering of connection points

Speedcon Technology

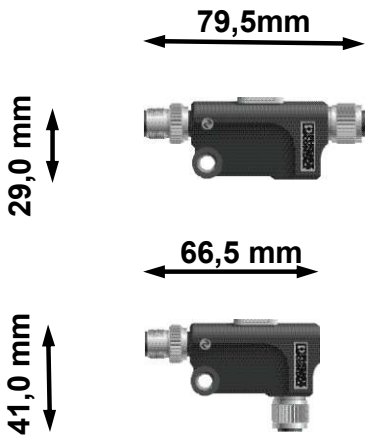
Axioline E

Housings

Metal	Plastic	Converter
Digital I/Os and IO-Link master	Digital I/Os and IO-Link master	IO-Link Analogue converter



Depth: 30,5 mm
(main housing: 20 mm)



Depth: 16,6 mm

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Axioline E

Portfolio

	Digital inputs	Digital inputs and outputs		Configurable digital in- / outputs	IO-Link and digital inputs	Analogue inputs	Analogue outputs	Temperature inputs
	16 channel	8 channel/ 8 channel	8 channel/ 4 channel, 2A	16 channel	8 channel 4 channel			
PROFIBUS								
PROFINET								
EtherNet/IP								
Modbus								
EtherCAT								
sercos the automation bus								
						0 – 10V 4 – 20mA	0 – 10V 4 – 20mA	RTD
IO-Link								

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Axioline E

IO-Link

- Master-module with 8 IO-Link ports
- Point to point connection
- Supply and communication via a single, unshielded sensor cable
- IO-Link devices for analogue in- and outputs and for temperature sensors and digital in- and outputs

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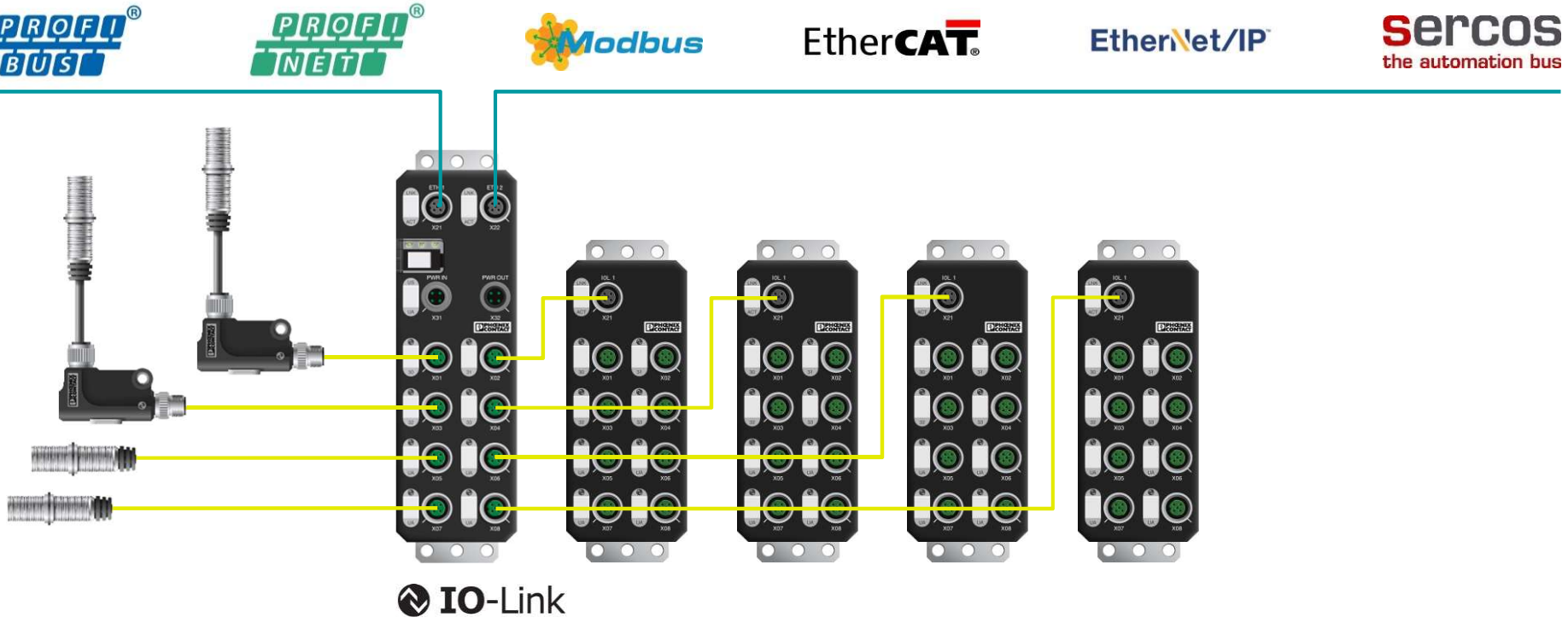
Axioline E

Modular I/O station



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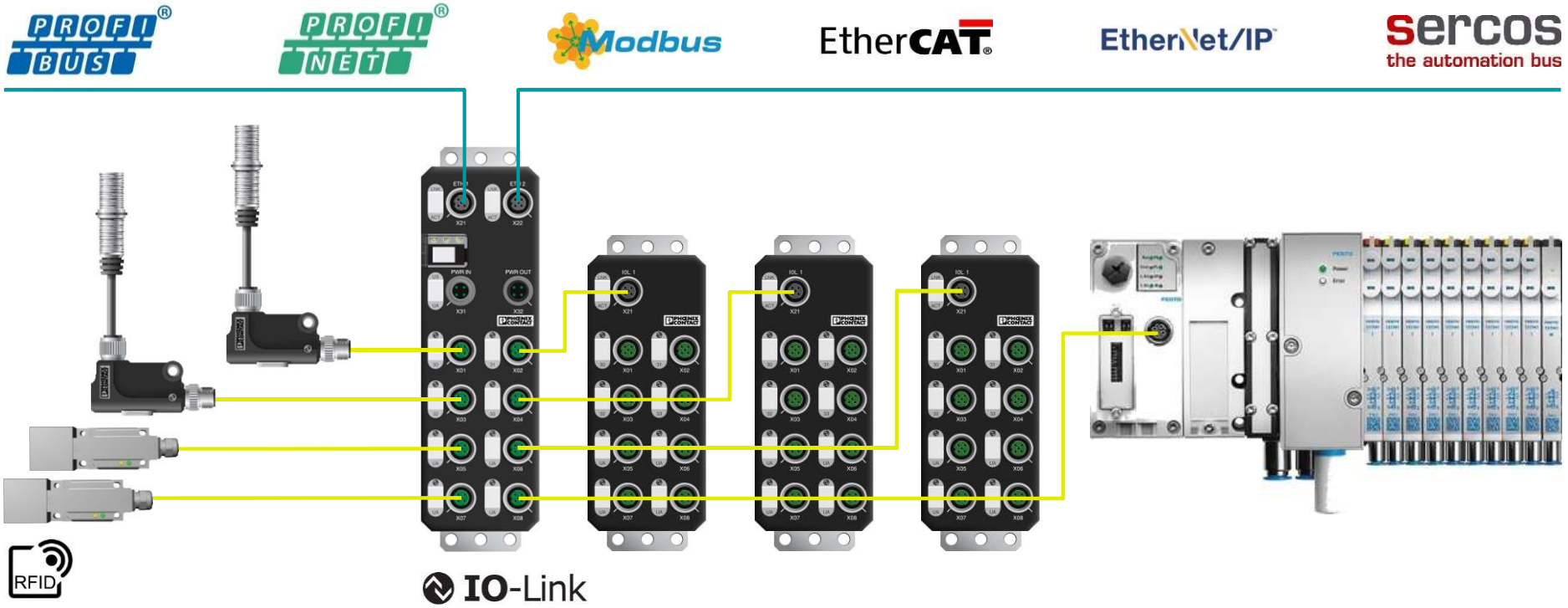
Axioline E

3rd party device integration



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The
Modular Automation System

IT‘S YOUR CHOICE

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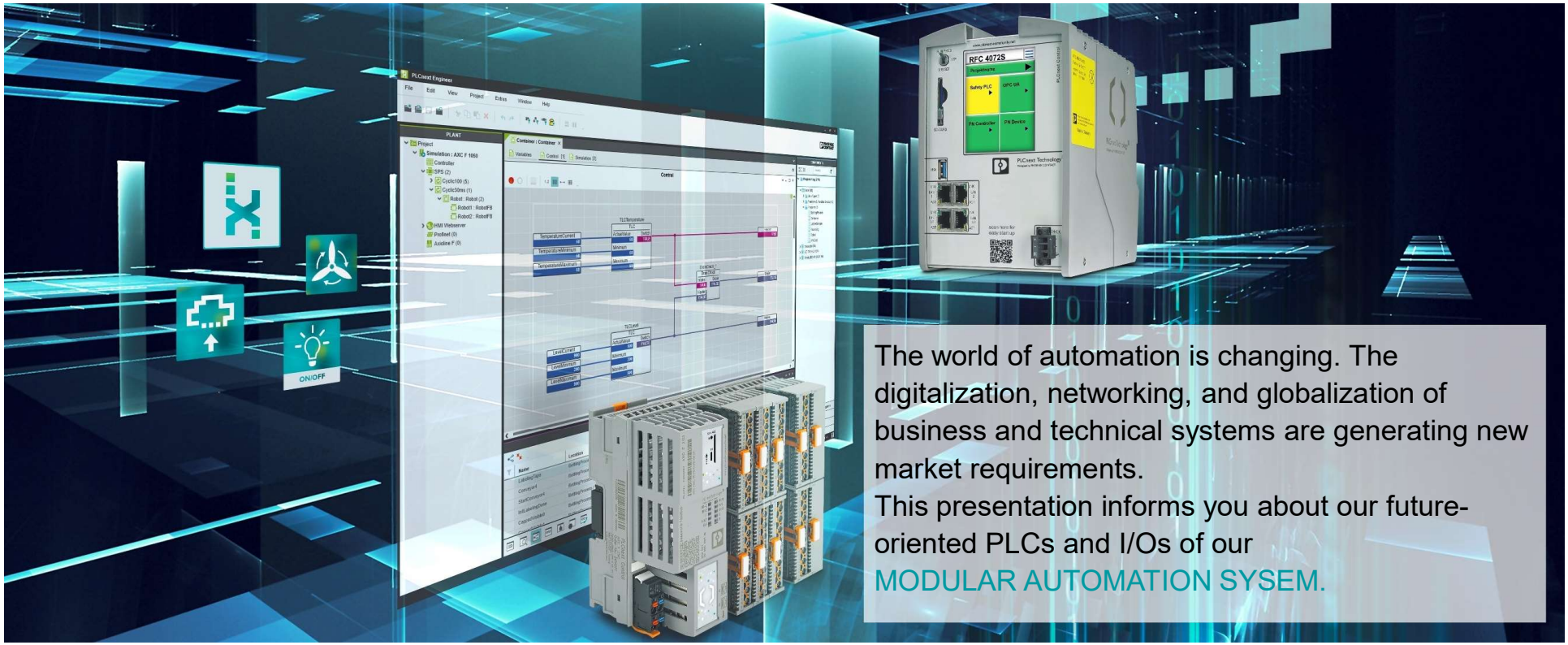
The modular automation system: basic idea

Open to the future



The world of automation is changing. The digitalization, networking, and globalization of business and technical systems are generating new market requirements.
This presentation informs you about our future-oriented PLCs and I/Os of our MODULAR AUTOMATION SYSEM.

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The modular automation system: basic idea

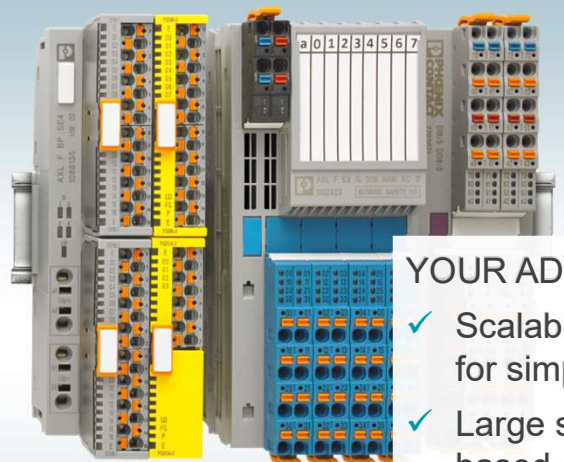
Modular automation system

Controllers

PLCs for high-level languages and IEC 61131-3 programming.

Bus couplers

Open to all common bus systems and network protocols.



I/Os

Modules with digital and analog inputs and outputs, functions or for special applications.

YOUR ADVANTAGES

- ✓ Scalable automation system for simple to complex tasks
- ✓ Large selection of modules based on the modular principle
- ✓ Systemic configuration to different networks using various front modules

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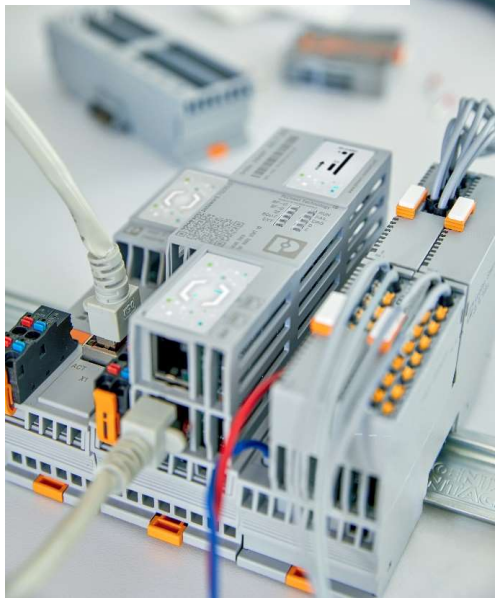
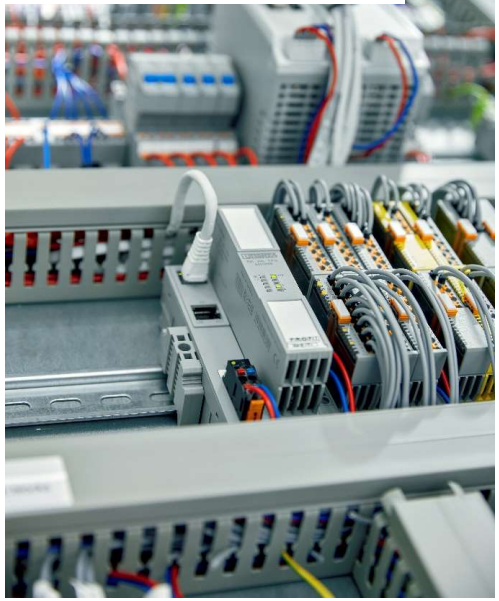
Details of each „discipline“

CONTROLS



BUS COUPLERS



I/Os

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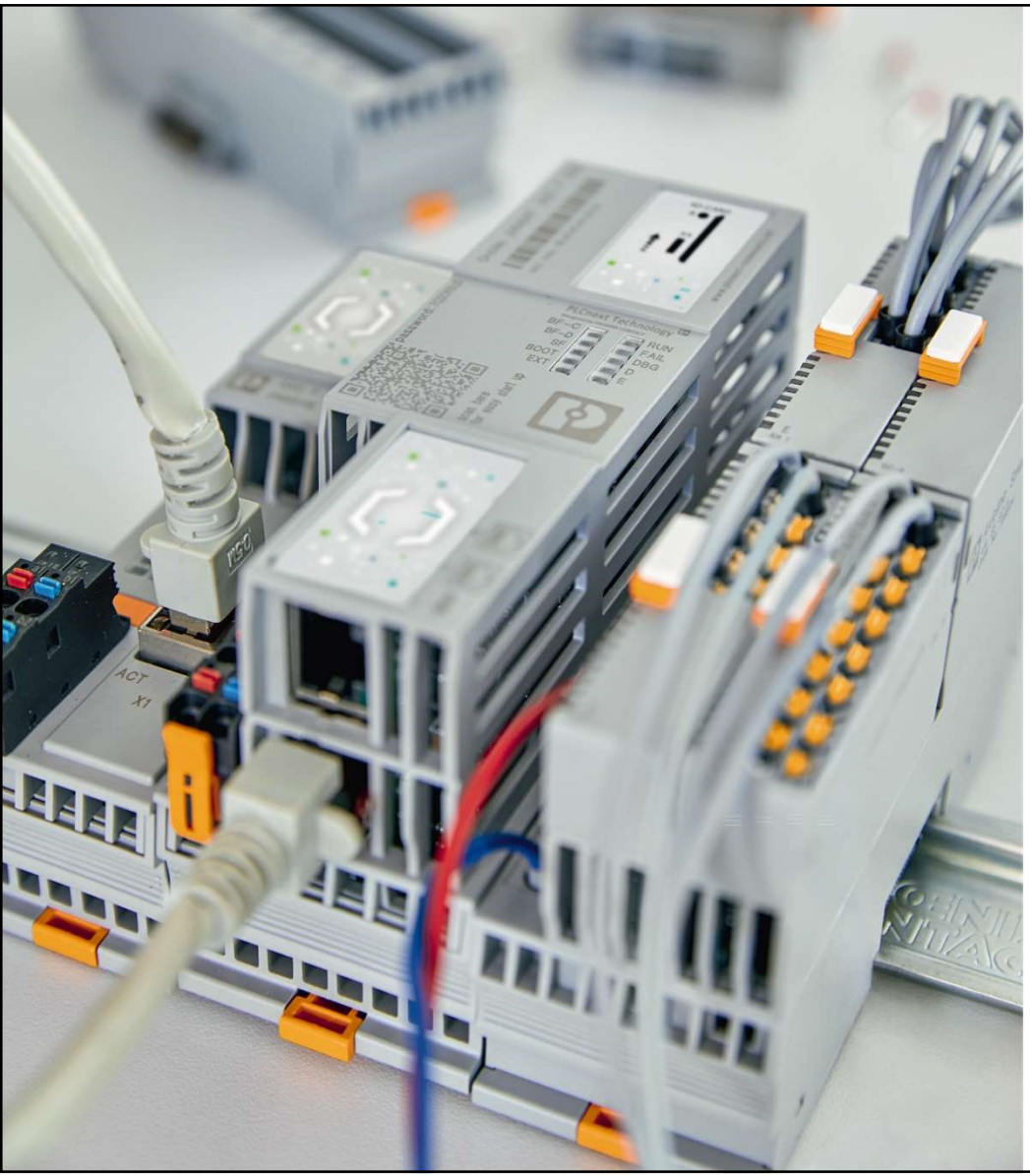
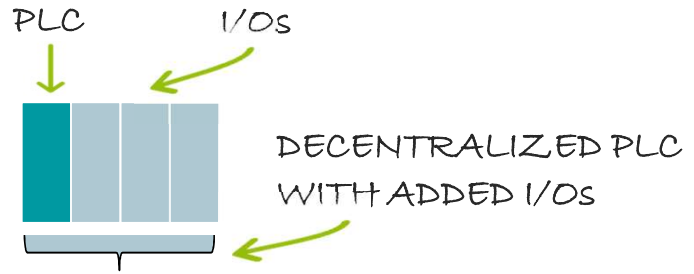


Controllers

PLCs for numerous applications

“PLCs for the open PLCnext Technology ecosystem are available in the form of PLCnext Control devices. They enable the implementation of automation projects without the limitations of proprietary systems.”

PLC in a modular I/O system



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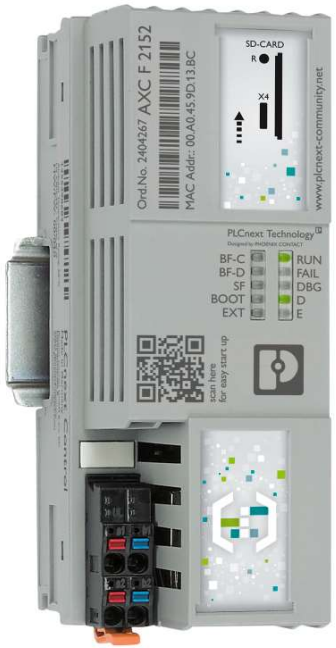
PLCnext Control

Portfolio overview - controllers



FOR BEGINNERS	STANDARD OPTION	HIGHER PERFORMANCE
AXC F 1152	AXC F 2152	AXC F 3152
8 tasks, 16 PN devices	32 tasks, 64 PN devices	32 tasks, 128 PN devices
ALL DETAILS	ALL DETAILS	ALL DETAILS

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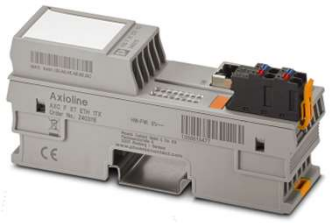
PLCnext Control

Portfolio overview - extensions



ETHERNET PORT

AXC F XT ETH 1TX

ALL DETAILS

INTERBUS MASTER

AXC F 2152

ALL DETAILS

INLINE ADAPTER

AXC F IL ADAPT

ALL DETAILS

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PLCnext Control

Easy expansion

“Expand the functions of your PLCnext Control device with an Ethernet or INTERBUS module that can be aligned to the left of the controllers (AXC F 2152 or AXC F 3152).”

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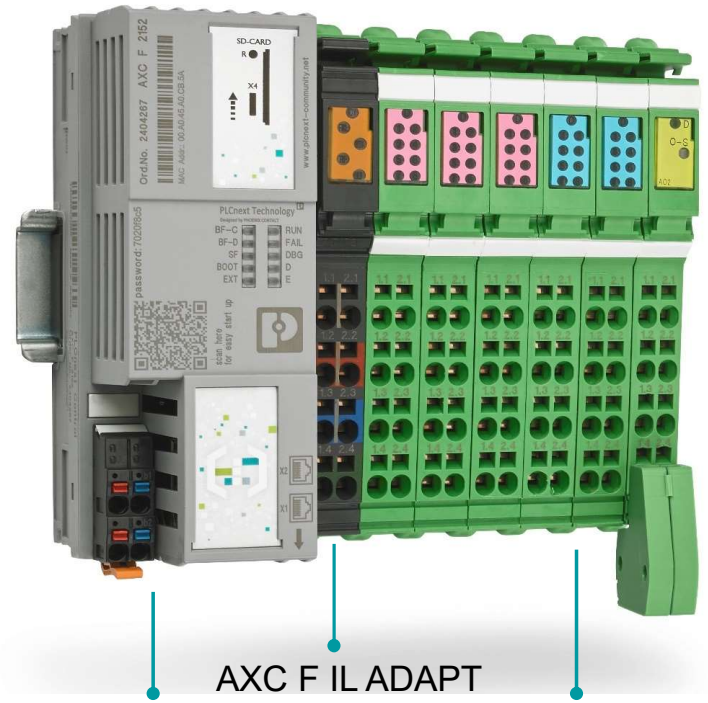
PLCnext Control

(Retro-)fit for the future

“The Inline I/O system and PLCnext Technology fit together!

The Inline adapter terminal (AXC F IL ADAPT 1020304) allows you to easily extend an existing I/O station with a PLCnext Control device, thereby enabling the successive modernization of an existing system.”



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PLCnext Control

Store

“ In the PLCnext Store, you can download ready-to-use solutions to your PLCnext Control device and create your application quickly – without any deep understanding of programming. Phoenix Contact already provides numerous software libraries for PLCnext Engineer which are now available for download. ”

LINK TO THE PLCnext Store

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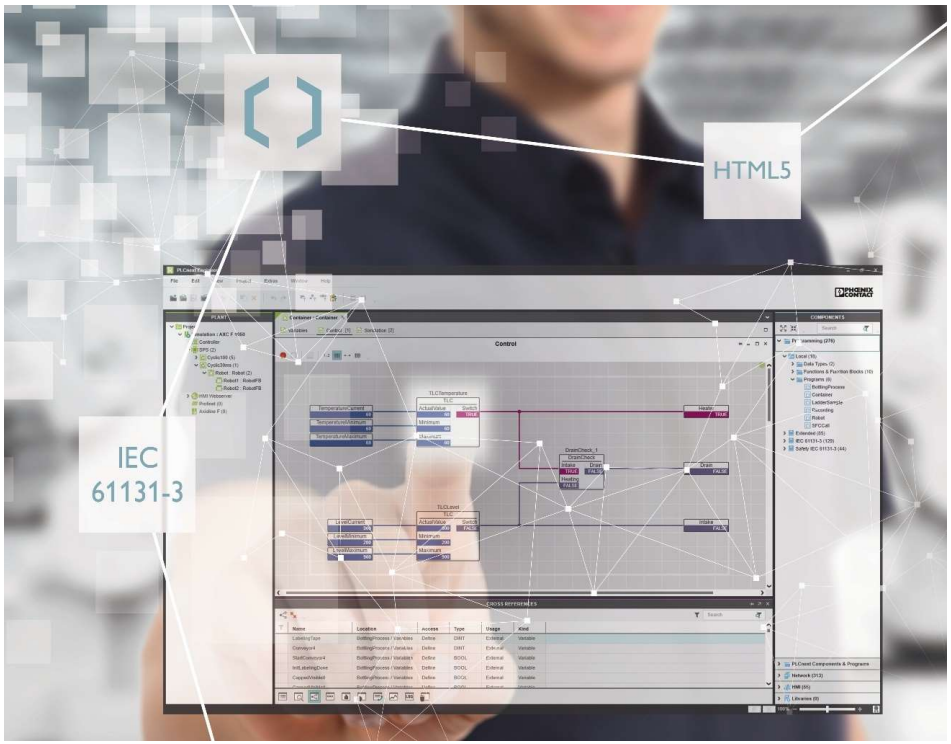
Controls

Function blocks

“You can easily integrate numerous functions into your system without programming effort, like:

- IT functionality
- Remote control functions
- SQL connection
- Control technology
- Industry-specific solutions

All available function blocks can be found by on our website.”



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Conventional PLCs

Portfolio overview - controllers

STANDARD PLC	PLC WITH ENHANCED PERFORMANCE
AXC 1050 + XC	AXC 3050
2 Ethernet interfaces	3 Ethernet interfaces
ALL DETAILS	ALL DETAILS

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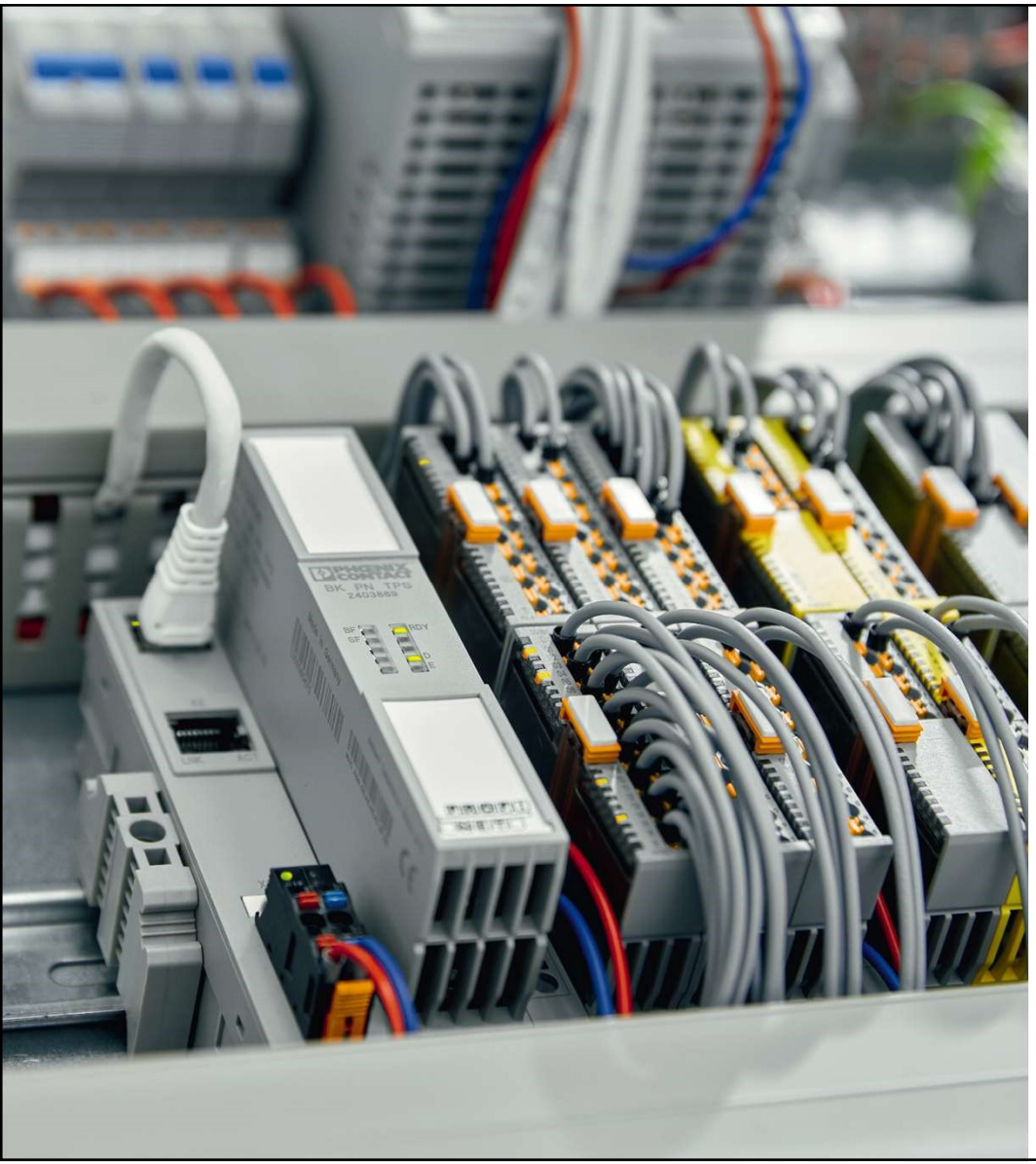
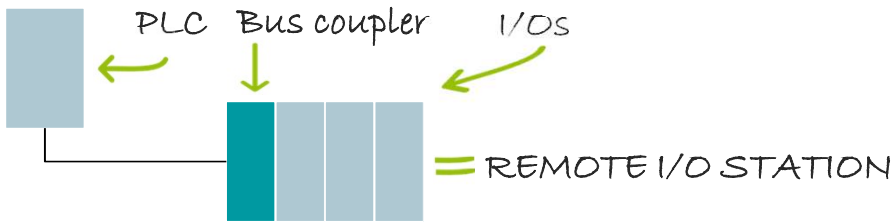


Bus coupler

Connect to various networks

“Use bus couplers to integrate all the I/Os of the modular automation system into your existing Ethernet network or bus system. The bus coupler opens up a local bus for up to 63 further I/Os.”

Bus coupler for a remote I/O soulution



PHOENIX CONTACT
INSPIRING INNOVATIONS

Bus coupler

Portfolio overview

MORE FLEXIBILITY IN YOUR AUTOMATION

- Bus couplers for all relevant communication protocols
- Links the I/O system into your network
- Opens up a local bus for up to 63 further devices

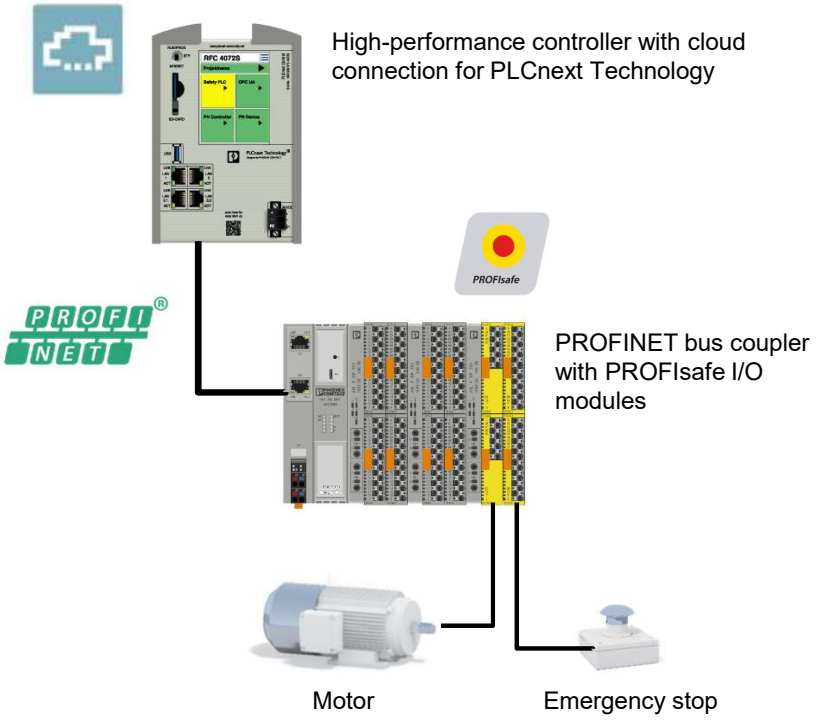
+ XC	+ XC			+ XC		
PROFINET	PROFIBUS	EtherCAT	EtherNet/IP	Modbus	sercos the automation bus	IEC 61850
PN	PB	EC	EIP	ETH	S3	SAS
ALL DETAILS	ALL DETAILS	ALL DETAILS	ALL DETAILS	ALL DETAILS	ALL DETAILS	ALL DETAILS

PHOENIX CONTACT
INSPIRING INNOVATIONS

Bus coupler

Safety in the system

“Implement PROFIsafe solutions systemically in PROFINET networks. This can be easily done through the lower-level connection of PROFINET bus couplers with PROFIsafe I/O modules to a Phoenix Contact PROFIsafe controller.”

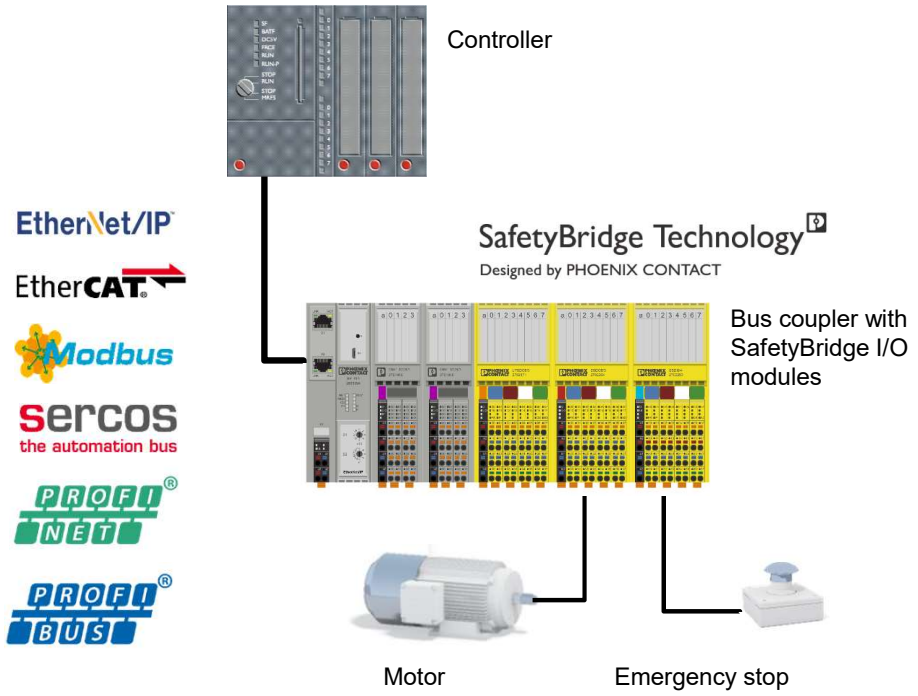


PHOENIX CONTACT
INSPIRING INNOVATIONS

Bus coupler

SafetyBridge Technology

“Use bus couplers to integrate I/Os into all common ethernet networks and bus systems. SafetyBridge Technology enables the network- and controller-independent implementation of safety applications – even without a safety controller.”

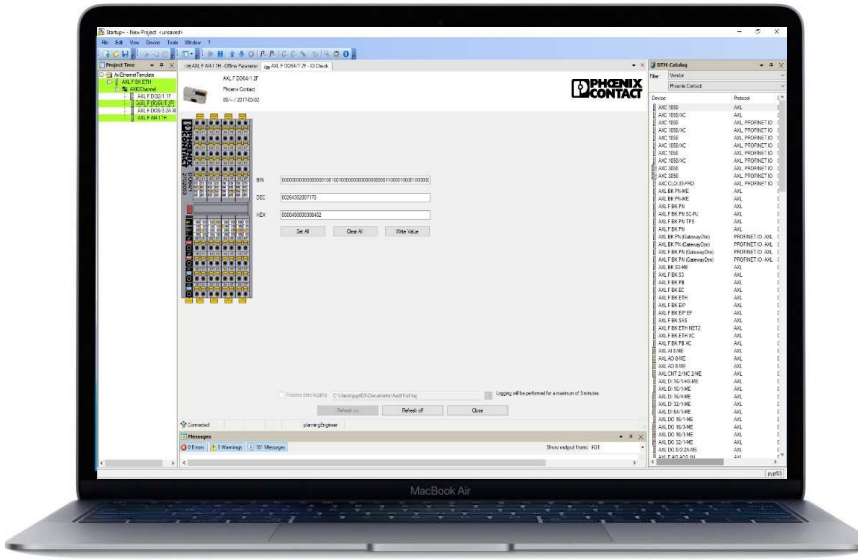


PHOENIX CONTACT
INSPIRING INNOVATIONS

Bus coupler

Easy offline parameterization - Startup+

“The Startup+ software is specifically designed for the Axioline F I/O system. Each bus coupler provides an interface for the data exchange with the software.”



Your benefits

- Easily check the wiring of the Axioline F I/O station
- Parameterization of the I/O modules used
- Comprehensive diagnostics during operation

AVAILABLE AS FREE DOWNLOAD !

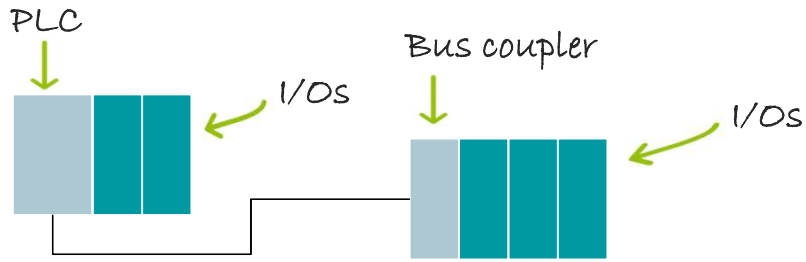
PHOENIX CONTACT
INSPIRING INNOVATIONS

I/Os

Combine I/Os flexibly

“The versatile IP20 range, which can be combined flexibly, provides reliable protection for your data and signal traffic, allowing you to design your systems for every possible area of application.”

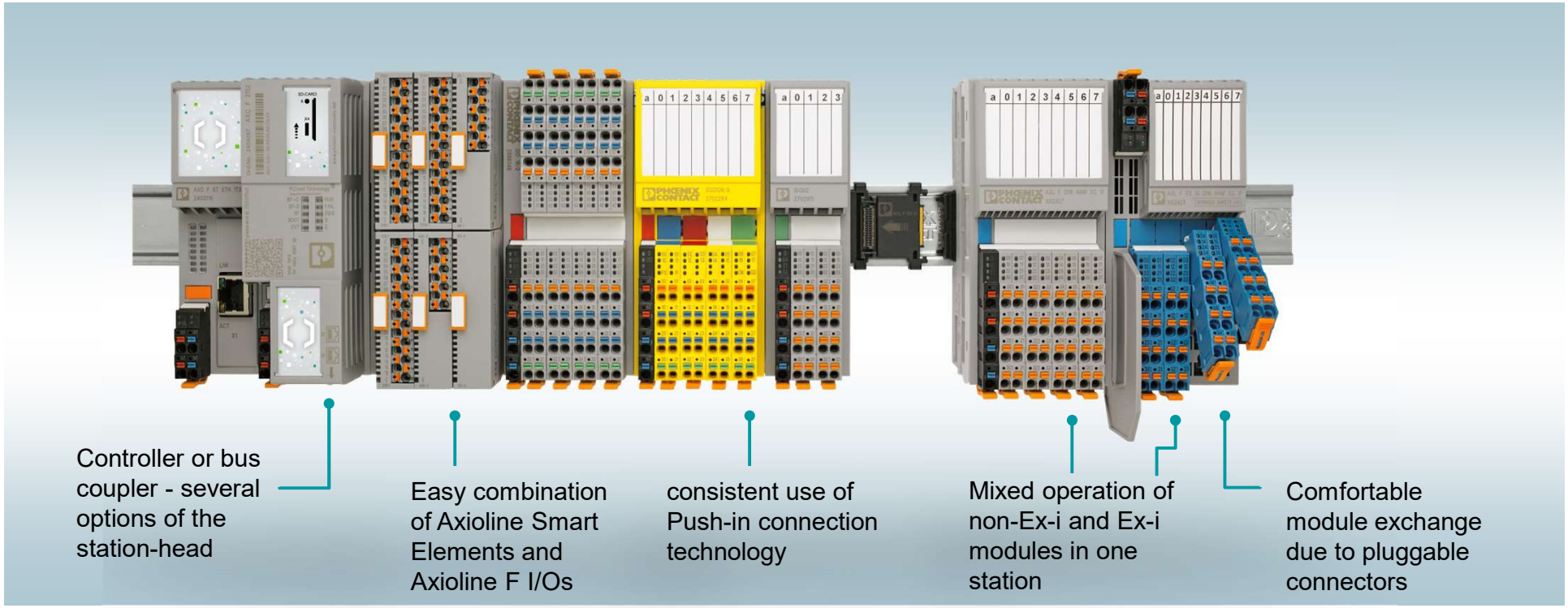
I/Os combined with a PLC or a bus coupler



PHOENIX CONTACT
INSPIRING INNOVATIONS

I/Os

Modularity in the system

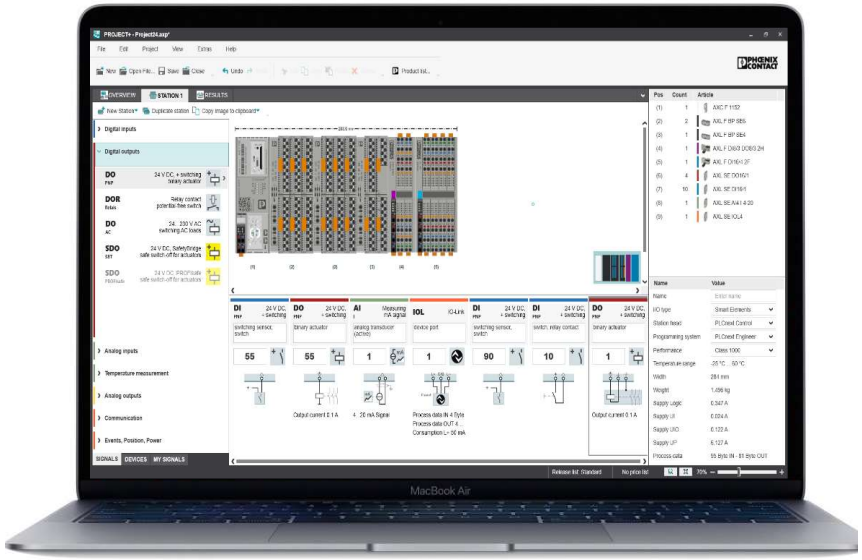


PHOENIX CONTACT
INSPIRING INNOVATIONS

I/Os

Configuration for I/Os - Project+

“With no training required, you can create a functional station in accordance with your specifications very quickly with Project+.”



Your benefits

- Configuration software for fast I/O station planning
- Easily create custom I/O stations that are technically correct
- The signal requirements and structure plan at a glance

AVAILABLE AS FREE DOWNLOAD !

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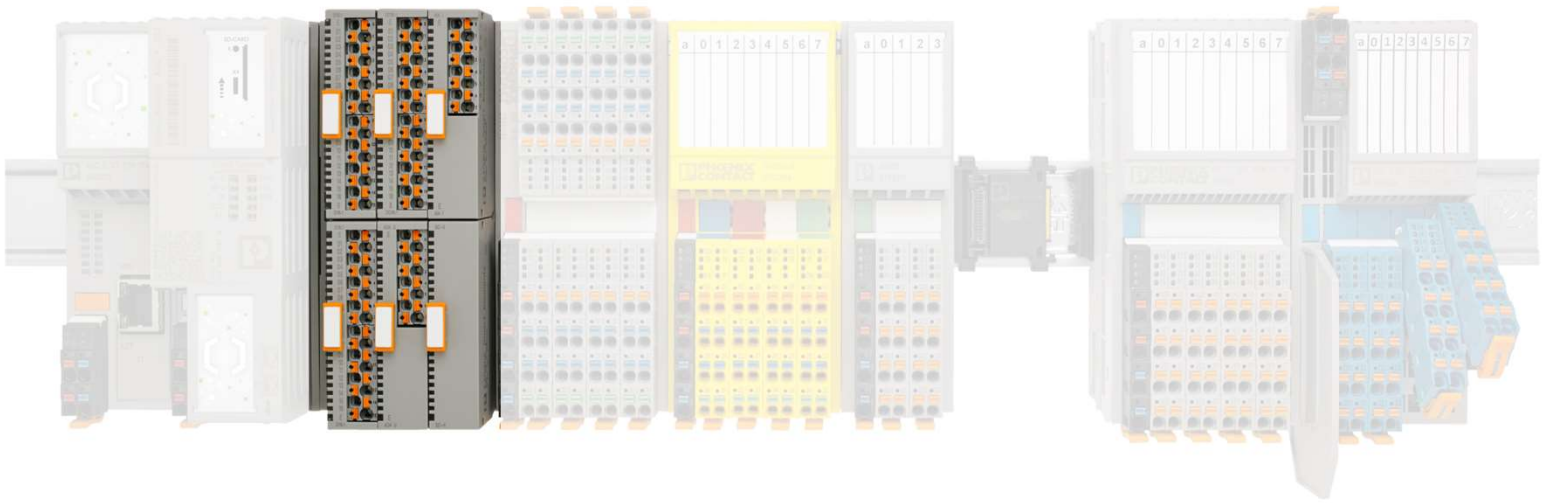
INSPIRING INNOVATIONS



AXIOLINE SMART ELEMENTS

PHOENIX CONTACT
INSPIRING INNOVATIONS

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

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline Smart Elements

Compact and flexible

COMPACT

8 or 16 connection points on a small footprint of 15 mm x 62 mm

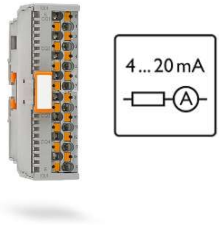
SYSTEM-INDEPENDENT

Due to the system-independent interface the elements can be used universally with specific backplanes

EASY HANDLING

Push-in technology and the toolfree unlook-mechanism reduce installation efforts

FAST START-UP



One function per module and few parameters to be set guarantee fast commissioning

PHOENIX CONTACT
INSPIRING INNOVATIONS

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

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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

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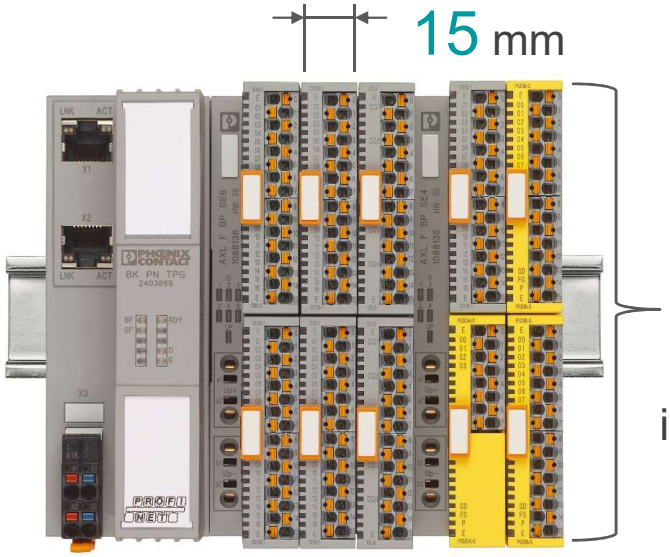
Axioline Smart Elements

Compact and flexible I/O solution



Up to
32
I/O channels
in ONE column

EXTREMLY COMPACT

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

PHOENIX CONTACT
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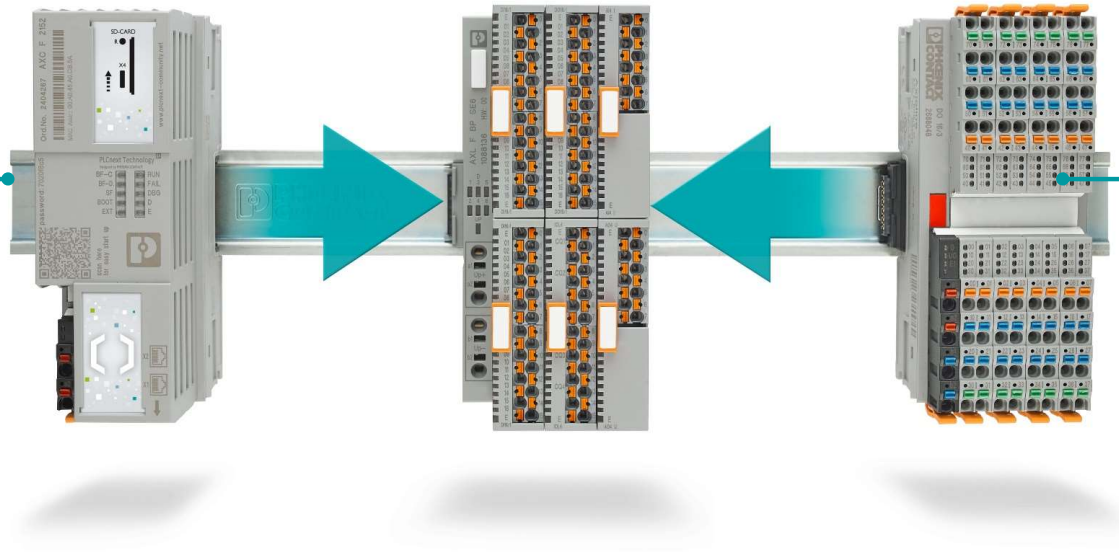
Axioline Smart Elements

Full compatibility

All Axiocontrols

All bus couplers



All Axioline F I/Os

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

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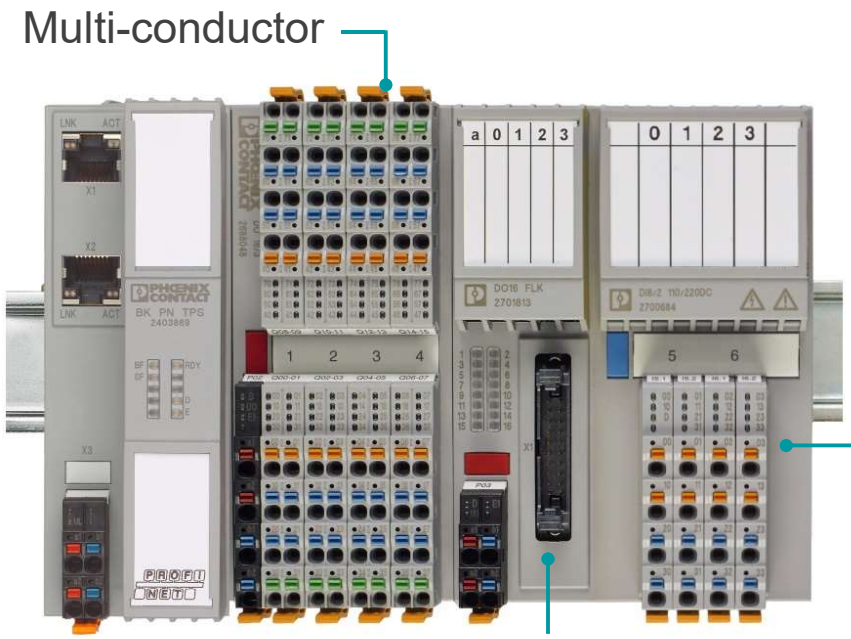
AXIOLINE F: Standard I/O modules

PHOENIX CONTACT
INSPIRING INNOVATIONS

Various connection methods



VERSATILE CONNECTABLE

Axioline F impresses with its versatile connection methods. Just as you need it.

I/Os

Functions for every application

IEC 61850

SafetyBridge Technology
Designed by PHOENIX CONTACT

IO-Link

LAGRE RANGE OF I/Os

“Axioline F is a modular I/O system designed to meet every requirement and it offers a large range of I/O modules with digital and analog inputs and outputs, functions or for special applications. Implement safety applications with PROFIsafe or SafetyBridge Technology.”

DIGITAL | ANALOG | FUNCTION | SAFETY

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I/Os

Designed to meet every requirement

OPTIMUM PERFORMANCE

Update time of 1 µs per I/O module in the local bus

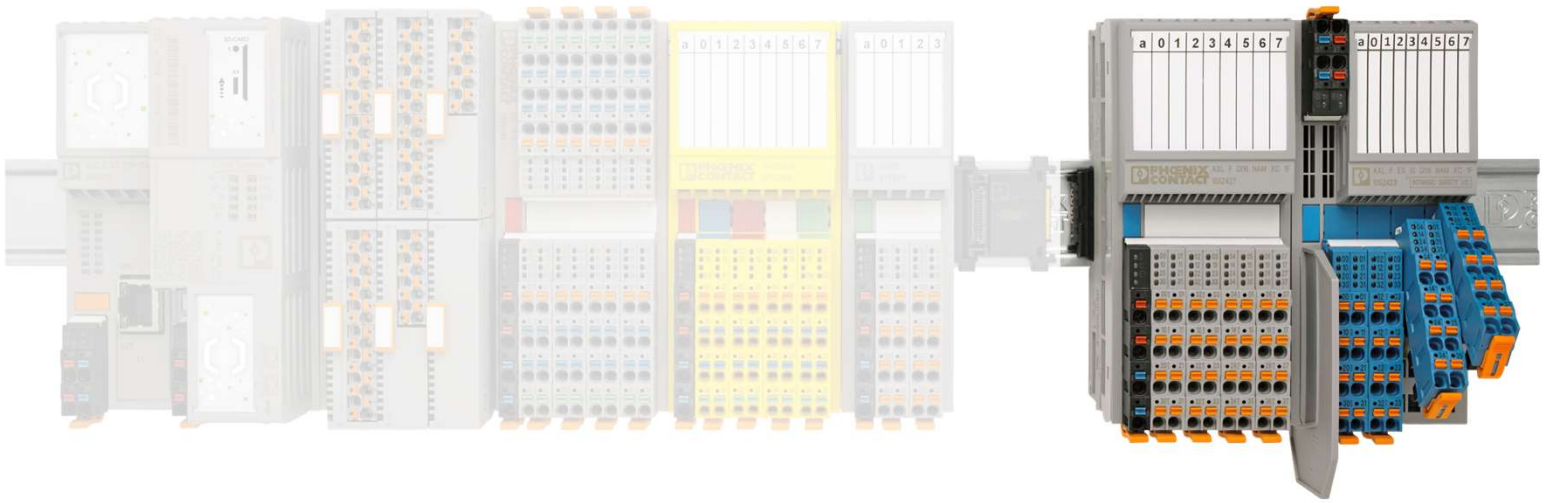
QUICK INSTALLATION

Push-in connection and clear wiring shortens installation times

ROBUST MECHANICAL DESIGN

Axioline F offers high shock and vibration resistance

PHOENIX CONTACT
INSPIRING INNOVATIONS



AXIOLINE F: Modules for special environment

PHOENIX CONTACT
INSPIRING INNOVATIONS

Extended temperature range

RELIABLE AT EXTREME TEMPERATURES

“In harsh environments, reliable communication is essential. Axioline F features a particularly robust mechanical design.

The XC versions with an extended operating temperature range from -40°C to +70°C and coated printed circuit boards are ideal for use under extreme conditions.”

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Approvals for marine automation

RELIABLE WITHOUT INTERFERENCE

“Due to their advantageous properties, the I/O modules have been approved by all major marine classification societies. With its low noise emission and robust mechanical design, Axioline F satisfies the stringent requirements for automation in shipbuilding.”

PHOENIX CONTACT
INSPIRING INNOVATIONS

Intrinsically safe I/Os

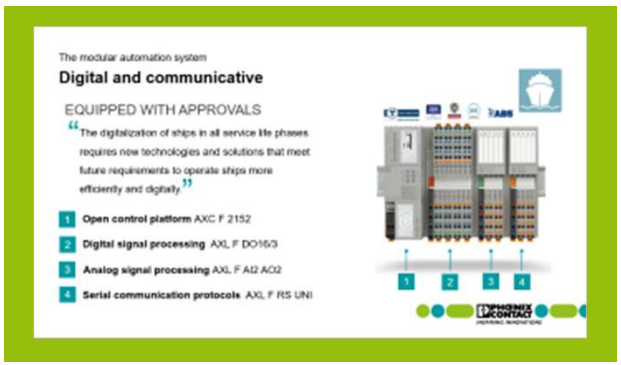
RELIABLE UP TO ZONE 0

“The intrinsically safe I/O modules can be installed in zone 2 and are suitable for the use of sensors and actuators up to zone 0. They feature HART communication and NAMUR functionality, making them particularly suitable for applications in process automation.”

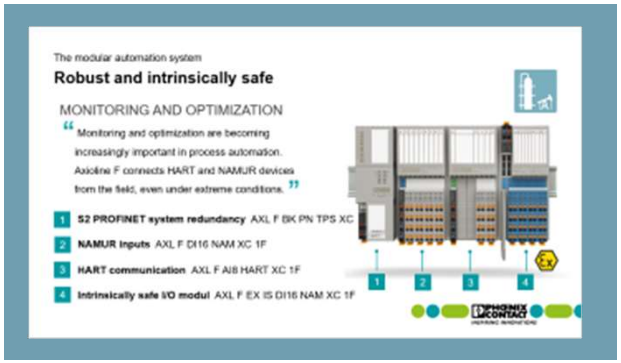
PHOENIX CONTACT
INSPIRING INNOVATIONS

The modular automation system

The right automation solution for every requirement



Click on the tiles to see four possible solution for different use cases which can be created using our Modular automation system.



PHOENIX CONTACT
INSPIRING INNOVATIONS

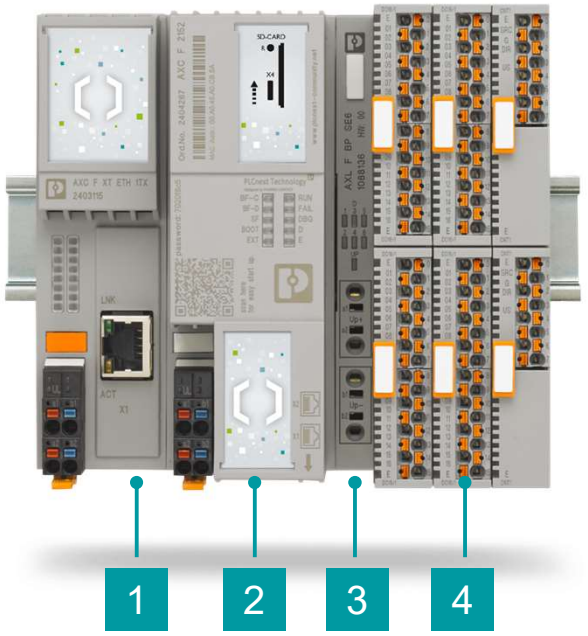
The modular automation system

Some solutions

OPEN AND FUTUREPROOF

“Create a compact I/O solution with Axioline Smart Elements and a PLCnext Control. Use parallel programming such as IEC 61131-3 or high-level-languages and easy access to cloud services.”

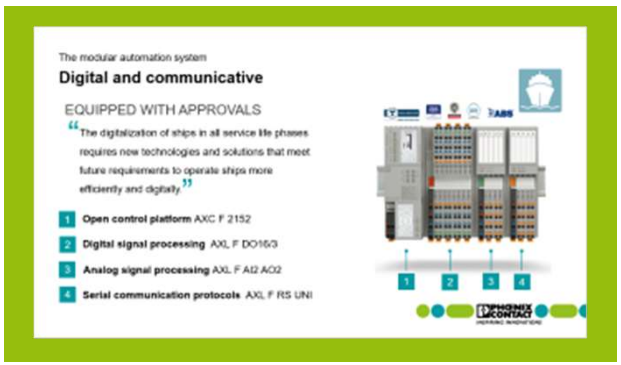
1. **Functional expansion of the PLC** AXC F XT ETH 1TX
2. **Open control platform** AXC F 2152
3. **Backplane for Axioline Smart Elements** AXC F BP SE6
4. **Digital signal processing** AXL SE DI16/1



PHOENIX CONTACT
INSPIRING INNOVATIONS

The modular automation system

The right automation solution for every requirement



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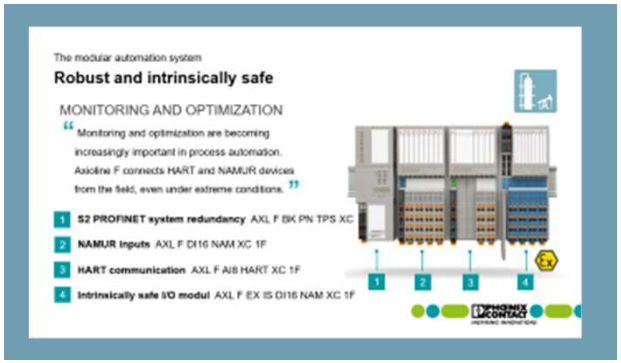


PHOENIX CONTACT
INSPIRING INNOVATIONS

The modular automation system

Some solutions

NUMEROUS POSSIBILITIES

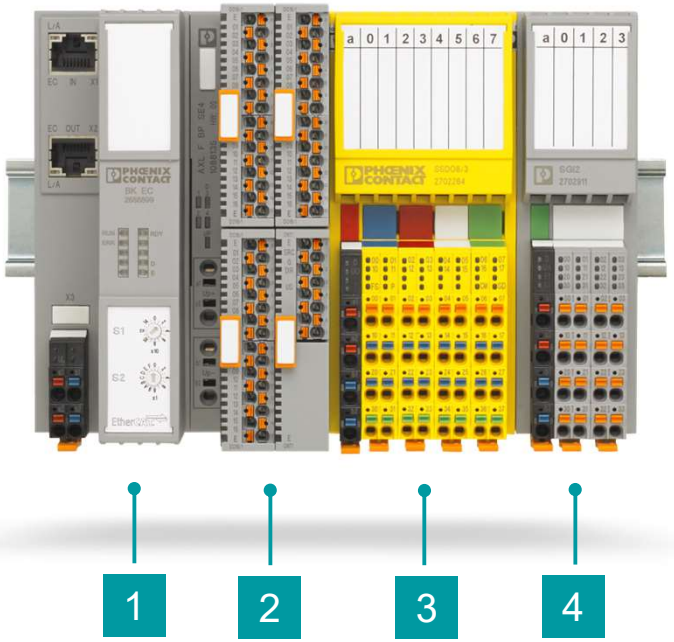
“Many machine variants require a high degree of flexibility with respect to the station structure and a wide range of function modules. Axioline F offers many products to provide an optimal solution for this type of application.”

1 **EtherCAT communication** AXL F BK EC

2 **Digital signal processing** AXL SE DO16

3 **SafetyBridge Technology** AXL F SSDO8/3

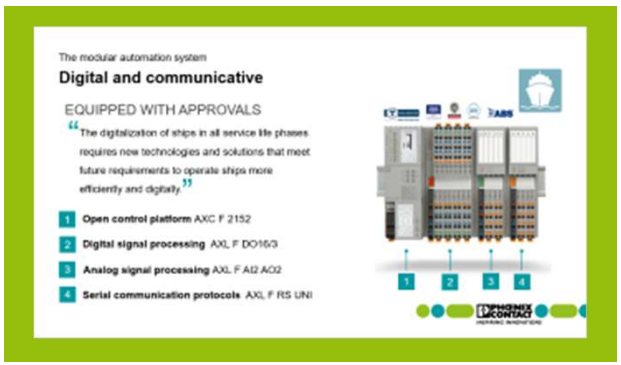
4 **Connection of strain gauge** AXL F SGI2



PHOENIX CONTACT
INSPIRING INNOVATIONS

The modular automation system

The right automation solution for every requirement



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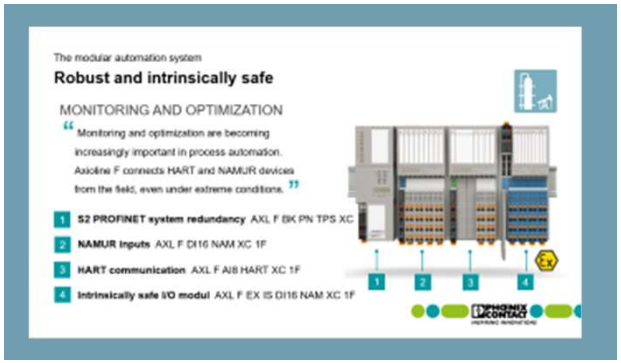

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INSPIRING INNOVATIONS

The modular automation system

Digital and communicative

EQUIPPED WITH APPROVALS

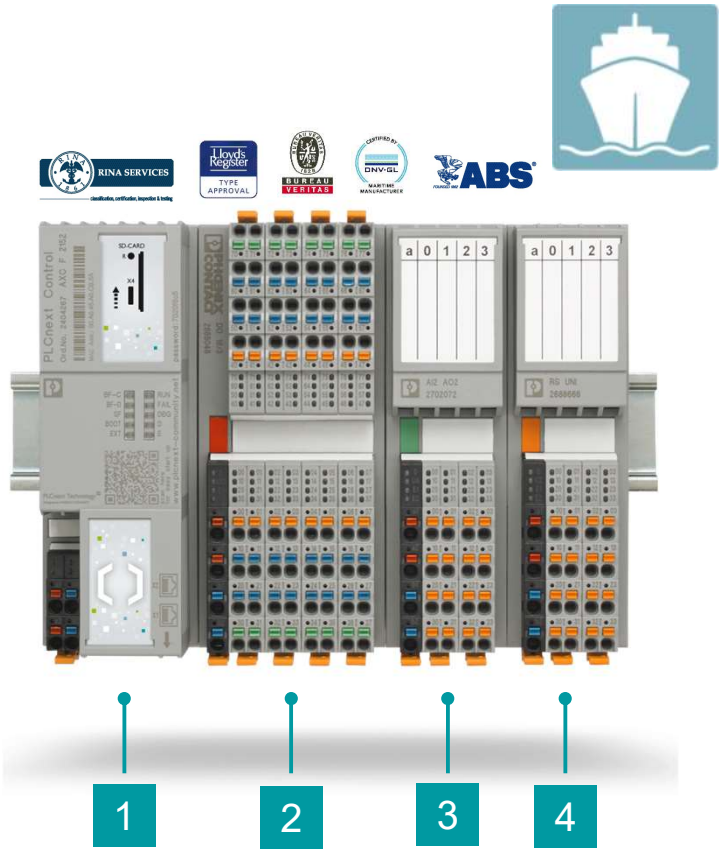
“The digitalization of ships in all service life phases requires new technologies and solutions that meet future requirements to operate ships more efficiently and digitally.”

1 **Open control platform** AXC F 2152

2 **Digital signal processing** AXL F DO16/3

3 **Analog signal processing** AXL F AI2 AO2

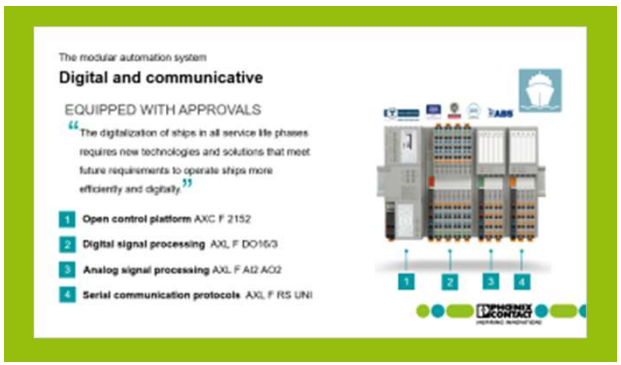
4 **Serial communication protocols** AXL F RS UNI



PHOENIX CONTACT
INSPIRING INNOVATIONS

The modular automation system

The right automation solution for every requirement



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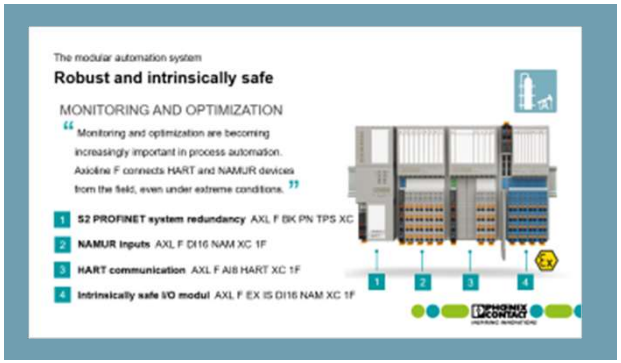


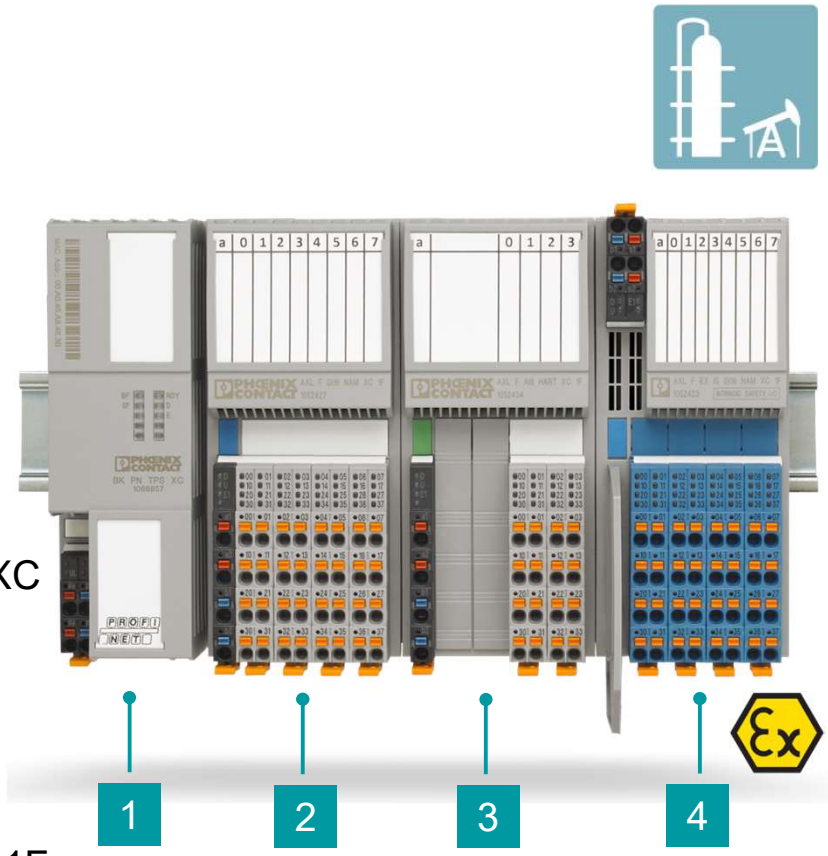
PHOENIX CONTACT
INSPIRING INNOVATIONS

The modular automation system

Robust and intrinsically safe

MONITORING AND OPTIMIZATION

“Monitoring and optimization are becoming increasingly important in process automation. Axioline F connects HART and NAMUR devices from the field, even under extreme conditions.”



1 **S2 PROFINET system redundancy** AXL F BK PN TPS XC

2 **NAMUR inputs** AXL F DI16 NAM XC 1F

3 **HART communication** AXL F AI8 HART XC 1F

4 **Intrinsically safe I/O modul** AXL F EX IS DI16 NAM XC 1F

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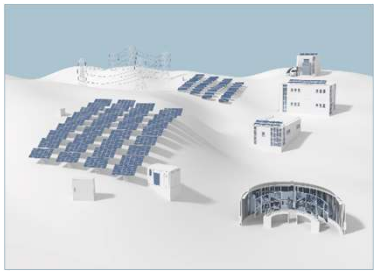
INSPIRING INNOVATIONS

Scope of applications

IP20 I/O Systems


SIMPLE APPLICATIONS COMPLEX





IO-Link IO-Link HART COMMUNICATION PROTOCOL HART COMMUNICATION PROTOCOL

MODULAR AUTOMATION SYSTEM

PHOENIX CONTACT
INSPIRING INNOVATIONS

I/O-Systems

SALES TECHNICAL

Agenda

- Axioline P Proxy update
- Axioline P I/O
- Axioline F XC I/O
- PC World
- Homework
- Webinars

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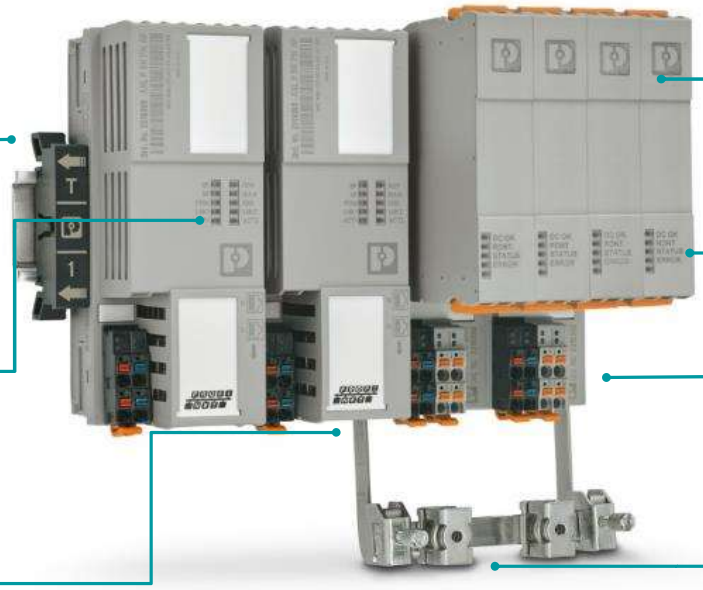
INSPIRING INNOVATIONS

Proxy Update

Key Elements

Axioline P Proxy

TECHNICAL



Terminator required at end of each assembly

High Power Trunk in pluggable Simplex or Redundant format

Status LEDs on Power modules

Network and Diagnostics LEDs

ISA G3-tested

Two PROFINET ports

Shielding of PROFIBUS-PA segments

Modular design with user-friendly GSDML Composer software to make setup easy
Designed to support PROFINET R1 & R2 in future

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INSPIRING INNOVATIONS

Axioline P with High Availability I/O

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INSPIRING INNOVATIONS

Key Elements

Axioline P I/O modules

TECHNICAL

- Power supply and I/O are combined in the module – no separate I.S. power supply is needed
- Additional modules can be added or removed without interrupting power to installed modules

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INSPIRING INNOVATIONS

Part Numbers

SALES

Axioline P I/O Modules

Order Number	Designation	Type	Function description
1052429	AXL P AI8 HART 1F	AI	HART Analog input, 8 channels
1052431	AXL P EX IS AI8 HART 1F	AI	Intrinsically Safe HART Analog input, 8 channels
1087079	AXL P AO4 HART 1F	AO	HART Analog output, 4 channels
1087082	AXL P EX IS AO4 HART 1F	AO	Intrinsically Safe HART Analog output, 4 channels
1052416	AXL P DI16 NAM 1F	DI	NAMUR Digital input, 16 channels
1052417	AXL P EX IS DI16 NAM 1F	DI	Intrinsically Safe NAMUR Digital input, 16 channels
1087078	AXL P EX IS DO4 SD 21-60 1F	DO	Intrinsically Safe Digital Output Solenoid Driver, 4 channels, 60 mA
1087077	AXL P EX IS DO4 SD 24-48 1F	DO	Intrinsically Safe Digital Output Solenoid Driver, 4 channels, 48 mA
1100201	AXL F/P IO EX PP	Barrier	Partition Plate to separate non- and Intrinsically Safe I/O Modules

Industries & Applications

Areas of application

SALES

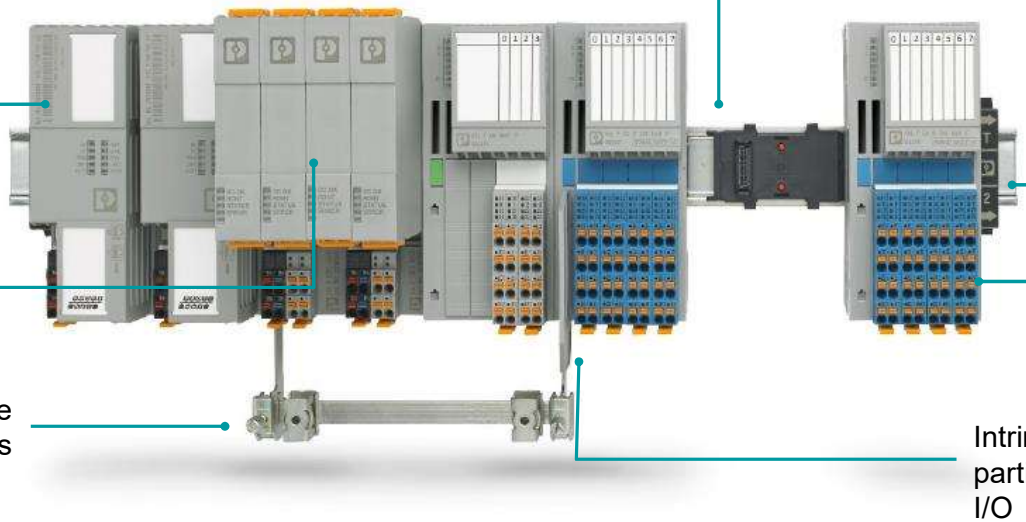
- Chemical
- Food & Beverage
- Oil & Gas
- Marine & Off-shore
- Powder and Liquids
- Distillation & Fermentation
- Fuel Storage & Transfer
- Carbon- and Bio-based Fuels

• Any Application requiring High Availability and Redundancy – coupled with **Hot Swap**, and operational upgrades and dynamic reconfiguration

Key Elements

Axioline P Portfolio

TECHNICAL



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Summary

Axioline P I/O

SALES

- *Key topics to remember:*
- PROFINET Control from DCS **ABB 800xA** or **Siemens PCS 7**, or **Siemens S7-1500** with **S2**
- Hot-Swap
- Integrated Power to the I/O modules from the backplane
- Analog HART Input and Output
- NAMUR Digital Inputs
  (aka Supervised Inputs)

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INSPIRING INNOVATIONS

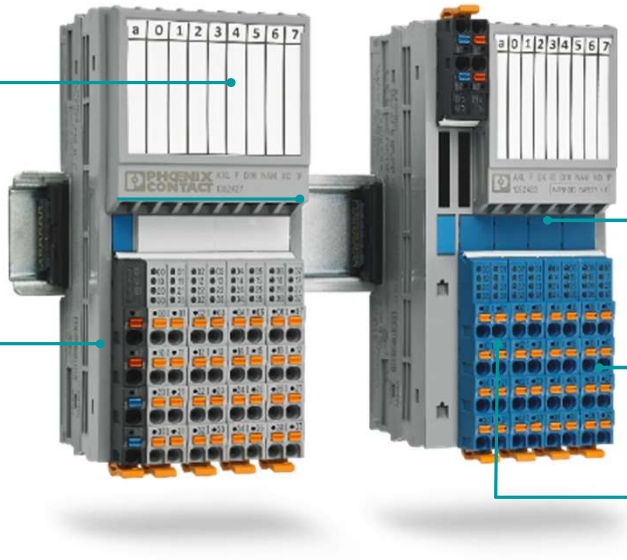
Axioline F with XC I/O

Key Elements

Axioline F XC I/O modules

TECHNICAL

All the Axioline F I/O attributes **plus** extreme condition temperature ratings, and IECEX / ATEX Zone 2 Certification



Channel I/O marker card

Power Supply Connector and I/O connector with status LEDs

Power supply connector and Intrinsically Safe I/O connections points are visibly separated from each other

Connection to Zone 0/1

Degree of protection IP20

PHOENIX CONTACT INSPIRING INNOVATIONS

Part Numbers

SALES

Axioline F XC I/O Modules

Order Number	Designation	Type	Function description
1052434	AXL F AI8 HART XC 1F	AI	HART Analog input, 8 channels
1052432	AXL F EX IS AI8 HART XC 1F	AI	Intrinsically Safe HART Analog input, 8 channels
1087080	AXL F AO4 HART XC 1F	AO	HART Analog output, 4 channels
1087081	AXL F EX IS AO4 HART XC 1F	AO	Intrinsically Safe HART Analog output, 4 channels
1052427	AXL F DI16 NAM XC 1F	DI	NAMUR Digital input, 16 channels
1052423	AXL F EX IS DI16 NAM XC 1F	DI	Intrinsically Safe NAMUR Digital input, 16 channels
1086902	AXL F EX IS DO4 SD 21-60 XC 1F	DO	Intrinsically Safe Digital Output Solenoid Driver, 4 channels, 60 mA
1086901	AXL F EX IS DO4 SD 24-48 XC 1F	DO	Intrinsically Safe Digital Output Solenoid Driver, 4 channels, 48 mA
1100201	AXL F/P IO EX PP	Barrier	Partition Plate for non- and Intrinsically Safe I/O Modules

Axioline F XC I/O Modules

Dimensional depth differences

TECHNICAL

The XC series of Axioline F modules in both I.S. and non I.S. are 23,2 mm higher than the regular Axioline F module.

77,1 mm

The regular depth of an Axioline F module is 54 mm. This module is used as reference since it shares the same 53,6 mm width and 126,1 mm height as the Hardened XC I/O series.

54 mm

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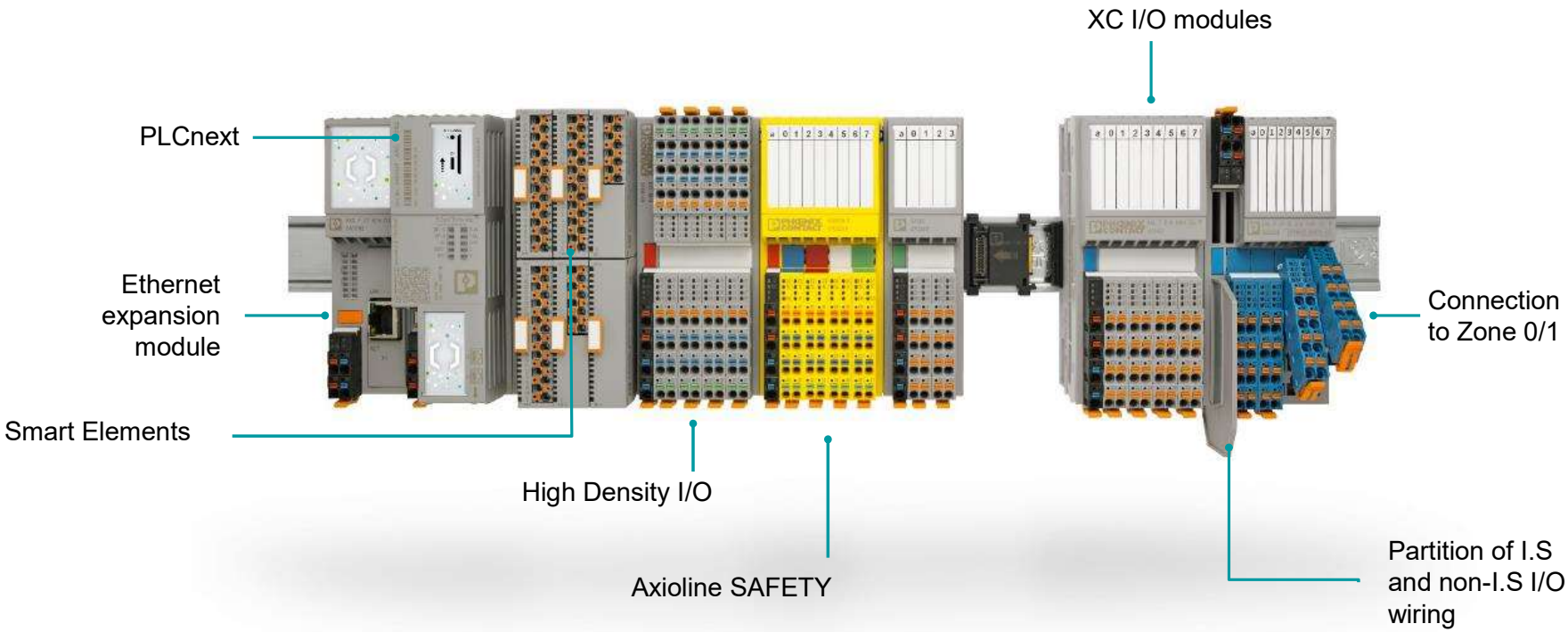
INSPIRING INNOVATIONS

Key Elements

Axioline F Portfolio



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INSPIRING INNOVATIONS

Summary

Axioline F XC I/O modules

SALES

- *Key Topics to Remember*
- PLCnext, all AxioControl and Bus Couplers
- Connectivity to IECEx / ATEX Zone 2 (grey)
- Connectivity to IECEx / ATEX Zone 0/1 (blue)
- NAMUR Digital Input
- Analog HART Input and Output
- All Vertical Markets

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INSPIRING INNOVATIONS

TECHNICAL

Key Features (1)

	Axioline P	Axioline F	Blue Inline
DI NAMUR	☑	☑	☑
AI HART	☑	☑	
DO	☑	☑	☑
AO HART	☑	☑	
Hot Swap	☑		
Integrated Power	☑		
PROFIBUS PA	☑		

TECHNICAL

Key Features (2)

	Axioline P	Axioline F
PROFINET	☑	☑
PLCnext Technology ™		☑
Standard Axioline I/O		☑
Axiocontrol		☑
EtherNet/IP		☑
Modbus TCP/IP		☑
Ethercat		☑

Visual & Technical Differences

TECHNICAL

Comparisons between XC I/O Modules

Axioline F XC I/O module

- Black Power Connector
- Partition Plate slots
- Interlocking backplane connectors in Axioline F

Axioline P I/O module

- Hot Swap
- Power to Module supplied from backplane
- Partition Plate slots
- Slide-in backplane connectors in Axioline P with terminators at both ends

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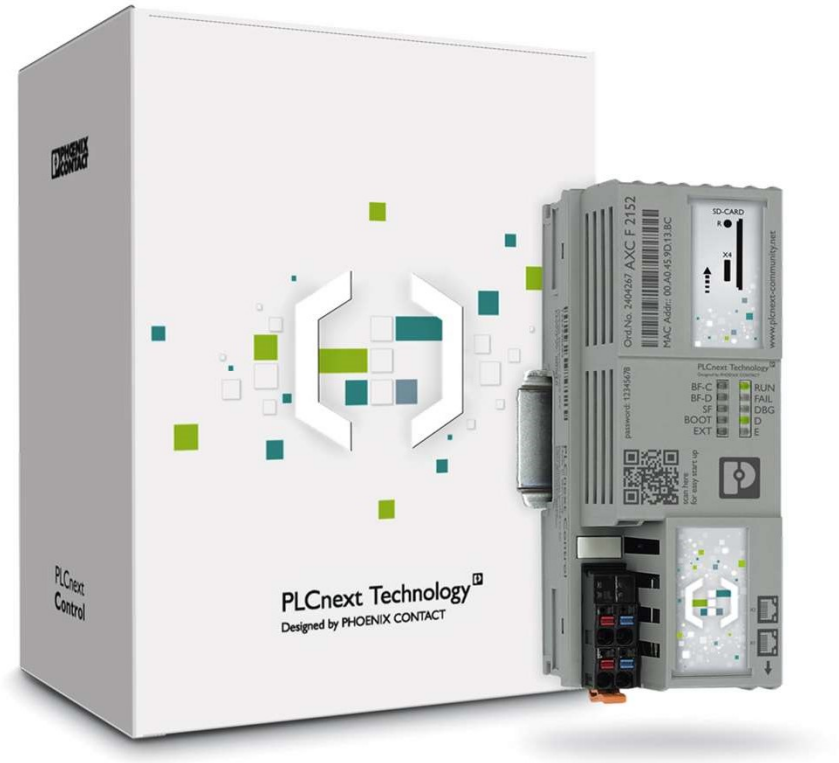
PLCnext Technology
Designed by PHOENIX CONTACT

PLCnext Control: AXC F 2152



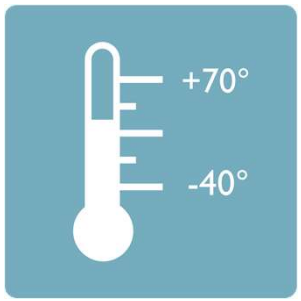
- Cyclone 5 with ARM Cortex-A9 CPU 2 x 800 MHz
- 512 Mbytes RAM
- lot
- rface ed
- up to 6
- sion capa
- Trusted platform module (TPM) for security
- Temperature range: -25°C up to +60°C

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F - the block-based modular I/O system

Axioline F XC (eXtreme Conditions)

- Axioline F XC modules for rugged environments
  - Can be used under extreme ambient conditions
  - Extended temperature range of -40°C ... +70°C (see “Tested successfully: use under extreme ambient conditions” in the data sheet)
  - Partially coated PCBs
  - **Ex** approvals for many XC modules
    - ATEX (Zone 2)
    - IECEx (Zone 2)
    - UL Hazardous Location Class I, Division 2



Completion Q3 2020

Class 1 Div. 2

INSPIRING INNOVATIONS

Axioline F in the zone – Ex approvals for Axioline F

Axiocontrol and Bus Coupler

PLCnext Control	PROFINET PROFIBUS-DP	Modbus/TCP (UDP) EtherNet/IP™
 **AXC F 2152** 2404267 32 tasks, 64 PN devices, ARM® Cortex® A9 dual core, 2x 800 MHz	 **AXL F BK PN TPS XC** 1068857	 **AXL F BK ETH XC** 2701949
	 **AXL F BK PB XC** 2702463	 **AXL F BK EIP XC** 1167192

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F in the zone – Ex approvals for Axioline F

XC - Digital Input / Output

Digital Input	Digital Output	Digital Input Digital Output
 **AXL F DI16/4 XC 2F** 2701224 24 V DC, 4-wire	 **AXL F DO16/3 XC 2F** 2701228 24 V DC, 500 mA, 3-wire, safety circuit	 **AXL F DI8/1 DO8/1 XC 1H** 2702017 8 DI, 24 V DC, 1-wire 8 DO, 24 V DC, 500 mA, 1-wire

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F in the zone – Ex approvals for Axioline F

XC Process I/Os - Digital Input / Output

Digital Input-NAMUR	Digital Output-Solenoid Driver
 **AXL F DI16 NAM XC 1F** 1052427 16 digital inputs for NAMUR proximity sensors (IEC/EN 60947-5-6), 2-wire	 **AXL F EX IS DO4 SD 24-48 XC 1F** 1086901 Intrinsically safe, 4 digital outputs, 24 V DC, 48 mA, 3-wire
 **AXL F EX IS DI16 NAM XC 1F** 1052423 Intrinsically safe, 16 digital inputs for NAMUR proximity sensors (IEC/EN 60947-5-6), 2-wire	 **AXL F EX IS DO4 SD 21-60 XC 1F** 1086902 Intrinsically safe, 4 digital outputs, 21 V DC, 60 mA, 3-wire

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F in the zone – Ex approvals for Axioline F

XC - Analog Input / Output

Analog Input	Analog Output
 **AXL F AI4 I XC 1H** 2702007 0 … 20 mA, 4 … 20 mA, -20 … +20 mA, 2-, 3-, 4-wire	 **AXL F AO4 XC 1H** 2702153 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, 2-wire
 **AXL F AI4 U XC 1H** 2702008 0 ... 5 V, -5 ... 5 V, 0 ... 10 V, -10 ... 10 V, 2-, 3-, 4-wire	

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F in the zone – Ex approvals for Axioline F

XC Process I/Os - Analog Input / Output (HART)

Analog Input-HART	Analog Output-HART
 **AXL F AI8 HART XC 1F** 1052434 8 analog inputs, HART enabled, 4 … 20 mA, 2-wire	 **AXL F AO4 HART XC 1F** 1087080 4 analog outputs, HART enabled, 4 … 20 mA, 2-wire
 **AXL F EX IS AI8 HART XC 1F** 1052432 Intrinsically safe, 8 analog inputs, HART enabled, 4 … 20 mA, 2-wire	 **AXL F EX IS AO4 HART XC 1F** 1087081 Intrinsically safe, 4 analog outputs, HART enabled, 4 … 20 mA, 2-wire

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F in the zone – Ex approvals for Axioline F

XC - Temperature measurement / Communication / Function

RTD (Resistive Temperature Sensors)	UTH (Thermocouple Sensors)	Serial (RS-232, RS-422/485) Counter, Incremental Encoder
 **AXL F RTD4 XC 1H** 1035430 4 channels; Pt, Ni, KTY, Cu sensors; linear resistance measuring; 2, 3, 4-wire (shielded)	 **AXL F UTH8 XC 1F** 2702464 8 channels; Sensor types: U, T, L, J, E, K, N, S, R, B, C, W, HK; linear voltage measuring; 2-wire (shielded, twisted pair)	 **AXL F RS UNI XC 1H** 2702006 1 interface, RS-485/422 or RS-232; Speed: 110 bps ... 250 kbps; Protocols: Transparent, end-to-end, XON/XOFF, Modbus/RTU
		 **AXL F CNT2 INC2 XC 1F** 2701239 2 Counter inputs, 32 Bit, 2 Incremental encoder inputs, Input frequency up to 300 kHz

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INSPIRING INNOVATIONS

Axioline F in the Zone

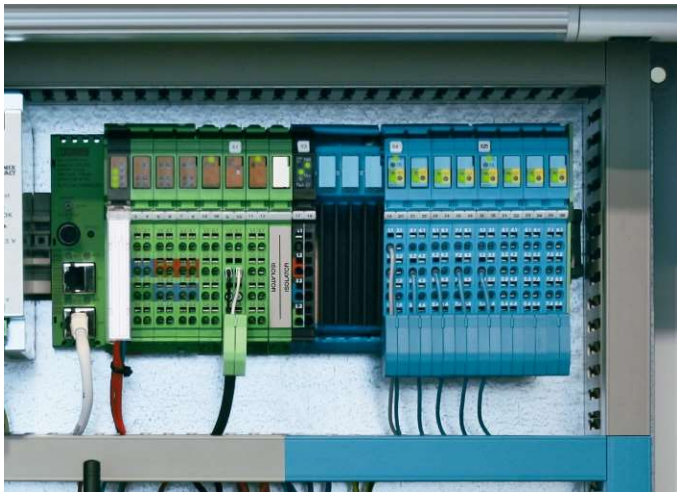
- **PLCnext 2152** with ATEX / IECEx / C1D2
- Bus Couplers – PROFINET, PROFIBUS-DP, EtherNet/IP, MODBUS-TCP
- Installation in Zone 2
- Connectivity to IECEx / ATEX Zone 2 (grey)
- Connectivity to IECEx / ATEX Zone 0/1 (blue)
- NAMUR Digital Input
- Solenoid Driver Digital Output
- Analog HART Input and Output
- All Vertical Markets with Automation

PHOENIX CONTACT
INSPIRING INNOVATIONS

Use Cases for AXL F and P with Zone 2 capability

Existing (Inline) Applications requiring Zone 2

- Pipeline Monitoring
- Whiskey with PROFIBUS-DP BK & PROFIBUS-PA Field Devices
- Alcohol production (distillation) – also similar to perfume and flavoring production
- Powder, Detergents and Cleaning liquids
- Ammunition and explosives – gun powder
- Paint line for medium sized jets
- Plastics granulate distribution and parts molding
- Methane & Gas production
- Undersea robotics in gas field exploration
- Natural Gas refilling Stations for CNG vehicles
- Aircraft jet refueling stations
- Grain silo storage
- Pharmaceutical bulk compound production
- Natural gas turbine and compressor stations



Product details

AXC F 1152 - 1151412

- ARM Cortex A9 single core, 800 MHz
- Up to 8 tasks
- Up to 16 PROFINET devices
- Up to 63 Axioline I/O modules can be aligned directly
- Trusted Platform Module (TPM) for security
- M2M system networking with OPC UA

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC F 2152 - 2404267

- ARM Cortex A9 dual core, 2x 800 MHz
- Up to 32 tasks
- Up to 64 PROFINET devices
- Up to 63 Axioline I/O modules
- Left-alignable interface extension (INTERBUS, PROFIBUS, Ethernet)
- Trusted Platform Module (TPM) for security
- M2M system networking with OPC UA

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC F 3152 - 1069208

- Intel® Atom™ E3930 dual core, 2x 1.3 GHz
- Integrated UPS
- Up to 128 PROFINET devices
- Ready for time-sensitive networking
- Up to 63 Axioline I/O modules
- Left-alignable interface extension (INTERBUS, PROFIBUS, Ethernet)
- Trusted Platform Module (TPM) for security
- M2M system networking with OPC UA

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC 1050 - 2700988

- Altera NIOS II processor
- 1 MB program memory
- 2 MB mass storage
- 48 kB non-volatile mass storage
- PROFINET controller
- 2 Ethernet interfaces and 1 Axioline F interface
- Extended temperature range with the XC version: -40°C … +70°C
- Programming with PC Worx in accordance with IEC 61131-3

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC 3050 - 2700989

- Intel® Atom™ E660
- 4 MB program memory
- 8 MB mass storage
- 128 kB non-volatile mass storage
- 3 separate Ethernet interfaces and 1 Axioline F interface
- PROFINET controller
- Maritime approvals
- Programming with PC Worx in accordance with IEC 61131-3

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC F XT ETH 1TX- 2403115

- Individual expansion option for PLCnext Controls of the Axiocontrol series
- Left-alignable Gigabit-class Ethernet interface
- Additional independent MAC address
- PROFINET support
- Electrical isolation between Ethernet interface and logic

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC F XT IB - 2403018

- Individual expansion option for PLCnext Controls of the Axiocontrol series
- Up to 512 INTERBUS remote bus devices can be connected
- INTERBUS connection via 9-pos. D-SUB socket
- Automatic detection of the transmission speed in INTERBUS (500 kbps or 2 Mbps)
- Electrical isolation between INTERBUS interface and logic
- Diagnostic and status indicators

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXC F IL ADAPT - 1020304

- Inline I/O adapter terminal specifically developed for all PLCnext Control devices of the Axiocontrol series
- A variety of functional I/Os creates options for flexible automation solutions
- Convert existing machines and systems to the new, open PLCnext Technology ecosystem
- Automatic detection of the transmission speed in INTERBUS (500 kbps or 2 Mbps)
- Up to 63 INTERBUS devices can be connected
- Diagnostic and status indicators

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK PN TPS - 2403869

- PROFIsafe support and PROFIenergy support
- Conformance with PROFINET specification V2.3
- 2 RJ45 connections
- BootP and DCP
- Firmware can be updated
- Typical cycle time of the Axioline F local bus is around 10 µs
- Safe analog value processing with SAFE AI and other components

+ XC **AXL F BK PN TPS XC- 1068857**

- Extended temperature range of -40 °C ... +70 °C

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK EC - 2688899

EtherCAT®

- 2 RJ45 connections
- Automatic addressing
- Station mapped as a modular EtherCAT® device using a modular device profile (MDP)
- Station can be mapped as a block device
- Acyclic data communication (mailbox protocols)
- Cyclic data communication
- Firmware can be updated
- Typical cycle time of the Axioline F local bus is around 10 µs

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK EIP EF - 2702782

- 2 Ethernet ports (with integrated switch)
- Transmission speed of 10 Mbps and 100 Mbps
- Rotary coding switches for setting the IP address assignment and other functions
- Supported protocols: EtherNet/IP□, DLR, SNMP, HTTP, TFTP, FTP, BootP, DHCP, DCP
- Firmware can be updated
- Typical cycle time of the Axioline F local bus is around 10 µs

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK ETH - 2688459

- 2 Ethernet ports (with integrated switch)
- Rotary coding switches for setting the IP address assignment and other functions
- Supported protocols: Modbus/TCP (UDP), SNMP, HTTP, TFTP, FTP, BootP, DHCP, DCP
- Firmware can be updated
- Runtime in the bus coupler is negligible (almost 0 µs) (for Modbus/UDP)

+ XC **AXL F BK ETH XC - 2701949**

- Extended temperature range of -40 °C ... +70 °C

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK S3 - 2701686

sercos
the automation bus

- 2 RJ45 connections
- Rotary encoding switch
- Supports Sercos V1.3
- FSP-IO (Function Specific Profile-IO) for modular I/O devices
- 8 connections
- Firmware can be updated
- Typical cycle time of the Axioline F local bus is around 10 µs

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK SAS - 2701457

IEC 61850

- 2 RJ45 connections
- Transmission speed of 100 Mbps
- Rotary encoding switch
- Supports IEC 61850, MMS, and GOOSE
- BootP and DHCP
- Web-based management to set up an I/O station for MMS or GOOSE communication

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

AXL F BK PB - 2688530

- Electrical isolation between PROFIBUS interface and logic
- DP/V1 for class 1 and class 2 masters
- PROFIBUS data transmission speed of 9.6 kbps to 12 Mbps
- Dynamic configuration is supported
- I&M functions
- Firmware can be updated
- Typical cycle time of the Axioline F local bus is around 10 µs

+ XC **AXL F BK PB XC - 2702463**

- Extended temperature range of -40 °C ... +70 °C

BACK TO OVERVIEW

Product details

Digital I/Os

Digital inputs	+ XC
CHANNELS	8 - 64
CONNECTION METHOD	1-, 2, or 4-wire-connection
SPECIAL FEATURES	Input modules for IEC 61850

Digital outputs	+ XC
CHANNELS	4 - 64
CONNECTION METHOD	1-, 2, or 3-wire- or FLK connection
SPECIAL FEATURES	Output modules for IEC 61850, relay outputs

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

Analog I/Os

Analog inputs	+ XC
CHANNELS	2 - 8
A/D CONVERTER RESOLUTION	2-, 3, or 4-wire-connection
TYPES	Current, voltage, RTD, UTH

Analog outputs	+ XC
CHANNELS	2 - 8
A/D CONVERTER RESOLUTION	2-, 3, or 4-wire-connection
TYPES	Current, voltage

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

I/Os for safety applications

Safe digital inputs	
CHANNELS	4 safe digital inputs (two-channel) 8 safe digital inputs (single-channel)
TECHNOLOGY	SafetyBridge Technology PROFIsafe

Safe digital outputs	
CHANNELS	4 safe digital inputs (two-channel) 8 safe digital inputs (single-channel)
TECHNOLOGY	SafetyBridge Technology PROFIsafe

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Product details

Function modules

Portfolio overview

TYPES	Counter inputs and Incremental encoder inputs	AXL F CNT2 INC2 1F	+ XC
	SSI-interface	AXL F SSI1 AO1 1H	
	Digital pulse interface	AXL F IMPULSE2 XC 1H	XC
	Pulse width modulation	AXL F PWM2 1H	
	Strain gauge capture	AXL F SGI2 1H	
	Power measurement	AXL F PM EF 1F	
	Serial communication	AXL F RS UNI 1H	+ XC
	IO-Link master	AXL F IOL8 2H	
	M-Bus master	AXL F MA MBUS 1H	
	DALI master	AXL F MA DALI2 1H	

BACK TO OVERVIEW

PHOENIX CONTACT
INSPIRING INNOVATIONS

Thank you

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