

AXL E PN DIO16 M12 6M

**Axioline E PROFINET device, metal housing,
16 freely configurable inputs or outputs,
24 V DC, M12 fast connection technology**



Data sheet
8443_en_11

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1 Description

The Axioline E device is designed for use within a PROFINET network.

It is used to acquire and output digital signals.

The device is designed for use in systems manufacturing. It is suitable for use without a control cabinet under harsh industrial conditions.

The Axioline E device can be used on tool platforms, directly on welding robots or in conveying technology, for example.

- Specification: mapping in accordance with PROFINET specification v2.2
- Mapping as PROFINET IO device (conformance class B)
- Device description using GSDML file
- Firmware can be updated
- Integrated web server for web-based management

PROFINET features

- Connection to PROFINET network using M12 connectors (D-coded)
 - Transmission speed 100 Mbps
 - 2 Ethernet ports (with integrated switch)
- PROFINET RT (RTC 1) supported with minimum cycle time of 1 ms
- Supported protocols: SNMP, LLDP, MRP, DCP
- PROFINET features:
 - FSU, shared device, MRP client, I&M functions 0 - 4

Axioline E features

- Connection of digital sensors and actuators to M12 connectors (A-coded)
- Diagnostic and status indicators
- Short-circuit and overload protection of the sensor supply
- IP65/67 degree of protection



This data sheet is only valid in association with the corresponding user manual. Make sure you use the latest documentation. It can be downloaded via the product at phoenixcontact.net/products.



For the latest device description files, visit phoenixcontact.net/products. If several versions of the device description file are available, make sure that you are working with the file version that corresponds to the firmware/hardware version used.



Abbreviations used:

- FSU: Fast startup
- MRP: Media Redundancy Protocol
- I&M: Identification and maintenance

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3 Ordering data

| Description | Type | Order No. | Pcs./Pkt. |
|---|-----------------------|-----------|-----------|
| Axioline E PROFINET device in a metal housing with 16 freely configurable inputs or outputs, 24 V DC, M12 fast connection technology degree of protection IP65/67 | AXL E PN DIO16 M12 6M | 2701517 | 1 |

| Accessories | Type | Order No. | Pcs./Pkt. |
|--|--------------------------|-----------|-----------|
| An M12 screw plug for the unoccupied M12 sockets of the sensor/actuator cable, boxes and flush-type connectors (Protection and sealing elements) | PROT-M12 | 1680539 | 5 |
| Bus system connector, Ethernet/PROFINET CAT5 (100 Mbps), 4-position, shielded, Plug straight M12, D-coded, Screw connection, Knurl material: Zinc die-cast, nickel-plated, Cable gland Pg9, External cable diameter 6 mm ... 8 mm (Connector/Adapter) | SACC-M12MSD-4CON-PG 9-SH | 1521261 | 1 |
| Mounting plate for Axioline E metal devices (Assembly) | AXL E MP 60 | 2701761 | 1 |
| Snap-in markers, Sheet, white, unlabeled, can be labeled with: THERMOMARK PRIME, THERMOMARK CARD, BLUEMARK ID, BLUEMARK ID COLOR, BLUEMARK CLED, TOPMARK NEO, TOPMARK LASER, mounting type: snapped into marker carrier, lettering field size: 7 x 10 mm (Marking) | UCT-EM (7X10) | 0830765 | 10 |

| Documentation | Type | Order No. | Pcs./Pkt. |
|--|---------------------------------------|-----------|-----------|
| User manual, English, Axioline E: system and installation | UM EN AXL E SYS INST | - | - |
| Application note, English, Startup of Axioline E PROFINET devices on a SIMATIC® S7 controller (for experienced S7 users) | AH EN S7 - AXL E PN PRO | - | - |
| Application note, English, Startup of Axioline E PROFINET devices using PC Worx (for experienced S7 users) | AH EN AXL E PN PCWORX | - | - |
| Application note, English, Updating the firmware of AXL E devices using the Windows Explorer | AH EN FIRMWARE UPDATE AXL E | - | - |
| Application note, English, Changing the partner ports with AXL E PROFINET devices under STEP 7 | AH EN AXL E PN S7 PARTNER PORT CHANGE | - | - |

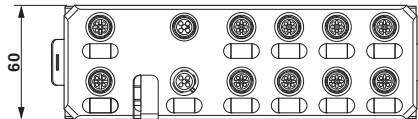
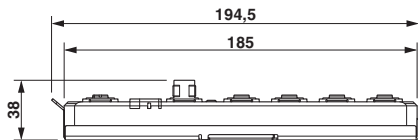
| Documentation | Type | Order No. | Pcs./Pkt. |
|---|--|-----------|-----------|
| Application note, English, Changing the partner ports with AXL E PROFINET devices under STEP 7 in TIA Portal | AH EN AXL E PN S7 TIA PARTNER PORT CHANGE | - | - |
| Application note, English, Wiring of Axioline E devices | AH EN AXL E CABLE / WIRING | - | - |
| Application note, English, Measures to protect network-capable devices with Ethernet connection against unauthorized access | AH EN INDUSTRIAL SECURITY | - | - |

Additional ordering data

For additional accessories, visit phoenixcontact.net/products.

4 Technical data

Dimensions (nominal sizes in mm)



| | |
|--------|--------|
| Width | 60 mm |
| Height | 185 mm |
| Depth | 38 mm |

Note on dimensions

The height is 194.5 mm including the mounting plate.
With fixing clips pulled out, the height is 212 mm.
The depth is 38 mm including the mounting plate
(30.5 mm without the mounting plate).

General data

| | |
|---------------------------------|------------------|
| Housing material | Zinc die-cast |
| Weight | 750 g |
| Ambient temperature (operation) | -25 °C ... 60 °C |



CAUTION: Risk of burns

If the device is used at an ambient temperature above 50°C, the contact temperature of metal surfaces may exceed 70°C.

| | |
|--|---|
| Ambient temperature (storage/transport) | -25 °C ... 85 °C |
| Permissible humidity (operation) | 5 % ... 95 % |
| Permissible humidity (storage/transport) | 5 % ... 95 % |
| 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) |
| Degree of protection | IP65/67 |
| Protection class | III, IEC 61140, EN 61140, VDE 0140-1 |

Connection data

| | |
|-------------------|---------------|
| Connection method | M12 connector |
|-------------------|---------------|

Interface PROFINET

| | |
|------------------------------|-----------------------------------|
| Number | 2 |
| Designation connection point | Copper cable |
| Connection method | M12 fast connection technology |
| Note on connection method | D-coded |
| Number of positions | 4 |
| Transmission speed | 100 MBit/s (with autonegotiation) |

PROFINET

| | |
|--|--------------------------------|
| Equipment type | PROFINET Device |
| Conformance class | B |
| Update rate | 1 ms |
| Number of supported application relationships (AR) | 2 |
| PROFINET protocols | LLDP, MRP client, DCP, DCE-RPC |
| Additional protocols | SNMP v1, HTTP, TFTP, FTP |

Supply: Module electronics, sensors and actuators (U_S)

| | |
|------------------------------|--|
| Connection method | M12 connector (T-coded) |
| Number of positions | 4 |
| Supply voltage | 24 V DC |
| Nominal supply voltage range | 18 V DC ... 31.2 V DC (including all tolerances, including ripple) |
| Current consumption | typ. 190 mA ±15 % (at 24 V DC) max. 12 A |

Supply: Actuators (U_A) for additional devices

| | |
|------------------------------|--|
| Connection method | M12 connector (T-coded) |
| Number of positions | 4 |
| Supply voltage | 24 V DC |
| Nominal supply voltage range | 18 V DC ... 31.2 V DC (including all tolerances, including ripple) |
| Current consumption | typ. 3 mA ±15 % (at 24 V DC) max. 12 A |

Digital inputs

| | |
|--|-----------------------------------|
| Number of inputs | 16 |
| Connection method | M12 connector, double occupancy |
| Connection method | 4-wire |
| Description of the input | EN 61131-2 types 1 and 3 |
| Nominal input voltage | 24 V DC |
| Nominal input current | typ. 3 mA |
| Sensor current per channel | typ. 75 mA (from U _S) |
| Total sensor current | max. 1.2 A (per device) |
| Input voltage range "0" signal | 0 V DC ... 5 V DC |
| Input voltage range "1" signal | 11 V DC ... 30 V DC |
| Input filter time | < 1000 µs |
| Permissible conductor length to the sensor | 30 m |
| Overload protection, short-circuit protection of sensor supply | yes |

Digital outputs

| | |
|---|---|
| Number of outputs | 16 |
| Connection method | M12 connector, double occupancy |
| Connection method | 3-wire |
| Nominal output voltage | 24 V DC (from voltage U _S) |
| Output voltage range | 18 V DC ... 31.2 V DC |
| Maximum output current per channel | 500 mA |
| Nominal load, ohmic | 12 W (48 Ω; with nominal voltage) |
| Nominal load, inductive | 12 VA (1.2 H, 48 Ω, with nominal voltage) |
| Signal delay | max. 150 µs (when switched on) max. 200 µs (when switched off) |
| Switching frequency | max. 5500 per second (with at least 50 mA load current) |
| Switching frequency | max. 1 per second (with inductive load) |
| Limitation of the voltage induced on circuit interruption | -28 V ... -17 V |
| Output voltage when switched off | max. 1 V |
| Output current when switched off | max. 20 µA |
| Behavior with overload | Auto restart |

Digital outputs

| | |
|--|-----------------------|
| Reverse voltage resistance to short pulses | Reverse voltage proof |
| Overcurrent shut-down | min. 0.7 A |
| Overload protection, short-circuit protection of outputs | yes |

Electrical isolation/isolation of the voltage areas

| Test section | Test voltage |
|--|-------------------------|
| 24 V supply (communications power/sensor supply, digital inputs/outputs)/bus connection (Ethernet 1) | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (communications power/sensor supply, digital inputs/outputs)/bus connection (Ethernet 2) | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (communications power/sensor supply, digital inputs/outputs)/FE | 500 V AC, 50 Hz, 1 min. |
| Bus connection (Ethernet 1)/FE | 500 V AC, 50 Hz, 1 min. |
| Bus connection (Ethernet 2)/FE | 500 V AC, 50 Hz, 1 min. |
| Bus connection (Ethernet 1)/bus connection (Ethernet 2) | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (actuator supply)/24 V supply (communications power and sensor supply, digital inputs/outputs) | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (actuator supply)/bus connection (Ethernet 1) | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (actuator supply)/bus connection (Ethernet 2) | 500 V AC, 50 Hz, 1 min. |
| 24 V supply (actuator supply)/FE | 500 V AC, 50 Hz, 1 min. |

Mechanical tests

| | |
|--|--|
| Vibration resistance according to EN 60068-2-6/IEC 60068-2-6 | 5g |
| Shock according to EN 60068-2-27/IEC 60068-2-27 | 30g, 11 ms period, half-sine shock pulse |
| Continuous shock according to EN 60068-2-27/IEC 60068-2-27 | 10g |

Conformance with EMC Directive 2014/30/EU

Noise immunity test in accordance with EN 61000-6-2

| | |
|---|---|
| Electrostatic discharge (ESD) EN 61000-4-2/IEC 61000-4-2 | Criterion B, 6 kV contact discharge, 8 kV air discharge |
| Electromagnetic fields EN 61000-4-3/IEC 61000-4-3 | Criterion A, Field intensity: 10 V/m |
| Fast transients (burst) EN 61000-4-4/IEC 61000-4-4 | Criterion B, 2 kV |
| Transient overvoltage (surge) EN 61000-4-5/IEC 61000-4-5 | Criterion B, DC supply lines: ± 0.5 kV/ ± 0.5 kV (symmetrical/asymmetrical) |
| Conducted interference EN 61000-4-6/IEC 61000-4-6 | Criterion A; Test voltage 10 V |
| Noise emission test as per EN 61000-6-4 | Class A |

Approvals

For the latest approvals, please visit phoenixcontact.net/products

5 Internal circuit diagram

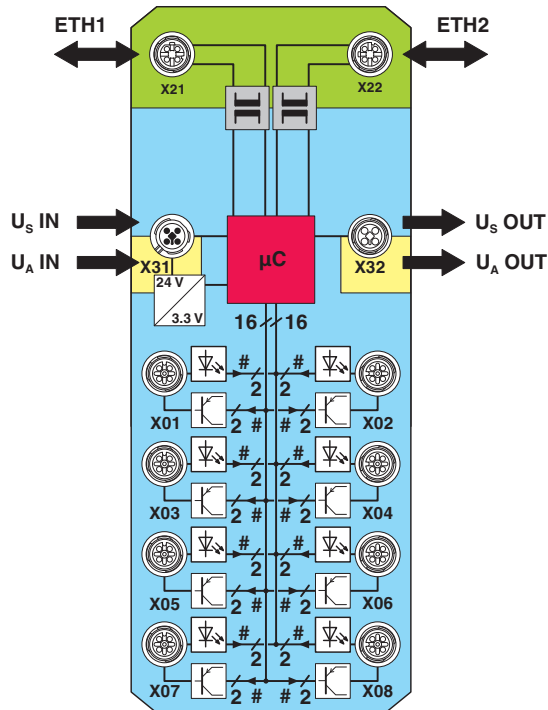


Figure 1 Internal wiring of connections

Key:

Green area: Network
 Blue area: U_S
 Yellow area: U_A



Transmitter with electrical isolation



Power supply unit with electrical isolation



Microcontroller



Digital input



Digital output



LED



Transistor



The device and the freely configurable inputs and outputs are supplied from the voltage U_S . The voltage U_A is only passed through the device.

Separate switching-off of the outputs is therefore not possible.

6 Pin assignment

6.1 PROFINET and power supply connection

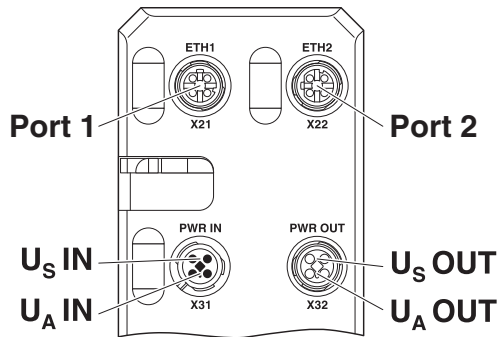


Figure 2 Connections for PROFINET and power supply

| Designation | Meaning |
|--------------------------|--|
| Port 1 (X21) | Ethernet port 1 |
| Port 2 (X22) | Ethernet port 2 |
| U _S IN (X31) | Power supply IN (logic, sensors and actuators) |
| U _A IN (X31) | Power Supply IN (actuators) for additional devices |
| U _S OUT (X32) | Power supply OUT for additional devices |
| U _A OUT (X32) | Power supply OUT for additional devices |



Ground the device by means of the mounting screws of the fixing clips or the mounting plate or the DIN rail.

6.2 PROFINET pin assignment

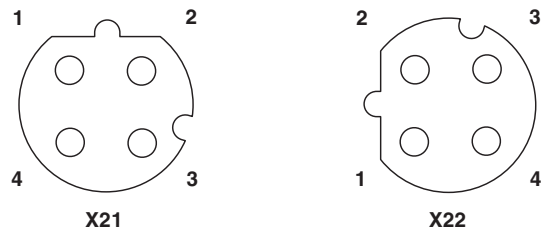


Figure 3 Pin assignment, D-coded

| Pin | Ethernet port 1 (X21) | Ethernet port 2 (X22) |
|-----|-----------------------|-----------------------|
| 1 | TX+ | TX+ |
| 2 | RX+ | RX+ |
| 3 | TX- | TX- |
| 4 | RX- | RX- |



The shield is connected to FE in the device.



The thread is used for additional shielding.

6.3 Pin assignment of the power supply U_S/U_A

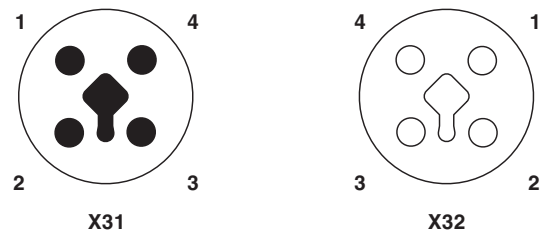


Figure 4 Pin assignment of the power supply, T-coded

| Pin | IN | OUT | Conductor colors |
|-----|----------------------------|----------------------------|------------------|
| 1 | +24 V DC (U _S) | +24 V DC (U _S) | Brown |
| 2 | GND (U _A) | GND (U _A) | White |
| 3 | GND (U _S) | GND (U _S) | Blue |
| 4 | +24 V DC (U _A) | +24 V DC (U _A) | Black |

6.4 Connecting inputs and outputs

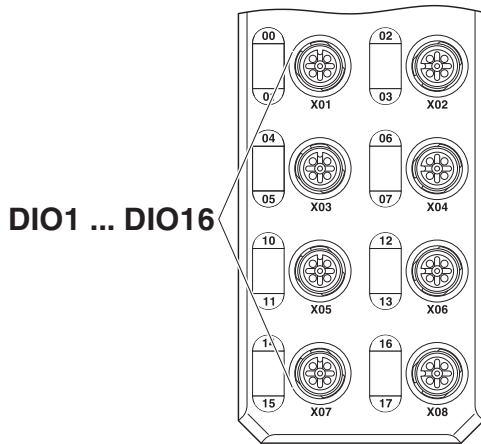


Figure 5 Input and output connections

| Designation | Meaning |
|------------------------------|-------------------------|
| DIO1 ... DIO16 (X01 ... X08) | Inputs/outputs 1 ... 16 |

6.5 Pin assignment of the inputs and outputs

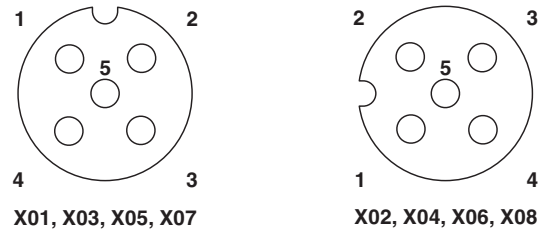


Figure 6 Pin assignment of the inputs and outputs, A-coded

| Pin | Input/output socket |
|-----|------------------------------|
| 1 | +24 V DC (U_S) |
| 2 | Input/output 2, 4, 6, ... 16 |
| 3 | GND |
| 4 | Input/output 1, 3, 5, ... 15 |
| 5 | FE |

7 Connection example

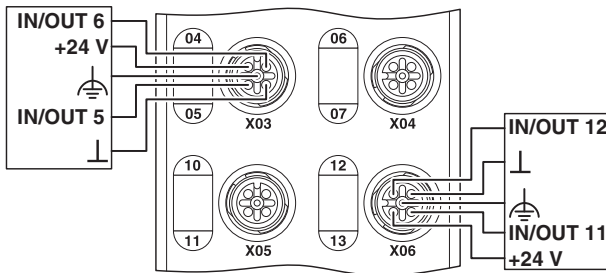


Figure 7 Example of connection of sensors and actuators

8 Connection notes



NOTE: Data corruption or loss

Implement the FE connection using mounting screws, in order to ensure immunity to interference.



NOTE: Device damage

To ensure IP65/67 degree of protection, cover unused sockets with protective caps.



NOTE: Damage to the electronics

Only supply the sensors with the voltage U_S provided at the terminal points.



NOTE: Damage to the electronics

Observe the correct polarity of the supply voltages U_S and U_A in order to prevent damage to the device.



NOTE: Malfunction

When connecting the sensors and actuators, observe the assignment of the connections to the PROFINET input and output data.



Secure the device to a level surface or to a profile. Do not use this device to bridge gaps, in order to prevent forces being transmitted via the device.



Use standard M5 screws with toothed lock washer and self-locking nuts. Observe the maximum torque of the screws.

9 Factory reset via rotary encoding switches

You can do a factory reset using the rotary encoding switches.

After modifying the switch position, restart the device, as the modification to the switch position does not take effect during operation.

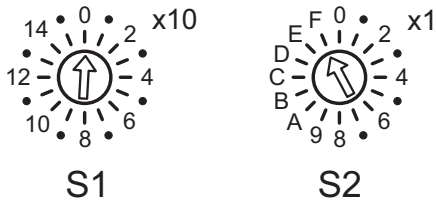


Figure 8 Rotary encoding switches

The image shows code 0F.

| S1 | S2 | Code | Function |
|----|----|------|-----------------------------------|
| 0 | F | 0F | Resetting to the default settings |

Switch position 0F

All settings are reset to default settings, including IP parameters.



The device is ready for operation after powering up, as soon as the RDY LED lights up green.
 A connection to the device however cannot be established in this switch position.
 As soon as the RDY LED lights up green, a new switch position can be selected on the rotary encoding switch and the device can be restarted.

10 Local status and diagnostic indicators

10.1 Indicators for Ethernet ports and power supply

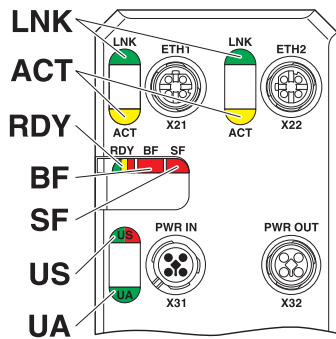


Figure 9 Indicators for Ethernet ports and power supply

| Designation | Color | Meaning | State | Description |
|-------------|---|-----------------|------------------------------|---|
| LNK 1/2 | Green | Link | Green on | Connection is present at port 1/2. |
| | | | Off | Connection is not present at port 1/2. |
| ACT 1/2 | Yellow | Activity | Yellow flashing | Data transmission is present at port 1/2. |
| | | | Off | Data transmission is not present at port 1/2. |
| RDY | Green/ yellow/ red | Ready | Green on | Device is ready for operation. |
| | | | Yellow flashing | Firmware update is being performed. |
| | | | Flashing green/ yellow | Over- or undervoltage at U_S |
| | | | | Temperature of the device is in the critical area. |
| | | | | Failure of the actuator supply U_A |
| Off | Surge voltage/undervoltage of the actuator supply U_A And red US LED: sensor supply overload Device is not ready for operation. | | | |
| BF | Red | Bus Fault | Red on | No link status is available on any port. |
| | | | Flashing | SF LED not flashing: Link status available, no communication connection to the PROFINET controller |
| | | | Flashing | SF LED flashing: hardware watchdog has been triggered. |
| | | | Off | A PROFINET controller has established an active communication connection to the PROFINET device. |
| SF | Red | Station Fail | On | PROFINET diagnostics are available. |
| | | | Flashing | Flashes only together with the BF LED; watchdog triggered |
| | | | Off | PROFINET diagnostics are not available. |
| US | Green/ red | $U_{Sensors}$ | Green on | Communications power/sensor voltage is present. |
| | | | Off | Communications power/sensor voltage is not present or too low. |
| | | | Red on | Sensor voltage overload |
| UA | Green | $U_{Actuators}$ | On | Actuator voltage is present. |
| | | | Off | Actuator voltage is not present. |

10.2 Input and output indicators

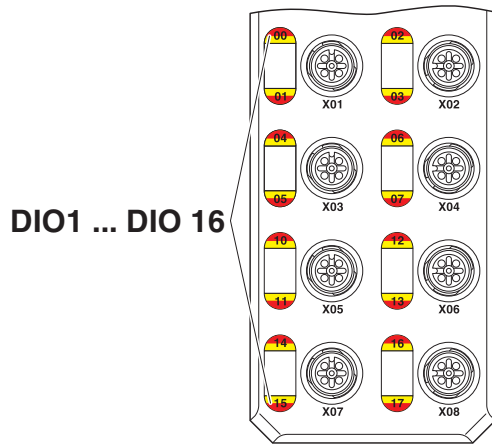


Figure 10 Input and output indicators

| Designation | Color | Meaning | State | Description |
|-------------------------|------------|---|-----------|--|
| 00 ... 07, 10 ... 17 | Yellow | Status of the inputs and outputs when used as an input | On | Input is set. |
| | | | Off | Input is not set. |
| 00 ... 07, 10 ... 17 | Yellow/red | Status of the inputs and outputs when used as an output | Yellow on | Output is set. |
| | | | Red on | Output is short circuited or overloaded. |
| | | | Off | Output is not set. |



The numbering of the LEDs is as follows: the first number specifies the byte, the second number specifies the bit.

11 PROFINET IO Device

The Axioline E PROFINET device operates as a PROFINET IO device based on PROFINET specification v2.2.

Slot 1 always contains the “Status module” with 4 bytes of IN process data and 4 bytes of OUT process data. Slot 2 contains the IO module, which contains the process data and startup parameters.

11.1 Status module

The status module cyclically provides the following diagnostics options via process data:

| Bit 31 ... bit 6 | Bit 5 | Bit 4 | Bit 3 | Bit 2 | Bit 1 | Bit 0 |
|------------------|---|----------|----------|-------|----------|------------------------|
| Reserved | Supply of the module electronics, sensors and actuators (U_S) | | Reserved | | Outputs | |
| | Undervoltage | Overload | | | Reserved | Overload/Short-circuit |

11.2 IO module

Configuration of digital inputs and outputs

A channel, whether an input or an output, is configured by using the IN or OUT process data according to the channel function.

Parameterization is not necessary.



If the channel is used as an output, the status of the channel is also mapped to the IN process data. This can be useful, e.g., for diagnostic purposes.
If the channel is used as an input, the channel cannot simultaneously be used as an output.



Depending on the configuration, process data bytes 0 and 1 can be swapped.

Assignment of the terminal points to the IN process data

When the byte order is not reversed, the process data looks like this:

| Input process data | | | | | | | | | | | | | | | | |
|--------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|
| Byte | 0 | | | | | | | | 1 | | | | | | | |
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| IN | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |
| Connection | X04 | | X03 | | X02 | | X01 | | X08 | | X07 | | X06 | | X05 | |
| Pin | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 |
| DI | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |

Key:

- Bit: Process data assignment
- IN: LED marking
- DI: Device input

Assignment of the terminal points to the OUT process data

When the byte order is not reversed, the process data looks like this:

| Output process data | | | | | | | | | | | | | | | | |
|---------------------|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|-----|----|
| Byte | 0 | | | | | | | | 1 | | | | | | | |
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| OUT | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |
| Connection | X04 | | X03 | | X02 | | X01 | | X08 | | X07 | | X06 | | X05 | |
| Pin | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 | 2 | 4 |
| DO | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 16 | 15 | 14 | 13 | 12 | 11 | 10 | 9 |

Key:

- Bit: Process data assignment
- OUT: LED marking
- DO: Device output

11.3 Substitute value behavior

The substitute value behavior is set via the IO module in slot 2. The following parameters are available:

| Parameter | Possible values | Description |
|------------------------------------|--|--|
| Failsafe substitute value behavior | 0 = Reset all outputs (default) | Substitute value behavior for all outputs |
| | 1 = Set all outputs | |
| | 2 = Hold last value | |
| | 3 = Substitute values | |
| Failsafe substitute values | 0 = Zero (default) Possible values: 0 ... 65535 _{dec} | Specification of a substitute value pattern for all outputs In order to use this parameter, you must first set the "Substitute values" value in the "Failsafe substitute value behavior" parameter. |

Byte arrangement: substitute value pattern



The "Failsafe substitute value" parameter always controls the same outputs, regardless of the "Invert byte arrangement" setting. Take this into account when calculating the substitute value.

Non-inverted byte arrangement:

| Byte | 0 | | | | | | | | 1 | | | | | | | |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| OUT | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |

Inverted byte arrangement:

| Byte | 1 | | | | | | | | 0 | | | | | | | |
|------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|
| Bit | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| OUT | 07 | 06 | 05 | 04 | 03 | 02 | 01 | 00 | 17 | 16 | 15 | 14 | 13 | 12 | 11 | 10 |

11.4 Invert byte arrangement

The byte arrangement of the process data can be changed via the IO module in slot 2 with the following parameter.

| Parameter | Possible values | Description |
|-------------------------|--------------------------|--|
| Invert byte arrangement | 0 = Off (default) | This parameter is used to invert the process data, i.e., the bytes. The "Failsafe substitute value" parameter is not affected by this. |
| | 1 = On | |

11.5 Diagnostic messages

PROFINET enables the PROFINET device to store diagnostic information together with the error location and error type.

An incoming alarm informs the PROFINET controller that diagnostic information has been entered. When the diagnostic information has been removed, an outgoing alarm is sent to the device. If at least one piece of diagnostic information is stored, the SF LED is on. If no diagnostic information is present, the SF LED is off.

The following PROFINET diagnostic messages are indicated by the PROFINET device:

| Diagnostic messages | Status bit process data | Network-specific diagnostic mapping |
|-------------------------------------|-------------------------|-------------------------------------|
| Overtemperature device | - | Yes |
| Undervoltage U_S | Bit 5 | Yes |
| Overload U_S | Bit 4 | Yes |
| Overvoltage U_S | - | Yes |
| Overload/Short-circuit of an output | Bit 0 | Yes |



Channel diagnostics are always reported in groups of 4. The LED status can be found in chapter 10.

11.6 LLDP - Link Layer Discovery Protocol

The device supports LLDP according to IEEE 802.1AB and therefore enables topology detection of devices that also have LLDP activated.

Advantages of using LLDP:

- Improved error location detection
- Improved device replacement
- More efficient network configuration

The following information is received by or sent to neighbors, as long as LLDP is activated:

- The device sends its own management and connection information to neighboring devices.
- The device receives management and connection information from neighboring devices.

Engineering tools can be used to represent the LLDP information as a topology overview.

11.7 MRP - Media Redundancy Protocol

The device supports the role of a Media Redundancy Client (MRC) in an MRP network.



Follow the instructions in the documentation for your engineering tool and controller in order to parameterize this function.

11.8 FSU - Fast Startup

The device supports the Fast Startup function. This function enables fast startup of the PROFINET device. The device is ready to operate in < 500 ms.



Follow the instructions in the documentation for your engineering tool and controller in order to parameterize this function.

11.9 Shared device

The device supports the shared device function. This enables two controllers to simultaneously establish a cyclic connection to the device and read input data. Writing outputs can only be activated by the first controller.



Follow the instructions in the documentation for your engineering tool and controller in order to parameterize this function.

11.10 Device replacement

Devices can be replaced without having to reconfigure them within the PROFINET network.

Device replacement is only then possible if the new device is in its default state.

The controller must support the device replacement function.

The device name and the device address are assigned by the controller to the newly added PROFINET device with the help of the neighborhood detection function.

11.11 I&M functions

The PROFINET device supports Identification & Maintenance functions (I&M). General Identification & Maintenance functions 0 ... 4 can be read via slot 0.

I&M 0 (slot 0)

| I&M data | Access / data type | Presets |
|-----------------------|--------------------|---|
| MANUFACTURER_ID | Read / 2 bytes | B0 _{hex} (Phoenix Contact GmbH & Co. KG) |
| ORDER_ID | Read / 20 bytes | 2701517 |
| SERIAL_Number | Read / 16 bytes | Stipulated in the product process |
| HARDWARE_Revision | Read / 2 bytes | Corresponds to the hardware version of the device |
| SOFTWARE_Revision | Read / 4 bytes | Corresponds to the firmware version of the device |
| REVISION_Counter | Read / 2 bytes | 0000 _{hex} (reserved) |
| PROFILE_ID | Read / 2 bytes | 4E00 _{hex} (generic device) |
| PROFILE_SPECIFIC_TYPE | Read / 2 bytes | 0003 _{hex} (IO module) |
| IM_VERSION | Read / 2 bytes | 0101 _{hex} (Version 1.1) |
| IM_SUPPORTED | Read / 2 bytes | 001E _{hex} (I&M 1 ... 4) |

I&M 1 (slot 0)

| I&M data | Access / data type | Presets |
|--------------|-----------------------|------------------------------|
| TAG_FUNCTION | Read/write / 32 bytes | "20 _{hex} " (empty) |
| TAG_LOCATION | Read/write / 22 bytes | "20 _{hex} " (empty) |

I&M 2 (slot 0)

| I&M data | Access / data type | Presets |
|-------------------|-----------------------|------------------------------|
| INSTALLATION_DATE | Read/write / 16 bytes | "20 _{hex} " (empty) |
| RESERVED | Read/write / 38 bytes | 00 _{hex} |

I&M 3 (slot 0)

| I&M data | Access / data type | Presets |
|------------|-----------------------|------------------------------|
| DESCRIPTOR | Read/write / 54 bytes | "20 _{hex} " (empty) |

I&M 4 (slot 0)

| I&M data | Access / data type | Presets |
|-----------|-----------------------|------------------------------|
| SIGNATURE | Read/write / 54 bytes | "20 _{hex} " (empty) |

12 Startup

12.1 Delivery state/default settings

By default upon delivery, the following functions and features are available:

PROFINET

| | |
|---------------------|-----------------------|
| PROFINET name: | No name assigned |
| IP parameters: | 0.0.0.0 |
| Subnet mask: | 0.0.0.0 |
| Default Gateway: | 0.0.0.0 |
| Device designation: | AXL E PN DIO16 M12 6M |
| Vendor ID: | 00B0 _{hex} |
| Device ID: | 0104 _{hex} |

Firmware update

| | |
|----------------------------------|-----------------|
| Firmware update on next restart: | deactivated |
| TFTP server IP address: | 192.168.210.211 |
| Firmware file name: | FIRMWARE.NXF |

System identification

| | |
|------------------|-------------------------|
| Device name: | No name assigned |
| Description: | No description assigned |
| Device location: | No location assigned |
| Contact: | No contact assigned |

Web-based Management (WBM)

| | |
|------------|---------|
| User name: | admin |
| Password: | private |

12.2 Starting the firmware

Once you have connected the power, the firmware is started.

After completion of the firmware boot process, the RDY LED lights up green.

After completion of the firmware boot process, the BF LED either lights up or flashes.

12.3 Firmware update

In order to update the firmware of the device, the device must be provided with a firmware container via a TFTP server or it must be loaded onto the device via FTP. Any FTP client or TFTP server can be used for this. The update must always be initiated by the web-based management. When carrying out the firmware update, the RDY LED flashes yellow.

12.4 Restoring the default settings

The default settings can be restored via rotary encoding switches or WBM.

To do this, go to:

Administration web page > default settings and follow the instructions.

13 WBM - Web-based management

The device has a web server, which generates the required pages for web-based management and, depending on the requirements of the user, sends them to a standard web browser. Web-based management can be used to access static information (e.g., technical data, MAC address) or dynamic information (e.g., IP address, status information).



You can access web-based management by entering the IP address you assigned to the device in the browser.



If you cannot access the WBM pages, check the connection settings in your browser and deactivate the proxy, if set.

14 SNMP - Simple Network Management Protocol

The device supports SNMP v1.

Management Information Base - MIB



The corresponding latest MIBs are available on the Internet at phoenixcontact.net/products.

For the object descriptions, please refer to the ASN1 descriptions for this product.

The password for read access is "public" and cannot be changed.

By default upon delivery, the password for write/read access is "private" and can be modified at any time.

15 Device description file (GSDML)

PC Worx

Parameterization of the PROFINET device in PC Worx requires at least PC Worx Version 6.30.601. This is part of the AUTOMATION Software Suite 2013, Version 1.80, Order No. 2985660.

An online data sheet of the device with important technical data and a configuration file are integrated into PC Worx. If several versions of the configuration file are available, make sure that you are working with the file version that corresponds to the firmware/hardware version used.

Other tools (STEP 7 ...)

The PROFINET device is parameterized using the configuration tool of the PROFINET controller. For parameterization, integrate the corresponding device GSDML file in the relevant software tool (STEP 7/HW Config, etc.).



For the latest device description files, visit phoenixcontact.net/products. If several versions of the device description file are available, make sure that you are working with the file version that corresponds to the firmware/hardware version used.