ICA-*-G60A*-IO

I/O Hub with IO-Link
For Module Variants 16DI, 10DI6DO, 16DIO

Manual

IO-Link

Your automation, our passion.

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With regard to the supply of products, the current issue of the following document is applicable:
The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central
Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most
recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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1 Introduction

1.1 Content of this Document

This document contains information required to use the product in the relevant phases of the product life cycle. This may include information on the following:

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

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Note

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

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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.

The documentation comprises the following parts:

- This document
- Datasheet

In addition, the documentation may comprise the following parts, if applicable:

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

1.2 Manufacturer

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

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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.

Action

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 very rugged metal housing made of die-cast zinc. The module electronics are completely protected from environmental influences by the fully encapsulated housing. The modules have the degrees of protection IP65, IP67, and IP69k. The permissible temperature range of the modules is -20 °C to +70 °C. The module series is very well suited for direct field applications in harsh industrial environments.

Despite the sturdy design, the modules have compact dimensions and low weight.

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)
- Module with 10 digital inputs/6 digital outputs (10DI6DO)

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 I/O signals as well as the IO-Link interface. The 16DIO module also has a connector with M12-L encoding for the voltage supply of the sensors/actuators.

2.3 Module Variants

The manual applies to subsequent module variants.

Product name	Description	IO-Link and power ports	IO ports
ICA-16DI-G60A-IO	IO-Link device: IO hub with IO-Link interface and 16 digital inputs	IOL - M12A	8x M12
ICA-16DIO-G60AL-IO	IO-Link device: IO hub with IO-Link interface and 16 freely configurable digital inputs/outputs	IOL - M12A PWR - M12L	8x M12
ICA-10DI6DO-G60A-IO	IO-Link device: IO hub with IO-Link interface and with 10 digital inputs and 6 digital outputs	IOL - M12A	8x M12

Table 2.1

The following sections briefly describe the module variants.

2.3.1 ICA-16DI-G60A-IO

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

The IO-Link module ICA-16DI-G60A-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 sensors are powered by the IO-Link master supply voltage (L+) at X01.
The module does not require a separate supply voltage connection.

2.3.2 ICA-16DIO-G60AL-IO

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

The IO-Link module ICA-16DIO-G60AL-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 system voltage of the IO-Link module is supplied from the A-encoded M12 connection X01. The sensors and actuators are supplied from the L-coded M12 power connection X02. The sensors and actuators are not galvanically isolated from the IO-Link interface.

Caution!

Error message

The IO-Link module reports an error if power connections X1 and X2 are not both connected.

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2.3.3 ICA-10DI6DO-G60A-IO

IO-Link device—I/O hub with IO-Link—10DI6DO

The IO-Link module ICA-10DI6DO-G60A-IO with 10 digital inputs and 6 digital 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 inputs and outputs are galvanically isolated. The sensors are powered by the IO-Link master supply voltage (L+) at X01. The actuators are supplied via the advanced power supply U_{Aux} (2L+) Class B of the master via X01. The module is operated with a Class B master port and requires no separate connection of the supply voltage.

2.4 Names and Synonyms

Name/Synonym	Description
Type A	IO-Link port specification (Class A)
Type B	IO-Link port specification (Class B)
I/O port	X1 – X8
I/O port pin 4 (C/Q)	Channel A of X1 – X8
I/O port pin 2	Channel B of X1 – X8
U_{Aux}	$U_{Auxiliary}$ is the auxiliary supply of the Class B IO-Link master
DI	Standard digital input
DO	Standard digital output
I/O	Input/output
IOL	IO-Link

Table 2.2

2.5 Indicators

2.5.1 LED Indicators

LED	Color	Description
IO-Link	Off	Module is powered down
	Green	Module is switched on, no communication
	Green flashing	Communication OK
	Red	Signal line overload
U_S	Off	Module is powered down
	Green	System/sensor supply voltage OK
	Red	System/sensor supply voltage < 18 V
	Red flashing	Supply voltage overload sensor
U_{Aux}	Off	Supply voltage not available actuator
	Green	Supply voltage OK actuator
	Red	Supply voltage < 18 V actuator
X1-X8 (A/DIA)	Off	Channel A—signal = 0/OFF
	Orange	Channel A—signal = 1/ON
	Red	Peripheral fault (sensor or actuator overload/short circuit)

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LED	Color	Description
X1-X8 (B/DIA)	Off	Channel B—signal = 0/OFF
	White	Channel B—signal = 1/ON
	Red	Peripheral fault (sensor or actuator overload/short circuit)

Table 2.3

Note

Channel errors or general errors on the IO-Link module are indicated by an illuminated red U_S LED.

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 X01—IO-Link interface on the I/O hub

- Connection: M12 plug, 5-pin, A-coded
- Color coding: black
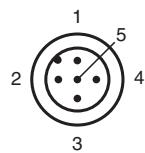
Figure 2.1   Schematic drawing of port X01

Pin	16DI (Class A)	16DIO (Class A)	10DI/6DO (Class B)	Function
1	+24 VDC (L+)	+24 VDC (L+)	+24 VDC (L+)	System/sensor voltage (U_S) (from IO-Link master)
2	n.c.	n.c.	+24 VDC (2L+)	Actuator supply (U_{Aux}) (from IO-Link master)
3	GND (L-)	GND (L-)	GND (L-)	Reference potential for system/sensor voltage (U_S)
4	C/Q (IO-Link)	C/Q (IO-Link)	C/Q (IO-Link)	IO-Link data channel
5	n.c.	n.c.	GND (2M)	Reference potential for actuator supply (U_{Aux})

Table 2.4

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2.6.2 X1 – X8—Ports for the Sensors/Actuators

- Connection: M12 socket, 5 pin, A-coded
- Color coding: black

Figure 2.2   Schematic drawing of ports X1 to X8

Pin	16DI	16DIO	10DI/6DO	Function
1	+24 VDC (L+)	+24 VDC (L+)	+24 VDC (L+)	Sensor supply
2	X1...X8: IN B	X1...X8: IN/OUT	X1...X5: IN B X6...X8: OUT B	Digital inputs/outputs
3	GND (L-)	GND (L-)	GND (L-)	Reference potential for sensor supply
4	X1...X8: IN A	X1...X8: IN/OUT	X1...X5: IN A X6...X8: OUT A	Digital inputs/outputs
5	FG	FG	FG	Functional ground

Table 2.5

2.6.3 X02—Voltage supply with M12 power (16DIO only)

- Connection: M12 socket, 5-pin, L-coded
- Color coding: gray
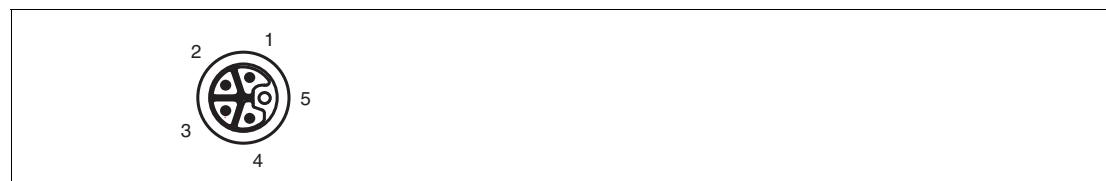
Figure 2.3

Pin	16DIO	Function
1	24 VDC (U_S)	Sensor supply U_S
2	GND (U_L)	Reference potential for actuator supply U_L
3	GND (U_S)	Reference potential for sensor supply (U_S)
4	24 VDC (U_L)	Actuator supply U_L
5	FG	Functional ground

Caution!

Use of incorrect power supply units may lead to malfunctions.

For the system/sensor and actuator supply, use only power supplies that comply with PELV (protective extra-low voltage) or SELV (safety extra-low voltage). Power supplies according to EN 61558-2-6 (transformer) or EN 60950-1 (switching power supplies) fulfill these requirements.

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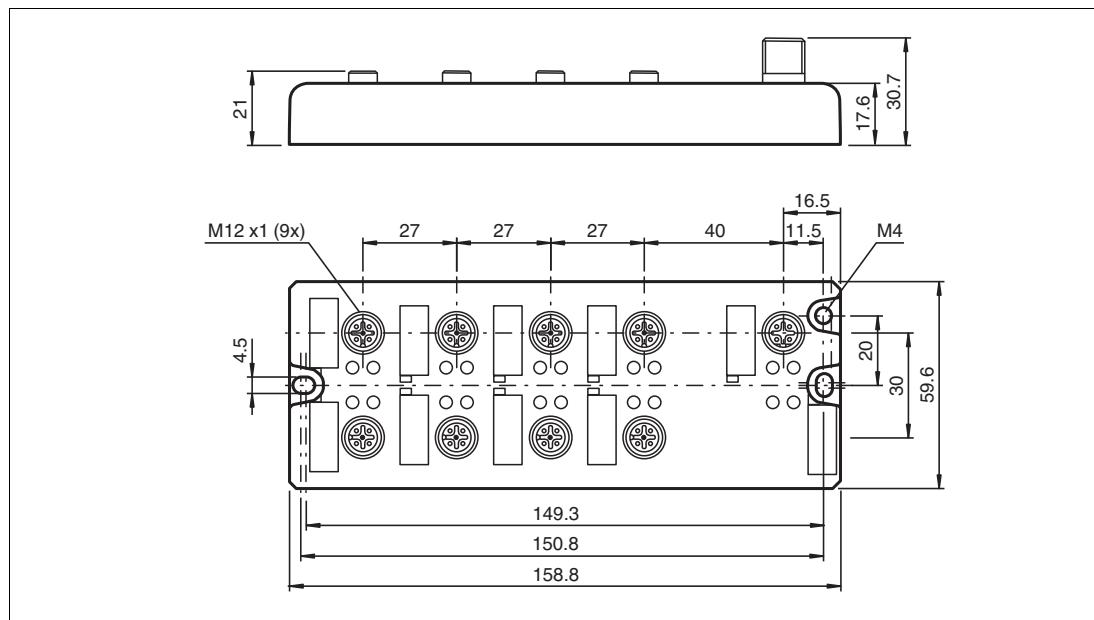
2.7 Dimensions

ICA-16DI-G60A-IO and ICA10DI6DO-G60A-IO

Figure 2.4
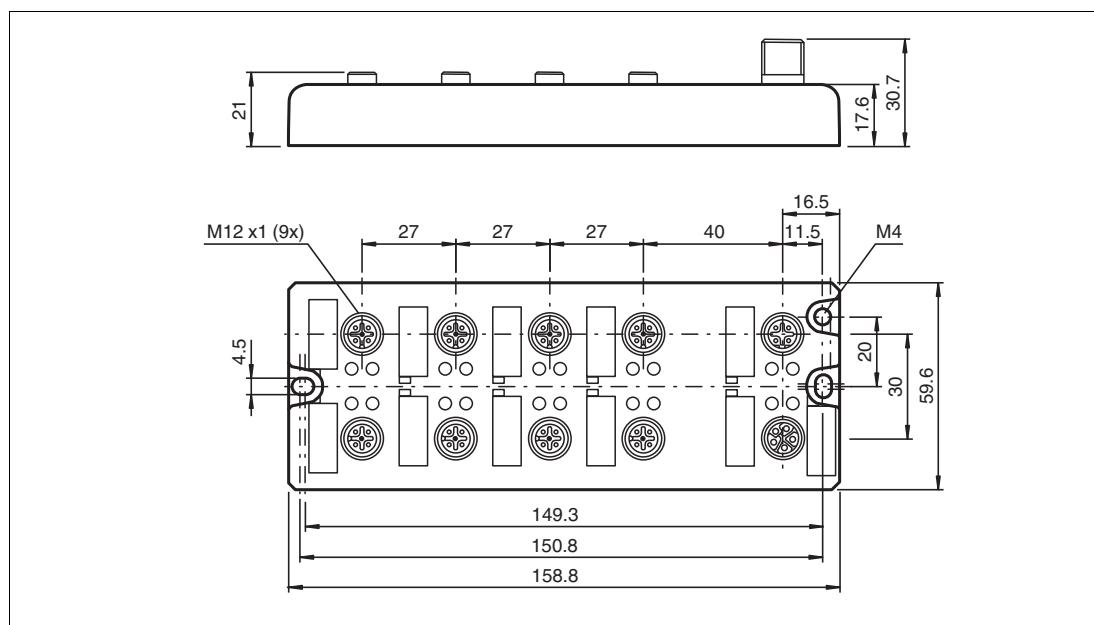
ICA-16DIO-G60AL-IO

Figure 2.5

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3 Installation

3.1 Mounting and Wiring

General Information on Mounting and Connecting

Install the module with two M4x25/30 size screws on a level surface. The required torque is 1 Nm. For all types of mounting, use washers according to DIN 125. For the installation holes, use a spacing of 149.3 mm to 150.8 mm.

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

Due to the current limiting in accordance with IO-Link Class A, the ICA-16DI-G60A-IO module can be connected to all ports of the ICE1-8IOL-G60L-V1D. A 3-wire line is sufficient.

The ICA-10DI6DO-G60A-IO module must be connected to a Class B port. To connect the auxiliary power supply UAux, use a 5-wire line.

The ICA-16DIO-G60AL-IO module has an additional voltage supply via X02. Using a suitable M12 connection line, connect the M12 connector to the DC power supply provided.

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

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Note

To dissipate interference currents and for the EMC strength, the modules use a short circuit to ground with an M4 thread. This is marked with the symbol for grounding and the label "XE."

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Note

Connect the module using an electrical connection with low impedance to the reference ground. In the case of a grounded mounting surface, you can connect the module directly via the fixing screws.

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Note

For non-grounded mounting surfaces, use a ground strap or a suitable FE conductor. Connect the ground strap or FE conductor to the grounding point using an M4 screw and place a washer and a serrated washer under the fixing screw if possible.

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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.

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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.

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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.

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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 16DI Modules: ICA-16DI-G60A-IO

5.1.1 Input Data

This module provides a total of four bytes of input data, the input process image is mapped in the first two bytes as follows:

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X4-B	X4-A	X3-B	X3-A	X2-B	X2-A	X1-B	X1-A
Byte 1	X8-B	X8-A	X7-B	X7-A	X6-B	X6-A	X5-B	X5-A
Byte 2	Channel Number				OVL U_{Aux}	OVL U_S	UV_{Aux}	UV_S
Byte 3	MODE	ID						

Table 5.1

Alternative Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X8-A	X7-A	X6-A	X5-A	X4-A	X3-A	X2-A	X1-A
Byte 1	X8-B	X7-B	X6-B	X5-B	X4-B	X3-B	X2-B	X1-B
Byte 2	Channel Number				OVL U_{Aux}	OVL U_S	UV_{Aux}	UV_S
Byte 3	MODE	ID						

Legend

- X1-A…X8-A: input status channel A (pin 4) for slots X1 to X8
- X1-B…X8-B: input status channel B (pin 2) for slots X1 to X8

5.1.2 Output Data

This module provides four bytes of output data.

Standard Mapping / Alternative Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	–	–	–	–	–	–	–	–
Byte 1	–	–	–	–	–	–	–	–
Byte 2	–	–	–	–	–	–	–	–
Byte 3	RST	–	–	–	–	–	–	–

Table 5.2

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5.2 10DI6DO-Module: ICA-10DI6DO-G60A-IO

5.2.1 Input Data

This module provides a total of four bytes of input data, the input process image is mapped in the first two bytes as follows:

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X4-B	X4-A	X3-B	X3-A	X2-B	X2-A	X1-B	X1-A
Byte 1	–	–	–	–	–	–	X5-B	X5-A
Byte 2	Channel Number				OVL U_{Aux}	OVL U_S	UV_{Aux}	UV_S
Byte 3	MODE	ID						

Table 5.3

Alternative Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	–	–	–	X5-A	X4-A	X3-A	X2-A	X1-A
Byte 1	–	–	–	X5-B	X4-B	X3-B	X2-B	X1-B
Byte 2	Channel Number				OVL U_{Aux}	OVL U_S	UV_{Aux}	UV_S
Byte 3	MODE	ID						

Legend

- X1-A…X5-A: input status channel A (pin 4) for slots X1 to X5
- X1-B…X5-B: input status channel B (pin 2) for slots X1 to X5

5.2.2 Output Data

This module also provides four bytes of output data, the output process image is mapped in the first two bytes as follows:

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	–	–	–	–	–	–	–	–
Byte 1	X8-B	X8-A	X7-B	X7-A	X6-B	X6-A	–	–
Byte 2	–	–	–	–	–	–	–	–
Byte 3	RST	–	–	–	–	–	–	–

Table 5.4

Alternative Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X8-A	X7-B	X6-B	–	–	–	–	–
Byte 1	X8-B	X7-B	X6-B	–	–	–	–	–
Byte 2	–	–	–	–	–	–	–	–
Byte 3	RST	–	–	–	–	–	–	–

Table 5.5

Legend

- X6-A…X8-A: input status channel A (pin 4) for slots X6 to X8
- X6-B…X8-B: input status channel B (pin 2) for slots X6 to X8

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5.3 16DIO-Module: ICA-16DIO-G60AL-IO

5.3.1 Input Data

This module provides a total of four bytes of input data, the input process image is mapped in the first two bytes as follows:

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X4-B	X4-A	X3-B	X3-A	X2-B	X2-A	X1-B	X1-A
Byte 1	X8-B	X8-A	X7-B	X7-A	X6-B	X6-A	X5-B	X5-A
Byte 2	Channel Number				OVL U_{Aux}	OVL U_S	UV_{Aux}	UV_S
Byte 3	MODE	ID						

Table 5.6

Alternative Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X8-A	X7-A	X6-A	X5-A	X4-A	X3-A	X2-A	X1-A
Byte 1	X8-B	X7-B	X6-B	X5-B	X4-B	X3-B	X2-B	X1-B
Byte 2	Channel Number				OVL U_{Aux}	OVL U_S	UV_{Aux}	UV_S
Byte 3	MODE	ID						

Legend

- X1-A…X8-A: input status channel A (pin 4) for slots X1 to X8
- X1-B…X8-B: input status channel B (pin 2) for slots X1 to X8

5.3.2 Output Data

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Note

The 16DIO hub does not support pre-configuration of channels A and B. The 16DIO hub automatically detects whether a channel is used as a digital input or digital output by controlling the output data.

This module also provides four bytes of input data, the output process image is mapped in the first two bytes as follows:

Standard mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X4-B	X4-A	X3-B	X3-A	X2-B	X2-A	X1-B	X1-A
Byte 1	X8-B	X8-A	X7-B	X7-A	X6-B	X6-A	X5-B	X5-A
Byte 2	–	–	–	–	–	–	–	–
Byte 3	RST	–	–	–	–	–	–	–

Table 5.7

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Alternative Mapping

INPUT	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Byte 0	X8-A	X7-A	X6-A	X6-A	X4-A	X3-A	X2-A	X1-A
Byte 1	X8-B	X7-B	X6-B	X5-B	X4-B	X3-B	X2-B	X1-B
Byte 2	–	–	–	–	–	–	–	–
Byte 3	RST	–	–	–	–	–	–	–

Legend

- X1-A…X8-A: input status channel A (pin 4) for slots X1 to X8
- X1-B…X8-B: input status channel B (pin 2) for slots X1 to X8

5.4 Description of Byte 2 and Byte 3

UV U_S   Module diagnosis – Low voltage of the system/sensor voltage supply (U_S)

UV U_{Aux}   Module diagnosis – Low voltage of the actuator voltage supply (U_{Aux})

OVL$_S$ Module diagnosis – Overload/short circuit in the system/sensor voltage supply (U_S)

OVL$_{Aux}$ Module diagnosis – Overload/short circuit in the actuator voltage supply (U_{Aux})

Channel Number   Port information (1 to 8) of the OVL U_{Aux} diagnosis (or OVL U_S channel information, if available)

ID   ID byte for detection of a tool change, 0 = not used, ID = 1 – 127

MODE   Possible values
1 = User parameterization is active, different from the standard settings
0 = Standard parameterization is active

RST   Reset to factory setting of the parameterization 50 ms after detection of the signal "1"

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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 IO-Link Data Storage

The I/O hubs with IO-Link and the IO-Link masters support the data storage functionality. All user-adjustable parameters are saved in the module and in the master. (Exception: ID number index 0x60)

6.2 IO-Link Factory Setting

The module can be reset to the factory settings in two ways.

1. By activating the "Restore Factory Settings" system command specified by IO-Link. The command must be written to index 0x02, subindex 0, with 0x82.
2. By setting the output bit "RST" in the process data, byte 3, bit 7. The prerequisite for this is that the command in the parameter—Module Configuration, Index 0x40, subindex 3, has been activated.

6.3 16DI module: ICA-16DI-G60A-IO

Direct parameter 1

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0000	8	Vendor ID1 (MSB)	R	1	UINT8	0x0001
0x0000	9	Vendor ID2 (MSB)	R	1	UINT8	
0x0000	10	Device ID1 (MSB)	R	1	UINT8	0x0F0201 (dec 983553)
0x0000	11	Device ID2	R	1	UINT8	
0x0000	12	Device ID3 (LSB)	R	1	UINT8	

Table 6.1

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Identification

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0010	0	Vendor name	R	64	String	Pepperl+Fuchs
0x0011	0	Vendor text	R	64	String	www.pepperl-fuchs.com/io-link
0x0012	0	Product name	R	64	String	ICA-16DI-G60A-IO
0x0013	0	Product ID	R	64	String	313335
0x0014	0	Product text	R	64	String	ICA-16DI-G60A-IO, A-coded, IO-Hub with IO-Link, 16DI
0x0015	0	Serial number	R	16	String	P+F SN
0x0016	0	Hardware revision	R	64	String	HW01.00
0x0017	0	Firmware revision	R	64	String	FW01.00
0x0018	0	Application specific tag	R/W	32	String	Your automation, our passion.
0x0019	0	Function tag	R/W	32	String	***
0x001A	0	Location tag	R/W	32	String	***

Table 6.2

Device parameters (individual)

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0040	1 – 3	Module Config	R/W	1	Bool	0
0x0041	1 – 3	Diagnosis Config	R/W	1	Bool	0
0x0043	1 – 16	DI Config—Filter	R/W	16	UINT8	3 ms
0x0044	1 – 16	DI Config—Signal extension	R/W	16	UINT8	Off
0x0045	1 – 16	DI Config—Logic	R/W	16	UINT8	Active high

Table 6.3

6.4   10DI/6DO Module: ICA-10DI6DO-G60A-IO

Direct parameter 1

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0000	8	Vendor ID1 (MSB)	R	1	UINT8	0x0001
0x0000	9	Vendor ID2 (MSB)	R	1	UINT8	
0x0000	10	Device ID1 (MSB)	R	1	UINT8	0x0F0202 (dec 983554)
0x0000	11	Device ID2	R	1	UINT8	
0x0000	12	Device ID3 (LSB)	R	1	UINT8	

Table 6.4

Identification

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0010	0	Vendor name	R	64	String	Pepperl+Fuchs
0x0011	0	Vendor text	R	64	String	www.pepperl-fuchs.com/io-link
0x0012	0	Product name	R	64	String	ICA-10DI6DO-G60A-IO
0x0013	0	Product ID	R	64	String	314644
0x0014	0	Product text	R	64	String	ICA-10DI6DO-G60A-IO, A-coded, IO-Hub with IO-Link, 10DI6DO
0x0015	0	Serial number	R	16	String	P+F SN
0x0016	0	Hardware revision	R	64	String	HW01.00
0x0017	0	Firmware revision	R	64	String	FW01.00
0x0018	0	Application specific tag	R/W	32	String	Your automation, our passion.
0x0019	0	Function tag	R/W	32	String	***
0x001A	0	Location tag	R/W	32	String	***

Table 6.5

Device parameters (individual)

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0040	1 – 16	Module Config	R/W	1	Bool	0
0x0041	1 – 16	Diagnosis Config	R/W	1	Bool	0
0x0043	1 – 16	DI Config—Filter	R/W	16	UINT8	3 ms
0x0044	1 – 16	DI Config—Signal extension	R/W	16	UINT8	Off
0x0045	1 – 16	DI Config—Logic	R/W	16	UINT8	Normal
0x0046	1 – 16	Fail Safe Settings	R/W	16	UINT8	Low
0x0060	1	Module ID	R/W	1		0 (b7: res. + b6 ... b0)

Table 6.6

PEPPERL+FUCHS

6.5 16DIO module: ICA-16DIO-G60AL-IO

Direct parameter 1

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0000	8	Vendor ID1 (MSB)	R	1	UINT8	0x0001
0x0000	9	Vendor ID2 (MSB)	R	1	UINT8	
0x0000	10	Device ID1 (MSB)	R	1	UINT8	0x0F0203 (dec 983555)
0x0000	11	Device ID2	R	1	UINT8	
0x0000	12	Device ID3 (LSB)	R	1	UINT8	

Table 6.7

Identification

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0010	0	Vendor name	R	64	String	Pepperl+Fuchs
0x0011	0	Vendor text	R	64	String	www.pepperl-fuchs.com/io-link
0x0012	0	Product name	R	64	String	ICA-16DIO-G60AL-IO
0x0013	0	Product ID	R	64	String	70101647
0x0014	0	Product text	R	64	String	I/O-Hub with IO-Link
0x0015	0	Serial number	R	16	String	P+F SN
0x0016	0	Hardware revision	R	64	String	HW01.00
0x0017	0	Firmware revision	R	64	String	FW01.00
0x0018	0	Application specific tag	R/W	32	String	Your automation, our passion.
0x0019	0	Function tag	R/W	32	String	***
0x001A	0	Location tag	R/W	32	String	***

Table 6.8

Device parameters (individual)

Index	Sub-Index	Parameter	Access	Data length [byte]	Data type	Default values
0x0040	1 – 16	Module Config	R/W	1	Bool	0
0x0041	1 – 16	Diagnosis Config	R/W	1	Bool	0
0x0043	1 – 16	DI Config—Filter	R/W	16	UINT8	3 ms
0x0044	1 – 16	DI Config—Signal extension	R/W	16	UINT8	Off
0x0045	1 – 16	DI Config—Logic	R/W	16	UINT8	Normal
0x0046	1 – 16	Fail Safe Settings	R/W	16	UINT8	Low
0x0060	1	Module ID	R/W	1		0 (b7: res. + b6 ... b0)

Table 6.9

PEPPERL+FUCHS

6.6 Writing the Parameter Data

6.6.1 Parameter – Module Config

Access to individual sub-indices not possible.

Writing to index 0x40

Index	Sub-Index	Bit Offset	Parameter	Default Values
0x40	1	0	I/O Port Mapping, 0 = standard (AB-AB), 1 = alternative (AA-BB)	0
0x40	2	1	Actuator Reset by Process Data, 0 = automatic restart, 1 = no restart	1
0x40	3	2	Factory Reset by Process Data, 0 = perform a factory reset by setting related bit in process data, 1 = disabled	0

Table 6.10

6.6.2 Parameter – Diagnosis Config

Access to individual sub-indices not possible.

Writing to index 0x41

Index	Sub-Index	Bit Offset	Parameter	Default values
0x41	1	0	Diagnosis over PDin, 0 = enable diagnosis information, 1 = disable diagnosis information	0
0x41	2	1	Actuator Error Diagnosis, 0 = enable diagnosis on actuator error, 1 = disable diagnosis on actuator error	0
0x41	3	2	UAux Undervoltage Diagnosis, 0 = enable undervoltage detection, 1 = disable undervoltage detection	0

Table 6.11

Writing to index 0x41, sub-index 2 + 3

UA	Dependencies of actuator fault parameter settings		AE diagnosis/UV diagnosis
NOK < 5 V OK > 18 V	Actuator Error Diagnosis = FALSE	UAux Undervoltage Diagnosis = FALSE	
NOK	0	0	Yes (at least one output logically set)/Yes
NOK	0	1	Yes (at least one output logically set)/No
NOK	1	0	Yes (at least one output logically set)/Yes
NOK	1	1	No (at least one output logically set)/No
OK	0	0	Yes (overload or short circuit)/Yes
OK	0	1	Yes (overload or short circuit)/No
OK	1	0	No (overload or short circuit)/Yes
	1	1	No (overload or short circuit)/No

Table 6.12

PEPPERL+FUCHS

6.6.3 Parameter – DI Config Filter

Use the parameter setting to specify an input filter time.

Writing to index 0x43[1]

Index	Sub-Index	Bit Offset	IO channel/port	Parameter	Default values
0x43	1	120	0/X1-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	2	112	1/X1-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	3	104	2/X2-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	4	96	3/X2-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	5	88	5/X3-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	6	80	6/X3-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	7	72	7/X4-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	8	64	8/X4-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	9	56	9/X5-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	10	48	9/X5-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	11	40	10/X6-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	12	32	11/X6-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	13	24	12/X7-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	14	16	13/X7-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	15	8	14/X8-A	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4
0x43	16	0	15/X8-B	0 = off, 1 = 0.5ms, 2 = 1ms, 3 = 2ms, 4 = 3ms	4

Table 6.13

[1] Subindex 11 – 16 is not used for the 10DI/6DO module

PEPPERL+FUCHS

6.6.4 Parameter – DI Config Signal Extension

Using the parameter setting, a minimum input switching time is specified.

This minimum switching time is used for both the state Logical-1 and the state Logical-0.

Writing to index 0x44[1]

Index	Sub-Index	Bit Offset	IO channel/port	Parameter	Default values
0x44	1	120	0/X1-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	2	112	1/X1-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	3	104	2/X2-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	4	96	3/X2-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	5	88	5/X3-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	6	80	6/X3-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	7	72	7/X4-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	8	64	8/X4-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	9	56	9/X5-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	10	48	9/X5-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	11	40	10/X6-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	12	32	11/X6-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	13	24	12/X7-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	14	16	13/X7-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	15	8	14/X8-A	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0
0x44	16	0	15/X8-B	0 = off, 1 = 0.5 ms, 2 = 1 ms, 3 = 2 ms, 4 = 3 ms	0

Table 6.14

[1] Subindex 11 – 16 is not used for the 10DI/6DO module

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6.6.5 Parameter – DI Config Logic

This parameter determines whether the switched input is displayed as Logical-1 (normal mode) or, alternatively, as Logical-0 (inverted mode)

Writing to index 0x45[1]

Index	Sub-Index	Bit Offset	IO channel/ port	Parameter	Default value
0x45	1	120	0/X1-A	Active high = 0 Active low = 1	0
0x45	2	112	1/X1-B	Active high = 0 Active low = 1	0
0x45	3	104	2/X2-A	Active high = 0 Active low = 1	0
0x45	4	96	3/X2-B	Active high = 0 Active low = 1	0
0x45	5	88	5/X3-A	Active high = 0 Active low = 1	0
0x45	6	80	6/X3-B	Active high = 0 Active low = 1	0
0x45	7	72	7/X4-A	Active high = 0 Active low = 1	0
0x45	8	64	8/X4-B	Active high = 0 Active low = 1	0
0x45	9	56	9/X5-A	Active high = 0 Active low = 1	0
0x45	10	48	9/X5-B	Active high = 0 Active low = 1	0
0x45	11	40	10/X6-A	Active high = 0 Active low = 1	0
0x45	12	32	11/X6-B	Active high = 0 Active low = 1	0
0x45	13	24	12/X7-A	Active high = 0 Active low = 1	0
0x45	14	16	13/X7-B	Active high = 0 Active low = 1	0
0x45	15	8	14/X8-A	Active high = 0 Active low = 1	0
0x45	16	0	15/X8-B	Active high = 0 Active low = 1	0

Table 6.15

[1] Subindex 11 – 16 is not used for the 10DI/6DO module

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6.6.6 Parameter – Fail-Safe Settings

Note

Only for modules with DO function (10DI6DO and 16DO), otherwise do not use.

The parameter setting determines the behavior of the digital outputs in case of loss of communication. Each channel can be configured individually.

Writing to index 0x46[1]

Index	Sub-Index	Bit Offset	IO channel / port	Parameter	Default values
0x43	1	120	0/X1-A	0 = low, 1 = high, 2 = hold last	0
0x43	2	112	1/X1-B	0 = low, 1 = high, 2 = hold last	0
0x43	3	104	2/X2-A	0 = low, 1 = high, 2 = hold last	0
0x43	4	96	3/X2-B	0 = low, 1 = high, 2 = hold last	0
0x43	5	88	5/X3-A	0 = low, 1 = high, 2 = hold last	0
0x43	6	80	6/X3-B	0 = low, 1 = high, 2 = hold last	0
0x43	7	72	7/X4-A	0 = low, 1 = high, 2 = hold last	0
0x43	8	64	8/X4-B	0 = low, 1 = high, 2 = hold last	0
0x43	9	56	9/X5-A	0 = low, 1 = high, 2 = hold last	0
0x43	10	48	9/X5-B	0 = low, 1 = high, 2 = hold last	0
0x43	11	40	10/X6-A	0 = low, 1 = high, 2 = hold last	0
0x43	12	32	11/X6-B	0 = low, 1 = high, 2 = hold last	0
0x43	13	24	12/X7-A	0 = low, 1 = high, 2 = hold last	0
0x43	14	16	13/X7-B	0 = low, 1 = high, 2 = hold last	0
0x43	15	8	14/X8-A	0 = low, 1 = high, 2 = hold last	0
0x43	16	0	15/X8-B	0 = low, 1 = high, 2 = hold last	0

Table 6.16

[1] Subindex 1 – 10 is not used for the 10DI/6DO module

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6.6.7 Parameter – Surveillance Timeout

A delay time can be configured using this parameter before output current monitoring
is activated. The delay time begins when the status of the output channel has been changed.
Once the specified time has elapsed, the output is monitored and fault states are reported
by the diagnostics.

Note

Subindex 1 – 10 is not used for the 10DI/6DO module

Writing to index 0x47

Index	Sub-Index	Bit Offset	IO channel/port	Parameter	Default values
0x47	1	120	0/X1-A	0 – 255	80 ms
0x47	2	112	1/X1-B	0 – 255	80 ms
0x47	3	104	2/X2-A	0 – 255	80 ms
0x47	4	96	3/X2-B	0 – 255	80 ms
0x47	5	88	4/X3-A	0 – 255	80 ms
0x47	6	80	5/X3-B	0 – 255	80 ms
0x47	7	72	6/X4-A	0 – 255	80 ms
0x47	8	64	7/X4-B	0 – 255	80 ms
0x47	9	56	8/X5-A	0 – 255	80 ms
0x47	10	48	9/X5-B	0 – 255	80 ms
0x47	11	40	10/X6-A	0 – 255	80 ms
0x47	12	32	11/X6-B	0 – 255	80 ms
0x47	13	24	12/X7-A	0 – 255	80 ms
0x47	14	16	13/X7-B	0 – 255	80 ms
0x47	15	8	14/X8-A	0 – 255	80 ms
0x47	16	0	15/X8-B	0 – 255	80 ms

Table 6.17

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6.6.8 Parameter – Module ID

The parameter specifies the ID for detection to ensure correct tool changes.

The parameter (index 0x60) is outside of the data storage memory bank.

Writing to index 0x60

Index	Subindex, Data length [bytes]	Parameter	Default value
0x60	1	Module identification	0

Table 6.18

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