MURR ELEKTRONIK

stay connected

ENGLISH MANUAL

for devices of the MVP12 series
Art.-No. 59840 | 59841

This document is valid for the following products:

Product designation	Art.-No.
MVP12-P3 AI-MULT4 4xM12A IOLA12 E0	59840
MVP12-P3 AI-RTD4 4xM12A IOLA12 E0	59841

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NOTE
Translation of the original instructions

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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
5x designation label
1x grounding set (1 ring cable lug + 1 lock washer)

1.3 Applicable documents

Document	Art.-No.
Operating instructions	59840
Product data	59840
Product data	59841

The other applicable documents are included in the scope of delivery or can be downloaded
from: shop.murrelektronik.com

1.4 Environmentally friendly disposal

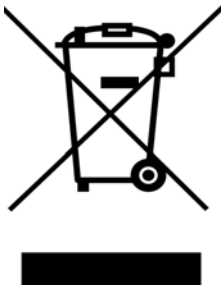
Comply with country-specific waste disposal regulations!

➔ 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

2 For your safety

2.1 General safety instructions

Qualified personnel

Only qualified and safety-trained personnel may assemble, commission and operate the device.

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. 59840

- IO-Link hub for voltage and current measurement
- 30 mm plastic housing
- 1 x M12 IO-Link class A
- 4 x M12 AI multi (U/I)

Art.-No. 59841

- IO-Link hub for resistance temperature devices (RTD)
- 30 mm plastic housing
- 1 x M12 IO-Link class A
- 4 x M12 AI RTD

3.1 Product Designation Code

The product designation provides information on the device function.

Art.-No. 59840

MVP12-P3 AI-MULT4 4xM12A IOLA12 E0	
MVP12-P3	Product family + module size
AI-MULT	■ A = analog ■ I = input ■ MULT = multifunctional
4xM12A	Number, size, and coding of the slots
IOLA	■ IOL = IO-Link ■ A = class A
E0	Extended Firmware Features

Art.-No. 59841

MVP12-P3 AI-RTD4 4xM12A IOLA12 E0	
MVP12-P3	Product family + module size
AI-RTD	■ A = analog ■ I = input ■ RTD = Resistance Temperature Device
4xM12A	Number, size, and coding of the slots
IOLA	■ IOL = IO-Link ■ A = class A
E0	Extended Firmware Features

3.2 Device structure

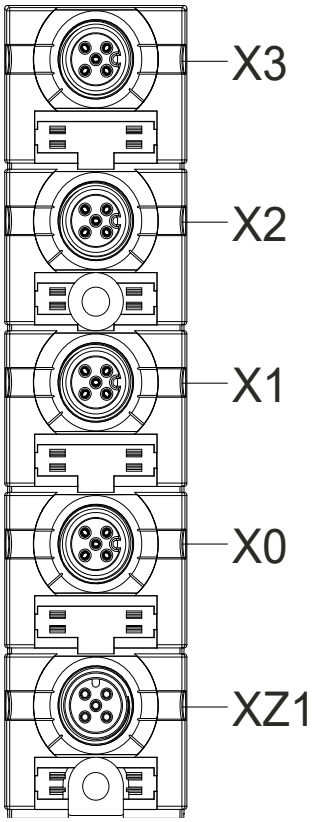


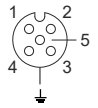
Fig. 3-1: Device structure and port designations

Art.-No.	Port designation	Explanation
59840	X0 ... X3	Analog U/I inputs
	XZ1	Device supply, IO-Link class A
59841	X0 ... X3	Analog inputs RTD
	XZ1	Device supply, IO-Link class A

3.3 PIN assignment

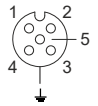
Art.-No. 59840

IO-Link	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.

AI (U/I)	X0 ... X3 (M12 female connectors)	
	Pin 1	24 V ⎓ US
	Pin 2	AI
	Pin 3	0 V US
	Pin 4	n.c.
	Pin 5	n.c.

Art.-No. 59841

IO-Link	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.

AI (RTD)	X0 ... X3 (M12 female connectors)	
	Pin 1	CH+
	Pin 2	CH S+
	Pin 3	CH-
	Pin 4	CH S-
	Pin 5	n.c.

4 Technical Data

4.1 Art.-No. 59840

4.1.1 Electrical data

Device supply		
Operating voltage US		24 V ⎓
Operating voltage range US		18 ... 30 V ⎓
Power consumption when idling		≤50 mA
Galvanic isolation		No
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		≥1.6 ms
VendorID		0x012F
DeviceID		0x0C0015
Process data		10 bytes (inputs), 5 bytes (outputs)
Sensor power supply		
Connection/female connector		M12
Operating voltage		24 V ⎓
Power supply	Per port	≤0.2 A
Input (AI)		
Port		M12 female connector A-coded
Sensor cable		<30 m
Input resistance	Voltage ranges Current ranges	50 kOhm 249 Ohm
Supported voltage and current rates (MULT)		0 ... 10 V, -10 ... 10 V, 0 ... 5 V, -5 ... 5 V, 0 ... 20 mA, 4 ... 20 mA
Conversion principle	ADC	Sigma-Delta
Resolution	ADC	24 bits
Filter	Interference frequency filter	Off, 50/60 Hz
Conversion time	Interference frequency filter Off Interference frequency filter Off Interference frequency filter 50/60 Hz (-95 dB)	2 ms 12 ms 240 ms

4.1.2 Measuring ranges

Rated measuring range 0 … 10 V		
Override range		-1.76 … 11.76 V
Resolution		361.69 µV
Measurement accuracy	At 25 °C (full scale)	<0.3 %
Drift		30 ppm/K

Rated measuring range -10 … 10 V		
Override range		-11.76 … 11.76 V
Resolution		361.69 µV
Measurement accuracy	At 25 °C (full scale)	<0.3 %
Drift		30 ppm/K

Rated measuring range 0 … 5 V		
Override range		-0.88 … 5.88 V
Resolution		180.85 µV
Measurement accuracy	At 25 °C (full scale)	<0.3 %
Drift		30 ppm/K

Rated measuring range -5 … 5 V		
Override range		-5.88 … 5.88 V
Resolution		180.85 µV
Measurement accuracy	At 25 °C (full scale)	<0.3 %
Drift		30 ppm/K

Rated measuring range 0 … 20 mA		
Override range		0 … 23.51 mA
Resolution		723.38 nA
Measurement accuracy	At 25 °C (full scale)	<0.4 %
Drift		60 ppm/K

Rated measuring range 4 … 20 mA		
Override range		1.19 … 22.81 mA
Resolution		578.70 nA
Measurement accuracy	At 25 °C (full scale)	<0.4 %
Drift		60 ppm/K

4.1.3 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 61000-6-3 Emission	QP: 42-35 dBµV/m@ 30 ... 230 MHz; QP: 42 dBµV/m@ 230 MHz ... 1 GHz; PK: 70 dB, AV: 50 dB@ 1 ... 2 GHz

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 IO-Link (5 kHz) ±1 kV AIN (5 kHz, 100 kHz)
Conducted interferences, high-frequency fields	EN 61000-4-6, asymmetric	10 V

4.1.4 Protection

Device protection		
Overvoltage protection		Yes
Overload protection of module supply	To be ensured through load circuit monitoring	Yes
Reverse polarity protection, module supply		Yes
Short-circuit protection, sensor supply		Electronic
Protective circuit for input	Internal	Suppressor diode

4.1.5 Mechanical data

Material data		
Housing material		Valox 553 black
Flame resistance	IEC 60695-2-1	

Assembly data		
Weight	Net	150 g
Dimensions	L x W x H	126 x 29.78 x 34.3 mm

4.1.6 Product reliability

Product reliability		
MTTF	SN 29500 (at 40 °C and rated data)	216 years

4.1.7 Conformity, Approvals

Conformity, Approvals		
Product standard	EN 61131-2 Programmable logic controllers, Part 2	
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		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. 59841

4.2.1 Electrical data

Device supply		
Operating voltage US		24 V ⎓
Operating voltage range US		18 ... 30 V ⎓
Power consumption when idling		≤50 mA
Galvanic isolation		No

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		≥1.6 ms
VendorID		0x012F
DeviceID		0x0C0016
Process data		10 bytes (inputs), 5 bytes (outputs)

Input (AI)		
Connection		M12 female connector A-coded
Connection technology		2-, 3- and 4-wire
Sensor cable		<30 m, shielded
Line resistance		<50 Ω/line
Supported sensors (RTD)		PT100, PT100 climate, PT200, PT500, PT1000, NI100, NI120, NI200, NI500, NI1000
Resistance measurement		0 Ω … 3 kΩ
Sensor current		approx. 250 µA
Conversion principle	ADC	Sigma-Delta
Resolution	ADC	24 bits
Conversion time	Interference frequency filter Off	12 ms
	Interference frequency filter 50 Hz (-33 dB)	50 ms
	Interference frequency filter 50/60 Hz (-95 dB)	120 ms

4.2.2 Measuring ranges

PT100, PT200, PT500, PT1000		
Rated measuring range		-200 °C ... +850 °C
Override range		-220 °C... +1000 °C
Resolution		0.1 °C
Measurement accuracy	At 25 °C (full scale)	<0.15 %
Drift		40 ppm/K

PT100 climate		
Rated measuring range		-120 °C ... +130 °C
Override range		-145 °C... +155 °C
Resolution		0.01 °C
Measurement accuracy	At 25 °C (full scale)	<0.2 %
Drift		60 ppm/K

NI100, NI120, NI200, NI500, NI1000		
Rated measuring range		-60 °C ... +250 °C
Override range		-100 °C... +300 °C
Resolution		0.1 °C
Measurement accuracy	At 25 °C (full scale)	<0.2 %
Drift		20 ppm/K

Ohm 0 Ω ... 3000 Ω		
Rated measuring range		0 Ω ... 3000 Ω
Override range		0 Ω ... 3527,67 Ω
Resolution		0.1085 Ω
Measurement accuracy	At 25 °C (full scale)	<0.2 %
Drift		20 ppm/K

4.2.3 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 61000-6-3 Emission	QP: 42 ... 35 dBµV/m @ 30 ... 230 MHz; QP: 42 dBµV/m@ 230 MHz ... 1 GHz; PK: 70 dB, AV: 50 dB @ 1 ... 3 GHz; PK: 74 dB, AV: 54 dB @ 3 ... 6 GHz

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 IO-Link (5 kHz) ±1 kV AIN (5 kHz, 100 kHz)
Conducted interferences, high-frequency fields	EN 61000-4-6, asymmetric	10 V

4.2.4 Protection

Device protection		
Overvoltage protection		Yes
Overload protection of module supply	To be ensured through load circuit monitoring	Yes
Reverse polarity protection, module supply		Yes

4.2.5 Mechanical data

Material data		
Housing material		Valox 553 black
Flame resistance	IEC 60695-2-1	

Assembly data		
Weight	Net	150 g
Dimensions	L x W x H	126 x 29.78 x 34.3 mm

4.2.6 Product reliability

Product reliability		
MTTF	SN 29500 (at 40 °C and rated data)	216 years

4.2.7 Conformity, Approvals

Conformity, Approvals		
Product standard	EN 61131-2 Programmable logic controllers, Part 2	
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		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:

- Even mounting surface to avoid mechanical tension.
- Provide proper grounding.
- Suitable installation site in terms of vibration and shock load, temperature and humidity (see chap. 4 "Technical Data").
- Protected to avoid tearing off the connecting cables by personnel or device.

➔ Provide the following conditions for mounting the device:

- Installation site in the immediate vicinity of the sensor / actuator
- Even mounting surface to avoid mechanical tension
- Grounded mounting surface for connection of the ring cable lug
- Short wiring routes to all components
- Enough space for easy replacement of devices and for the connection of the connectors
- Suitable installation site in terms of vibration and shock load, temperature and humidity (see section Technical data)
- Protection to avoid tearing off the connecting cables by personnel or device
- Diagnostic LEDs of the device are visible during operation

5.2 Dimensions

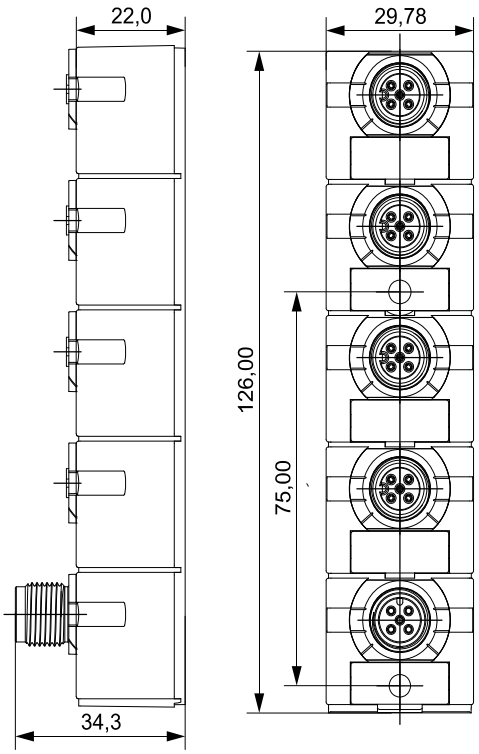


Fig. 5-1: Dimensions in mm

5.3 Mounting distance

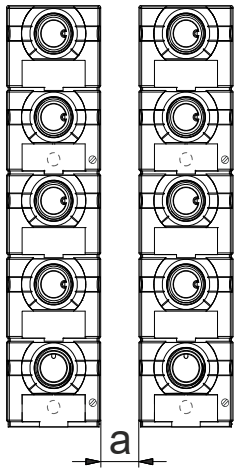


Fig. 5-2: Distance between the devices

a | Male connector straight: 5 mm
Male connector angled: 50 mm

NOTE

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

5.4 Functional ground

The use of the ring cable lug is necessary for EMC compliance.

The shield connection of the input and output female connectors is made via the ring cable lug.

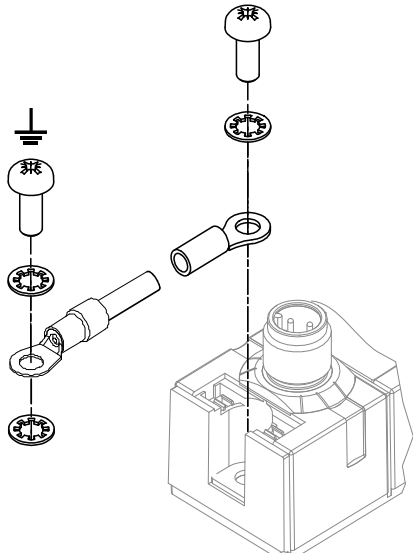


Fig. 5-3: Ring cable lug fastening

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.

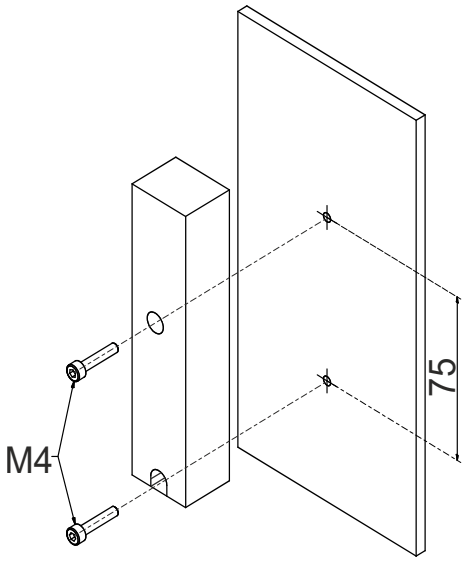


Fig. 5-4: Fastening, dimensions in mm

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

Mounting

1 | Align housing.
2 | Fasten the ring cable lug with a conductive screw (see chap. 5.4 "Functional ground").
3 | Slightly tighten an M4 bolt.
4 | Slightly tighten the second M4 bolt.
5 | Carefully tighten both M4 bolts according to tightening torque.

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.

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.

The degree of protection IP65/67/68 is only guaranteed if all connections are sealed with plug connectors, screw plugs, or sealing caps.

➔ Seal unused male and female connectors.

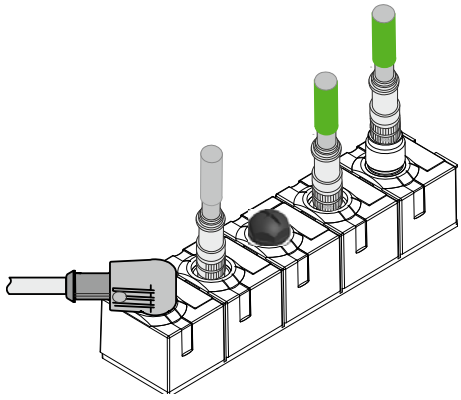


Fig. 6-1: Connecting cables

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:

- LED indication for IO-Link and US sensor supply
- LED indication for inputs

Indication takes place by means of static lighting or flashing of the LEDs.

7.1.1 LED indication US and IO-Link

The device has a combined LED for the IO-Link status and the status of the US sensor 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 indication	LED state	Description
Green	Permanently on	IO-Link not in OPERATE status, no cyclic data communication; sensor power supply OK
Green	Flashing **1 Hz**	IO-Link in OPERATE status, cyclic data communication; sensor power supply OK
Red	Flashing **1 Hz**	Error/warning
Off		Device off, no IO-Link connection

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

Firmware update

LED indication	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 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

LED indication analog inputs

LED indication	LED state	Description
Green	Permanently on	Channel on
Red	Flashing **1 Hz**	Error at channel
Off		Channel deactivated, device off or firmware update is being performed

Tab. 7-3: LED indication for analog inputs

7.2 IO-Link object directory

7.2.1 DPP (Direct Parameter Page)

ISDU index	Object name	Access	Length in bytes	Meaning/default value	
Identification					
				59840	59841
0x0000	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	0x0C0015	0x0C0016
0x000D	ProfileCharacteristic	R	6	0x00\0x31, \0x40\0x00	0x00\0x31, \0x40\0x00
0x000E	PDInputDescriptor	R	20	\\x03\x10\x00 \x03\x10\x10 \x03\x10\x20 \x03\x10\x30 \x01\x08\x40 \x02\x08\x48	
0x000F	PDOutputDescriptor	R	16	\x01\x08\x00 \x01\x08\x08 \x01\x08\x10 \x01\x08\x18 \x03\x08\x20	
0x0010	VendorName	R	64	Murrelektronik GmbH	
0x0011	VendorText	R	64	www.murrelektronik.com	
0x0012	ProductName	R	64	MVP12-P3 AI-MULT4 4xM12A IOLA12 E0	MVP12-P3 AI-RTD4 4xM12A IOLA12 E0
0x0013	ProductID	R	64	59840	59841
0x0014	ProductText	R	64	Analog IN Hub MVP12-P3, IO-Link class A AI4 MULTI (U/I) 8xM12A Extended Firmware Edition: 10 byte IN/5 byte OUT	Analog IN Hub MVP12-P3, IO-Link class A AI4 RTD 8xM12A Extended Firmware Edition: 10 byte IN/5 byte OUT
0x0015	SerialNumber	R	16	Running serial number set during production	
0x0016	HardwareRevision	R	10	e.g. “01.00”	
0x0017	FirmwareRevision	R	09	e.g. “V.1.00.00”	
0x0018	ApplicationSpecificTag	R	3	User-specific designation e.g. “System 3/Port 4”	
0x0019	FunctionTag	R	32		
0x001A	LocationTag	R	32		

ISDU Index	ISDU SubIndex	Object name	Access	Length in bytes	Meaning/default value
0x0025	1	DetailedDeviceStatus	R	3	Octet 1: EventQualifier, Octet2, 3: EventCode
	..	..	R	3	Octet 1: EventQualifier, Octet2, 3: EventCode
	10	DetailedDeviceStatus	R	3	Octet 1: EventQualifier, Octet2, 3: EventCode
	Gesamtlänge in Byte			30	

NOTE
Refer to IO-Link specification for structural specification, refer to 7.3.1 "Vendor-specific IO-Link events".

7.2.2 ISDU (Indexed Service Data Unit)

7.2.2.1 Art.-No. 59840

Diagnostic					
ISDU Index	**ISDU Subindex**	**Object name**	**Access**	**Length in bytes**	**Meaning**
0x0024		DeviceStatus	R	1	0: Device is operating properly 1: Maintenance Required 2: Out of Specification 3: Functional Check 4: Failure 5 ... 255 = reserved

ISDU index	Object name	Access	Length in bytes	Meaning	Default value
0x0040	Status: Power Supply Status US	R	1	Indicates the status of US - 0x00 = OK - 0x01 = undervoltage - 0x02 = overvoltage	0
0x0041	Status: Power Supply Value US	R	02	Indicates the measured voltage value of US in steps of 0.1 V. Update every 10 ms.	0
0x0044	Status: Internal Temperature Value °C	R	02	Indicates the internal device temperature from -25 °C to +70 °C in steps of 0.1 °C. Update every 10 ms.	0
0x0045	Status: Internal Temperature Value °F	R	02	Indicates the internal device temperature from -13 °F to +158 °F in steps of 0.1 °F. Update every 10 ms.	0
0x0060	Identification: Identification ID	R/W	01	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
0x79	Data Format	R/W	1	Motorola = 0x00 Intel = 0x01	0

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0062	1	IO-Link Event Code transmission to master	R/W	1	Configurable diagnostics: 0 = active 1 = deactivated	0x0000
	2	US - Diagnostic undervoltage	R/W	1		
	3	US - Diagnostic overvoltage	R/W	1		
	4	US - LED status	R/W	1		
	5	Reserved	R/W	1		
	6	Reserved	R/W	1		
	7	Reserved	R/W	1		
	8	Reserved	R/W	1		
	9	TEMP - Diagnostic low temperature	R/W	1		
	10	TEMP - Diagnostic high temperature	R/W	1		
	11	TEMP - LED Status	R/W	1		
	12	Lower warning threshold	R/W	1		
	13	Upper warning threshold	R/W	1		
	14	Sensor wire break	R/W	1		
	15	Nominal measuring range underflow	R/W	1		
	16	Nominal measuring range overflow	R/W	1		
	17	Sensor supply short circuit	R/W	1		
	Total length in bytes			17		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0077	1	IO-Link Event Code transmission to master	R/W	1	Configurable analog mode: 0x00 = deactivated 0x01 = 0 ... 10 V 0x02 = -10 ... 10 V 0x03 = 0 ... 5 V 0x04 = -5 ... 5 V 0x05 = 0 ...20 mA 0x06 = 4 ... 20 mA	0x01
	2	US - Diagnostic undervoltage	R/W	1		
	3	US - Diagnostic overvoltage	R/W	1		
	4	US - LED status	R/W	1		
	Total length in bytes			4		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0087	0	Conversion time port X0 ... X3	R/W	1	Configurable values: 0x00 = 2 ms 0x01 = 12 ms 0x02 = 240 ms	0x02
	Total length in bytes			1		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0088	1	Inputs: Upper warning threshold port X0	R/W	2	Configurable values: -32 768 ... 32 767	-32 768
	2	Inputs: Upper warning threshold port X1	R/W	2		
	3	Inputs: Upper warning threshold port X2	R/W	2		
	4	Inputs: Upper warning threshold port X3	R/W	2		
	Total length in bytes			8		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0089	1	Inputs: Upper warning threshold port X0	R/W	2	Configurable values: -32 768 ... 32 767	32 767
	2	Inputs: Upper warning threshold port X1	R/W	2		
	3	Inputs: Upper warning threshold port X2	R/W	2		
	4	Inputs: Upper warning threshold port X3	R/W	2		
	Total length in bytes			8		

7.2.2.2 Art.-No. 59841

ISDU index	Object name	Access	Length in bytes	Meaning	Default value
0x0040	Status: Power supply status US	R	1	Indicates the status of US - 0x00 = OK - 0x01 = undervoltage - 0x02 = overvoltage	0
0x0041	Status: Power supply value US	R	2	Indicates the measured voltage value of US in steps of 0.1 V. Update every 10 ms.	0
0x0044	Status: Internal temperature value °C	R	2	Indicates the internal device temperature from -25 °C to +70 °C in steps of 0.1 °C. Update every 10 ms.	0
0x0045	Status: Internal temperature value °F	R	2	Indicates the internal device temperature from -13 °F to +158 °F in steps of 0.1 °F. Update every 10 ms.	0
0x0060	Identification: Identification ID	R/W	1	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
0x79	Data Format	R/W	1	Motorola = 0x00 Intel = 0x01	0
0x7A	Temperature Format	R/W	1	Celsius = 0x00 Fahrenheit = 0x01	0

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0062	1	IO-Link Event Code transmission to master	R/W	1	Configurable diagnostics: 0 = active 1 = deactivated	0
	2	US - Diagnostic undervoltage	R/W	1		
	3	US - Diagnostic overvoltage	R/W	1		
	4	US - LED status	R/W	1		
	5	Reserved	R/W	1		
	6	Reserved	R/W	1		
	7	Reserved	R/W	1		
	8	Reserved	R/W	1		
	9	TEMP - Diagnostic low temperature	R/W	1		
	10	TEMP - Diagnostic high temperature	R/W	1		
	11	TEMP - LED Status	R/W	1		
	12	Lower warning threshold	R/W	1		
	13	Upper warning threshold	R/W	1		
	14	Sensor wire break	R/W	1		
	15	Nominal measuring range underflow	R/W	1		
	16	Nominal measuring range overflow	R/W	1		
	Total length in bytes			16		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0077	1	IO-Link Event Code transmission to master	R/W	1	Configurable values: 0x00 = deactivat-ed0x01 = Pt100Cli-ma0x02 = Pt1000x03 = Pt2000x04 = Pt5000x05 = Pt10000x06 = NI1000x07 = NI1200x08 = NI2000x09 = NI5000x0A = NI10000x0B = RES3K	0x01
	2	US - Diagnostic undervoltage	R/W	1		
	3	US - Diagnostic overvoltage	R/W	1		
	4	US - LED status	R/W	1		
	Total length in bytes			4		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0078	1	Wire Mode X0	R/W	1	Configurable values: 0x00 = 2-Leiter0x01 = 3-Leiter0x02 = 4-Leiter	0x02
	2	Wire Mode X1	R/W	1		
	3	Wire Mode X2	R/W	1		
	4	Wire Mode X3	R/W	1		
	Total length in bytes			4		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0087	0	Conversion time port X0 ... X3	R/W	1	Configurable values: 0x00 = 2 ms 0x01 = 12 ms 0x02 = 240 ms	0x02
	Total length in bytes			1		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0088	1	Inputs: Upper warning threshold port X0	R/W	2	Configurable values: -32 768 ... 32 767	-32 768
	2	Inputs: Upper warning threshold port X1	R/W	2		
	3	Inputs: Upper warning threshold port X2	R/W	2		
	4	Inputs: Upper warning threshold port X3	R/W	2		
	Total length in bytes			8		

ISDU Index	ISDU Subindex	Object name	Access	Length in bytes	Meaning	Default value
0x0089	1	Inputs: Upper warning threshold port X0	R/W	2	Configurable values: -32 768 ... 32 767	32 767
	2	Inputs: Upper warning threshold port X1	R/W	2		
	3	Inputs: Upper warning threshold port X2	R/W	2		
	4	Inputs: Upper warning threshold port X3	R/W	2		
	Total length in bytes			8		

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".

Art.-No. 59840

Event code	Event type	Description	Action
0x0000	Notification	No malfunction	-
0x1000	Error	General malfunction	Unknown error
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
0x5000	Error	Hardware error in the device	Replace the device
0x5110	Warning	Primary sensor supply voltage (US) is over-run	Check the permitted voltage range
0x5111	Warning	Primary sensor supply voltage (US) is under-run	Check the permitted voltage range
0x6000	Error	Device software error	Check the firmware edition status
0x6320	Error	Parameter error	Check data sheet and values
0x6321	Error	Parameter missing	Check data sheet
0x7700	Error	Cable break of a subordinate device	Check installation
0x7701	Error	Cable break of the subordinate device 1	Check installation
0x7702	Error	Cable break of the subordinate device 2	Check installation
0x7703	Error	Cable break of the subordinate device 3	Check installation
0x7704	Error	Cable break of the subordinate device 4	Check installation
0x7710	Error	Short circuit	Check installation
0x8C00	Error	Technology-specific error in the application	Reset device
0x8C10	Warning	Process value above the valid range	Process value uncertain
0x8C20	Error	Measurement range exceeded	Check application
0x8C30	Warning	Process value below the valid range	Process value uncertain
0x8CD0	Error	Power pin current overload/short circuit - Port 0 Pin 1	Check installation
0x8CD1	Error	Power pin current overload/short circuit - Port 1 Pin 1	Check installation
0x8CD2	Error	Power pin current overload/short circuit - Port 2 Pin 1	Check installation
0x8CD3	Error	Power pin current overload/short circuit - Port 3 Pin 1	Check installation
0x8CE0	Warning	Analog input threshold overrun - Port 0	Check application
0x8CE1	Warning	Analog input threshold overrun - Port 1	Check application
0x8CE2	Warning	Analog input threshold overrun - Port 2	Check application
0x8CE3	Warning	Analog input threshold overrun - Port 3	Check application
0x8CF0	Warning	Analog input threshold underrun - Port 0	Check application
0x8CF1	Warning	Analog input threshold underrun - Port 1	Check application
0x8CF2	Warning	Analog input threshold underrun - Port 2	Check application
0x8CF3	Warning	Analog input threshold underrun - Port 3	Check application
0x8D30	Warning	Lower user-defined warning threshold underrun - Port 0	Check application
0x8D31	Warning	Lower user-defined warning threshold underrun - Port 1	Check application
0x8D32	Warning	Lower user-defined warning threshold underrun - Port 2	Check application
0x8D33	Warning	Lower user-defined warning threshold underrun - Port 3	Check application
0x8D40	Warning	Upper user-defined warning threshold overrun - Port 0	Check application

Event code	Event type	Description	Action
0x8D41	Warning	Upper user-defined warning threshold overrun - Port 1	Check application
0x8D42	Warning	Upper user-defined warning threshold overrun - Port 2	Check application
0x8D43	Warning	Upper user-defined warning threshold overrun - Port 3	Check application

Tab. 7-4: IO-Link-Events 59840

Art.-No. 59841

Event code	Event type	Description	Action
0x0000	Notification	No malfunction	-
0x1000	Error	General malfunction	Unknown error
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
0x5000	Error	Hardware error in the device	Replace the device
0x5110	Warning	Primary sensor supply voltage (US) is over-run	Check permitted voltage range
0x5111	Warning	Primary sensor supply voltage (US) is under-run	Check permitted voltage range
0x6000	Error	Device software error	Check firmware edition status
0x6320	Error	Parameter error	Check data sheet and values
0x6321	Error	Parameter missing	Check data sheet
0x7700	Error	Cable break of a subordinate device	Check installation
0x7701	Error	Cable break of the subordinate device 1	Check installation
0x7702	Error	Cable break of the subordinate device 2	Check installation
0x7703	Error	Cable break of the subordinate device 3	Check installation
0x7704	Error	Cable break of the subordinate device 4	Check installation
0x7710	Error	Short circuit	Check installation
0x8C00	Error	Technology-specific error in the application	Reset device
0x8C10	Warning	Process value above the valid range	Process value uncertain
0x8C20	Error	Measurement range exceeded	Check application
0x8CE0	Warning	Analog input overrun - Port 0	Check application
0x8CE1	Warning	Analog input overrun - Port 1	Check application
0x8CE2	Warning	Analog input overrun - Port 2	Check application
0x8CE3	Warning	Analog input overrun - Port 3	Check application
0x8CF0	Warning	Analog input underrun - Port 0	Check application
0x8CF1	Warning	Analog input underrun - Port 1	Check application
0x8CF2	Warning	Analog input underrun - Port 2	Check application
0x8CF3	Warning	Analog input underrun - Port 3	Check application
0x8D30	Warning	Lower user-defined warning threshold underrun - Port 0	Check application
0x8D31	Warning	Lower user-defined warning threshold underrun - Port 1	Check application
0x8D32	Warning	Lower user-defined warning threshold underrun - Port 2	Check application
0x8D33	Warning	Lower user-defined warning threshold underrun - Port 3	Check application
0x8D40	Warning	Upper user-defined warning threshold overrun - Port 0	Check application
0x8D41	Warning	Upper user-defined warning threshold overrun - Port 1	Check application
0x8D42	Warning	Upper user-defined warning threshold overrun - Port 2	Check application
0x8D43	Warning	Upper user-defined warning threshold overrun - Port 3	Check application

Tab. 7-5: IO-Link-Events 59841

7.4 Process data

7.4.1 Input data

Byte 0, 1	
Measured value	X0

Byte 2, 3	
Measured value	X1

Byte 4, 5	
Measured value	X2

Byte 6, 7	
Measured value	X3

Byte 8				
Bit	7	6	5	4
Diagnostic	Global status	Diagnose Parameter Write	Channel MSB	Channel Middle Bit

Byte 8				
Bit	3	2	1	0
Diagnostic	Channel LSB	Error or warning on input	Device temperature too high or too low	L+ (US) overvoltage or undervoltage

Byte 9	
Bit	7 ... 0
Device identification	User defined bits, e. g. for tool change applications 0 = not used 1 ... 255 = ID value is read out from object

7.4.1.1 Measured values for Art.-No. 59840

Analog input U 0 ...10 V

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	Hex.	0 ... 10 V			
32511	7EFF	>11.7589 V	Overflow	Yes	Error
28512	6F60	<10.3087 V	Override range	Yes	Warning
27649	6C01	10 V +361.7 µV		None	None
27648	6C00	10.0000 V	Nominal range		
20736	5100	7.50 V			
13824	3600	5.00 V			
1	0001	361.7 µV			
0	0000	0 uV			
-1	FFFF	-361.7 µV	Underride range		
-345	FEA7	>-0.1243 V		Yes	Warning
-4864	ED00	<-1.7593 V	Underflow	Yes	Error

Analog input U -10 ... +10 V

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	Hex.	-10 ... 10 V			
32511	7EFF	>11.7589 V	Overflow	Yes	Error
28512	6F60	<10.3087 V	Override range	Yes	Warning
27649	6C01	10V +361.7 µV		None	None
27648	6C00	10 V	Nominal range		
20736	5100	7.50 V			
13824	3600	5.00 V			
1	0001	361.7 µV			
0	0000	0 uV			
-1	FFFF	-361.7 µV			
-13824	CA00	-5.00 V			
-20736	AF00	-7.50 V			
-27648	9400	-10.0000 V			
-27649	93FF	-10.0000 V -361.7 µV	Underride range		
-28512	90A0	>-10.3087 V		Yes	Warning
-32512	8100	<-11.7593 V	Underflow	Yes	Error

Analog input U 0 ... 5 V

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	Hex.	0 ... 5 V			
32511	7EFF	>5.8795 V	Overflow	Yes	Error
28512	6F60	<5.1543 V	Override range	Yes	Warning
27649	6C01	5 V +180.85 µV		None	None
27648	6C00	5 V	Nominal range		
20736	5100	3.75 V			
13824	3600	2.5 V			
1	0001	180.85 µV			
0	0000	0 uV			
-1	FFFF	-180.85 µV	Override range		
-345	FEA7	>-0.0621 V		Yes	Warning
-4864	ED00	<-0.8796 V	Underflow	Yes	Error

Analog input U -5 ... 5 V

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	**Hex.**	**-5 ... 5 V**			
32511	7EFF	>5.8795 V	Overflow	Yes	Error
28512	6F60	<5.1543 V	Override range	Yes	Warning
27649	6C01	5V +180.85 µV		None	None
27648	6C00	5.0000 V	Nominal range		
20736	5100	3.75 V			
13824	3600	2.5 V			
1	0001	180.9 µV			
0	0000	0 uV			
-1	FFFF	-180.9 µV			
-13824	CA00	-2.5 V			
-20736	AF00	-3.75 V			
-27648	9400	-5.0000 V			
-27649	93FF	-5.0000 V -180.9 µV	Underride range		
-28512	90A0	>-5.1543 V		Yes	Warning
-32512	8100	<-5.8795 V	Underflow	Yes	Error

Analog Input I 0 ...20 mA

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	**Hex.**	**0 ... 20 mA**			
32511	7EFF	>23.5178 mA	Overflow	Yes	Error
28512	6F60	<20.6190 mA	Override range	Yes	Warning
27649	6C01	20.0000 mA +723 nA		None	None
27648	6C00	20.0000 mA	Nominal value		
20736	5100	15.0000 mA			
13824	3600	10.0000 mA			
1	0001	723 nA			
0	0000	0 mA			

NOTICE
For the analog input, there is no underflow range or underflow at 0 ... 20 mA.

Analog input I 4 ... 20 mA

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	**Hex.**	**4 ... 20 mA**			
32511	7EFF	>22.8142 mA	Overflow	Yes	Error

Digits in		Measured value	Area	Diagnosis	Diagnosis type
Dez.	**Hex.**	**4 ... 20 mA**			
28512	6F60	<20.6190 mA	Override range	Yes	Warning
27649	6C01	0.0000 mA +578.7 nA		None	None
27648	6C00	20.0000 mA	Nominal range		
20736	5100	16.0000 mA			
13824	3600	12.0000 mA			
1	0001	4 mA +578.7 nA			
0	0000	4 mA			
-1	FFFF	4 mA -578.7 nA	Underride range		
-345	FEA7	<3.8 mA		Yes	Warning
-4864	ED00	>1.185 mA	Underflow	Yes	Error

7.4.1.2 Measured values for Art.-No. 59841

Temperature **PT100, PT200, PT500, PT1000**

Values		Measured value	Area
Dec.	**Hex.**	**Temperature in °C**	
32767	7FFF	>1000.0	Overflow
10000	2710	1000.0	Override range
8501	2135	850.1	
8500	2134	850.0	Nominal range
1	0001	0.1	
0	0000	0.0	
-2000	F830	-200.0	
-2001	F82F	-200.1	Underride range
-2200	F768	-220.0	
-32768	8000	<220.0	Underflow

Temperature **PT100 climate**

Values		Measured value	Area
Dec.	**Hex.**	**Temperature in °C**	
32767	7FFF	>155.00	Overflow
15500	3C8C	155.00	Override range
13001	32C9	130.01	
13000	32C8	130.00	Nominal range
1	0001	0.01	
0	0000	0.00	
-12000	D120	-120.00	
-12001	D11F	-120.01	Underride range
-14500	C75C	-145.00	
-32768	8000	<-145.00	Underflow

Temperature **NI100, NI120, NI200, NI500, NI1000**

Values		Measured value	Area
Dec.	**Hex.**	**Temperature in °C**	
32767	7FFF	>300,0	Overflow
3000	0BB8	300,0	Override range
2501	09C5	250,1	
2500	09C4	250,0	Nominal range
1	0001	0,1	
0	0000	0,0	
-600	FDA8	-60,0	
-601	FDA7	-60,1	Underride range
-1000	FC18	-100,0	
-32768	8000	<-100,0	Underflow

Resistor

Values		Measured value	Area
Dec.	**Hex.**	**R in Ohm**	
32767	7FFF	>3527.7	Overflow
32511	7EFF	3527.7	Override range
27649	6C01	3000.1	
27648	6C00	3000	Nominal range
1	0001	0.1085	
0	0000	0.0	

7.4.2 Output data

7.4.2.1 Art.-No. 59840

Alternatively to chap. 7.2 "IO-Link object directory", sensor type, connection type and conversion time can be parameterized via the output process data.

Byte 0			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Conversion time for X0, X1, X2 and X3	Reserved	Sensor type X0
Values	0b00 – 2 ms 0b01 – 12 ms 0b10 – 240 ms		0b0000 – deactivated 0b0001 – 0 … 10 V 0b0010 – -10 … 10 V 0b0011 – 0 … 5 V 0b0100 – -5 … 5 V 0b0101 – 0 … 20 mA 0b0110 – 4 … 20 mA

Byte 1			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Reserved	Reserved	Sensor type X1
Values			0b0000 – deactivated 0b0001 – 0 … 10 V 0b0010 – -10 … 10 V 0b0011 – 0 … 5 V 0b0100 – -5 … 5 V 0b0101 – 0 … 20 mA 0b0110 – 4 … 20 mA

Byte 2			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Reserved	Reserved	Sensor type X2
Values			0b0000 – deactivated 0b0001 – 0 … 10 V 0b0010 – -10 … 10 V 0b0011 – 0 … 5 V 0b0100 – -5 … 5 V 0b0101 – 0 … 20 mA 0b0110 – 4 … 20 mA

Byte 3			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Reserved	Reserved	Sensor type X3
Values			0b0000 – deactivated 0b0001 – 0 … 10 V 0b0010 – -10 … 10 V 0b0011 – 0 … 5 V 0b0100 – -5 … 5 V 0b0101 – 0 … 20 mA 0b0110 – 4 … 20 mA

Byte 4	
Description	Process data command 0xFC: „Parameter write“

7.4.2.2 Art.-No. 59841

Byte 0			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Conversion time for X0 and X1	Wire mode X0	Sensor type X0
Values	0b00 – 12 ms 0b01 – 50 ms 0b10 – 120 ms	0b00 – 2 wire 0b01 – 3 wire 0b10 – 4 wire	0b0000 – deactivated 0b0001 – Pt100 Clima 0b0010 – Pt100 0b0011 – Pt200 0b0100 – Pt500 0b0101 – Pt1000 0b0110 – Ni100 0b0111 – Ni120 0b1000 – Ni200 0b1001 – Ni500 0b1010 – Ni1000 0b1011 – Resistance 0…3 kΩ

Byte 1			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Reserved	Wire Mode X1	Sensor type X1
Values	0b00 – 12 ms 0b01 – 50 ms 0b10 – 120 ms	0b00 – 2 wire 0b01 – 3 wire 0b10 – 4 wire	0b0000 – deactivated 0b0001 – Pt100 Clima 0b0010 – Pt100 0b0011 – Pt200 0b0100 – Pt500 0b0101 – Pt1000 0b0110 – Ni100 0b0111 – Ni120 0b1000 – Ni200 0b1001 – Ni500 0b1010 – Ni1000 0b1011 – Resistance 0…3 kΩ

Byte 2			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Conversion time for X2 and X3	Wire mode X2	Sensor type X2
Values	0b00 – 12 ms 0b01 – 50 ms 0b10 – 120 ms	0b00 – 2 wire 0b01 – 3 wire 0b10 – 4 wire	0b0000 – deactivated 0b0001 – Pt100 Clima 0b0010 – Pt100 0b0011 – Pt200 0b0100 – Pt500 0b0101 – Pt1000 0b0110 – Ni100 0b0111 – Ni120 0b1000 – Ni200 0b1001 – Ni500 0b1010 – Ni1000 0b1011 – Resistance 0…3 kΩ

Byte 3			
Bit	**7, 6**	**5, 4**	**3 ... 0**
Description	Reserved	Wire mode X3	Sensor type X3
Values	0b00 – 12 ms 0b01 – 50 ms 0b10 – 120 ms	0b00 – 2 wire 0b01 – 3 wire 0b10 – 4 wire	0b0000 – deactivated 0b0001 – Pt100 Clima 0b0010 – Pt100 0b0011 – Pt200 0b0100 – Pt500 0b0101 – Pt1000 0b0110 – Ni100 0b0111 – Ni120 0b1000 – Ni200 0b1001 – Ni500 0b1010 – Ni1000 0b1011 – Resistance 0…3 kΩ

Byte 4	
Beschreibung	Process data command 0xFC: „Parameter write“

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
Ground strap 4 mm^2 100 mm for M4	4000-71001-0410004
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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