MURR ELEKTRONIK

stay connected

ENGLISH MANUAL

for devices of the MVP12 series

Art.-No. 59728 | 59738 | 59828 | 59838

This document is valid for the following products:

Product designation	Art.-No.
MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL4 B0	59728
MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL4 E0	59828
MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL5 B0	59738
MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL5 E0	59838

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NOTE
Translation of the original instructions

Table of Contents

1 Introduction

Purpose of this document

This document instructs the technical staff of the machine manufacturer or machine operator on the safe use of the described devices.

It does not include instructions on the safe use of the machine in which the devices are integrated. For such information, please refer to the operating instructions of the machine.

- ➔ Read this chapter carefully before you start working with the documentation or the device.
- ➔ Read the documentation carefully before starting up the device.
- ➔ Store the manual in a place that is accessible to all users at all times for the entire service life of the device.

You will need general knowledge about automation engineering in order to understand this manual. In addition, planning and using automation systems requires technical knowledge which is not contained in this manual.

Glossary
You can find explanations of the terms/abbreviations used at:
murrelektronik.com/products-industries/glossary/

1.1 Service and support

Sales and distribution

Our sales employees in the indoor and outdoor service and our technicians will support you at any time.

Customer Service Center (CSC)

Our staff of the Customer Service Center will help you with all questions concerning installation and start-up. They support you, for example, if you have problems with combining hardware and software products from different manufacturers with Murrelektronik products.

A number of support tools and measurement facilities are available for field bus systems and EMC interferences.

Please do not hesitate to call us at +49 (0) 7191 47-2050 or send an e-mail to support@murrelektronik.com

Service addresses

Murrelektronik GmbH has a policy of customer proximity, both at national and international level. Please visit our website to find your contact person:
www.murrelektronik.com

1.2 Scope of delivery

The scope of delivery includes:

1x	MVP
1x	operating instructions
10x	designation label
1x	grounding set (1 ring cable lug + 1 lock washer)

1.3 Applicable documents

Document	Art.-No.
Operating instructions	59728
Product Data	59728
Product Data	59828
Product Data	59738
Product Data	59838

You will find the applicable documents included in the scope of delivery or online: shop.murrelektronik.com

1.4 Environmentally friendly disposal

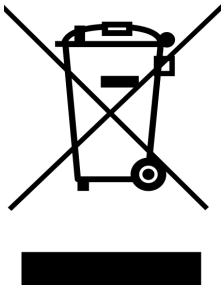
Comply with country-specific waste disposal regulations!

➔ Always dispose of scrap devices in compliance with the applicable country-specific regulations on waste disposal (e.g., the European Waste Code 16 02 14).

Scrap materials may only be sorted by qualified persons!

➔ Proceed with caution when dismantling the device since you could injure yourself.

➔ Sort the separated components into the correct recycling line.



Disposal

The product can be returned to Murrelektronik GmbH free of charge for disposal. The same is true for the original packaging and any batteries or power packs. Any units that have been contaminated with hazardous substances will not be accepted for repair or disposal.

Returns

➔ Label the product and the packaging with ***"For disposal"***.

➔ Package the product.

➔ Send the package to:

Murrelektronik GmbH

Falkenstraße 3

71570 Oppenweiler / GERMANY

We will make sure that the items are disposed of in accordance with German legislation. The most recent owner is responsible for transport to the return point until items arrive at their destination.

1.5 About this manual

1.5.1 Symbols

This document includes information and notes that must be observed for your own safety and to avoid injuries and equipment damage. They are marked as follows:

DANGER!

Immediate danger

➔ Failure to observe this warning involves an imminent risk of death or serious injuries.

WARNING!

Possible danger

➔ Failure to observe this warning can lead to death or serious injuries.

CAUTION!

Low-risk danger

➔ Failure to observe this warning can lead to mild or moderate injuries.

NOTICE

Possible material damage

➔ Failure to observe the warning may cause damage to the device and/or the system.

NOTE
Other technical information and notes of Murrelektronik GmbH.

RECOMMENDATION
Notes with this symbol are recommendations of Murrelektronik GmbH.

PRODUCTS AND ACCESSORIES
This symbol indicates accessories or product recommendations.

Instruction for use

➔ An arrow marks instructions.

➔ Read and observe the instructions.

1 | If they are numbered, it is absolutely necessary to follow them in the correct order.

2 | Read and observe the instructions.

1.5.2 Trademarks

Trademarks of the following companies and institutions are used in this documentation:

IO-Link	c/o PROFIBUS Nutzerorganisation e.V. (PNO)

1.5.3 Specifications

Specification	Link
IO-Link Version 1.1.2 dated 2013-07	www.io-link.com

NOTE
The features of IO-Link specification version 1.1.3 are also supported.

2 For your safety

2.1 General safety instructions

Fachpersonal

Nur Fachpersonal der Automatisierungstechnik darf das Gerät montieren, in Betrieb nehmen und betreiben.

Fachpersonal sind laut der Norm IEC 600500-195 Personen mit entsprechender Ausbildung und Erfahrung, die ihn oder sie befähigt, Gefahren und Risiken, die durch Elektrizität entstehen können, zu meiden.

Target group

This document is intended for specialists in automation technology.

Five safety rules of electrical engineering

When working on electrical systems, always observe the five safety rules of electrical engineering:

1 | Disconnect from the mains.
2 | Secure against reconnection.
3 | Verify that the system is dead.
4 | Carry out earthing and short circuiting.
5 | Provide protection from adjacent live parts.

NOTE
Interventions in the hardware and software of the device dare, if they are not described in this document, only be carried out by qualified personnel from Murrelektronik GmbH.

NOTE
The operating instructions must always be available to the operator of the machine where the device is used.

2.2 Intended purpose

The product has been designed and manufactured for:

- industrial use
- operation within the specified environmental conditions
- field use.

NOTE
Radio interference may occur if the device is used in a domestic or mixed environment.

➔ Follow standards for domestic or mixed environments!

2.2.1 Foreseeable misuse

Foreseeable misuse

The device:

➔ must not be altered with regard to design, engineering, or electrical features.

➔ should only be used in the application fields described in this manual, in the technical data or in the operating instructions.

- must not be used as a safety-related device. It does not meet the relevant standards. Safety functions of the system are not ensured.
- should only be used in the respective IP-protected environment.
- should only be cleaned with oil-free compressed air and a leather cloth.
- must not be used as a climbing aid.

2.2.2 Warranty and liability

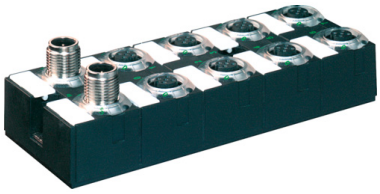
Warranty and liability claims cannot be made if:

- the product is not used according to its designated use,
- damage is caused due to non-observance of the operating instructions,
- the personnel was/is not qualified.

3 Description

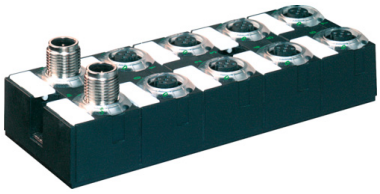
Art.-No. 59728, 59828

- IO-Link hub in 50 mm plastic housing
- 1 x M12 IO-Link class A
- 1 x M12L 4-pin external voltage supply
- 8 x M12 I/O
- 16 configurable digital inputs/outputs
- Galvanically isolated voltage groups



Art.-No. 59738, 59838

- IO-Link hub in 50 mm plastic housing
- 1 x M12 IO-Link class A
- 1 x M12L 5-pin external voltage supply
- 8 x M12 I/O
- 16 configurable digital inputs/outputs
- Galvanically isolated voltage groups



NOTE
As of HW 2.0, the safety functions are supported.
The application examples for safe switch-off are described in chap. 3.4 "Use in safety functions".

3.1 Product Designation Code

The product designation provides information on the device function.

Art.-No. 59728	**MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL4 B0**	
Art.-No. 59828	**MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL4 E0**	
Art.-No. 59738	**MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL5 B0**	
Art.-No. 59838	**MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL5 E0**	
	MVP12-P6	Product family + module size
	DIO	■ D = digital ■ I = input ■ O = output
	8xM12A	Number, size, and coding of the slots ■ A = A-coding
	IOLA	■ IOL = IO-Link ■ A = class A
	PL4 PL5	■ Power L-coded + number of pins
	B0	Basic Firmware Features
	E0	Extended Firmware Features

3.2 Device structure

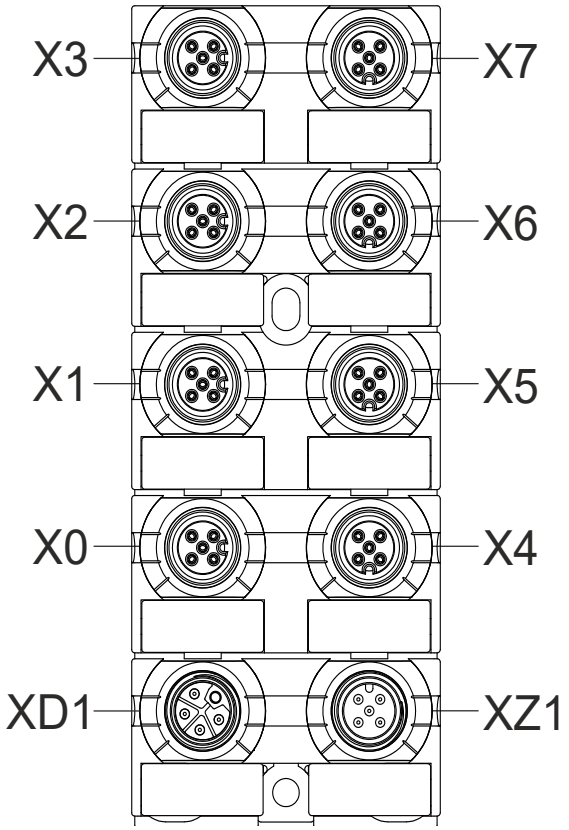


Fig. 3-1: Device structure and port designations

Art.-No.	Port designation	Explanation
59728, 59738, 59828, 59838	X0 ... X3	Digital inputs and outputs UL2
	X4 ... X7	Digital inputs and outputs UL1
	XD1	Power I/O power supply
	XZ1	IO-Link class A

3.3 PIN assignment

3.3.1 Art.-No. 59728, 59828

I/O power	XD1 (M12 male connector)	
	Pin 1	24 V ⎓ UL1
	Pin 2	0 V UL2
	Pin 3	0 V UL1
	Pin 4	24 V ⎓ UL2
	Pin 5	n.c.

IO-Link Class A	XZ1 (M12 male connectors)	
	Pin 1	24 V ⎓ US (L+)
	Pin 2	n.c.
	Pin 3	0 V US (L-)
	Pin 4	C/Q IO-Link
	Pin 5	n.c.

DIO	X0 ... X3 (M12 female connectors)	
	Pin 1	24 V ⎓ UL2
	Pin 2	DIO UL2
	Pin 3	0 V UL2
	Pin 4	DIO UL2
	Pin 5	⏚

DIO	X4 ... X7 (M12 female connectors)	
	Pin 1	24 V ⎓ UL1
	Pin 2	DIO UL1
	Pin 3	0 V UL1
	Pin 4	DIO UL1
	Pin 5	⏚

3.3.2 Art.-No. 59738, 59838

I/O power	XD1 (M12 male connector)	
	Pin 1	24 V ⎓ UL1
	Pin 2	0 V UL2
	Pin 3	0 V UL1
	Pin 4	24 V ⎓ UL2
	Pin 5	⏚

IO-Link Class A	XZ1 (M12 male connectors)	
	Pin 1	24 V ⎓ US (L+)
	Pin 2	n.c.
	Pin 3	0 V US (L-)
	Pin 4	C/Q IO-Link
	Pin 5	n.c.

DIO	X0 ... X3 (M12 female connectors)	
	Pin 1	24 V ⎓ UL2
	Pin 2	DIO UL2
	Pin 3	0 V UL2
	Pin 4	DIO UL2
	Pin 5	⏚

DIO	X4 ... X7 (M12 female connectors)	
	Pin 1	24 V ⎓ UL1
	Pin 2	DIO UL1
	Pin 3	0 V UL1
	Pin 4	DIO UL1
	Pin 5	⏚

3.4 Use in safety functions

With an external two-channel and two-pin shut-off of voltages ULx_24V und ULx_0V, the device can be used in safety functions up to PL d in acc. with EN 13849-1.
Ensured by safe separation between the device's actuator end and other voltages in the device.

NOTE
The device is not a functionally safe product.
➔ Use in safety functions only with the specified external wiring.

3.4.1 Safe switch-off

WARNING!
Personal injury and material damage caused by wrong connection.
Voltage supply to an output or sensor supply is not allowed and may lead to module malfunction.
➔ External power supply via the DIOs is not allowed.
➔ External power supply via the sensor supply pin 1 is not allowed.

WARNING!
Personal injury and material damage caused by incorrect application.
Incorrect application principles may cause the module to malfunction.
➔ Only the application examples shown below are allowed to be implemented.
➔ Other application principles are allowed but do not meet the requirements for the safe switch-off.

The MVP device is designed in a way that cross-circuits cannot occur due to the compliance with safe clearance and creepage distances and at least one single-channel switch-off remains effective in case of EMC component failures.

3.4.1.1 Safety-related switch-off UL1 and UL2

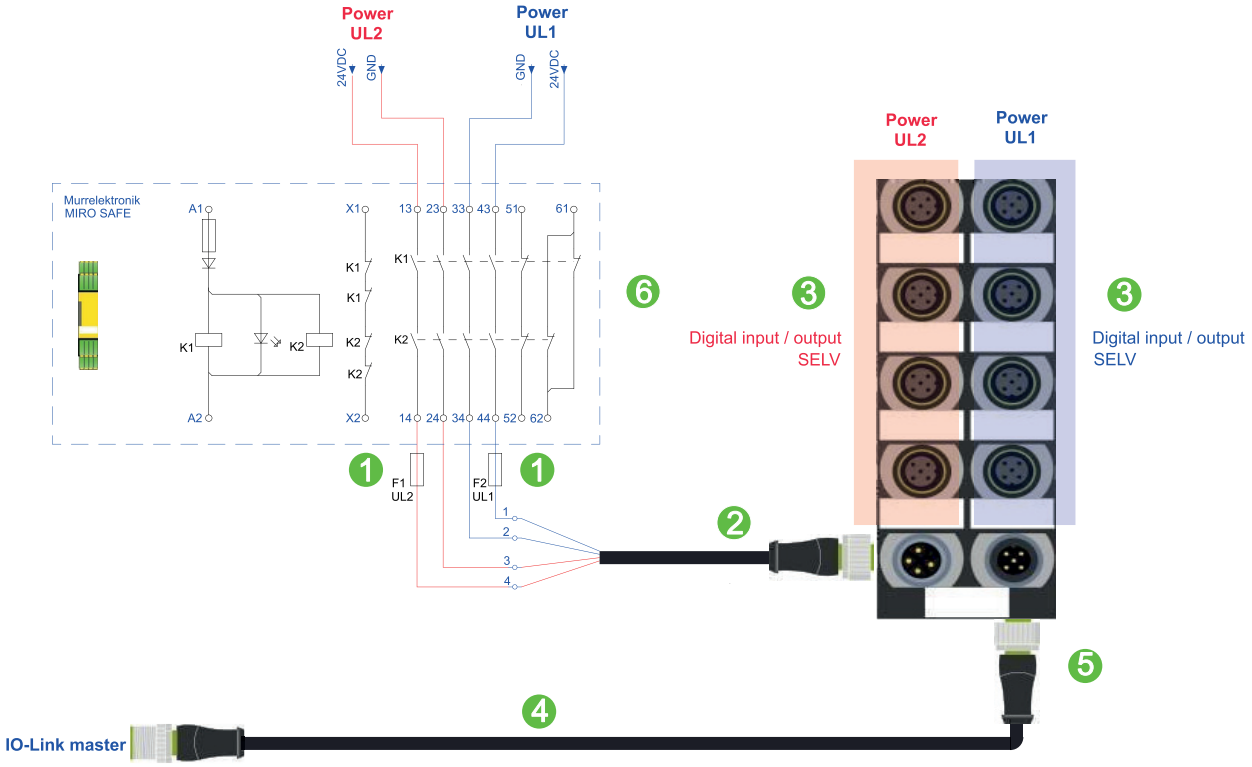
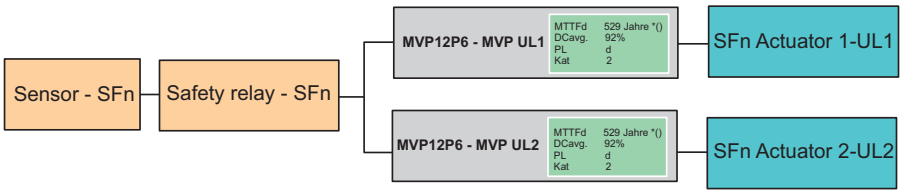


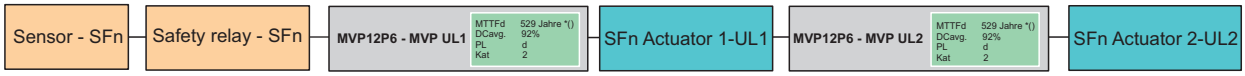
Fig. 3-2: Safety-related switch-off UL1 and UL2

Safety structure

- Two-channel UL1 and UL2



- Single-channel UL1 and UL2 with single-channel actuators



Legend:

1 | SF = safety functions
2 | n = 1-x
3 | * (MTTFd - SN 29500 at 40 °C and rated data)

3.4.1.2 Safety-related switch-off UL1 and/or UL2

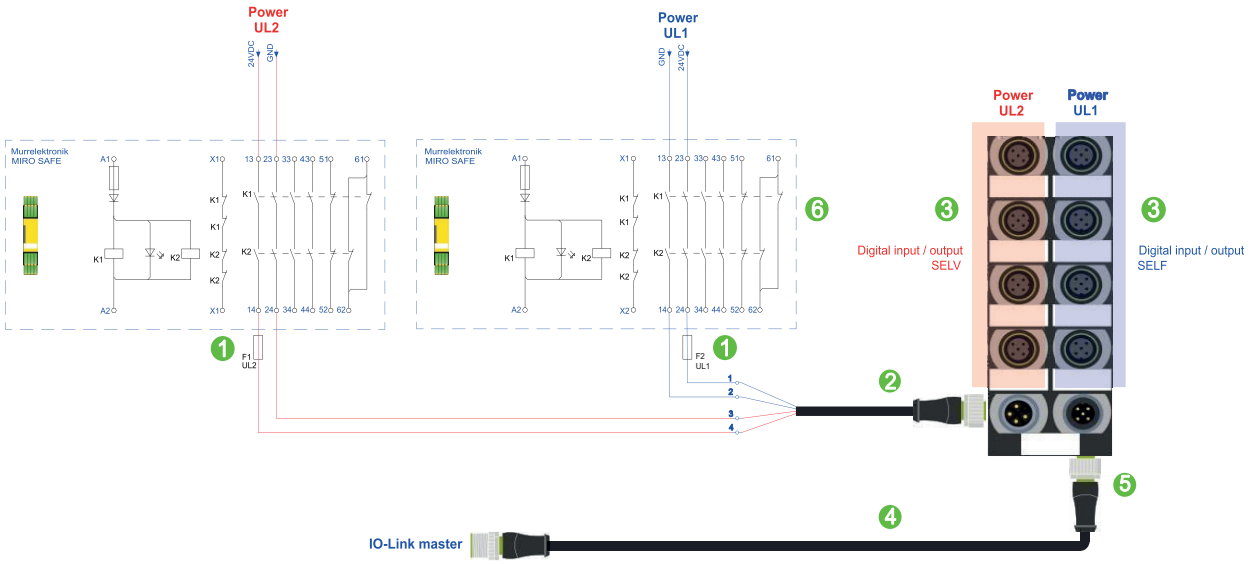
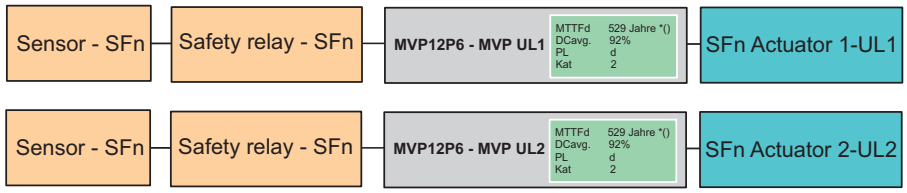


Fig. 3-3: Safety-related switch-off UL1 and/or UL2

Safety structure

- Two-channel UL1 and/or UL2



Legend:

1 | SF = safety functions
2 | n = 1-x
3 | * (MTTFd - SN 29500 at 40 °C and rated data)

3.4.1.3 Safety-related switch-off UL1 and UL2 supplied by power supply unit

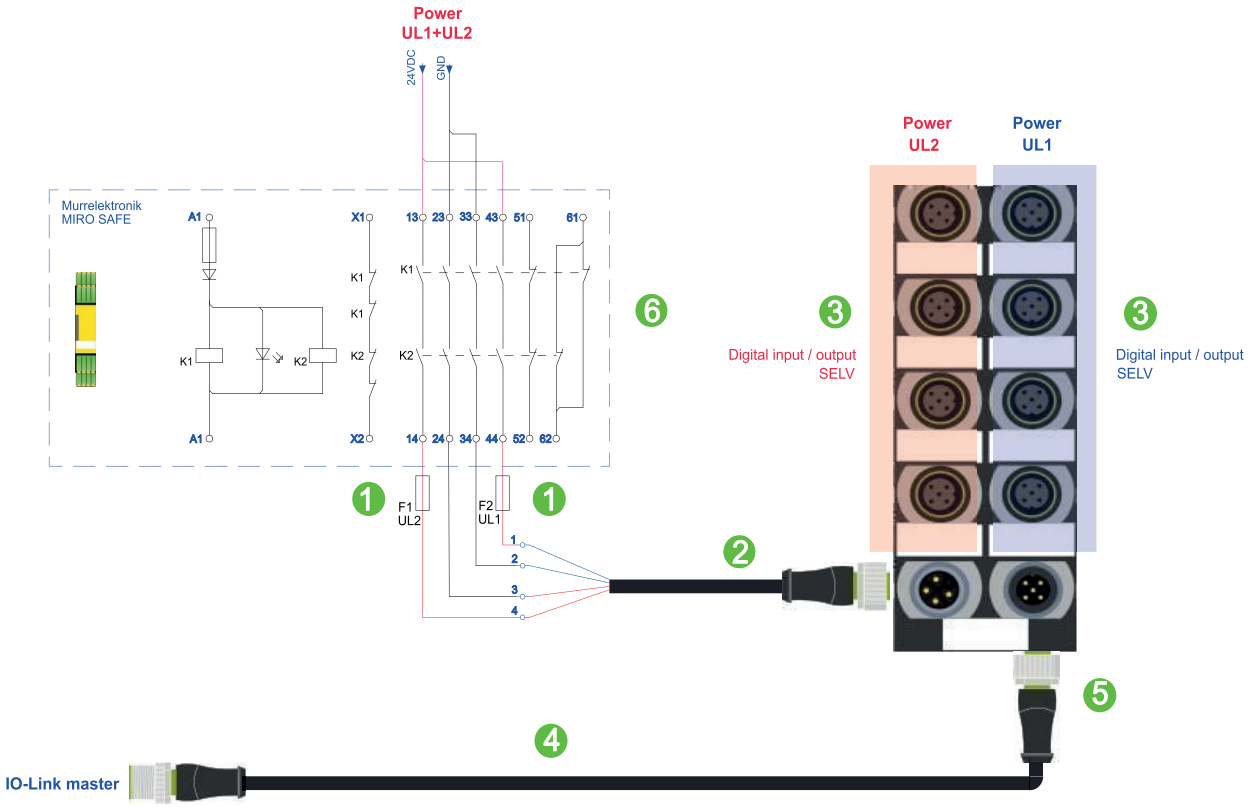
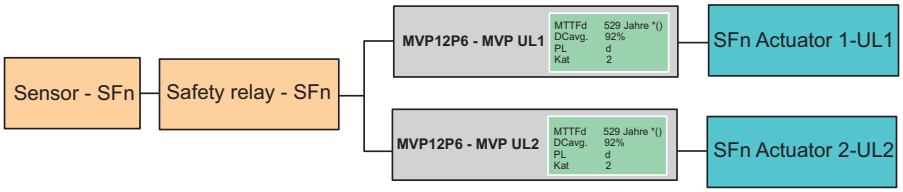


Fig. 3-4: Safety-related switch-off UL1 and UL2 supplied by power supply unit

Safety structure

- Two-channel UL1 and UL2



- Single-channel UL1 and UL2 with single-channel actuators

Legend::

1 | SF = safety functions
2 | n = 1-x
3 | * (MTTFd - SN 29500 at 40 °C and rated data)

3.4.1.4 Safety-related switch-off UL1

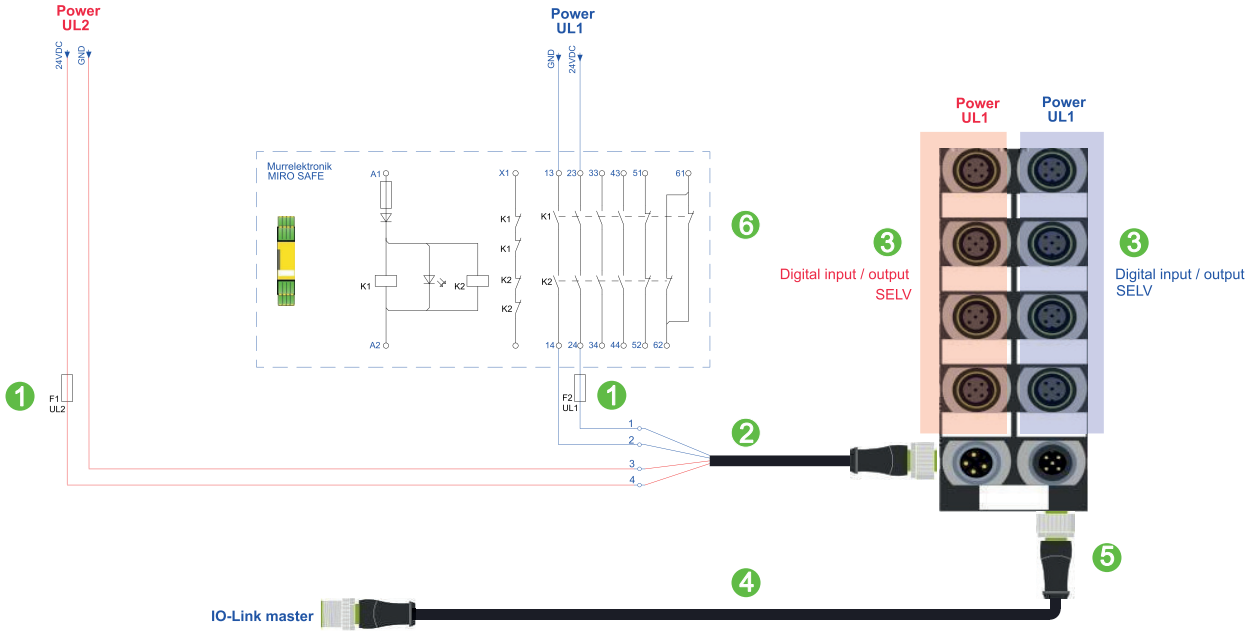
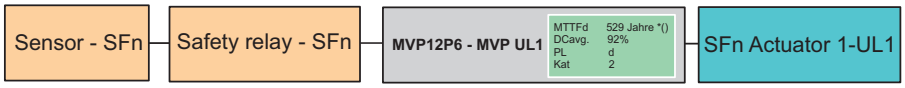


Fig. 3-5: Safety-related switch-off UL1

Safety structure

- Single-channel UL1 only



Legend:

1 | SF = safety functions
2 | n = 1-x
3 | * (MTTFd - SN 29500 at 40 °C and rated data)

3.4.1.5 Safety-related switch-off UL2

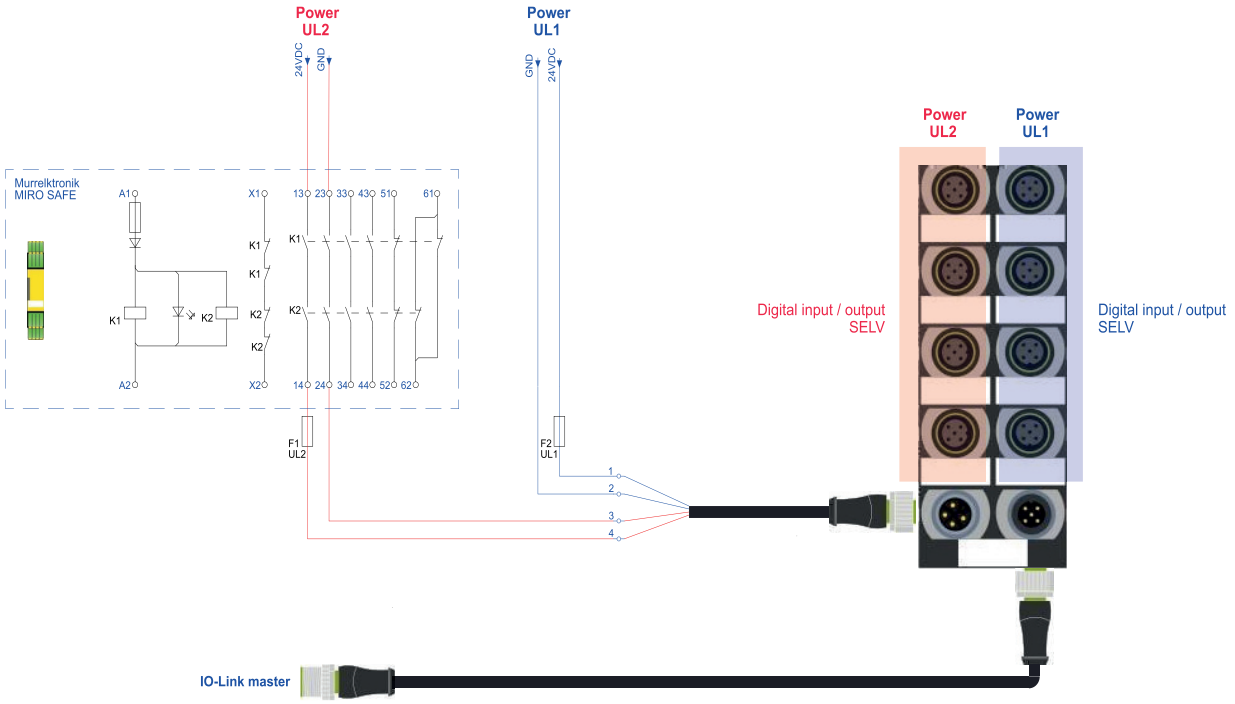
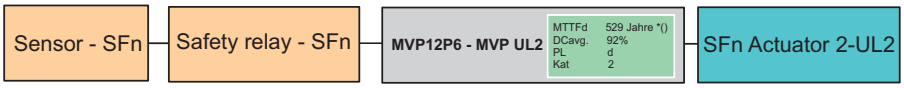


Fig. 3-6: Safety-related switch-off UL2

Safety structure

- Single-channel UL2 only



Legend:

1 | SF = safety functions
2 | n = 1-x
3 | * (MTTFd - SN 29500 at 40 °C and rated data)

3.4.1.6 Safety-related switch-off via the control

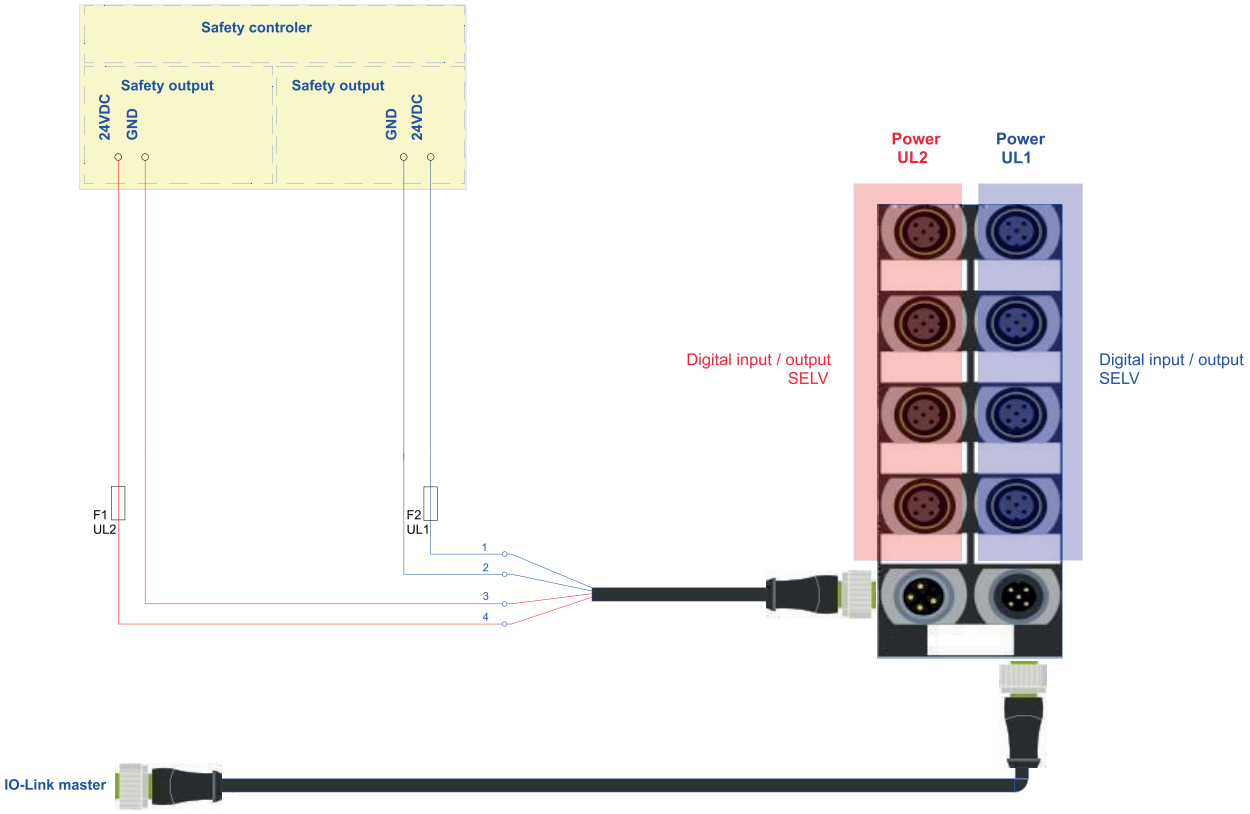


Fig. 3-7: Safety-related switch-off via the control

Safety structure

- All safety structures, as shown for the use of safety relays, are possible when a safety control is used.
  The failure rates can be taken from there.

General explanations of the figure „Safe switch-off".

Position	Description
1	Provide a ballast fuse for safe fault switch-off, see Information on item 1 below the table.
2	Safe cable routing according to DIN EN ISO 13849-2. Consider the table D.4 fault exclusions of lines/ cables!
3	DIO components are only allowed in SELV operation. ■ When using the DIO output voltage to supply a sensor, this may only be fed back to the input of the respective ULx unit. ■ Keep the **UL1** and **UL2** potentials always separated from each other.
4	Do not connect UL1_0V with UL2_0V, PE/FE or IOL_0V!
5	If the IOL supply is defective, the internal IOL supply is switched off. Due to the internal circuit structure, it may be switched on again after a time “xx”. This device behavior must be taken into account in the application, see Information on item 5 below the table.
6	Provide user diagnostics according to DIN EN ISO 13849-1/-2.

Information on item 1

- A maximum total current of 6 A per ULx range is allowed, see chap. 4, Seite 27.
- Selection of the back-up fuse and the power supply unit:

1 | Determination of the maximum continuous load current per ULx range.

2 | Selection of the back-up fuse per ULx range for the maximum continuous load current. It is recommended choosing fuse characteristic “B”.

3 | Selection of a suitable power supply unit. The maximum continuous load current must be made available. The possible short-circuit current of the power supply unit must be high enough so that the back-up fuse is blown within 1 s in case of a fault.

Information on item 5

In the higher-ranking control, the error message “IO-Link Connection Lost” must be evaluated. When this error message is detected, the higher-ranking control must draw the attention of the operating personnel to it.

Service and support

External EMC interference may cause the external fuse to blow. After checking the safety chain, the fuse may be replaced and the device put back into operation.

If you have any questions, please contact: support@murrelektronik.com

Observe safety regulations

- Only qualified personnel is allowed to carry out mounting, commissioning, modification, inspection and retrofitting work.
- The valid regulations and standards according to the information in the operating instructions and the manual must be observed.
- Please observe the safety regulations of electrical engineering and the professional association.

No liability is assumed for product damage and consequential damage in case of non-respect or improper handling.

Overall acceptance of the safety circuit

Put the system into operation only if the overall acceptance of the safety circuit has been successful. The overall acceptance of the safety circuit must only be performed by a qualified and trained personnel.

Items to be checked during overall acceptance

- Check the components used of the required category and the PL according to EN13849-1.
- Check the wiring of the components according to the specifications of EN 60204-1 (see excerpts from EN 60204-1 in the manual, chap. 3.4.2 "Safe installation".
- Check whether the specifications of the operating instructions are fulfilled. If used in an IP67 environment, the work steps that are decisive for the tightness, such as tightening the screws with a torque wrench and checking whether the seals and sealing surfaces are damaged or contaminated, must be carried out with utmost care.
- All connecting cables and connectors on the safety distributor must be clearly marked. Since the device has several connections of the same design, make sure that the detached connection lines are connected again to the right connection.
- Carry out a complete verification of the safety functions of the system. The configuration of the safety circuit, the configuration of the individual safety components and the results of the safety check must be documented completely.

Regular checks of the safety functions

During maintenance of the machine, a verification of the safety function of the system must be performed at regular intervals.

- Before putting the system into operation, check and document the switch-off of the actuator voltage by means of an upstream safety control device.
- Carry out this safety check once a year and document the result. Alternatively, comparable measures are possible.
- If the safety function fails, search for and eliminate the error.

  Putting into operation is not allowed until the error has been eliminated!

3.4.2 Safe installation

Safely and securely install the cabling of the product in accordance with EN 60204-1:

Excerpt (EN 60204-1:2018 Section 13.4.3)

Flexible cables of machines shall be so installed or protected as to minimize the possibility ox external damage due to factors that include the following cable use or potential abuse:

- Being run over by the machine itself.
- Being run over by vehicles or other machines.
- Coming into contact with the machine structure during movements.
- Running in and out of the cable baskets, or on or off cable drums.
- Acceleration forces and wind forces on festoon systems or suspended cables.
- Excessive rubbing by cable collector.
- Exposure to excessive radiated heat.

The bending radii from EN 60204-1 Table 8 must be observed.

Excerpt (EN 60204-1:2018 Section 13.5.1)

All sharp edges, burrs, rough surfaces, or threads with which the insulation of the conductors can come in contact shall be removed from ducts and fittings. Where necessary, additional protection consisting of a flame-retardant, oil-resistant insulating material shall be provided to protect conductor insulation. Ducts and cable trays shall be rigidly supported and positioned at a sufficient distance from moving parts and in such manner so as to minimize the possibility of damage or wear. In areas where human passage is required, the ducts and cable trays shall be mounted at least 2 m above the working surface. The objective is to achieve high operational safety. To prevent parasitic voltages, the different voltages in one cable or piece of equipment must be isolated from the highest possible voltage (protection against electric shock, IEC 61140 – Line insulation between two conductors with different potentials).

Excerpt (EN 60204-1:2018 Section 18)

Tests must be performed in accordance with EN 60204-1 Section 18.

3.4.3 Standards

DIN EN ISO 13849-2:2013-02

EN ISO 13849-2:2012 (D)

EN 60204-1

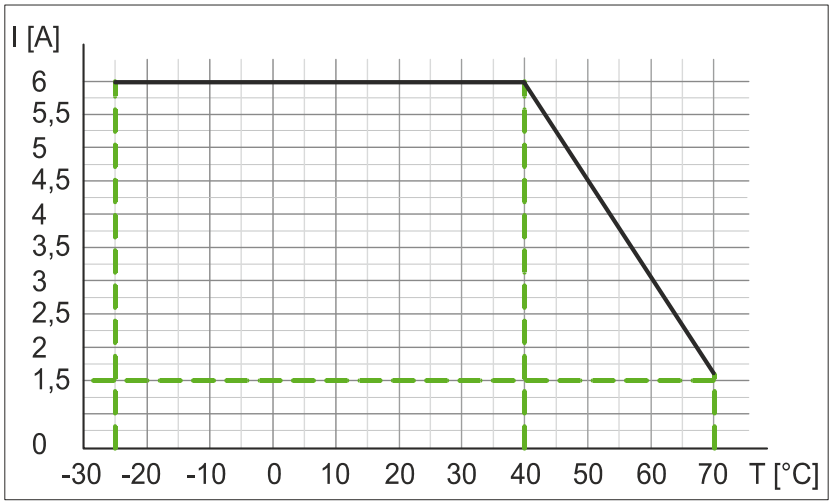
4 Technical Data

4.1 Art.-No. 59728

4.1.1 Electrical data

Device supply		
Operating voltage UL1		24 V ⎓
Operating voltage UL2		24 V ⎓
Operating voltage IO-Link		24 V ⎓
Range of operating voltage UL1		18 ... 30 V ⎓
Range of operating voltage UL2		18 ... 30 V ⎓
Range of operating voltage IO-Link		18 ... 30 V ⎓
Total current UL1	≤40 °C (see derating)	6 A
Total current UL2	≤40 °C (see derating)	6 A
Power consumption when idling		≤75 mA
Galvanic isolation	Between UL1/UL2/IOL	Yes
Cable length	I/O-Power	≤30 m

Total current UL1/UL2



IO-Link		
Communication speed		COM3
Transfer rate		230,400 bit/s
Bus protocol		IO-Link V1.1.2, compatible with IO-Link V1.1.3
IO-Link cycle time		≥1 ms
VendorID		0x012F
DeviceID		0x0C0017
Process data		2 bytes (inputs), 2 bytes (outputs)

Sensor power supply		
Connection/female connector		M12, A-coded
Operating voltage		24 V ⎓
Power supply	Per port	≤0.5 A

Input (DI)		
Connection/female connector		M12, A-coded
Cable cross-section		≤0.75 mm²
Cable length		≤30 m
Input characteristic	EN 61131-2	Type 1 + type 3
Input filter		1 ms

Output (DO)		
Connection/female connector		M12, A-coded
Cable cross section		≤0.75 mm²
Cable length		≤30 m
Output current	Per pin	≤2 A
Switching frequency	Resistive load	≤25 Hz

Supply ULx		
Connection/female connector		M12, L-coded
Cable cross section		>1,5 mm²
Cable length		≤30 m
Operating voltage		24 V
Total current	Per ULx	6 A

4.1.2 Environmental characteristics

Climatic		
Operating temperature		-25 °C ... +70 °C
Storage temperature		-40 °C ... +85 °C
Installation height	Above sea level	≤3000 m
Relative humidity		≤95 %

Mechanical		
Vibration test	EN 60068 Parts 2-6	5 ... 500 Hz; Const. amplitude 1 mm; Acceleration 15 g
Shock test	EN 60068 Parts 2-27	50 g @ 11 ms

Electrical safety		
Degree of protection	IP Rating is not a part of UL approval.	IP65, IP67, IP68
Protection class		III
Degree of pollution		2

Emitted EMC interference		
Radio interference field strength	EN 61000-6-4 Emission	QP: 40 dBµ V/m @ 30 ... 230 MHzQP: 47 dBµ V/m @ 230 ... 1000 MHz

EMC immunity		
Electrostatic discharge (housing)	EN 61000-4-2	±4 kV @ contact ±8 kV @ air
Electromagnetic high-frequency fields (housing)	EN 61000-4-3 RF field	10 V/m
Rapid transient electric disturbances (burst) DC inputs/outputs	EN 61000-4-4	±2 kV I/O supply ±1 kV data line/ ±1 kV I/O line
Conducted interferences, high-frequency fields	EN 61000-4-6, asymmetric	10 V

4.1.3 Protection

Device protection		
Overvoltage protection		Yes
Overload protection of device supply	To be ensured through load circuit monitoring	Yes
Reverse polarity protection of device supply		Yes
Short-circuit protection, sensor supply		Electronically
Short-circuit protection, output (DO)		Electronically
Protective circuit for input	Internal	Suppressor diode

4.1.4 Mechanical data

Material data		
Housing material		Valox 553 black

Assembly data		
Weight	Net	200 g
Dimensions	L x W x H	126 x 50 x 34.5 mm

4.1.5 Product reliability

Product reliability		
MTTF	SN 29500 (at 40 °C and rated data)	89 years

Other failure rates at higher temperatures upon request.

4.1.6 Conformity, Approvals

Conformity, Approvals		
Product standard	EN 61131-2 (IEC 61131-2) Programmable logic controllers, Part 2 EN 61131-9 (IEC 61131-9) Programmable logic controllers, Part 9	
CE	2014/30/EU 2011/65/EU	
UKCA	Electromagnetic Compatibility Regulations 2016, The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012	
EMC	2014/30/EU	
REACH	No. 1907/2006	SVHC List
WEEE	2012/19/EU	
cULus	EN 61010-1	E201820
RoHS	2011/65/EU & 2015/863	Exception 6c&7a&7c1
China RoHS	SJ/T 11364-2014	25 EPUP

Hazardous substance (有害物質)						
Part Name 零件名稱	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr (VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴联苯醚
Component part PCB [1] [2] 组件部分 印刷电路板	X	O	O	O	O	O
Connection Terminal / Screws / Housing[3] 接线端子 /拧/ 外殼	X	O	O	O	O	O
O : Indicates that the content of the harmful substance in all homogeneous materials of the component part is below the limit defined in GB/T 26572. O: 表明該有害物質在組成部分的所有均質材料的含量低於按GB/ T26572定義的限制。 X: Indicates that the content of the harmful substance in at least one homogeneous material of the component part exceeds the limit defined in GB/T 26572. X: 表示該有害物質在組成部分中的至少一個均質材料的含量超過按GB / T26572定義的限制。						

1 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(a) Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead)

2 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(c)-I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g., piezoelectronic devices, or in a glass or ceramic matrix compound.

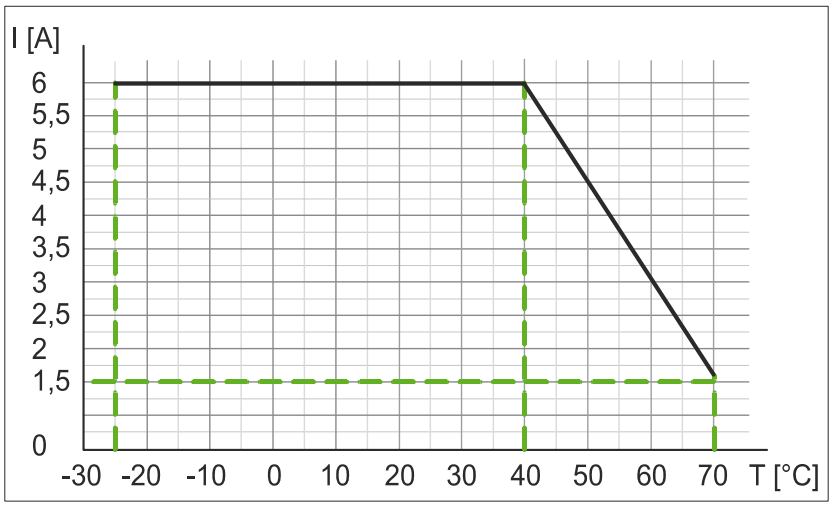
3 EU RoHS Directive 2011/65/EU, Annex III: Exemption 6(c) Copper alloy containing up to 4 % lead by weight.

4.2 Art.-No. 59828

4.2.1 Electrical data

Device supply		
Operating voltage UL1		24 V ⎓
Operating voltage UL2		24 V ⎓
Operating voltage IO-Link		24 V ⎓
Range of operating voltage UL1		18 ... 30 V ⎓
Range of operating voltage UL2		18 ... 30 V ⎓
Range of operating voltage IO-Link		18 ... 30 V ⎓
Total current UL1	≤40 °C (see derating)	6 A
Total current UL2	≤40 °C (see derating)	6 A
Power consumption when idling		≤75 mA
Galvanic isolation	Between UL1/UL2/IOL	Yes
Cable length	I/O-Power	≤30 m

Total current UL1/UL2



IO-Link		
Communication speed		COM3
Transfer rate		230,400 bit/s
Bus protocol		IO-Link V1.1.2, compatible with IO-Link V1.1.3
IO-Link cycle time		≥1 ms
VendorID		0x012F
DeviceID		0x0C000D
Process data		4 bytes (inputs), 2 bytes (outputs)

Sensor power supply		
Connection/female connector		M12, A-coded
Operating voltage		24 V ⎓
Power supply	Per port	≤0.5 A

Input (DI)		
Connection/female connector		M12, A-coded
Cable cross-section		≤0.75 mm²
Cable length		≤30 m
Input characteristic	EN 61131-2	Type 1 + type 3
Input filter		1 ... 10 ms, adjustable

Output (DO)		
Connection/female connector		M12, A-coded
Cable cross section		≤0.75 mm²
Cable length		≤30 m
Output current	Per pin	≤2 A
Total current	X0, X2, X4, X6 each pin 4	≤4 A
Switching frequency	Resistive load	≤25 Hz

Supply ULx		
Connection/female connector		M12, L-coded
Cable cross section		>1,5 mm²
Cable length		≤30 m
Operating voltage		24 V
Total current	Per ULx	6 A

4.2.2 Environmental characteristics

Climatic		
Operating temperature		-25 °C ... +70 °C
Storage temperature		-40 °C ... +85 °C
Installation height	Above sea level	≤3000 m
Relative humidity		≤95 %

Mechanical		
Vibration test	EN 60068 Parts 2-6	5 ... 500 Hz; Const. amplitude 1 mm; Acceleration 15 g
Shock test	EN 60068 Parts 2-27	50 g @ 11 ms

Electrical safety		
Degree of protection	IP Rating is not a part of UL approval.	IP65, IP67, IP68
Protection class		III
Degree of pollution		2

Emitted EMC interference		
Radio interference field strength	EN 61000-6-4 Emission	QP: 40 dBµ V/m @ 30 ... 230 MHzQP: 47 dBµ V/m @ 230 ... 1000 MHz

EMC immunity		
Electrostatic discharge (housing)	EN 61000-4-2	±4 kV @ contact ±8 kV @ air
Electromagnetic high-frequency fields (housing)	EN 61000-4-3 RF field	10 V/m
Rapid transient electric disturbances (burst) DC inputs/outputs	EN 61000-4-4	±2 kV I/O supply ±1 kV data line/ ±1 kV I/O line
Conducted interferences, high-frequency fields	EN 61000-4-6, asymmetric	10 V

4.2.3 Protection

Device protection		
Overvoltage protection		Yes
Overload protection of device supply	To be ensured through load circuit monitoring	Yes
Reverse polarity protection of device supply		Yes
Short-circuit protection, sensor supply		Electronically
Short-circuit protection, output (DO)		Electronically
Protective circuit for input	Internal	Suppressor diode

4.2.4 Mechanical data

Material data		
Housing material		Valox 553 black

Assembly data		
Weight	Net	200 g
Dimensions	L x W x H	126 x 50 x 34.5 mm

4.2.5 Product reliability

Product reliability		
MTTF	SN 29500 (at 40 °C and rated data)	89 years

Other failure rates at higher temperatures upon request.

4.2.6 Conformity, Approvals

Conformity, Approvals		
Product standard	EN 61131-2 (IEC 61131-2) Programmable logic controllers, Part 2 EN 61131-9 (IEC 61131-9) Programmable logic controllers, Part 9	
CE	2014/30/EU 2011/65/EU	
UKCA	Electromagnetic Compatibility Regulations 2016, The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012	
EMC	2014/30/EU	
REACH	No. 1907/2006	SVHC List
WEEE	2012/19/EU	
cULus	EN 61010-1	E201820
RoHS	2011/65/EU & 2015/863	Exception 6c&7a&7c1
China RoHS	SJ/T 11364-2014	25 EPUP

Hazardous substance (有害物質)						
Part Name 零件名稱	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr (VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴联苯醚
Component part PCB [1] [2] 组件部分 印刷电路板	X	O	O	O	O	O
Connection Terminal / Screws / Housing[3] 接线端子 /拧/ 外殼	X	O	O	O	O	O
O : Indicates that the content of the harmful substance in all homogeneous materials of the component part is below the limit defined in GB/T 26572. O: 表明該有害物質在組成部分的所有均質材料的含量低於按GB/ T26572定義的限制。 X: Indicates that the content of the harmful substance in at least one homogeneous material of the component part exceeds the limit defined in GB/T 26572. X: 表示該有害物質在組成部分中的至少一個均質材料的含量超過按GB / T26572定義的限制。						

1 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(a) Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead)

2 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(c)-I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g., piezoelectronic devices, or in a glass or ceramic matrix compound.

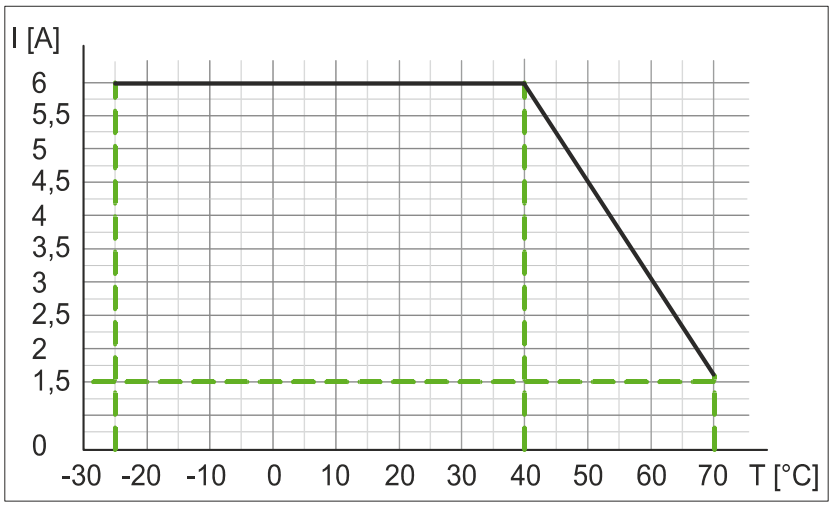
3 EU RoHS Directive 2011/65/EU, Annex III: Exemption 6(c) Copper alloy containing up to 4 % lead by weight.

4.3 Art.-No. 59738

4.3.1 Electrical data

Device supply		
Operating voltage UL1		24 V ⎓
Operating voltage UL2		24 V ⎓
Operating voltage IO-Link		24 V ⎓
Range of operating voltage UL1		18 ... 30 V ⎓
Range of operating voltage UL2		18 ... 30 V ⎓
Range of operating voltage IO-Link		18 ... 30 V ⎓
Total current UL1	≤40 °C (see derating)	6 A
Total current UL2	≤40 °C (see derating)	6 A
Power consumption when idling		≤75 mA
Galvanic isolation	Between UL1/UL2/IOL	Yes
Cable length	I/O-Power	≤30 m

Total current UL1/UL2



IO-Link		
Communication speed		COM3
Transfer rate		230,400 bit/s
Bus protocol		IO-Link V1.1.2, compatible with IO-Link V1.1.3
IO-Link cycle time		≥1 ms
VendorID		0x012F
DeviceID		0x0C0018
Process data		2 bytes (inputs), 2 bytes (outputs)

Sensor power supply		
Connection/female connector		M12, A-coded
Operating voltage		24 V ⎓
Power supply	Per port	≤0.5 A

Input (DI)		
Connection/female connector		M12, A-coded
Cable cross-section		≤0.75 mm²
Cable length		≤30 m
Input characteristic	EN 61131-2	Type 1 + type 3
Input filter		1 ms

Output (DO)		
Connection/female connector		M12, A-coded
Cable cross section		≤0.75 mm²
Cable length		≤30 m
Output current	Per pin	≤2 A
Switching frequency	Resistive load	≤25 Hz

Supply ULx		
Connection/female connector		M12, L-coded
Cable cross section		>1,5 mm²
Cable length		≤30 m
Operating voltage		24 V
Total current	Per ULx	6 A

4.3.2 Environmental characteristics

Climatic		
Operating temperature		-25 °C ... +70 °C
Storage temperature		-40 °C ... +85 °C
Installation height	Above sea level	≤3000 m
Relative humidity		≤95 %

Mechanical		
Vibration test	EN 60068 Parts 2-6	5 ... 500 Hz; Const. amplitude 1 mm; Acceleration 15 g
Shock test	EN 60068 Parts 2-27	50 g @ 11 ms

Electrical safety		
Degree of protection	IP Rating is not a part of UL approval.	IP65, IP67, IP68
Protection class		III
Degree of pollution		2

Emitted EMC interference		
Radio interference field strength	EN 61000-6-4 Emission	QP: 40 dBµ V/m @ 30 ... 230 MHzQP: 47 dBµ V/m @ 230 ... 1000 MHz

EMC immunity		
Electrostatic discharge (housing)	EN 61000-4-2	±4 kV @ contact ±8 kV @ air
Electromagnetic high-frequency fields (housing)	EN 61000-4-3 RF field	10 V/m
Rapid transient electric disturbances (burst) DC inputs/outputs	EN 61000-4-4	±2 kV I/O supply ±1 kV data line/ ±1 kV I/O line
Conducted interferences, high-frequency fields	EN 61000-4-6, asymmetric	10 V

4.3.3 Protection

Device protection		
Overvoltage protection		Yes
Overload protection of device supply	To be ensured through load circuit monitoring	Yes
Reverse polarity protection of device supply		Yes
Short-circuit protection, sensor supply		Electronically
Short-circuit protection, output (DO)		Electronically
Protective circuit for input	Internal	Suppressor diode

4.3.4 Mechanical data

Material data		
Housing material		Valox 553 black

Assembly data		
Weight	Net	200 g
Dimensions	L x W x H	126 x 50 x 34.5 mm

4.3.5 Product reliability

Product reliability		
MTTF	SN 29500 (at 40 °C and rated data)	89 years

Other failure rates at higher temperatures upon request.

4.3.6 Conformity, Approvals

Conformity, Approvals		
Product standard	EN 61131-2 (IEC 61131-2) Programmable logic controllers, Part 2 EN 61131-9 (IEC 61131-9) Programmable logic controllers, Part 9	
CE	2014/30/EU 2011/65/EU	
UKCA	Electromagnetic Compatibility Regulations 2016, The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012	
EMC	2014/30/EU	
REACH	No. 1907/2006	SVHC List
WEEE	2012/19/EU	
cULus	EN 61010-1	E201820
RoHS	2011/65/EU & 2015/863	Exception 6c&7a&7c1
China RoHS	SJ/T 11364-2014	25 EPUP

Hazardous substance (有害物質)						
Part Name 零件名稱	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr (VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴联苯醚
Component part PCB [1] [2] 组件部分 印刷电路板	X	O	O	O	O	O
Connection Terminal / Screws / Housing[3] 接线端子 /拧/ 外殼	X	O	O	O	O	O
O : Indicates that the content of the harmful substance in all homogeneous materials of the component part is below the limit defined in GB/T 26572. O: 表明該有害物質在組成部分的所有均質材料的含量低於按GB/ T26572定義的限制。 X: Indicates that the content of the harmful substance in at least one homogeneous material of the component part exceeds the limit defined in GB/T 26572. X: 表示該有害物質在組成部分中的至少一個均質材料的含量超過按GB / T26572定義的限制。						

1 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(a) Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead)

2 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(c)-I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g., piezoelectronic devices, or in a glass or ceramic matrix compound.

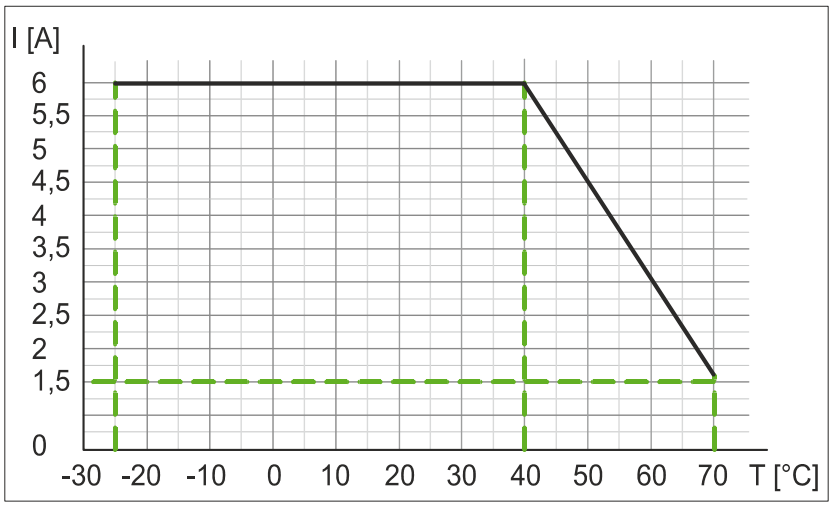
3 EU RoHS Directive 2011/65/EU, Annex III: Exemption 6(c) Copper alloy containing up to 4 % lead by weight.

4.4 Art.-No. 59838

4.4.1 Electrical data

Device supply		
Operating voltage UL1		24 V ⎓
Operating voltage UL2		24 V ⎓
Operating voltage IO-Link		24 V ⎓
Range of operating voltage UL1		18 ... 30 V ⎓
Range of operating voltage UL2		18 ... 30 V ⎓
Range of operating voltage IO-Link		18 ... 30 V ⎓
Total current UL1	≤40 °C (see derating)	6 A
Total current UL2	≤40 °C (see derating)	6 A
Power consumption when idling		≤75 mA
Galvanic isolation	Between UL1/UL2/IOL	Yes
Cable length	I/O-Power	≤30 m

Total current UL1/UL2



IO-Link		
Communication speed		COM3
Transfer rate		230,400 bit/s
Bus protocol		IO-Link V1.1.2, compatible with IO-Link V1.1.3
IO-Link cycle time		≥1 ms
VendorID		0x012F
DeviceID		0x0C000E
Process data		4 bytes (inputs), 2 bytes (outputs)

Sensor power supply		
Connection/female connector		M12, A-coded
Operating voltage		24 V ⎓
Power supply	Per port	≤0.5 A

Input (DI)		
Connection/female connector		M12, A-coded
Cable cross-section		≤0.75 mm²
Cable length		≤30 m
Input characteristic	EN 61131-2	Type 1 + type 3
Input filter		1 ... 10 ms, adjustable

Output (DO)		
Connection/female connector		M12, A-coded
Cable cross section		≤0.75 mm²
Cable length		≤30 m
Output current	Per pin	≤2 A
Total current	X0, X2, X4, X6 each pin 4	≤4 A
Switching frequency	Resistive load	≤25 Hz

Supply ULx		
Connection/female connector		M12, L-coded
Cable cross section		>1,5 mm²
Cable length		≤30 m
Operating voltage		24 V
Total current	Per ULx	6 A

4.4.2 Environmental characteristics

Climatic		
Operating temperature		-25 °C ... +70 °C
Storage temperature		-40 °C ... +85 °C
Installation height	Above sea level	≤3000 m
Relative humidity		≤95 %

Mechanical		
Vibration test	EN 60068 Parts 2-6	5 ... 500 Hz; Const. amplitude 1 mm; Acceleration 15 g
Shock test	EN 60068 Parts 2-27	50 g @ 11 ms

Electrical safety		
Degree of protection	IP Rating is not a part of UL approval.	IP65, IP67, IP68
Protection class		III
Degree of pollution		2

Emitted EMC interference		
Radio interference field strength	EN 61000-6-4 Emission	QP: 40 dBµ V/m @ 30 ... 230 MHzQP: 47 dBµ V/m @ 230 ... 1000 MHz

EMC immunity		
Electrostatic discharge (housing)	EN 61000-4-2	±4 kV @ contact ±8 kV @ air
Electromagnetic high-frequency fields (housing)	EN 61000-4-3 RF field	10 V/m
Rapid transient electric disturbances (burst) DC inputs/outputs	EN 61000-4-4	±2 kV I/O supply ±1 kV data line/ ±1 kV I/O line
Conducted interferences, high-frequency fields	EN 61000-4-6, asymmetric	10 V

4.4.3 Protection

Device protection		
Overvoltage protection		Yes
Overload protection of device supply	To be ensured through load circuit monitoring	Yes
Reverse polarity protection of device supply		Yes
Short-circuit protection, sensor supply		Electronically
Short-circuit protection, output (DO)		Electronically
Protective circuit for input	Internal	Suppressor diode

4.4.4 Mechanical data

Material data		
Housing material		Valox 553 black

Assembly data		
Weight	Net	200 g
Dimensions	L x W x H	126 x 50 x 34.5 mm

4.4.5 Product reliability

Product reliability		
MTTF	SN 29500 (at 40 °C and rated data)	89 years

Other failure rates at higher temperatures upon request.

4.4.6 Conformity, Approvals

Conformity, Approvals		
Product standard	EN 61131-2 (IEC 61131-2) Programmable logic controllers, Part 2 EN 61131-9 (IEC 61131-9) Programmable logic controllers, Part 9	
CE	2014/30/EU 2011/65/EU	
UKCA	Electromagnetic Compatibility Regulations 2016, The Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations 2012	
EMC	2014/30/EU	
REACH	No. 1907/2006	SVHC List
WEEE	2012/19/EU	
cULus	EN 61010-1	E201820
RoHS	2011/65/EU & 2015/863	Exception 6c&7a&7c1
China RoHS	SJ/T 11364-2014	25 EPUP

Hazardous substance (有害物質)						
Part Name 零件名稱	Lead (Pb) 铅	Mercury (Hg) 汞	Cadmium (Cd) 镉	Hexavalent Chromium (Cr (VI)) 六价铬	Polybrominated biphenyls (PBB) 多溴联苯	Polybrominated diphenyl ethers (PBDE) 多溴联苯醚
Component part PCB [1] [2] 组件部分 印刷电路板	X	O	O	O	O	O
Connection Terminal / Screws / Housing[3] 接线端子 /拧/ 外殼	X	O	O	O	O	O
O : Indicates that the content of the harmful substance in all homogeneous materials of the component part is below the limit defined in GB/T 26572. O: 表明該有害物質在組成部分的所有均質材料的含量低於按GB/ T26572定義的限制。 X: Indicates that the content of the harmful substance in at least one homogeneous material of the component part exceeds the limit defined in GB/T 26572. X: 表示該有害物質在組成部分中的至少一個均質材料的含量超過按GB / T26572定義的限制。						

1 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(a) Lead in high melting temperature type solders (i.e., lead-based alloys containing 85 % by weight or more lead)

2 EU RoHS Directive 2011/65/EU, Annex III: Exemption 7(c)-I Electrical and electronic components containing lead in a glass or ceramic other than dielectric ceramic in capacitors, e.g., piezoelectronic devices, or in a glass or ceramic matrix compound.

3 EU RoHS Directive 2011/65/EU, Annex III: Exemption 6(c) Copper alloy containing up to 4 % lead by weight.

5 Mounting

5.1 Requirements

Prerequisites for mounting:

1 | Even mounting surface to avoid mechanical tension.

2 | Provide proper grounding.

3 | Suitable installation site in terms of vibration and shock load, temperature and humidity (see chap. 4 "Technical Data").

4 | Protected to avoid tearing off the connecting cables by personnel or device.

5.2 Dimensions

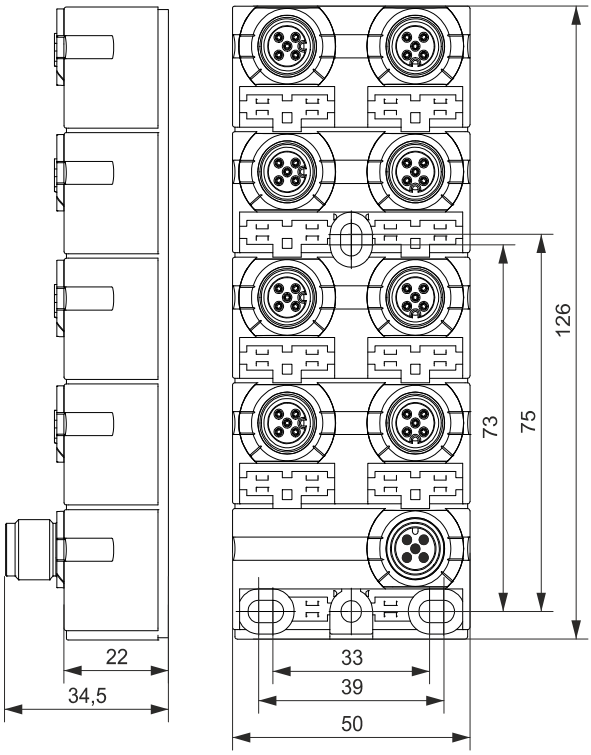


Fig. 5-1: Dimension in mm

5.3 Mounting distance

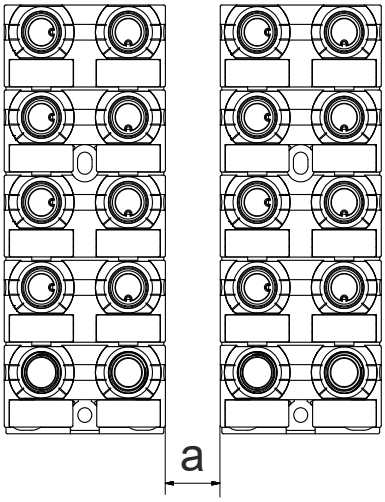


Fig. 5-2: Distance between the devices

a | Straight male connector: 5 mm
Angled male connector: 50 mm

NOTE

➔ If angled male connectors are used, a minimum distance of 50 mm is required.

5.4 Functional ground

FE connection

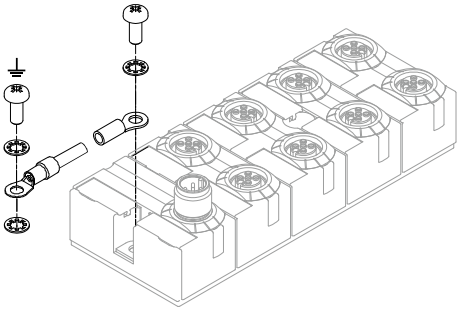


Fig. 5-3: Ring cable lug fastening

M4	2 Nm		Art.-No. 7000-98001-0000000

5.5 Mounting the device

NOTICE

Material damage due to incorrect installation.

The fastening screws and tightening torques depend on the surface of the installation site.

➔ Use fastening screws that are suitable for the mounting surface structure.

➔ Carefully tighten the screws. The indicated tightening torques must be adhered to.

NOTICE

Material damage through improper use.

Do not use the devices as climbing aids. Improper use can cause the devices to break off or to be damaged otherwise.

➔ Install the devices in such a way that they cannot be used as climbing aid.

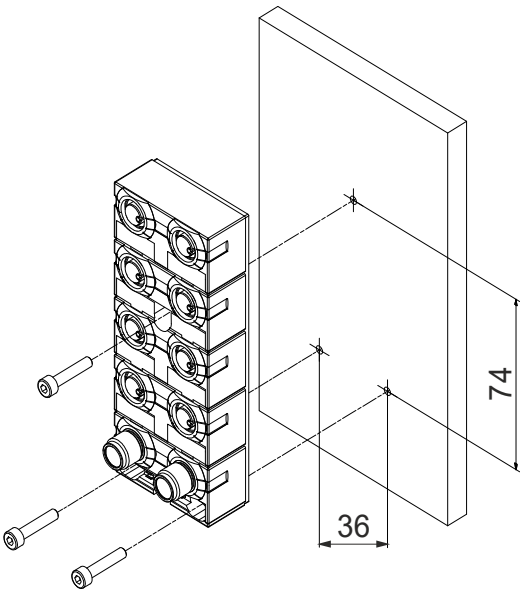


Fig. 5-4: Fastening. Dimensions in mm

M4	2 Nm		Art.-No. 7000-98001-0000000

Mounting

Mount the device in the order indicated below:

1 | Align housing.

2 | Slightly tighten an M4 bolt.

3 | Slightly tighten the second M4 bolt.

4 | Slightly tighten the third M4 bolt.

5 | Carefully tighten all three M4 bolts.

6 | *Grounding the device:*

Fasten the ring cable lug (see 5.4 "Functional ground").

6 Installation

WARNING!

High electrical voltages.

Electric shock may cause life-threatening injuries.

➔ Only qualified personnel may connect the device.

➔ Comply with the five safety rules of electrical engineering.

Protective measures during connection work

➔ According to IEC 60364 - Protection against electric shock.

WARNING!

Life-threatening voltage.

If there is a defect in a power supply unit, voltages on touchable components may reach 120 V DC or 50 V AC and more.

➔ Use only power supply units which allow max. 60 V DC or 25 V AC in the event of a fault. They must comply with SELV.

CAUTION!

Hot surface

Burnings and line damage caused by touching the devices.

➔ Wear thermally suitable protective gloves.

➔ Only use lines with a temperature resistance of at least 80 °C.

6.1 Connection lines

WARNING!

Risk of fire due to short circuit!

Supply lines and/or devices damaged by short circuit can cause overheating and fires!

➔ Provide intelligent current monitoring or fuse.

NOTE

Maximum cable length of the sensor and actuator cables is limited to 30 m.

6.2 Ensure tight seal

NOTICE

Damage to and failure of the device due to ingress of liquids!

Potential function impairment hazard, device damage.

Degree of protection IP67 is not reached.

➔ Unused ports must be sealed with dummy plugs!

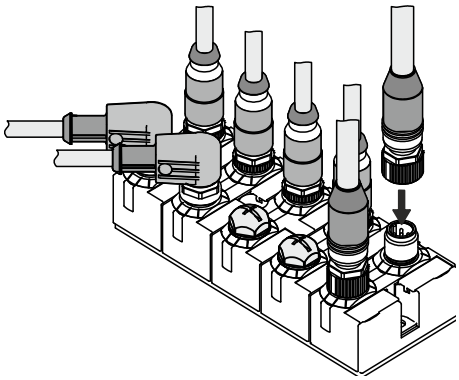


Fig. 6-1: Connecting cables

M12	0,6 Nm		Art.-No. 7000-99102-0000000

PRODUCTS AND ACCESSORIES

You will find a wide range of connecting lines in the catalog or in the Murrelektronik online shop shop.murrelektronik.com

7 Operation

NOTE
After writing an application-specific tag in the IO-Link hub, the hub briefly interrupts the IO-Link connection if the text is not the same as the text stored in the hub.

7.1 LED indication

The MVP devices are equipped with the following separate LED indicators:

- IO-Link-supply US on XZ1
- Power supply UL1 on XD1
- Power supply UL2 on XD1
- Digital inputs and outputs on X0 ... X7

The indication is continuous lighting or flashing of the LEDs.

7.1.1 LED indication IO-Link

The device has a combined LED for the IO-Link status and the status of the US power supply. This can give rise to a mixture of green and red flashing codes (in case of overlap orange flashing code).

Combined LED indication IO-Link and US

LED indicator	LED state	Description
Green	Permanently on	IO-Link not in OPERATE status, no cyclic data communication; Power supply US OK
Green	Flashing **1 Hz**	IO-Link in OPERATE status, cyclic data communication; Power supply US OK
Red	Permanently on	Short circuit DO, temperature warning etc.
Off		Device off, no IO-Link connection

Tab. 7-1: Indication IO-Link and US

Firmware update

LED indicator	LED state	Description
Green	Permanently on	IO-Link in IDLE status, Firmware update completed successfully
Green	Flashing **1 Hz**	IO-Link in status PREOPERATE/OPERATE, Update is not yet being performed
Red	Permanently on	Update failed
Green/ Red	Flashing **2 Hz**	IO-Link in status PREOPERATE/OPERATE, Update is being performed
Off		Device off, no IO-Link connection

Tab. 7-2: Firmware update

NOTE
At US <18 V, an error-free operation is no longer guaranteed.

7.1.2 LED indication for inputs and outputs

LED indication digital inputs/outputs

LED indication	LED state	Voltage at input	Description	Logical value
Yellow	Permanently on	24 V	Channel on	1
Red	Permanently on	0 V	Short-circuit or overload DO	0
Off		0 V	Device off or firmware update is being performed	0

Tab. 7-3: LED indication for digital inputs/outputs

7.1.3 LED indicator UL1 and UL2

LED indicator UL1 and UL2

LED indicator	LED state	Description
Green	Permanently on	OK, 17.5 V < UA < 30 V
Red	Permanently on	Undervoltage, 12.5 V < UA < 17 V
Red	Flashing **1 Hz**	Overvoltage UA > 30.5 V
Off		Device off, UA < 12 V

Tab. 7-4: LED indicator UL1 and UL2

7.2 IO-Link object directory

7.2.1 DPP (Direct Parameter Page)

7.2.1.1 Art.-No. 59728, 59828

ISDU index	DPP index	Object name	Access	Length in bytes	Meaning/default value	
Identification						
					Art.-No. 59728	Art.-No. 59828
0x0000	0x00	MasterCommand	W	1		
	0x01	MasterCycleTime	R/W	1		
	0x02	MinCycleTime	R	1		
	0x03	M-sequenceCapability	R	1		
	0x04	RevisionID	R/W	1		
	0x05	ProcessDataIn	R	1		
	0x06	ProcessDataOut	R	1		
	0x07	VendorID 1 (MSB)	R	1	0x012F	
	0x08	VendorID 2 (MSB)	R	1		
	0x09	DeviceID 1 (octet 2, MSB)	R/W	1	0x0C	
	0x0A	DeviceID 1 (octet 1, MSB)		1	0x00	
	0x0B	DeviceID 1 (octet 0, LSB)		1	0x0C0017	0x0C0018
	0x0C	FunctionID 1 (MSB)	R	1		
	0x0D	FunctionID 2 (LSB)		1		
	0x0E	Reserved	R	1		
	0x0F	SystemCommand	W	1		
0x0002		SystemCommand	R	1		
0x0003		DataStorageIndex	R	Variable		
0x000D		ProfileCharacteristic	R	Variable		
0x000E		PDInputDescriptor	R	Variable		
0x000F		PDOutputDescriptor	R	Variable		
0x0010		VendorName	R	64	Murrelektronik GmbH	
0x0011		VendorText	R	64	www.murrelektronik.com	
0x0012		ProductName	R	64	MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL4 B0	MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL4 E0
0x0013		ProductID	R	64	59728	59828
0x0014		ProductText	R	64	Digital I/O Hub MVP12-P60, IO-Link Class A DIO8 DIO8 8xM12A Basic Firmware Edition: 2 Byte IN / 2 Byte OUT	Digital I/O Hub MVP12-P60, IO-Link Class A DIO8 DIO8 8xM12A Extended Firmware Edition: 4 Byte IN / 2 Byte OUT
0x0015		SerialNumber	R	16	Running serial number set during production	
0x0016		HardwareRevision	R	64	e.g. “01.00”	
0x0017		FirmwareRevision	R	64	e.g. “V.1.00.00”	
0x0018		ApplicationSpecificTag	R	16 ... 32	User-specific designation e.g. “System 3/Port 4”	
0x0019		FunctionTag	R	32		
0x001A		LocationTag	R	32		
Diagnostic						
0x0020		Error Count	R	2		

ISDU index	DPP index	Object name	Access	Length in bytes	Meaning/default value
0x0024		DeviceStatus	R	1	0: The device works properly 1: Maintenance necessary 2: Out of specification 3: Functional check 4: Error 5 ... 255: Reserved
0x0025		DetailedDeviceStatus	R	Variable	6 x (octet 1: EventQualifier, octet 2, 3: EventCode)
0x0028		ProcessDataInput	R	PD-Length	
0x0029		ProcessDataOutput	R	PD-Length	
0x0031 ... 0x003F		Reserved for profiles			

7.2.1.2 Art.-No. 59738, 59838

ISDU index	DPP index	Object name	Access	Length in bytes	Meaning/default value	
Identification						
					Art.-No. 59738	Art.-No. 59838
0x0000	0x00	MasterCommand	W	1		
	0x01	MasterCycleTime	R	1		
	0x02	MinCycleTime	R	1		
	0x03	M-sequenceCapability	R	1		
	0x04	RevisionID	R	1		
	0x05	ProcessDataIn	R	1		
	0x06	ProcessDataOut	R	1		
	0x07	VendorID 1 (MSB)	R	1	0x012F	
	0x08	VendorID 2 (MSB)	R	1		
	0x09	DeviceID 1 (octet 2, MSB)	R	1	0x0C	
	0x0A	DeviceID 1 (octet 1, MSB)		1	0x00	
	0x0B	DeviceID 1 (octet 0, LSB)		1	0x0C000D	0x0C000E
	0x0C	FunctionID 1 (MSB)	R	1		
	0x0D	FunctionID 2 (LSB)		1		
	0x0E	Reserved	R	1		
	0x0F	SystemCommand	W	1		
0x0002		SystemCommand	W	1		
0x0003		DataStorageIndex	R	Variable		
0x000C		Device Access Locks	R/W	2		
0x000D		ProfileCharacteristic	R	Variable		
0x000E		PDInputDescriptor	R	Variable		
0x000F		PDOutputDescriptor	R	Variable		
0x0010		VendorName	R	64	Murrelektronik GmbH	
0x0011		VendorText	R	64	www.murrelektronik.com	
0x0012		ProductName	R	64	MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL5 B0	MVP12-P6 DIO8 DIO8 8xM12A IOLA12 PL5 E0
0x0013		ProductID	R	64	59738	59838
0x0014		ProductText	R	64	Digital I/O Hub MVP12-P60, IO-Link Class A DIO8 DIO8 8xM12A Basic Firmware Edition: 2 Byte IN / 2 Byte OUT	Digital I/O Hub MVP12-P60, IO-Link Class A DIO8 DIO8 8xM12A Extended Firmware Edition: 4 Byte IN / 2 Byte OUT
0x0015		SerialNumber	R	16	Running serial number set during production	
0x0016		HardwareRevision	R	64	e.g. “01.00”	
0x0017		FirmwareRevision	R	64	e.g. “V.1.00.00”	
0x0018		ApplicationSpecificTag	R/W	16 ... 32	User-specific designation e.g. “System 3/Port 4”	
0x0019		FunctionTag	R/W	32		
0x001A		LocationTag	R/W	32		
Diagnostic						
0x0020		Error Count	R	2		

ISDU index	DPP index	Object name	Access	Length in bytes	Meaning/default value
0x0024		DeviceStatus	R	1	0: The device works properly 1: Maintenance necessary 2: Out of specification 3: Functional check 4: Error 5 ... 255: Reserved
0x0025		DetailedDeviceStatus	R	Variable	6 x (octet 1: EventQualifier, octet 2, 3: EventCode)
0x0028		ProcessDataInput	R	PD-Length	
0x0029		ProcessDataOutput	R	PD-Length	
0x0031 ... 0x003F		Reserved for profiles			

7.2.2 ISDU (Indexed Service Data Unit)

7.2.2.1 Art.-No. 59828, 59838

ISDU Index	Object name	Access	Length in bytes	Meaning	Default value
0x0040	Status: Power Supply Status UL1	R	1	Indicates the status of UL1 - 0x00 = OK - 0x01 = undervoltage - 0x02 = overvoltage	-
0x0041	Status: Power Supply Value UL1	R	4	Indicates the measured voltage value of UL1 in steps of 0.1 V. Update every 10 ms.	-
0x0042	Status: Power Supply Status UL2	R	2	Indicates the status of UL2 - 0x00 = OK - 0x01 = undervoltage - 0x02 = overvoltage - 0x03 = OFF/not connected	-
0x0043	Status: Power Supply Value UL2	R	8	Indicates the measured voltage value of UL2 in steps of 0.1 V. Update every 10 ms.	-
0x0044	Status: Internal Temperature Value °C	R	4	Indicates the internal device temperature from -25 °C to +70 °C in steps of 0.1 °C. Update every 10 ms.	-
0x0045	Status: Internal Temperature Value °F	R	4	Indicates the internal device temperature from -13 °F to +158 °F in steps of 0.1 °F. Update every 10 ms.	-
0x0050	Diagnosis: Short Circuit Detection DO	R	16	Allows the detection of a short circuit occurred on a specific channel. - Subindex 1: X0 Pin 4 - Subindex 2: X0 Pin 2 ... - Subindex 15: X7 Pin 4 - Subindex 16: X7 Pin 2	-
0x0060	Identification: Identification ID	R/W	2	Identification number for device identification. The value is shown in the input process data.	0x0000
0x0061	Identification: User-Defined Serial Number	R/W	16	User-defined serial number which ensures that the device is connected to the correct master.	0x0000
0x0062	Diagnosis: Disable General Diagnosis	R/W	2	Configurable diagnostics: 0 = active 1 = deactivated	0
0x0063	Current Limit	R/W	1		
0x0070	In-/outputs: Bit Mapping Layout	R/W	1	Bit mapping layout of the process data. 0 = port-based bit mapping 1 = pin-based bit mapping	0
0x0072	In-/Outputs: Channel Configuration	R/W	16	Setting of the I/O function per channel. - Subindex 1: X0 Pin 4 - Subindex 2: X0 Pin 2 … - Subindex 15: X7 Pin 4 - Subindex 16: X7 Pin 2 Setting per channel (subindex): 0 = auto-configuration/universal (DIO) 1 = input 2 = Output	0
0x0073	Output current limitation	R/W	1		
0x0080	Inputs: Inverting Input Logic	R/W	2	Inverting of the input logic per channel. - Bit 0: X0 Pin 4 - Bit 1: X0 Pin 2 … - Bit 14: X7 Pin 4 - Bit 15: X7 Pin 2 Setting per channel (subindex): 0 = normal, no inverting 1 = inverted	0

ISDU Index	Object name	Access	Length in bytes	Meaning	Default value
0x0081	Inputs: Signal Extension/ Impulse Stretching	R/W	16	Extension of the input pulses in steps of 10 ms. - Subindex 1: X0 Pin 4 - Subindex 2: X0 Pin 2 … - Subindex 15: X7 Pin 4 - Subindex 16: X7 Pin 2 Setting per channel (subindex): 0 = 0 ms/OFF 1 = 10 ms 2 = 20 ms 3 = 30 ms … 255 = Reserved	0
0x0082	Inputs: Input Debounce/Filter Time	R/W	16	Setting of the input filter time per channel. - Subindex 1: X0 Pin 4 - Subindex 2: X0 Pin 2 … - Subindex 15: X7 Pin 4 - Subindex 16: X7 Pin 2 Setting per channel (subindex): 0 = OFF (no filtering) 1 = 1 µs 2 = 10 µs 3 = 100 µs 4 = 1 ms 5 = 2 ms 6 = 3 ms 7 = 5 ms 8 = 10 ms	4
0x0090	Outputs: Short Circuit Recovery Behavior	R/W	2	Defines the behavior of each individual output (channel) after a short circuit/overload: - Bit 0: X0 Pin 4 - Bit 1: X0 Pin 2 … - Bit 14: X7 Pin 4 - Bit 15: X7 Pin 2 Setting per channel (subindex): 0 = automatic reset after 60 sec. 1 = manual reset via output process data For a manual reset, set the respective bit in the process data from 0 to 1.	0
0x0091	Outputs: Fail-Safe Behavior	R/W	16	Defines the behavior of each individual output (channel) in case of a loss of communication with the master. - Subindex 1: X0 Pin 4 - Subindex 2: X0 Pin 2 … - Subindex 15: X7 Pin 4 - Subindex 16: X7 Pin 2 Setting per channel (subindex): 0 = logical 0/OFF 1 = logical 1/ON 2 = maintain last state	0
0x43BD	Firmware Password	W	2		
0x43BE	Hardware Identification Key	R	8		
0x43BF	Bootmode Status	R	1		

7.3 Diagnostic

7.3.1 Vendor-specific IO-Link events

NOTE
In addition to the vendor-specific IO-Link events listed here, the standard events of the IO-Link specification also apply, version see chapter 1.5.3 "Specifications".

Event code	Event type	Description	Action
0x4000	Error	Temperature error	Overload
0x4210	Warning	Allowed device temperature exceeded	Localize the heat source
0x4220	Warning	Device temperature dropped below admissible value	Isolate the device
0xFF91	Notification	Upload of the Data storage (DS) by the Master required	Perform DS-Upload
0x5100	Error	General fault in supply voltage (UL1)	Check availability
0x5110	Warning	Overvoltage in the main power supply (UL1)	Check the permitted voltage range
0x5111	Warning	Undervoltage in the main power supply (UL1)	Check the permitted voltage range
0x1830	Warning	Secondary sensor supply voltage (UL2) is over-run	Check the permitted voltage range
0x1831	Warning	Secondary sensor supply voltage (UL2) is under-run	Check the current consumption of connected consumers
0x1832	Error	Secondary power supply fault (UL2) - below shutdown voltage	Check the current consumption of connected consumers
0x1833	Warning	Overvoltage in the secondary power supply (UL1)	Check the permitted voltage range
0x1834	Warning	Undervoltage in the secondary power supply (UL1)	Check the permitted voltage range
0x1835	Error	General fault in secondary power supply (UL1)	Check availability
0x1836	Warning	Overvoltage in the secondary power supply (UL2)	Check the permitted voltage range
0x1837	Warning	Undervoltage in the secondary power supply (UL2)	Check the permitted voltage range
0x1838	Error	General fault in secondary power supply (UL2)	Check availability
0x7710	Error	Short circuit	Check installation
0x8CA0	Error	DIO pin current overload/shortcircuit - Port 0 Pin 4	Check installation
0x8CA1	Error	DIO pin current overload/ shortcircuit - Port 0 Pin 2	Check installation
0x8CA2	Error	DIO pin current overload/ shortcircuit - Port 1 Pin 4	Check installation
0x8CA3	Error	DIO pin current overload/ shortcircuit - Port 1 Pin 2	Check installation
0x8CA4	Error	DIO pin current overload/shortcircuit - Port 2 Pin 4	Check installation
0x8CA5	Error	DIO pin current overload/ shortcircuit - Port 2 Pin 2	Check installation
0x8CA6	Error	DIO pin current overload/shortcircuit - Port 3 Pin 4	Check installation
0x8CA7	Error	DIO pin current overload/ shortcircuit - Port 3 Pin 2	Check installation
0x8CA8	Error	DIO pin current overload/shortcircuit - Port 4 Pin 4	Check installation
0x8CA9	Error	DIO pin current overload/ shortcircuit - Port 4 Pin 2	Check installation
0x8CAA	Error	DIO pin current overload/shortcircuit - Port 5 Pin 4	Check installation
0x8CAB	Error	DIO pin current overload/ shortcircuit - Port 5 Pin 2	Check installation
0x8CAC	Error	DIO pin current overload/shortcircuit - Port 6 Pin 4	Check installation
0x8CAD	Error	DIO pin current overload/ shortcircuit - Port 6 Pin 2	Check installation
0x8CAE	Error	DIO pin current overload/shortcircuit - Port 7 Pin 4	Check installation
0x8CAF	Error	DIO pin current overload/ shortcircuit - Port 7 Pin 2	Check installation
0x8CD0	Error	Power pin current overload/ shortcircuit - Port 0 Pin 1	Check installation
0x8CD1	Error	Power pin current overload/ shortcircuit - Port 1 Pin 1	Check installation
0x8CD2	Error	Power pin current overload/ shortcircuit - Port 2 Pin 1	Check installation
0x8CD3	Error	Power pin current overload/ shortcircuit - Port 3 Pin 1	Check installation
0x8CD4	Error	Power pin current overload/ shortcircuit - Port 4 Pin 1	Check installation

Event code	Event type	Description	Action
0x8CD5	Error	Power pin current overload/ shortcircuit - Port 5 Pin 1	Check installation
0x8CD6	Error	Power pin current overload/ shortcircuit - Port 6 Pin 1	Check installation
0x8CD7	Error	Power pin current overload/ shortcircuit - Port 7 Pin 1	Check installation

Tab. 7-5: IO-Link events

7.4 Process data

7.4.1 Port-Based Bitmapping

Byte 0 inputs X0 ... X3								
Bit	7	6	5	4	3	2	1	0
Contact	Pin2_X3	Pin4_X3	Pin2_X2	Pin4_X2	Pin2_X1	Pin4_X1	Pin2_X0	Pin4_X0

Byte 1 inputs X4 ... X7								
Bit	7	6	5	4	3	2	1	0
Contact	Pin2_X7	Pin4_X7	Pin2_X6	Pin4_X6	Pin2_X5	Pin4_X5	Pin2_X4	Pin4_X4

NOTE
Byte 2 and 3 are supported only by E0 devices.

Byte 2				
Bit	7	6	5	4
Diagnostic	Global status 0 = No diagnostic 1 = Error	Channel X 0 = channel 1 ... 15 = channel 16	Channel X 0 = channel 1 ... 15 = channel 16	Channel X 0 = channel 1 ... 15 = channel 16

Byte 2				
Bit	3	2	1	0
Diagnostic	Channel X 0 = channel 1 ... 15 = channel 16	Error or warning at the input/output (short circuit or overload)	Device temperature too high or too low	Error or warning at the supply (overvoltage or undervoltage)

Byte 3	
Bit	7 ... 0
Device identification	User-defined bits for e.g. tool change applications 0 = not used 1 ... 255 = ID value read from object

Process data
Digital outputs

Byte 0 outputs X0 ... X3

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Contact	Pin2_X3	Pin4_X3	Pin2_X2	Pin4_X2	Pin2_X1	Pin4_X1	Pin2_X0	Pin4_X0

Byte 1 outputs X4 ... X7

Bit	**7**	**6**	**5**	**4**	**3**	**2**	**1**	**0**
Contact	Pin2_X7	Pin4_X7	Pin2_X6	Pin4_X6	Pin2_X5	Pin4_X5	Pin2_X4	Pin4_X4

7.4.2 Pin-Based Bitmapping

Process data
Digital inputs

Byte 0 inputs X0 ... X7

Bit	7	6	5	4	3	2	1	0
Contact	Pin4_X7	Pin4_X6	Pin4_X5	Pin4_X4	Pin4_X3	Pin4_X2	Pin4_X1	Pin4_X0

Byte 1 inputs X0 ... X7

Bit	7	6	5	4	3	2	1	0
Contact	Pin2_X7	Pin2_X6	Pin2_X5	Pin2_X4	Pin2_X3	Pin2_X2	Pin2_X1	Pin2_X0

NOTE
Byte 2 and 3 are supported only by E0 devices.

Byte 2				
Bit	7	6	5	4
Diagnostic	Global status 0 = No diagnostic 1 = Error	Channel X 0 = channel 1 ... 15 = channel 16	Channel X 0 = channel 1 ... 15 = channel 16	Channel X 0 = channel 1 ... 15 = channel 16

Byte 2				
Bit	3	2	1	0
Diagnostic	Channel X 0 = channel 1 ... 15 = channel 16	Error or warning at the input/output (short circuit or overload)	Device temperature too high or too low	Error or warning at the supply (overvoltage or undervoltage)

Byte 3	
Bit	7 ... 0
Device identification	User-defined bits for e.g. tool change applications 0 = not used 1 ... 255 = ID value read from object

Process data
Digital outputs

Byte 0 outputs X0 ... X7

Bit	7	6	5	4	3	2	1	0
Contact	Pin4_X7	Pin4_X6	Pin4_X5	Pin4_X4	Pin4_X3	Pin4_X2	Pin4_X1	Pin4_X0

Byte 1 outputs X0 ... X7

Bit	7	6	5	4	3	2	1	0
Contact	Pin2_X7	Pin2_X6	Pin2_X5	Pin2_X4	Pin2_X3	Pin2_X2	Pin2_X1	Pin2_X0

8 Maintenance and cleaning

NOTE

➔ Replace defective or damaged devices.

Device cleaning:

➔ Use only oil-free compressed air or spirit

➔ Use only lint-free materials (e.g. leather cloth)

➔ Do not use contact spray

9 Appendix

9.1 Accessories

Description	Art.-No.
Screw Plug M12 Metal	996049
Plastic M12 screw plug, VE10	58627
Crimping cable lugs, ring form 10 mm² (M4) (narrow)	4000-71004-0000004
Grounding strap screw-down set M4	4000-71003-0101604

Designation	Art.-No.
6-part screwdriver set	7000-98001-0000000
M12 torque wrench set, AF 13	7000-99102-0000000

PRODUCTS AND ACCESSORIES
You will find a wide range of products in our catalog or in our Murrelektronik online shop: shop.murrelektronik.com

10 Legal notes

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