

# AXL F AI4 U XC 1H - Analog module

2702008

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The figure shows the standard item

Axioline F, Analog input module, Analog inputs: 4, 0 V ... 5 V, -5 V ... 5 V, 0 V ... 10 V, -10 V ... 10 V, connection technology: 2-, 3-, 4-conductor, transmission speed in the local bus: 100 Mbps, integrated sensor supply, Extreme conditions version, degree of protection: IP20, including bus base module and Axioline F connectors

## Product description

The module is designed for use within an Axioline F station. It is used to acquire analog voltage signals.

## Your advantages

- 4 analog, bipolar input channels for the connection of voltage signals
- Connection of sensors in 2-, 3-, and 4-conductor technology
- Voltage ranges: 0 V ... 10 V,  $\pm 10$  V, 0 V ... 5 V,  $\pm 5$  V
- Simultaneous scanning of all channels by means of simultaneous sampling
- High crosstalk attenuation between the channels, thanks to separate signal paths
- Particularly robust against electromagnetic interference
- Device rating plate stored
- 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

## Commercial data

|                                      |               |
|--------------------------------------|---------------|
| Item number                          | 2702008       |
| Packing unit                         | 1 pc          |
| Minimum order quantity               | 1 pc          |
| Sales key                            | DR02          |
| Product key                          | DRI241        |
| GTIN                                 | 4055626008400 |
| Weight per piece (including packing) | 218.6 g       |
| Weight per piece (excluding packing) | 206 g         |
| Customs tariff number                | 85389091      |
| Country of origin                    | DE            |

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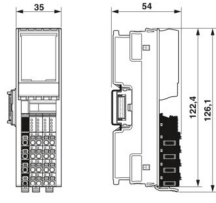


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## Technical data

### Dimensions

|                     |  |
|---------------------|--|
| Dimensional drawing |  |
| Width               | 35 mm  |
| Height              | 126.1 mm   |
| Depth               | 54 mm  |
| Note on dimensions  | The depth applies when a TH 35-7.5 DIN rail is used (in accordance with EN 60715). |

### Notes

|                         |   |
|-------------------------|---|
| Note on application     |   |
| Note on application     | Only for industrial use   |
| Utilization restriction |   |
| EMC note                | EMC: class A product, see manufacturer's declaration in the download area |

### Material specifications

|                 |                 |
|-----------------|-----------------|
| Color (Housing) | gray (RAL 7042) |
|-----------------|-----------------|

### Interfaces

|                      |                 |
|----------------------|-----------------|
| Axioline F local bus |                 |
| Number of interfaces | 2               |
| Connection method    | Bus base module |
| Transmission speed   | 100 Mbps        |

### System properties

|                                   |        |
|-----------------------------------|--------|
| Programming data (LocalbusSlave)  |        |
| Input address area                | 8 Byte |
| Output address area               | 0 Byte |
| Fieldbus data telegram (PROFIBUS) |        |
| Required parameter data           | 7 Byte |
| Required configuration data       | 6 Byte |

### Input data

|                 |  |
|-----------------|--|
| Analog: General |  |
|-----------------|--|

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|   |  |
|---|--|
| Input name                                | Analog inputs  |
| Description of the input                  | Differential inputs, voltage   |
| Number of inputs                          | 4  |
| A/D conversion time                       | 31.25 µs   |
| Connection method                         | Push-in connection   |
| Connection technology                     | 2-, 3-, 4-conductor  |
| Note regarding the connection technology  | shielded, twisted pair   |
| Voltage input signal                      | 0 V ... 5 V<br>-5 V ... 5 V<br>0 V ... 10 V<br>-10 V ... 10 V  |
| Input resistance of voltage input         | 268 kΩ (typical)   |
| A/D converter resolution                  | 16 bit   |
| Data formats                              | IB IL, S7-compatible   |
| Input filter                              | 30 Hz, 12 kHz and mean value generation (can be parameterized)   |
| Limit frequency (3 dB)                    | 30 Hz<br>12 kHz  |
| Common mode voltage range signal - ground | -50 V DC ... 50 V DC   |
| Measured value representation             | 16 bits (15 bits + sign bit)   |
| Protective circuit                        | Transient protection of inputs; Suppressor diode<br>Overload protection of the voltage inputs; ±30 V DC, maximum |

## Product properties

|                    |  |
|--------------------|--|
| Product type       | I/O component  |
| Product family     | Axioline F   |
| Type               | block modular  |
| Mounting position  | any (no temperature derating)                          |
| Scope of supply    | including bus base module and Axioline F connectors    |
| Special properties | integrated sensor supply<br>Extreme conditions version |

## Insulation characteristics

|                      |                              |
|----------------------|------------------------------|
| Overvoltage category | II (IEC 60664-1, EN 60664-1) |
| Pollution degree     | 2 (IEC 60664-1, EN 60664-1)  |

## Electrical properties

|   |        |
|---|--------|
| Maximum power dissipation for nominal condition | 1.85 W |
|---|--------|

## Potentials: Axioline F local bus supply ( $U_{BUS}$ )

|                |                              |
|----------------|------------------------------|
| Supply voltage | 5 V DC (via bus base module) |
| Current draw   | max. 150 mA<br>typ. 120 mA   |

## Potentials: Supply for analog modules ( $U_A$ )

|                |  |
|----------------|--|
| Supply voltage | 24 V DC (I/O supply and sensor supply) |
|----------------|--|

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|                      |   |
|----------------------|---|
| Supply voltage range | 19.2 V DC ... 30 V DC (including all tolerances, including ripple)  |
| Current draw         | max. 245 mA ( $I_{IS} = 4 \times 50 \text{ mA}$ (full load))  |
|                      | max. 45 mA ( $I_{IS} = 0 \text{ mA}$ )  |
|                      | typ. 118 mA ( $I_{IS} = 4 \times 20 \text{ mA}$ (nominal load))   |
|                      | max. 125 mA ( $I_{IS} = 4 \times 20 \text{ mA}$ (nominal load))   |
|                      | typ. 238 mA ( $I_{IS} = 4 \times 50 \text{ mA}$ (full load))  |
| Current consumption  | typ. 38 mA ( $I_{IS} = 0 \text{ mA}$ )  |
| Protective circuit   | Surge protection; electronic (35 V, 0.5 s)  |
|                      | Reverse polarity protection; up to HW 02: polarity protection diode from HW 03: parallel diode; with external 5 A fuse (for startup only) |
|                      | Transient protection; Suppressor diode  |

## Supply:

|                     |                          |
|---------------------|--------------------------|
| Designation         | Sensor supply $U_{IS}$   |
| Supply voltage      | 24 V DC (from $U_A$ )    |
| Current consumption | max. 50 mA (per channel) |

## Electrical isolation/isolation of the voltage ranges

|  |                        |
|--|------------------------|
| Test voltage: 5 V supply of the local bus ( $U_{BUS}$ ) / 24 V supply (I/Os) | 500 V AC, 50 Hz, 1 min |
| Test voltage: 5 V supply of the local bus ( $U_{BUS}$ ) / analog inputs      | 500 V AC, 50 Hz, 1 min |
| Test voltage: 5 V supply of the local bus ( $U_{BUS}$ ) / functional ground  | 500 V AC, 50 Hz, 1 min |
| Test voltage: 24 V supply (I/O) / analog inputs                              | 500 V AC, 50 Hz, 1 min |
| Test voltage: 24 V supply (I/O) / functional ground                          | 500 V AC, 50 Hz, 1 min |
| Test voltage: Analog inputs / functional ground                              | 500 V AC, 50 Hz, 1 min |

## Connection data

### Connection technology

|                               |   |
|-------------------------------|---|
| Connection name               | Axioline F connector  |
| Note on the connection method | Please observe the information provided on conductor cross-sections in the "Axioline F: system and installation" user manual. |

### Axioline F connector

|                                   |   |
|-----------------------------------|---|
| Connection method                 | Push-in connection  |
| Note on the connection method     | Please observe the information provided on conductor cross-sections in the "Axioline F: system and installation" user manual. |
| Conductor cross-section, rigid    | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>   |
| Conductor cross-section, flexible | 0.2 mm <sup>2</sup> ... 1.5 mm <sup>2</sup>   |
| Conductor cross-section AWG       | 24 ... 16   |
| Stripping length                  | 8 mm  |

## Environmental and real-life conditions

### Ambient conditions

|                                 |  |
|---------------------------------|--|
| Ambient temperature (operation) | -25 °C ... 60 °C (Standard, applications with UL approval, use in zone 2 potentially explosive area) |
|---------------------------------|--|

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|  |   |
|--|---|
|  | -40 °C ... 70 °C (Extended, see section "Tested successfully: use under extreme ambient conditions" in the data sheet.) |
| Degree of protection                     | IP20  |
| Air pressure (operation)                 | 70 kPa ... 106 kPa (up to 3000 m above sea level)   |
| Air pressure (storage/transport)         | 70 kPa ... 106 kPa (up to 3000 m above sea level)   |
| Ambient temperature (storage/transport)  | -40 °C ... 85 °C  |
| Permissible humidity (operation)         | 5 % ... 95 % (non-condensing)   |
| Permissible humidity (storage/transport) | 5 % ... 95 % (non-condensing)   |

## Mechanical test

|  |     |
|--|-----|
| Vibration resistance in accordance with EN 60068-2-6/IEC 60068-2-6 | 5g  |
| Shock in accordance with EN 60068-2-27/IEC 60068-2-27              | 30g |
| Continuous shock in accordance with EN 60068-2-27/IEC 60068-2-27   | 10g |

## Test (noxious gas)

|  |   |
|--|---|
| Test standard  | ISA-71.04-2013 G3 Harsh Group A<br>IEC 60068-2-60:2015 Method 4 |
| Temperature  | 25 °C ±1 K  |
| Humidity (relative)                                      | 75 % ±3 %   |
| Test duration  | 21 Days   |
| Volume concentration H <sub>2</sub> S (Hydrogen sulfide) | 50 ppb  |
| Volume concentration NO <sub>2</sub> (Nitrogen dioxide)  | 1250 ppb  |
| Volume concentration Cl <sub>2</sub> (Chlorine)          | 10 ppb  |
| Volume concentration SO <sub>2</sub> (Sulfur dioxide)    | 300 ppb   |

## Standards and regulations

|                  |                                       |
|------------------|---------------------------------------|
| Protection class | III (IEC 61140, EN 61140, VDE 0140-1) |
|------------------|---------------------------------------|

## Approvals

### ATEX

|                |                          |
|----------------|--------------------------|
| Identification | ⊕ II 3 G Ex ec IIC T4 Gc |
| Certificate    | UL 20 ATEX 2441X         |

### IECEX

|                |                    |
|----------------|--------------------|
| Identification | Ex ec IIC T4 Gc    |
| Certificate    | IECEX ULD 20.0026X |

### UL, USA/Canada

|                |         |
|----------------|---------|
| Identification | cULus   |
| Certificate    | E238705 |

### UL Ex, USA / Canada

|                |   |
|----------------|---|
| Identification | Class I, Zone 2, AEx ec IIC T4<br>Class I, Division 2, Groups A, B, C, D, T4<br>Ex ec IIC T4 Gc X |
|----------------|---|

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|                |                 |
|----------------|-----------------|
| Certificate    | E366272         |
| CCC / China-Ex |                 |
| Identification | Ex ec IIC T4 Gc |
| Certificate    |                 |

## Mounting

|                   |                               |
|-------------------|-------------------------------|
| Mounting type     | DIN rail mounting             |
| Mounting position | any (no temperature derating) |

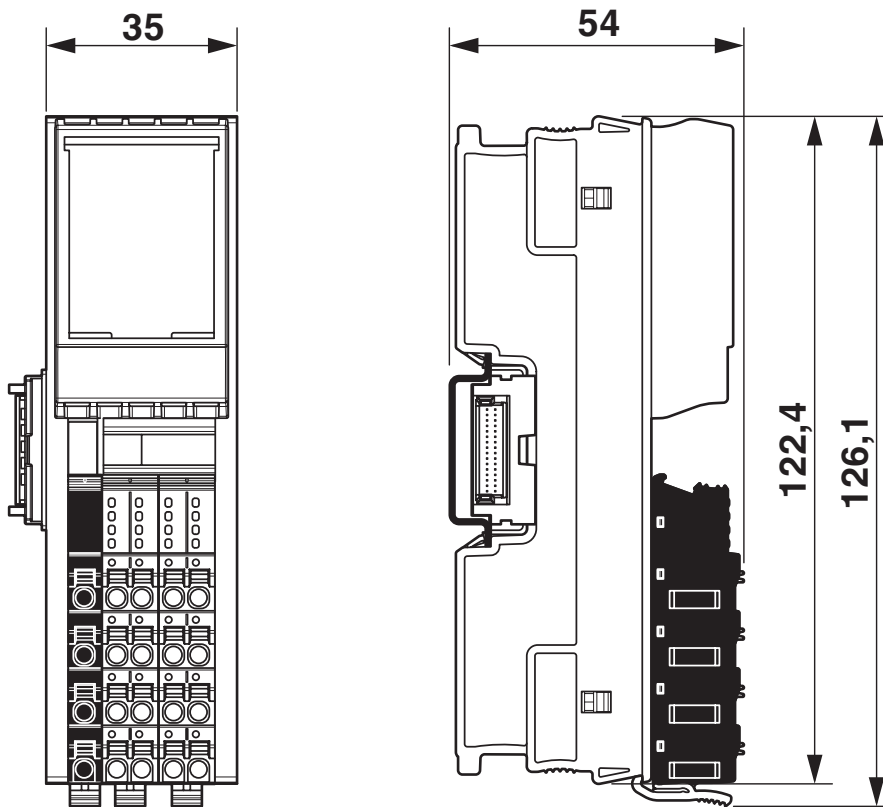
# AXL F AI4 U XC 1H - Analog module

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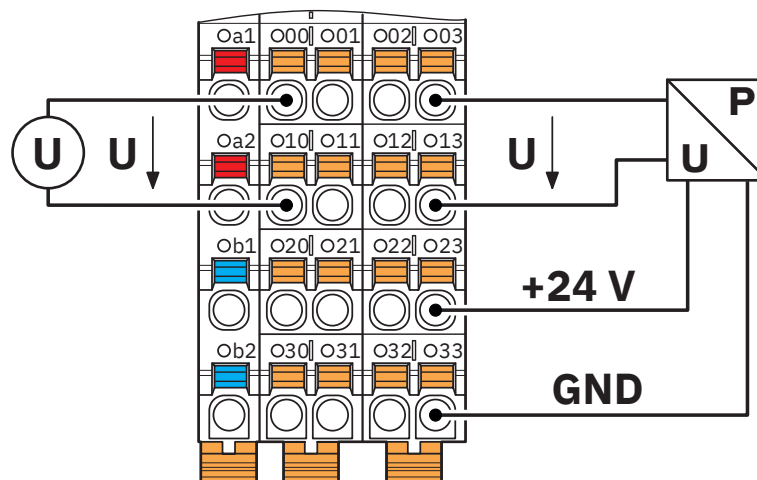
<https://www.phoenixcontact.com/us/products/2702008>

## Drawings

Dimensional drawing



Connection diagram



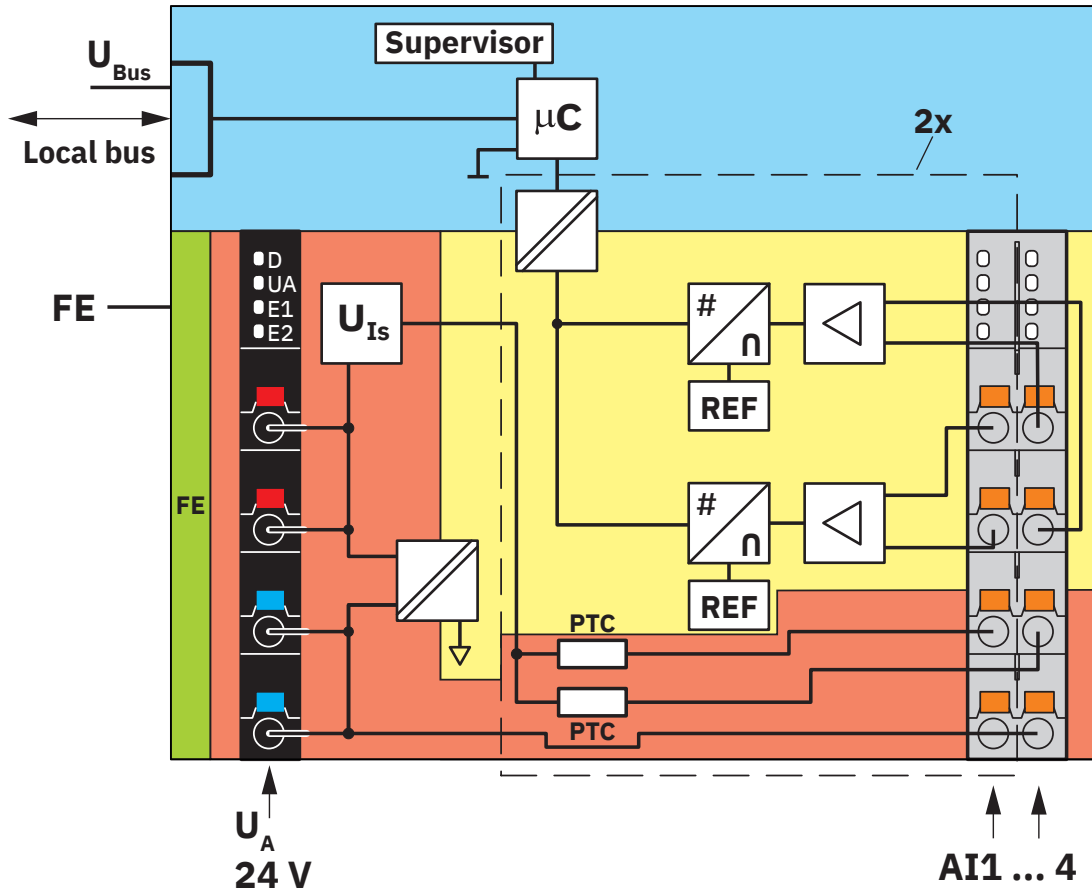
Connector for voltage measurement

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Block diagram



Internal wiring of the terminal points

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## Approvals

To download certificates, visit the product detail page: <https://www.phoenixcontact.com/us/products/2702008>



**DNV GL**

Approval ID: TAA00000DF



**LR**

Approval ID: LR2480202TA-02



**PRS**

Approval ID: TE/1020/880590/21

**BSH**

Approval ID: 840



**RINA**

Approval ID: ELE008423XG001



**cULus Listed**

Approval ID: E238705



**IECEx**

Approval ID: IECEx ULD 20.0026X



**ATEX**

Approval ID: UL 20 ATEX 2441X



**cULus Listed**

Approval ID: E366272



**CCC**

Approval ID: 2021122309114456\_CN

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## Classifications

### ECLASS

|             |          |
|-------------|----------|
| ECLASS-13.0 | 27242601 |
| ECLASS-15.0 | 27242601 |

### ETIM

|           |          |
|-----------|----------|
| ETIM 10.0 | EC001596 |
|-----------|----------|

### UNSPSC

|             |          |
|-------------|----------|
| UNSPSC 21.0 | 32151600 |
|-------------|----------|

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## Environmental product compliance

### EU RoHS

|   |              |
|---|--------------|
| Fulfills EU RoHS substance requirements | Yes          |
| Exemption                               | 7(a), 7(c)-I |

### China RoHS

|  |   |
|--|---|
| Environment friendly use period (EFUP) | EFUP-50   |
|  | An article-related China RoHS declaration table can be found in the download area for the respective article under "Manufacturer declaration". For all articles with EFUP-E, no China RoHS declaration table issued and required. |

### EU REACH SVHC

|                                     |                                      |
|-------------------------------------|--------------------------------------|
| REACH candidate substance (CAS No.) | Lead(CAS: 7439-92-1)                 |
| SCIP                                | 099a6599-a840-4da8-bd3b-90d40c583960 |

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