



## ► IndustrialPI RO

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Operating Manual-1006975-EN-01  
- IndustrialPI



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SD means Secure Digital

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# 1 Introduction

## 1.1 Validity of documentation

This documentation is valid for the product IndustrialPI RO. It is valid until new documentation is published.

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

## 1.2 Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document should be retained for future reference.

## 1.3 Definition of symbols

Information that is particularly important is identified as follows:



### **DANGER!**

This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.



### **WARNING!**

This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.



### **CAUTION!**

This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.



### **NOTICE**

This describes a situation in which the product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.



**INFORMATION**

This gives advice on applications and provides information on special features.

## 2 Overview

An IndustrialPI RO is used when electrical circuits need to be controlled and switched. This expansion module can be used to switch motors, valves, lighting systems, ventilation systems and other devices on and off. It enables circuits to be connected or disconnected in various industrial environments. The IndustrialPI RO is connected to the base module via the PiBridge interface and is compatible with the IndustrialPI 4.

### 2.1 Product features

- ▶ Expansion module for the IndustrialPI 4
- ▶ 4 outputs with N/O relay contacts
- ▶ Monitoring of the predicted service life

## **3 Safety**

### **3.1 Safety regulations**

#### **3.1.1 Use of qualified personnel**

The products may only be assembled, installed, programmed, commissioned, operated, de-commissioned and maintained by persons who are competent to do so.

A competent person is a qualified and knowledgeable person who, because of their training, experience and current professional activity, has the specialist knowledge required. In order to inspect, assess and handle products, devices, systems, plant and machinery, this person must be familiar with the state of the art and the applicable national, European and international laws, directives and standards.

It is the company's responsibility only to employ personnel who

- ▶ Are familiar with the basic regulations concerning health and safety / accident prevention,
- ▶ Have read and understood the information provided in the section entitled Safety
- ▶ Have a good knowledge of the generic and specialist standards applicable to the specific application.

#### **3.1.2 Warranty and liability**

All claims to warranty and liability will be rendered invalid if

- ▶ The product was used contrary to the purpose for which it is intended,
- ▶ Damage can be attributed to not having followed the guidelines in the manual,
- ▶ Operating personnel are not suitably qualified,
- ▶ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

#### **3.1.3 Disposal**

- ▶ When decommissioning, please comply with local regulations regarding the disposal of electronic devices, such as the Electrical and Electronic Equipment Act.

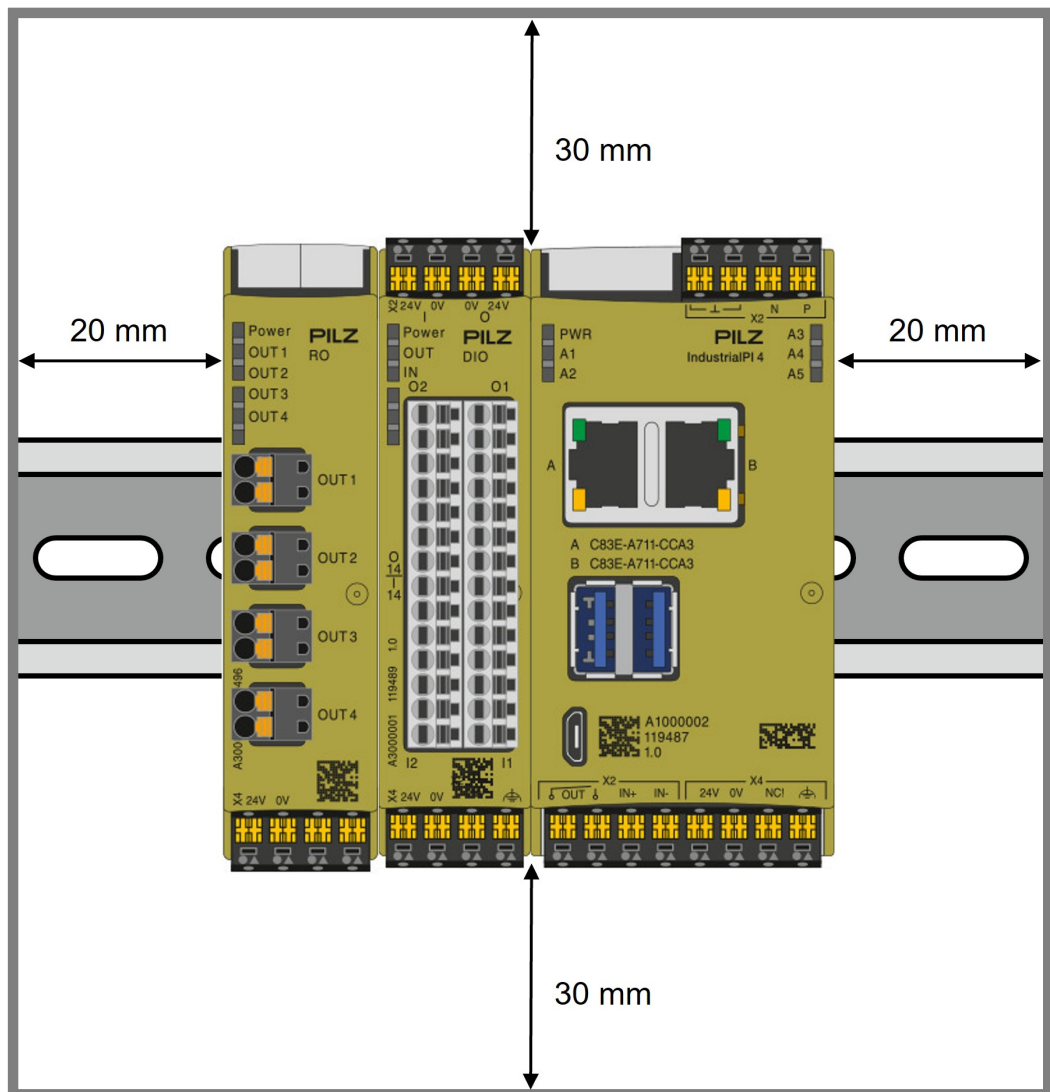
## **4            Function description**

The expansion module has four relay outputs with volt-free N/O contacts for switching loads. The number of operations can be monitored. The configuration is carried out using the browser-based application PiCtory (see Configuration).

## 5 Installation

IndustrialPI modules were developed for use in a control cabinet or housing. To operate them as intended in an industrial environment, you must observe the following:

- ▶ The protection type and protection class of the control cabinet or housing must comply with the standards provided for the intended use.
- ▶ For control cabinet installation you will need a mounting rail 35 x 7.5 mm (EN 50022).
- ▶ Install the mounting rail horizontally in the control cabinet, in accordance with the manufacturer's instructions. Only when installed horizontally is it guaranteed that air flows through the IndustrialPI modules from bottom to top, and can thereby cool the electronics (stack effect).
- ▶ Ensure that the IndustrialPI is at a sufficient distance from other products to guarantee sufficient airflow.



Procedure:

- ▶ Hold the latching element on the IndustrialPI module up to the mounting rail.
- ▶ Press the locking mechanisms towards the IndustrialPI module.

- Ensure that the IndustrialPI module is firmly connected to the mounting rail.

**NOTICE****Excessive temperatures can damage the module!**

Ensure that the ambient temperature in the control cabinet is less than 55 °C.

## 6 Wiring

The PiBridge is a backplane bus, which you can use to connect together all the modules from the IndustrialPI range.

The following expansion modules can be connected using the PiBridge:

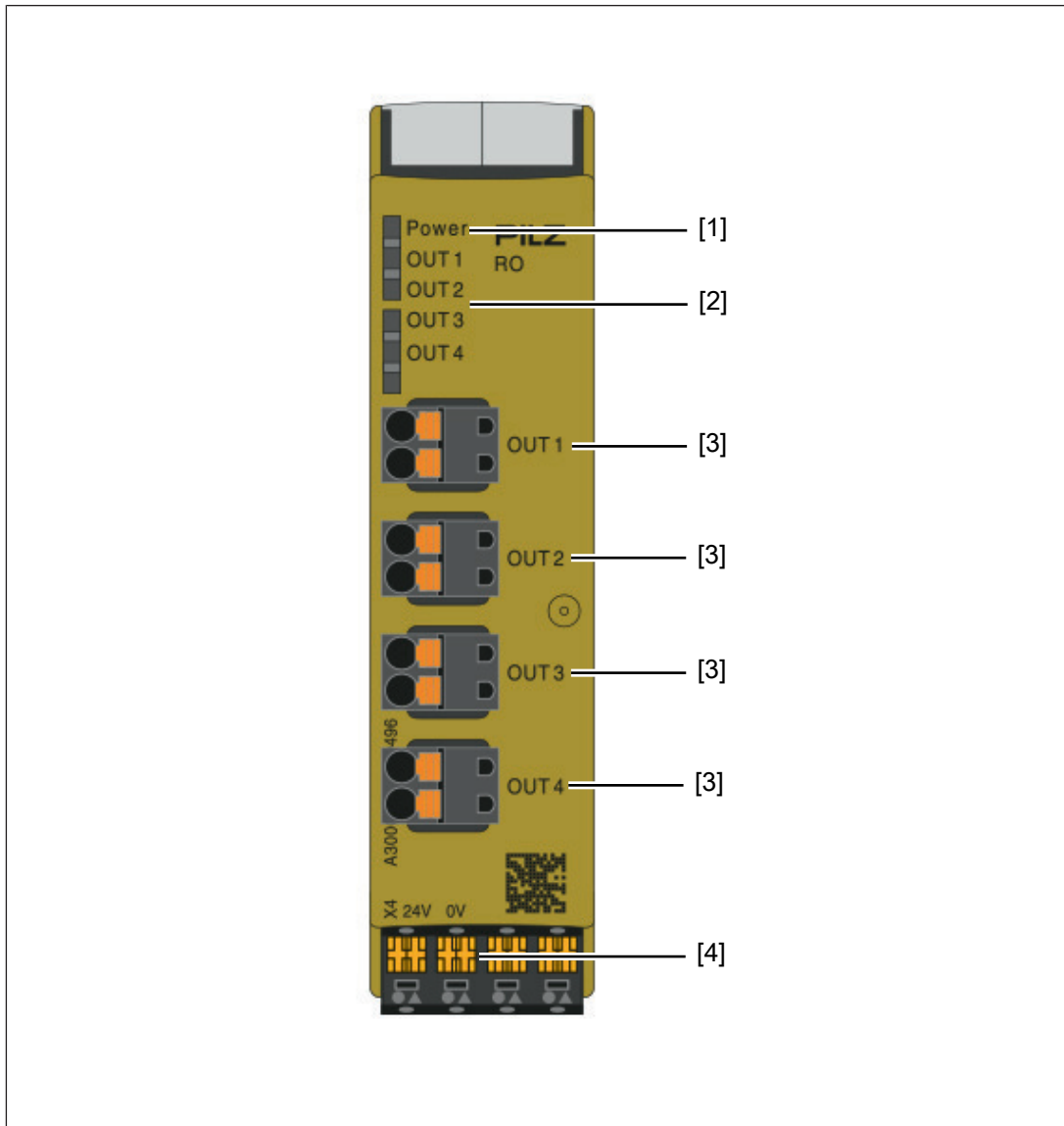
Up to ten expansion modules (e.g. our IO modules); five of these expansion modules on the left and five on the right.

Insert PiBridge, as shown [1], on to the PiBridge connections of the products you wish to connect.

Data is transmitted by signal lines from one module to the other via the PiBridge.



## 6.1 Terminal configuration



| Position | Connection                                                                     |
|----------|--------------------------------------------------------------------------------|
| 1        | Status LED Power indicates the device status.                                  |
| 2        | Status LEDs OUT 1 to OUT 4 indicate the status of the respective relay output. |
| 3        | Relay outputs OUT 1 to OUT 4                                                   |
| 4        | Supply voltage connection                                                      |

## 6.2 Supply voltage

Do not connect the IndustrialPI to the supply voltage until you have connected all the other products and connectors. If the IndustrialPI is already connected to the power source and you subsequently connect a product, the product may be damaged.

The IndustrialPI RO is delivered with an X4 connector for the supply voltage.

To connect the supply voltage you will also need:

- ▶ Power supply (the IndustrialPI RO needs maximum 2.5 W)
- ▶ Cable (cross section 0.35 ... max. 2.5 mm<sup>2</sup>)
- ▶ When using stranded wires: ferrules that are compatible with the cable

Pin assignment for supply voltage:

| Terminal | Name | Assignment                                                              |
|----------|------|-------------------------------------------------------------------------|
| 1        | 24 V | 24 V infeed for the module supply in a voltage range of 10.7 ... 28.8 V |
| 2        | 0 V  | 0 V infeed (earth)                                                      |
| 3        |      | Not assigned                                                            |
| 4        |      | Not assigned                                                            |

## 7 Configuration

### 7.1 Configure outputs

You can use PiCtory to configure the IndustrialPI system. This section describes the Value Editor's setting values for the four relay outputs OUT 1 ... OUT 4 on the IndustrialPI RO.

Prerequisites:

- ▶ You have a web browser installed on your PC (e.g. Chrome).
- ▶ Your IndustrialPI 4 and IndustrialPI RO are connected together via the PiBridge.
- ▶ The IndustrialPI 4 is in your network.

Procedure:

- ▶ Open your web browser.
- ▶ Enter the IP address of your IndustrialPI 4 in your browser's address bar.  
The login window opens.
- ▶ Log in with the user name "admin".
- ▶ Enter your password. You'll find it on the sticker on the side of your IndustrialPI 4.
- ▶ Click on **LOGIN**.  
You'll now see the current device status of your IndustrialPI 4.
- ▶ Click on the **APPS** tab.
- ▶ To open PiCtory, click on **START** next to PiCtory.  
PiCtory opens.
- ▶ Select your IndustrialPI 4 from the Device Catalogue.
- ▶ Drag & drop your IndustrialPI 4 on to the configuration board.
- ▶ Open the **I/O Devices** folder in the Device Catalogue.
- ▶ Select the IndustrialPI RO.
- ▶ Drag & drop the IndustrialPI RO into the empty slot on the configuration board, to the left of the IndustrialPI 4.
- ▶ Define the basic settings for your modules under Device Data. This entry is optional. If you are using many devices and wish to process the data later in another program, this entry may be very helpful.
- ▶ Configure the outputs in the Value Editor. You'll find the detailed setting values in the next section.
- ▶ Click on **File > Save**. This saves your file.
- ▶ Click on **Tools > Reset Driver**. This activates the changes.

### 7.2 Warning limit for operations

Using the four memory variables in the Value Editor, you can set a threshold value per relay output for the number of operations. If the threshold value is exceeded, the IndustrialPI RO switches on the red status LED for the respective output and generates a warning on the status bit for the respective relay.

The default value is 0. If the threshold value is 0, no warning is generated at the status bit and the warning LED is not triggered.

You can query the current number of switching operations using piTest -C RO-ADDRESS.

An overview of recommended threshold values can be found in the table below. The values are based on the data sheet for the relevant relay module:

| Type of load   | Voltage | Current | Recommended threshold value for warning limit |
|----------------|---------|---------|-----------------------------------------------|
| Resistive load | 250 VAC | 3 A     | 100 000                                       |
|                | 30 VAC  |         | 100 000                                       |
|                | 250 VAC | 5 A     | 80 000                                        |
|                | 30 VAC  |         | 80 000                                        |
| Inductive load | 250 VAC | 2 A     | 100 000                                       |
|                | 30 VAC  |         | 100 000                                       |
| No load        | 0 V     | 0 A     | 1 000 000                                     |

Status byte in the process image

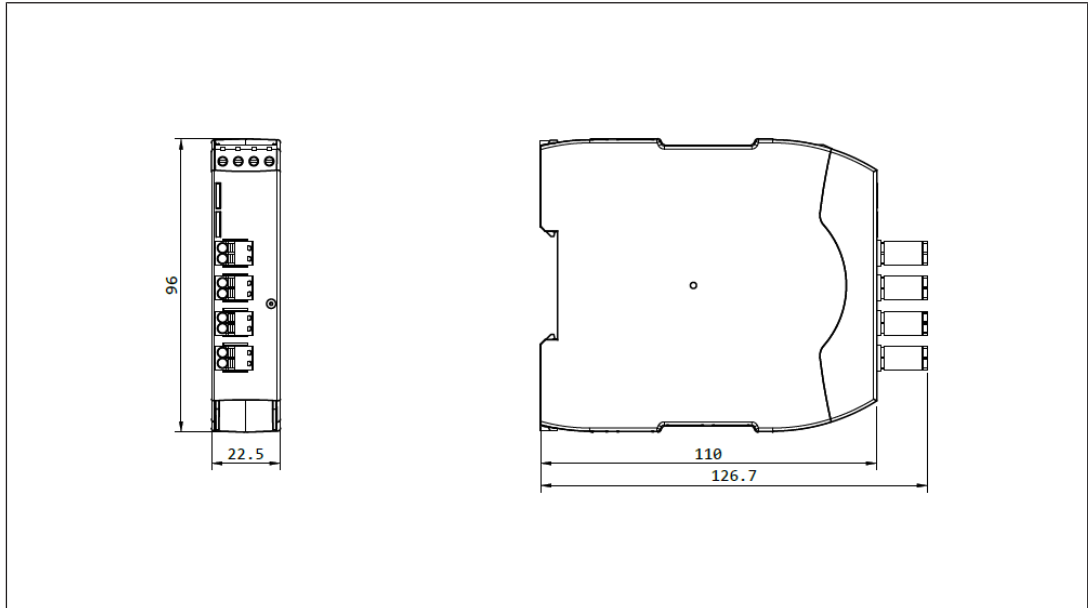
| Name   | Data type | Number | Offset | Description                                                                                                                                                                              |
|--------|-----------|--------|--------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Status | BYTE      | 1      | 0      | <p>Bit-coded status of the outputs</p> <p>Bits 0 to 3 indicate the current warning status of relays 1 to 4.</p> <p>1: Warning on the relay (threshold exceeded)</p> <p>0: No warning</p> |

## 8 Operation

### 8.1 Display elements and messages

| LED             | Description                                                                                                                                                                                                                                                                                         |
|-----------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Power           | Indicates the product status:<br>Green: The product is ready for operation.<br>Flashing red: Establishing the connection to the IndustrialPI 4 (initialisation phase).<br>Red: An error has occurred. Check that you are using a suitable power supply and that all cables are connected correctly. |
| OUT 1 ... OUT 4 | Indicates the status of the respective relay output:<br>Green: Relay is switched on.<br>Red: Warning limit for operations has been reached (relay is switched off).<br>Red/flashing green: Warning limit for operations has been reached (relay is switched on).                                    |

## 9 Dimensions



## 10 Technical details

|                                                |                                                                                                                                                                                                  |
|------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Housing dimensions (H x W x D)                 | 96 x 22.5 x 111.5 mm (excl. connector) 96 x 22.5 x 126 mm (incl. connector)                                                                                                                      |
| Housing type                                   | Top-hat rail housing (EN 50022 for top-hat rail type)                                                                                                                                            |
| Housing material                               | Polycarbonate                                                                                                                                                                                    |
| Weight                                         | Approx. 95 g/110 g (incl. connector)                                                                                                                                                             |
| Protection type                                | IP20                                                                                                                                                                                             |
| Supply voltage                                 | 24 VDC (10.8 ... 28.8 VDC)                                                                                                                                                                       |
| Maximum power consumption                      | 2.5 W                                                                                                                                                                                            |
| Permitted operating temperature                | -20 ... +55 °C                                                                                                                                                                                   |
| Permitted storage temperature                  | -40 ... +85 °C                                                                                                                                                                                   |
| Max. relative humidity (at 40 °C)              | 85 % (non-condensing)                                                                                                                                                                            |
| Interfaces                                     | 4 volt-free relay contacts, max. 250 VAC / 30 VDC, 5 A (2 A inductive load)                                                                                                                      |
| Service life of the relay contacts, mechanical | Min. 20 000 000 operations (at 18 000 operations/hour)                                                                                                                                           |
| Service life of the relay contacts, electrical | Min. 100 000 operations (3 A, 250 VAC / 30 VDC, resistive load), min. 80 000 operations (5 A, 250 VAC / 30 VDC, resistive load), min. 100 000 operations (2 A, 250 VAC / 30 VDC, inductive load) |
| Plug-in connector                              | 1 x 8-pin spring-loaded plug-in connector for supply voltage, 4 x 2-pin spring-loaded plug-in connector (0.08 mm <sup>2</sup> ... 1.5 mm <sup>2</sup> ), 3.5 mm spacing                          |
| Compatible IndustrialPI modules                | Compatible with all IndustrialPI 4                                                                                                                                                               |
| EMC emission                                   | In accordance with EN 61000-6-3 (can therefore also be used without restriction in residential and office areas)                                                                                 |
| EMC immunity                                   | In accordance with EN 61000-6-2                                                                                                                                                                  |
| Optical display                                | 5 status LEDs (2-colour)                                                                                                                                                                         |
| Insulation distances (relay contact circuits)  | In accordance with EN 60664-1 conformity                                                                                                                                                         |
| UL certification                               | Planned                                                                                                                                                                                          |

## 11 Order reference

|                 |                                                                                                                                                                      |          |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|
| IndustrialPI RO | Expansion module for the IndustrialPI 4, 4 relay outputs (N/O), max. resistive load: 5 A at 250 VAC/5 A at 30 VDC, max. inductive load: 2 A at 250 VAC/2 A at 30 VDC | A3000005 |
|-----------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------|

