Leuze

Original operating instructions

MD 742-11-88IO3-12

IO-Link device

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1 About These Instructions

These operating instructions describe the structure, functions and the use of the product and will help you to operate the product as intended. Read these instructions carefully before using the product. This is to avoid possible damage to persons, property or the device. Retain the instructions for future use during the service life of the product. If the product is passed on, pass on these instructions as well.

1.1 Target groups

These instructions are aimed at qualified personal and must be carefully read by anyone mounting, commissioning, operating, maintaining, dismantling or disposing of the device

1.2 Explanation of symbols used

The following symbols are used in these instructions:

Tab. 1.1: Warning symbols and signal words

	Symbol indicating dangers to persons
	Symbol indicating possible property damage
NOTE	Signal word for property damage Indicates dangers that may result in property damage if the measures for danger avoidance are not followed.
CAUTION	Signal word for minor injuries Indicates dangers that may result in minor injury if the measures for danger avoidance are not followed.
WARNING	Signal word for serious injury Indicates dangers that may result in severe or fatal injury if the measures for danger avoidance are not followed.
DANGER	Signal word for life-threatening danger Indicates dangers with which serious or fatal injury is imminent if the measures for danger avoidance are not followed.

Tab. 1.2: Other symbols

	Symbol for tips Text passages with this symbol provide you with further information.
	Symbol for action steps Text passages with this symbol instruct you to perform actions.
	Symbol for action results Text passages with this symbol describe the result of the preceding action.

1.3 Additional documents

The following additional documents are available online at www.leuze.com:

- Data sheet
- EU Declaration of Conformity
- Commissioning manual IO-Link devices

2 Notes on the Product

2.1 Product identification

This instruction is valid for following devices:

- MD 742-11-88IO3-12

2.2 Scope of delivery

The scope of delivery includes:

- I/O hub
- Dummy plugs for M8 or M12 connectors
- Label clips

2.3 Legal requirements

The device falls under the following EU directives:

- 2014/30/EU (electromagnetic compatibility)
- 2011/65/EU (RoHS Directive)

3 For Your Safety

The product is designed according to state-of-the-art technology. However, residual risks still exist. Observe the following warnings and safety notices to prevent damage to persons and property. Leuze electronic GmbH + Co. KG accepts no liability for damage caused by failure to observe these warning and safety notices.

3.1 Intended Use

These devices are designed solely for use in industrial areas.

The block modules of the MD 742… series are IO-Link devices and serve as I/O hub between field devices (sensors) and the IO-Link master. The hub has 8 digital I/O channels. 8 digital inputs for connecting digital sensors (MD 742) are provided. On devices with DXP channels, each I/O channel can be used as either a digital input or output without additional configuration.

The device is designed in IP67/IP69K and can be mounted directly in the field.

⚠ CAUTION!

Observe intended use!!

↳ Only operate the device in accordance with its intended use. The protection of personnel and the device cannot be guaranteed if the device is operated in a manner not complying with its intended use.

Leuze electronic GmbH + Co. KG is not liable for damages caused by improper use.

↳ Read these operating instructions before commissioning the device. Knowledge of the operating instructions is an element of proper use.

NOTE

Comply with conditions and regulations!

↳ Observe the locally applicable legal regulations and the rules of the employer's liability insurance association.

3.2 General safety notes

- The device may only be assembled, installed, operated, parameterized and maintained by professionally-trained personnel.
- The device may only be used in accordance with applicable national and international regulations, standards and laws.
- The device only meets the EMC requirements for industrial areas and is not suitable for use in residential areas.

NOTE

Do not modify or otherwise interfere with the device!

↳ Do not carry out modifications or otherwise interfere with the device. The device must not be tampered with and must not be changed in any way.

The device must not be opened. There are no user-serviceable parts inside.

Repairs must only be performed by Leuze electronic GmbH + Co. KG.

4 Product Description

The I/O hubs of the MD 742… series connect up to 8 digital sensors with one IO-Link master port.
The following device types are available:

- MD 742-11-88IO3-12:
  - 8 digital input channels
  - 8 M8 connectors

The devices are designed in a fully encapsulated housing with degree of protection IP67/IP69K.

4.1 Device Overview

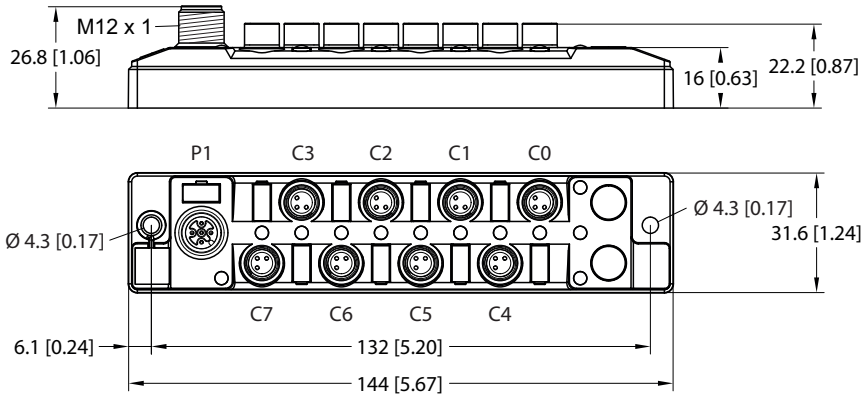

Fig. 1: Dimensions MD 742…

4.2 Properties and Features

- Fiber-glass reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection class IP67/IP69K
- IO-Link diagnostics for short-circuit and supply over- and undervoltage
- MD 742…: 1 digital input channel or 1 universal digital channels per connector
- Metal connectors

4.3 Functions and Operating Modes

The I/O hubs with IO-Link of the MD 742… series connect up to 8 digital sensors with one IO-Link master port.
The device provides diagnostics for power supply and short circuit of the sensors on the IO-Link master.

5 Mounting

The device is mounted via four M4 screws on a flat and pre-drilled mounting surface.

↳ Attach the module to the mounting surface with two M4 screws. The maximum tightening torque for the screws is 1.3 Nm.

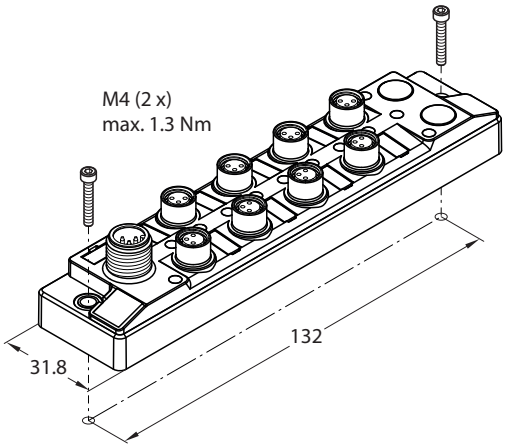

Fig. 2: Mounting the device to a mounting surface (example: MD 742-…)

5.1 Grounding the device

↳ When mounting on a mounting plate, fasten the device with an M4 metal screw.

⇨ The FE connection of the device is connected to the reference potential of the installation via the M4 metal screw.

6 Connecting

WARNING!
Penetration of liquids or foreign objects through leaking connections **Danger to life due to malfunction** ↳ Fasten the M12 connectors with a tightening torque of 0.8 Nm. ↳ Always seal unused connectors with respective protection caps.

6.1 Connecting the supply voltage and IO-Link

WARNING!
Incorrect or defective power supply unit **Danger to life due to dangerous voltages on touchable parts** ↳ Only use SELV or PELV power supplies in accordance with EN ISO 13849-2, which allow a maximum of 60 VDC or 25 VAC in the event of a fault.

For the connection to IO-Link and the supply voltage, a 5-pole M12 connector is available.

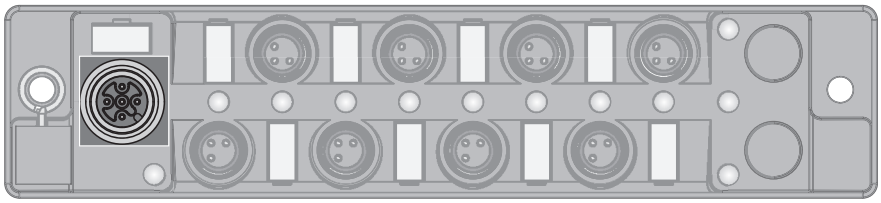

Fig. 3: M12 connector for the connection to IO-Link

↳ For the connection to IO-Link and the supply voltage, a 5-pole M12 connector is available.

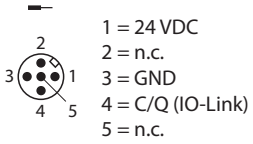

Fig. 4: Pin assignment IO-Link

6.2 Connecting Digital Sensors

Connecting digital sensors - MD 742-…

For connecting digital sensors, MD 742-… provides eight 3-pin M8 connectors.

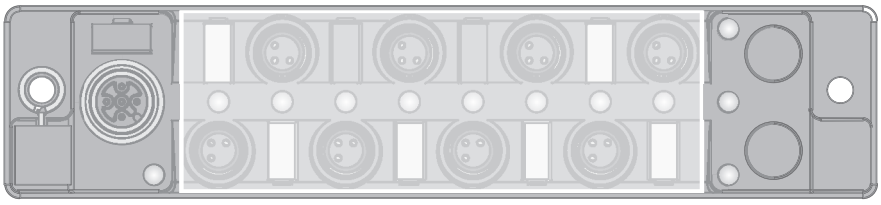

Fig. 5: MD 742-…: M8 connector for connecting digital sensors

↳ Connect the sensors to the device according to the pin assignment.

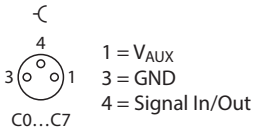

Fig. 6: Pin assignment MD 742-11-88IO3-12

7 Parameterizing and Configuring

7.1 Parameters

IO-Link object directory - ISDU device parameters: Direct Parameter Page

ISDU Index Hex. (Dec.)	Subindex	Object name	Access	Length [Byte]	Meaning/default value
0x00 (0)	Direct Parameter Page 1		read only	16	
	0x07	Vendor ID	read only	2	0x0152 (ID for Leuze)
	0x08				
	0x09	Device ID	read only	3	e.g. MD 742-11-88IO3-12: 0x13EE
	0x0A				
	0x0B				

IO-Link object directory - ISDU device parameters: Identification

ISDU Index Hex. (Dec.)	Object name	Access	Length [Byte]	Meaning/default value	Comment
0x10 (16)	Vendor Name	read only	16	Leuze	
0x11 (17)	Vendor Text	read only	32	www.leuze.com	
0x12 (18)	Product Name	read only	32	e.g. MD 742-11-88IO3-12	
0x13 (19)	Product ID	read only	16	Ident no. of the device: e.g. 50144902 for MD 742-11-88IO3-12	
0x14 (20)	Product Text	read only	32	I/O hub	
0x15 (21)	Serial Number	read only	16	Sequential serial number	
0x16 (22)	Hardware ID	read/write	8	Hardware ID of the device, e.g. V1.0	
0x17 (23)	Firmware Revision	read only	16	Firmware version of the device, e.g. V1.0.7.0	

ISDU Index Hex. (Dec.)	Object name	Access	Length [Byte]	Meaning/default value	Comment
0x18 (24)	Application Specific Tag	read/write	32	Default "***"	Customer-specific or application-specific data can be stored in this field.
0x19 (25)	Function Tag	read/write	32	Default "***"	The application-specific device function can be stored in this field.
0x1A (26)	Location Tag	read/write	32	Default "***"	The application-specific installation location of the device can be stored in this field.

IO-Link object directory - ISDU device parameters: Preferred Index (parameters and diagnostics of the digital in- and outputs)

ISDU Index Hex. (dec.)	Object name	Access	Length [Byte]	Meaning
0x40 (64)	Parameter ID	read/write	4	Customer-specific ID, for free use
0x41 (65)	Inverting Input	read/write	1	Invert digital input
0x42 (66)	Activate Output	read/write	1	Activate output only for MD 742-11-88IO3-12
0x43 (67)	Impulse Stretching Input	read/write	8	Pulse stretching input
0x46 (70)	Under Voltage Diagnostics	read/write	2	Undervoltage Diagnosis (defining the threshold value for the undervoltag diagnostics)
Diagnostics				
0x50 (80)	Supply Error	read only	2	• Over- and undervoltage supply • Overcurrent V_{AUX} connector C0…C7 or C0…C3

Invert Digital Input - 0x41 (65), sub index 0

This parameter inverts the state of the digital input in the process image.

Format	Length	
Byte	1 byte	1 bit per channel

Default values are shown in **bold**.

Value	Meaning	
0	**no**	
1	Yes	Input signal inverted

- MD 742-11-88IO3-12

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

NOTE

This parameter can also be set for all connectors of the module via the IODD.

Pulse Stretching Input - 0×43 (67)

This parameter defines the duration of the pulse stretching for digital input edges in multiples of 10 ms. This allows that even short signals with longer PLC cycle times can be detected.

Format	Length	
Array of Bytes	8 byte	1 byte per channel

Default values are shown in **bold.**

Value	Meaning	
0	**Disabled**	Pulse stretching deactivated
1	1…255	Pulse stretching input [*10 ms]

- MD 742-11-88IO3-12

Bit offset							
0	8	16	24	32	40	48	56
Sub index							
8	7	6	5	4	3	2	1
C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4

Bit offset							
0	8	16	24	32	40	48	56
Sub index							
16	15	14	13	12	11	10	9
C3P2	C3P4	C2P2	C2P4	C1P2	C1P4	C0P2	C0P4

NOTE

This parameter can also be set for all connectors of the module via the IODD.

Undervoltage Diagnosis - 0x46 (70), Sub Index 0

This parameter defines threshold value for the undervoltage diagnostics.

Format	Length	
Array of Bytes	2 byte	1 bit per module

Default values are **shown in bold**

Value	Meaning	
0	**Standard (IEC 61131-2)**	lower threshold: 19.2 V upper threshold: 20.4 V
1	Extended	lower threshold: 17.5 V

Byte 0							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	Threshold

Byte 1							
Bit offset							
7	6	5	4	3	2	1	0
-	-	-	-	-	-	-	-

8 Operating

8.1 Process Input Data

MD 742-11-88IO3-12

Byte no.	Bit offset							
	7	6	5	4	3	2	1	0
Inputs								
0	C7P4	C6P4	C5P4	C4P4	C3P4	C2P4	C1P4	C0P4
Module diagnostics								
1	Group diagnos-tics	-	-	-	-	Under-voltage	-	Over-voltage
Connector diagnostics - overcurrent sensor supply								
2	Over-current C7	Over-current C6	Over-current C5	Over-current C4	Over-current C3	Over-current C2	Over-current C1	Over-current C0

NOTE

The diagnostics can also be be retrieved via IO-Link indices.

Designation	Meaning		
Inputs			
CxPy	0	Input inactive	
	1	Input inactive	
Module diagnostics			
Group diagnotics	0	No diagnostics	

	1	Moduldiagnose aktiv	• Evaluate the bit to monitor the diagnostics cyclically.
			  • Bit = 0: no diagnostics active
			  • Bit = 1: Module diagnostics
			• Bit = 1: Evaluate further diagnostic bits to determine the origin of the diagnostic message.

Undervoltage	0	No diagnostics	
	1	Undervoltage of supply voltage	
Overvoltage	0	No diagnostics	
	1	Overvoltage of supply voltage	

Designation	Meaning	
Connector diagnostics - overcurrent sensor supply		
Overcurrent Cx	0	No diagnostics
	1	Overload of the sensor supply at the connector. The sensor supply is protected in groups. If an overload occurs at one slot, all diagnostic bits of a group are active. Groups: • MD 742-11-88IO3: C0…C3, C4…C7
Channel diagnostics - overcurrent output		
Overcurrent CxPy	0	No diagnostics
	1	Overload at the output/short-circuit

8.2 LED Displays

The device has the following LED indicators:

- IO-Link communication
- I/O status

8.2.1 IO-Link

IO-Link LED	Meaning
Green flashing (1 Hz)	IO-Link communication OK, valid process data are sent
Red	IO-Link communication error or module error
Red flashing (1 Hz)	IO-Link communication OK, invalid process data or diagnostic message
Off	no voltage supply

8.2.2 Channel-LEDs

MD 742-11-88IO3-12

LED 0…7	Meaning (input)
Green	Input inactive
Red flashing (0.5 Hz)	Overload of the sensor supply In devices with group diagnostics, all connector-LEDs of the supply group flash simultaneously in case of an error.
Rot	–
Off	Input inactive

8.3 Evaluating Diagnostic Data

Group diagnostics: Undervoltage and overcurrent sensor supply - 0x50 (80), sub index 0

The group diagnosis indicates errors in the module and sensor supply:

- Group diagnostics: Diagnostics pending at the module
- Over- or undervoltage, per module
- Overcurrent sensor supply VAUX, per connector

Format	Length
Array of Bytes	2 byte

0 = no diagnostics
1 = diagnostic message pending

Byte 0							
Bit offset							
15	**14**	**13**	**12**	**11**	**10**	**9**	**8**
Group diagnostics	-	-	-	-	Undervoltage supply	-	Overvoltage supply

MD 742-…

Byte 1							
Bit offset							
7	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Over-current V_{AUX} C7	Over-current V_{AUX} C6	Over-current V_{AUX} C5	Over-current V_{AUX} C4	Over-current V_{AUX} C3	Over-current V_{AUX} C2	Over-current V_{AUX} C1	Over-current V_{AUX} C0

8.4 IO-Link Events

Event Code	Description	Event Mode	
0x5110	Overvoltage supply	0xF4 (appears)	Supply voltage too high
		0xB4 (disappears)	
0x5111	Undervoltage supply	0xF4 (appears)	Supply voltage too low
		0xB4 (disappears)	
0x7710	Overcurrent V_{AUX} connector x or overcurrent output x	0xF4 (appears)	Group event for Overcurrent • Overcurrent of the sensor supply at one of the connectors or • overcurrent at one of the outputs (DO0…DO7) The mapped diagnostics in the process image of the inputs show which slot or output detects an overcurrent.
		0xB4 (disappears)	

8.5 IO-Link error codes

Error code	Description	
0x8011	Index not available	
0x8012	Sub index not available	
0x8023	Accesss denied	Index cannot be written
0x8030	Parameter value out of range	Parameterwert außerhalb des gültigen Bereichs
0x8033	Parameter length overrun	Length of data to be written does not match the length defined for this parameter.
0x8034	Parameter length underrun	
0x8035	Function not available	Function not available in the device
0x8041	Inconsistent parameter set	

9 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present. If there is no ambient interference present, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.

10 Care, maintenance and disposal

10.1 Cleaning

Ensure that the plug connections and cables are always in good condition.
The devices are maintenance-free, clean dry if required.

10.2 Servicing

The device does not normally require any maintenance by the operator.
Repairs to the device must only be carried out by the manufacturer.

↳ For repairs, contact your responsible Leuze electronic subsidiary or Leuze electronic customer service (see chapter 11 „Service and support“).

10.3 Disposing

↳ For disposal observe the applicable national regulations regarding electronic components.

11 Service and support

Service hotline

You can find the contact information for the hotline in your country on our website www.leuze.com under **Contact & Support**.

Repair service and returns

Defective devices are repaired in our service centers competently and quickly. We offer you an extensive service packet to keep any system downtimes to a minimum.

Our service center requires the following information:

- Your customer number
- Product description or part description
- Serial number and batch number
- Reason for requesting support together with a description

Please register the merchandise concerned. Simply register return of the merchandise on our website www.leuze.com under **Contact & Support > Repair Service & Returns**.

To ensure quick and easy processing of your request, we will send you a returns order with the returns address in digital form.

What to do should servicing be required?

NOTE
Please use this chapter as a master copy should servicing be required! ↳ Enter the contact information and fax this form together with your service order to the fax number given below.

Customer data (please complete)

Device type:	
Serial number:	
Firmware:	
Display messages	
Status of LEDs:	
Error description:	
Company:	
Contact person/department:	
Phone (direct dial):	
Fax:	
Street/No:	
ZIP code/City:	
Country:	

Leuze Service fax number:

+49 7021 573 - 199

12 Technical Data

12.1 General technical data

Technical Data	
Connectors	
IO-Link	M12, 5-pole
Input/output	
MD 748-11-88IO3	M8, 3-pole
Permissible torques	
IO-Link	0.8 Nm
I/O channels	M8: 0.4 Nm M12: 0.6 Nm
Mounting (M4 screws)	1.3 Nm
IO-Link	
IO-Link specification	Specified according to version 1.1
Parameterization	FDT/DTM, IODD
Transmission rate	COM 2: 38,4 kbit/s
Transmission physics	corresponds to 3-wire physics (PHY2)
Standard/Directive conformity	
Vibration test	According to EN 60068-2-6
Shock test	According to EN 60068-2-27
Drop and topple	According to IEC 60068-2-31/IEC 60068-2-32
Electro-magnetic compatibility	According to EN 61131-2/-6-4
Approvals	CE, cULus
UL conditions	Housing type 1, pollution degree 2, relative humidity ≤ 95 %, for indoor applications Use UL-certified cables (CYJV or PVVA) that are suitable for the application in terms of voltage and current..
General Information	
Dimensions (B × L × H)	31.6 × 144 × 26.8 mm
Operating temperature	-40…+70 °C
Storage temperature	-40…+85 °C
Protection class	IP67/IP69K (not evaluated by UL)
Overvoltage category	II
Housing material	PA6-GF30

Technical Data	
Housing color	Black
Halogen-free	Yes
Mounting	2 mounting holes, Ø 4.3 mm

12.2 Technical Data - MD 742-11-88IO3-12

Technical Data	
Power supply	
Operating/load voltage	18…30 VDC
Operating current	< 120 mA
Sensor supply V_{AUX}	Supply connectors C0…C7 bzw. C0…C3 0.5 A per channel group, short-circuit protected with diagnostics channel groups: • MD 742-11-88IO3-12: C0…C3, C4…C7
Total current	Max. 4 A per module
Inputs	
Number of channels	8 digital pnp inputs (EN 61131-2)
Input voltage	18…30 VDC from supply voltage
Signal voltage, low level	-3…5 VDC (EN 61131-2, type 1 and 3)
Signal voltage, high level	11…30 VDC (EN 61131-2, type 1 and 3)
Input delay	0.010 ms
Max. input current	15 mA
Potential isolation	Inputs to FE, 500 VDC
IO-Link	
Minimum cycle time	2.2 ms

13 EC Declaration of Conformity

The IO-Link devices of the MD 742 series have been developed and manufactured in accordance with the applicable European standards and directives.

The manufacturer of the product, Leuze electronic GmbH + Co. KG in D-73277 Owen, possesses a certified quality assurance system in accordance with ISO 9001.

The EC Declaration of Conformity is available in the product download area at www.leuze.com.