



Antonio Gordillo

IMA

Enero 2021

# Welcome

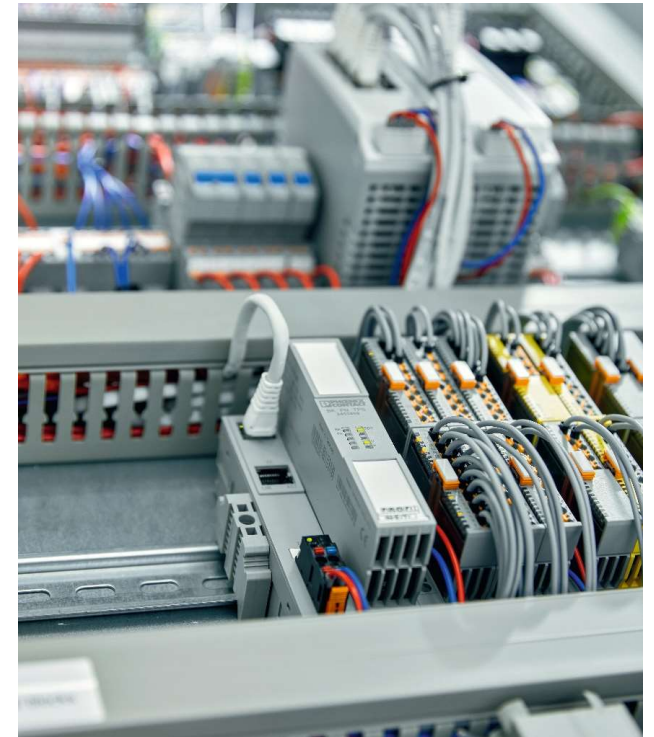
## Sistema modular Axioline F de Entradas y Salidas

Webinars

# Agenda

---

- Oferta Axioline F
  - Actualización IO-Link
  - Project+ 3.6
  - Arquitecturas
- 



Webinar IMA Enero 2021

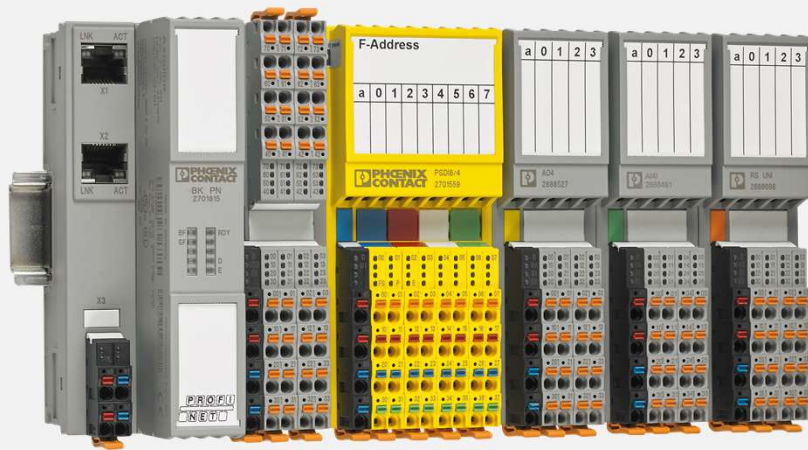
## Sistema modular Axioline F de Entradas y Salidas



|          |               |
|----------|---------------|
| Fecha    | 14 Enero 2021 |
| Hora     | 9:00          |
| Hora     |               |
| Duración | 1 hora        |
| Costo    | gratuito      |

Un mayor conocimiento sobre el Sistema modular Axioline F y sus alternativas de módulos de Control, nuevos módulos de control de seguridad, acopladores de bus y módulos especiales serán presentados.

En el desarrollo de la sesión se orientará con mayor profundidad de las reglas y todos los elementos disponibles de este Sistema modular Axioline F desde sus herramientas para selección, programación, puesta en marcha, diagnóstico así como descubrir las mejores arquitecturas al utilizar módulos Axioline SE, nuevos controladores de expansión para seguridad, Arquitecturas SBT y módulos especiales para áreas peligrosas.



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

TECHNICS



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
- 



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

## Axioline F – the specialist in the control cabinet

PLCnext Control  
or bus coupler

combined with Axioline  
Smart Elements

robust mechanical  
design

Tool-free  
installation

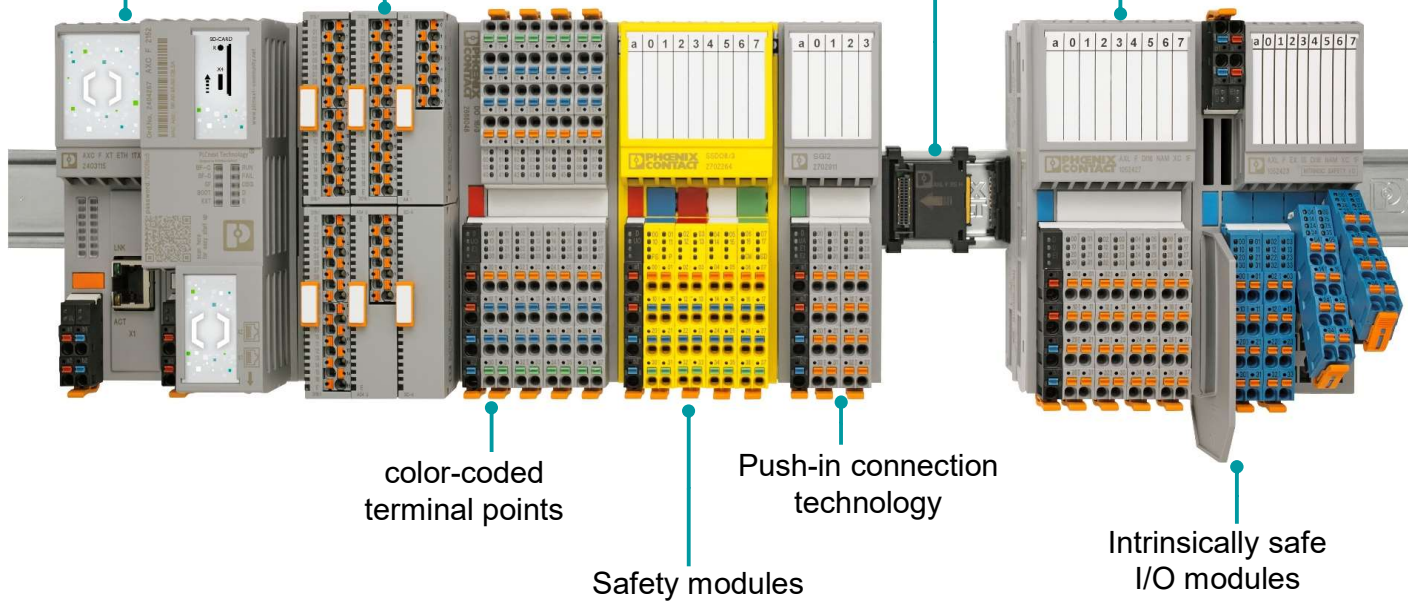
Plug-in I/O  
connection

color-coded  
terminal points

Push-in connection  
technology

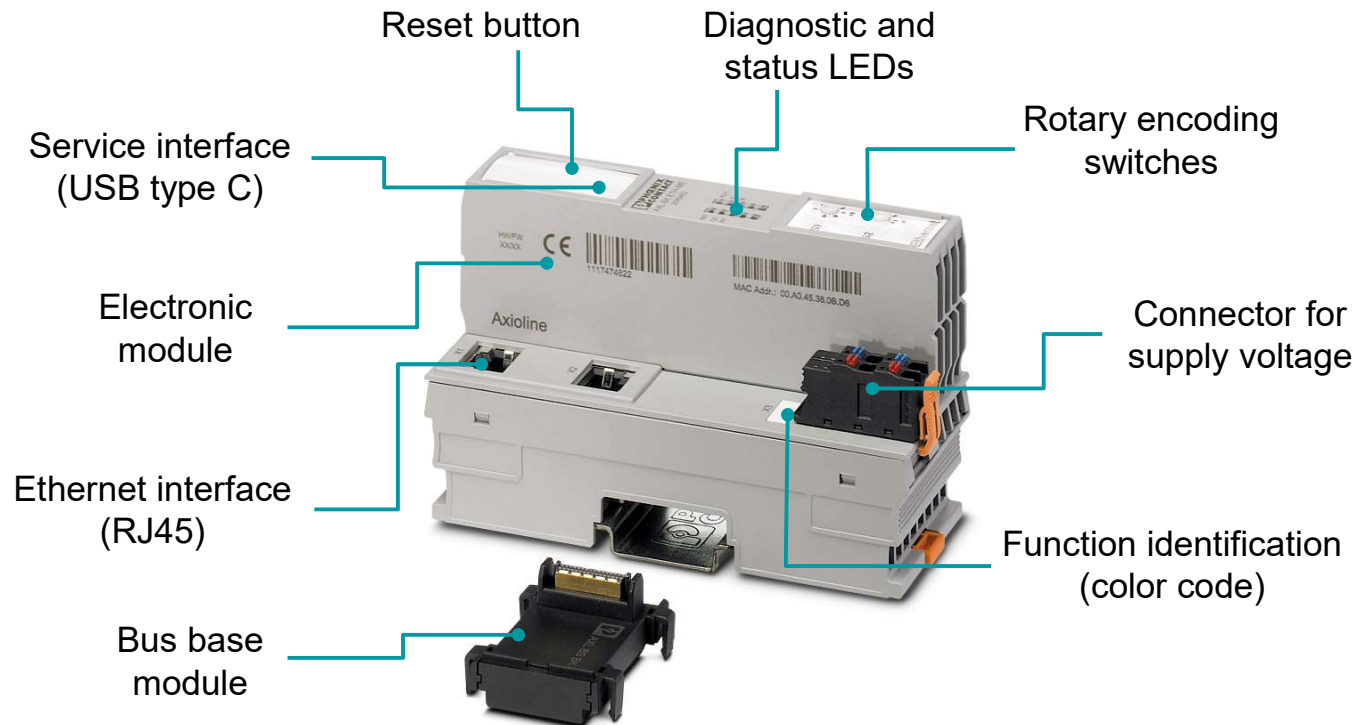
Safety modules

Intrinsically safe  
I/O modules



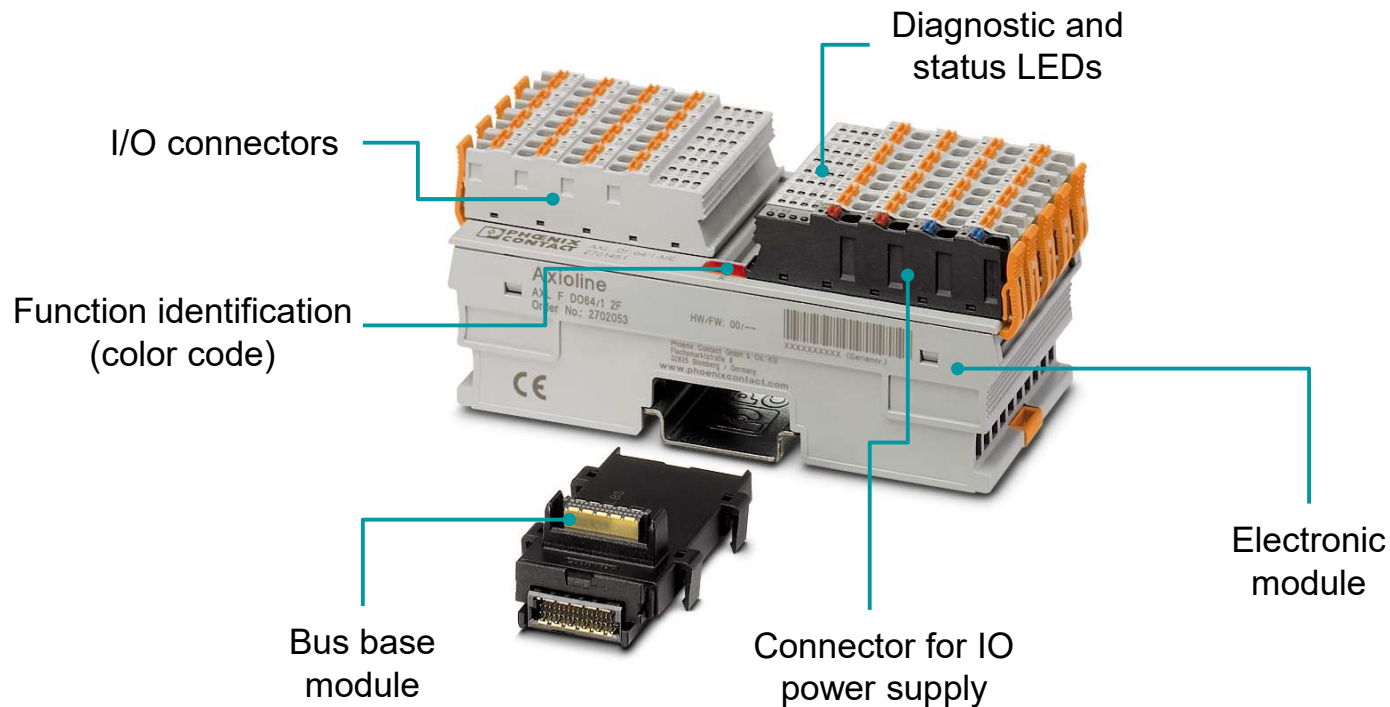
Axioline F - the block-based modular I/O system

## Components of an Axioline F bus coupler



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

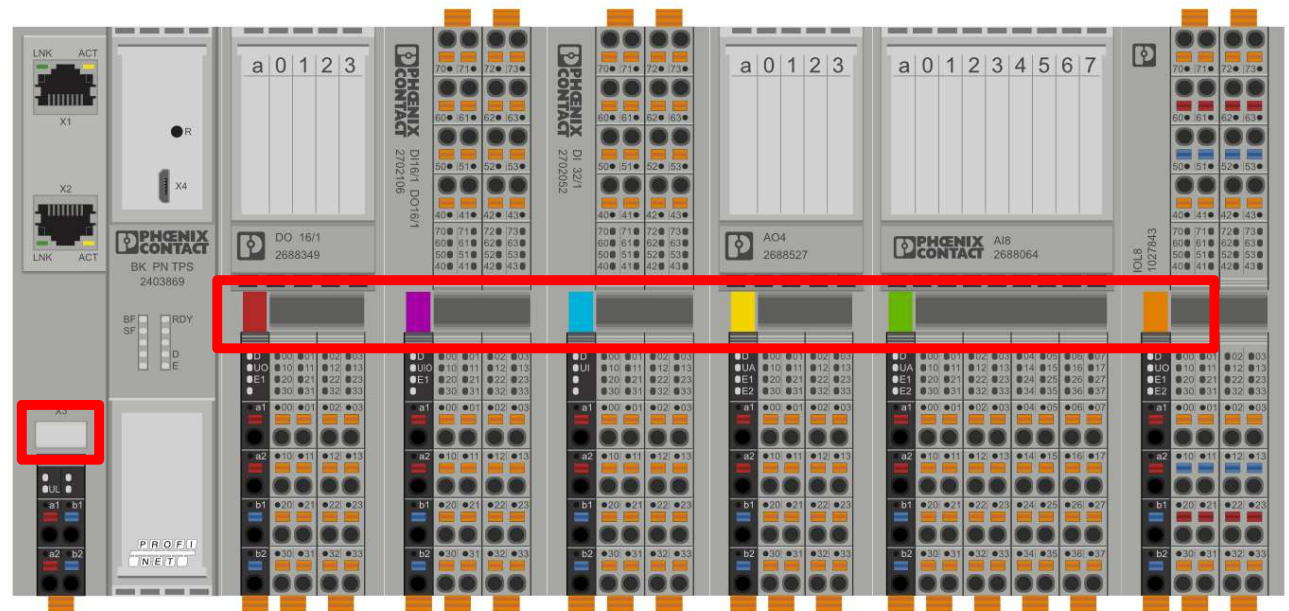
## Components of an Axioline F I/O module



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

## Function identification via color code

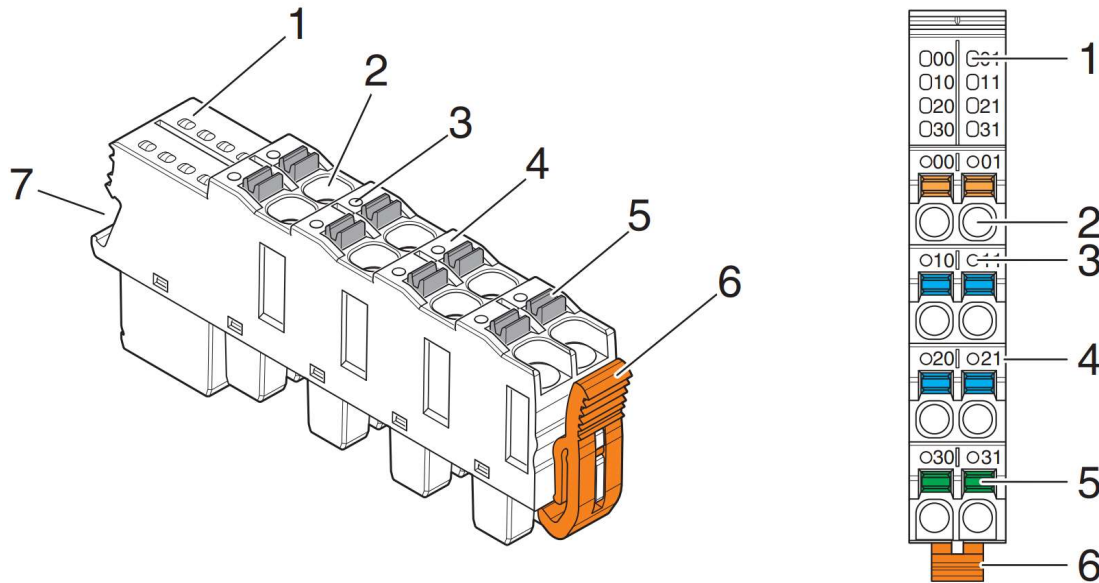
|  |                          |
|--|--------------------------|
|  | Bus coupler / PWR        |
|  | Digital input            |
|  | Digital output           |
|  | Digital input / output   |
|  | Analog input             |
|  | Temperature measurement  |
|  | Analog output            |
|  | Function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





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

## Basic design of an Axioline F connector

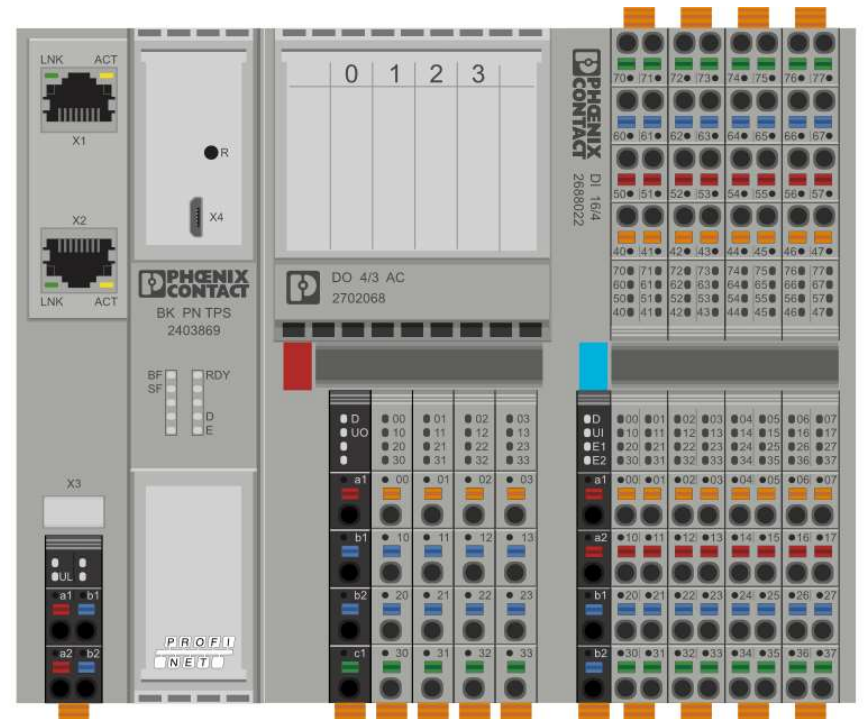


1. Local diagnostic and status LEDs
2. Terminal point
3. Touch connection  
(Measuring point)
4. Terminal point marking
5. Colored spring lever
6. Locking latch
7. Space for connector marking  
("ZBF 10/5,8 AXL" or "ZBF 5")

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

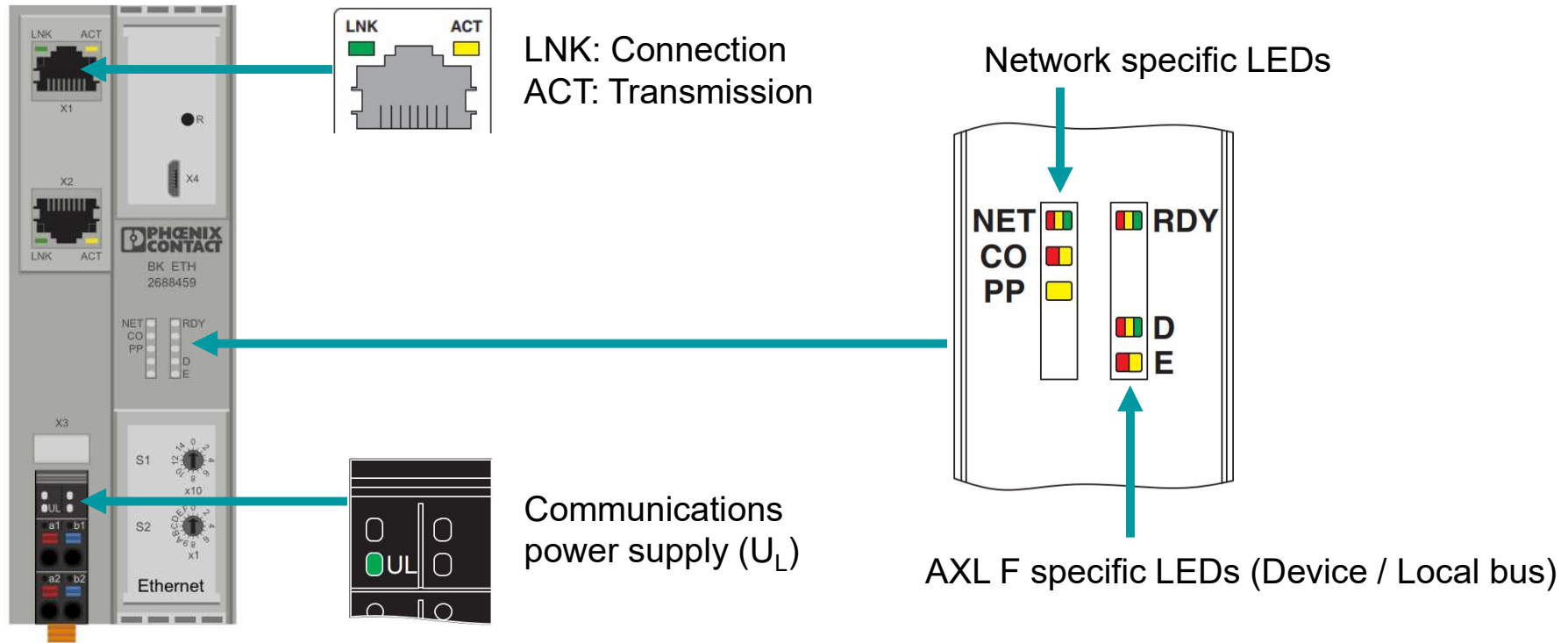
## Color coded terminal points (spring lever)

| 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<br>(neutral conductor)               |
|  | FE<br>(functional ground)       | PE<br>(protective conductor)           |



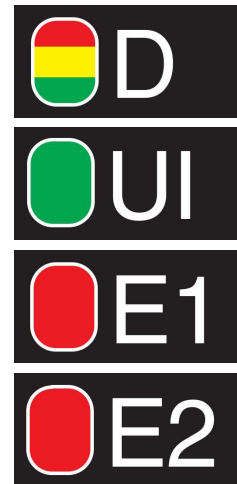
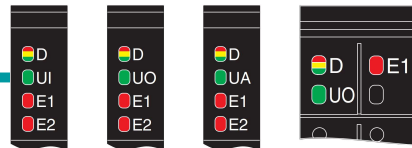
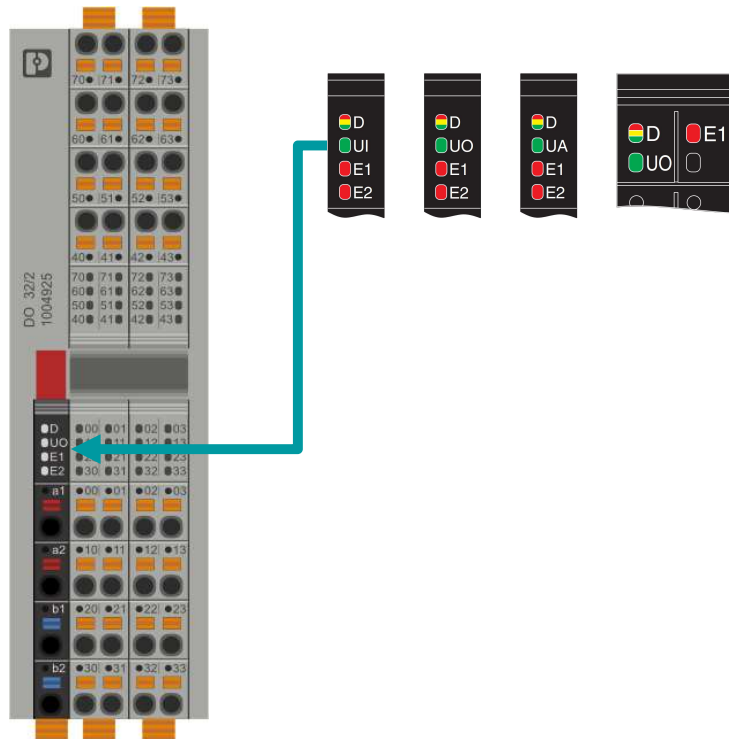
Axioline F - the block-based modular I/O system

## Diagnostic LEDs of bus couplers



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

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



Diagnostics of local bus communication

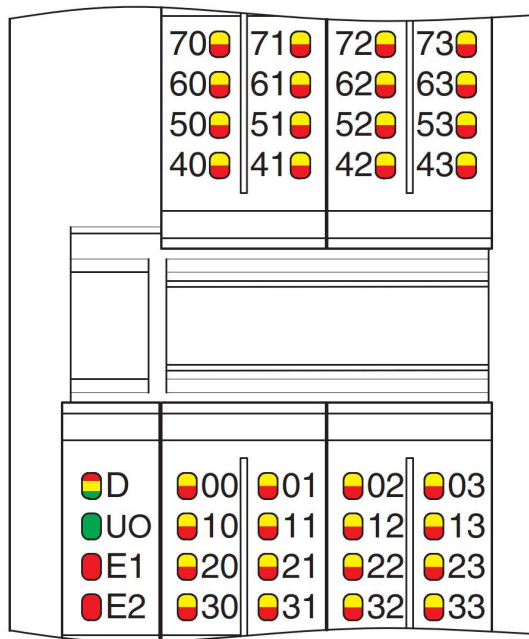
I/O supply ( $U_I$ ,  $U_O$ ,  $U_{IO}$ ,  $U_A$ )

I/O error (entire device)

Channel error

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

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

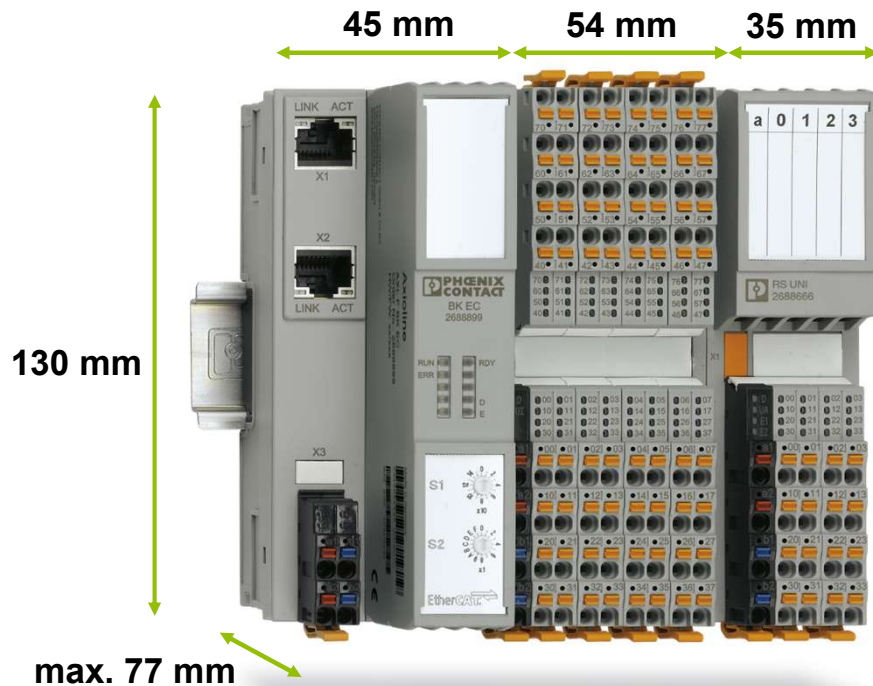


- LEDs are numbered according to terminal points
- Yellow → Status of the input or output
- Red → Diagnostics of the output



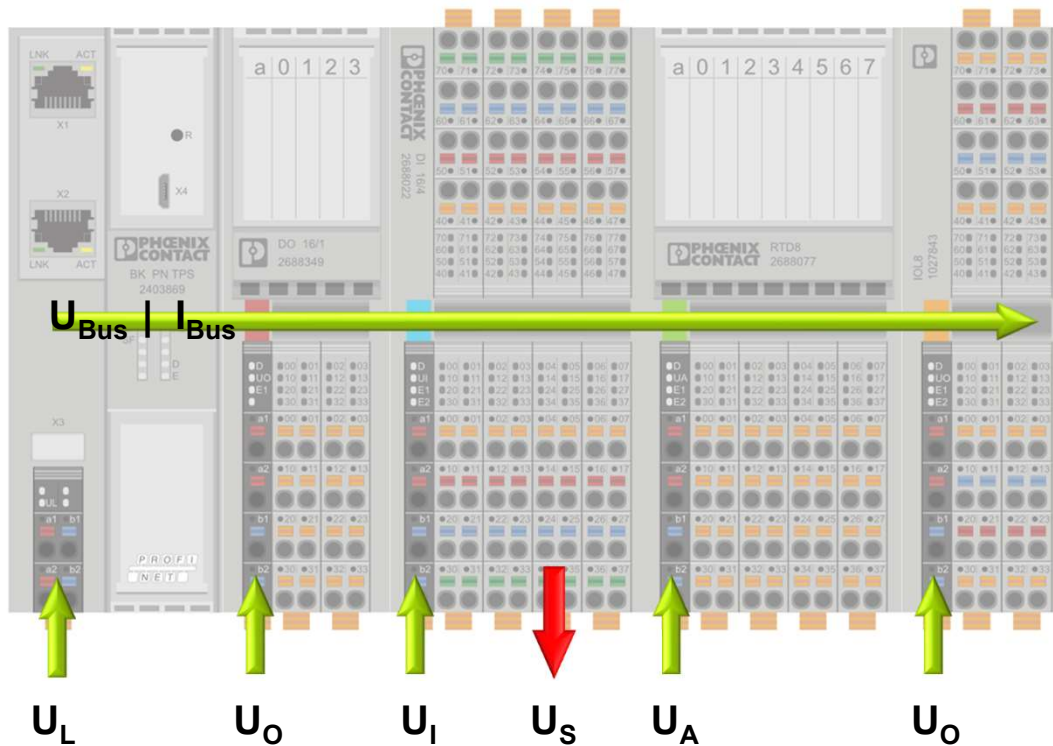
Axioline F - the block-based modular I/O system

## Module dimensions



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

## Axioline F system supply

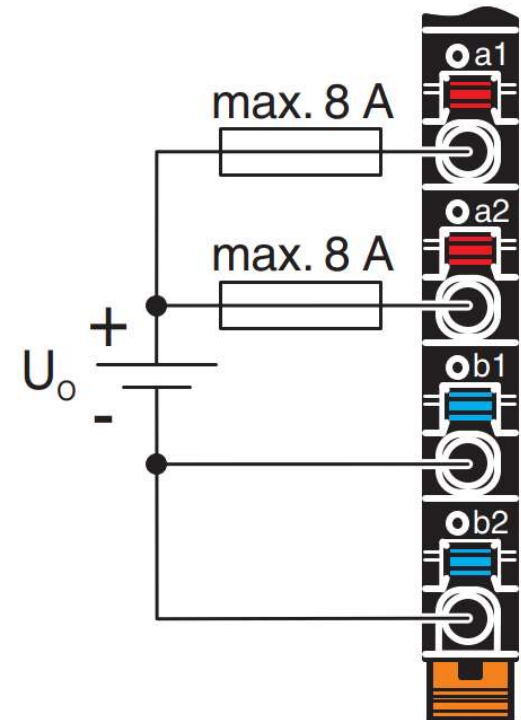


- $U_L$  ( $U_{Logic}$ ) Communications power supply
- $I_{Bus}$  ( $I_{Bus}$ ) Local bus
- $U_{Bus}$  ( $U_{Bus}$ ) Local bus (gen. from  $U_L$ )
- $U_I$  ( $U_{Input}$ ) Digital input modules
- $U_S$  ( $U_{Sensor}$ ) Sensor supply (gen. from  $U_I$ )
- $U_O$  ( $U_{Output}$ ) Digital output modules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

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

## Parallel power supply for more than 8 A

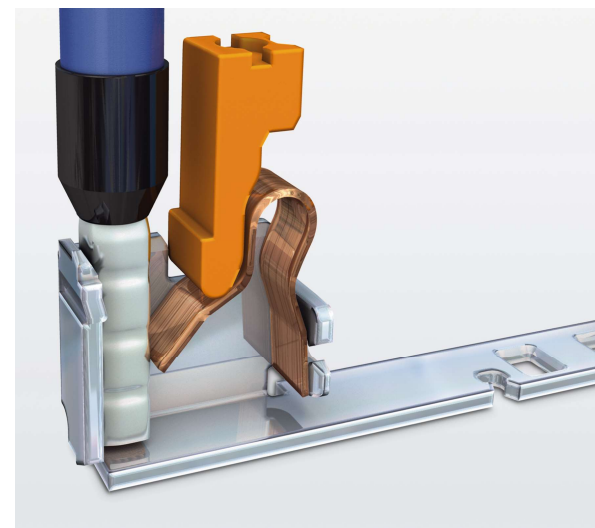
- Maximum current consumption of a terminal point → 8 A
- Example:
  - AXL F DO32/1 2H → 32 channels \* 0,5 A = 16 A
  - Power supply ( $U_O$ ) via one single terminal point limited up to 8 A
  - → Parallel power supply for  $U_O$  up to 16 A



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

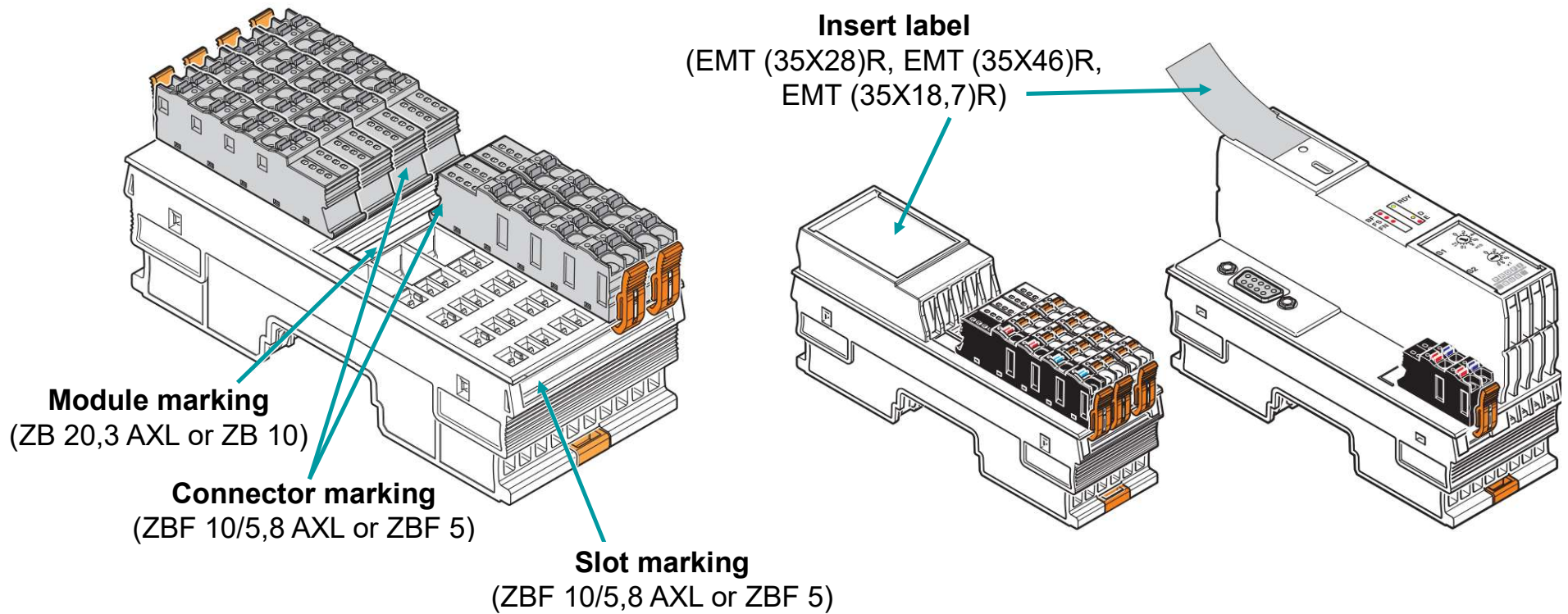
## Conductor cross sections | Push-in Technology

| Conductor              |                                                                                     | Push-in technology                                     | using the spring lever                                 |
|------------------------|-------------------------------------------------------------------------------------|--------------------------------------------------------|--------------------------------------------------------|
| solid                  |    | min. 0,50 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> | min. 0,20 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> |
| stranded               |    | -                                                      | min. 0,20 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> |
| ferrule without collar |   | min. 0,25 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> | min. 0,25 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> |
| ferrule with collar    |  | min. 0,25 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> | min. 0,25 mm <sup>2</sup><br>max. 1,50 mm <sup>2</sup> |



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

## Individual marking with zack marker strips and labels

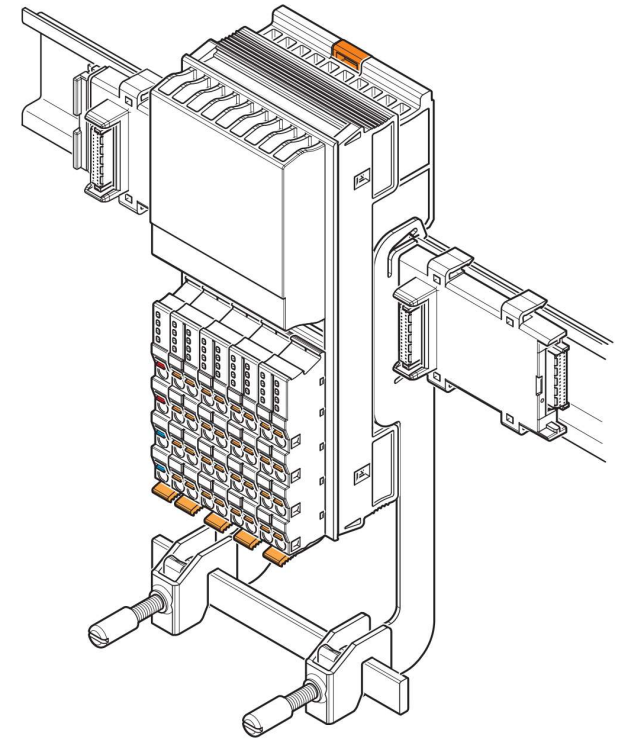
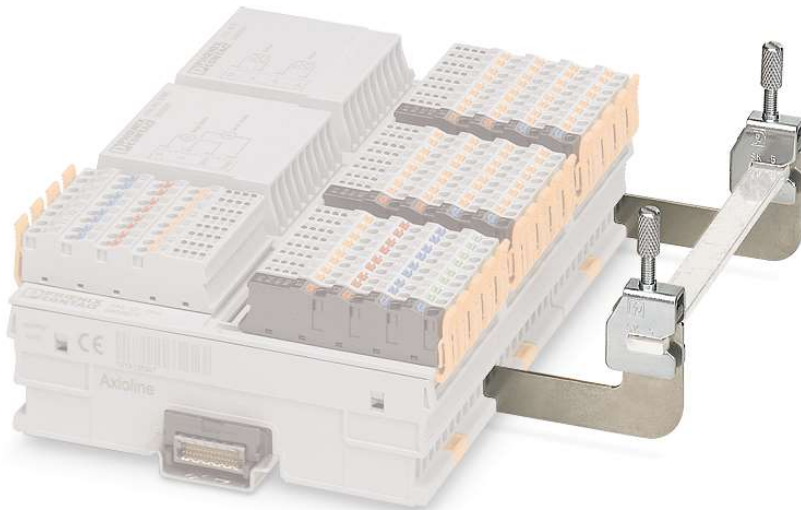




Axioline F - the block-based modular I/O system

## Shielding of signal cables

- System integrated shielding set
  - AXL SHIELD SET - 2700518





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 !

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)<br>(> 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)                                                                       |

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

## Approvals

### Local approvals



### Marine approvals



### Ex approvals\*



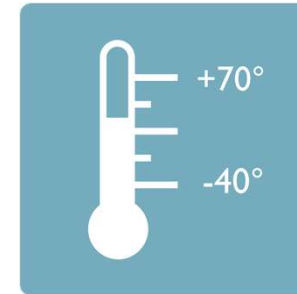
Class 1 Div. 2

\* XC modules only

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

## Axioline F XC (eXtreme Conditions)

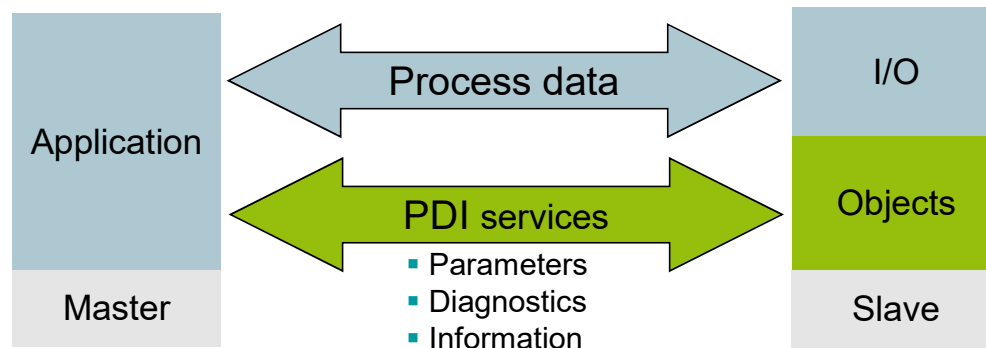
- Axioline F XC modules for rough environment
  - Can be used under extreme ambient conditions
  - Extended temperature range of -40°C ... +70°C (see "Tested successfully: use under extreme ambient conditions" in the data sheet)
  - Partially coated PCBs
  - Ex approvals for many XC modules (July 2020)
    - ATEX (Zone 2)
    - IEC Ex (Zone 2)
    - UL haz. loc. Class 1 Div 2



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

## 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



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

## Diagnostic state (0018<sub>hex</sub>: DiagState)

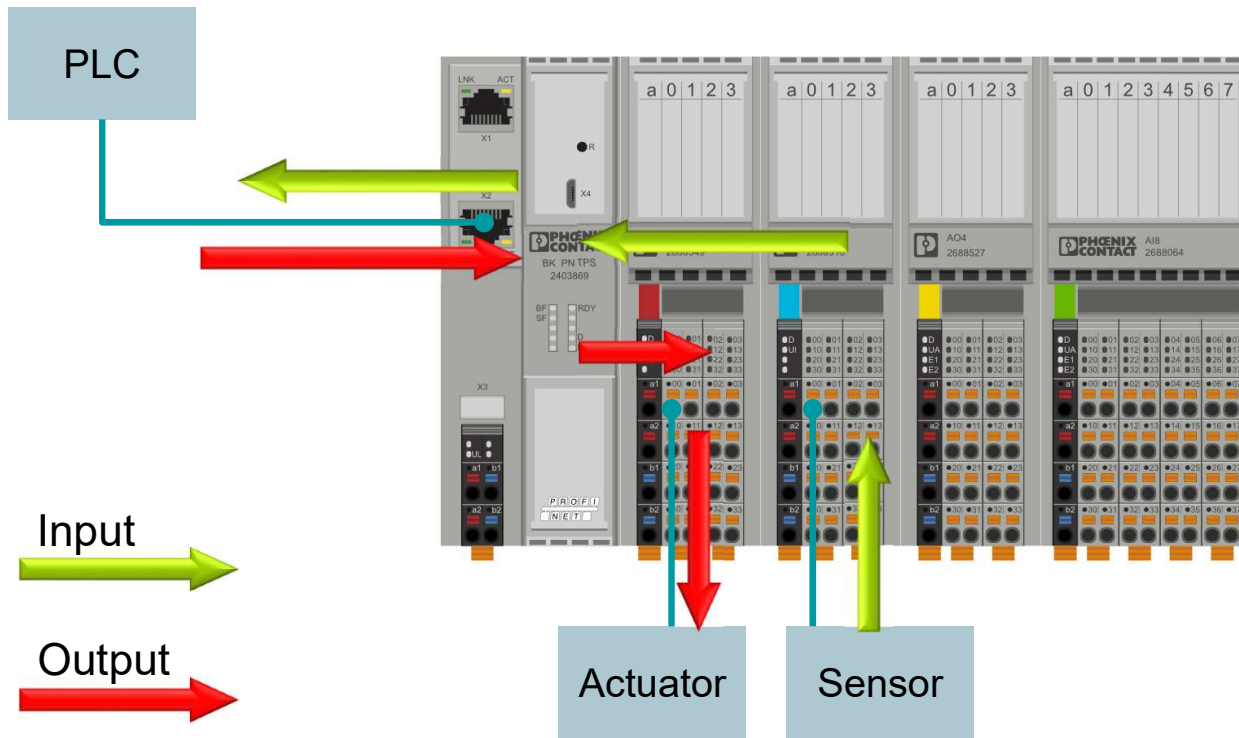
| Index [hex] | Object name | Meaning                                                                               |
|-------------|-------------|---------------------------------------------------------------------------------------|
| 0018        | DiagState   | Diagnostic state                                                                      |
| .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 <sub>hex</sub> : entire device)               |
| .04         | Code        | Error code                                                                            |
| ....        | ...         | ...                                                                                   |
| .0B         | Text        | Device-specific explanation of the malfunction that occurred;<br>Default: "Status OK" |





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

## Response times for an Axioline F system

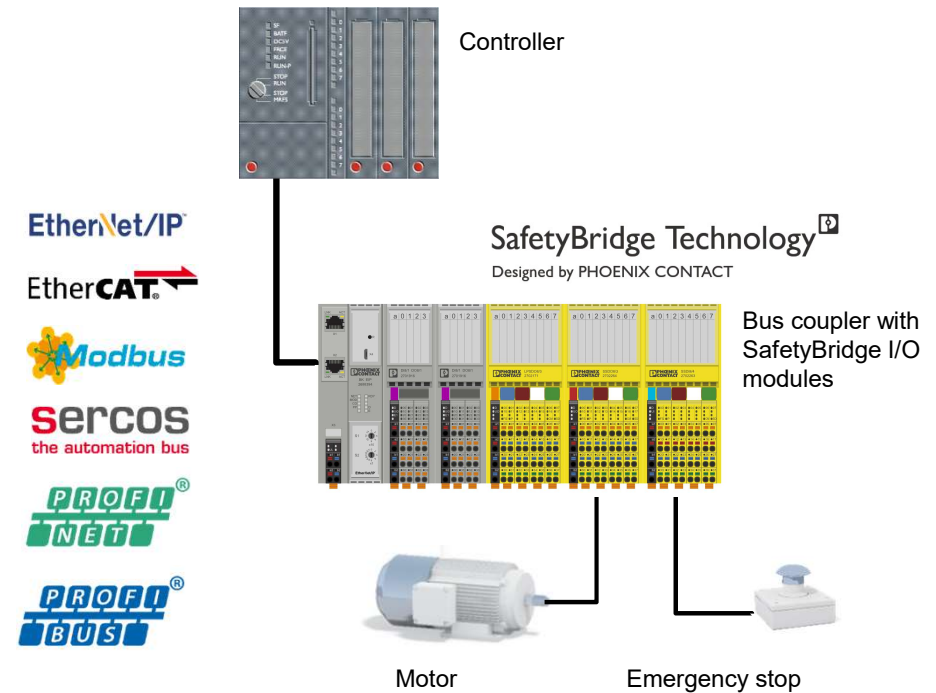


- Response time = time from reading in the input, processing in the controller to setting the output
- When determining the response time of the overall system, Axioline F represents the smallest proportion by far and therefore can normally be ignored.

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



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

# Axiocontrol

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

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

# Bus coupler

| PROFINET<br>PROFIBUS                                                                                                                                                                                                             | EtherCAT®<br>Sercos                                                                                                                                                                                                            | Modbus/TCP (UDP)<br>EtherNet/IP™                                                                                                                                                                                                    | Ethernet (IEC 61850)                                                                                                                                                                                                              |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><br/></div> <div><b>AXL F BK PN TPS</b><br/>2403869</div> | <div><br/></div> <div><b>AXL F BK EC</b><br/>2688899</div>   | <div><br/></div> <div><b>AXL F BK ETH</b><br/>2688459</div>   | <div><br/></div> <div><b>AXL F BK SAS</b><br/>2701457</div> |
| <div><br/></div> <div><b>AXL F BK PB</b><br/>2688530</div>   | <div><br/></div> <div><b>AXL F BK S3</b><br/>2701686</div> | <div><br/></div> <div><b>AXL F BK EIP</b><br/>2688394</div> |                                                                                                                                                                                                                                   |

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

## Digital Input

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

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

## Digital Output

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



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

# Digital Input / Output

| 16 Channels                                                                                                                                                                                               | 24 channels                                                                                                                                                                                                | 32 channels                                                                                                                                                                                                    |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div><p><b>AXL F DI8/1 DO8/1 1H</b><br/>2701916</p><p>8 DI, 24 V DC, 1-wire<br/>8 DO, 24 V DC, 500 mA, 1-wire</p></div>  | <div><p><b>AXL F DI16/1 DO8/2-2A 2H</b><br/>2702291</p><p>16 DI, 24 V DC, 1-wire<br/>8 DO, 24 V DC, 2 A, 2-wire</p></div> | <div><p><b>AXL F DI16/1 DO16/1 2H</b><br/>2702106</p><p>16 DI, 24 V DC, 1-wire<br/>16 DO, 24 V DC, 500 mA, 1-wire</p></div> |
| <div><p><b>AXL F DI8/3 DO8/3 2H</b><br/>2702071</p><p>8 DI, 24 V DC, 3-wire<br/>8 DO, 24 V DC, 500 mA, 3-wire</p></div> |                                                                                                                                                                                                            |                                                                                                                                                                                                                |

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

## Analog Input / Analog Output

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

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

## Temperature measurement / Strain Gauge Input

| RTD<br>(Resistive Temperature Sensors)                                                                                                                                                                                                  | UTH<br>(Thermocouple Sensors)                                                                                                                                                                                                                                                 | SGI<br>(Strain Gauge Input)                                                                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>AXL F RTD4 1H</b><br/>2688556</p> <p>4 channels;<br/>Pt, Ni, KTY, Cu sensors;<br/>linear resistance measuring;<br/>2, 3, 4-wire (shielded)</p>  |  <p><b>AXL F UTH4 1H</b><br/>2688598</p> <p>4 channels;<br/>Sensor types: U, T, L, J, E, K, N, S,<br/>R, B, C, W, HK;<br/>linear voltage measuring;<br/>2-wire (shielded, twisted pair)</p>  |  <p><b>AXL F SGI2 1H</b><br/>2702911</p> <p>2 channels;<br/>high-precision,<br/>4-, 6-wire connection;<br/>2-point adjustment,<br/>path-adjustment,<br/>PD update time 0,2 ... 100 ms</p> |
|  <p><b>AXL F RTD8 1F</b><br/>2688077</p> <p>8 channels,<br/>Pt, Ni, KTY, Cu sensors;<br/>linear resistance measuring;<br/>2, 3, 4-wire (shielded)</p> |  <p><b>AXL F UTH8 1F</b><br/>2688417</p> <p>8 channels;<br/>Sensor types: U, T, L, J, E, K, N, S,<br/>R, B, C, W, HK;<br/>linear voltage measuring;<br/>2-wire (shielded, twisted pair)</p> |                                                                                                                                                                                                                                                                              |

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

## Communication / Master

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

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

## Function / Power Measurement / Power feed

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

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

# SafetyBridge / PROFIsafe

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



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

# XC - Axiocontrol and bus coupler

| Conventional PLCs                                                                                                                                                                                                     | PROFINET<br>PROFIBUS                                                                                                                                                                                                           | Modbus/TCP (UDP)<br>EtherNet/IP™                                                                                                                                                                                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <div></div> <div><b>AXC 1050 XC</b><br/>1089334</div> <div>8 tasks, 16 PN devices,<br/>Altera® NIOS® II processor,<br/>100 MHz</div> | <div></div> <div><b>AXL F BK PN TPS XC</b><br/>1068857</div> | <div></div> <div><b>AXL F BK ETH XC</b><br/>2701949</div>   |
|                                                                                                                                                                                                                       | <div></div> <div><b>AXL F BK PB XC</b><br/>2702463</div>  | <div></div> <div><b>AXL F BK EIP XC</b><br/>1167192</div> |

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

## XC - Digital Input / Output

| Digital Input                                                                                                                                              | Digital Output                                                                                                                                                                    | Digital Output<br>Digital Input/Output                                                                                                                                                                |
|------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>AXL F DI16/4 XC 2F</b><br/>2701224</p> <p>24 V DC,<br/>4-wire</p>  |  <p><b>AXL F DO16/3 XC 2F</b><br/>2701228</p> <p>24 V DC, 500 mA,<br/>3-wire, safety circuit</p> |  <p><b>AXL F DO8/2 2A XC 1H</b><br/>1035427</p> <p>24 V DC, 2 A,<br/>2-wire</p>                                    |
|  <p><b>AXL F DI32/1 XC 1F</b><br/>2701226</p> <p>24 V DC,<br/>1-wire</p> |  <p><b>AXL F DO32/1 XC 1F</b><br/>2701230</p> <p>24 V DC, 500 mA,<br/>1-wire</p>                |  <p><b>AXL F DI8/1 DO8/1 XC 1H</b><br/>2702017</p> <p>8 DI, 24 V DC, 1-wire<br/>8 DO, 24 V DC, 500 mA, 1-wire</p> |

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

## XC Process I/Os - Digital Input / Output

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

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

## XC - Analog Input / Output

| Analog Input                                                                                                                                                                                                          | Analog Input<br>Analog Input/Output                                                                                                                                                                                                                         | Analog Output                                                                                                                                                                                                                                             |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>AXL F AI4 I XC 1H</b><br/>2702007</p> <p>0 ... 20 mA,<br/>4 ... 20 mA,<br/>-20 ... +20 mA,<br/>2-, 3-, 4-wire</p>             |  <p><b>AXL F AI8 XC 1F</b><br/>2701232</p> <p>0 ... 5 V, -5 ... +5 V,<br/>0 ... 10 V, -10 ... +10 V,<br/>0 ... 20 mA, 4 ... 20 mA,<br/>-20 ... +20 mA,<br/>2-wire</p>      |  <p><b>AXL F AO4 XC 1H</b><br/>2702153</p> <p>0 ... 5 V, -5 ... +5 V,<br/>0 ... 10 V, -10 ... +10 V,<br/>0 ... 20 mA, 4 ... 20 mA,<br/>2-wire</p>                      |
|  <p><b>AXL F AI4 U XC 1H</b><br/>2702008</p> <p>0 ... 5 V,<br/>-5 ... 5 V,<br/>0 ... 10 V,<br/>-10 ... 10 V,<br/>2-, 3-, 4-wire</p> |  <p><b>AXL F AI2 AO2 XC 1H</b><br/>1035429</p> <p>0 ... 5 V, -5 ... +5 V,<br/>0 ... 10 V, -10 ... +10 V,<br/>0 ... 20 mA, 4 ... 20 mA,<br/>-20 ... +20 mA,<br/>2-wire</p> |  <p><b>AXL F AO8 XC 1F</b><br/>2701237</p> <p>0 ... 5 V, -5 ... +5 V,<br/>0 ... 10 V, -10 ... +10 V,<br/>0 ... 20 mA, 4 ... 20 mA,<br/>-20 ... +20 mA,<br/>2-wire</p> |

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

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

| Analog Input                                                                                                                                                                                                                      | Analog Output                                                                                                                                                                                                                      |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>AXL F AI8 HART XC 1F</b><br/>1052434</p> <p>8 analog inputs, HART enabled,<br/>4 ... 20 mA,<br/>2-wire</p>                                |  <p><b>AXL F AO4 HART XC 1F</b><br/>1087080</p> <p>4 analog outputs, HART enabled,<br/>4 ... 20 mA,<br/>2-wire</p>                                |
|  <p><b>AXL F EX IS AI8 HART XC 1F</b><br/>1052432</p> <p>Intrinsically safe,<br/>8 analog inputs, HART enabled,<br/>4 ... 20 mA,<br/>2-wire</p> |  <p><b>AXL F EX IS AO4 HART XC 1F</b><br/>1087081</p> <p>Intrinsically safe,<br/>4 analog outputs, HART enabled,<br/>4 ... 20 mA,<br/>2-wire</p> |

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

## XC - Temperature measurement / Communication / Function

| RTD<br>(Resistive Temperature Sensors)                                                                                                                                                                                                     | UTH (Thermocouple Sensors)<br>Serial (RS-232, RS-422/485)                                                                                                                                                                                                                       | Counter, Incremental Encoder<br>Impulse-Input                                                                                                                                                                                                                                      |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  <p><b>AXL F RTD4 XC 1H</b><br/>1035430</p> <p>4 channels;<br/>Pt, Ni, KTY, Cu sensors;<br/>linear resistance measuring;<br/>2, 3, 4-wire (shielded)</p>  |  <p><b>AXL F UTH8 XC 1F</b><br/>2702464</p> <p>8 channels;<br/>Sensor types: U, T, L, J, E, K, N, S,<br/>R, B, C, W, HK;<br/>linear voltage measuring;<br/>2-wire (shielded, twisted pair)</p> |  <p><b>AXL F CNT2 INC2 XC 1F</b><br/>2701239</p> <p>2 Counter inputs, 32 Bit,<br/>2 Incremental encoder inputs,<br/>Input frequency up to 300 kHz</p>                                           |
|  <p><b>AXL F RTD8 XC 1F</b><br/>2701235</p> <p>8 channels,<br/>Pt, Ni, KTY, Cu sensors;<br/>linear resistance measuring;<br/>2, 3, 4-wire (shielded)</p> |  <p><b>AXL F RS UNI XC 1H</b><br/>2702006</p> <p>1 interface,<br/>RS-485/422 or RS-232;<br/>Speed: 110 bps ... 250 kbps;<br/>Protocols: Transparent, end-to-end,<br/>XON/XOFF, Modbus/RTU</p> |  <p><b>AXL F IMPULSE2 XC 1H</b><br/>2702655</p> <p>2 channels for magnetostrictive<br/>position sensors with start/stop<br/>interface,<br/>5 stop events per channel,<br/>4 digital inputs</p> |



| Designation   | Order No. |
|---------------|-----------|
| AXL F IOL8 2H | 1027843   |
| AXL SE IOL4   | 1088132   |

## Axoline F IO-Link



**IO / Software**

**IO / Software**

Software

## IOL-CONF

The advantage of IO-Link devices is that manufacturers can design them more universally than conventional sensors/actuators. It is only when in use, i.e., during startup, that the IO-Link devices are parameterized for their specific application. To do this, Phoenix Contact provides the IOL-CONF parameterization software. IOL-CONF is a browser-based software tool for the easy parameterization of IO-Link devices.

The IOL-CONF software supports the operation of IO-Link masters from the modular Axioline automation system for the control cabinet (AXL F IOL8 2H and AXL SE IOL4). To use the software, the IO-Link master must be operated on selected bus couplers of the Axioline F system.

Using the Phoenix Contact AXL F IOL8 2H and AXL SE IOL4 IO-Link masters, the software enables the easy and efficient parameterization of IO-Link devices from Phoenix Contact and other manufacturers.



## IOL-CONF

# Functions

Use of the IOL-CONF software offers the following options:

- ONLINE and OFFLINE parameterization of IO-Link masters from Phoenix Contact and any IO-Link devices over the network.
  - Setting parameters
  - Loading parameters from an IO-Link device
  - Writing parameters to IO-Link devices
  - Storing and loading parameter records to/from a file
  - Writing/copying parameters to multiple IO-Link devices
- Graphical representation of process values
  - Evaluation of measured values
  - Writing process data
  - Exporting displayed measured values



Figure 3-1 “LIMITED” marking in the user interface

IOL-CONF

## Supported....

**Supported IO-Link masters (used downstream of one of the above bus couplers):**

| Designation   | Order No. | As of hardware | As of firmware |
|---------------|-----------|----------------|----------------|
| AXL F IOL8 2H | 1027843   | 02 or later    | 1.01 or later  |
| AXL SE IOL4   | 1088132   | 00 or later    | 1.00 or later  |

**Supported IO-Link devices:**

Any, all IO-Link devices of IO-Link specification V1.1.1 or later

**Supported bus couplers:**

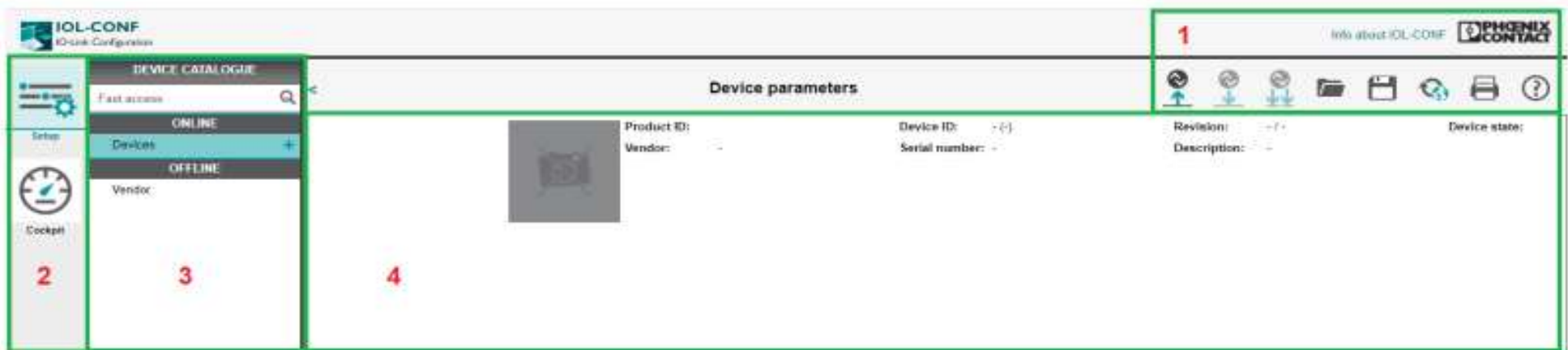
| Designation        | Order No. | As of hardware | As of firmware |
|--------------------|-----------|----------------|----------------|
| AXL F BK PN TPS    | 2403869   | 02 or later    | 1.31 or later  |
| AXL F BK ETH       | 2688459   | 05 or later    | 1.30 or later  |
| AXL F BK EIP       | 2688394   | 05 or later    | 1.30 or later  |
| AXL F BK EC        | 2688899   | 05 or later    | 1.30 or later  |
| AXL F BK PN TPS XC | 1068857   | 01 or later    | 1.31 or later  |
| AXL F BK ETH XC    | 2701949   | 05 or later    | 1.30 or later  |
| AXL F BK EIP XC    | 2403869   | 05 or later    | 1.30 or later  |



IOL-CONF

## Software Interface

1. Tool bar/information area
2. View
3. Device catalog
  - ONLINE
  - FILE (not shown in the screenshot below)
  - OFFLINE
4. Device-specific area



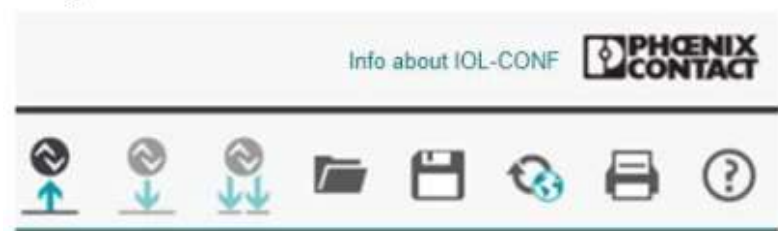
# Tool bar



|                                                                                      |                                    |                                                                                                                                    |
|--------------------------------------------------------------------------------------|------------------------------------|------------------------------------------------------------------------------------------------------------------------------------|
| Info IOL-Conf                                                                        | Info about IOL-CONF                | Product and contact information, such as the software version, legal information, open-source license terms and conditions         |
|    | Read from device                   | Read IO-Link-specific device parameters from IO-Link masters and devices<br>Scan network for available devices                     |
|    | Write to device                    | Write modified IO-Link-specific device parameters to <b>one</b> IO-Link master or IO-Link device                                   |
|    | Write to multiple selected devices | Write modified IO-Link-specific device parameters to <b>multiple</b> selected IO-Link devices (from OFFLINE mode)                  |
|  | Load parameters from a file        | Load IO-Link-specific device parameters of one IO-Link master and/or one or more IO-Link devices from a project-specific lrp file. |



# Tool bar



|                                                                                    |                                    |                                                                                                                                                                                                        |
|------------------------------------------------------------------------------------|------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|   | Save parameters to a file          | Save IO-Link-specific device parameters of one IO-Link master and/or one or more IO-Link devices to a project-specific lrp file in the "Downloads" folder in Windows.                                  |
|   | IODD Manager<br>Search for updates | Import IODD files from the local storage location or from the ONLINE database (IODDfinder)<br>Delete selected IODD files from the device catalog<br>Search for updates to already installed IODD files |
|   | Print displayed parameters         | Print preview of parameters from the "Device-specific view"                                                                                                                                            |
|  | User manual                        | Open the item page for the IOL-CONF software in the Phoenix Contact e-shop<br>The latest software versions, information, and documentation can be accessed under Download.                             |



IOL-CONF

# View



|                       |                                                                                                                |
|-----------------------|----------------------------------------------------------------------------------------------------------------|
| Parameteriza-<br>tion | View for the parameterization of IO-Link masters and/or IO-Link de-<br>vices                                   |
| Cockpit               | Display mode for all online, available process data including visualiza-<br>tion and the option to set outputs |

IOL-CONF

## Device Catalog



When there is an active TCP/IP connection between IOL-CONF and AXL F stations, the AXL F station along with the connected IO-Link devices can be displayed and parameterized in the ONLINE area (numbering).

In the OFFLINE area of the device catalog, you can virtually create and parameterize IO-Link masters with connected IO-Link devices and save them to files. To do this, the description files (IODDs) of IO-Link masters and IO-Link devices from Phoenix Contact are stored in IOL-CONF (pre-installed).

You can import IODDs later to extend the range of pre-installed devices.

## Device Area

←

## Device parameters

**All**

Identification

Parameter

System commands

Resolution (0x0263)

Unit (0x0264)

Path calibration function: offset (0x265)

Path calibration function: reference (0x267)

Comparison of reference junctions

Cold junction temperature (0x0268)

Comparison of reference junctions: offset (0x0269)

Comparison of reference junctions: reference (0x026A)

Product ID: AXLE IOL TC4/K M12

Vendor: Phoenix Contact

Cyclic polling: ☐

Device ID: 69131 d (176 d)

Serial number: 0000000000

Revision: 00 / 1.00

Description: Axline E IO-Link/analog converter with 4 analog TC in K)

Device state: ●

| Parameter                                 | Value                             | Unit | Min         | Max        | Description                          |
|-------------------------------------------|-----------------------------------|------|-------------|------------|--------------------------------------|
| Application Specific Tag                  |                                   |      | 0           | 32         | Application Specific Tag             |
| Standard Command                          | Device Reset                      |      |             |            |                                      |
| Standard Command                          | Restore Factory Settings          |      |             |            |                                      |
| Resolution: TC1                           | <input type="text" value="0.01"/> |      |             |            | Resolution                           |
| Resolution: TC2                           | <input type="text" value="0.1"/>  |      |             |            | Resolution                           |
| Resolution: TC3                           | <input type="text" value="0.1"/>  |      |             |            | Resolution                           |
| Resolution: TC4                           | <input type="text" value="0.1"/>  |      |             |            | Resolution                           |
| Unit: TC1 ... TC4                         | <input type="text" value="°C"/>   |      |             |            | Unit                                 |
| Path calibration function: offset: TC1    | <input type="text" value="0"/>    |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: offset: TC2    | <input type="text" value="0"/>    |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: offset: TC3    | <input type="text" value="0"/>    |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: offset: TC4    | <input type="text" value="0"/>    |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: reference: TC1 | <input type="text" value=""/>     |      | -2147483648 | 2147483647 | Path calibration function: reference |
| Path calibration function: reference: TC2 | <input type="text" value=""/>     |      | -2147483648 | 2147483647 | Path calibration function: reference |
| Path calibration function: reference: TC3 | <input type="text" value=""/>     |      | -2147483648 | 2147483647 | Path calibration function: reference |
| Path calibration function: reference: TC4 | <input type="text" value=""/>     |      | -2147483648 | 2147483647 | Path calibration function: reference |

**Device parameters**

IOL-CONF

# Parametrization ONLINE

The screenshot displays the IOL-CONF web interface for configuring a device. The interface is divided into several sections:

- Left Sidebar:** Contains a 'Setup' icon, a 'Clock' icon, and a 'Device Catalogue' section. The 'Device Catalogue' is split into 'ONLINE' and 'OFFLINE' tabs. Under 'ONLINE', there is a search bar and a list of devices. The selected device is 'AXL F BK PN TPS (192.168.0.6)'. Below this, there are several status indicators: '-01: AXL F IOL8 2H', '-02: 16 digital inputs', '-03: AXL SE IOL4', '-04: 1 communication channel (RS485)', '-05: Steel Cover Active', '-06', '-07', and '-08'.
- Top Bar:** Displays 'IOL-CONF IO-Link Configuration' and 'Info about IOL-CONF'.
- Device Parameters Section:** Shows the selected device's details: Product ID: AXL F BK PN TPS, Device ID: 4096 d (176 d), Revision: 2 / 1.30, and Description: Headstation. It also includes a 'Cyclic polling' checkbox.
- Parameter Table:** A table with columns for 'Parameter', 'Value', 'Unit', 'Min', 'Max', and 'Description'. The parameters listed are: IP address (192.168.0.6), Subnet mask (255.255.255.0), IP gateway address (0.0.0.0), Ethernet name (axl-f-tps), and MAC address (90:80:40:00:00:00).

IOL-CONF

## Starting up IO-Link Master

The screenshot displays the IOL-CONF software interface. On the left, a sidebar contains a 'Setup' icon and a 'Clock' icon. The main area is divided into two panes. The left pane, titled 'DEVICE CATALOGUE', shows a list of devices under the 'ONLINE' tab, with 'AXL F BK PN TP5 (192.168.0.6)' selected. The right pane, titled 'Device parameters', shows the configuration for this device. It includes fields for Product ID, Device ID, Vendor, Serial number, Revision, and Description. Below these fields is a table of parameters for ports 1 through 8, each with a 'Port mode' parameter set to '01'.

**Device parameters**

Product ID: AXL F BK PN TP5  
Device ID: 180 d (176 d)  
Vendor: Phoenix Contact  
Serial number: 0123456789  
Revision: 01 / 1.02  
Description: IO-Link Master  
Device state:

Cyclic polling: ☐

| Parameter  | Value | Unit | Min | Max | Description |
|------------|-------|------|-----|-----|-------------|
| Port1 mode | 01    |      |     |     | Port mode   |
| Port2 mode | 01    |      |     |     | Port mode   |
| Port3 mode | 01    |      |     |     | Port mode   |
| Port4 mode | 01    |      |     |     | Port mode   |
| Port5 mode | 01    |      |     |     | Port mode   |
| Port6 mode | 01    |      |     |     | Port mode   |
| Port7 mode | 01    |      |     |     | Port mode   |
| Port8 mode | 01    |      |     |     | Port mode   |

IOL-CONF

## Parametrization Port 1

**IOL-CONF**  
IO-Link Configuration

Info about IOL-CONF **PHOENIX CONTACT**

**DEVICE CATALOGUE**

Fast access

**ONLINE**

Devices

AXL F BK PN TPS (192.168.0.5)

AXL F IOL 8 ZH

AXL E IOL TC4K M12

Port 1

Port 2

Port 3

Port 4

Port 5

Port 6

Port 7

Port 8

**OFFLINE**

Vendor

**Device parameters**

Product ID: AXL F IOL 8 ZH

Device ID: 100 d (176 d)

Revision: 01 / 1.02

Vendor: Phoenix Contact

Serial number: 0123456789

Description: IO-Link Master

Device state:

Cyclic polling: ☐

| Parameter                                           | Value               | Unit | Min | Max      | Description                                                                 |
|-----------------------------------------------------|---------------------|------|-----|----------|-----------------------------------------------------------------------------|
| Port 1 mode                                         | IO-Link             |      |     |          | Port mode                                                                   |
| Port 1 IO-Link Device ID                            | 0                   |      | 0   | 16777215 | IO-Link Device ID to validate                                               |
| Port 1 IO-Link Vendor ID                            | 0                   |      | 0   | 65535    | IO-Link Vendor ID to validate                                               |
| Port 1 IO-Link Compatibility check and data storage | No device check     |      |     |          | Degree of severity of the compatibility check and the data storage behavior |
| Port 1 IO-Link Cycle time                           | As fast as possible |      |     |          | IO-Link cycle time                                                          |
| Port 1 alarm                                        | Enabled             |      |     |          | Report or ignore unexpected port state                                      |
| Port 1 IO-Link diagnostics                          | Enabled             |      |     |          | Report or ignore IO-Link device diagnostics                                 |
| Port 2 mode                                         | DI                  |      |     |          | Port mode                                                                   |
| Port 3 mode                                         | DI                  |      |     |          | Port mode                                                                   |
| Port 4 mode                                         | DI                  |      |     |          | Port mode                                                                   |
| Port 5 mode                                         | DI                  |      |     |          | Port mode                                                                   |
| Port 6 mode                                         | DI                  |      |     |          | Port mode                                                                   |
| Port 7 mode                                         | DI                  |      |     |          | Port mode                                                                   |
| Port 8 mode                                         | DI                  |      |     |          | Port mode                                                                   |

Device parameters

IOL-CONF

## Parameter records (OFFLINE)

You have the option of creating a file in OFFLINE mode. In this file, you can save the parameters of an IO-Link device or the parameters of an IO-Link master together with its devices. If the parameter record of an IO-Link master is written to a file, the parameters of the master and all the parameters of the devices configured for it will be saved. If just one device is selected in the OFFLINE catalog, only its parameters will be saved to a file.

- Under "Vendor" in the OFFLINE area of the device catalog, select your IO-Link master or your IO-Link device.

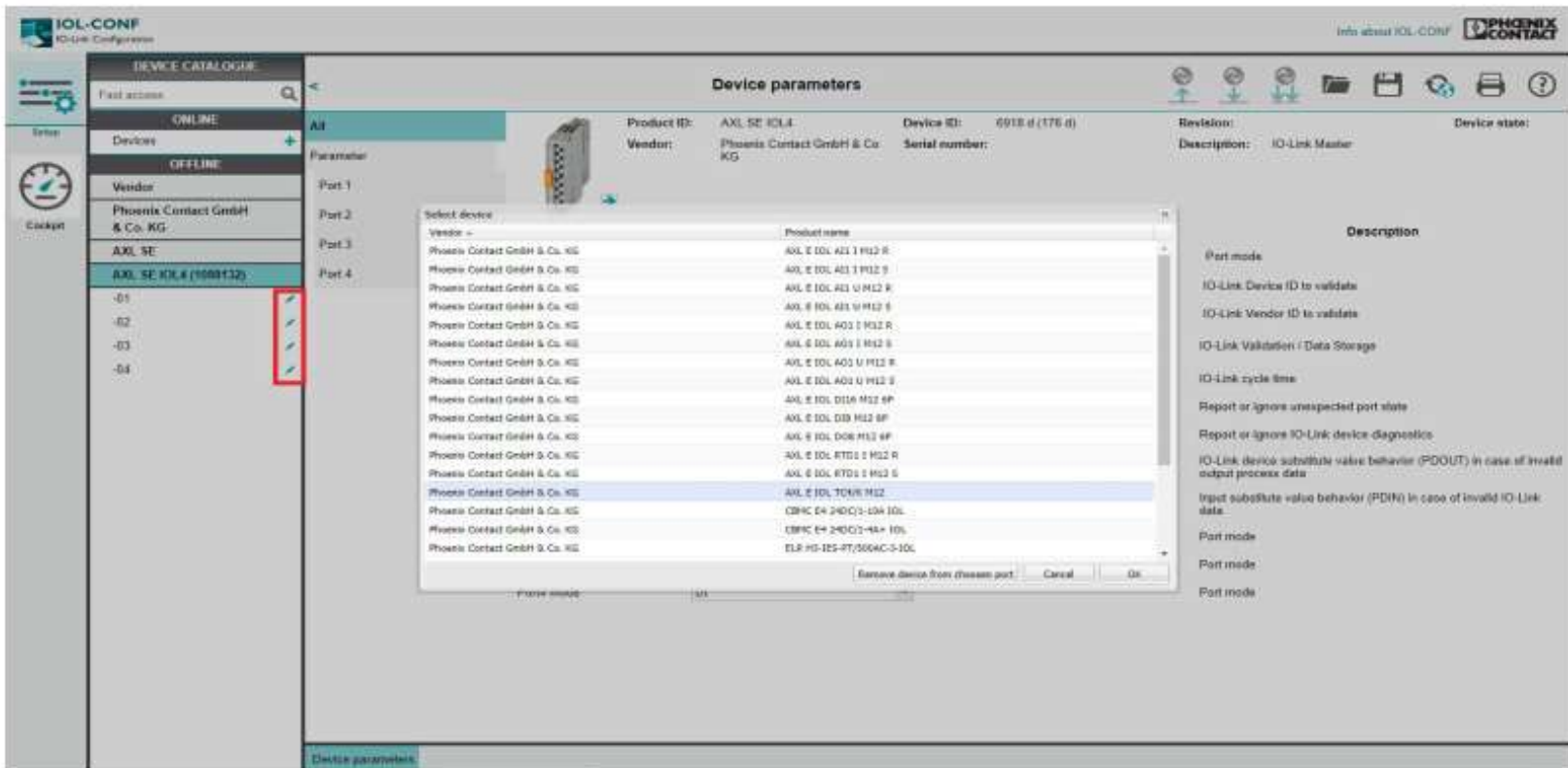
The screenshot displays the IOL-CONF software interface. On the left, the 'DEVICE CATALOGUE' is shown in 'OFFLINE' mode. The 'Vendor' dropdown is set to 'Phoenix Contact GmbH & Co. KG', and the 'AXL SE' dropdown is set to 'AXL SE IOL 4 (1088132)'. The 'Device parameters' section on the right shows the configuration for the selected device. The 'Parameter' column lists various settings, and the 'Value' column shows the current values. The 'Unit', 'Min', and 'Max' columns provide additional context for the parameters. The 'Description' column explains the function of each parameter.

| Parameter                              | Value                                   | Unit | Min | Max      | Description                                                                             |
|----------------------------------------|-----------------------------------------|------|-----|----------|-----------------------------------------------------------------------------------------|
| Port1 mode                             | IO-Link                                 |      |     |          | Port mode                                                                               |
| Port1 IO-Link Device ID                |                                         | B    | 0   | 16777215 | IO-Link Device ID to validate                                                           |
| Port1 IO-Link Vendor ID                |                                         | B    | 0   | 65535    | IO-Link Vendor ID to validate                                                           |
| Port1 IO-Link Validation / DataStorage | No check and clear                      |      |     |          | IO-Link Validation / Data Storage                                                       |
| Port1 IO-Link Cycle time               | As fast as possible                     |      |     |          | IO-Link cycle time                                                                      |
| Port1 alarm                            | Enabled                                 |      |     |          | Report or ignore unexpected port state                                                  |
| Port1 IO-Link diagnostics              | Enabled                                 |      |     |          | Report or ignore IO-Link device diagnostics                                             |
| Port1 IO-Link device substitute value  | Apply substitute value of the connected |      |     |          | IO-Link device substitute value behavior (PGOUT) in case of invalid output process data |
| Port1 Input substitute value           | Set input value to zero value           |      |     |          | Input substitute value behavior (PGIN) in case of invalid IO-Link data                  |
| Port2 mode                             | DI                                      |      |     |          | Port mode                                                                               |
| Port3 mode                             | DI                                      |      |     |          | Port mode                                                                               |
| Port4 mode                             | DI                                      |      |     |          | Port mode                                                                               |



IOL-CONF

## Device Catalog Parameter



IOL-CONF

## Parametrization IO-Link Device

The screenshot displays the IOL-CONF software interface for configuring an IO-Link device. The interface is divided into several sections:

- Left Sidebar:** Contains navigation icons for 'Setup' and 'Checkup'. Below these is the 'DEVICE CATALOGUE' with tabs for 'ONLINE' and 'OFFLINE'. Under 'ONLINE', a list of devices is shown, including 'Phoenix Contact GmbH & Co. KG', 'AXL SE', and 'AXL SE IOL4 (1088132)'. The selected device is 'AXL E IOL TC4K M12'.
- Top Bar:** Displays 'IOL-CONF IO-Link Configuration' and 'Info about IOL-CONF'. The Phoenix Contact logo is in the top right corner.
- Device Parameters Section:** Shows the selected device's details: Product ID: AXL E IOL TC4K M12, Device ID: 69131 d (176 d), Revision: Axoline E IO-Link/analog converter with 4 analog TC inputs, and Device state: OK. A small image of the device is shown next to the details.
- Parameter Table:** A table with columns: Parameter, Value, Unit, Min, Max, and Description. The table lists various parameters for the device, including resolution and path calibration functions for four temperature channels (TC1, TC2, TC3, TC4).

| Parameter                                 | Value              | Unit | Min         | Max        | Description                          |
|-------------------------------------------|--------------------|------|-------------|------------|--------------------------------------|
| Application Specific Tag                  | ***                |      | 0           | 32         | Application Specific Tag             |
| Standard Command                          | [Standard Command] |      |             |            |                                      |
| Standard Command                          | [Standard Command] |      |             |            |                                      |
| Resolution: TC1                           | 0.1                |      |             |            | Resolution                           |
| Resolution: TC2                           | 0.01               |      |             |            | Resolution                           |
| Resolution: TC3                           | 0.01               |      |             |            | Resolution                           |
| Resolution: TC4                           | 0.01               |      |             |            | Resolution                           |
| Unit: TC1... TC4                          | °F                 |      |             |            | Unit                                 |
| Path calibration function: offset: TC1    | 10                 |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: offset: TC2    | 250                |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: offset: TC3    | 3000               |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: offset: TC4    | 0                  |      | -32768      | 32767      | Path calibration function: offset    |
| Path calibration function: reference: TC1 | 0                  |      | -2147483648 | 2147483647 | Path calibration function: reference |
| Path calibration function: reference: TC2 | 0                  |      | -2147483648 | 2147483647 | Path calibration function: reference |
| Path calibration function: reference: TC3 | 0                  |      | -2147483648 | 2147483647 | Path calibration function: reference |
| Path calibration function: reference: TC4 | 0                  |      | -2147483648 | 2147483647 | Path calibration function: reference |

IOL-CONF

## Device Catalog IODD

ONLINE via the IODDfinder portal

Device description files (IODD): download and install

☒ Updates ☐ Remove device description files (IODDs)

| Vendor              | Device                                                            | Available version |
|---------------------|-------------------------------------------------------------------|-------------------|
| itm electronic gmbh | AL2205_Acyclic (AL2205), AL2605_Acyclic (AL2605)                  | 1.0.0.43          |
| itm electronic gmbh | AL2205_Cyclic (AL2205), AL2605_Cyclic (AL2605)                    | 1.0.0.43          |
| itm electronic gmbh | AL2221, AL2225, AL232L, AL2325                                    | 1.0.0.43          |
| itm electronic gmbh | AL2330, AL2330                                                    | 1.3.18.401427     |
| itm electronic gmbh | AL2331, AL2331                                                    | 1.3.42.0          |
| itm electronic gmbh | AL2340, AL2340                                                    | 1.3.42.0          |
| itm electronic gmbh | AL2341, AL2341                                                    | 1.3.42.0          |
| itm electronic gmbh | AL2400                                                            | 1.2.13.6          |
| itm electronic gmbh | AL2401                                                            | 1.2.13.6          |
| itm electronic gmbh | AL2410                                                            | 1.3.14.3          |
| itm electronic gmbh | AL2411                                                            | 1.3.14.3          |
| itm electronic gmbh | DF2100                                                            | 1.0.10            |
| itm electronic gmbh | DP2101                                                            | 1.0.21            |
| itm electronic gmbh | D15024, D15026, D1523A, D1524A                                    | 1.3.44.42         |
| itm electronic gmbh | D15027, D15026, D15029, D15030                                    | 1.3.14.10         |
| itm electronic gmbh | D15031, D15032                                                    | 1.3.14.6          |
| itm electronic gmbh | D15033, D15034                                                    | 1.3.14.6          |
| itm electronic gmbh | DP1213                                                            | 1.3.51.890953     |
| itm electronic gmbh | DP1222                                                            | 1.3.51.797696     |
| itm electronic gmbh | DP1223                                                            | 1.3.51.717696     |
| itm electronic gmbh | DP2300                                                            | 1.3.18.317610     |
| itm electronic gmbh | DT1410, DT1411, DT1420, DT1421, DT1424, DT1425, DT1430, DT1431    | 1.3.42.204020     |
| itm electronic gmbh | DV1500, DV1510, DV1520, DV1530                                    | 1.4               |
| itm electronic gmbh | DV1500 Status B (DV1500), DV1510 Status B (DV1510), DV1520 Sta... | 1.5               |
| itm electronic gmbh | DV2120, DV2121                                                    | 1.0               |
| itm electronic gmbh | DV2130                                                            | 1.0               |
| itm electronic gmbh | DV2131                                                            | 1.0               |
| itm electronic gmbh | DV2500, DV2510, DV2520, DV2530                                    | 1.4               |
| itm electronic gmbh | DV2500 Status B (DV2500), DV2510 Status B (DV2510), DV2520 Sta... | 1.5               |
| itm electronic gmbh | DV2045, DV2055                                                    | 1.0               |
| itm electronic gmbh | IC30291_AB (IC30291)                                              | 1.0.0.13          |

Ok Cancel Search

IOL-CONF

## Device Catalog IODD

Manually from the local file system of your PC

You can search for the file on your computer and install it in IOL-CONF from there.

- To do this, click on the “Search” button in the bottom right corner.
- Click “OK” to load the IODD in the IOL-CONF software.

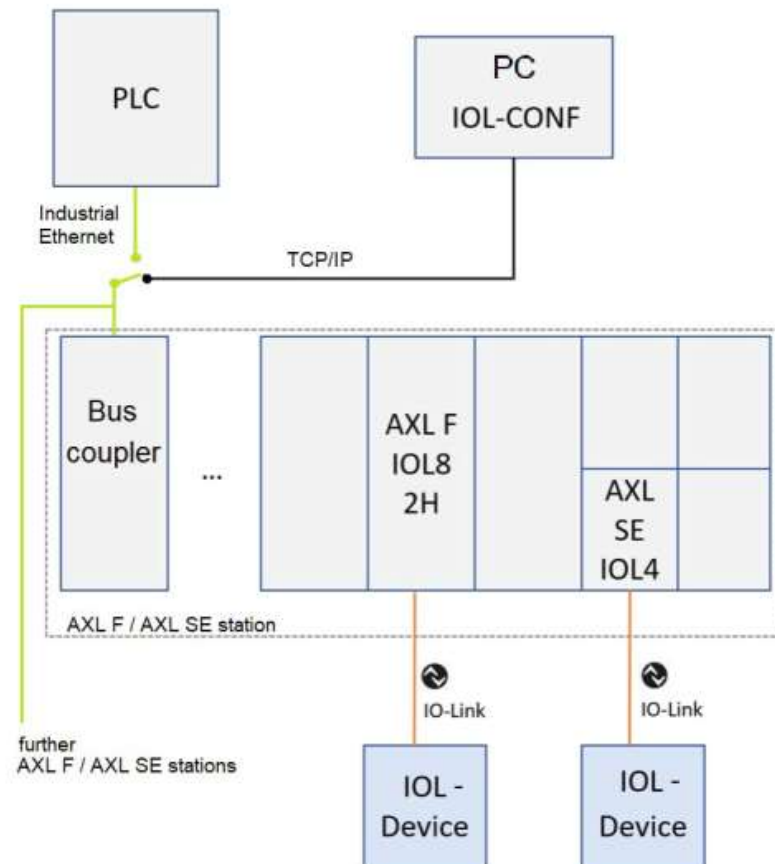
|                                                                                    |                                           |                                                                                                                                                                                                                          |
|------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <b>IODD Manager</b><br>Search for updates | Import IODD files from the local storage location or from the ONLINE database ( <a href="#">IODDfinder</a> )<br>Delete selected IODD files from the device catalog<br>Search for updates to already installed IODD files |
|------------------------------------------------------------------------------------|-------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

IOL-CONF

## IO-Link Topology example



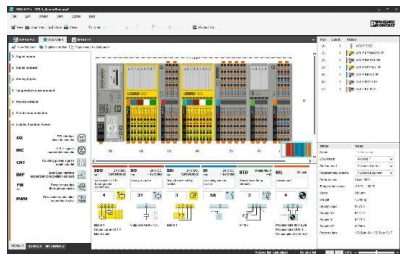
| Designation   | Order No. |
|---------------|-----------|
| AXL F IOL8 2H | 1027843   |
| AXL SE IOL4   | 1088132   |



# Project+ 3.6

**PROJECT+3**

I/O Project Planning



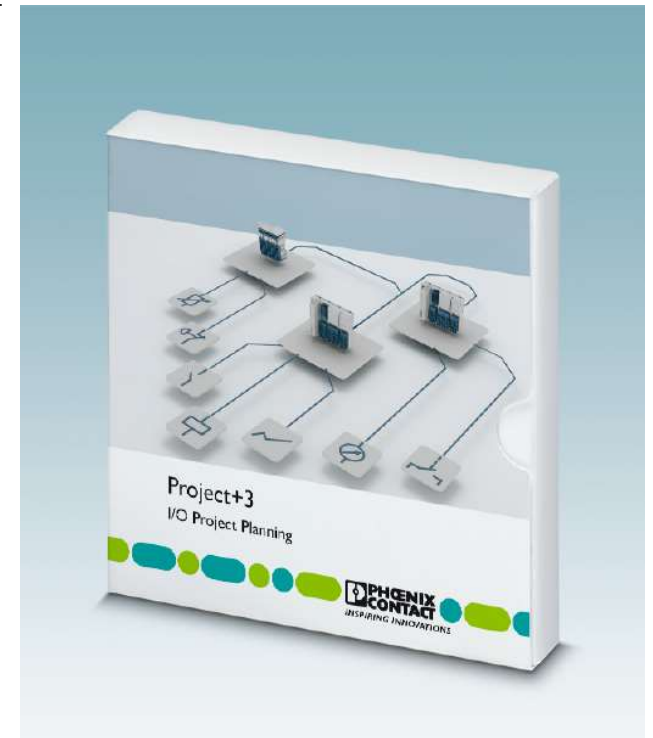
Project+ 3.6

Axioline F System

## Project+ 3.6

---

- Axioline F I/O modules for connecting process signals; standard area and potentially explosive atmospheres
  - Planning of signals switched via relay contacts  
Inline and Axioline F relay modules
  - New Smart Elements Modules DI/DO-NPN  
Axioline F I/O module for CAN
  - Integrated call of Project+ from PROJECT complete
- 

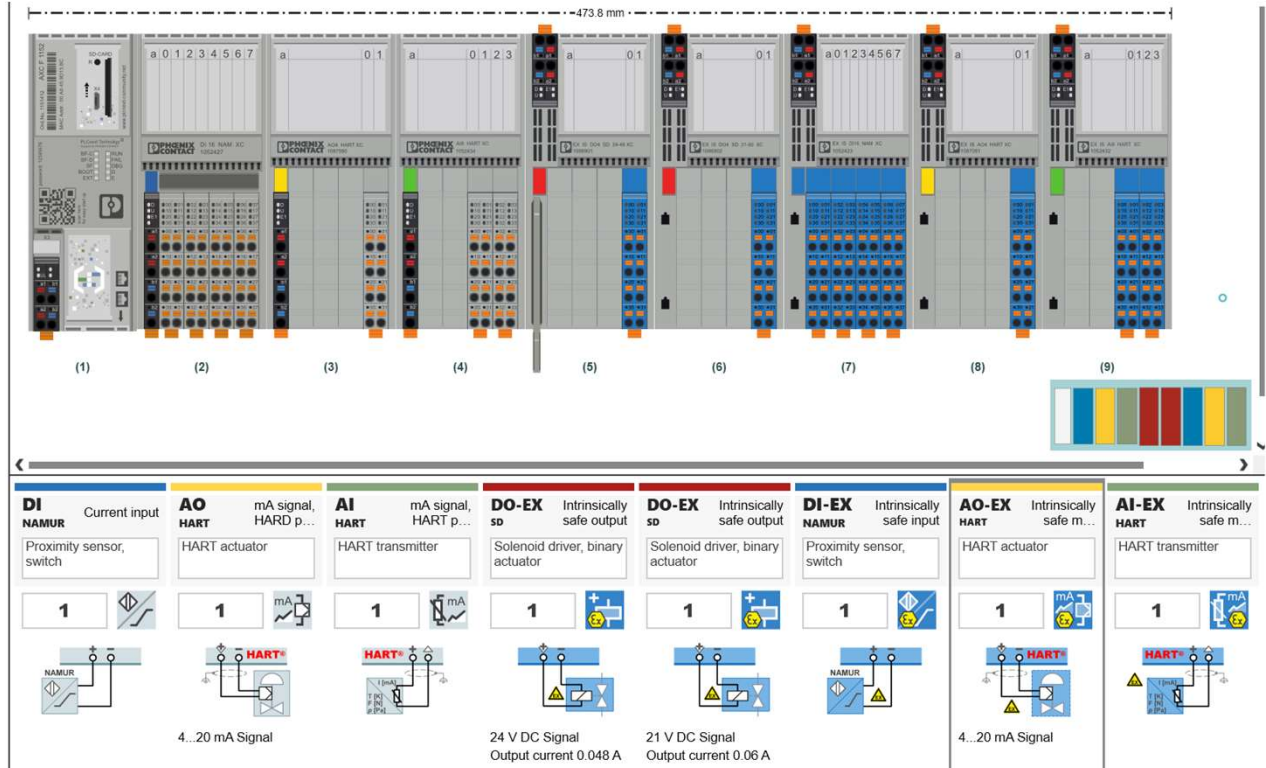




Overview - new Axioline F modules for connecting process signals

## Axioline F modules for connecting process signals

| I/O group  | Item no. | Designation                    |
|------------|----------|--------------------------------|
| Axioline F |          | <b>Digital input modules</b>   |
|            | 1052427  | AXL F DI16 NAM XC 1F           |
|            | 1052423  | AXL F EX IS DI16 NAM XC 1F     |
|            |          | <b>Digital output modules</b>  |
|            | 1086901  | AXL F EX IS DO4 SD 24-48 XC 1F |
|            | 1086902  | AXL F EX IS DO4 SD 21-60 XC 1F |
|            |          | <b>Analog input modules</b>    |
|            | 1052434  | AXL F AI8 HARD XC 1F           |
|            | 1052432  | AXL F EX IS AI8 HARD XC 1F     |
|            |          | <b>Analog output modules</b>   |
|            | 1087080  | AXL F AO4 HARD XC 1F           |
|            | 1087081  | AXL F EX IS AO4 HARD XC 1F     |
|            |          | <b>Infrastructure modules</b>  |
|            | 1100201  | AXL F/P IO EX PP               |



Axioline F I/O modules for connecting process signals

## NAMUR signals in the standard range (XC)

InterfaceType: **IDigitalInFeature**

SignalType: **DI NAMUR**

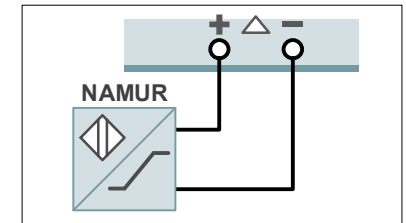
Identifier: Current input

Description: NAMUR sensor

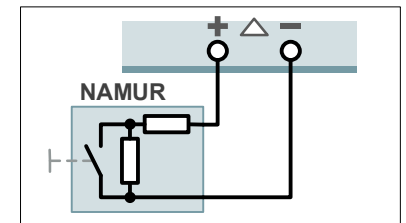
Connection scenario:

| Digital inputs          |                                                              |                                                                                     |  |
|-------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| <b>DI</b><br>PNP        | PNP input<br>24 V DC, + switching                            |    |  |
| <b>DI</b><br>5 kV       | DC/5 kV surge-resistant<br>DC voltage signals                |    |  |
| <b>SDI</b><br>SBT       | Safety input<br>24 V DC, SafetyBridge                        |   |  |
| <b>SDI</b><br>PROFIsafe | Safety input<br>24 V DC, PROFIsafe                           |  |  |
| <b>DI</b><br>NAMUR      | Current input<br>NAMUR sensor                                |  |  |
| <b>DI-EX</b><br>NAMUR   | Intrinsically safe input<br>potentially explosive atmosphere |  |  |

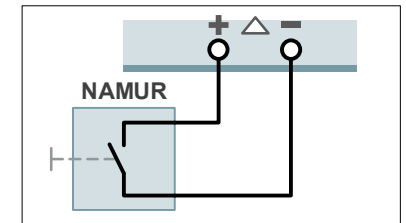
Proximity switch



Contact with resistor circuit



Unconnected contact



Axioline F I/O modules for connecting process signals

## NAMUR signals in potentially explosive atmospheres (XC)

InterfaceType: **IDigitalInFeature**

SignalType: **DI-EX NAMUR**

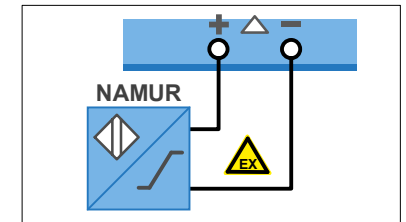
Identifier: Intrinsically safe input

Description: potentially explosive atmosphere

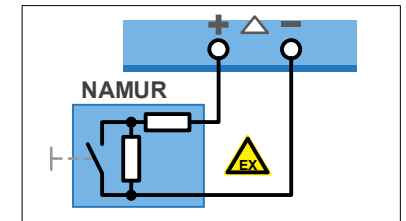
Connection scenario:

| Digital inputs          |                                                              |                                                                                     |  |
|-------------------------|--------------------------------------------------------------|-------------------------------------------------------------------------------------|--|
| <b>DI</b><br>PNP        | PNP input<br>24 V DC, + switching                            |    |  |
| <b>DI</b><br>5 kV       | DC/5 kV surge-resistant<br>DC voltage signals                |    |  |
| <b>SDI</b><br>SBT       | Safety input<br>24 V DC, SafetyBridge                        |   |  |
| <b>SDI</b><br>PROFIsafe | Safety input<br>24 V DC, PROFIsafe                           |  |  |
| <b>DI</b><br>NAMUR      | Current input<br>NAMUR sensor                                |  |  |
| <b>DI-EX</b><br>NAMUR   | Intrinsically safe input<br>potentially explosive atmosphere |  |  |

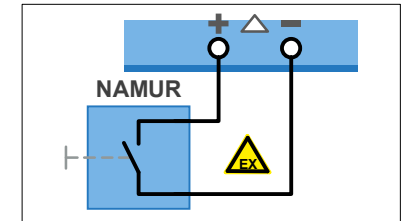
Proximity switch



Contact with resistor circuit



Unconnected contact



Axioline F I/O modules for connecting process signals

## Digital output signals in potentially explosive atmospheres

InterfaceType: **IDigitalOutFeature**

SignalType: **DO-EX SD**

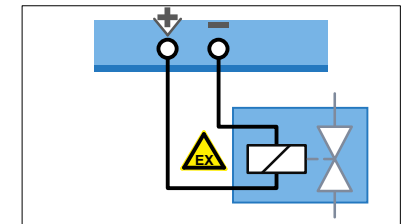
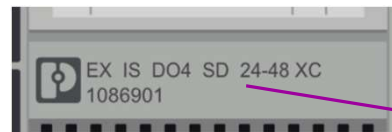
Identifier: Intrinsically safe output

Description: potentially explosive atmosphere

Connection scenario:

Solenoid valve, binary actuator

| Digital outputs         |                                                               |                                                                                     |
|-------------------------|---------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>DO</b><br>PNP        | PNP output<br>24 V DC, + switching                            |    |
| <b>DO</b><br>NPN        | NPN output<br>24 V DC, - switching                            |    |
| <b>DO</b><br>AC         | AC load, single phase<br>low voltage range                    |   |
| <b>SDO</b><br>SBT       | Safety output<br>24 V DC, SafetyBridge                        |  |
| <b>SDO</b><br>PROFIsafe | Safety output<br>24 V DC, PROFIsafe                           |  |
| <b>DO-E)</b><br>SD      | Intrinsically safe output<br>potentially explosive atmosphere |  |



| Name           | Value                       |
|----------------|-----------------------------|
| Name           | Solenoid driver, binary act |
| Description    | 2-wire-connection           |
| Signal         | 24 V DC                     |
| Circuitry      | 21 V DC                     |
| Switch design  | 24 V DC Transistor          |
| Output current | 0.048 A (0...0.06 A)        |

Axioline F I/O modules for connecting process signals

## Analog input signals with HART communication

InterfaceType: **IAnalogInFeature**

SignalType: **AI HART**  
**AI-EX HART**

| Analog inputs         |                                                                  |                                                                                     |
|-----------------------|------------------------------------------------------------------|-------------------------------------------------------------------------------------|
| <b>AI</b><br>I        | Measuring mA signal<br>current measuring signal                  |    |
| <b>AI</b><br>U        | Measuring V signal<br>voltage measuring signal                   |    |
| <b>AI</b><br>2-wire   | 4...20 mA current loop<br>2-wire transmitter                     |   |
| <b>AI</b><br>$\Omega$ | Measuring $\Omega$ linear<br>Resistance measurement              |  |
| <b>SGI</b>            | Strain gauge bridge<br>load cells, force transducer              |  |
| <b>AI</b><br>HART     | mA signal, HART protocol<br>HART transmitter                     |  |
| <b>AI-EX</b><br>HART  | Intrinsically safe mA signal<br>potentially explosive atmosphere |  |

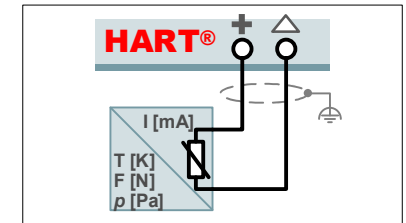
Identifier: mA signal, HART protocol

Description: HART transmitter

Connection scenario:

HART transmitter

Current loop, point-to-point connection



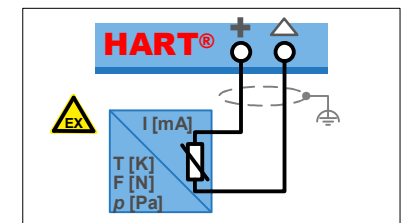
Identifier: Intrinsically safe mA signal

Description: potentially explosive atmosphere

Connection scenario:

HART transmitter

Intrinsically safe current loop



Axioline F I/O modules for connecting process signals

## Analog output signals with HART communication

InterfaceType: **IAnalogOutFeature**

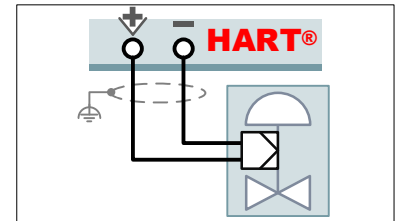
SignalType: **AO HART**

**AO-EX HART**

Identifier: mA signal, HART protocol

Description: HART analog controller

Connection scenario:



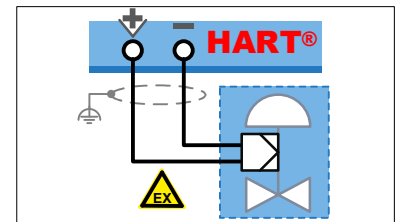
HART actuator

Current loop, point-to-point connection

Identifier: Intrinsically safe mA signal

Description: Hazardous area

Connection scenario:



HART actuator

Intrinsically safe current loop

| Analog outputs       |                                                                  |  |
|----------------------|------------------------------------------------------------------|--|
| <b>AO</b><br>I       | mA signal, set value<br>current control signal                   |  |
| <b>AO</b><br>U       | V signal, set value<br>voltage control signal                    |  |
| <b>AO</b><br>HART    | mA signal, HART protocol<br>HART analog controller               |  |
| <b>AO-E)</b><br>HART | Intrinsically safe mA signal<br>potentially explosive atmosphere |  |

Planning I/O modules with relay outputs via signals

## Signal types for planning signals switched via relay contacts

| ▼ Relay outputs     |                                                               |                                                                                   |
|---------------------|---------------------------------------------------------------|-----------------------------------------------------------------------------------|
| <b>DOR<br/>CTRL</b> | Decouple control signal<br>Relay contact, 24 V control sig... |  |
| <b>DOR<br/>AC</b>   | Switching AC load<br>Relay contact, AC load circuit           |  |
| <b>DOR<br/>DC</b>   | Relay contact, DC-load<br>Relay contact, DC load circuit      |  |

**DOR-CTRL** - Galvanic isolation of control signals in the extra-low voltage range; switching of low powers to control electronic inputs, e.g. a PLC  
Switching voltages - 24 V DC  
- V AC

**DOR-AC** - Design of signals for switching AC loads in the low voltage range  
Switching voltages - 120 V AC  
- 0 V AC

**DOR-DC** - Design of signals for switching of DC loads in the low and extra-low voltage range  
Switching voltages - 24 V DC  
- V DC  
- 0 V DC  
- 0 V DC



Planning I/O modules with relay outputs via signals

## DOR-CTRL – floating separation of control signals

- › Digital inputs
- › Digital outputs
- › Relay outputs
  - DOR CTRL** Decouple control signal  
Relay contact, control signal
  - DOR AC** Switching AC load  
Relay contact, AC load circuit
  - DOR DC** Relay contact, DC-load  
Relay contact, DC load circuit
  - SDOR SBT** Safety relay output  
Relay contact, SafetyBridge
  - SDOR PROFIsafe** Safety relay output  
Relay contact, PROFIsafe
- › Analog inputs
- › Temperature measurement
- › Analog outputs
- › Communication
- › Events, Position, Power

### DC control signals

### AC control signals

☐ IB IL 24/230 DOR1/W-PAC  
☐ IB IL 24/230 DOR4/W-PAC  
☐ IB IL 24/48 DOR 2/W-PAC

| Name                | Value                        |
|---------------------|------------------------------|
| Name                | DC control signals           |
| Description         | floating change-over contact |
| Signal              | 24 V DC                      |
| Circuitry           | DC control signal            |
| Switch design       | Floating relay contact       |
| Output current      | 0.01 A (0...0.05 A)          |
| Switching frequency | - Hz (0...20 Hz)             |

**Variant**

- ☐ DC control signals non-isolated N/O contact
- ☐ DC control signals non-isolated change-over contact
- ☐ DC control signals floating N/O contact
- ☒ DC control signals floating change-over contact

Control signals in the extra-low voltage range (24 V DC / 24 V AC) for controlling electronic inputs

– Relay contacts with gold plating, these have only a very limited switching capacity

Planning I/O modules with relay outputs via signals

## DOR-AC – Project engineering of signals for switching AC loads in the low-voltage range

➤ Digital inputs

➤ Digital outputs

▼ Relay outputs

**DOR**  
**CTRL**

Decouple control signal  
Relay contact, control signal

**DOR**  
**AC**

Switching AC load  
Relay contact, AC load circuit

**DOR**  
**DC**

Relay contact, DC-load  
Relay contact, DC load circuit

**SDOR**  
**SBT**

Safety relay output  
Relay contact, SafetyBridge

**SDOR**  
**PROFIsafe**

Safety relay output  
Relay contact, PROFIsafe

➤ Analog inputs

➤ Temperature measurement

➤ Analog outputs

➤ Communication

➤ Events, Position, Power

**230 V AC**

**DOR AC**

Switching AC load

AC load signals

1

230 V AC Signal  
Output current 1 A

**230 V AC**

**DOR AC**

Switching AC load

AC load signals

1

230 V AC Signal  
Output current 1 A

**120 V AC**

**DOR AC**

Switching AC load

AC load signals

1

120 V AC Signal  
Output current 1 A

**AC loads**

☐ IB IL 24/230 DOR1/W-PAC

☐ IB IL 24/230 DOR4/HC-PAC

☐ IB IL 24/230 DOR4/W-PAC

| Name                | Value                  |
|---------------------|------------------------|
| Name                | AC load signals        |
| Description         | floating N/O contact   |
| Signal              | 230 V AC               |
| Circuitry           | AC load                |
| Switch design       | Floating relay contact |
| Output current      | 1 A (0.01...10 A)      |
| Switching frequency | - Hz (0...1 Hz)        |

**Variant**

☒ AC load signals  
floating N/O contact

☐ AC load signals  
floating change-over contact

for AC loads, the relay contact can switch the maximum switching current over the entire voltage range

since the arc is extinguished at the zero crossing of the switching current

Planning I/O modules with relay outputs via signals

## DOR-DC – Project engineering of signals for switching DC loads in the low and extra-low voltage range

› Digital inputs

› Digital outputs

› Relay outputs

**DOR**  
CTRL

Decouple control signal  
Relay contact, control signal

**DOR**  
AC

Switching AC load  
Relay contact, AC load circuit

**DOR**  
DC

Relay contact, DC-load  
Relay contact, DC load circuit

**SDOR**  
SBT

Safety relay output  
Relay contact, SafetyBridge

**SDOR**  
PROFIsafe

Safety relay output  
Relay contact, PROFIsafe

› Analog inputs

› Temperature measurement

› Analog outputs

› Communication

› Events, Position, Power

142.6 mm

0.1 A

0.1 A

(1) (2) (3) (4) (5) (4) (5) (4)

**DOR**  
DC

Relay contact,  
DC-load

DC load signals

1

Output current 0.1 A

**DOR**  
DC

Relay contact,  
DC-load

DC load signals

1

48 V DC Signal  
Output current 0.15 A

**110 V DC**

...

1

110 V DC  
Output c

**DOR**  
DC

...

1

DC load

**DC loads**

☐ IB IL 24/230 DOR1/W-PAC

☐ IB IL 24/230 DOR4/W-PAC

☐ IB IL 24/48 DOR 2/W-PAC

| Name                | Value                        |
|---------------------|------------------------------|
| Name                | DC load signals              |
| Description         | floating change-over contact |
| Signal              | 48 V DC                      |
| Circuitry           | DC load                      |
| Switch design       | Floating relay contact       |
| Output current      | 0.15 A (0.01...3 A)          |
| Switching frequency | - Hz (0...1 Hz)              |

**Variant**

☐ DC load signals floating N/O contact

☒ DC load signals floating change-over contact

☐ DC load signals non-isolated N/O contact

☐ DC load signals non-isolated change-over contact

Selection of the switching voltage:

- 24 V DC
- 48 V DC
- 110 V DC
- 220 V DC

for DC voltages, the maximum switching current is strongly dependent on the level of the switching voltage

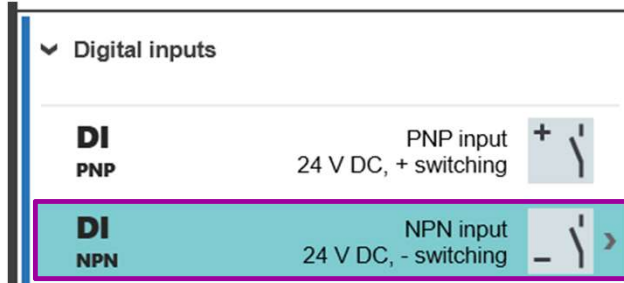
 **PHOENIX CONTACT**  
INSPIRING INNOVATIONS

Axioline Smart Elements modules for connection of sensors/actuators in NPN circuit

## Smart Elements DI & DO module for NPN circuits

InterfaceType: **IDigitalInFeature**

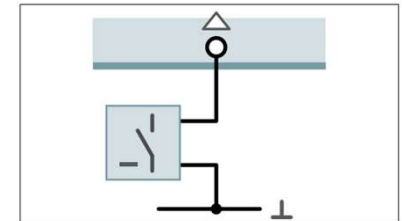
SignalType: **DI NPN**



Identifier: NPN input

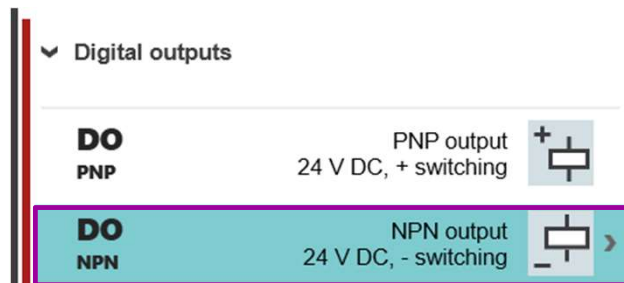
Description: 24 V DC, - switching

Connection scenario: 1-wire connection



InterfaceType: **IDigitalOutFeature**

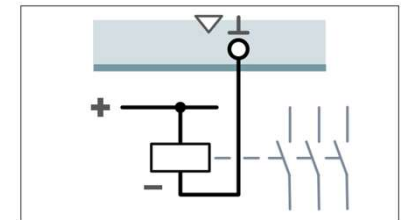
SignalType: **DO NPN**



Identifier: NPN output

Description: 24 V DC, - switching

Connection scenario: 1-wire connection



Axioline F communication modules

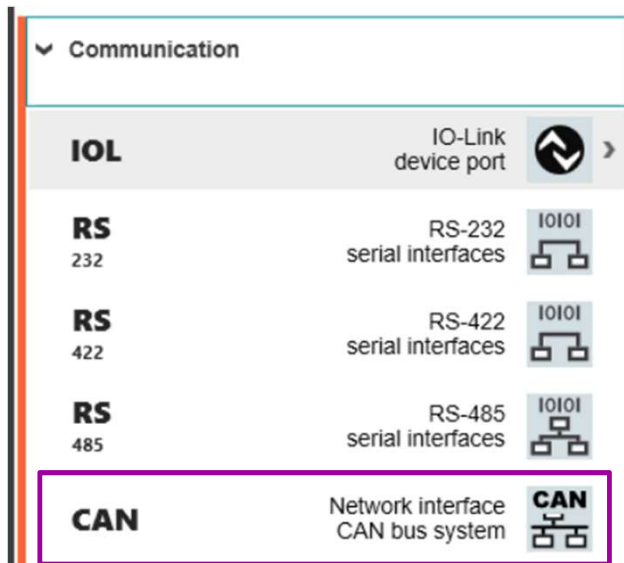
## Axioline F I/O module for connection to a CAN bus system

InterfaceType: **ICANInterfaceFeature**

SignalType: **CAN**

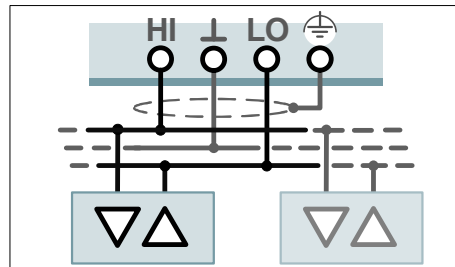
Identifier: Network interface

Description: CAN bus system

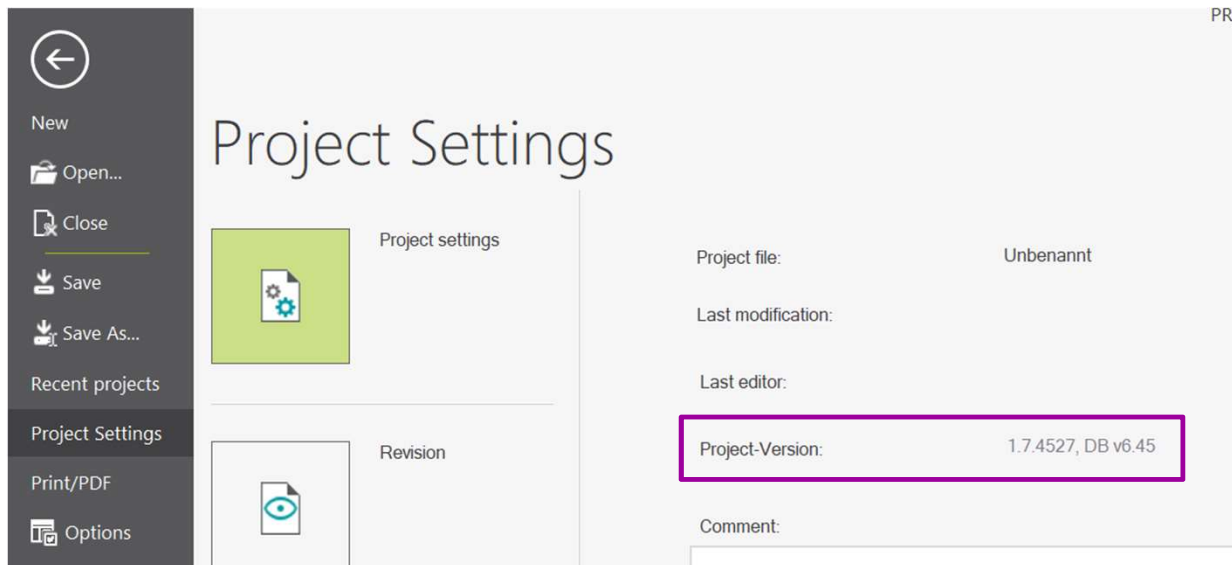
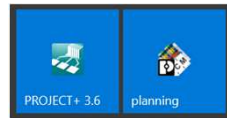


Connection scenario:

Connection to a CAN bus system



# Integrated call of Project+ from PROJECT complete



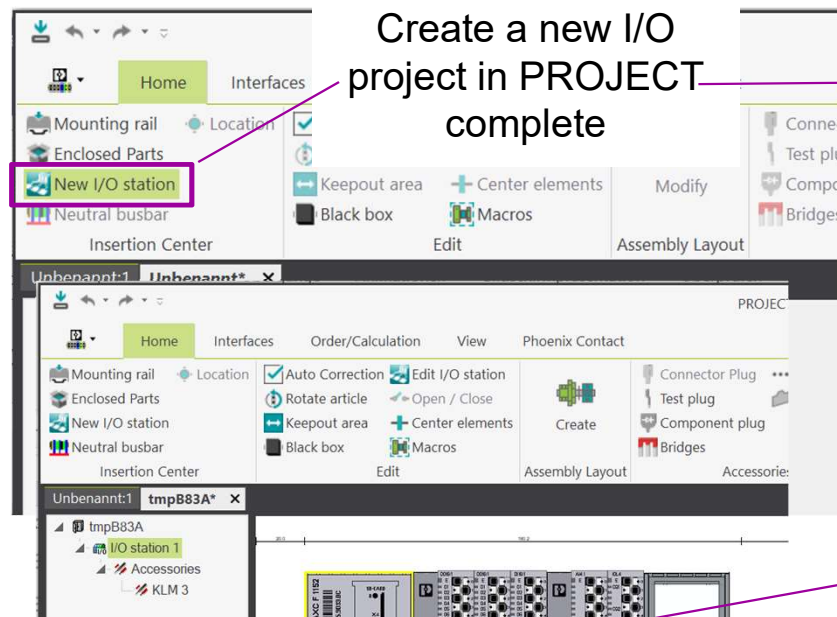
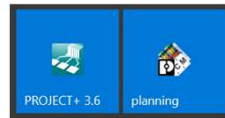
Creation and editing of I/O stations via integrated call of Project+ from PROJECT complete Planning

➤ as of version 1.7.4527 with Project+ 3.6.182



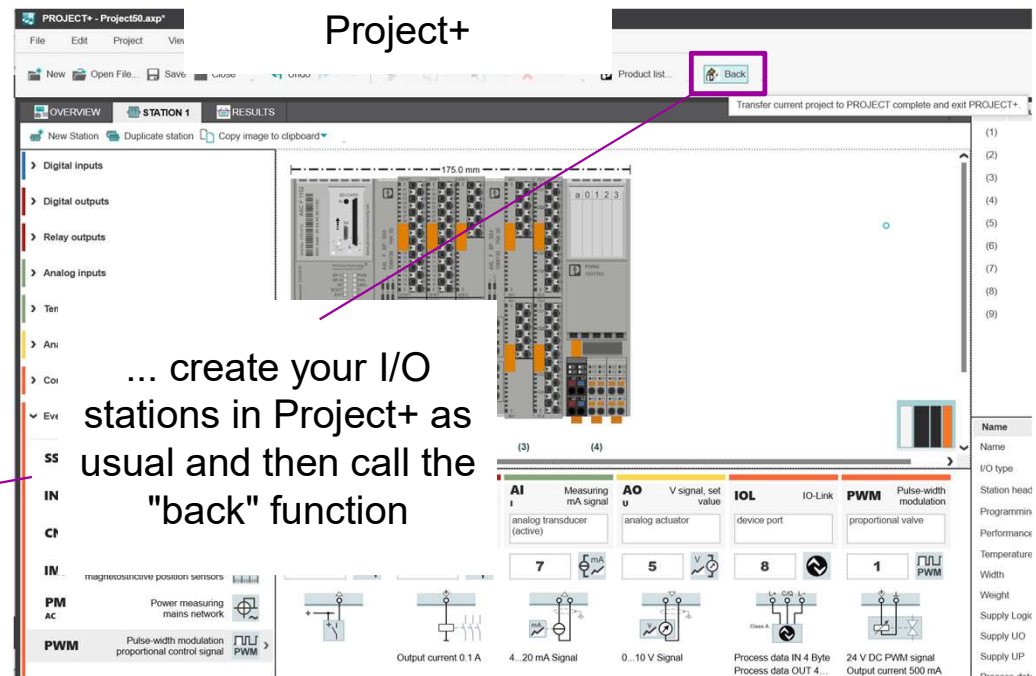
Coupling of PROJECT complete and Project+ for the creation and editing of I/O stations

## Integrated call of Project+ from PROJECT complete



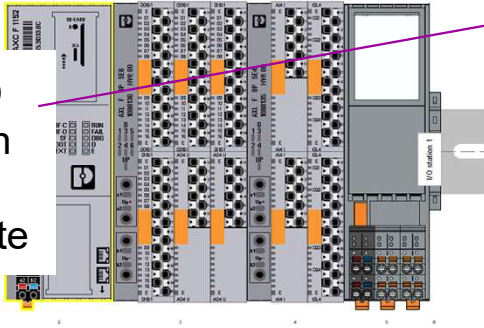
Create a new I/O project in PROJECT complete

... automatically executes a call to Project+



... create your I/O stations in Project+ as usual and then call the "back" function

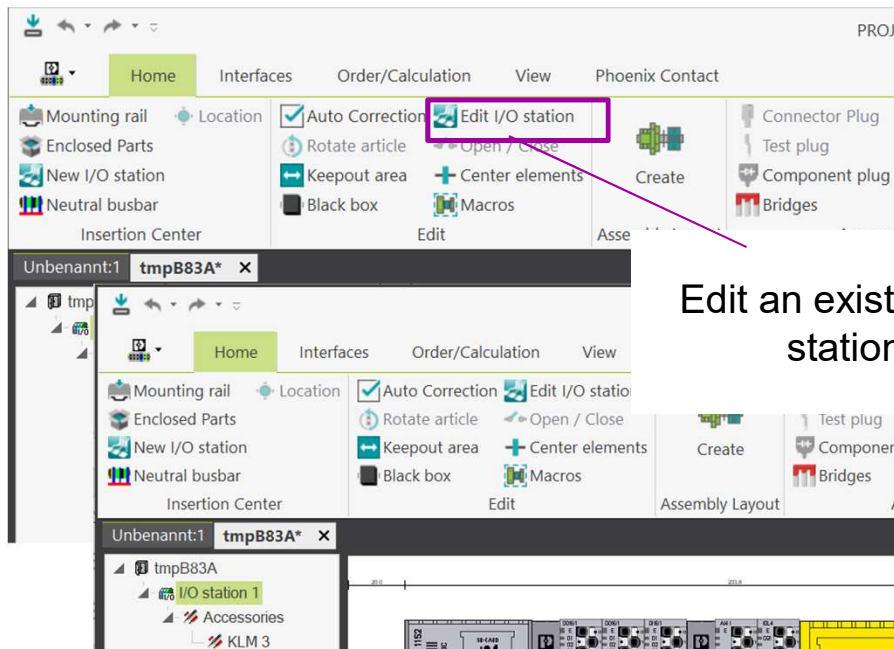
... imports the I/O stations created in Project+ into PROJECT complete



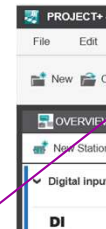


Coupling of PROJECT complete and Project+ for the creation and editing of I/O stations

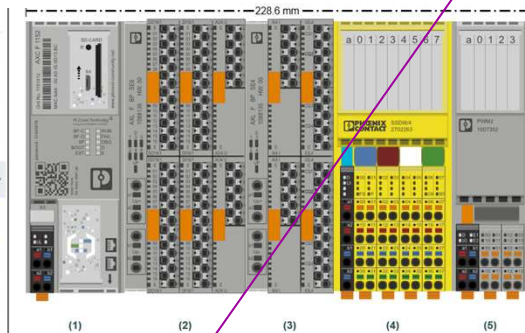
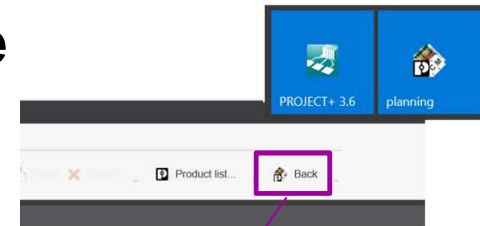
## Integrated call of Project+ from PROJECT complete



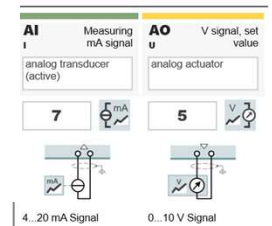
Edit an existing I/O station



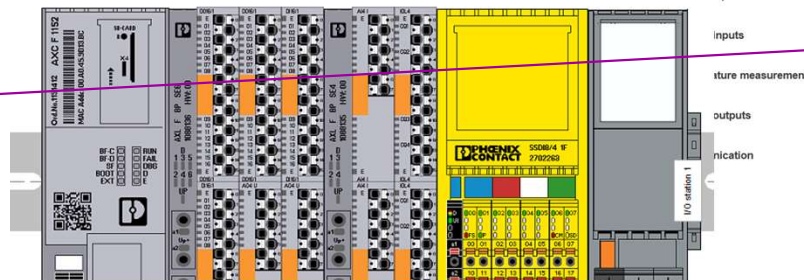
... takes over the I/O project back into Project+



... edit the I/O stations in Project+ and apply the changes with "back"

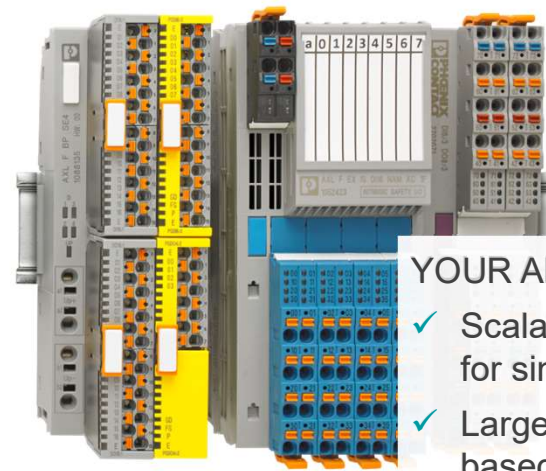


... imports the revised I/O stations back into PROJECT complete



Axioline F

## Arquitecturas



### 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

## Details of each „discipline“

CONTROLS



BUS COUPLERS



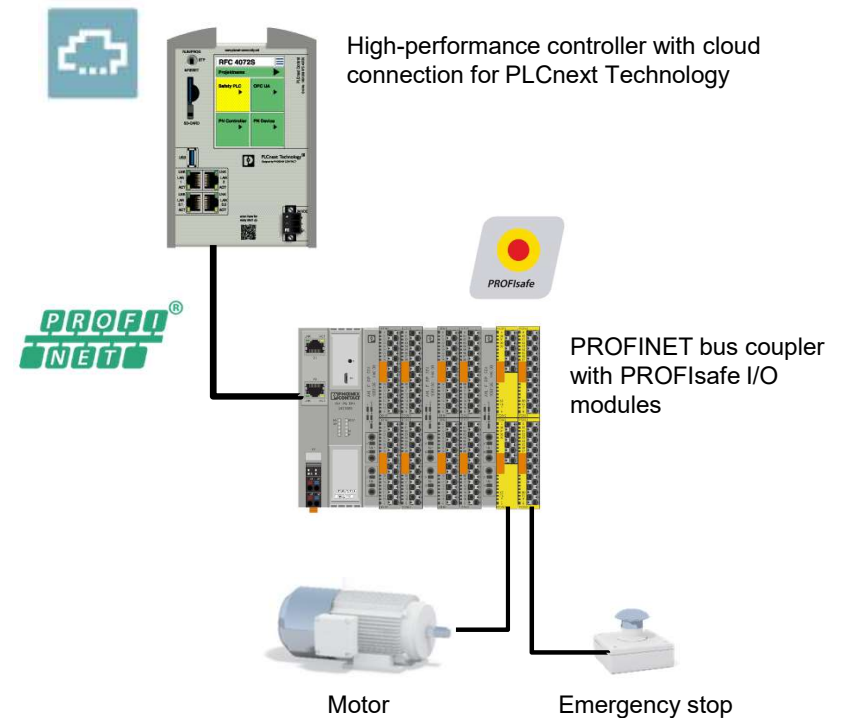
I/Os



Bus coupler

## Safety in the system

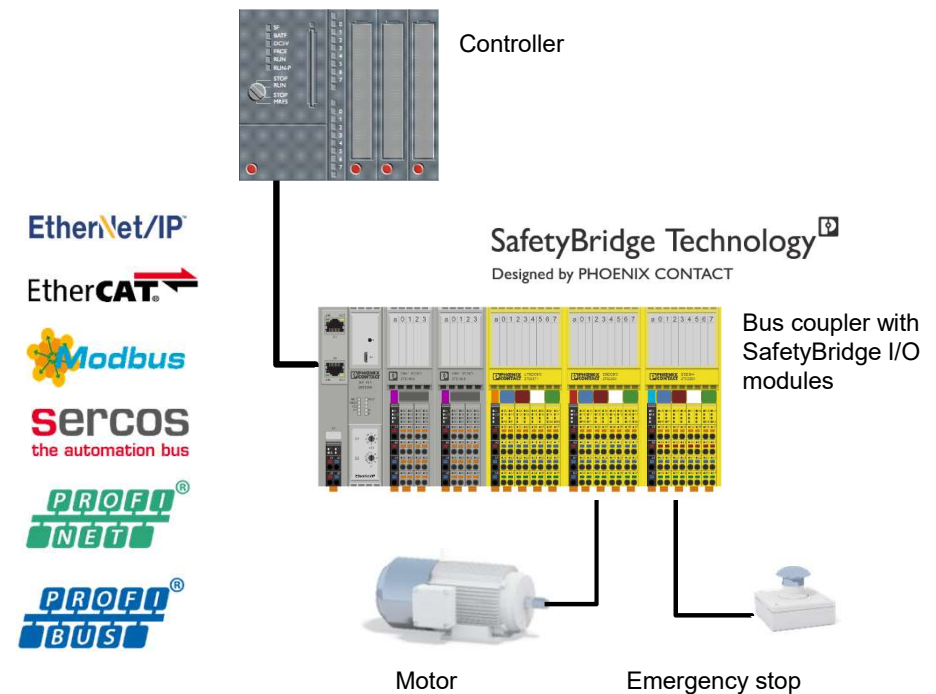
“ Implement PROFIsafe solutions systemically in PROFINET networks. This can be easily done through the lower-level connection of PROFINET bus couplers with PROFIsafe I/O modules to a Phoenix Contact PROFIsafe controller. ”



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. ”





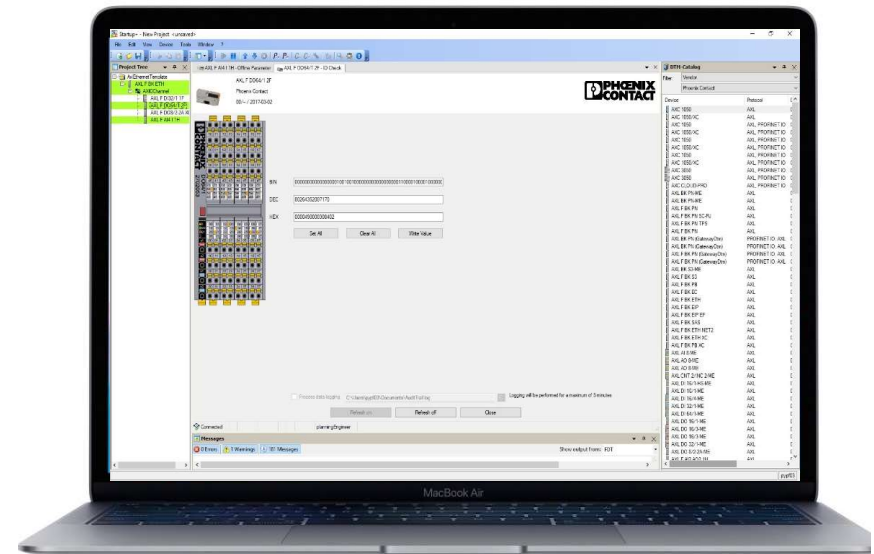
Bus coupler

## 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

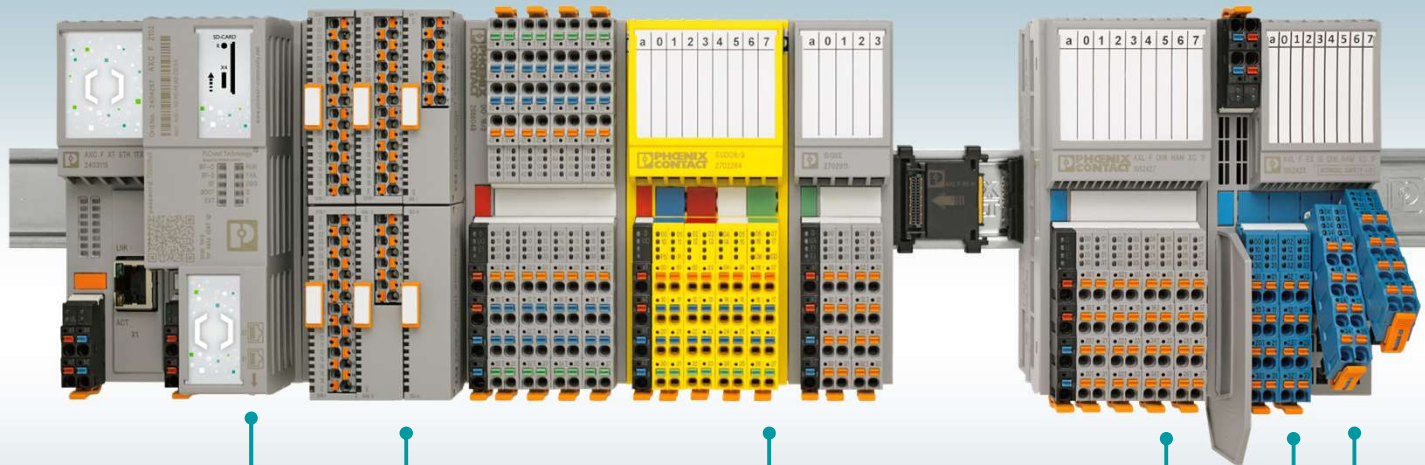
- Easily check the wiring of the Axioline F I/O station
- Parameterization of the I/O modules used
- Comprehensive diagnostics during operation



AVAILABLE AS FREE DOWNLOAD !

I/Os

## Modularity in the system



Controller or bus coupler - several options of the station-head

Easy combination of Axioline Smart Elements and Axioline F I/Os

consistent use of Push-in connection technology

Mixed operation of non-Ex-i and Ex-i modules in one station

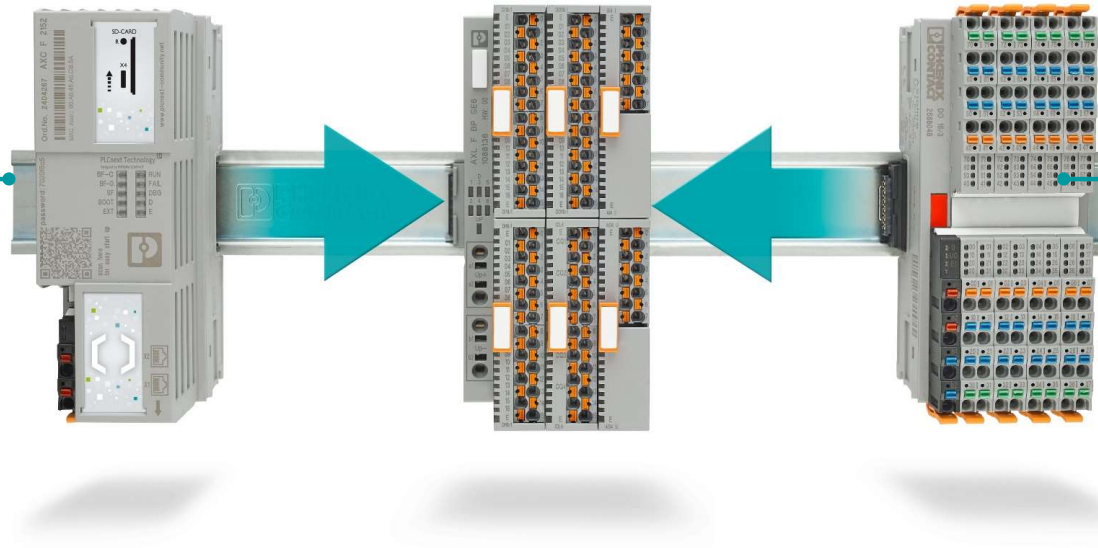
Comfortable module exchange due to pluggable connectors



Axioline Smart Elements

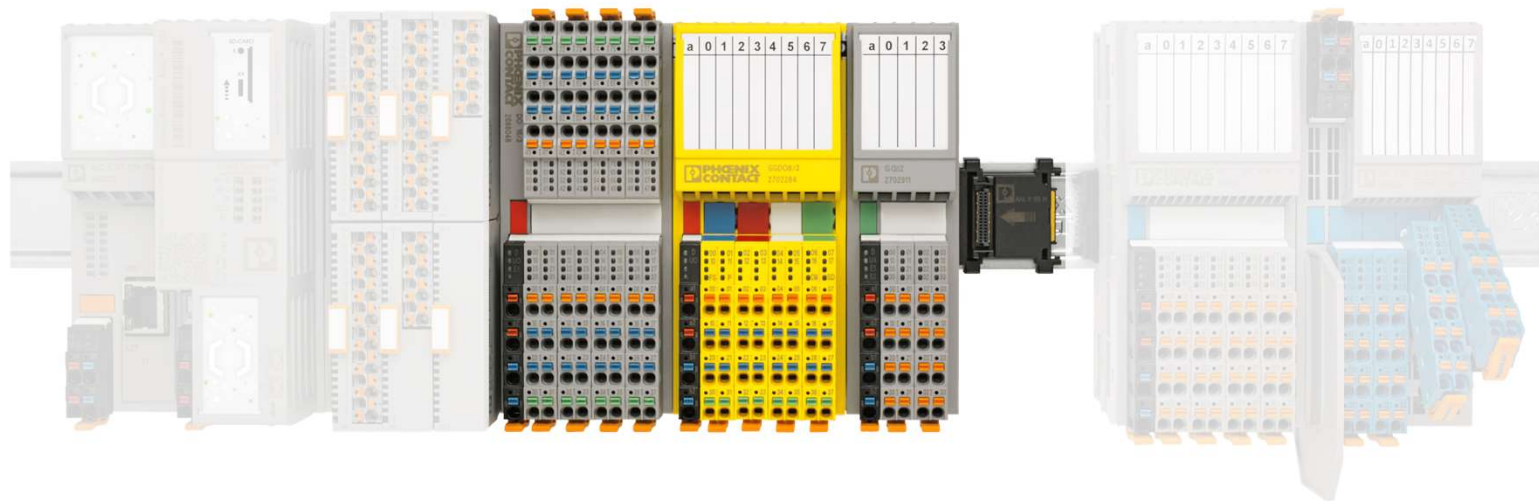
## Full compatibility

All Axiococontrols  
All bus couplers



All Axioline F I/Os

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

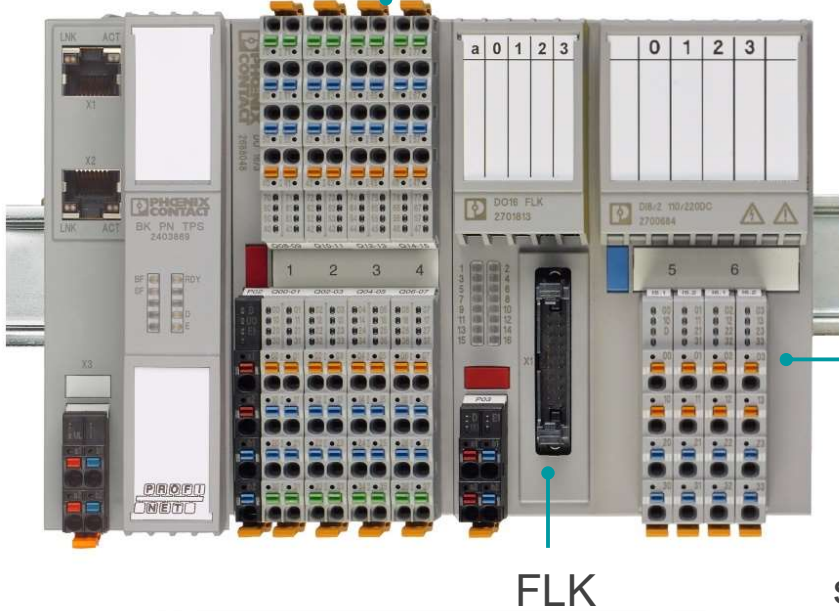


## AXIOLINE F: Standard I/O modules

I/Os

## Various connection methods

Multi-conductor



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

Up to  
**220 V DC**  
connectable  
**WITHOUT**  
separating plate

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

The modular automation system

# The right automation solution for every requirement

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 AXL F XT ETH 1TX
- 2 Open control platform AXL F 215Z
- 3 Backplane for Axioline Smart Elements AXL F BP SE6
- 4 Digital signal processing AXL SE D116/1



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 SSD06/3
- 4 Connection of strain gauge AXL F SG2



PHOENIX CONTACT  
INSPIRING INNOVATIONS

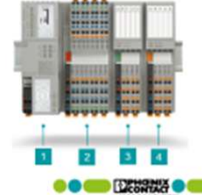
The modular automation system

**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 AXL F 215Z
- 2 Digital signal processing AXL F DO16/3
- 3 Analog signal processing AXL F AQ AQ2
- 4 Serial communication protocols AXL F RS UNI



PHOENIX CONTACT  
INSPIRING INNOVATIONS

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

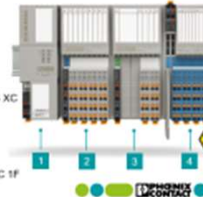
The modular automation system

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



PHOENIX CONTACT  
INSPIRING INNOVATIONS

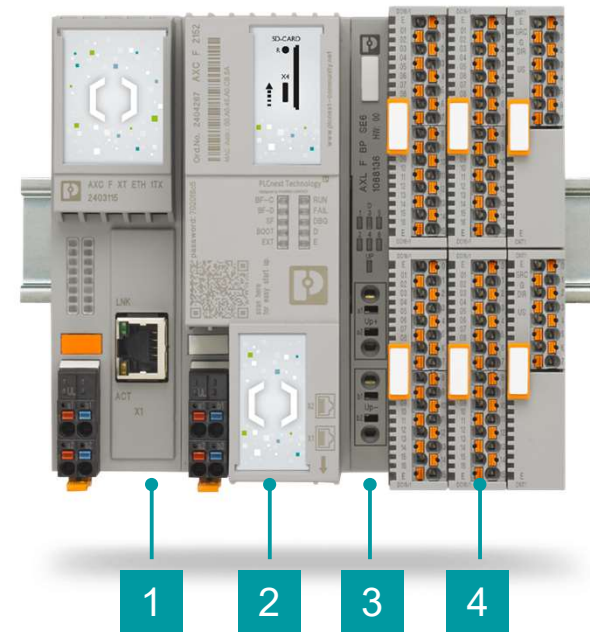
The modular automation system

## 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





The modular automation system

# The right automation solution for every requirement

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 AXL F XT ETH 1TX
- 2 Open control platform AXL F 215Z
- 3 Backplane for Axioline Smart Elements AXL F BP SE6
- 4 Digital signal processing AXL SE D116/1



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 SSD06/3
- 4 Connection of strain gauge AXL F SG2



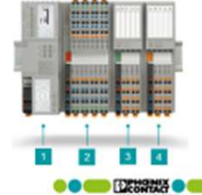
The modular automation system

**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 AXL F 215Z
- 2 Digital signal processing AXL F DO16/3
- 3 Analog signal processing AXL F AQ AQ2
- 4 Serial communication protocols AXL F RS UNI



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

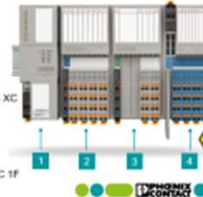
The modular automation system

**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 AIB HART XC 1F
- 4 Intrinsically safe I/O modul AXL F EX IS D116 NAM XC 1F





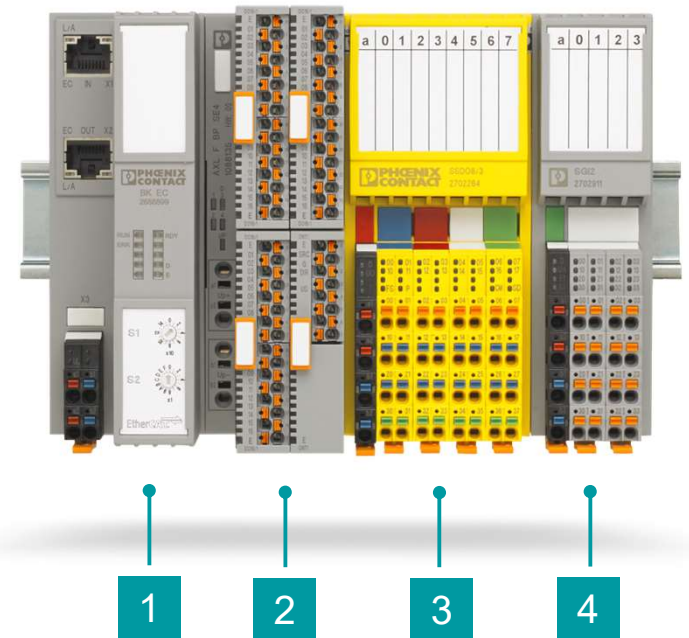
The modular automation system

## 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



# Sistema Axioline

Axioline SE en

EtherNet/IP

Studio 5000 (software)



Axioline Smart Element configuration with EtherNet/IP integration

The modular automation system

# The right automation solution for every requirement

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 AXL F XT ETH 1TX
- 2 Open control platform AXL F 215Z
- 3 Backplane for Axioline Smart Elements AXL F BP SE6
- 4 Digital signal processing AXL SE D116/1



PHOENIX CONTACT  
INTEGRATING INTELLIGENCE

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 SSD06/3
- 4 Connection of strain gauge AXL F SG2



PHOENIX CONTACT  
INTEGRATING INTELLIGENCE

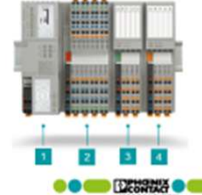
The modular automation system

**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 AXL F 215Z
- 2 Digital signal processing AXL F DO16/3
- 3 Analog signal processing AXL F AQ AQ2
- 4 Serial communication protocols AXL F RS UNI



PHOENIX CONTACT  
INTEGRATING INTELLIGENCE

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

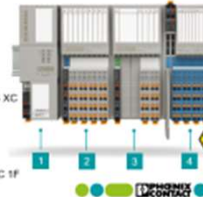
The modular automation system

**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 AIB HART XC 1F
- 4 Intrinsically safe I/O modul AXL F EX IS D116 NAM XC 1F



PHOENIX CONTACT  
INTEGRATING INTELLIGENCE

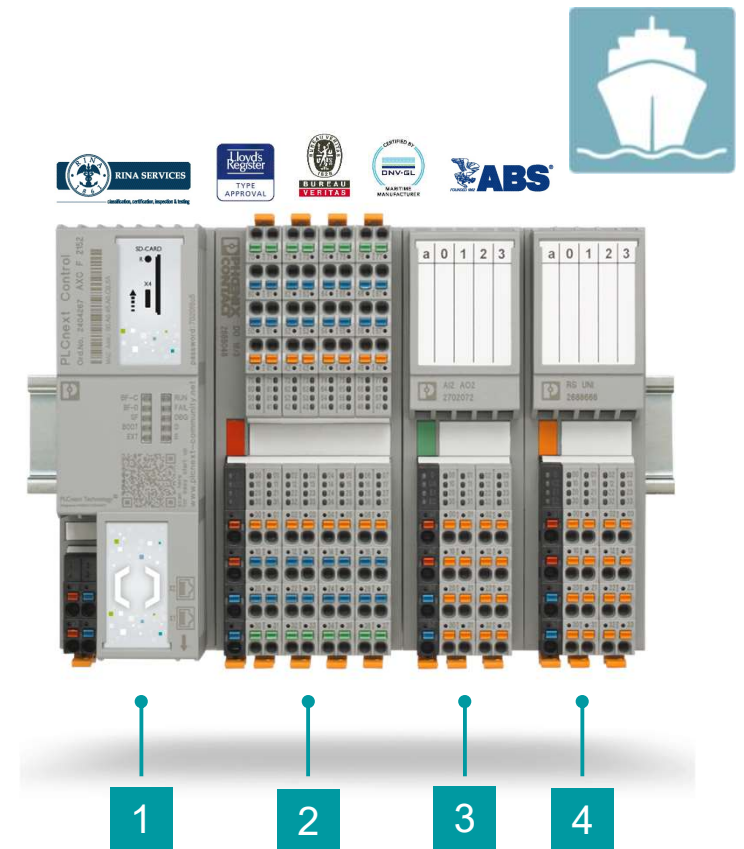
The modular automation system

## 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



The modular automation system

# The right automation solution for every requirement

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 AXL F XT ETH 1TX
- 2 Open control platform AXL F 215Z
- 3 Backplane for Axioline Smart Elements AXL F BP SE6
- 4 Digital signal processing AXL SE D116/1



PHOENIX CONTACT

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 SSD06/3
- 4 Connection of strain gauge AXL F SG2



PHOENIX CONTACT

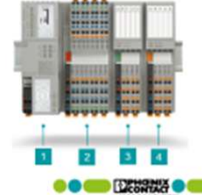
The modular automation system

**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 AXL F 215Z
- 2 Digital signal processing AXL F DO16/3
- 3 Analog signal processing AXL F AQ AQ2
- 4 Serial communication protocols AXL F RS UNI



PHOENIX CONTACT

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

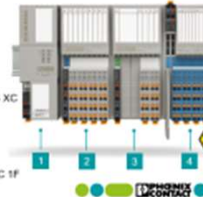
The modular automation system

**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 AIB HART XC 1F
- 4 Intrinsically safe I/O modul AXL F EX IS D116 NAM XC 1F



PHOENIX CONTACT

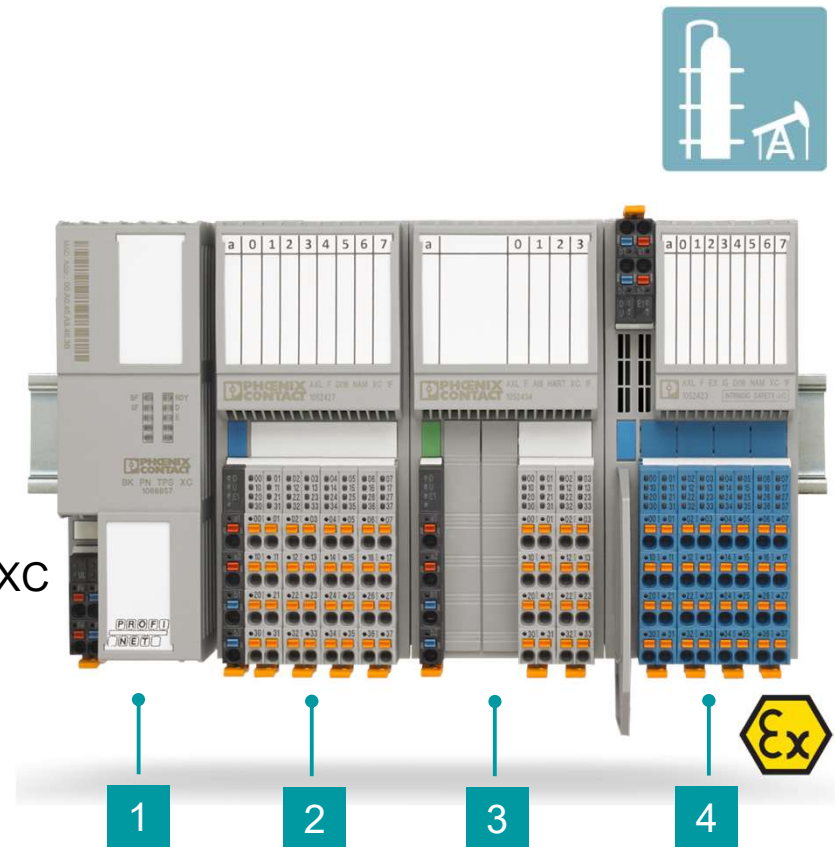
The modular automation system

## 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





**Axioline F**

**Profinet**

**Inside TIA Portal**



**Axioline F - Profinet**

**Set up**  
Linking a Profinet I/O station  
into the TIA Portal V13



**How to set up an Axioline F Profinet I/O station in the TIA Portal**

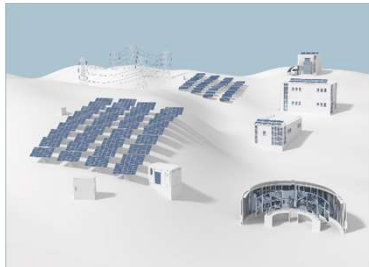


Scope of applications

## IP20 I/O Systems



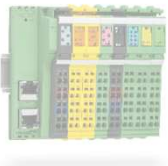
SIMPLE



APPLICATIONS



COMPLEX



 **IO-Link**



 **IO-Link**



 **HART**  
COMMUNICATION PROTOCOL



 **HART**  
COMMUNICATION PROTOCOL

MODULAR AUTOMATION SYSTEM

Webinar IMA 2020

## Mayor información



Phoenix Contact, S.A. de C.V.  
Lago Alberto 319 Piso 9,  
Locales 902 y 903-A,  
Col. Granada Del. Miguel Hidalgo,  
Ciudad de México. 11520  
Tel.: +52 55 1101 1380 Ext. 393  
Cel.: +52 55 3233 6518  
agordillo@phoenixcontact.com.mx  
www.phoenixcontact.com.mx

**Ing. Antonio Gordillo**  
Infrastructure and Systems Automation  
Product Marketing Manager

[www.phoenixcontact.com.mx](http://www.phoenixcontact.com.mx)

[ventas@phoenixcontact.com.mx](mailto:ventas@phoenixcontact.com.mx)

55 1101 1380

Actividades 2020

Folletos

Presentaciones

Webinars