Welcome

Sistema de Control Axioline

Antonio Gordillo IMA Septiembre - Diciembre 2020

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INSPIRING INNOVATIONS

Webinars

Agenda

- Axioline E
- Axioline F
- Axioline SE
- Ejemplos de Integración en Sistemas de Control
  - IO-Link

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Axioline E

The I/O system for field installation– fast, robust and easy

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From the cabinet into the field

- Decentralized I/O system for automation tasks on machine and system engineering under harsh environmental conditions

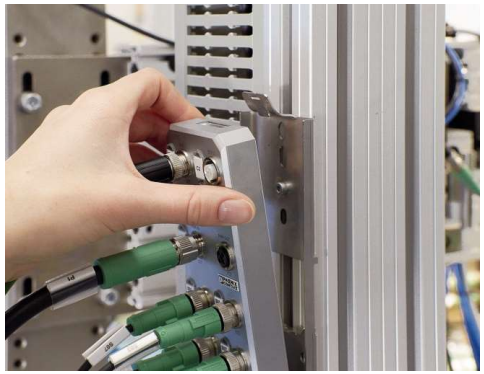
- Stand-alone concept for highly decentralized application with low numbers of I/Os

- Analog functions provided through IO-Link/Analog converters

System properties

- Direct connection to your network
- Degree of protection IP65/67
- Metal and plastic housing
- Available for all networks shown below:
- PROFINET
- Ethernet/IP
- EtherCAT
- Modbus TCP
- sercos
- Profibus DP

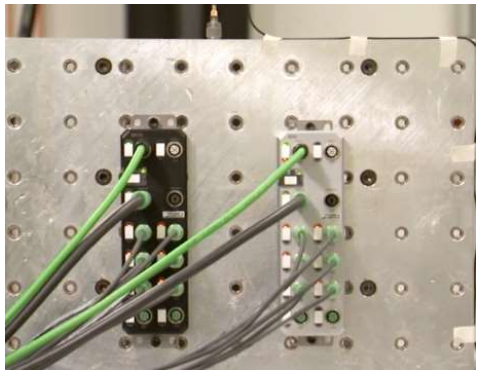
Axioline E is fast



- Fast cabling due to consistent M12-SPEEDCON-connection method at every port
- Toolfree assembly grants fast device exchange (Metal version)

Axioline E is robust

- Especially robust housings
- Highly vibration-and shock-resistant mechanics
- Highest resistance against electromagnetic disturbances
- High temperature range



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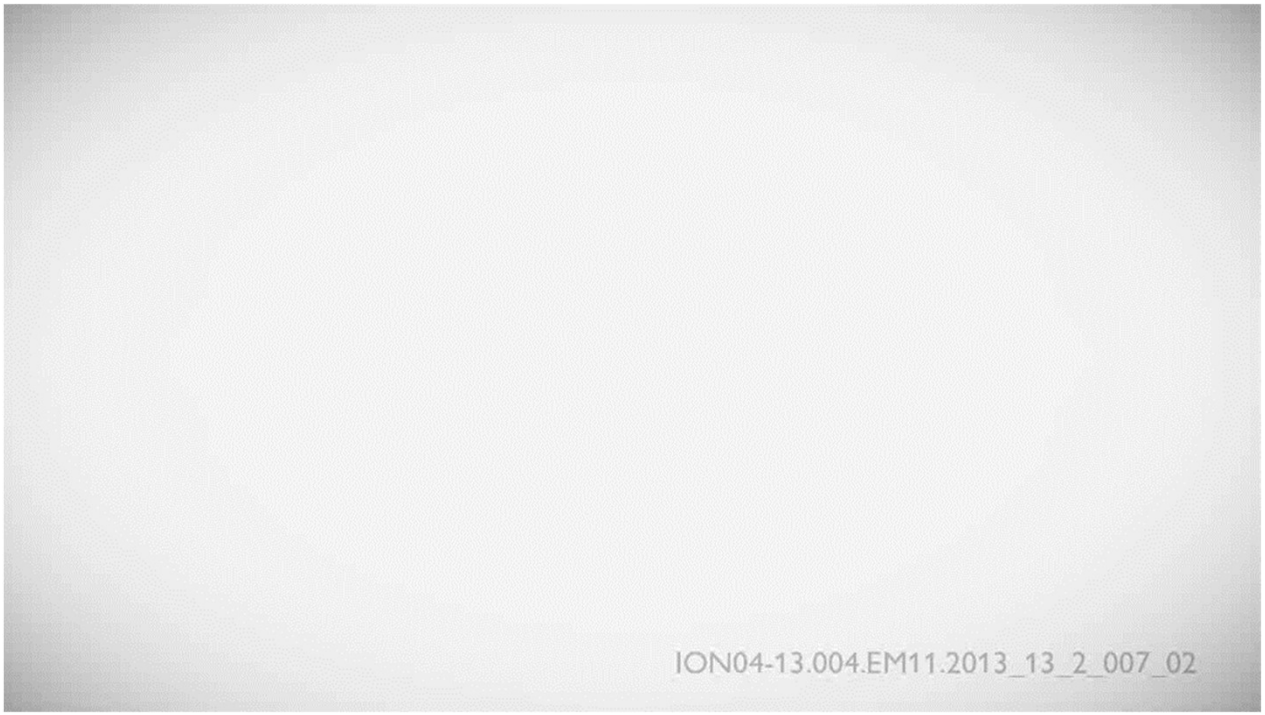
Axioline E



Video Axioline E Robust

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Axioline E is easy

- Reduced cabling thanks to current transmission of M12 Power
- Easiest diagnosis and setting of parameters by means of integrated webserver at the device
- Easy diagnosis onto the device

Axioline E – fast, robust, easy

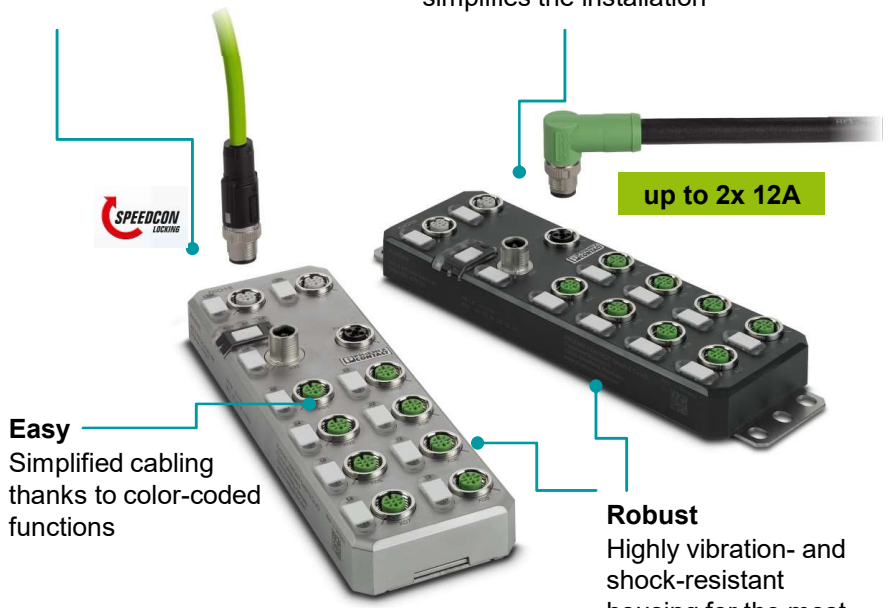
Fast
Reduced installation time thanks to fast cabling

Easy
M12 Power – up to 2 x 12A in only one single cable simplifies the installation

Fast
Individual and fast marking thanks to MARKING system-Printing systems

Easy
Rotary encoding switch for easy start-up – with an otimum of protection

Easy
More flexibility thanks to IO-Link communication



Easy
Simplified cabling thanks to color-coded functions

Robust
Highly vibration- and shock-resistant housing for the most varied of applications

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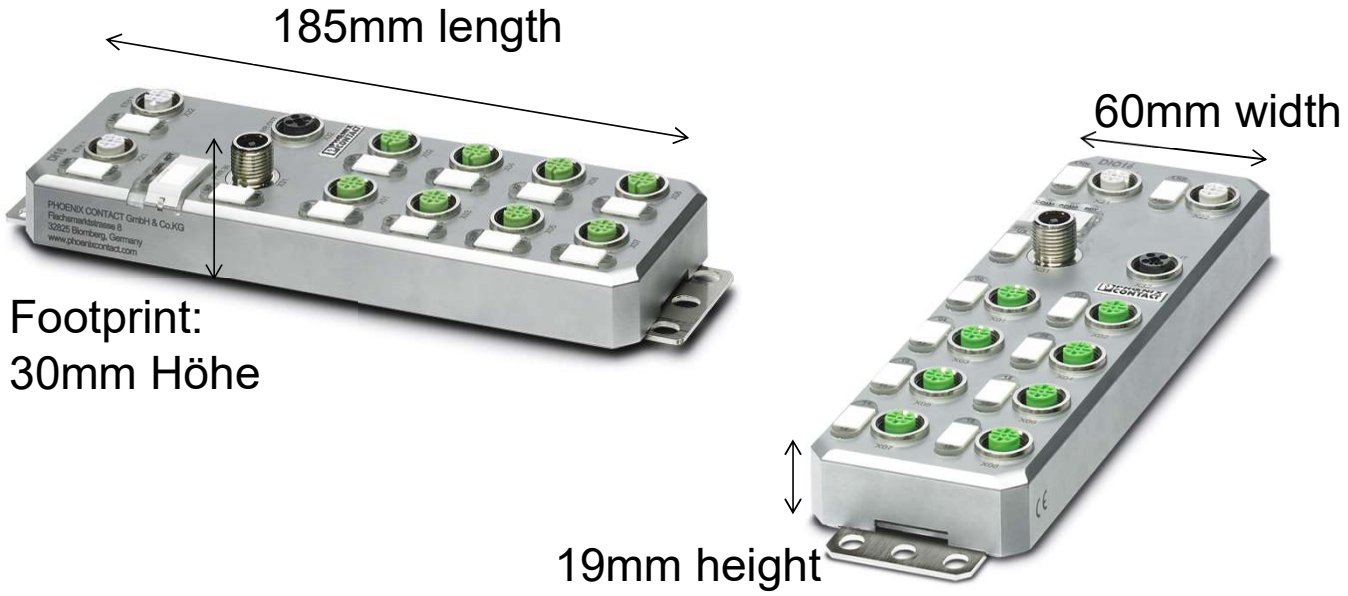
Dimensions



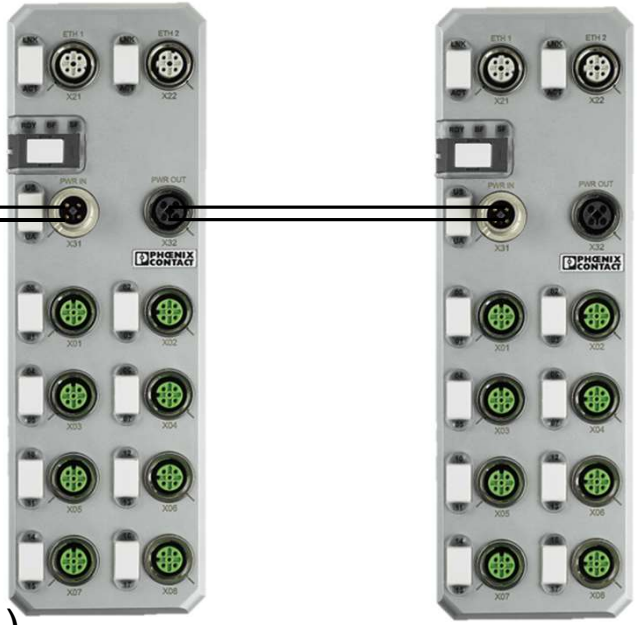
Power supply concept

U_S – sensor and logic supply

Max 12A

U_A – actuator supply

Max 12A



- M12 power cable
  (2 x 24V DC, up to 12A each)
- Short-circuit protected (U_S)
- Overload protected (U_S)
- Reverse polarity protected (U_A, U_A)

Portfolio Axioline E

Function / Network		DI16	DIO16 *configurable*	DI8 DO8	DI8 DO4-2A	IOL8 DI4
PROFINET		Plastic 2701510	Plastic 2701511	Plastic 2701509	Plastic 2701512	Plastic 2701513
		Metal 2701516	Metal 2701517	Metal 2701515	Metal 2701518	Metal 2701519
EtherNet/IP		Plastic 2701493	Plastic 2701494	Plastic 2701492	Plastic 2701495	Plastic 2701496
		Metal 2701488	Metal 2701489	Metal 2701487	Metal 2701490	Metal 2701491
EtherCAT		Plastic 2701521	Plastic 2701522	Plastic 2701520	Plastic 2701523	Plastic 2701524
		Metal 2701526	Metal 2701528	Metal 2701525	Metal 2701529	Metal 2701531
Modbus		Plastic 2701533	Plastic 2701534	Plastic 2701532	Plastic 2701535	Plastic 2701536
		Metal 2701538	Metal 2701539	Metal 2701537	Metal 2701540	Metal 2701541
sercos the automation bus		Plastic 2701544	Plastic 2701545	Plastic 2701542	Plastic 2701546	Plastic 2701547
		Metal 2701549	Metal 2701550	Metal 2701548	Metal 2701551	Metal 2701552
PROFIBUS		Plastic 2701498	Plastic 2701499	Plastic 2701497	Plastic 2701502	Plastic 2701503
		Metal 2701505	Metal 2701506	Metal 2701504	Metal 2701507	Metal 2701508

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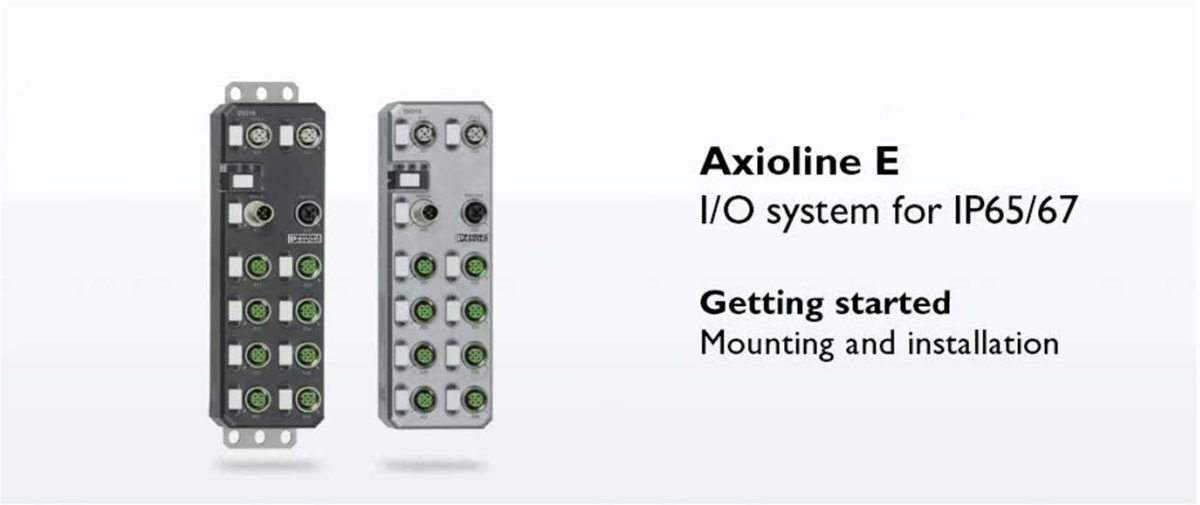
Axioline E



Axioline Getting Started

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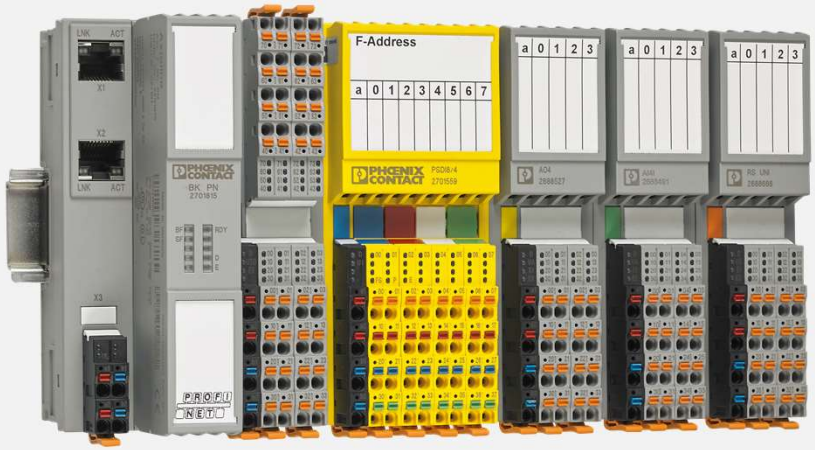

Axioline F
the block-based modular I/O system

TECHNICS

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

Agenda

- Overview / Basics Axioline F
- Look, colors, LEDs, mechanical specifications
- Power supply, wiring, labelling, shielding
- STARTUP+ - Wiring Check for Axioline F
- Technical data / Approvals
- Axioline F XC (eXtreme Conditions)
- Process data, PDI channel, Response times
- SafetyBridge Technology
- Product Portfolio

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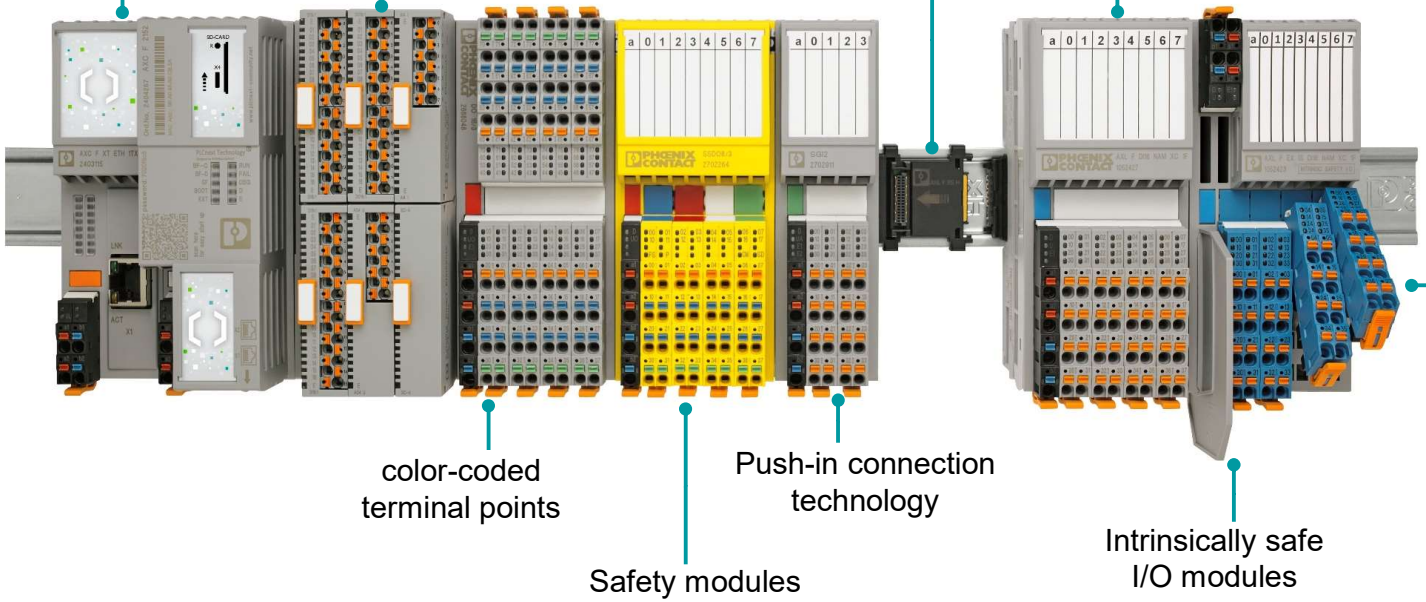
Axioline F - the block-based modular I/O system

Axioline F – the specialist in the control cabinet



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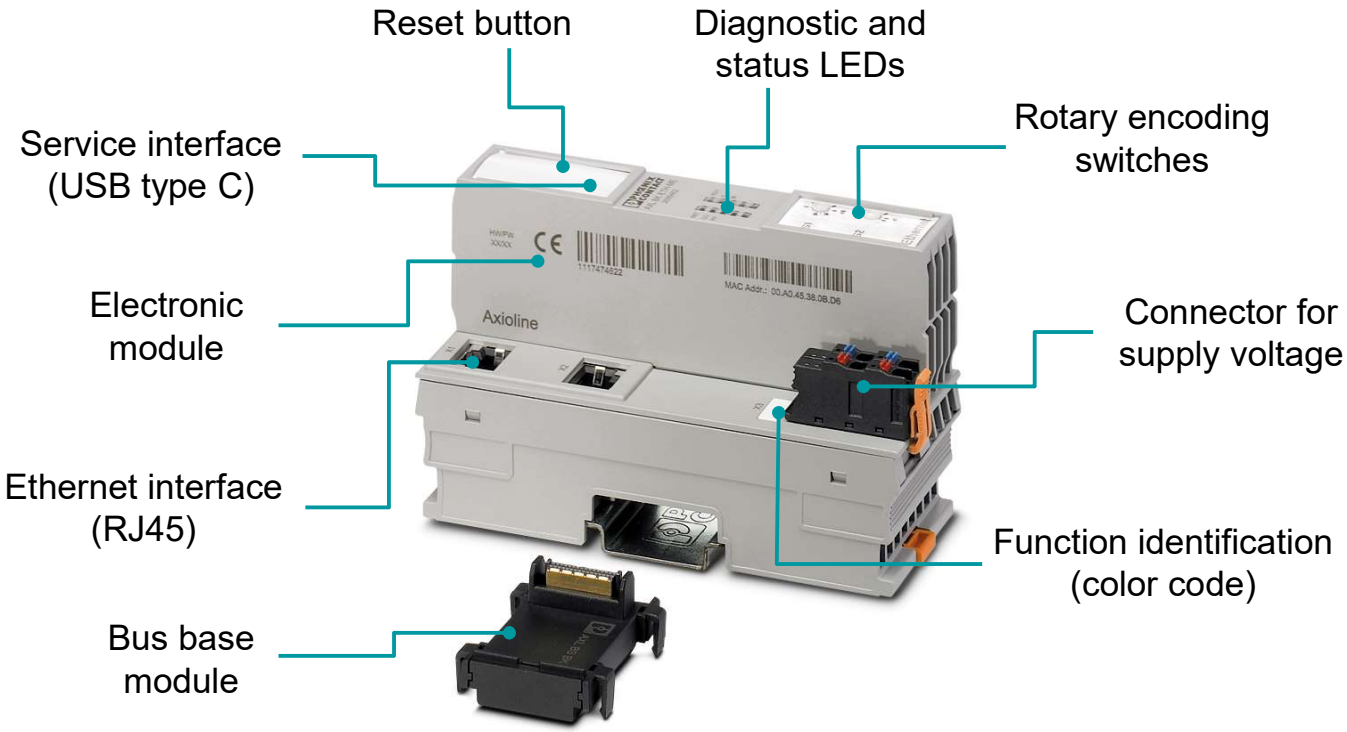
Axioline F - the block-based modular I/O system

Components of an Axioline F bus coupler



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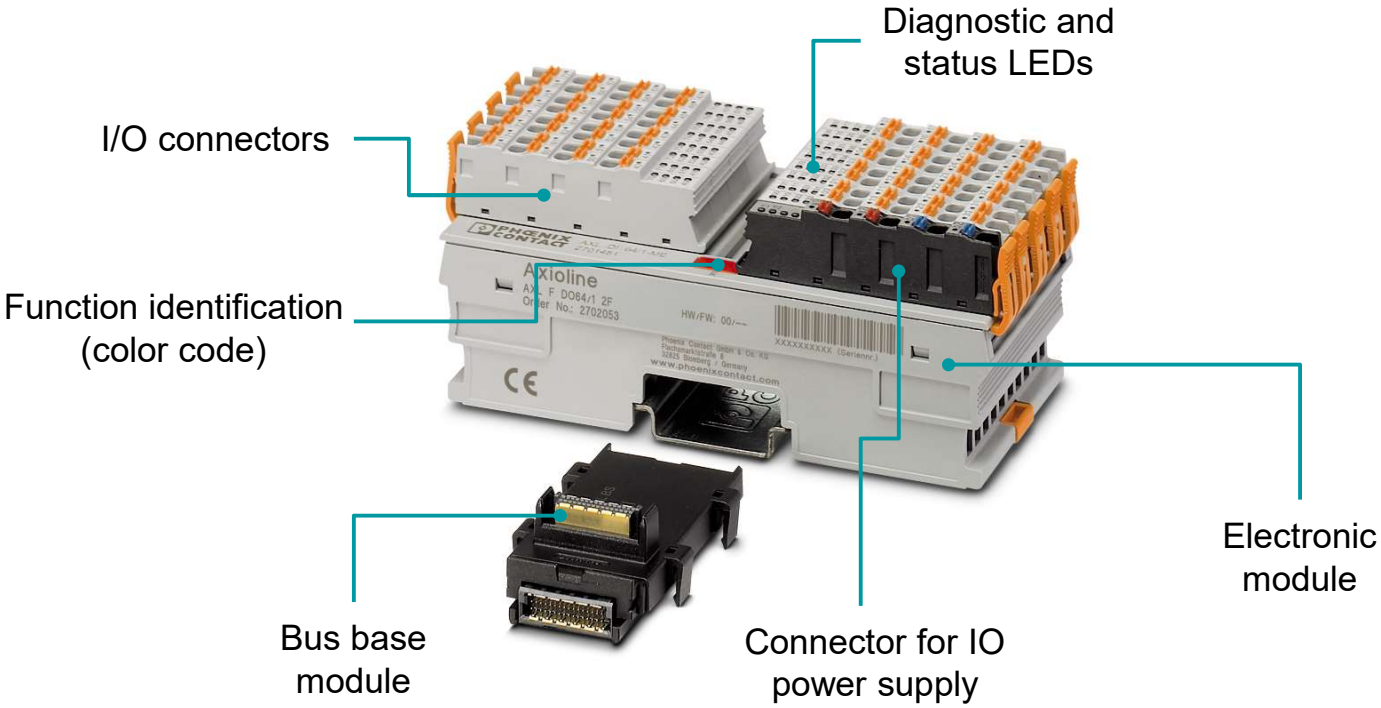
Components of an Axioline F I/O module



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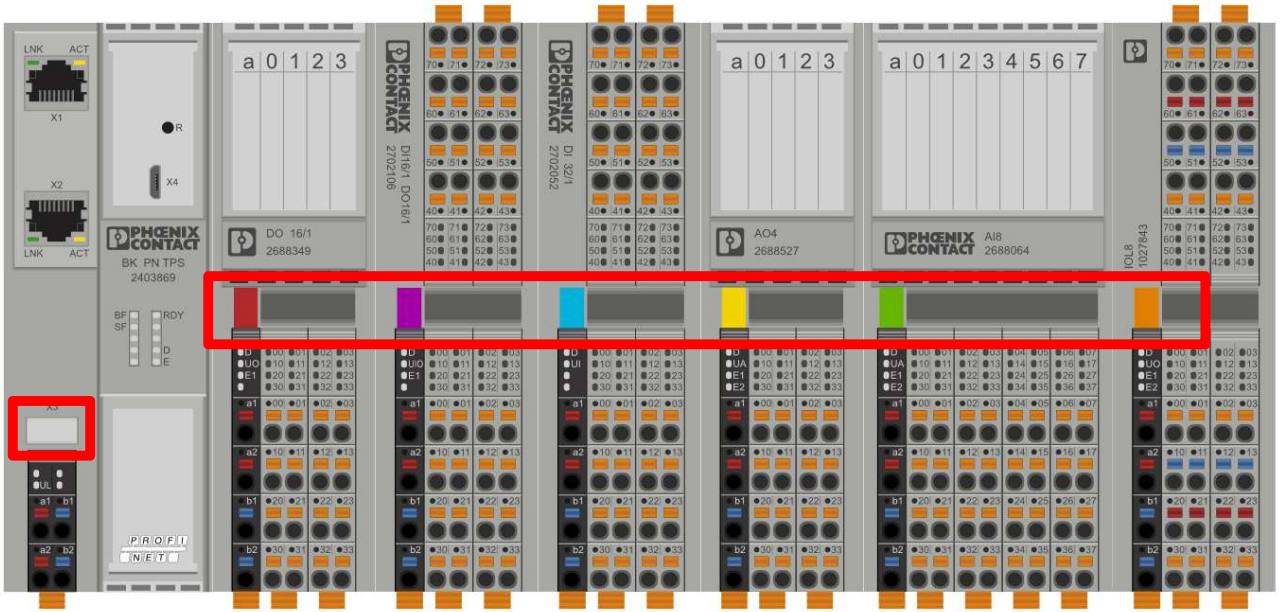
Axioline F - the block-based modular I/O system

Function identification via color code

- Bus coupler / PWR
- Digital input
- Digital output
- Digital input / output
- Analog input
- Temperature measurement
- Analog output
- Function / communication



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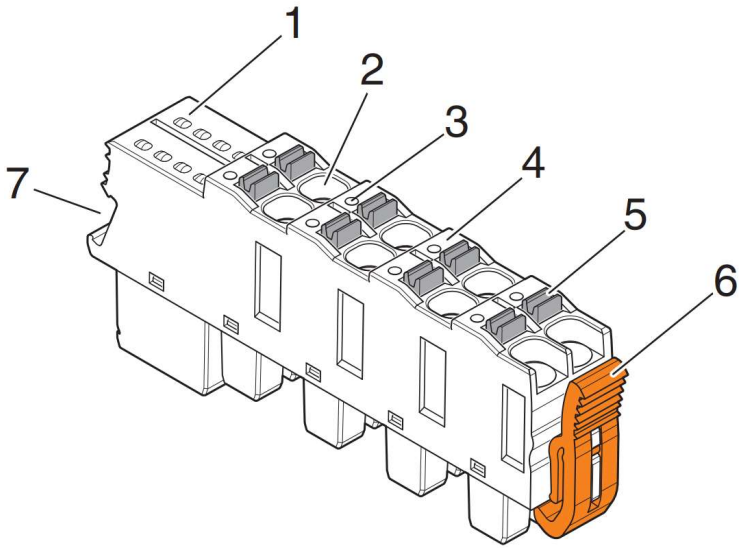
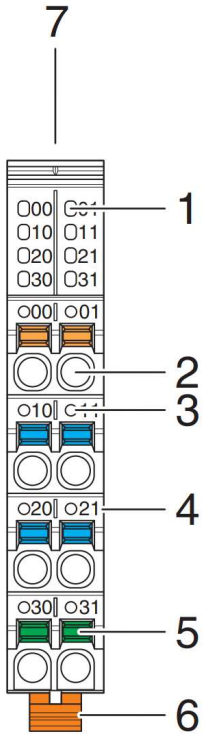
Axioline F - the block-based modular I/O system

Basic design of an Axioline F connector





1. Local diagnostic and status LEDs
2. Terminal point
3. Touch connection (Measuring point)
4. Terminal point marking
5. Colored spring lever
6. Locking latch
7. Space for connector marking (“ZBF 10/5,8 AXL” or “ZBF 5”)

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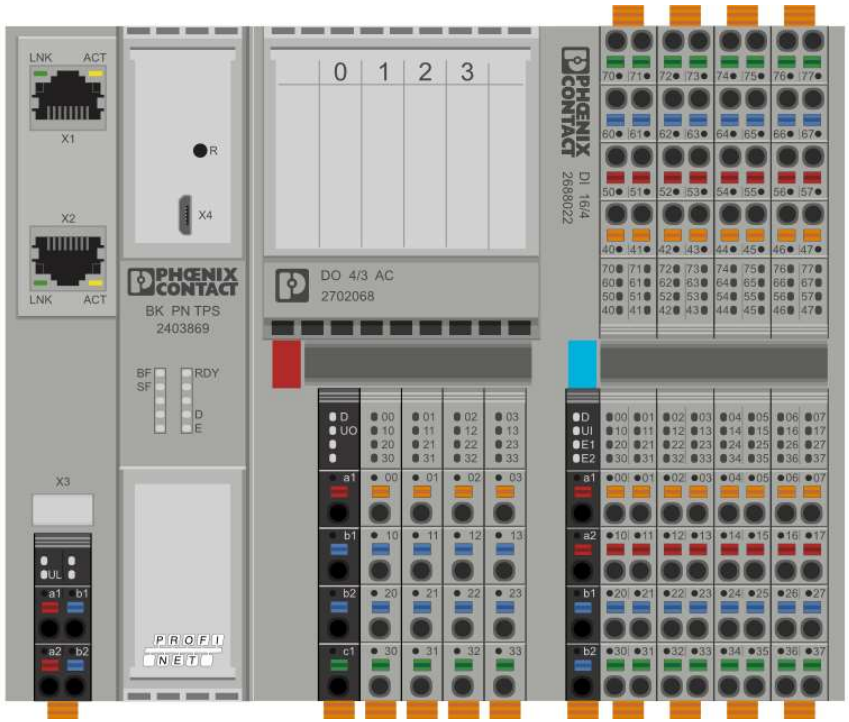
Color coded terminal points (spring lever)

Color	Function of the terminal points	
	Low-level signal	Low voltage
	Signal	Signal
	24 V DC	230 V AC, 220 V DC, relay main contact
	GND	N (neutral conductor)
	FE (functional ground)	PE (protective conductor)



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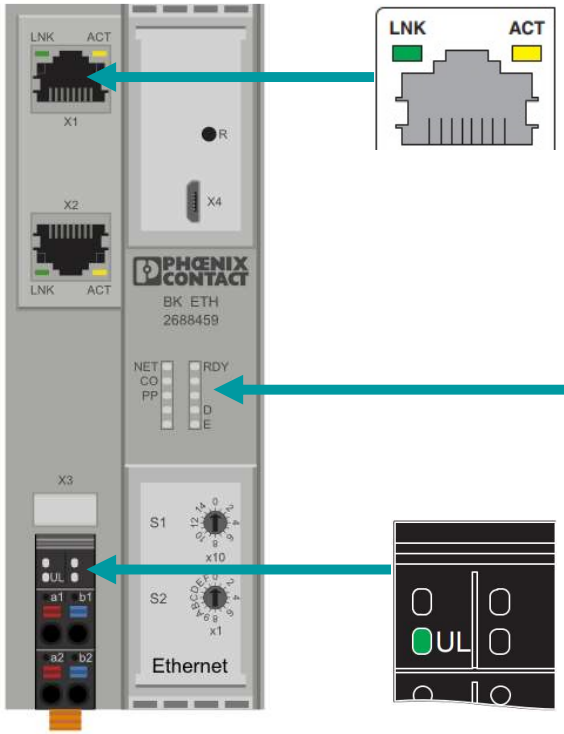
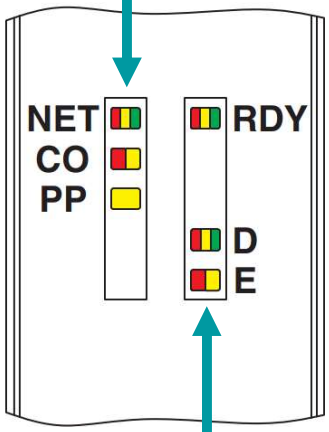
Diagnostic LEDs of bus couplers



LNK: Connection
ACT: Transmission

Communications power supply (U_L)

Network specific LEDs



AXL F specific LEDs (Device / Local bus)

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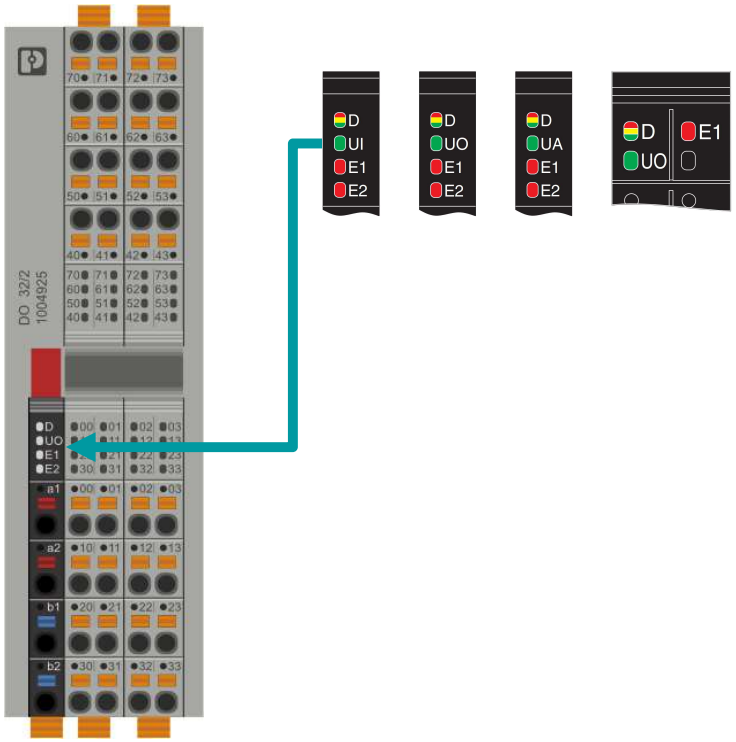
Diagnostic LEDs of I/O modules | PWR connectors



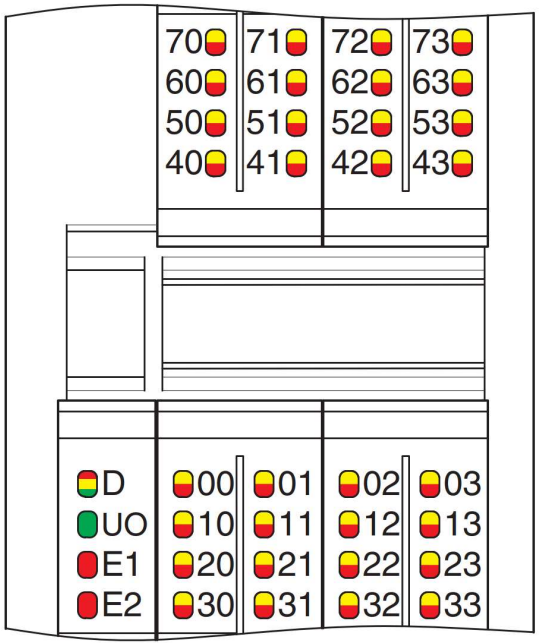
Diagnostics of local bus communication

I/O supply (U_I, U_O, U_{IO}, U_A)

I/O error (entire device)

Channel error

Diagnostic LEDs of I/O modules | I/O connectors



- LEDs are numbered according to terminal points
- Yellow → Status of the input or output
- Red → Diagnostics of the output

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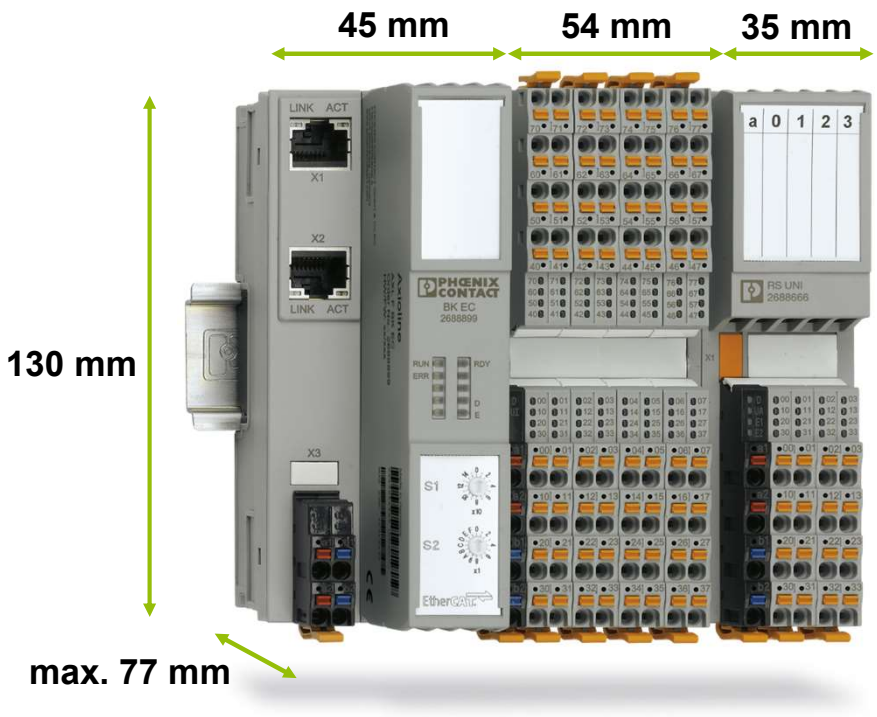
Axioline F - the block-based modular I/O system

Module dimensions



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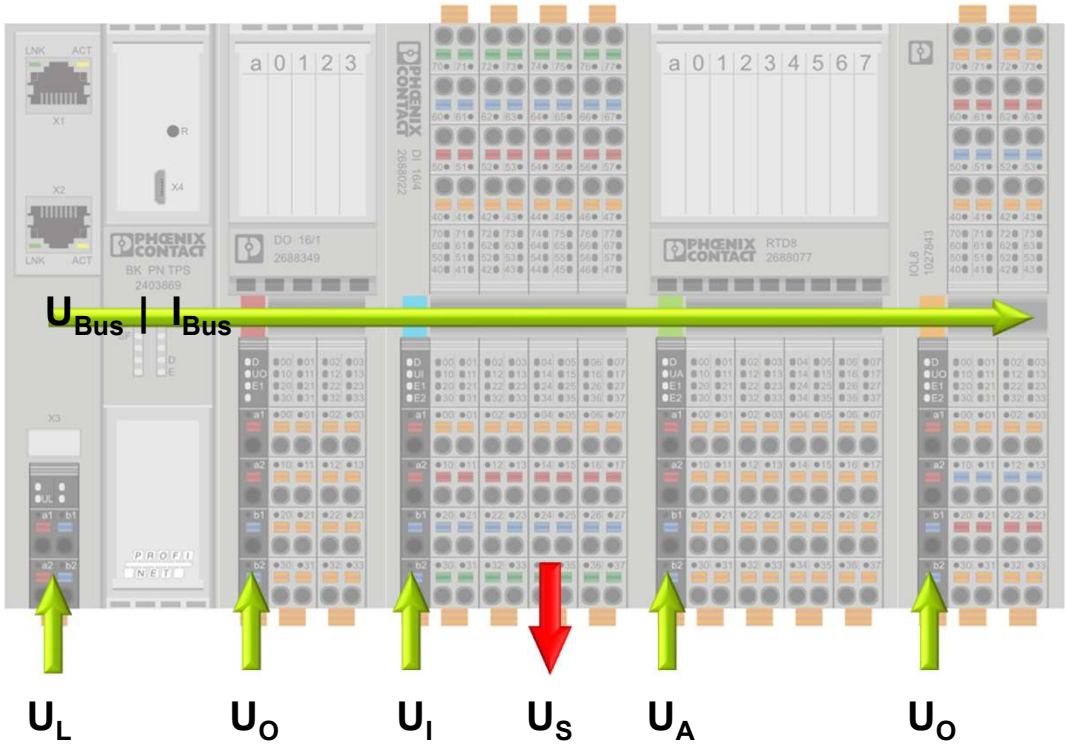
Axioline F system supply



- U_L (U_{Logic}) Communications power supply
- I_{Bus} (I_{Bus}) Local bus
- U_{Bus} (U_{Bus}) Local bus (gen. from U_L)
- U_I (U_{Input}) Digital input modules
- U_S (U_{Sensor}) Sensor supply (gen. from U_I)
- U_O (U_{Output}) Digital output modules
- U_{IO} ($U_{Input/Output}$) Digital input/output modules
- U_A (U_{Analog}) Analog modules

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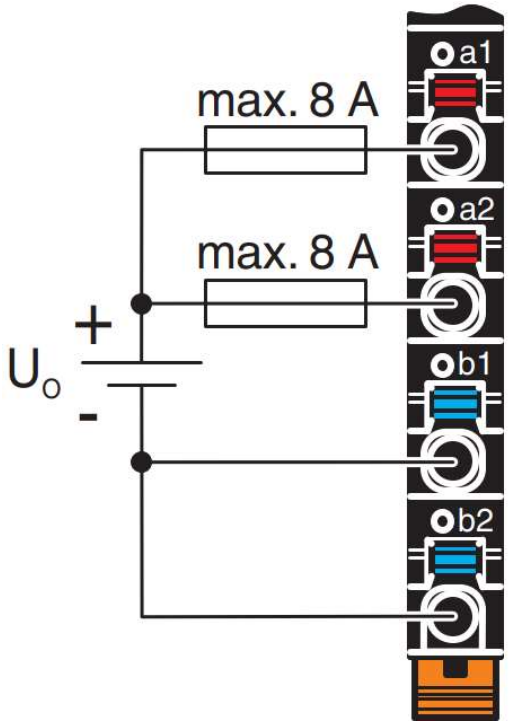
Parallel power supply for more than 8 A

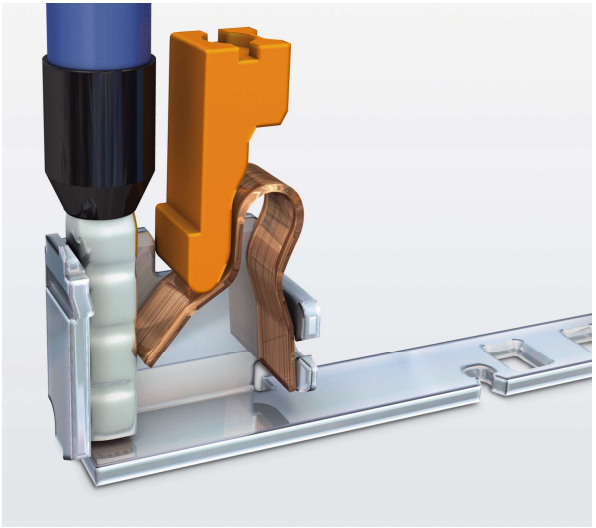
- Maximum current consumption of a terminal point → 8 A
- Example:
  - AXL F DO32/1 2H → 32 channels * 0,5 A = 16 A
  - Power supply (U_O) via one single terminal point limited up to 8 A
  - → Parallel power supply for U_O up to 16 A



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

Conductor cross sections | Push-in Technology

Conductor	Push-in technology	using the spring lever
solid 	min. 0,50 mm² max. 1,50 mm²	min. 0,20 mm² max. 1,50 mm²
stranded 	-	min. 0,20 mm² max. 1,50 mm²
ferrule without collar 	min. 0,25 mm² max. 1,50 mm²	min. 0,25 mm² max. 1,50 mm²
ferrule with collar 	min. 0,25 mm² max. 1,50 mm²	min. 0,25 mm² max. 1,50 mm²



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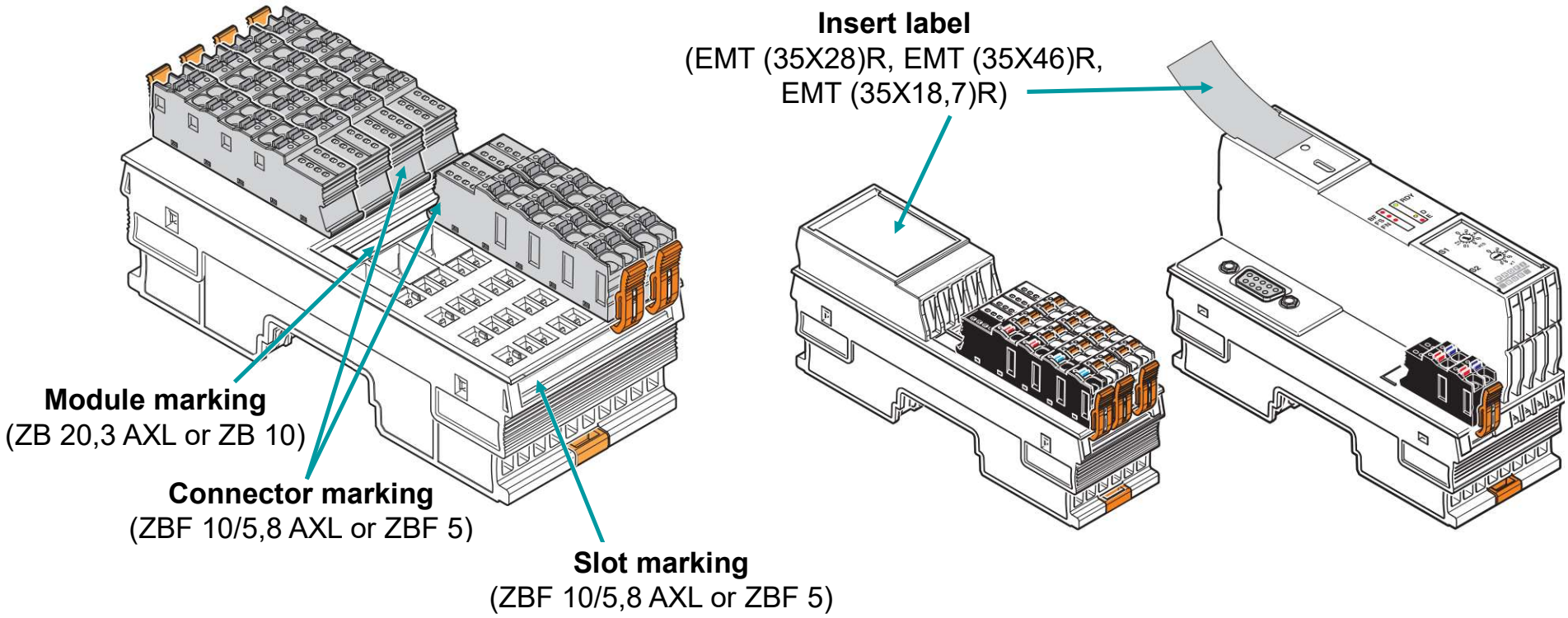
Individual marking with zack marker strips and labels



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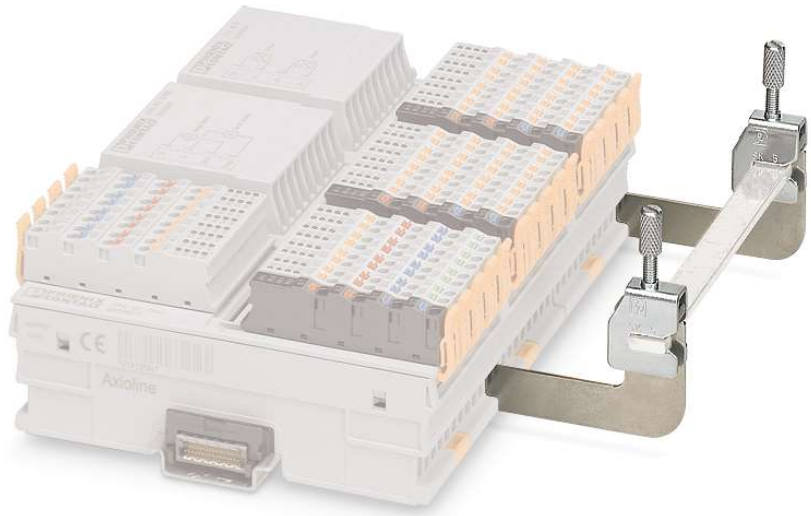
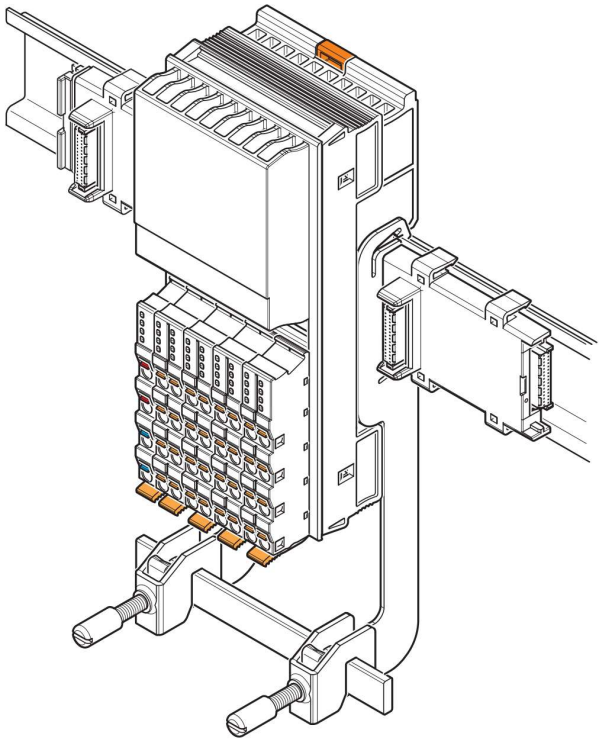
Axioline F - the block-based modular I/O system

Shielding of signal cables

- System integrated shielding set
  - AXL SHIELD SET - 2700518





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

STARTUP+ – Wiring Check for Axioline F

- Connection to the bus coupler via RJ45 or USB interface
- Reading the connected bus; all modules will be displayed
- Reading and writing module process data (IO-Check)
- Parameterization of the modules
- I/O module and the bus coupler diagnostics
- Free to download

AVAILABLE AS FREE DOWNLOAD !

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Axioline F

Startup +

Video How to configure Axioline F Buskopler EIP with Startup +

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

Technical Data – Environment & mechanical tests

Ambient temperature (operation)	-25°C ... +60°C
Ambient temperature (storage/transport)	-40°C ... +85°C
Permissible humidity	5% ... 95% (non-condensing)
Permissible air pressure	70 kPa ... 106 kPa (up to 3000 m above sea level) (> 3000 m with restraints, see user manual)
Degree of protection	IP20
Vibration resistance (IEC 60068-2-6)	5g
Shock testing (IEC 60068-2-27)	30g
Bump endurance test (IEC 60068-2-27)	10g
Noise emission test (EN 61000-6-3)	Class B (residential area)

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

Approvals

Local approvals

CE

c UL US LISTED

EAC

Marine approvals

RINA SERVICES
classification, certification, inspection & testing

BUREAU VERITAS

Lloyd's Register
TYPE APPROVAL

CERTIFIED BY DNV·GL
MARITIME MANUFACTURER

ABS

Ex approvals*

Ex

IECEx

c UL US LISTED
Class 1 Div. 2

* XC modules only

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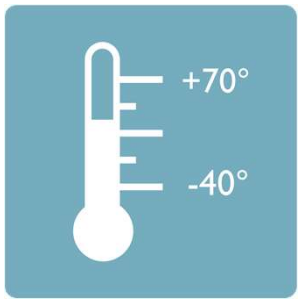
Axioline F - the block-based modular I/O system

Axioline F XC (eXtreme Conditions)

- Axioline F XC modules for rough environment
  - 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 (July 2020)
    - ATEX (Zone 2)
    - IEC Ex (Zone 2)
    - UL haz. loc. Class 1 Div 2



Class 1 Div. 2

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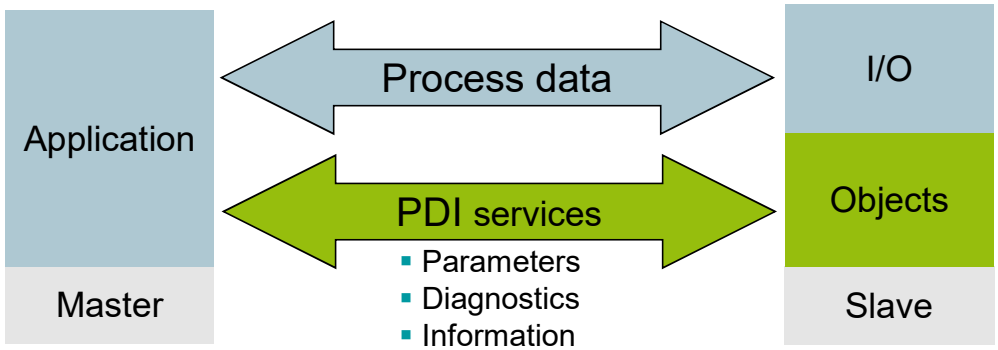
Process data and PDI channel

- Process data
  - Every AXL F device has at least one byte process data
  - Motorola format (Big Endian)
- PDI = **P**arameters, **D**iagnostics, and **I**nformation
  - Demand-oriented, acyclic transmission of parameter and diagnostic data



Diagnostic state (0018_{hex}: DiagState)

Index [hex]	Object name	Meaning
0018	DiagState	Diagnostic state
.01	Consec. no.	Consecutive error number since the last power up or error memory reset
.02	Priority	Priority of the message. 1: highest priority
.03	Channel	Channel on which the error occurred (FF_{hex}: entire device)
.04	Code	Error code
….	…	…
.0B	Text	Device-specific explanation of the malfunction that occurred; Default: “Status OK”

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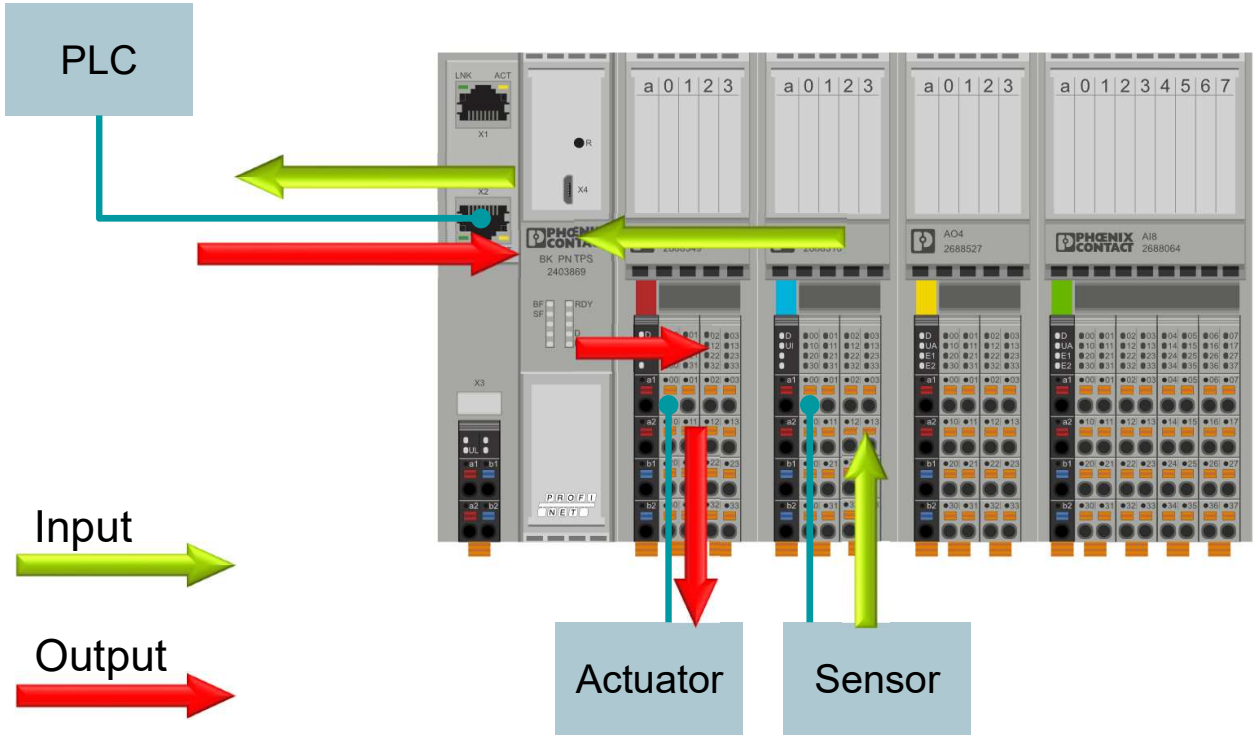
Response times for an Axioline F system



- Response time =
  time from reading in the input,
  processing in the controller
  to setting the output
- When determining the response time of the overall system, Axioline F represents the smallest proportion by far and therefore can normally be ignored.

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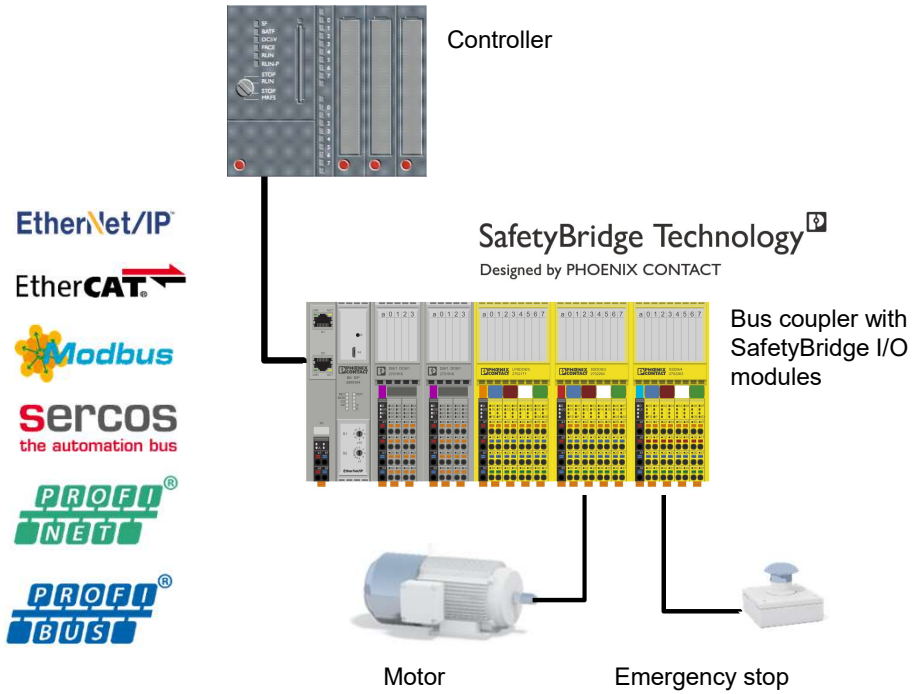
Axioline F - the block-based modular I/O system

SafetyBridge Technology

- Safety I/O modules exchange safety-related signals with each other
- The standard controller and network is only used for transport purposes
- Safety I/O modules process the safety functions themselves
- All safety requirements up to SIL 3 or PL e
  - ➢ Cost-effective solution for functional safety in standard applications



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

Axiocontrol

PLCnext Control	Extensions (for AXC F 2152 / 3152)	Conventional PLCs
 **AXC F 1152** 1151412 8 tasks, 16 PN devices, ARM® Cortex® A9 single core, 800 MHz	 **AXC F XT ETH 1TX** 2403115 Left-alignable Ethernet interface, Independent MAC-Address, PROFINET support	 **AXC 1050** 2700988 8 tasks, 16 PN devices, Altera® NIOS® II processor, 100 MHz
 **AXC F 2152** 2404267 32 tasks, 64 PN devices, ARM® Cortex® A9 dual core, 2x 800 MHz	 **AXC F XT IB** 2403018 Left-alignable INTERBUS-master, up to 512 INTERBUS devices, 500K / 2MBD (automatic detection)	 UPS **AXC 3050** 2700989 16 tasks, 256 PN devices, Intel® Atom™ E660, 1.3 GHz
 **AXC F 3152** TSN UPS 1234567 32 tasks, 128 PN devices, Intel® Atom™ E3930 dual core, 2x 1.3 GHz	 **AXC F IL ADAPT** 1020304 Right-alignable Inline adapter terminal (INTERBUS master), 500K / 2MBD (automatic detection)	

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

Bus coupler

PROFINET PROFIBUS	EtherCAT® Sercos	Modbus/TCP (UDP) EtherNet/IP™	Ethernet (IEC 61850)
PROFINET  **AXL F BK PN TPS** 2403869	EtherCAT  **AXL F BK EC** 2688899	Modbus  **AXL F BK ETH** 2688459	**IEC 61850**  **AXL F BK SAS** 2701457
PROFIBUS  **AXL F BK PB** 2688530	sercos the automation bus  **AXL F BK S3** 2701686	EtherNet/IP  **AXL F BK EIP** 2688394	

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

Digital Input

16 Channels	32 channels	64 channels	8 channels (IEC 61850)
 **AXL F DI16/4 2F** 2688022 24 V DC, 4-wire	 **AXL F DI32/1 2H** 2702052 24 V DC, 1-wire	 **AXL F DI64/1 2F** 2701450 24 V DC, 1-wire	 **AXL F DI8/2 24DC 1F** 2702783 24 V DC, IEC 61850-3
 **AXL F DI16/1 1H** 2688310 24 V DC, 1-wire	 **AXL F DI32/1 1F** 2688035 24 V DC, 1-wire		 **AXL F DI8/2 48/60DC 1F** 2702654 48 / 60 V DC, IEC 61850-3
 **AXL F DI16/1 HS 1H** 2701722 24 V DC, 1-wire, high speed			 **AXL F DI8/2 110/220DC 1F** 2700684 110 / 220 V DC, IEC 61850-3

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INSPIRING INNOVATIONS

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

Digital Output

4 / 8 Channels	16 channels	16 / 32 channels	64 channels
 **AXL F DO8/2 2A 1H** 2688381 24 V DC, 2 A, 2-wire	 **AXL F DO16/3 2F** 2688048 24 V DC, 500 mA, 3-wire, safety circuit	 **AXL F DO16 FLK 1H** 2701813 24 V DC, 500 mA, FLK connection	 **AXL F DO64/1 2F** 2702053 24 V DC, 500 mA, 1-wire
 **AXL F DO4/3 AC 1F** 2702068 Triac, 230 V AC, 2 A, 3-wire	 **AXL F DO16/1 1H** 2688349 24 V DC, 500 mA, 1-wire	 **AXL F DO32/1 2H** 1004925 24 V DC, 500 mA, 1-wire	
 **AXL F DOR4/2 AC/220DC 1F** 2700608 Relay, 8A, 220 V DC / 230 V AC	 **AXL F DO16/2 2H** 1027904 24 V DC, 500 mA, 2-wire, safety circuit	 **AXL F DO32/1 1F** 2688051 24 V DC, 500 mA, 1-wire	

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INSPIRING INNOVATIONS

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

Digital Input / Output

16 Channels	24 channels	32 channels
 **AXL F DI8/1 DO8/1 1H** 2701916 8 DI, 24 V DC, 1-wire 8 DO, 24 V DC, 500 mA, 1-wire	 **AXL F DI16/1 DO8/2-2A 2H** 2702291 16 DI, 24 V DC, 1-wire 8 DO, 24 V DC, 2 A, 2-wire	 **AXL F DI16/1 DO16/1 2H** 2702106 16 DI, 24 V DC, 1-wire 16 DO, 24 V DC, 500 mA, 1-wire
 **AXL F DI8/3 DO8/3 2H** 2702071 8 DI, 24 V DC, 3-wire 8 DO, 24 V DC, 500 mA, 3-wire		

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INSPIRING INNOVATIONS

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

Analog Input / Analog Output

Analog Input 4 Channels	Analog Input 8 Channels	Analog Output 4 / 8 Channels	Analog Input / Output 4 Channels
 **AXL F AI4 I 1H** 2688491 0 … 20 mA, 4 … 20 mA, -20 … +20 mA, 2-, 3-, 4-wire	 **AXL F AI8 1F** 2688064 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-wire	 **AXL F AO4 1H** 2688527 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, 2-wire	 **AXL F AI2 AO2 1H** 2702072 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-wire
 **AXL F AI4 U 1H** 2688501 0 ... 5 V, -5 ... 5 V, 0 ... 10 V, -10 ... 10 V, 2-, 3-, 4-wire	 **AXL F AI8 W 1F** 2702525 0 V ... 5 V, -5 ... +5 V, 0 V ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-wire, high long-term stability	 **AXL F AO8 1F** 2688080 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-wire	

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INSPIRING INNOVATIONS

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

Temperature measurement / Strain Gauge Input

RTD (Resistive Temperature Sensors)	UTH (Thermocouple Sensors)	SGI (Strain Gauge Input)
 **AXL F RTD4 1H** 2688556 4 channels; Pt, Ni, KTY, Cu sensors; linear resistance measuring; 2, 3, 4-wire (shielded)	 **AXL F UTH4 1H** 2688598 4 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 SGI2 1H** 2702911 2 channels; high-precision, 4-, 6-wire connection; 2-point adjustment, path-adjustment, PD update time 0,2 … 100 ms
 **AXL F RTD8 1F** 2688077 8 channels, Pt, Ni, KTY, Cu sensors; linear resistance measuring; 2, 3, 4-wire (shielded)	 **AXL F UTH8 1F** 2688417 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)	

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

Communication / Master

IO-Link Master, Serial (RS-232, RS-422/485)	Conventional Subbus Masters / Interfaces	Building Automation Subbus Master
 **AXL F IOL8 2H** 1027843 8 IO-Link class A ports, 3-wire, IO-Link-Spec V1.1.2, Parameter data storage	 **AXL F IF CAN 1H** 2702668 1 CAN interface; transparent protocol, max. speed of 1 Mbps **Restricted distribution**	 **AXL F MA DALI2 1H** 2702864 DALI master, two channels, integrated DALI power supply, single master operation, protected up to 250 V AC **only for AXC / RFC**
 **AXL F RS UNI 1H** 2688666 1 interface, RS-485/422 or RS-232; Speed: 110 bps ... 250 kbps; Protocols: Transparent, end-to-end, XON/XOFF, Modbus/RTU	 **AXL F MA IB 1H** 2702148 1 INTERBUS-Master, 9-pos. D-SUB socket, max. 64 byte process data width, 500K / 2MBD (automatic detect.), Automatic startup of INTERBUS **Restricted distribution**	 **AXL F MA MBUS 1H** 1104545 M-Bus master, 2-wire connection, up to 80 devices, transmission speed up to 38.4 kbps, Integrated isolated M-Bus power supply **only for AXC / RFC**

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INSPIRING INNOVATIONS

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

Function / Power Measurement / Power feed

SSI, PWM	Power Measurement, Counter, Incremental Encoder	Logic power supply
 **AXL F SSI1 AO1 1H** 2688433 1 SSI interface for absolute encoder, 62.5 kHz to 2 MHz; 1 analog output	 **AXL F PM EF 1F** 2702671 Power measurement, 4 inputs, 0 … 400 V AC (phase/neutral), 0 … 690 V AC (phase/phase), 0 … 5 A AC	 **AXL F PWR 1H** 2688297 Logic supply U_{Bus}, max. 4 A
 **AXL F PWM2 1H** 1007352 pulse width modulation, 2 independent channels, 24 V DC, 500 mA, 5 V DC, 10 mA, Frequency output (0 ... 65535 Hz)	 **AXL F CNT2 INC2 1F** 2688093 2 Counter inputs, 32 Bit, 2 Incremental encoder inputs, Input frequency up to 300 kHz	

PHOENIX CONTACT
INSPIRING INNOVATIONS

Axioline F

Configure
Axioline F Profinet

Video Axioline F PROFINET TIA Portal

INSPIRING INNOVATIONS

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

SafetyBridge / PROFIsafe

SafetyBridge logical module	SafetyBridge I/O	PROFIsafe I/O
 **AXL F LPSDO8/3 1F** 2702171 integrated safety logic; 4 safe DOs (two-channel occupancy) or 8 safe DOs (single-channel occupancy)	 **AXL F SSDI8/4 1F** 2702263 4 safe DIs (two-channel occupancy) or 8 safe DIs (single-channel occupancy)	 **AXL F PSDI8/4 1F** 2701559 4 safe DIs (two-channel occupancy) or 8 safe DIs (single-channel occupancy)
	 **AXL F SSDO8/3 1F** 2702264 4 safe DOs (two-channel occupancy) or 8 safe DOs (single-channel occupancy)	 **AXL F PSDO8/3 1F** 2701560 4 safe DOs (two-channel occupancy) or 8 safe DOs (single-channel occupancy)

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INSPIRING INNOVATIONS

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

XC - Axiocontrol and bus coupler

Conventional PLCs	PROFINET PROFIBUS	Modbus/TCP (UDP) EtherNet/IP™
 **AXC 1050 XC** 1089334 8 tasks, 16 PN devices, Altera® NIOS® II processor, 100 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

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INSPIRING INNOVATIONS

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

XC - Digital Input / Output

Digital Input	Digital Output	Digital Output Digital Input/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 DO8/2 2A XC 1H** 1035427 24 V DC, 2 A, 2-wire
 **AXL F DI32/1 XC 1F** 2701226 24 V DC, 1-wire	 **AXL F DO32/1 XC 1F** 2701230 24 V DC, 500 mA, 1-wire	 **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

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INSPIRING INNOVATIONS

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

XC Process I/Os - Digital Input / Output

Digital Input	Digital Output
 **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 - the block-based modular I/O system

XC - Analog Input / Output

Analog Input	Analog Input Analog Input/Output	Analog Output
 **AXL F AI4 I XC 1H** 2702007 0 … 20 mA, 4 … 20 mA, -20 … +20 mA, 2-, 3-, 4-wire	 **AXL F AI8 XC 1F** 2701232 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-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	 **AXL F AI2 AO2 XC 1H** 1035429 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-wire	 **AXL F AO8 XC 1F** 2701237 0 ... 5 V, -5 ... +5 V, 0 ... 10 V, -10 ... +10 V, 0 ... 20 mA, 4 ... 20 mA, -20 ... +20 mA, 2-wire

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INSPIRING INNOVATIONS

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

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

Analog Input	Analog Output
 **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

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

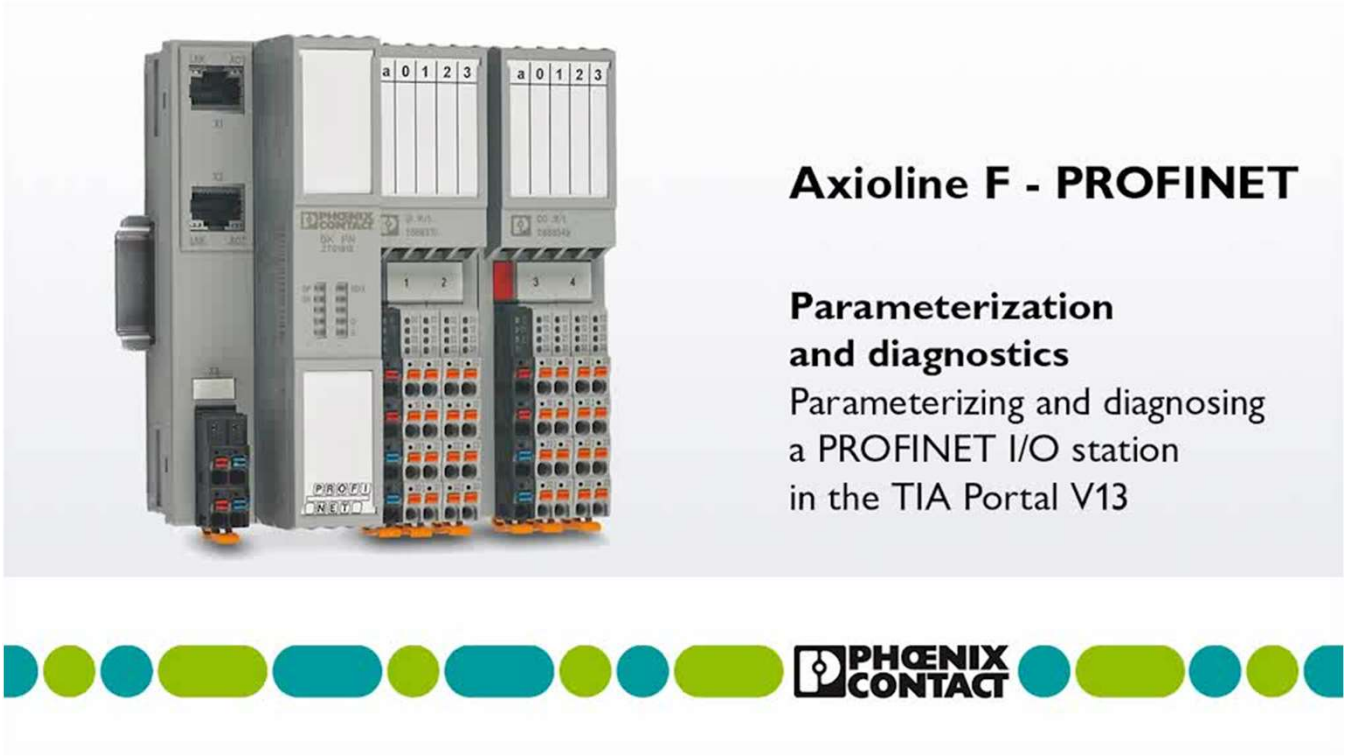
XC - Temperature measurement / Communication / Function

RTD (Resistive Temperature Sensors)	UTH (Thermocouple Sensors) Serial (RS-232, RS-422/485)	Counter, Incremental Encoder Impulse-Input
 **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 CNT2 INC2 XC 1F** 2701239 2 Counter inputs, 32 Bit, 2 Incremental encoder inputs, Input frequency up to 300 kHz
 **AXL F RTD8 XC 1F** 2701235 8 channels, Pt, Ni, KTY, Cu sensors; linear resistance measuring; 2, 3, 4-wire (shielded)	 **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 IMPULSE2 XC 1H** 2702655 2 channels for magnetostrictive position sensors with start/stop interface, 5 stop events per channel, 4 digital inputs

PHOENIX CONTACT
INSPIRING INNOVATIONS

Sistema de control Axioline

Axioline F Parametrization Diagnostic



Video Axioline F Parametrization and Diagnostic

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Sistema de Control Axioline

Axioline SE Smart Elements

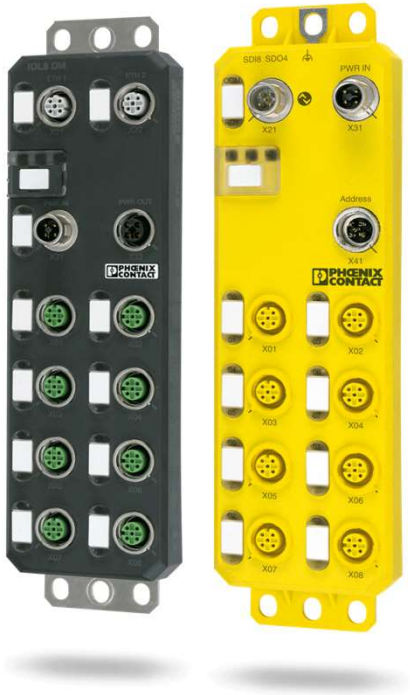
- Un Webinar sobre Axioline SE Smart Elements se realizará próximamente.

Miniaturization in control cabinet building

PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

The Phoenix Contact IO-Link portfolio



IO-Link

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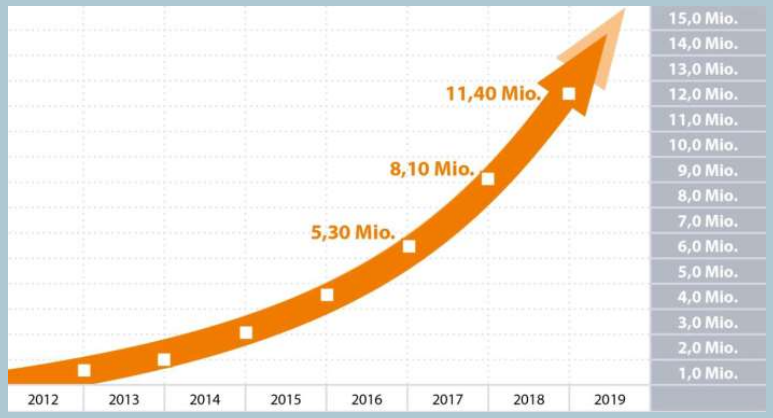
IO-Link portfolio

Fast growing communication standard of industrial automation

Market trend
End of 2018 there have been about 11,40 million IO-Link devices in use.



Source: www.io-link.com

Success factors

- ✓ **Open** standard IEC 61131-9
- ✓ **Simple,** significantly reduced number of interfaces on the sensors/actuators
- ✓ **Consistent** communication between sensors/ actuators and the PLC
- ✓ **Cost-effective** because of non-shielded cabling

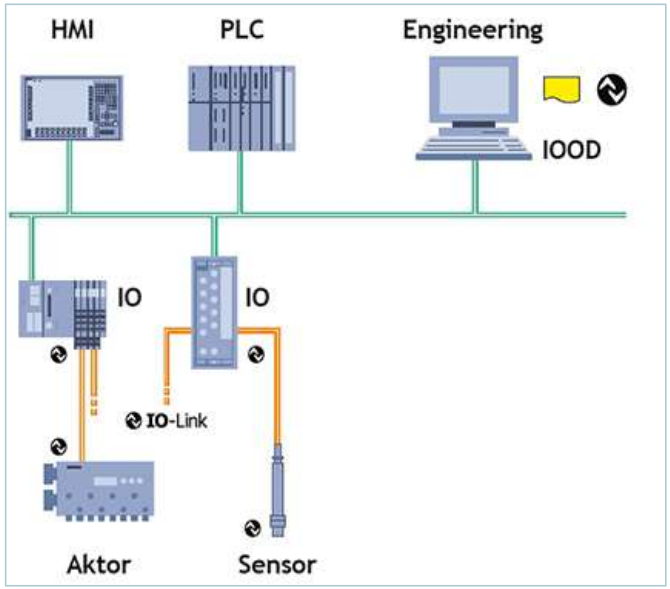
PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

Components of an IO-Link system

An IO-Link system basically consists of the following components:

- IO-Link master
- IO-Link device (e.g. sensors, RFID reader, valves, motor starter, I/O modules)
- Unshielded 3- or 5-wire standard cables
- Engineering tool for project planning and parameterization of IO-Link



Source: www.io-link.com

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INSPIRING INNOVATIONS

IO-Link portfolio

The Phoenix Contact IO-Link portfolio

IO-Link master


new

Axioline F Master

IP20


new

Standalone Master

IP20

Axioline E Master

IP67

Interface to superior control system

IO-Link devices


new

Safety relay

IP20

Circuit breaker

IP20

Hybrid motor starter

IP20


new

Safe I/O Box

IP67

I/O Box

IP67

For all sensors or actuators connected to the system

Software


new

Software IOL-CONF

Parameterisation

Consistent communication from the control cabinet to the field level

PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

Standalone IO-Link master

Available SPS 18

IO-Link master for the cabinet

- 8 IO-Link Ports
- 4 additional digital inputs
- Configuration by web server
- IO-Link V1.1 compatible

Order information:

IOL MA8 PN DI8 (1072838) for PROFINET

IOL MA8 EIP DI8 (1072839) for Ethernet/IP™

PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

Axioline F IO-Link master

Available SPS 18

IO-Link master for Axioline F I/O system

- 8 IO-Link ports type A
- IO-Link V1.1 compatible
- 200 mA at C/Q, 2A at L+/L- (total 8A)

Order information:

AXL F IOL8 2H (1027843)

Total functionality until Hannover Fair 2019 only with AXL F ETH BK

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INSPIRING INNOVATIONS

IO-Link portfolio

Axioline E IO-Link master

Available

IO-Link master for Axioline E I/O system

- 4 IO-Link ports type A, 4 IO-Link Ports type B
- IO-Link V1.1 compatible
- M12 power connector

Order information:

AXL E xx IOL8 DI4 M12 6M (metal housing)
AXL E xx IOL8 DI4 M12 6P (plastic housing)

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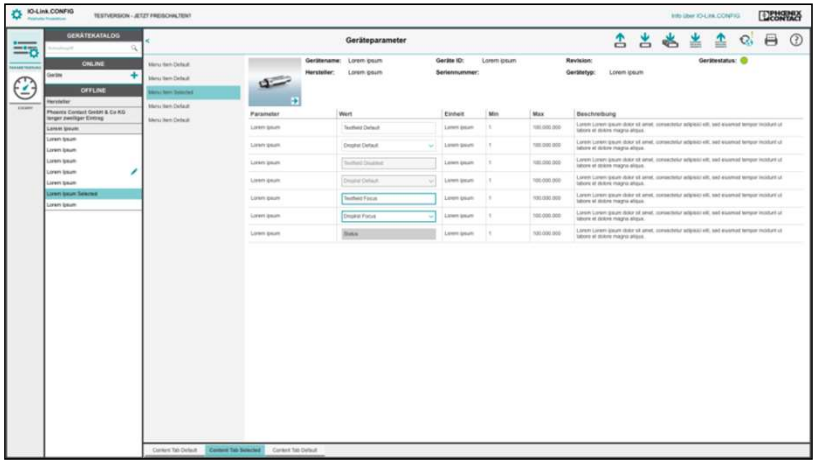
IO-Link portfolio

Software IOL-CONF

Available HM 2019



Software for IO-Link device configuration

- Configuration of each IO-Link Device
- Easy integration of IODD
- Visualization of device process data

Order information:

IOL-CONF (1083065) download

PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

Axioline E IO-Link I/O Boxes

Available

I/O Boxes for digital inputs and outputs in the field

- IO-Link V1.1 compatible
- 8 or 16 digital input channels
- 8 digital output channels

Order information:

AXL E IOL DI8 M12 6P (2702658)
AXL E IOL DI16 M12 6P (2702660)
AXL E IOL DO8 M12 6P (2702659)

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INSPIRING INNOVATIONS

IO-Link portfolio

Axioline E IO-Link Converter

Available HM 2019

Converter for analog Signals to IO-Link

- Input / output for analog signals (voltage / ampere)
- Input / output for temperature signals (RTD)
- 4 TC-Input channels (Type K)

Order information:

AXL E IOL TC4 K M12 (2702983)
AXL E IOL Ax….
AXL E IOL RTD…

PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

Non-contact safety switch with diagnostics

Available SPS 2018

Non-contact safety switch PSRswitch with safety relay PSRmini

- Up to 32 switches in line
- Additional input for safety switch
- Combination with safety relay PSRmini PSR-MC42 for intelligent diagnostics via IO-Link

Order information:

PSR-MC42-2NO-1DO-24DC-SC (2702901, 2702902)
PSR-CT-F-SEN-1-8 (2702976) Fixcode sensor
PSR-CT-C-SEN-1-8 (2702972) Unicode sensor
PSR-CT-M-SEN-1-8 (2702975) Multicode sensor
PSR-CT-C-ACT (2702973) actuator

PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link portfolio

Axioline E Safety IO-Link I/O Box

Available HM 2019

IO-Link I/O Box with safety digital inputs and outputs

- Suitable for PROFIsafe or SafetyBridge Technology
- 8 digital inputs
- 4 digital outputs

Order information:

AXL E IOL SDI8 SDO4 2A M12 6P (2702833)

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INSPIRING INNOVATIONS

IO-Link portfolio

Hybrid Motor Starter with IO-Link

Available

Hybrid Motor Starter CONTACTRON pro with IO-Link interface

- Motor protection
- Current measuring
- Extended diagnostic

Order information:

ELR H5-IES-PT/500AC-3-IOL (2908669)
ELR H5-IES-PT/500AC-9-IOL (2908670)
ELR H3-IES-PT/500AC-3-IOL (2908671)
ELR H3-IES-PT/500AC-9-IOL (2908672)

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INSPIRING INNOVATIONS

IO-Link portfolio

Electronic Circuit Breaker

Available

Circuit Breaker multichannel compact with IO-Link

- Current limitation from 1…10A or 1…4A
- Extended diagnostics
- Adjustable by button or IO-Link

Orderinformation:

CBMC E4 24DC/1-10A IOL (2910411)
CBMC E4 24DC/1-47A+ IOL (2910410)

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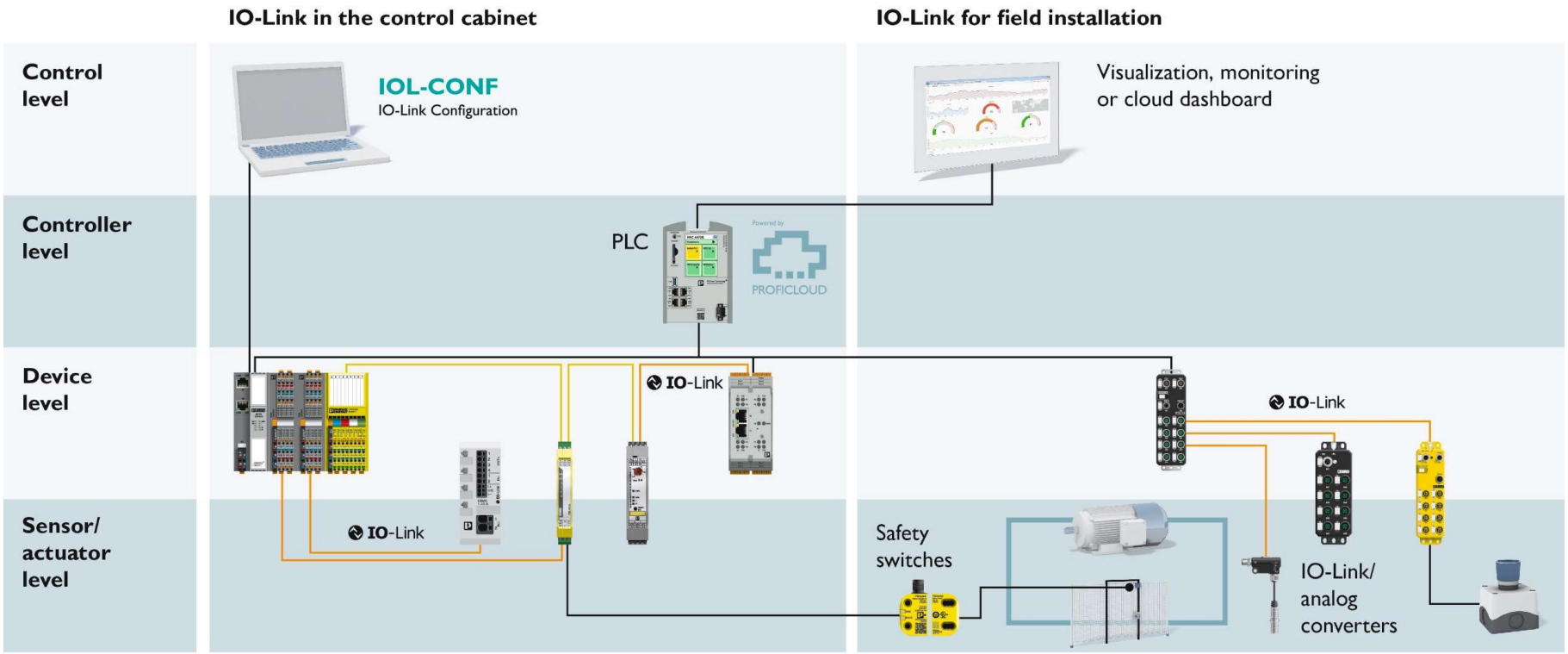
IO-Link portfolio

IO-Link products from Phoenix Contact



PHOENIX CONTACT
INSPIRING INNOVATIONS

IO-Link in the Axioline E system

IO-Link

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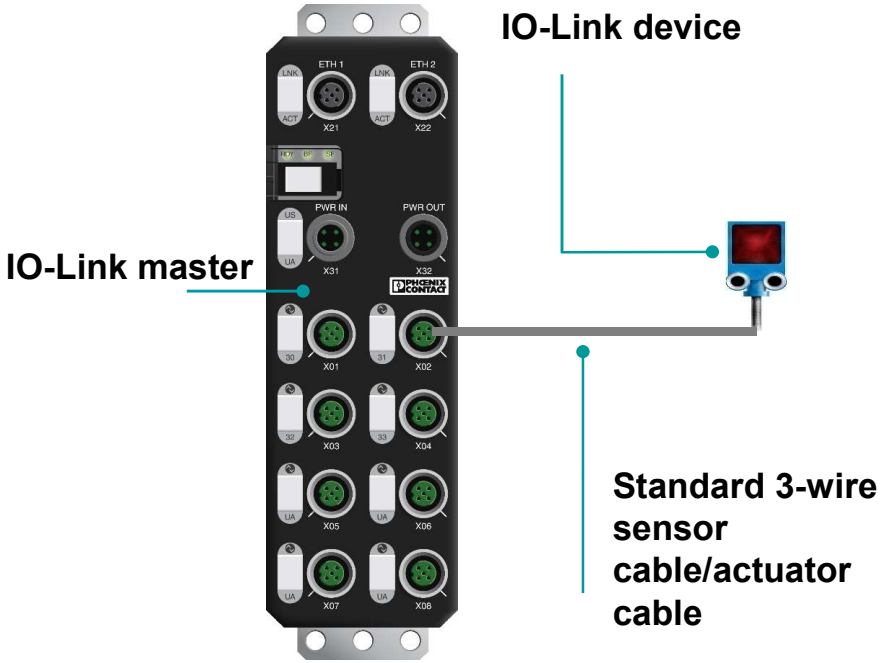
INSPIRING INNOVATIONS

What is IO-Link?

- Standardized IO-technology (IEC 61131-9) focussing the communication between field devices and PLC
- Direct point-to-point communication based on 3-wire sensor/actuator connection
- Current specification: IO-Link spec V1.1

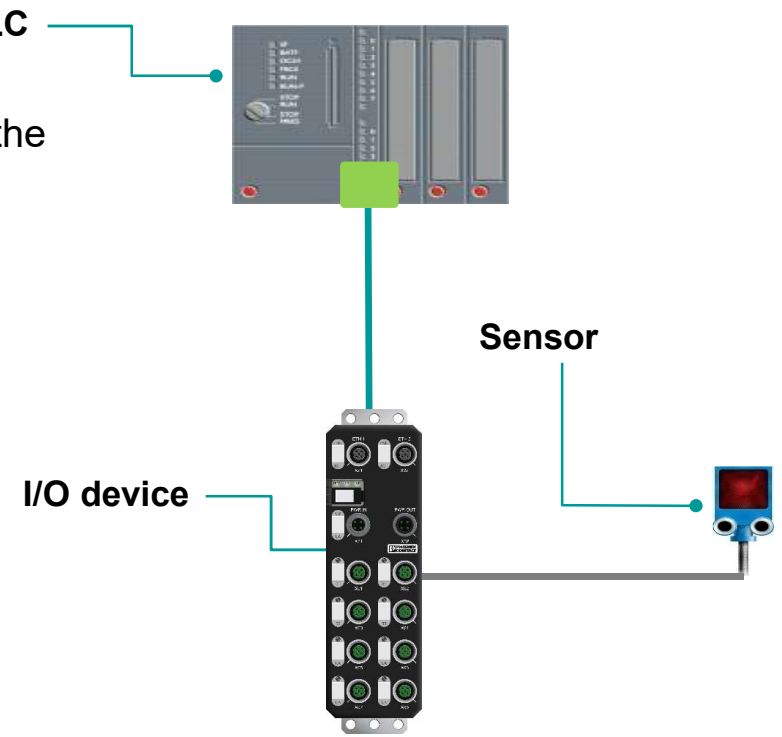
System components

- An IO-Link system consists of:
  - IO-Link master
  - IO-Link devices
  - Standard 3-wire sensor cable/actuator cable



Data transfer conventional

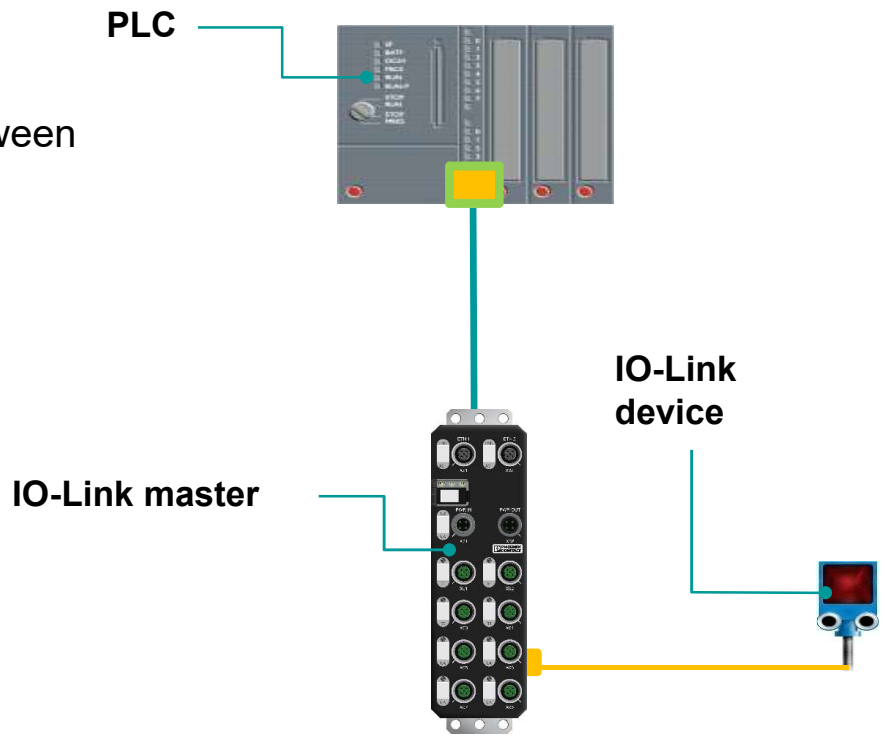
- Data transfer via data packages (Ethernet)
- Transfer of process data, parameters and diagnostics between the PLC and the I/O device



Data packages (example Ethernet)

Data transfer via IO-Link

- Data transfer via data packages (Ethernet)
- Transferring process data, parameters and diagnosis between controller and IO-Link device through the IO-Link master



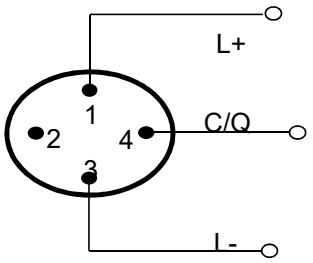
Data packages (example Ethernet)

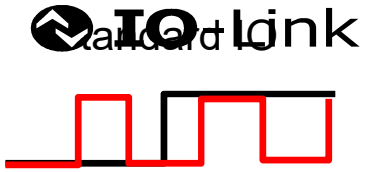
IO-Link data package

Functional principle

- 3-wire connection
- Function of any Port is adjustustable:
  - Standard IO (SIO)
  - IO-Link
- Transfer of:
  - Cyclic process data
  - Device-parameters (acyclic)
  - Events

PHYSICAL LAYER





Portfolio

PHOENIX CONTACT
INSPIRING INNOVATIONS

Overview of IO-Link componets for Axioline E

IO-Link master

IO-Link master

IO-Link device

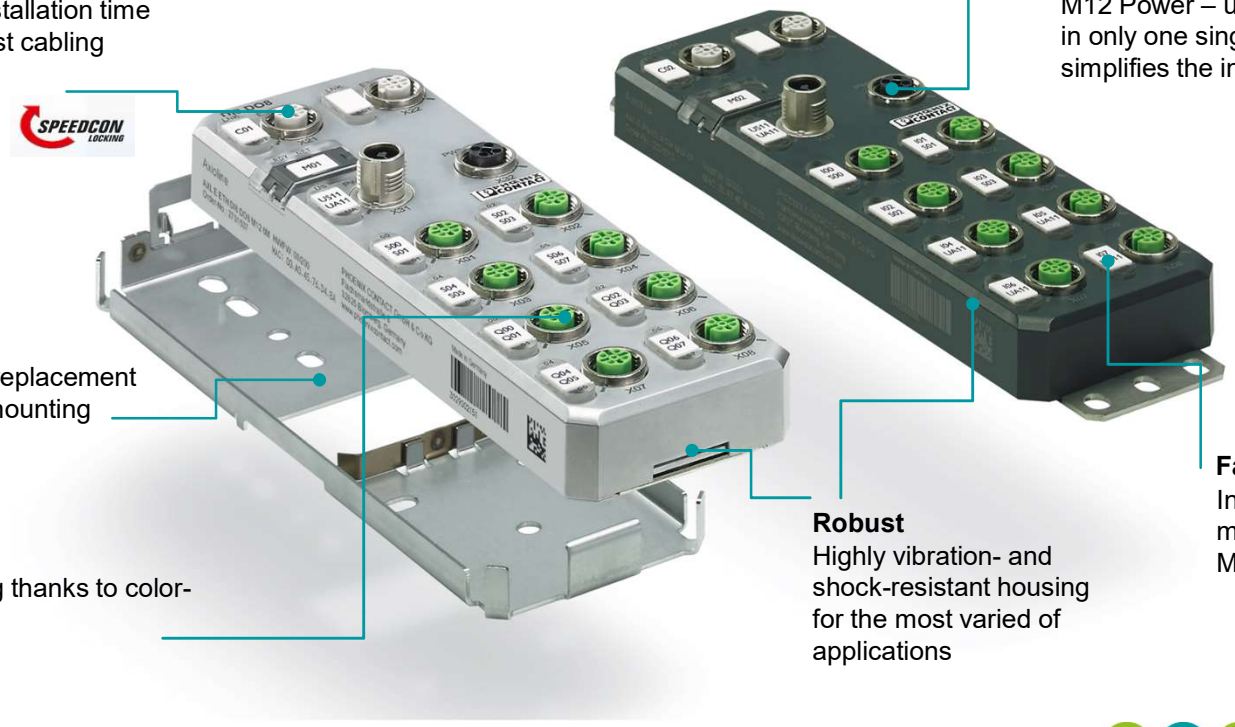
IO-Link device

IO-Link

Axioline E – fast, robust, easy

Fast
Reduced installation time thanks to fast cabling

Easy
M12 Power – up to 2 x 12 A in only one single cable simplifies the installation



Fast
Tool-free device replacement when using the mounting plate

Easy
Simplified cabling thanks to color-coded functions

Robust
Highly vibration- and shock-resistant housing for the most varied of applications

Fast
Individual and fast marking thanks to MARKING system-Printing systems

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IO-Link

IO-Link-Master für Axioline E

Axioline E xxx IOL8 DI4

- Degree of protection IP65/67
- Metal and plastic housing
- Available for all leading industrial protocols
- IO-Link spec.
  - Acc. IO-Link spec V 1.1
  - 4 Type A ports
  - 4 Type B ports
- 4 Additional DIs onboard

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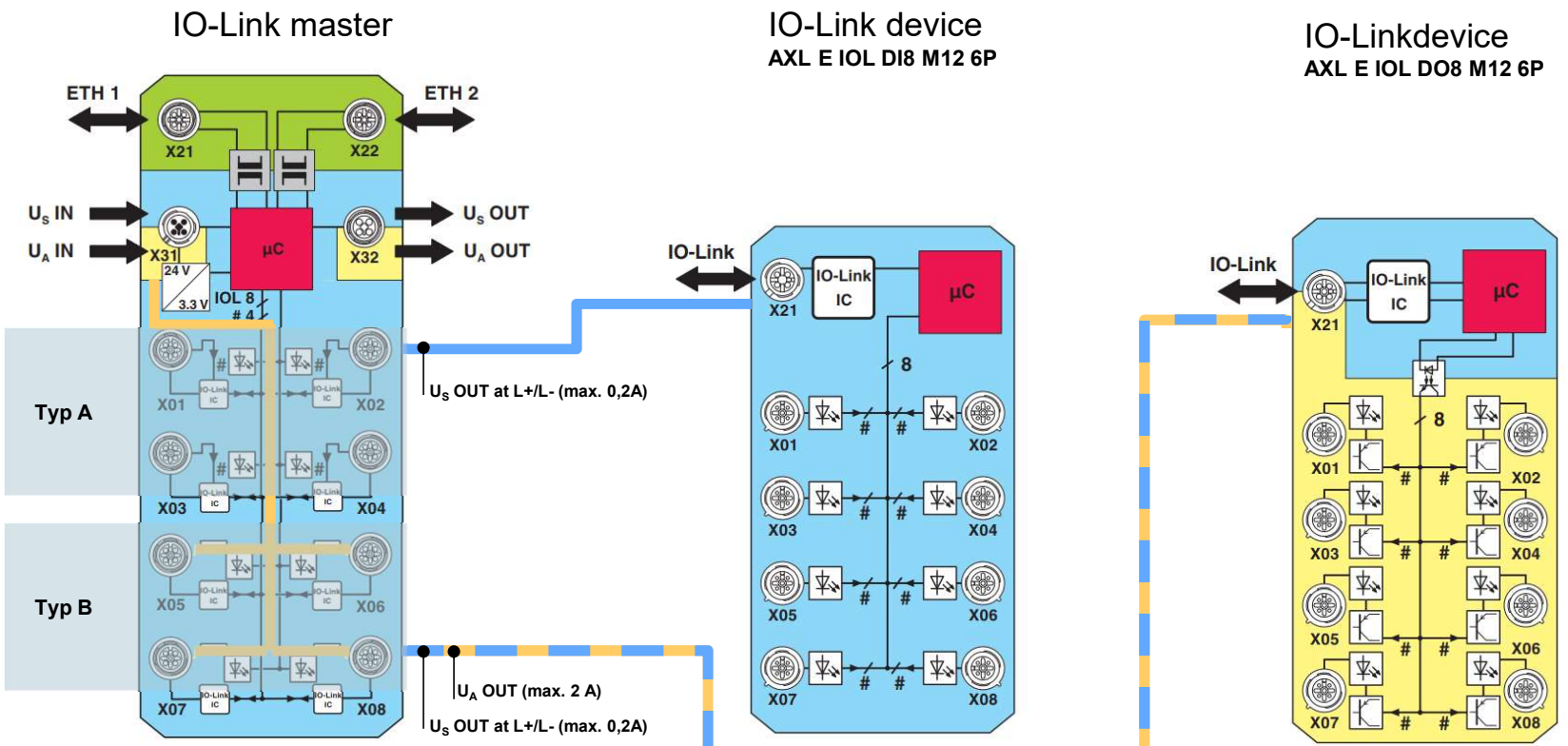
Power supply concept IO-Link



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IO-Link devices – digital I/O boxes

- Variants:
  - 8 digital inputs
  - 8 digital outputs, 500 mA
- Techical design:
  - 8 x M12
  - 60 mm width

IO-Link devices – Analog communication

Axioline E IOL1 xxx

- Analog converters using IO-Link as communication protocol
- Straight or rectangular design
- IO-Link spec V 1.1
- 12 Bit resolution
- Available functions:
  - AI-I 4-20mA
  - AI-U 0-10V
  - AO-I 4-20mA
  - AO-U 0-10V
  - RTD (PT100/PT1000)

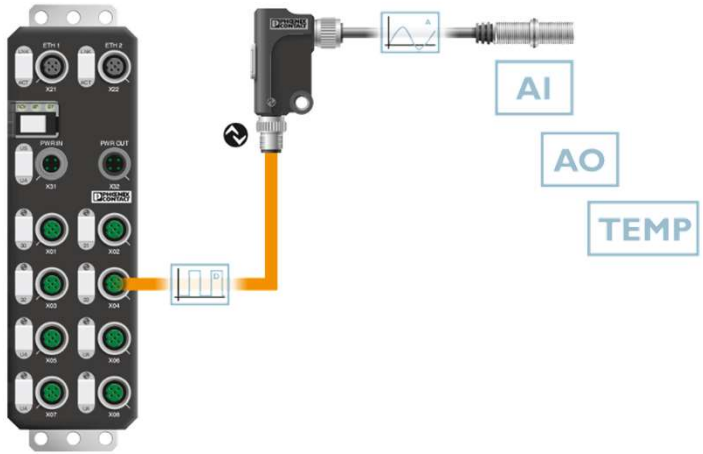
Application benefits

IO-Link-Devices - Analog communication

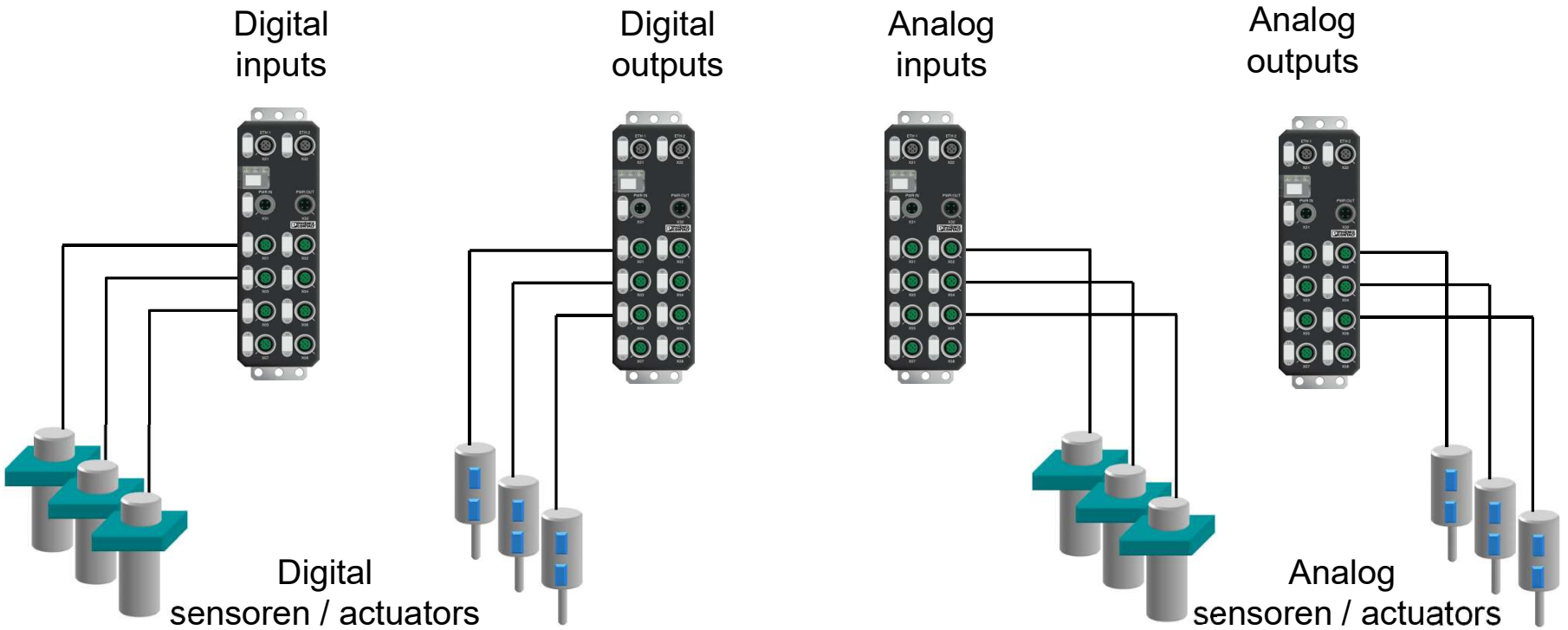
- Capture and output analog signals via IO-Link and analog converters
- M12-connection method for direct assembly at sensor or acuator

Advantages:

- ✓ No longer need of shielded cables due to digital data transmission
- ✓ Enhanced EMC behaviour
- ✓ Needs-based use of analog function at the device
- ✓ One end device for all signals will reduce storage cost



Standardisation of the decentralized periphery



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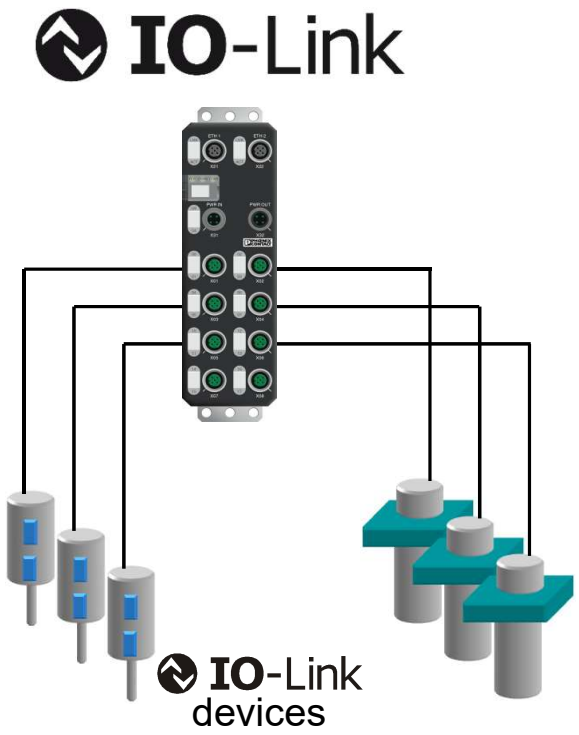
Standardisation of the decentralized periphery



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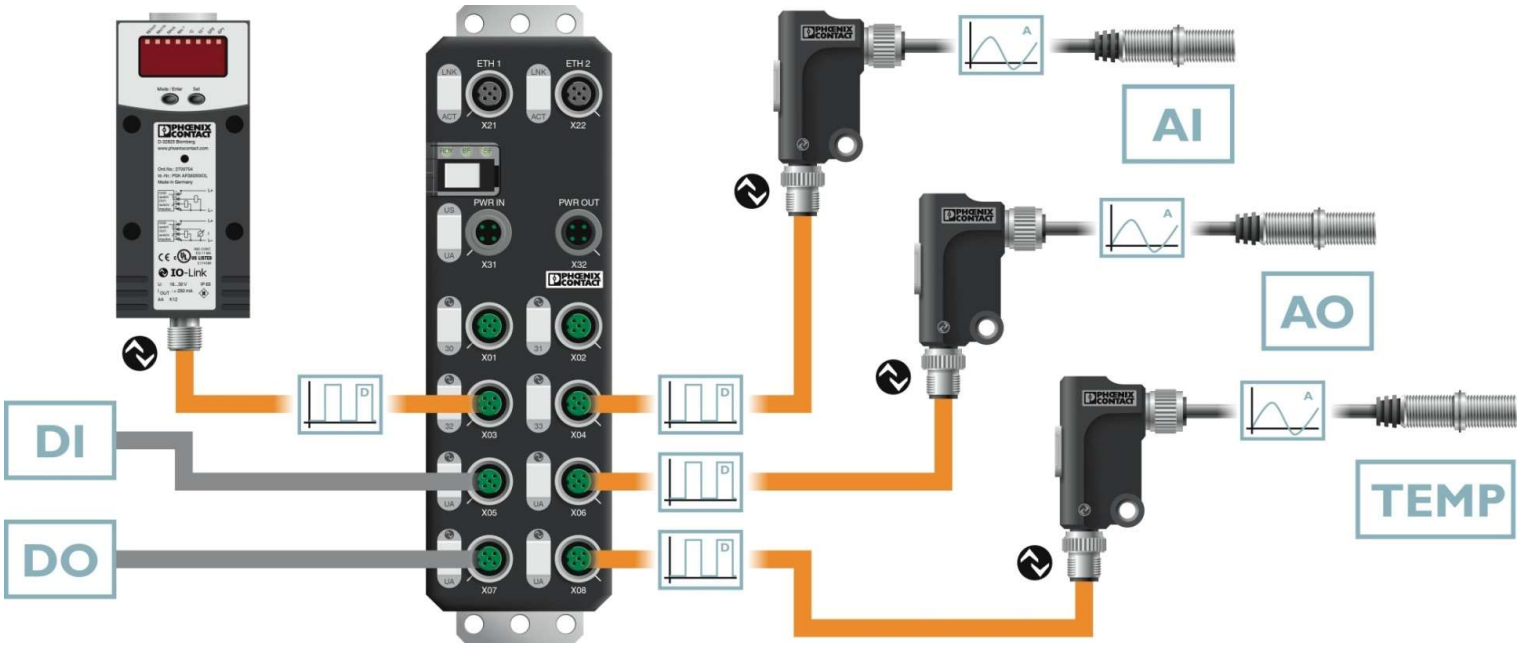
One device– numerous possibilities



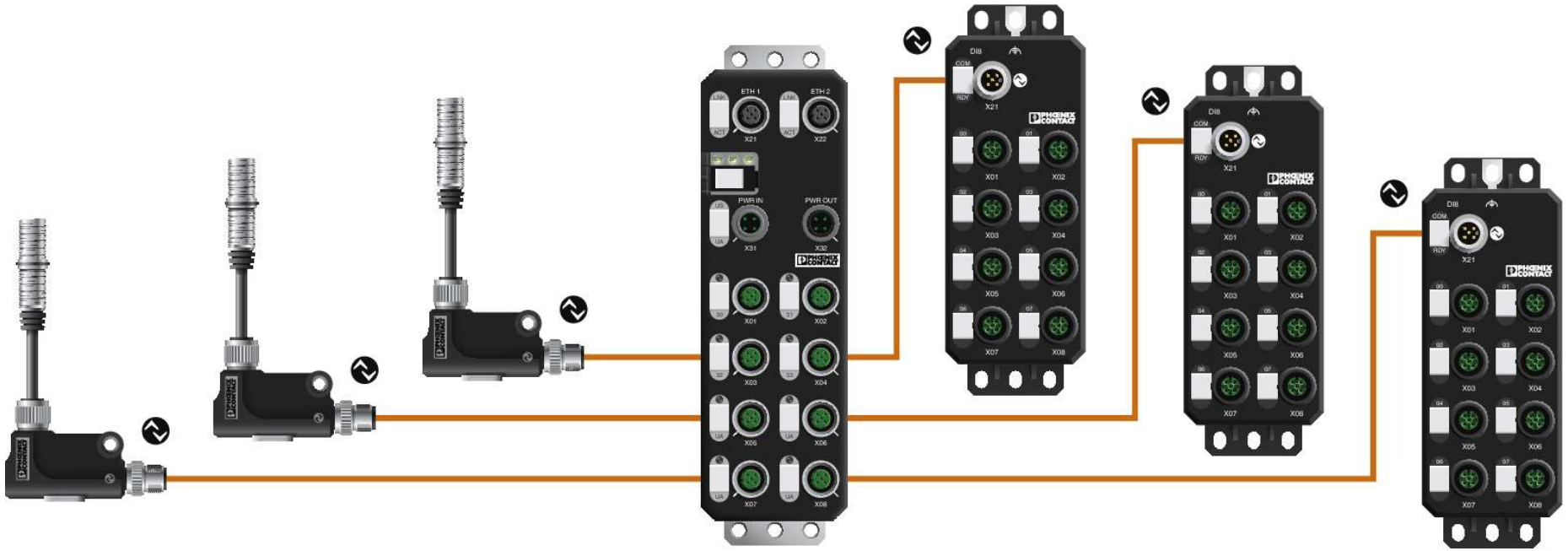
Configuration possibilities

Configurations*	DI	DO	IO-Link
IOL8 DI4	4	0	8
DI12	12	0	0
DI4 DO8	4	8	0
IOL4 DI8	8	0	4
IOL4 DI4 DO4	4	4	4
IOL2 DI4 DO6	4	6	2
IOL2 DI8 DO2	8	2	2
IOL6 DI4 DO2	4	2	6

* This overview does not display every configuration

IO-Link

Modularity in the field



IO-Link devices extend the functional scope of an Axioline E device

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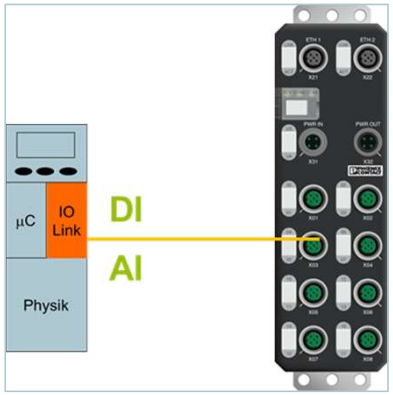
IO-Link

Reducing the installation effort

- Data transfer of different signals in only one unshielded 3-wire cable
- Reduced cabling and dimensions of the field device for more diagnosis and functionality



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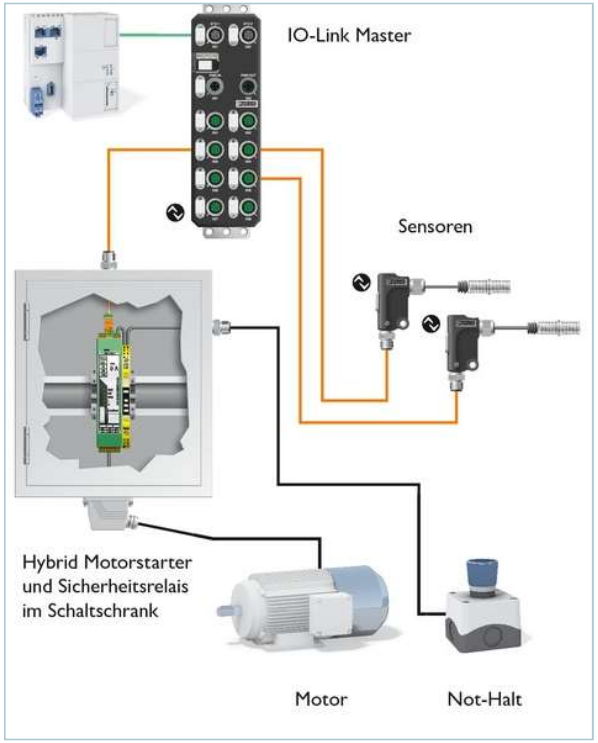
Further IO-Link devices

Hybrid motor starter CONTACTRON with IO-Link

Switch and reverse motors quickly and reliably with the CONTACTRON hybrid motor starters. The new linkable variants enable continuous communication between the field and controller levels so that process data can be transferred easily.

- IO-Link interface for direct connection and transmission of process data
- Flexible use in central control cabinet and in the decentralized control box
- Increased system availability, thanks to service intervals based on process data
- Low-wear switching using hybrid technolog
- Compact design saves space in the application



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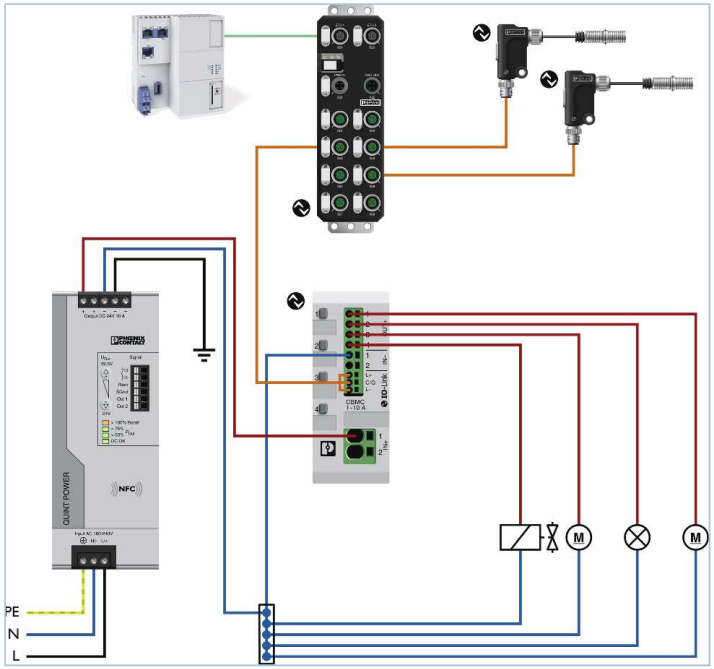
Further IO-Link devices

Multi-channel electronic circuit breakers with IO-Link

The new electronic CBMC device circuit breakers combine compact design and the ability to be adjusted individually. This circuit breaker can easily and flexibly adjust currents, save space, and reliably protect all applications with just one device.

- Four independent channels
- Nominal current adjustable in 1 A increments
- Floating remote indication contact
- Individual marking options
- Electronic protection of overload and short-circuit currents
- Rated voltage: 24 V DC
- Push-in connection



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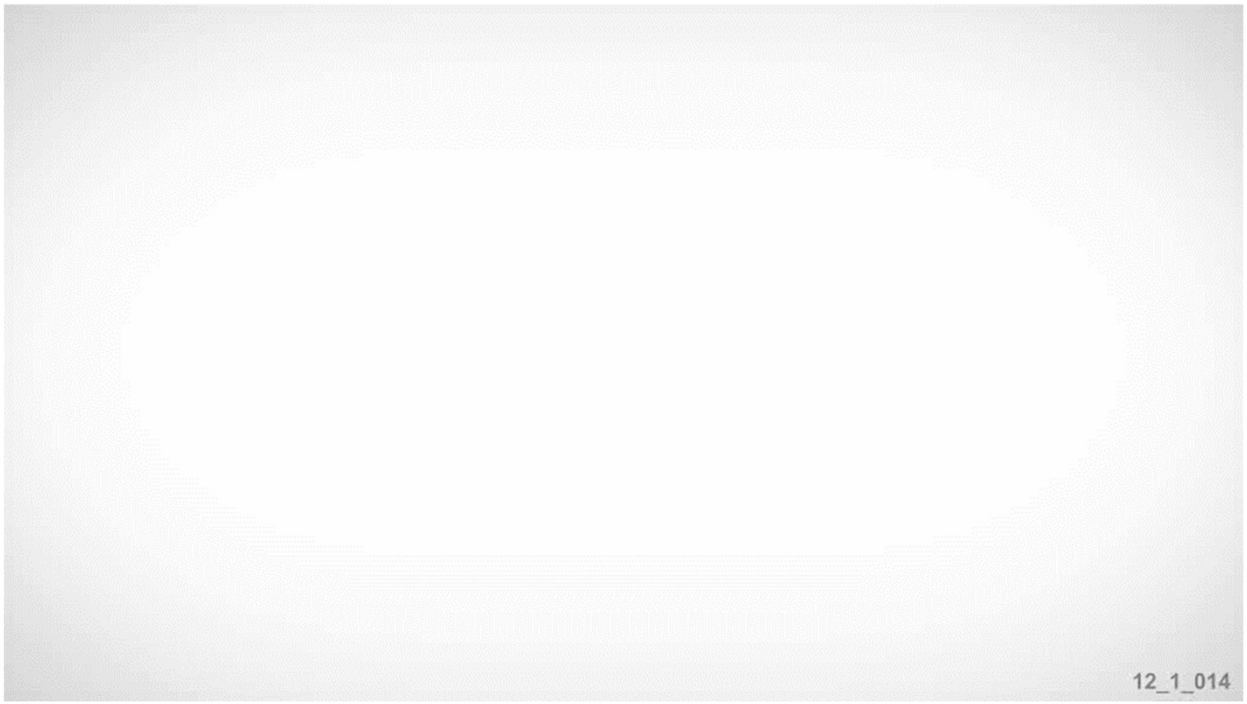
Sistemas de Control

Axioline E



Link

Axioline E Connecting With IO-Link

Link

Axioline E DIO 16

Videos Axioline E Application

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