ICA-16DI-G11-IO | ICA-16DIO-G11-IO | ICA-16DI-G16-IO | ICA-16DIO-G16-IO

I/O Hub with IO-Link

Manual



IO-Link

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1 Introduction

1.1 Content of this Document

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

Note

For full information on the product, refer to the further documentation on the Internet at www.pepperl-fuchs.com.

Note

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com/device-information.

The documentation consists of the following parts:

- Present document
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Instruction manual
- Functional safety manual
- Cybersecurity documentation
- Other documents

1.2 Manufacturer

Pepperl+Fuchs Group Lilienthalstraße 200, 68307 Mannheim, Germany
Internet: www.pepperl-fuchs.com

1.3 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

1.4 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



Danger!

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.



Caution!

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

Informative Symbols



Note

This symbol brings important information to your attention.



Tip

This symbol brings an useful tip to your attention.



Example

This symbol provides an example of the issue described.



Action

1. This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

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2 Product Description

2.1 Intended Use

The devices described in this manual serve as decentralized input/output modules in a fieldbus IO network.

We develop, manufacture, test, and document our products while observing the necessary safety standards. If the described operating regulations and technical safety instructions for project planning, mounting, and intended operation are observed, the products will not normally pose a danger to persons or property.

The modules meet the requirements of the EMC Directive.

The modules are designed for use in the industrial sector. The industrial environment is characterized by the fact that consumers are not directly connected to the public low voltage system. Further measures are necessary for use in private homes or in business and commercial areas.



Caution!

Device interference is possible in residential areas!

This product may cause radio interference in residential areas. In this case, the owner may be required to take appropriate countermeasures.

Proper and safe operation of the product requires proper transportation, storage, installation and mounting as well as careful operation.

A fully assembled device housing is required for the intended operation of the modules. Connect the modules only to devices that meet the requirements of EN 61558-2-4 and EN 61558-2-6.

During project planning, installation, commissioning, maintenance, and testing of devices, note the relevant valid safety and accident prevention regulations for the specific application.

Only install cables and accessories that meet the requirements and regulations for safety, electromagnetic compatibility and, if necessary, telecommunications terminal equipment facilities, as well as the specification stipulations. Information about which cables and accessories are approved for installation is available from Pepperl+Fuchs or on our website.

2.2 System Description

The ICA module series has a PBT PC housing. The module electronics are completely protected from environmental influences by the fully encapsulated housing. The modules have the degrees of protection IP67, IP68, and IP69k. The permissible temperature range of the modules is -25 °C to +70 °C. The module series is very well suited for direct field applications in harsh industrial environments.

The modules have compact dimensions and low weight and are available with two different housings:

- G11
- G16

The ICA module series consists of multiple I/O hubs with IO-Link interfaces with different I/O functionality.

- Module with 16 digital inputs (16DI)
- Module with 16 freely configurable digital inputs/outputs (16DIO)

In principle, an ICA module with digital inputs detects binary sensor signals from the process level and transmits them via an IO-Link master and the higher-level fieldbus system to the PLC. ICA modules with digital outputs receive output commands from the PLC via the IO-Link master, which they output as binary signals to connected actuators.

The modules with output functionality offer a fail-safe function. During the configuration of these modules, the behavior of each individual output channel can be set in case of interruption or loss of communication.

The widespread M12 connection technology is used for the electrical connection, with M12 A-encoding for the IO-Link interface. It is also used for the I/O signals for the G11 variants. For the G16 variants, the I/O signals use M8.

2.3 Module Variants

The manual applies to subsequent module variants.

Product name	Description	IO-Link ports	IO ports
ICA-16DI-G16-IO	IO-Link device: IO hub with IO-Link interface and 16 digital inputs	IOL - M12A	8x M8A
ICA-16DIO-G16-IO	IO-Link device: IO hub with IO-Link interface and 16 freely configurable digital inputs/outputs	IOL - M12A	8x M8A
ICA-16DI-G11-IO	IO-Link device: IO hub with IO-Link interface and 16 digital inputs	IOL - M12A	8x M12A
ICA-16DIO-G11-IO	IO-Link device: IO hub with IO-Link interface and 16 freely configurable digital inputs/outputs	IOL - M12A	8x M12A

Table 2.1

The following sections briefly describe the module variants.

2.3.1 ICA-16DI-G16-IO

IO-Link device—I/O hub with IO-Link—16DI

The IO-Link module ICA-16DI-G16-IO with 16 digital inputs detects binary sensor signals from the process level and transmits them via the IO-Link master and the higher-level fieldbus system to the PLC.

The IO-Link module and the inputs are powered by the IO-Link master supply voltage (L+). The module does not require a separate supply voltage connection.

2.3.2 ICA-16DIO-G16-IO

IO-Link device—I/O hub with IO-Link—16DIO

The IO-Link module ICA-16DIO-G16-IO with 16 freely configurable digital inputs and outputs detects binary sensor signals from the process level and transmits them via the IO-Link master and the higher-level fieldbus system to the PLC.

The IO-Link module and the inputs and outputs are powered by the IO-Link master supply voltage (L+). The module does not require a separate supply voltage connection.

2.3.3 ICA-16DI-G11-IO

IO-Link device—I/O hub with IO-Link—16DI

The IO-Link module ICA-16DI-G11-IO with 16 digital inputs detects binary sensor signals from the process level and transmits them via the IO-Link master and the higher-level fieldbus system to the PLC.

The IO-Link module and the inputs are powered by the IO-Link master supply voltage (L+). The module does not require a separate supply voltage connection.

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2.3.4 ICA-16DIO-G11-IO

IO-Link device—I/O hub with IO-Link—16DIO

The IO-Link module ICA-16DIO-G11-IO with 16 freely configurable digital inputs and outputs detects binary sensor signals from the process level and transmits them via the IO-Link master and the higher-level fieldbus system to the PLC.

The IO-Link module and the inputs and outputs are powered by the IO-Link master supply voltage (L+). The module does not require a separate supply voltage connection.

2.4 Names and Synonyms

Name/Synonym	Description
Class A	IO-Link port specification (Class A)
I/O port	P1 – P8
I/O port pin 4	Channel A of P1 – P8
I/O port pin 2	Channel B of P1 – P8
DI	Standard digital input
DO	Standard digital output
I/O	Input/output
IOL	IO-Link

Table 2.2

2.5 LED Indicators

LED	Color	Description
PWR	Green flashing	IO-Link mode
IO	Yellow	Only IO/IN pin 4 is active
	Blue	Only IO/IN pin 2 is active
	Green	Both IO /IN pin 4 and 2 are active
	Red flashing	Supply voltage overload sensor Or output (only for DIO)

Table 2.3

2.6 Interfaces and Connections

Note

The contact arrangements described in this chapter show the front view of the plug-in area of the connectors.

2.6.1 IO-Link interface on the I/O hub

- Connection: M12 plug, 4-pin, A-coded
- Color coding: black

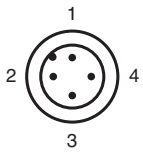


Figure 2.1 Schematic drawing of IO-Link port

Pin	16DI (Class A)	16DIO (Class A)	Function
1	+24 VDC (L+)	+24 VDC (L+)	System/sensor voltage (U_S) (from IO-Link master)
2	n.c.	n.c.	Not connected
3	GND (L-)	GND (L-)	Reference potential for system/sensor voltage (U_S)
4	C/Q (IO-Link)	C/Q (IO-Link)	IO-Link data channel

Table 2.4

2.6.2 P1 – P8—Ports for the Sensors/Actuators

- **For G11**
  Connection: M12 socket, 4 pin, A-coded
  For G16
  Connection: M8 socket, 4 pin, A-coded
- Color coding: black



Figure 2.2 Schematic drawing of ports P1 to P8 (M8)

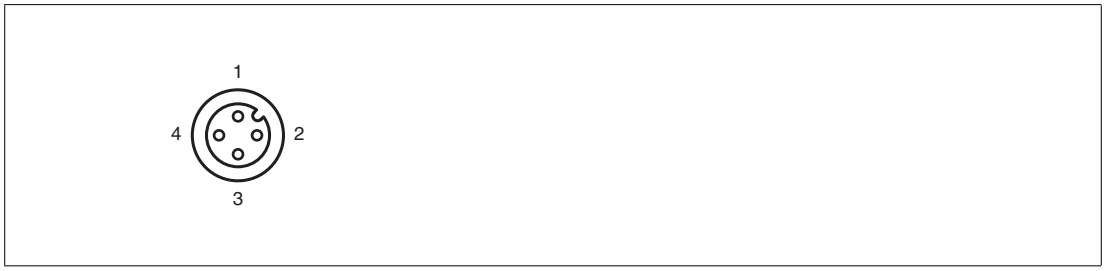


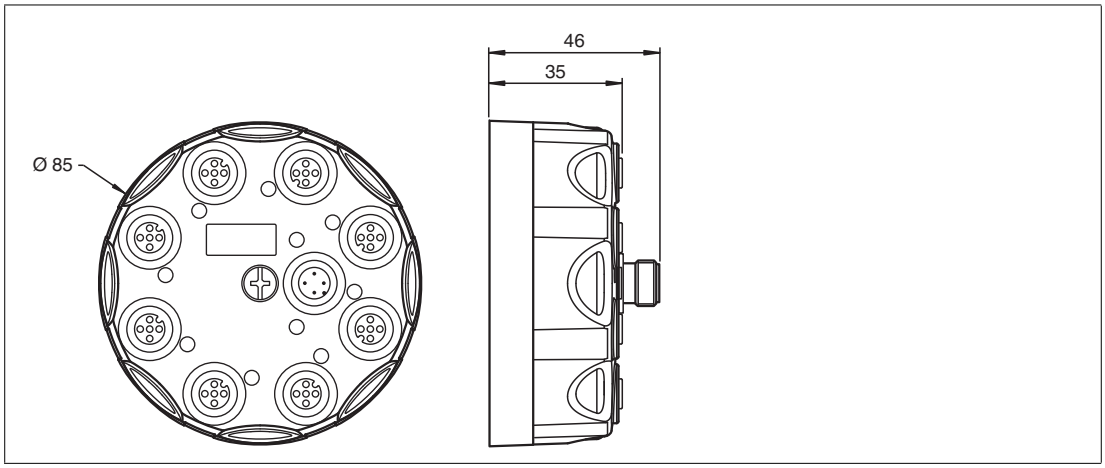
Figure 2.3 Schematic drawing of ports P1 to P8 (M12)

Pin	16DI	16DIO	Function
1	+24 VDC (L+)	+24 VDC (L+)	Sensor supply
2	P1...P8: IN 2, 4, ... 16	P1...P8: IO 2, 4, ... 16	Digital inputs/outputs
3	GND (L-)	GND (L-)	Reference potential for sensor supply
4	P1...P8: IN 1, 3, ... 15	P1...P8: IO 1, 3, ... 15	Functional ground

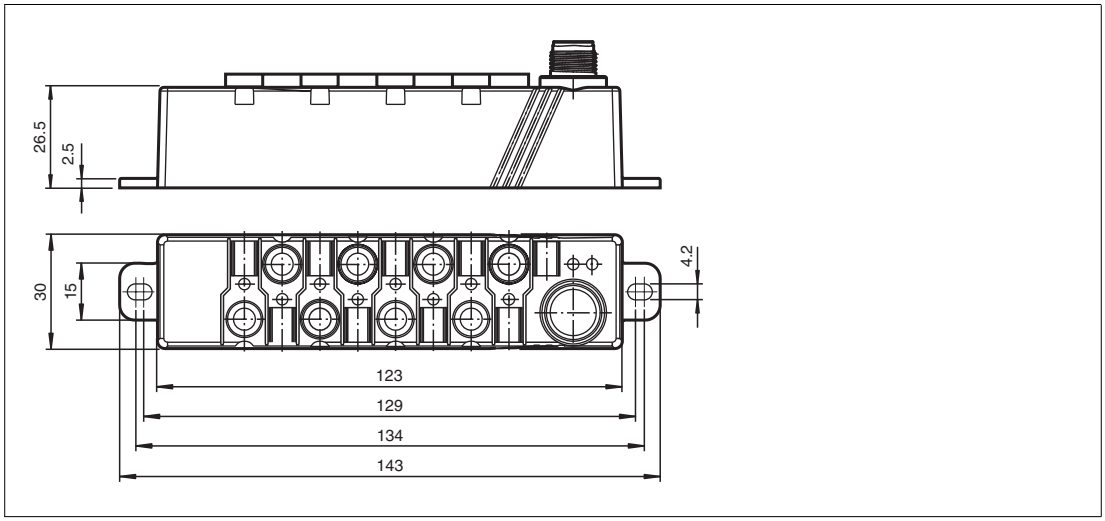
Table 2.5

2.7 Dimensions

ICA-16DI-G11-IO and ICA-16DIO-G11-IO



ICA-16DI-G16-IO and ICA-16DIO-G16-IO



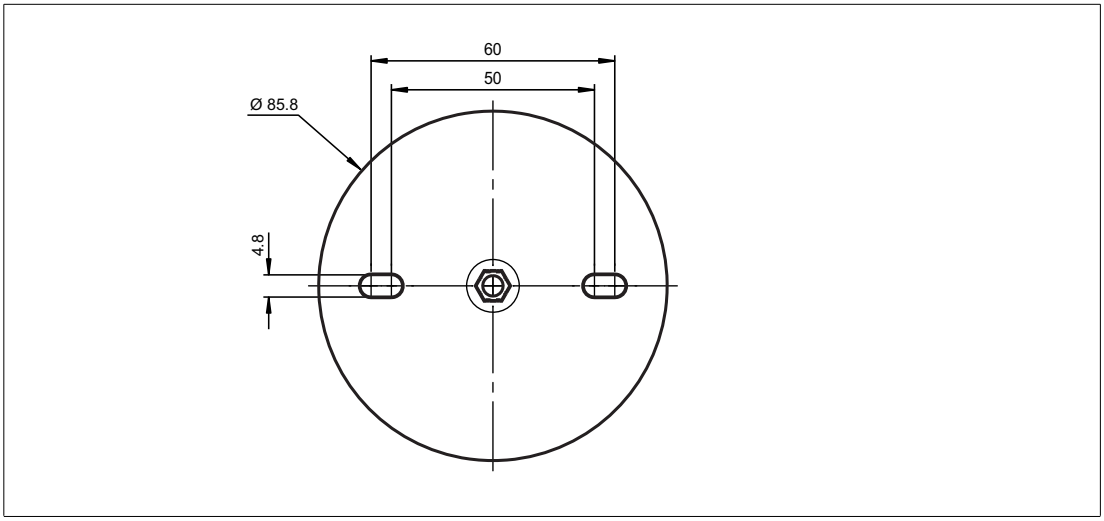
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3 Installation

3.1 Mounting

G11 Modules

Align the device as required and secure to a flat mounting surface by screwing it in place with two M4 mounting screws. The mounting screws are not included.



Screw a dummy plug onto unused connections to ensure the relevant degree of protection. The recommended torque for securing dummy plugs is 0.4 Nm.

G16 Modules

Install the module with two M4x25/30 size screws on a level surface.

Required Torque

Connector	Torque
M12	0.4 Nm
M8	0.2 Nm

For all types of mounting, use washers according to DIN 125. For the installation holes, use a spacing of 134 mm to 129 mm.

3.2 Wiring

Connect the IO-Link interface of the I/O module by means of a standardized M12 connection line to the IO-Link master.

For the intended use of an IO-Link device—I/O hub, connection to an IO-Link master is essential!

Note

FOR UL APPLICATION

Connect devices using only a UL-certified cable with suitable ratings (CYJV or PVVA.) To program the controller, please consult the manufacturer information and use only the appropriate accessories.

Note

FOR UL APPLICATION

Installation and operation of the modules is permitted for indoor use only. Please note the maximum mounting and operating altitude of 2000 m above sea level. Permitted up to a maximum pollution degree of 2.

Warning!

Risk of burning

Terminals, the enclosure of field-wired terminal boxes or components may exceed temperatures of 60 °C. This presents a risk of burning.

Warning!

Risk of damage

Any work on the electrical wiring of the modules may only be carried out in a de-energized state to prevent the destruction of electronic components.

4 Project Planning and Commissioning

The I/O hubs with IO-Link are operated with an IO-Link master with version 1.1. The IO-Link masters from Pepperl+Fuchs support standard 1.1.

The data storage mechanism is supported only in connection with an IO-Link master function with standard 1.1.

More information on project planning and commissioning is available in the respective fieldbus protocol-specific IO-Link master documentation.

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5 Assigning Process Data

5.1 ICA-16DI-G16-IO

5.1.1 Input Data

This module provides a total of three bytes of input data.

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	/	/	Module Supply Under-voltage	/	Module Overtem-perature	Port Sup-ply Over-load	/	/
Byte 1	P8-Pin 2	P8-Pin 4	P7-Pin 2	P7-Pin 4	P6-Pin 2	P6-Pin 4	P5-Pin 2	P5-Pin 4
Byte 2	P4-Pin 2	P4-Pin 4	P3-Pin 2	P3-Pin 4	P2-Pin 2	P2-Pin 4	P1-Pin 2	P1-Pin 4

Table 5.1

5.2 ICA-16DIO-G16-IO

5.2.1 Input Data

This module provides a total of three bytes of input data.

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	/	/	Module Supply Under-voltage	/	Module Overtem-perature	Port Sup-ply Over-load	Digital Output Overload	/
Byte 1	P8-Pin 2	P8-Pin 4	P7-Pin 2	P7-Pin 4	P6-Pin 2	P6-Pin 4	P5-Pin 2	P5-Pin 4
Byte 2	P4-Pin 2	P4-Pin 4	P3-Pin 2	P3-Pin 4	P2-Pin 2	P2-Pin 4	P1-Pin 2	P1-Pin 4

Table 5.2

5.2.2 Output Data

This module provides two bytes of output data.

Standard Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	P8-Pin 2	P8-Pin 4	P7-Pin 2	P7-Pin 4	P6-Pin 2	P6-Pin 4	P5-Pin 2	P5-Pin 4
Byte 1	P4-Pin 2	P4-Pin 4	P3-Pin 2	P3-Pin 4	P2-Pin 2	P2-Pin 4	P1-Pin 2	P1-Pin 4

Table 5.3

5.3 ICA-16DI-G11-IO

5.3.1 Input Data

This module provides a total of three bytes of input data.

For the standard mapping, see See chapter 5.1.1 .

5.4 ICA-16DIO-G11-IO

5.4.1 Input Data

This module provides a total of three bytes of input data.

For the standard mapping, see See chapter 5.2.1.

5.4.2 Output Data

This module provides two bytes of output data.

Standard Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	P8-Pin 2	P8-Pin 4	P7-Pin 2	P7-Pin 4	P6-Pin 2	P6-Pin 4	P5-Pin 2	P5-Pin 4
Byte 1	P4-Pin 2	P4-Pin 4	P3-Pin 2	P3-Pin 4	P2-Pin 2	P2-Pin 4	P1-Pin 2	P1-Pin 4

Table 5.4

6 Parameterization of I/O Hub IO-Link Modules

The parameters set during system start-up are transferred to the device. The device and the master store these parameters. In case of a module replacement, the saved parameters can be automatically transferred to the new module. The behavior of the master and device is defined at the IO-Link master port.

6.1 Parameterization ICA-16DI-G16-IO

For the parameterization, see the Parameter Data Sheet:

https://www.pepperl-fuchs.com/en-us/products-gp25581/132936

6.2 Parameterization ICA-16DIO-G16-IO

For the parameterization, see the Parameter Data Sheet:

https://www.pepperl-fuchs.com/en-us/products-gp25581/132937

6.3 Parameterization ICA-16DI-G11-IO

For the parameterization, see the Parameter Data Sheet:

https://www.pepperl-fuchs.com/en-us/products-gp25581/132372

6.4 Parameterization ICA-16DIO-G11-IO

For the parameterization, see the Parameter Data Sheet:

https://www.pepperl-fuchs.com/en-us/products-gp25581/132371

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