



Operating Manual

CM50I.PN IO-Link Master with PROFINET

EN-US

1 About this document

1.1 Purpose and scope of application

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. Information on this is found in the operating manual of the machine.

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

Understanding the present manual requires general knowledge about automation technology. In addition, planning and using automation systems requires technical knowledge which is not included in this manual.

1.2 Applicable documents

- Available for download at <u>www.baumer.com</u>:
 - Instruction manual
 - Data sheet
 - Device description file
 - EU Declaration of Conformity
 - Certificates and Approvals
- Attached to product:
 - General information sheet (11042373)

1.3 Labels in this manual

Identifier	Usage	Example
Dialog element	Indicates dialog elements.	Click the OK button.
Unique name	Indicates the names of products, files, etc.	<i>Internet Explorer</i> is not supported in any version.
Code	Indicates entries.	Enter the following IP address: 192.168.0.250

1.4 Warnings in this manual

Warnings draw attention to potential personal injury or material damage. The warnings in this manual indicate different hazard levels:

Symbol	Warning term	Explanation	
		Indicates an imminent potential danger with high risk of death or serious personal injury if not being avoided.	
_ •	WARNING	Indicates potential danger with medium risk of death or (serious) personal injury if not being avoided.	
	CAUTION	Indicates a danger with low risk, which could lead to light or medium injury if not avoided.	
	NOTE	Indicates a warning of material damage.	
-`ᢕ	INFO	Indicates practical information and tips that enable optimal use of the devices.	

1.5 Scope of delivery

Delivery includes:

- 1 x CM501 device
- 1 x instruction manual multilingual
- 15 x designation label

1.6 Trademarks

The present documentation uses the trademarks of the following companies and institutions:

PROFINET/PROFINET IO	PROFIBUS Nutzerorganisation e.V. (PNO)
EtherNet/IP	ODVA, Inc.
IO-Link	c/o PROFIBUS Nutzerorganisation e.V. (PNO)
STUDIO 5000 LOGIX DESIGNER	Rockwell Automation Inc.

1.7 Software-Tools

Applied software
Totally Integrated Automation (TIA) Portal of Siemens AG
Studio5000, Rockwell Automation Inc
Baumer Sensor Suite (BSS)

Specifications 1.8

Specification	Link
GSDML Technical Specification for PROFINET IO	www.profibus.com
Version 2.34 of 08.2017	
PROFINET	www.profibus.com
Specification V2.4	
IO-Link	www.io-link.com
Version 1.1.2 of 07.2013	



The features of IO-Link specification V 1.1.3 are supported.

2 General information

Intended use

This product is a precision device and serves the detection of items, objects, or physical measurement variables and the preparation or provision of measured values as electric variables for the higher-level system.

Unless specifically labeled, this product may not be used in explosive environments.

Commissioning

Assembly, installation, and calibration of this product may only be performed by a specialist.

Installation

Only use the fasteners and fastener accessories intended for this product for installation. Outputs not in use must not be wired. Unused wires of cable outputs must be insulated. Do not go below the permissible cable bending radii. Disconnect the system from power before the product is electrically connected. Use shielded cables to prevent electro-magnetic interference. If the customer assembles plug connections on shielded cables, then EMC-version plug connections should be used and the cable shield must be connected to the plug housing across a large surface area.

Disposal (environmental protection)



Used electrical and electronic devices may not be disposed of in household waste. The product contains valuable raw materials that can be recycled. Therefore dispose of this product at the appropriate collection point. For additional information visit <u>www.baumer.com</u>.

3 Safety

3.1 **General safety instructions**



\Lambda DANGER

High electrical voltage in the machine/system.

Death or severe injuries resulting from electric shock.

a) While working on the machine/devices, comply with the five safety rules of electrical engineering.

Protection of persons and material assets

According to DIN VDE 0105-100 - Operation of electrical systems - Part 100: General definitions

The 5 Safety Rules

Protect against high electrical voltage

- 1. Switch off the device.
- Secure against unwanted switchon.
- 3. Ensure that each pole is not live respectively under voltage.
- Grounding and short-circuiting.
- 5. Cover or block neighboring parts under voltage.

Qualified personnel

The appliance may only be installed, commissioned and operated by qualified personnel who have received safety training.

Qualified means fulfilling the following requirements:

- the personnel underwent suitable training in electrical engineering,
- the personnel is familiar with the safety standards which are common practice in automation engineering,
- the personnel has access to the Operating instructions and the present Instruction Manual,
- are familiar with the safety standards of automation technology,
- the personnel is familiar with the related and applicable basic and technical standards.

Intended use of the device

- During project engineering, installation, commissioning, operation, and testing of the device comply with the existing regulations on accident prevention as well as health and safety at work.
- Check material resistance against aggressive media.



INFO

Any manipulation/modification of hardware and software only qualified *Baumer* personnel, except for firmware updates.

Ċ_ INFO

Only use a power unit of max. 60 V DC respectively 25 V AC in single fault condition. Power supply must comply with *SELV* or *PELV*.

Protective measures by the machine operator

- Follow the instructions in this manual.
- Observe the specifications and operating instructions of each connected component.

4 Description

4.1 Device

CM50I.PN

- PROFINET compact module, plastic
- PROFINET encoding via M12 -D- encoding
- Power via M12 L- encoding, 5-pin
- 8x M12 slots, digital inputs/outputs/8 IOL, A-encoding



4.1.1 Device structure



X0 X7	Digital I/O or IO-Link
	M12 A-encoding
0	Channel corresponds to pin 4
1	Channel corresponds to pin 2
	Examples:
	Channel 02 = Pin 4 port X2
	Channel 16 = Pin 2 port X6
XD1	Power supply POWER IN, M12
	L-encoding 5-pin
XD2	Power supply POWER OUT,
	M12 L-encoding 5-pin
1	Rotary switch
XF1	Ethernet Port 1, M12 D encoding
XF2	Ethernet Port 2, M12 D encoding
2	Ground strap for functional
	ground

4.1.2 Product name nomenclature

The nomenclature is based on a scheme indicating the product functionality.

CM50I	Product family	
PN	Industrial Ethernet Protocol	
	PROFINET	

4.1.3 Pin assignment

X0 X7		
$ \begin{array}{c} 5 \\ 0 \\ 10 \\ 0 \\ 0 \end{array} $	Pin 1	L+
	Pin 2	DI
	Pin 3	L-
4	Pin 4	C/Q
	Pin 5	n.a.

M12 female connector A-encoding

M12 male/female connector, POWER IN/OUT

XD1			XD2
	Pin 1	US+	(FE)
	Pin 2	UA-	
2 3	Pin 3	US-	
	Pin 4	UA+	
	Pin 5	FE	

M12 female connector D-encoding port 1 / port 2

XF1 / XF2			
1 0 2 5	Pin 1	Tx +	
	Pin 2	Rx +	
4 3	Pin 3	Tx -	
	Pin 4	Rx -	
	Pin 5	n.a.	

4.1.4 Display elements



Also see about this

LED indicator [▶ 114]

X0 ... X7 LED digital I/O or IO-Link

LED BUS RUN LED CfgF LED LNK1/ACT1 LED LNK2/ACT2 LED Status (ST) LED POWER UA LED POWER US

1

4.2 IO-Link

Within the IO-Link standard, smart devices at sensor and actuator level connect to automation systems.

Communication takes place between the IO-Link master and one or more IO- Link peripheral devices. Each port connects a single device. IO-Link is a point-to-point communication standard, not a fieldbus system.

The IO-Link Master acts as interface between the superior fieldbus level and the IO-Link devices.



III. 1: IO-Link

IO-Link-Mode (IOL)

The IO-Link communication (C/Q) is assigned to pin 4, for connection and use of an IOL device.

Acyclic data may serve for writing device parameters of a IO-Link device or for reading parameters, measured values and diagnostic data from a IO-Link device.

IO-Link CALL

The following tasks can be performed:

Parameterization/configuration of IO-Link devices during operation.

- Diagnostic of IO-Link devices by reading diagnostic parameters.
- Execute IO-Link port functions.
- Back-up/recovery of IO-Link device parameters.

IO-Link device data are uniquely addressed via index and sub-index.

Such data can be accessed with the so-called IOL CALL block. Usually, it is provided as data handling block by the PLC manufacturer.





III. 2: IO-Link CALL

Also see about this

IO-Link configuration [▶ 69]

4.2.1 Data storage

- The INFO

Data storage is only available for IO-Link devices compliant to IO-Link version V1.1 and higher.

- Data storage allows for replacing IO-Link devices without the need for new configuration.
- IO-Link master and IO-Link device save the parameterization of the previous device.
- Data storage synchronizes the data memories of IO-Link master and IO-Link device.
- Once the IO-Link device has been replaced, the master will write the saved parameters into the new device, provided data storage is enabled in the IO- Link Master.
- This allows for application restart without parameterization from scratch.
- When replacing the IO-Link master, the new Master will read parameterization out of the IO-Link device and save it. Doing so requires the data storage option "Save and restore" being enabled.
- This allows for application restart without parameterization from scratch.
- For data storage application, vendor ID and device ID of the connected IO-Link device must be entered in the validation settings of each IO-Link master port.
- The IO-Link port mode must be set to "Manual".
- To store the modified IO-Link device parameters again in the master, de- vice parameterization must be done via block parameterization.
 - After this, the device transmits an upload request to the Master.
 - Block parameterization can be carried out via the IO-Link device tool in the "Parameter" window and with the "Block Write Mode".
 - Optionally, block parameterization can be done by device parameter writing via web server or PLC block, e.g. Siemens IOL_Call.
 - Always terminate block parameterization with command "Parameter Download Store" ISDU Index 0x02 Subindex 0 Value 05.
- In validation/backup mode "no Device check", the saved device parameter content in the IO-Link master is deleted.

4.3 PROFINET IO

4.3.1 **PROFINET IO Communication**

IEC 61784-2

PROFINET IO is an open communication protocol compliant to *IEC 61784-2*. The communication protocol is based on Ethernet.

Data exchange

Data is exchanged between the control unit, the sol-called *PROFINET IO* Controller and the connected users called *PROFINET IO* devices.

Communication

Communication is based on a full-duplex Ethernet network with 100 Mbit/s or 1 Gbit/s. IO controller and IO devices communicate by Ethernet telegrams. Devices exchange data cyclically based on the provider-consumer principle. Devices function as receiver (consumer) and transmitter (provider) at the same time.

The IO controller sends output data to the IO devices and receives input data from the IO devices. The IO devices send input data and receive output data.

Other components of the communication protocol include telegrams in form of acyclic communication for parameter transfer and read/write access to the I&M data or manufacturer-specific features.

4.3.2 Structure of the conformance classes

Structure

The scope of functions of *PROFINET IO* classified in *Conformance Classes (CC)*. These classes give a clear overview of the various minimum properties. There are three conformance classes:



III. 3: Structure of the conformance classes

CC-A

CC-Aoffer basic functions for *PROFINET IO* with RT communication. Typical cycle times are 2 ms and more. Also unmanaged switches can also be used. Wireless communication is only enabled in this class.

All I CM50I.PN comply with the CC-A class.

All Baumer switches (unmanaged and managed) can be used.

СС-В

CC-B expands the concept by the inclusion of network diagnostics and topology information. Typical cycle times are 2 ms and more. Topology information and projected device names enable easy device exchange. The defective device can be easily exchanged by a new device with factory settings. All *CM50I.PN* comply with the **CC-B** class.

CC-C

CC-C describes the basic functions for devices with hardware-supported bandwidth reservation and synchronization (IRT communication) and hence is the basis for isochronous applications. Implementing Isochronous Real Time (IRT) in Ethernet controllers allows for update times of 31.25 µs and jitter accuracy of less than 1 µs.

4.3.3 Media redundancy (MRP)

The Media Redundancy Protocol (MRP) according to IEC 62439 describes the *PROFINET* redundancy with a typical reconfiguration time of <200 ms for communication paths with TCP / IP and RT frames after the occurrence of error. Failure-free operation of automation systems implies a Media Redundancy Manager (MRM) and several Media Redundancy Clients (MRC) in a ring arrangement.

Function of Media Redundancy Manager (MRM)

The function of a Media Redundancy Manager (MRM) is to check the operability of the ring structure specified by the configuration. This is done by cyclic transmission of telegrams. As long as the MRM is receiving the test telegrams, the ring structure is intact. The MRM uses this behavior to prevent telegram circulation and converts the ring structure into a line structure.

Media Redundancy Clients (MRC) are switches acting as so- called "telegram transfer hatch" and usually do not play an active role.

MRC must provide two switch ports to connect to other MRCs or the MRM in a single ring. Devices can be configured as MRC. When being interrupted from the ring, *PROFINET* communication is continued after reconfiguration.

Also see about this

Media Redundancy Protocol (MRP) configuration [> 84]

4.3.4 Isochronous-Real-Time (IRT)

In *PROFINET* communication, the IRT concept (Isochronous-Real-Time) defines, isochronous data exchange by transmission of data frames at regular time intervals ranging from few hundred milliseconds up to four milliseconds.

The beginning of a bus cycle is adhered to with the highest precision (jitter $\leq 1 \ \mu$ s). Each of the individual time intervals in IRT communication is split into an IRT interval and an open standard interval; this requires special IRT switches.



III. 4: Communication cycles split into IRT and RT

Also see about this

Isochronous-Real-Time (IRT) configuration [▶ 87]

4.3.5 I&M data

Identification and Maintenance (I&M)

The I&M function is a standard of the PROFIBUS Nutzerorganisation e.V (PNO) and a prerequisite for high-performance asset management.

Identification data

Identification data (I data) provides device information, such as order or serial number. Sometimes, this information can be seen on the device housing. I-data is manufacturer-specific device information. They provide read access only.

Maintenance data

Maintenance data (M data) is system-specific information, such as installation site and date. Mdata is created during projecting, written into the remanent memory of the device.

Also see about this

I&M-Daten [> 71]

4.4 Simple Network Management Protocol (SNMP)

SNMP is a simplified network protocol with varied objects for monitoring the following:

- 1. Network components,
- 2. Remote control and configuration of network components,
- 3. Error detection and error messaging.

TCP/IP based network components relate to standard RFC 1213. This standard describes the access options and structure of the corresponding objects.

Also see about this

Simple Network Management Protocol (SNMP) [> 89]

4.5 Industrial Internet of Things (IIoT)

The device supports the following IIoT functions for industrial communication: *JSONMQTT* and OPC UA.

5 Technical data

5.1 Electrical Data

IIoT functions		
Web Interface	http://	Yes
OPC UA	For IO-Link according to Com- panion Specification Release 1.0	Yes
OPC UA	Transport	UA TCP, UA Secure Conver- sation, UA Binary Encoding
OPC UA	Minimum release interval	100 ms
OPC UA	Maximum number of sessions/ clients	5
JSON	JSON integration for IO-Link V1.0.0	Yes, via REST API and MQTT
Energy monitoring	Current and voltage	Yes
Temperature monitoring		Yes
Bus data		
Fieldbus protocol		PROFINET
Connection		4-pin M12, D- encoding
PROFINET Conformance Class		C
Transmission rate		100 Mbit/s
PROFINET addressing		Via DCP
Cycle time		≥1 ms
IRT	Network communication	Yes
	Application	No
MRP	Client	Yes
SNMP		Yes
PROFINET Netload Class		
IO-Link		

·• -····	
Operating voltage IO-Link de- vices	24 V 🗆
Voltage range IO-Link devices	20 30 V 🗆
Transmission rate	COM1 / COM2 / COM3
Standardized Master Interface (SMI)	According to IO-Link Specifica- tion V1.1.3
Transmission rate recognition	Automatic

Supply		
Operating voltage US		24 V 🗆
Voltage range US		18 30 V 🗆
	When using IO-Link	20,3 30 V 🗆
Operating voltage UA		24 V 🗆
Voltage range UA		18 30 V 🗆
Sensor current US	≤40 °C (see Derating)	≤16 A
Actuator current UA	≤40 °C (see Derating)	≤16 A
Current consumption	At idle	≤0,18 A
Protection against reverse po- larization for US and UA		Yes
Reverse polarity protection		Yes
Connection		5-pin M12, L-encoding
Conductor cross-section	Current per supply ≤12 A	≥1.5 mm2
	Current per supply >12 A	≥2.5 mm2
Input (DI)		
Sensor supply +	Per port, ≤40 °C (see Derating)	≤2 A load Automatic start
Total current sensor supply	≤40 °C (see Derating)	≤10 A
Filter time		0 15 ms + tcycle, adjustable
Delay time at changed signal		2 5 ms
Input characteristic	EN 61131-2	Туре 1 + Туре 3
Short-circuit protection sensor supply		MOSFET with current mea- surement
Connection		5-pin M12, A-encoding
Cable cross-section M12		≤0.75 mm2
Cable length		≤30 m
Total current	Per port	≤4 A
Output (DO)		
Output current DO (UA)	Per pin, ≤40 °C (see Derating)	≤2 A
Total current outputs	≤40 °C (see Derating)	≤10 A
Switching frequency		≤50 Hz
Short-circuit protection actua- tor		MOSFET with current mea- surement
Connection		5-pin M12, A-encoding
Cable cross-section M12		≤0.75 mm2
Cable length		≤30 m
Total current	Per port	≤4 A

Derating sensor current US/ actuator current UA



III. 5: Derating sensor current US/ actuator current UA



Derating total current, sensor power supplies/outputs total current

III. 6: Derating total current, sensor power supplies and total current, outputs

Derating current per sensor supply/output



III. 7: Derating current per sensor power supply and output

5.2 Ambient conditions

Climate						
Operating temperature		-25 °C +70 °C				
Storage temperature	Ensure acclimatization for commissioning	-25 °C +85 °C				
Transport temperature	Ensure acclimatization for commissioning	-25 °C +85 °C				
Relative humidity		≤95 %				
Installation hight	Above sea level	≤3000 m				
Mechanical						
Oscillation test	EN 60068 Part 2-6	10 58 Hz, amplitude 0.35 mm, 58 150 Hz; 20 g				
Shock test	EN 60068 Part 2-27	50 g for 11 ms				
Electrical safety						
Protection	EN 60529	IP67				
Protection rating	Using a SELV- or PELV- power supply	111				
Level of contamination		2				
EMC emission						
Radiated inteference E-field housing enclosure	EN 55016-2-3	Compliant				
EMC-immunity						
Electrostatic discharge (ESD)	EN 61000-4-2	Compliant				
Electromagnetic RF-fields	EN 61000-4-3	Compliant				
Fast transient burst	EN 61000-4-4	Compliant				
Shock tension surge	EN 61000-4-5	Compliant				
Conducted RF-fields	EN 61000-4-6	Compliant				
Voltage dips	EN 61000-4-11	Compliant				

5.3 Protection

Device protection		
Overvoltage protection		Yes
Overload protection device supply	To be ensured by load circuit monitoring	Yes
Inverse-polarity protection de- vice supply		Yes
Short-circuit protection sensor supply		Electronically
Short-circuit protection output		Electronically
Protective circuit input	Internal	Suppressor diode

5.4 Mechanical data

Material data					
Housing material	Plastic				
Mounting data					
Weight Net 470 g					
Dimensions	L x W x H	225,4 x 63 x 36 mm			

5.5 Conformity, Approvals

Conformity, Approvals						
Product standard	EN 61131-2	Compliant				
	Programmable Logic Con- trollers Part 2					
CE	2014/30/EU	Compliant				
	2011/65/EU					
UKCA		Compliant				
EMC	2014/30/EU	Compliant				
REACH	No. 1907/2006	SVHC List				
WEEE	2012/19/EU	Compliant				
ULus		E201820				
RoHS	2011/65/EU & 2015/863	Exception 6c&7a				
China RoHS	SJ/T 11364-2014	25 EPUP				

Hazardous substance (有害物質)							
2 5	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 组件部分 印刷电路板		x	0	0	0	0	0
Connection Terminal/ So 接线端子 / 拧	crews	x	0	0	0	0	0

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。

6 Installation

6.1 Requirements

Installation requirements:

- Even mounting surface to avoid mechanical tension.
- Provide proper grounding.
- Suitable installation site in terms of vibration and shock load, temperature and humidity (see Technical data [> 19]).
- Protected site to prevent connection cables from being torn off accidentally.

6.2 Dimensions



III. 8: Dimensions in mm



6.3 Mounting distance

Ύ_ INFO

For proper installation and improved heat dissipation, we recommend maintaining a minimum distance of 3 mm when installing *CM50I*.



INFO

Minimum distance of 50 mm requried where using angled connectors.

6.4 Mounting the device

Material damage due to incorrect installation.

Use fastening screws that are appropriate for the mounting surface.

- a) Fastening screws and tightening torques depend on mounting surface.
- b) Ttighten the screws carefully. Observe the specified tightening torques.



🗥 WARNING

Material damage through improper use.

Do not use the devices as climbing aids. Devices may come off by improper use or might be damaged.

a) Install the device in such a way that it cannot be used as climbing aid.



III. 10: Fasten the device. Dimensions in mm (illustration similar)

M6	3 Nm	ArtNo.
		7000-98001-0000000

When mounting the device, observe the order indicated below:

a) Slightly tighten the top M6 screw.

- b) Align the housing.
- c) Slightly tighten the lower M6 screw.
- d) Tighten both M6 screws to the specified torque.
- e) Device grounding: Attach grounding strap (see Functional ground [27]).

∫_ INFO

The screws and grounding strap of the illustration are not included in the delivery.

6.4.1 Functional ground





III. 11: Attach the grounding strap

Tool

- **O** M4
- Tighten the screw at 1.2 Nm ±0.1 Nm.



INFO

The screws and grounding strap of the illustration are not included in the delivery. The grounding strap is available at the Baumer Website <u>http://baumer.com</u>.

Also see about this

Accessories [> 140]

6.4.2 Addressing lid



III. 12: Attaching the adressing lid

Tool

• **O** M3

Instruction:

• Tighten the screws at 0.8 Nm ±0.1 Nm fest.

7 Installation

7.1 Electrical installation of the device

High electrical voltage in the machine/system.

Death or severe injuries resulting from electric shock.

a) While working on the machine/devices, comply with the five safety rules of electrical engineering.

Protection of persons and material assets

In accordance with DIN VDE 0105-100 - Operation of electrical installations - Part 100: General requirements

Risk of fire due to short circuit.

Supply lines and/or devices may short circuit when damaged causing overheating and fire.

a) Ensure smart current monitoring or fuse The fuse must be able to hold max. 9 A.

Loss of function due to improper installation.

Failure to observe may result in personal injury and/or damage to property.

 a) Only use cables and accessories compliant to the requirements and relevant regulations for safety, electromagnetic compatibility and, if required, telecommunication end devices and specifications.



Hot surface.

Minor personal injuries and damage to the device when contacting hot surfaces.

- a) Wear suitable isolating gloves.
- b) Only use connection cables that meet thermal requirements.

Damage to machine/system by improper voltage on/off.

Switching on the device by separate actuator and sensor voltage, the functions of the digital inputs and outputs cannot be guaranteed.

- a) For device switch-on observe the following order:
- a) Switch on sensor voltage.
- b) Switch on actuator voltage.



INFO

Only use a power unit capable of limiting voltage to max. 60 VDC resp. 25 AC at the occurrence of error. Power supply must comply with SELV or PELV.

7.1.1 Rotary switch settings



Factory defaults : Rotary switch position is 000.

Ċ___ INFO

An unambiguous and unique IP address must be assigned to each user in the network.

x 10	00	X	10	х	1
307	37	E.	51/	Q	2
EQ.	派	\mathcal{O}	51	9	51
1.32			~ 1	~	

Address range 1999x1Rotary switch (units)x10Rotary switch (tens)x100Rotary switch (hundreds)

Position/ Range	Web server	JSON	OPC UA	MQTT	Description	
0	-	-	-	-	Standard operation	
001 910	-	-	-	-	Reserviert**	
911	Disabled	Disabled	Disabled	Disabled	Secure Mode	Fieldbus communication in
912	-	Disabled	Disabled	Disabled	IIoT mode disabled	standard operation
913	Disabled	-	-	-	Web server dis- abled	
914	Enabled	Enabled	Enabled	Enabled	Enables all IIoT pro- tocols and web server.	
915-978	-	-	-	-	Reserved	
979	Enabled	Enabled	Enabled	Enabled	Restore default	Sequence of actions only for this rotary switch position:
						 Disconnect device from power supply.
						2. Set switch to position 979.
						 Connect device to power supply.
						4. Wait for at least 2 min- utes.
						 Disconnect device from power supply.
						 Set switch to position 000 or any other required.
						 Connect device to power supply.
980-999	-	-	-	-	Reserved	

Tab. 1: Rotary switch for addressing

Tab. 2: Setting the address

) INFO

Reserved switch positions do n ot enable fieldbus communication, see LED indicator [> 114].

Service settings

Switch positions 911, 912 and 913 disable the device services marked in the "set address" matrix. With these settings, the switching behaviour of the device is according to the previous address configuration without limiting any functions, except the services disabled by this switch position. The services disabled by doing so could not be re-enabled in any other way, e.g. via the control's configuration parameters.

Switch position 914 will enable all services again. Again, the device funtionalities are not limited.

- 1. Connect device to power supply.
- 2. Disconnect supply.
- 3. Set original address.

Setting the address

Setting the address

- 1. Disconnect device from supply.
- 2. Remove addressing lid.
- 3. Set an address which is unique.
- 4. Fasten addressing lid again.
- 5. Connect device to power supply.

רי ואדס

For appropriate tightening torque see Addressing lid [28].

7.1.2 Sensors and actuators

Connection of M12 female connector





III. 13: Example of M12 connection inputs and outputs

M12	0.6 Nm	ArtNo. 7000-99102-0000000



_ INFO

Feeding external ground via M12 female connectors may lead to errors.

a)
Do not feed external ground into the device via the M12 female connectors.

רי INFO

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

Sensor supply

Important:

- Sensors supply is via pin 1 (24 V) and pin 3 (0 V) of the M12 female connectors.
- The maximum permissible current for supplying the sensors is **2** A per M12 socket.
- In the event of overcurrent or short circuit, disconnect supply cable resp. sensor from the M12 female connector.

Supported IO-Link communication

The device supports IO-Link communication at the following rates:

- 4.800 Baud (COM 1)
- 38.400 Baud (COM 2)
- 230.400 Baud (COM 3)



INFO

The device would automatically select the communication rate apporpriate for the related IO-Link device.



í_ INFO

Maximum cable length for IO-Link communication is 20 m.

'∽_ INFO

A large selection of connection cables can be found on the Baumer website <u>https://</u> www.baumer.com.

7.1.3 **PROFINET IO Communication**

Connection of M12 female connector



III. 14: Example of M12 connection (EtherNet/IP Bus)

M12 0.6 Nm	James and Dames	ArtNo. 7000-99102-0000000
------------	-----------------	------------------------------

Also see about this

Pin assignment [> 10]

7.1.4 Power supply

According to *PROFINET Cabling and Interconnection Technologys* [4] Guideline Version 4.00 May 2017, a cable with a black outer sheath and 4 strands with the following colors must be used for an M12 L-coded style 4 (4 pin without FE):



III. 15: [4]: Excerpt from "PROFINET Cabling and Interconnection Technology"

A fifth strand which is not connected in the device can increase the interference on the 24 V conductor in the event of EMC interference due to capacitive coupling.



III. 16: Example of M12 connection (POWER)





INFO

A large selection of connection cables can be found on the Baumer website <u>https://</u><u>www.baumer.com</u>.
7.2 Ensuring Tightness (IP67)

Leaky housing.

Risk of personal injury and material damage due to failure caused by ingress of conductive liquids.

a) Seal any male and female connectors not in use.

Cable connection







M12 0,6 N	ArtNo. 7000-99102	2-0000000
-----------	----------------------	-----------

Ύ_ INFO

A large selection of connection cables can be found on the Baumer website <u>https://</u><u>www.baumer.com</u>.

8 Commissioning

Risk of burns.

Prohibited to separate or establish electrical connection during operation. Failure to observe this warning may result in electric arcs that can cause burns.

a) Disconnect device from power supply.

Uncontrolled processes.

Personal injury and material damage due to incorrect commissioning (initial commissioning, device restart or change in device configuration).

a) Commissioning should always observe the order below:

- a) Insert the device.
- b) System check and approval by an expert.
- c) Put into operation.

Functional errors in residential areas.

Devices of EMC Class A may cause interference in residential areas.

a) The system operator must take appropriate measures.

8.1 Loading GSDML Files

GSDML Files"

Install GSDML file respectively description file

The GSDML file import procedure is described in your engineering software manual. In the engineering software, this is referred to as *Install GSDML files* or *Install device description file*.



INFO

The GSDML file is stored on the Baumer website <u>https://www.baumer.com</u> under the article number of the device in the download area.

Hardware catalog

 Read the GSDML file of the CM50I.PN into the hardware catalog of the hardware configuration program.

When using **TIA**, the module can then be found in the hardware catalog in the directory structure:

Other field devices | PROFINET IO | I/O | Baumer | CM50I.PN | V1.0

If the engineering software supports structuring in folders, the module is displayed in a similar way to the *hardware catalog* illustration.

Hardware catalog	
Options	
✓ Catalog	
<search></search>	tini tini
Filter Profile: <all></all>	- 📑
Controllers	
🕨 🧰 HMI	
PC systems	
Drives & starters	
Network components	
Detecting & Monitoring	
Distributed I/O	
Power supply and distribution	
Field devices	
 Other field devices 	
Additional Ethernet devices	
Drives	
Encoders	
🕨 🧰 Gateway	
▼ 10	
✓ Jaumer	
✓ 1 CM501	
▼ <u></u> V1.0	
CM50I.PN	
Baumer IVO GmbH & Co. KG	
Murrelektronik	
Sensors	
Im PROFIBUS DP	

III. 19: Hardware catalog

- a) Select the module CM50I.PN in the hardware catalog.
- b) Drag & drop the entry to a free space in *Devices & networks*.

	\$ ∀ ∀ 7	7 & 1 ¥			
A Siemens - C:\TIA Projekte/CM50I.PN Use	Manual/CM50I.PN User Manual				_
Project Edit View Jorant Opline Opti	nr Tools Window Malo				
😚 🅞 🗔 Save project 🛋 🕺 🖬 🕞 🗙	ちょのま 品 旧 田 田 国 G d Go online d Go offine 🌆 同 同 🗙 - III Contribution Contractor G	ia i		Totally Integrat	ed Automation PORTAL
Project tree	II ← CM50I.PN User Manual ► Devices & networks			X Hardware catalog	# 10 k
Devices		2 Topolo	ny view Network view Device vi	Ontions	
100					
2			nnections I/O communication VPN		
CM50LPN User Manual		W Device	Type Address in subnet	ubnet Catalog	
Add new device		= \$7-1200-Station_1	57-1200 station		109 L09
Devices & networks		PLC_1	CPU 1215C ACIDCINY	Filter Profile: <all></all>	 Image: Image: Ima
PLC 1 [CPU 1215C AC/DC/RM	CM50LPN	 GSD device_1 	GSD device	Controllers	
Device configuration	CIVIDUITIN	 CNEGUPN 	CMEDILPIN	ни	
Conline & diagnostics	CM50I.PN			PC systems	
Reprogram blocks	Baumer			Drives & starters	
Fight Technology objects	Not as Add IO system			Network components	
External source files	Assign to new IO controller			Detecting & Monitoring	
PLC tags	Disconnect from IO system			Distributed I/O	
Cd PLC data types	Highlight IO system			Power supply and distribution	
Watch and force tables	Show catalog Ctrl+Shift+C			Field devices	
Online backups		-		Other field devices	
Traces		1		Additional Ethernet devices	
Device proxy data				PROFINET IO	
Program info				Drives	
PLC alarm text lists				Encoders	
Local modules				Gateway	
Unorouned devices				▼ 10	
Security settings					
Unassigned devices				- 🛄 CM501	
Common data				👻 🧊 V1.0	
Documentation settings				CMSOLPN	
Languages & resources				Baumer IVO GmbH & Co. KG	
Online access				Murrelektronik	
Card Reader/USB memory				Emilia Sensors	
		~		PROFIBUS DP	
	K II > 200%		н	>	
		S Prop	erties 🚺 Info 🔒 🗓 Diagnostics		
	General () Cross-references Compile				
	w an w an messages				
	I Path Description	Go to ? Errors Warnings	Time		
✓ Details view					
Module					
Name					
Device configuration					
				- 1. e	

Assign module to new IO controller

III. 20: Assign module to new IO controller

a) On the module icon, click *not assigned*.

b) Select PLC_1.PROFINET-Schnittstelle_1.

✓ Module is assigned an IO controller.

c) Double-click on module for further configuration.

9 Configuration/setting

Overview

There are two options for device configuration.

- First: GSDML file is available for download at the Baumer Website.
 - As described in chapter *Read GSDML files* they can be imported into the programming software to benefit from pre-configured connections.
- Second: Device configuration via the integrated web server.

'ר`_ INFO

To adopt index changes made via Webserver and via acyclic ISDU into DataStorage, a *Param-DownloadStore Command* must be transmitted after the index change.

a) The ParamDownloadStore Command can be triggered by writing value 0x05 to index 0x02.

9.1 Changing the Configuration

Device protection function impaired by changed device configuration.

- a) Only authorized persons may change configuration.
- b) When changing the configuration, use the password hierarchy provided by your engineering software.
- c) After every change in configuration, check proper activity of the safety equipment.

9.2 Module configuration

Individual IO-Link ports *and* virtual modules can be implemented and configured via the hardware catalog.

Standard Module									
MVK Pro device	 Module parameterization 								
	Read and write access to the digital IOs								
	 Read and write access to IO-Link devices/ports 								
MVK Pro options	 Access to system state and qualifier 								
	 Communication protocol parameterization 								
	 Output forcing and web server access 								

Tab. 3: Module_Configuration_Standard_Modules

9.2.1 Slots

The 8 hardware ports are configured and parameterized via slots 1.X0 to 1.X7. For more portspecific parameter settings please see module "SIO data/Module parameters" on slot 1.1.

The module has the following display in the TIA Portal device view:

- Slot 1: PROFINET user
 - with pre-configured "SIO data/Module parameter" slot for universal IO channels and parameter settings
 - with 8 IO-Link ports
- Slot 2: Optional module*
 - with 8 optional submodules for design and parameterization of
 - a) optional communication protocols
 - b) the qualifier
 - c) system status
 - d) outputforcing
 - e) web server

CM50	I.PN User Manual 🕨	Ungrouped devices 🕨	CM501.PN	[CM501.PN]					- 1	∎ ■ ×
						F Topology view	- 📥 N	letwork vie	w 📑 Device v	iew
₫ ₽ [CM50I.PN [CM50I.PN]			Device overview			1			
			^	Y Module	Rack	Slot	I address	Q address	Туре	Articl
				 CM50I.PN 	0	0			CM50I.PN	1126
	.84		=	CM50I.PN	0	01			CM50I.PN	
	M501.			 CM50I.PN device_1 	0	1	23	23	CM50I.PN device	
	0			SIO data / Module param	0	11	23	23	SIO data / Module p	
					0	1 X0 (IO-Link master port 1)				
					0	1 X1 (IO-Link master port 2)				
					0	1 X2 (IO-Link master port 3)				
					0	1 X3 (IO-Link master port 4)				
		Baumer			0	1 X4 (IO-Link master port 5)				
					0	1 X5 (IO-Link master port 6)				
					0	1 X6 (IO-Link master port 7)				
			4		0	1 X7 (IO-Link master port 8)				
			-	 CM50I.PN options_1 	0	2			CM50I.PN options	
			•		0	21				
					0	2 2				
					0	2 3				
					0	2 4				
					0	2 5				
					0	2 6				
					0	27				
					0	28				
			~							_
<	> 100%	▼ ♥		<						>

III. 21: Slots for module configuration

As an option, the saved slots can be assigned specific virtual submodules.

Virtual modules are used to map the various diagnostic and status information to the process image of the IO-Link master.

Sub module to slot assignment is defined by GSDML file.

רׂ∽_ INFO

**At least one module, however, must be configured.

9.2.2 Modul MVK Pro device

Module *MVK Pro Device* is firmly assigned to slot **1**.

Submodules

Name	Slot	Description
		 Module parameterization
		 Port parameterization
		 2 Byte In Digital input data of the ports
SIO data/Module		2 Bytes Out – digital output data of
parameters	1.1	the ports
IO-Link Port X0	1.X0 (IO-Link master port 1)	IO-Link slot.
IO-Link Port X1	1.X1 (IO-Link master port 2)	Select a submodule from the hardware
IO-Link Port X2	1.X2 (IO-Link master port 3)	catalog.
IO-Link Port X3	1.X3 (IO-Link master port 4)	
IO-Link Port X4	1.X4 (IO-Link master port 5)	
IO-Link Port X5	1.X5 (IO-Link master port 6)	
IO-Link Port X6	1.X6 (IO-Link master port 7)	
IO-Link Port X7	1.X7 (IO-Link master port 8)	

Tab. 4: Submodule for MVK Pro Device

9.2.2.1 IO-Link-Ports

The module provides 8 IO-Link ports on slots 1 (X0 to X7), which can be assigned specific IO-Link devices or set to SIO mode.

Read and write access to the IO-Link devices/ports.

Disabled	1 Byte In								
	 The corresponding IO-Link port is disabled, i.e. the channel is neither used as digital input or output, nor as IO-Link port. 								
	 Input byte is reserved. 								
Standard digital input	0 Byte In, 0 Byte Out								
	 IO-Link standard IO mode 								
	The data is provided at slot 1.1 "SIO data".								
	 Output is addressed via slot 1.1 "SIO Data/ Module parameters". 								
Standard digital output	0 Byte In, 0 Byte Out								
	 IO-Link standard IO mode 								
	 Output is addressed via slot 1.1 "SIO Data". 								
	The input is addressed via slot 1.1 "SIO Data/Module parameters".								

Submodules

IO-Link In x bytes + PQI	x Byte In
	 IO-Link device with PQI and x byte(s) of input data.
	 Input data come in the following order: PQI-Daten (1 Byte)** one padding byte if required*
	 Optional parameterization of diagnostic and IO link properties.
IO-Link Out x bytes + PQI	y Byte Out
	 IO-Link device with PQI and y byte(s) of output data.
	 Input data: PQI-Daten (1 Byte) one padding byte if required*
	 Optional parameterization of diagnostic and IO link properties.
IO-Link In/Out x/y byte + PQI	x Byte In, y Byte Out
	 IO-Link device with x byte(s) of input data and y byte(s) of output data.
	 Input data come in the following order: current input data of IO-Link device PQI Daten (1 Byte) one padding byte if required*
	 Optional parameterization of diagnostic and IO link properties.
Profile Devices (diverse)	Number of input and output bytes is module-specific.
	 Input data come in the following order: current input data of IO-Link device (if present) PQI Daten (1 Byte) one padding byte if required*
	 Output data come in the following order: current output data of the IO-Link device (if present) one padding byte if required Optional parameterization of diagnostic and IO link properties.
ME devices (various)	Number of input and output bytes is module-specific.
	 Input data come in the following order: current input data of IO-Link device (if present) PQI Daten (1 Byte) one padding byte if required*
	 Output data come in the following order: current output data of the IO-Link device (if present) one padding byte if required Optional parameterization of diagnostic and IO link properties. Optional device parameterization by module-specific parameters (if present).

Tab. 5: Submodules for IO-Link ports

* Padding byte: Reserved byte to achieve even data length.

** PQI

The **Port Qualifier Information** (PQI) provides status information on IO-Link port and/ or device.

The flags "PQ"..and DevErr and DevCom" are copied directly from the Arg- Block of the SMI service "SMI_PDIn".

The flags in bit 2 to 4 are generated within the master application layer.

PQI-Flag-Bit Layout

Bit7	Bit6	Bit5	Bit4	Bit3	Bit2	Bit1	Bit0
Device	Port / de-	Device	Port oper-	Replace-	New pa-	Reserved	Reserved
process	vice error	communi-	ation	ment de-	rameter	("0")	("0")
data		cation		vice identi-			
validty				fied			
PQ	DevErr	DevCom	PortActive	SubstDev	New-Par	_	_

Tab. 6: PQI-Flag-Bit Layout

Flag M/O Value Description NewPar M 0 No update of the device parameters identified. 1 Device parameter update identified: Master has performed a data memory upload and a new IOLD-backup object (0xB901) is available.

Description of table "Layout of the PQI flag bits"

			data memory upload and a new IOLD-backup object (0xB901) is available.
SubstDev	М	0	No replacement device identified (identical serial number)
		1	Replacement device identified (different serial number).
PortActive	М	0	Port disabled via port function.
		1	Port enabled (standard).
DevCom	М	0	No device available.
		1	Device identified and in status pre-operate or operate.
DevErr	М	0	No error/warning occurred.
		1	Error/warning assigned to device or port has occurred.
PQ	М	0	Invalid IO device process data.
		1	Valid IO device process data.

Byte assignment of the generic IO-Link In/Out xx/yyc

	Subn	nodule	e type														
	DEA C		Input data submodule								Output data submodule						
Byte s		SIO	00/ УУ	01/ уу	02/ УУ	04/ УУ	08/ УУ	16/ УУ	32/ УУ	-	xx/ 00	xx/ 01	xx/ 02	xx/ 04	xx/ 08	xx/ 16	xx/ 32
0	R		PQI	I	I	I	I	I	I			0	0	0	0	0	0
1				PQI	I	I	I	I	I			R	0	0	0	0	0
2					PQI	I	I	I	I					0	0	0	0
3					R	I	I	I	I					0	0	0	0
4						PQI	I	I	I						0	0	0
5						R	I	I	I						0	0	0
6							I	I	I						0	0	0
7							I	I	I						0	0	0

Submodule type																
			Inpu	t data	subm	odule)			Outp	ut da	ta sub	modu	le		
Byte	DEA		00/	01/	02/	04/	08/	16/	32/	xx/	xx/	xx/	xx/	xx/	xx/	xx/
S	С	SIO	уу	уу	уу	уу	уу	уу	уу	00	01	02	04	80	16	32
8							PQI	 	 -						0	0
9							R	 	 -						0	0
10								 	 -						0	0
11						_				 			_		0	0
12										 					0	0
13				_					1						0	0
14						_			I	 		_	_		0	0
15										 					0	0
16								PQI	I							0
17								R	I							0
18									I	 						0
19									I							0
20									I							0
21									I							0
22									I							0
23									I							0
24									I							0
25									I							0
26									I							0
27									I							0
28									I							0
29									I							0
30									I							0
31			1						I							0
32									PQI							
33									R							

Legend:

- I = Input
- O = Output
- P = PQI (Port Qualifier Information)
- R = Reserved (Padding Byte)
- DEAC = Deactiviert
- SIO Mode

9.2.3 Modul MVK Pro options

- is firmly assigned to **slot 2**
- All submodules are optional

• However, at least one module must be seated.

Submodules

Name	Slot	Description
Qualifier DI	2.1	2 Byte In
		 Status of individual bits of the inputs in "Digital IO"
		 0 = invalid
		• 1: valid
		 Layout according to parameterization
Qualifier DO	2.2	2 Byte In
		 Status of individual bits of the outputs in "Digital IO"
		• 0 = invalid
		• 1: valid
		 Layout according to parameterization
System status *	2.3	4 Byte In
		 Summary of the current system state.
MQTT	2.4	Option to enable MQTT
OPC UA	2.5	Option to enable OPC UA
JSON	2.6	Option to enable JSON
Web server	2.7	Option to enable web server
Output forcing	2.8	Option to enable output forcings
MQTT	2.4	Option to enable MQTT

Tab. 7: Submodules for MVK Pro options



INFO

* For further information on the system status refer to chapter* 8.2.3.1 "Digitale I/O and System Status"

9.2.3.1 Digital I/O and System Status

System status IO layout in decimal and hexadecimal format

Bit	Value in decimal (dec) format	Value in hexadecimal (hex) format	Description
0	1	0x00 00 00 01	Sensor undervoltage
1	2	0x00 00 00 02	Actuator undervoltage
2	4	0x00 00 00 04	No actuator supply
3	8	0x00 00 00 08	Reserved
4	16	0x00 00 00 10	Sensor short circuit on at least one channel.
5	32	0x00 00 00 20	Actuator short circuit on at least one channel.
6	64	0x00 00 00 40	Reserved

Bit	Value in decimal (dec) format	Value in hexadecimal (hex) format	Description
7	128	0x00 00 00 80	Reserved
8	256	0x00 00 01 00	Reserved
9	512	0x00 00 02 00	IO-Link error, e.g. validation or data storage failed.
10	1024	0x00 00 04 00	Sensor overvoltage
11	2048	0x00 00 08 00	Actuator overvoltage
12	4096	0x00 00 10 00	Reserved
13 - 31			Reserved

Tab. 8: System status IO-Layout

Bit assignment of system status binary IO layout

Byte 3

7	6	5	4	3	2	1	0			
							Sensor undervoltage			
						Actuator undervoltage				
					No actuator supply					
				Reserv	rved					
			Sensor	short c	ircuit on	at least	one channell			
		Actuato	or short	circuit o	n at lea	st one c	hannel			
Reserved										
Reserv	ved									

Byte 2

7	6	5	4	3	2	1	0		
							Reserved		
						IO-Link error, e.g. validation or data storage failed			
				Sensor overvoltage					
				Actuato	or overv	oltage			
			Reserv	ed					
	Reserved								
	Reserved								
Reserv	red								

Byte 0 and byte 1 system status reserved

9.2.4 Addresses

Once the module has been assigned to the IO-Controller, the I/O addresses are assigned to the project according to the allocated addresses.

	∎≡×
🚰 Topology view 🛛 👗 Network view	Device view
🔐 CM50LPN [CM50LPN] 🔽 🗒 🕅 🐂 🖾 🗍 Device overview	
Module Rack Slot I address O address Type	Ar
=	1 🖊
- → CM50LPN 0 01 CM50LP	
	device
C* SIO data / Module param 0 1 1 23 23 SIO data	Module p
Standard digital input 0 1 X0 (IO-Link master port 1) Standard	digital inp
Standard digital output 0 1 X1 (IO-Link master port 2) Standard	digital ou
Deactivated 0 1 X2 (IO-Link master port 3) 4 Deactiva	ed
IO-Link In 02 bytes + PQI 0 1 X3 (IO-Link master port 4) 58 IO-Link In	02 bytes
Baumer IO-Link Out 01 byte + PQI 0 1 X4 (IO-Link master port 5) 910 45 IO-Link C	it 01 byt
IO-Link In/Out 02/02 byt 0 1 X5 (IO-Link master port 6) 1114 67 IO-Link In	Out 02/0
IO-Link In/Out 08/02 byt 0 1 X6 (IO-Link master port 7) 1524 89 IO-Link Ir	Out 08/0
IO-Link In/Out 08/02 byt 0 1 X7 (IO-Link master port 8) 2534 1011 IO-Link In	Out 08/0
✓ CM50LPN options_1 0 2 CM50LPh	options
0 21	
0 22	
0 23	
0 24	
0 25	
0 26	
0 27	
	>
SIO data / Module parameters [SIO data / Module parameters]	cs III
General 10 tags System constants Texts	
▼ General	
Catalog information VO addresses	
Module parameters Input addresses	
I/O addresses	
Start address: 2	
End address: 3	
Organization block: (Automatic update)	
Process image: Automatische Aktualisierung	
Toessinger / teenadere /	
> Output addresses	
Start address: 2	
Start address: 2 End address: 3	
Start address: 2 End address: 3 Organization block: (Automatic update)	
Start address: 2 End address: 3 Organization block: (Automatic update) Process image: Automatische Aktualisierung	
Start address: 2 End address: 3 Organization block: (Automatic update) Process image: Automatische Aktualisierung	

I/O addresses manually may also be changed manually.

III. 22: Module configuration addresses

9.3 Module parameterization

The present chapter explains the parameterization options.

The following modules are described:

- MVK Pro device
- MVK Pro options

9.3.1 Modul MVK Pro device

Submodule overview

- SIO data/Module parameters
- Disabled
- Standard digital input
- Standard digital output

- Generic IO-Link modules
- Profile Devices
- ME devices

Submodule module parameters

No.	Sub-module	Parame ter-No.	Parameter					
1	SIO data/Module parame-	1	Pin/port-based					
	ters	2	Disable global diagnostics report					
		3	Disable undervoltage bus/sensor supply report					
		4	Threshold value undervoltage bus/sensor sup- ply					
		5	Disable undervoltage actuator supply report					
		6	Enable threshold actuator undervoltage					
		7	Disable missing actuator supply report					
		8	Enable LED indication for suppressed diagnos- tics					
		9	Enable IO-Link diagnostics report					
		10	US disabled at pin 1					
		11	SIO Channel functionality pin 2					
		12	Input delay pin 2					
		13	Rated current for pin 1					
		14	Rated current for pin 2					
			Rated current for pin 4					
			IO-Link diagnostic event integration					
		17	Manual restart pin 2 in the event of overcurrent					
		18	Input value in the event of module failure					
2	Disabled	19	Port mode					
		20	Input value in the event of module failure					
3	Standard digital input	21	Function pin 4					
		22	Input delay pin 4					
		23	Enable port diagnostics report					
4	Standard digital output	24	Static output signal at pin 4					
		25	Manual restart pin 4 in the event of overcurrent					
		26	Enable port diagnostics report					
5	Generic	27	Enable port diagnostics report					
6	IO-Link modules	28	Enable process alarms report					
7	Profile Devices, ME devices	29	Configuration via PDCT					
		30	Input data fraction					
		31	Enable pull/plug diagnostics report					
		32	Port mode					
		33	Validiation/backup					

No.	Sub-module	Parame ter-No.	Parameter
		34	Cycle time
		35	Vendor ID
		36	Device ID

Tab. 9: Overview on submodule parameters 1 ... 36

9.3.1.1 Submodul 1_SIO data/Module parameters

Parameter 1

SIO data / N	Iodule param	eters	[SIO data / Modul	e parameters	s]			Rroperties	🗓 Info 🔒 🗓 Diagnostics	┛▤▾
General	IO tags	Sys	stem constants	Texts				-		
▼ General		[CIO ma da bitma	andrea la carat						
Catalog	information		SIO mode bitma	pping layout						
▼ Module par	ameters		SIO mode bit	mapping layo	out					
SIO mod	le bitmapping la	yout								
General	diagnostic repo	rt s		Layou	ut: Port-ba	d				-
IO-Link d	liagnostic repor	t			Port-ba	d				
Deactiva	ate Us (pin 1)				Pin-bas	1				_
SIO char	nnel function (pi	n 2)								
SIO char	nnel input filter t	i	•							
Us sense	or supply curren	t								
SIO outp	out current (pin 2	2)	•							
SIO outp	out current (pin 4	4)								
Ua outpi	ut overload mar	1u								
Module f	failure									
I/O address	es									
<	l	>								

III. 23: Parameter No. 1_pin/port based

No.	Parameter	Selection (D-Default)	Description	
1	Layout	Port-based (D)	Transmission of IO data in port- based format.	
		Pin-based	Transmission of IO data in port- based format.	

Port-based I/O data / Qualifier, DI/DO

I/O Byte 0										
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7			
Port X0 Pin 4	Port X0 Pin 2	Port X1 Pin 4	Port X1 Pin 2	Port X2 Pin 4	Port X2 Pin 2	Port X3 Pin 4	Port X3 Pin 2			
I/O Byte 1										
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7			
Port X4 Pin 4	Port X4 Pin 2	Port X5 Pin 4	Port X5 Pin 2	Port X6 Pin 4	Port X6 Pin 2	Port X7 Pin 4	Port X7 Pin 2			

Tab. 10: Port-based data layout

Pin-based I/O data / Qualifier, DI/DO

I/O Byte 0								
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	

Port X0	Port X1	Port X2	Port X3	Port X4	Port X5	Port X6	Port X7
Pin 4	Pin 4	Pin 4	Pin 4	Pin 4	Pin 4	Pin 4	Pin 4
I/O Byte 1							
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7
Port X0	Port X1	Port X2	Port X3	Port X4	Port X5	Port X6	Port X7
Pin 2	Pin 2	Pin 2	Pin 2	Pin 2	Pin 2	Pin 2	Pin 2

Tab. 11: Pin-based data layout

Parameter 2-8

SIO data / Module par	10 data / Module parameters [SIO data / Module parameters]				Rroperties	🗓 Info 🔒 📱 Diagnostics	∎ = ▼
General IO tags	Sys	tem constants	Texts				
✓ General Catalog information		General diagno	stic report se	ttings			
 Module parameters 		General diag	nostic repor	t settings			
SIO mode bitmappin General diagnostic re	port s			Disable diagnostic report			
IO-Link diagnostic rej Deactivate Us (pin 1)	ort	Undervolta	age sensor su	Disable under voltage bus/sensor supply report			_
SIO channel input filt	erti		thresh	Image: Default (17.0 V - 17.5 V) Image: Disable under voltage actuator supply report			•
SIO output current (p	n 2)	Undervoltag	je actuator su thresh	ply old: Default (17.0 V - 17.5 V)			•
Ua output overload n	anu			Disable missing actuator supply report Enable LED indication for suppressed diagnostics			
I/O addresses							
<	>						

III. 24: Parameter no. 2-8 _General diagnostic messages

No.	Parameter	Selection (D-Default)	Description
2	Disable diagnostics re-	Off (D)	Enable diagnostic report.
	port	On	Diagnostic report disabled .
3	Disable undervoltage bus/sensor supply re-	Off (D)	Enable reporting undervoltage bus/ sensor supply.
	port	On	Undervoltage bus/sensor supply is <i>disabled</i> .
4	Undervoltage sensor	17.0 17.5 V (D)	Reporting is within the selected
	supply threshold	17.5 18.0 V (D)	range.
		18.0 18.5 V (D)	
		18.5 19.0 V (D)	
		19.0 19.5 V (D)	
		19.5 20.0 V (D)	
5	Disable missing actua- tor supply report	Off (D)	Reporting undervoltage of actuator supply is enabled.
		On	Reporting undervoltage of actuator supply <i>disabled</i> .
6	Undervoltage actuator	17.0 17.5 V (D)	Reporting is within the selected
	supply threshold	17.5 18.0 V (D)	range.
		18.0 18.5 V (D)	_
		18.5 19.0 V (D)	
		19.0 19.5 V (D)	

No.	Parameter	Selection (D-Default)	Description
		19.5 20.0 V (D)	
7	Disable missing actua- tor supply report	Off (D)	Reporting undervoltage of actuator supply is enabled.
		On	Reporting undervoltage of actuator supply <i>disabled</i> .
8	Enable LED indication for suppressed diag-	Off (D)	Disable LED indication for sup- pressed diagnostics.
	nostics	On	Enable LED indication for sup- pressed diagnostics.

SIO data / Module parameters	[SIO data / Module parameters]		Q Properties	🗓 Info 🔒 🗓 Diagnostics	▋▋▼
General IO tags Sys	tem constants Texts				
✓ General Catalog information	IO-Link diagnostic report settings				
 Module parameters SIO mode bitmapping layout 	IO-Link diagnostic report set	ings			
General diagnostic report s IO-Link diagnostic report Poertingto Us (cip 1)	X0 (IO-Link master port 1): X1 (IO-Link master port 2):	Report all diagnostics Report all diagnostics			•
SIO channel input filter ti	X2 (IO-Link master port 3): X3 (IO-Link master port 4):	Report all diagnostics Report all diagnostics except wire break Report only wire break diagnostics			
Us sensor supply current SIO output current (pin 2)	X4 (IO-Link master port 5): X5 (IO-Link master port 6):	Report all diagnostics Report all diagnostics			•
SIO output current (pin 4) Ua output overload manu	X6 (IO-Link master port 7):	Report all diagnostics			•
Module failure I/O addresses	X7 (IO-Link master port 8):	Report all diagnostics			•
<					

III. 25: Parameter No. 9_IO-Link diagnostics report

No.	Parameter	Selection (D-Default)	Description
9	Enable IO-Link master	Report all diagnostics	All diagnostics are displayed
	port report	Report all diagnostics except wire break	No line break diagnostics are dis- played.
		Report only wire break diagnostics	Only cable break diagnoses are dis- played.

Parameter 10

SIO data / Module parameters	[SIO data / Module parameters]	🔍 Properties	🗓 Info 🔒 🗓 Diagnostics	
General IO tags Sy	stem constants Texts			
▼ General	Deactivate Us (pin 1)			
 Module parameters SIO mode bitmapping layout 	Deactivate Us (pin 1)			
General diagnostic report s IO-Link diagnostic report Deastivate Us (sin 1)	☐ X0 (pin 1) ☐ X1 (pin 1)			
SIO channel function (pin 2) SIO channel input filter ti	X2 (pin 1)			
Us sensor supply current SIO output current (pin 2)	X4 (pin 1)			
SIO output current (pin 4) Ua output overload manu Module failure	(pin 1)			
I/O addresses				
<				

III. 26: Parameter No. 10_disable US at pin 1

No.	Parameter	Selection (D-Default)	Description
10	Deactivate US (pin1)	Off (D) Pin 1 supplies 24 VDC, e.g. f sor supply.	
		On	No voltage on pin 1!

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Free selection of the individual port settings.

Parameter 11

SIO data / Module parameters	O data / Module parameters [SIO data / Module parameters]						🗓 Info 🔒 📱 Diagnostics	
General IO tags Syst	tem constants	Texts						
▼ General	SIO channel fun	ution (nin 2)	\					
Catalog information	SIO channel lun	icuon (pin 2,						
 Module parameters 	SIO channel	function (pi	n 2)					
SIO mode bitmapping layout								
General diagnostic report s		X0 (pi	n 2): Autom	matic mode (DIO)				-
IO-Link diagnostic report		X1 (pi	n 2): Autom	matic mode (DIO)				-
Deactivate Us (pin 1)			a 2): Autom	matic mode (DIO)				-
SIO channel function (pin 2)		×2 (pi	Autom	matic mode (DIO)				
SIO channel input filter ti		X3 (pi	n 2): Digital	al input (normally open - NO)				
Us sensor supply current		X4 (pii	n 2): Outpu	ut (CPU STOP = off)				
SIO output current (pin 2)		X5 (pi	AUX p n 2): Deacti	tivated				
SIO output current (pin 4)		NC (-i)		notic mode (DIO)				
Ua output overload manu		x6 (pi	n 2): Autom	matic mode (DIO)				
Module failure		X7 (pi	n 2): Autom	matic mode (DIO)				-
I/O addresses								
< III >								

III. 27: Parameter No. 11_SIO channel function pin 2

No.	Parameter	Selection (D-Default)	Description
11	SIO channel function (pin 2)	Automatic mode (D)	Automatic configuration (automatic input or output recognition).
		Digital input (normally- open NO)	Input normally closed
		Output (CPU STOP =off)	Output
		AUX power	Static voltage +24 V DC for supply of Class B devices.
		Disabled	Disabled

SIO data / Module parameters	[SIO data / Module parameters]	Q Properties	🚺 Info 👔 📱 Diagnostics 📃 🖡	, 78 -	
General IO tags Syst	tem constants Texts				
▼ General Catalog information	SIO channel input filter time (pin	2)			_
 Module parameters SIQ mode bitmapping layout 	SIO channel input filter time	(pin 2)			
General diagnostic report s	X0 (pin 2):	No filter		T	
IO-Link diagnostic report Deactivate Us (pin 1)	X1 (pin 2):	No filter		•	
SIO channel function (pin 2)	X2 (pin 2): X3 (pin 2):	Ims 3ms			
Us sensor supply current	X4 (pin 2):	5ms 10ms			
SIO output current (pin 2)	X5 (pin 2):	15ms			
Ua output overload manu	X6 (pin 2):	No filter		•	
Module failure	X7 (pin 2):	No filter		•	
< III >					

III. 28: Parameter No. 12_Input delay pin 2

No.	Parameter	Selection (D-Default)	Description
12	SIO channel input filter	No filter (D)	No input delay
	time (pin 2)	1 ms	Input delay 1 ms
		3 ms	Input delay 3 ms
		5 ms	Input delay 5 ms
		10 ms	Input delay 10 ms
		15 ms	Input delay 15 ms



The input delay time acts as a filter that detects input signals as high only when time X is active.

Parameter 13

SIO data / Module parameters	[SIO data / Modul	Q Properties	🗓 Info 🔒 📱 Diagnostics	▋▋▋▼		
General IO tags Sys	tem constants	Texts				
✓ General Catalog information	Us sensor supp	ly current (pin)			
 Module parameters SIO mode bitmapping layout 	Us sensor su	pply current (p	in 1)			
General diagnostic report s		X0 (pin 1)	2.0 A			-
IO-Link diagnostic report		X1 (pin 1)	2.0 A			-
Deactivate Us (pin 1) SIO channel function (pin 2)		X2 (pin 1)	0.5 A 1.0 A			
SIO channel input filter ti		X3 (pin 1)	1.5 A			- 11
Us sensor supply current	-	X4 (pin 1)	2.0 A			
SIO output current (pin 2)	-	X5 (pin 1)	2.0 A			-
Ua output overload manu		X6 (pin 1)	2.0 A			-
Module failure		X7 (pin 1)	2.0 A			-
I/O addresses						
< III >						

III. 29: Parameter No. 13_Rated current for pin 1

No.	Parameter	Selection (D-Default)	Description
13	Ua sensor supply cur-	2,0 A (D)	Overload of 125 % will switch off pin.
	rent (pin 1)	1,5 A	
		1 A	-
		0,5 A	-

SIO data / M	lodule param	eters [SIO data / Modul	Rroperties	🗓 Info 追 🗓 Diagnostics	■■▼			
General	IO tags	Syst	em constants	Texts					
▼ General				nt (nin 2)					
Catalog i	nformation		Sio ouput cuire	int (pin 2)					
 Module para 	ameters		SIO output cu	irrent (pin)	2)				
SIO mod	e bitmapping la	yout							
General	diagnostic repo	t s		X0 (pi	in 2): [D A			-
IO-Link di	iagnostic report			X1 (pi	in 2):	DA			-
Deactiva SIO chan	te Us (pin 1) nel function (pir	12)		X2 (pi	in 2):	5 A 0 A			
SIO chan	nel input filter ti			X3 (pi	in 2):	5 A			_
Us senso	or supply current	Ì		X4 (pi	in 2):	DA DA			
SIO outp	ut current (pin 2)			in 2):	D A			-
SIO outp	ut current (pin 4			X6 (ni	in 2).	n A			
Ua outpu	it overload man	u							
Module fa	ailure			X7 (pi	in 2):	DA			-
I/O addresse	es								
<		>							

III. 30: Rated current for pin 2 at the output

No.	Parameter	Selection (D-Default)	Description
14	Rated current for pin 2	2,0 A (D)	Overload of 125 % will switch off pin.
	at the output (SIO out-	1,5 A 1 A	
	put current pin 4)		
		0,5 A	-

Parameter 15

SIO data / Module parameter	rs [SIO data / Modul	e parameter		Q Properties	🗓 Info 🔒 📱 Diagnostics	
General IO tags Sy	ystem constants	Texts				
▼ General						
Catalog information	SIO output curre	nt (pin 4)				
 Module parameters 	SIO output cu	ırrent (pin 4)				
SIO mode bitmapping layout						
General diagnostic report s		X0 (pin	1: 2.0 A			-
IO-Link diagnostic report		X1 (pin	2.0 A			-
Deactivate Us (pin 1) SIO channel function (pin 2)		X2 (pin	0.5 A 1.0 A			
SIO channel input filter ti		X3 (pin	1.5 A			_
Us sensor supply current		X4 (pin	2.0 A 1: 2.0 A			
SIO output current (pin 2)	•	X5 (nin	- 20A			.
SIO output current (pin 4)	-	ve (pin	201			
Ua output overload manu		X6 (pin-	2.0 A			
Module failure		X7 (pin	2.0 A			-
I/O addresses						
< III >						

III. 31: Rated current for pin 2 at the output

No.	Parameter	Selection (D-Default)	Description
15	Rated current for pin 4	2,0 A (D)	Overload of 125 % will switch off pin.
	at the output (SIO out-	1,5 A	
	put current pin 4)	1 A	
		0,5 A	-

Free parameter selection for ports X0 to X7.

SIO data / Module parameters	[SIO data / Modul	le paramete	rs]	Q Properties	🗓 Info 🔒 🗓 Diagnostics	
General IO tags Sys	tem constants	Texts				
▼ General	Lis output over	and manual r	actart (nin 2)			
Catalog information	oa output oven	Jau manuari	estart (piri 2)			
✓ Module parameters	Ua output ov	erload manu	ual restart (pin 2)			
SIO mode bitmapping layout						
General diagnostic report s			X0 (pin 2)			
IO-Link diagnostic report			X1 (pin 2)			
Deactivate Us (pin 1)			V2 (nin 2)			
SIO channel function (pin 2)						
SIO channel input filter ti			🔄 X3 (pin 2)			
Us sensor supply current			X4 (pin 2)			
SIO output current (pin 2) 🔸			X5 (pin 2)			
SIO output current (pin 4)			V6 (nin 2)			
Ua output overload manu			X6 (pin 2)			
Module failure			27 (pin 2)			
I/O addresses						
<						

III. 32: Parameter No. 17_Manual restart pin 2 in the event of overcurrent

No.	Parameter	Selection (D-Default)	Description
17	Ua output overload manual restart pin 2	Off (D)	Autotmatic errro reset after approx. 10 seconds if error has not occurred again.
		On	No error reset until the related output signal has been manuallyset to 0.
			This function is currently not avail- able. For this reason, this parame- ter is not accessible.

Parameter 18

SIO data / N	/lodule param	eters	[SIO data / Modul	le paramet	ers]				Q Properties	🗓 Info 🔒 🖳 Diagnostics	
General	IO tags	Sys	tem constants	Texts							
▼ General			Mardula falluna								
Catalog	information		Module failure								
▼ Module par	rameters										
SIO mod	de bitmapping la	yout				With the "Keep last value" s	etting, you cannot	evaluate the value status	of the inputs.		
General	diagnostic repo	rts	Input va	Input values with module							
IO-Link d	diagnostic report		failure:			Input value 0					-
Deactive	ate Us (pin 1)										
SIO cha	nnel function (pir	n 2)									
SIO cha	nnel input filter ti	i 🖡									
Us sens	or supply current	· [
SIO outp	out current (pin 2) •									
SIO out	out current (pin 4	.)									
Ua outp	ut overload man	u									
Module	failure										
I/O address	ses										
<	1	>									

III. 33: Parameter No. 18_Input value in case of module failure

No.	Parameter	Selection (D-Default)	Description		
18	Input values with mod-	Input value 0 (D) The input value is set to 0.			
	ule failure	Keep last value	The last input value remains active.		

9.3.1.2 Submodule 2_Disabled

Parameter 19 - 20

CM501.PN U	ser Manual →	Ungr	ouped	devices	CM501.	PN [CM	501.PN]								
										-	P Topolog	y view	A Network view	Device v	iew
	PN [CM50I.PN]		- 📖		· 🖪 🗌	Devi	ce overview	7							
					~	_ 	Module		Pack	Slot	Laddrerr	O address	Type	Article no	
									O	0	Touciess	Q address	CMEDIPN	11261571	
4							CM50ITH	PN	0	01			CMEDI PN	11201371	
COLP.								device 1	0	1			CM50LPN device		
CN							• CMBULEN	ta / Medule param	0	1.1	2.2		CIVIDOILFIN device		
							SIU da	rta / Module param.		1 Y0 (10 Link mentangent 1)	25	25	Sto data / Module p		
	_						Stand	ard digital input	0	1 XU (IO-Link master port 1)			Standard digital inp		
	•						Stand	ard digital output	0	1 XT (IO-Link master port 2)			Standard digital ou		
_		(1951)					Deact	ivated	0	1 X2 (IO-Link master port 3)	4		Deactivated		
-		iol - i	RARRY				IO-Lin	c in 02 bytes + PQI	0	1 X3 (IO-Link master port 4)	58		IO-Link In 02 bytes		
			Baumer		4		IO-Lin	Cout 01 byte + PQI	0	1 X4 (IO-Link master port 5)	910	45	IO-Link Out 01 byt		
							IO-Lin	k In/Out 02/02 byt	0	1 X5 (IO-Link master port 6)	1114	67	IO-Link In/Out 02/0		
							IO-Lin	k In/Out 08/02 byt	0	1 X6 (IO-Link master port 7)	1524	89	IO-Link In/Out 08/0		
							IO-Lin	k In/Out 08/02 byt	0	1 X7 (IO-Link master port 8)	2534	1011	IO-Link In/Out 08/0		
							 CM50I.PN 	options_1	0	2			CM50I.PN options		
									0	21					
									0	2 2					
									0	2 3					
									0	2 4					
									0	2 5					
									0	2 6					
									0	2 7					
	100%		-			1			0	<u> </u>					5
		41		<u> Y</u>					_	III			•		- -
eactivated	u [Deactivated	1			1	_					Prop	erties	Linto Li C Dia	gnostics	
General	IO tags	Syst	em con	istants	Texts										
General			Modu	do param	otore										
Catalog i	information		Would	ne param	eters										
Hardware in	nterrupts		IO-Lin	k port par	amotor										
Module para	ameters		10-611	ik port par	anneter _										_
IO-Link p	oort parameter		IO-I	Link port	paramete	er									
Module fa	failure														
I/O addresse	es				Por	t Mode:	Deactivated								-
			Modu	le failure											
		Ĥ													
		•													
		-					With the "Keep	last value" setting,	you canı	not evaluate the value status (of the inpu	s.			
				Input vi	alues with	module									_
						failure:	Input value 0								Ψ.

III. 34: Parameter Nor. 19-20_Module Parameters

No.	Parameter	Selection (D-Default)	Description		
19	Port mode	Disabled (D)	Parameter cannot be edited!		
20	Input values with mod-	Input value 0 (D)	The input value is set to 0.		
	ule failure	Keep last value	The last input value is used and not overwritten with 0.		

9.3.1.3 Submodul 3_Standard digital input

CM501.PN User Manual ► Ung	grouped devices 🕨	CM501.PN [0	[M501.PN]						_ =	≣×
						⁹ Topolog	y view	Network view	Device vie	w
CM50I.PN [CM50I.PN]	- 🖽 🖭 🍊	De	vice overview							
		▲	Module	Back	Slot	Laddress	O address	Type	Article no	
			CM50LPN	0	0	roouress	Q DODICSS	CM50LPN	11261571	
4			CM50LPN	0	01			CM50LPN	112013/1	
50 ^{1,2}			 CM50LPN device 1 	0	1			CM50LPN device		
CAN			SIQ data / Module param	0	11	2 3	2.3	SIO data / Module n		
			Standard digital input	0	1 X0 (IO-Link master port 1)			Standard digital inp	1	
_			Standard digital output	0	1 X1 (IO-Link master port 2)			Standard digital ou		_
			Deactivated	0	1 X2 (IO-Link master port 3)	4		Deactivated		-
#1			IO-Link In 02 bytes + POI	0	1 X3 (IO-Link master port 4)	58		IO-Link In 02 bytes		
	& Baumer		IO-Link Out 01 byte + POI	0	1 X4 (IO-Link master port 5)	910	45	IO-Link Out 01 bvt		
			IO-Link In/Out 02/02 byt	0	1 X5 (IO-Link master port 6)	1114	67	IO-Link In/Out 02/0		
			IO-Link In/Out 08/02 byt	0	1 X6 (IO-Link master port 7)	1524	89	IO-Link In/Out 08/0		
			IO-Link In/Out 08/02 byt	0	1 X7 (IO-Link master port 8)	2534	1011	IO-Link In/Out 08/0		
			 CM50I.PN options 1 	0	2			CM50I.PN options		
				0	21					
				0	2 2					
				0	2 3					
				0	2 4					
				0	2 5					
				0	2 6					
				0	27					
100%				0			<u>i</u>			~
100%	· · · · · · ·		·	_		Lerre .				
Standard digital input [Standa	ird digital input]					Rope	rties	🗓 Info 🔒 🗓 Diag	jnostics	
General IO tags Sys	stem constants	Texts								
▼ General	Medule paramy	tors								
Catalog information		iters								—
 Module parameters 	Digital function									
Digital function										_
IO-Link port parameter	Digital functi	on								
	510 J	10 10 10 1								-
	SIO channe	I function (pin 4	-): Digital input (normally open - NO))						1
	SIO channe	el input filter tim	ie No filter							
	•	(pin 4	y. No men							
	IO-Link port para	emeter								
	IO Link port r	arameter								
	ю-ыпк ротт р	arameter								
			Enable port diagnostics							

Parameter 21 - 23

III. 35: Parameter No. 21, 22, 23_Digital input

No.	Parameter	Selection (D-Default)	Description
21	SIO channel function (pin 4)	Digital input (normally open NO) (D)	Normally open or closed
		Digital input (normally closed NC)	
22	SIO channel input filter time (pin 4)	No filter	The input delay time acts as a filter that detects input signals as high only when time X is active.
23	Enable IO-Link port parameter report	Enable port diagnos- tics An (D)	Reporting of IO-Link device and IO- Link master errors.
		Enable port diagnos- tics Off	<i>No</i> reporting of IO-Link device and IO-Link master errors.

9.3.1.4 Submodul 4_Standard digital output

CM501.PN User Manual ► Un	grouped devices)	CM501.	PN [CM501.PN]							<u> </u>	
						-	Topolog	y view	Network view	Device 1	view
4 CM50I.PN [CM50I.PN]			Device overview								
		~				at i			-	1	_
			Module		Rack	Slot	laddress	Q address	Type	Article no.	
~			 CM50I.PN 		0	0			CM50LPN	11261571	-
COLPT				LEN	0	1			CMEOLEN device		
CAND			CMBUI.FR	t device_1	0	1.1	2.2		CINDULFIN device		
			Store	ata / Module param	0	1 V0 (10 Link master part 1)	25	25	Sto data / Module p		
			Stand	lard digital input	0	1 XU (IO-Link master port 1)			Standard digital inp.		
			Dead	initia digitar output	0	1 X1 (IO-Link master port 2)	4		Depictivated		
	LECENCE .		Deach	lula 02 hitaa i BOL	0	1 X2 (IO-Link master port 5)	4		Deactivated		
121	Raumor		IO-LIN	k in 02 bytes + PQI	0	1 X5 (IO-Link master port 4)	50	4.5	IO-Link in 02 bytes		
	Daumer	-	10-Lin	k Out OT byte + PQT	0	1 X4 (IO-Link master port 5)	910	4	IO-Link Out of byt		
			IO-LIN	k In/Out 02/02 byt	0	1 X5 (IO-Link master port 6)	1114	0/	IO-Link In/Out 02/0		L
			IO-Lin	k In/Out 08/02 byt	0	1 X6 (IO-Link master port 7)	1524	89	IO-Link In/Out 08/0		
			IO-LIN	k In/Out 08/02 byt	0	1 X7 (IO-LINK master port 8)	2534	1011	IO-LINK IN/OUT 08/0		
			 CM50I.PK 	options_1	0	2			CM50I.PN options		
					0	21					
					0	22					
					0	2 3					
					0	2 4					
					0	2 5					
					0	2 6					
		~			0	27					
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Standard digital output [Stan	dard digital output	il i					Prone	urtios (1 Info 🙃 🗓 Dia	anostics	18.
Comment 10 town Cu		Terete	_				nope	indes [JIOSTICS	
General 10 tags Sy	stem constants	Texts									
General	Module param	eters									
Catalog information											
Module parameters	Digital function										
Digital function	Disital funct										
IO-Link port parameter	Digital funct	ion									
				ic = op(pip 4)							
				ic – on (pin 4)							
			Ua output o	overload manual resta	rt (pin	4)					
	1										
	IO-Link port par	ameter _									
	IO-Link port	oaramete	ər								
			🗹 Enable por	t diagnostics							
			_								

Parameter 24 - 26

III. 36: Parameter No. 24, 25, 26_Digital output

No.	Parameter	Selection (D-Default)	Description	
24	Static output signal at	Off (D)	No static output signal os active.	
	pin 4 (Output static = on (pin 4))	On	Static output signal is active.	
25 Ua output overload manual restart (pin 4)		Off (D)	<i>Automatic</i> error reset after approx. 10 seconds, provided the error has not occurred again.	
		On	The error is only logged off after the relevant output signal has been <i>manually</i> set to 0.	
			This function is currently not avail- able. For this reason, this parame- ter is not accessible.	

No.	Parameter	Selection (D-Default)	Description	
26	Enable IO-Link port parameter report	Enable port diagnos- tics On (D)	Reporting of every IO-Link device and IO-Link master error.	
		Enable port diagnos- tics Off	No reporting of IO-Link device and IO-Link master errors.	

9.3.1.5 Submodule 5, 6, 7

- Submodule 5 generic IO-Link modules
- Submodule 6 Profile Devices
- Submodule 7 ME devices

Parameter 27 - 36

IO-Link In/O	ut 02/02 byte	s + PQ	I [IO-Link In/Out	02/02 byte	+ PQI]	🔍 Properties	🚺 Info 🔋 🗓 Diagnostics	∎∎ ▼
General	IO tags	Syst	em constants	Texts				
▼ General			Modulo paramo	tors				^
Catalog	information		would parame					=
Hardware in	nterrupts		IO-Link port para	meter				
 Module par 	ameters							
IO-Link p	ort parameter		IO-Link port p	arameter				
I/O address	es				Enable port diagnostics			
					Enable process alarm (device notification)			
		•			Enable configuration via PDCT (Port and Device Configuration Tool)			
					Enable input fraction			
					Enable pull/plug alarm			
				Port M	de: Autostart			-
			Va	lidation / bac	up: No device check			•
				Port cycle t	me: As fast as possible			
				Vendo	r ID: 00,00			
				Devic	ID: 00,00,00			
								*

III. 37: Parameter Nr. 27 ... 36

IO-Link In/Out 02/02 bytes + PC	QI [IO-Link In/Out	02/02 bytes + P(QI]	🔍 Properties	🗓 Info 🔒 📱 Diagnostics	
General IO tags Sys	tem constants	Texts				
 ✓ General Catalog information Hardware interrupts 	Module parame	eters				*
✓ Module parameters IO-Link port parameter	IO-Link port para	arameter				
I/O addresses	Va	Port Mode : lidation / backup : Port cycle time : Vendor ID : Device ID :	As fast as possible 3.2 ms 4.8 ms 6.4 ms 6.4 ms 8.0 ms 10.0 ms 10.0 ms 12.0 ms 12.0 ms 16.0 ms 20.0 ms 40.0 ms 120.0 ms 40.0 ms 30.0 ms 120.0 ms As fast as possible 0.000 00.000 00.000 00.000			_

III. 38: Parameter No. 34_Cycle time

No.	Parameter	Selection (D-Default)	Description	
27	Enable port diagnos- Off tics report		NO reporting of IO-Link port diagnos- tics.	
		On (D)	Reporting of IO-Link port diagnostics.	
28	Enable process alarm	Off	No process alarm reporting.	
	report (device notifica- tion)	On (D)	Process alarm reporting enabled.	

No.	Parameter	Selection (D-Default)	Description
29	Configuration via	Off	<i>No</i> configuration via PDCT enabled.
	PDCT (Enable configu- ration via PDCT (Port and Device Configura- tion Tool)	On (D)	Configuration via PDCT enabled.
30	Enable input fraction	Off (D)	Validating input data length of the connected device.
		On	The input data length of the con- nected device may exceed the con- figured length. However, no error re- port.
			For more informationen see "IO-Link- data length"
31	Enable pull/plug diag- nostics report	Off	No pull/plug diagnostics reporting ifan IO-Link device connection gets lost
			 a device has been identified.
		On (D)	Pull/plug reporting enabled if
			 an IO-Link device connection gets lost
			 a device has been identified.
32	Port mode*	Autostart (D)	IO-Link mode.
			Validity check and filter time setting not enabled.
		Manual	IO-Link mode.
			Validity check and filter time setting not enabled.
		Disabled	Disabled

No.	Parameter	Selection (D-Default)	Description
33	Validation/backup*	No device check (D)	No validity checks enabled
		Type compatible de- vice (1.0)	Validity check is performed if port mode is set to Manual. Check is per- formed on IO-Link version 1.0.
			Output of diagnostics if device is not compatible.
		Type compatible de- vice (1.1)	Validity check is performed if port mode is set to Manual. Check is per- formed on IO-Link version 1.1.
			Output of diagnostics if device is not compatible.
		Type compatible V1.1 device with backup + restore	Validity check is performed if port mode is set to Manual. Check is per- formed on IO-Link version 1.0.
			Output of diagnostics if device is not compatible.
			Restore+backup behavior as defined in the IO-Link specification, see "IO- Link_DataStorage. Option Restore"
		Type compatible V1.1 device with restore	Validity check is performed if port mode is set to Manual. Check is per- formed on IO-Link version 1.0. Diag- nostics reporting if device is not com- patible.
			Restore behavior as defined in the IO- Link specification.
34	□Cycle time (Port cy- cle time), see "Param- eter cycle time"	as fast as possible (D)	The Master and connected IO-Link module will automatically determine the shortest cycle time.
		3.2 ms	Specified filter time
		4.8 ms	Specified filter time
		6.4 ms	Specified filter time
		8.0 ms	Specified filter time
		10 ms	Specified filter time
		12 ms	Specified filter time
		16 ms	Specified filter time
		20 ms	Specified filter time
		40 ms	Specified filter time
		80 ms	Specified filter time
		120 ms	Specified filter time
35	Vendor ID*	00, 00	Vendor ID of the IO-Link device to be used. Will be applied in validity check.

No.	Parameter	Selection (D-Default)	Description
		2-byte list, byte by byte, separated by comman and in hexac- ecimal format	
36	Device ID*	00, 00, 00 3-byte list, byte by byte, separated by comman and in hexac- ecimal format	Device ID of the IO-Link device to be used. Will be applied in validity check.

*Submodule 7 ME devices

Check the validity of the connected devices in submodule 7 "ME devices". Therefore the following restrictions apply to the parameter selection:

- Port mode
 - Parameter "Port mode" is permanently set to "Manual".
- Validiation/backup
 - Parameter "Validation/backup" is preset to "Type compatible device (1.1)". Only the options "Type compatible device (1.1)" and "Type compat- ible device (1.0)" can be selected.
- Vendor ID
 - Parameter "Vendor ID" is permanently set to the ID of the described device.
- Device ID
 - Parameter "Device ID" is permanently set to the ID of the described device.

IO-Link data length



Different lengths of IO-Link data are transmitted to Profinet without error.

In this case, however, part of the input data is transferred via Profinet. We expect input data length may vary (4, 6, and 8 bytes) according to sensor parameterization or profile. Sub module configuration in Profinet can define 4 input bytes and enable parameter "enable input fraction". This prevents any mismatch alarm and the first 4 bytes of the sensor are mapped to Profinet. The other bytes will be ignored.

A use case would be the IOL sensor which provides optional additional diagnostic input bytes; these would be ignored in Profinet if they are not PLC/machine. relevant. In this case, data are accessible in another way, e.g. OPC UA, MQTT, JSON.

IO-Link-DataStorage. Option Restore



When switching to "Restore" status, any previous device configurations stored in the device will be discarded, especially when switching from "Back- up&Restore" to "Restore".

Upon ilnitial connection of a compatible device in "Restore" status:

- a) Master is retrieving the DataStorage data (one-time backup) from the device,
- b) saves it and
- c) will transmit the data to every compatible device which is connected next with different configuration (Restore).

Parameter cycle time

Communication cycle time

Selection (D = Default)	Description
As fast as possible (D)	The master and the IO-Link device automati- cally determine the fastest cycle time.
3,2 128,0 ms	Set cycle time to this value.

Tab. 12: Communication cycle time

The parameter cycle time defines the cycle time applied in IO-Link Master and IO-Link device r communication.

For most applications, "As fast as possible" is best. When establishing communication, master and device select the shortest possible cycle time.

Specific conditions (e.g. using inductive couplers or other intermediate devices between master and IO-Link device) may require manual setting of cycle time.

If so, select a permanent cycle time (to be supported both by master and device) to remedy the problem.

Further information on the bits used in generic IO-Link devices please refer to section *IO-Link-Ports* [> 43]

9.3.2 Modul MVK Pro options

Submodule overview

- Qualifier DI
- Qualifier DO
- System status
- MQTT
- OPC UA
- JSON
- Web server
- Output Forcing

		1	
		Parame	
No.	Sub-module	ter-No.	Parameter
1	Qualifier DI	37	Input value in the event of module failure
2	Qualifier DO		
3	Systemstatus		
4	MQTT	38	Activation
		39	Server IP-Adresse
		40	Client ID
		41	Client head topic
		42	Topic for system data
5	OPC UA	43	Activation
		44	TCP port number
		45	Writing of ISDU data
		46	Writing of PDO data
6	JSON	47	Activation
7	Web server	48	Activation
8	Output Forcing	49	Forcing rules

Submodule module parameters

Tab. 13: Overview on submodule parameters 37 ... 49

9.3.2.1 Submodule 1-3

- Submodule Qualifier DI
- Submodule Qualifier DO
- Submodule System Status

Parameter 37

Qualifier DI [Qualifier DI]			🔍 Properties	🗓 Info 🔒 🎚 Diagnostics	
General IO tags Sys	tem constants Texts				
▼ General	Module failure				
Catalog information					
 Module parameters 					
Module failure		With the "Keep last value" setting, you cannot evaluate the value status	of the inputs.		
I/O addresses	Input values with module	,			
	failure:	Input value 0			
•					

III. 39: Parameter no. 37

No.	Parameter	Selection (D-Default)	Description
37	Input values with mod-	Input value 0 (D)	The input value is set to 0.
	ule failure	Keep last value	The last input value is applied and will not be overwritten by 0.

9.3.2.2 Submodule 4_MQTT

Parameter 38

MQTT [MQTT]			Q Properties	🗓 Info 🚺 🗓 Diagnostics	
General IO tags Syst	tem constants Texts				
✓ General Catalog information	MQTT general settings				
Module parameters MQTT general settings MOTT server related settings	MQTT general settings	Enable MOTT			
MQTT client related settings					
<					

III. 40: Parameter no. 38_General settings

No.	Parameter	Selection (D-Default)	Description
38	Enable MQTT	MQTT Off (D) MQTT is <i>not</i> available.	
		On	MQTT is available.

Parameter 39

MQTT [MQTT]		🔍 Properties	🗓 Info 🔒 📱 Diagnostics	
General 10 tags Sy	/stem constants Texts			
✓ General Catalog information	MQTT server related settings			
 Module parameters MOTT general settings 	MQTT server related settings			
MQTT server related settings	MQTT Server IP address: 0.0.0.0			
MQ II client related settings				

III. 41: Parameter No. 39_Server IP address

No.	Parameter	Selection (D-Default)	Description
39	MQTT Server IP-Ad-	0.0.0.0	MQTT server IP address.
	dress		

Parameter 40-42

MQTT [MQTT]			Properties	🗓 Info 🚺 🗓 Diagnostics 👘	
General IO tags Syst	tem constants Texts				
✓ General Catalog information	MQTT client related settings				_
 Module parameters MQTT general settings 	MQTT client related settings				
MQTT server related settings	MQTT Client ID:	MqttClient			
MQTT client related settings	Client head topic :				
	Topic for system data:				
< III >					

III. 42: Parameter 40, 41, 42_Client settings

No.	Parameter	Selection (D-Default)	Description
40	MQTT Client ID	MqttClient	ID des MQTT Clients
41	Client head topic		Client head topic
42	Topic for system data		Not applied!

9.3.2.3 Submodul 5_OPC UA

Parameter 43-46

OPC UA [OPC UA]		🔍 Properties	🗓 Info 🔒 🗓 Diagnostics	
General IO tags	System constants Texts			
▼ General	OPC UA settings			^
Catalog information				=
 Module parameters 	OPC UA settings			
OPC UA settings				
	Enable OPC UA			
	TCP port number: 4840			
	Allow OPC UA clients to write ISDU data			
	Allow OPC UA clients to write PDO data			

III. 43: Parameter 43, 44, 45, 46_OPC UA

No.	Parameter	Selection (D-Default)	Description
43	Enable OPC UA	Off (D)	Disabled. OPS UA <i>not</i> available.
		On	Enabled. OPC UA is available
44	TCP port number	4840	TCP port number
45	Allow OPC UA clients to write ISDU	Off (D)	Disabled
	data	On	Disabled. OPS UA no available. Enabled. OPC UA is available TCP port number Disabled Enabled Disabled Enabled
46	Allow OPC UA clients to write PDO	Off (D)	Disabled
	data	On	Enabled

9.3.2.4 Submodul 6_JSON

Parameter 47

JSON [JSON]							Q Properties	🗓 Info 🔒 📱 Diagnostics	
General	IO tags	Syst	em constants	Texts					
▼ General									
Catalog i	g information JSON general seturities			sturiys					
▼ Module para	meters	4	JSON genera	l settings					
JSON gen	eral settings	E	-	_					
		•			🛃 Enable JSON				
		-							

III. 44: Parameter no. 47_General settings

N	No.	Parameter	Selection (D-Default)	Description
4	17	Enable JSON	Off (D)	Disabled. JSON not available.
			On	Enabled. JSON available.

9.3.2.5 Submodul 7_Webserver

Parameter 48

Web server	[Web server]					🔍 Properties	🚺 Info 🚺 📱 Diagnostics 📰 🗉	-
General	IO tags	Syste	em constants	Texts				
▼ General			Web server gen	aral setting				^
Catalog i	information		web server gen	erar seturig.				
▼ Module para	ameters	4	Web server ge	eneral sett	ings			
Web server general settings								
	2	•			Enable web server			
<		>						*

III. 45: Parameter No. 48_enable web server

No.	Parameter	Selection (D-Default)	Description
48	Enable web server	Off (D)	Disabled. Web server <i>not</i> available.
		On	Enabled. Web server available.

9.3.2.6 Submodul 8_Output Forcing

Parameter 49

Output for	Output forcing [Output forcing]							 Diagnostics 	
General	IO tags	System	constants	Texts					
✓ General			lodulo paramo	tore					^
Catalog information			buule parame						=
Module parameters		4	Forcing output	its settings					
		-		Forcing rule	Forcing allowed if PLC not connected and denied if PLC connected				
									~

III. 46: Parameter No. 49_Forcing rules

Ύ_ INFO

Output Forcing:

Instead of transferring the controller process data, the data set via Output Forcing is transferred to the outputs. Output Forcing is accessible via Website or OPC UA.

Enable Output Forcing is only feasible if the set forcing rules are met.

No.	Parameter	Selection (D-Default)	Description
49	Forcing rules	Output forcing:permitted if no PLC connection established	Output forcing of the output data is only allowed with no PLC con nection established.
		 not permitted if PLC connection established (D) 	
		Output forcing permitted	Output forcing is <i>always permit-</i> <i>ted</i> , no matter what is the PLC connection status.
		Output forcing not permitted	Output forcing is <i>never permit-</i> <i>ted,</i> no matter what is the PLC connection status.

9.4 IO-Link configuration

IO-Link configuration

Module CM50I.PN provides two ways for for IO-Link device configuration and parameterization:

- IO-Link parameterization via PROFINET
- Baumer Sensor Suite (BSS)

IO-Link-Integration in PROFINET

IO-Link integration in *PROFINET* is a standardized method for accessing IO-Link device parameterization and configuration via *PROFINET* interfaces.

CM50I.PN supports integration V1.0 Edition 2.

Ċ_ INFO

For further information please see document *IO-Link-Integration-for-PROFINET_Ed2_2_832_V10_Jun17*.

Baumer Sensor Suite (BSS)

BSS allows for IO-Link device parameterization.

IO-Link data is visualized via a graphical interface and the parameterization of the device is made possible in the simplest possible way.



Software *Baumer Sensor Suite (BSS)* and the corresponding manual is available at *Baumer* website <u>https://www.baumer.com/bss</u>.

9.5 Cyclic and acyclic communication

The IO-Link specification defines three types of data in the transmission between IO-Link master and IO-Link device:

- Cyclic process data (process data objects input/output)
- Acyclic data as device data (on-request data objects)
- Acyclic data as events

Process data objects and their port qualifiers are transmitted cyclically once communication has been established.

Each IO-Link port enables individual parameterization of the transmission time as IO-Link cycle time (parameter *cycle time*).

Process data of the connected device may include 0 to 32 bytes (each input and output) and are transmitted via the set range of addresses.

The device defines the process data size. The port qualifier indicates whether process data is valid.

Device data (on-request data objects) comprise:

- Device parameters
- I&M data records (Identification & Maintenance)
- Diagnostic information

Device data can be written to the device as parameters or read out from the device as device status. Transmission is acyclically and on IO-Link Master request only.

IO-Link events are error messages and warnings/maintenance data.

The device flagging an event is followed by the IO Link master request for diagnostic data. *CM50I.PN* transmits diagnostics data via fieldbus to the control.

For more information on device diagnostics and IO-Link event codes please see chapter Kap. 9.2.3.1 "Description according IO-Link directive of integration edition 2" beschrieben...".

9.5.1 Acyclic IO-Link access

Acyclic access to different data sections in the IO-Link master or access to IO-Link device data utilizes PN-IO read/write services:

- Read/Write services for I&M data in Master and IO-Link devices.
- IO-Link function block IOL_Call with ISDU (Index Service Data Unit)
 - IOL_Index 0x0000 0x7FFF and IOL_Subindex 0x00 0xFF

(See: IO-Link Integration Part1 2812_V100_080124 and IO-Link Integration for PROFINET_Ed2_2832_V10_Jun17).

The IO-Link function block supports the following tasks:

- IO-Link device parameterization,
- IO-Link device diagnostics,
- Execute IO-Link port functions,
- save and recover IO-Link device parameters.

The IO-Link function block is provided by the controller manufacturer (e.g. Siemens FB IO_Link_Device for TIA Portal), see chapter 8.5.3 "IO-Link Funktion block".



For more information please refer to the instruction manual of the related control manufacturer.

9.5.2 I&M-Daten

I&M data acyclic reading may be any time in order to identify the system-installed devices. The system-specific description, location, function and date of installation can be written to the module.

The module supports the following I&M data records:

- IM_Index = 0xAFF0 -> Read access to IM0 IOL_M
- IM_Index = 0xAFF1 -> Read access to IM1 IOL_M
- IM_Index = 0xAFF2 -> Read access to IM2 IOL_M
- IM_Index = 0xAFF3 -> Read access to IM3 IOL_M
- IM_Index = 0xAFF4 -> Read access to IM4 IOL_M
- IM_Index = 0xB063 -> Read access to IOL_M Directory

I&M0 (Slot0, Index 0xAFF0)

I&M0 Data	Size in bytes/access (read/ write)	Description
VendorID	2 / r	Manufacturer ID
OrderID	20 / r	Product name
IM_Serial_Number	16 / r	Device serial number
IM_Hardware_Revision	2 / r	Device hardware revision
IM_Software_Revision	4 / r	Device software revision (V0.0.0)
IM_RevisionCounter	2 / r	Revision counter

I&M0 Data	Size in bytes/access (read/ write)	Description
IM_Profile_ID	2 / r	ID IO-Link sub module profile (API = 0x4E01)
IM_Profile_Specific_Type	2 / r	Additional profile value (= 0 not used)
IM_Version	2 / r	I&M-Version (Default 0x0101)
IM_Supported	2 / r	Supported I&M data records (e.g. 0x0001 -> only I&M0 is supported)

Tab. 14: I&M0 data record

I&M1 (Slot0, Index 0xAFF1)

	Size in bytes/access (read/	
I&M1 Data	write)	Description
TagFunction of submodule	32 / r/w	Device function
TagLocation of submodule	22 / r/w	Device location within the sys-
		tem

Tab. 15: I&M1 data record

I&M2 (Slot0, Index 0xAFF2)

	Size in bytes/access (re	ead/
I&M2 Data	write)	Description
Installation_Date	16 / r/w	Device installation date

Tab. 16: I&M2 data record

I&M3 (Slot0, Index 0xAFF3)

I&M3 Data	Size in bytes/access (read/ write)	Description
Descriptor	54 / r/w	Device description

Tab. 17: I&M3 data record

Reading of I&M data record

Function block RDREC_Instance in the TIA portal

Website
http://support.industry.siemens.com

Example: I&M Index 0xAFF0



III. 47: Function Block RDREC_Instance

RDREC block	Functionality
RDREC_Instance	This function block is used
RDREC block	Functionality
-------------	---
	 for acyclic reading via S7-program I&M data

9.5.3 IO-Link function block

IO_LINK_DEVICE function block in TIA Portal

The IO-Link function block is included in the library *IO_LINK_Library_V14.zal14*.

Library	Website
IO_LINK_Library_V14.zal14	http://support.industry.siemens.com

Function block *IO_LINK_DEVICE* in the TIA Portal is similar to *IOL_CALL*. *IOL_CALL* is defined in the IO-Link specification.



III. 48: Function block IO-Link device

IO-Link block	Functionality
IO_LINK_DEVICE	This function block is used
	 for acyclic writing of device parameters to an IO-Link device via S7 program
	 for reading parameters, measured values and diagnostic data from an IO-Link device

Input parameters

Parameter	Data type	Description
REQ	BOOL	Positive edge: initiate data transmission
ID	HW_IO	For S7-1200/1500
		Hardware ID of the IO-Link communication module
	DWORD	For S7-300/400
		Logical address of the IO-Link communication mod- ule (module or sub module)
CAP	DINT	Client Access Point (CAP = 0xB400)
	(S7-1200/1500)	
	INT	
	(S7-300/400)	
RD_WR	BOOL	Read or write access
		0: read
		1: write
PORT	INT	Port number the IO-Link device is operated at. Per- mitted values: 0 63
		Port 0 IO-Link Master Modul;
		Port 1 IO-Link device on port 1, etc.

Parameter	Data type	Description
IOL_INDEX	INT	Number of IO-Link index to be read out or de- scribed
IOL_SUBINDEX	INT	Number of IO-Link sub index to be read out or de- scribed;
		1 255: parameter of record
LEN	INT	Length of data to be written (net data) Read: 0 232 (not relevant)
		Wrote 1 232

Tab. 18: IO_LINK_DEVICE Input parameters

Output parameters

Parameter	Data type	Description
DONE_VALID	BOOL	Validity:
		0: data not valid
		1 = data valid
BUSY	BOOL	Order in progress:
		0: order completed (valid or error)
		1: Order in progress
ERROR	BOOL	Error status:
		0: no error
		1: aborted with error
STATUS	DWORD	ERROR = 1 -> function error, see table 8-19: "IO_LINK_DEVICE
		- Parameter STATUS" and Tab. 8-20:
		"IO_LINK_DEVICE - Parameter STATUS error code"
		ERROR = 0 -> status of function DW#16#000x0000
		(x: processing step 0 3)
IOL_STATUS	DWORD	ERROR = 1 -> IO Link error or communication er-
		ror, see tab. 8-21: "IOL M Error Codes"
RD_LEN	INT	Length of the read data (net data)

Tab. 19: IO_LINK_DEVICE Output parameters

Input and output parameters

Parameter	Data type	Description
RECORD_IOL_D	ARRAY [0 231] of	Source and target areas for the data to be read and
ATA	BYTE	to be written

Tab. 20: IO_LINK_DEVICE Input and output paramters

Parameter STATUS

The STATUS is composed of 4 bytes:

Byte 3	Byte 2	Byte 1	Byte 0
Manufacturer-specific ID	0x80 defines error as acyclic communication error	STATUS Code	Manufacturer-specific ID

Tab. 21: IO_LINK_DEVICE - Parameter STATUS

Status-Code	Name	Description
0xFF000000	TIMEOUT	Internal error module communication error
0x00FFFF00	INVALID_HANDLE	
0x00FFFE00	HANDLE_OUT_OF_BUFFERS	
0x00FFFD00	HANDLE_DESTINATION_ UN- AVAILABLE	
0x00FFFC00	HANDLE_UNKNOWN	
0x00FFFB00	HANDLE_METHOD_ INVALID	
0xxx80A0xx	MASTER_READ_ERROR	Reading error
0xxx80A1xx	MASTER_WRITE_ERROR	Writing error
0xxx80A2xx	MASTER_MODULE_FAILURE	IO-Link master failure, potential bus error
0xxx80A6xx	MASTER_NO_DATA	No data received
0xxx80A7xx	MASTER_BUSY	IO-Link master busy
0xxx80A9xx	MASTER_FEA- TURE_NOT_SUPPORTED	Feature not supported by IO-Link Master
0xxx80AAxx	MASTER_RESOURCE_ UN- AVAILABLE	IO-Link Master not available
0xxx80B0xx	ACCESS_INVALID_INDEX	Index invalid, incorrect INDEX_CAP
0xxx80B1xx	AC- CESS_WRITE_LENGTH_ER- ROR	Module cannot process data length to be written, maybe you are addressing the wrong module
0xxx80B2xx	ACCESS_INVALID_ DESTINA- TION	Incorrect slot addressing
0xxx80B03xx	ACCESS_TYPE_CONFLICT	IOL_CALL invalid
0xxx80B5xx	ACCESS_STATE_CONFLICT	error in sequence IOL_CALL
0xxx80B6xx	ACCESS_DENIED	Access denied by IO-Link Master block
0xxx80C2xx	RESOURCE_BUSY	IO-Link Master module busy resp. await-
0xxx80C3xx	RESOURCE_UNAVAILABLE	ing reply of connected IO-Link device
0xxx8901xx	INPUT_LEN_TOO_SHORT	The index to be read contains more data than specified in input variable <i>LEN</i>

Tab. 22: IO_LINK_DEVICE - Parameter STATUS error code

IOL_STATUS

The IOL_STATUS comprises the 2-byte IOL M error code and 2-byte IOL error type.

FB IO_LINK_DEVICE - Parameter IOL_STATUS / IOL M Error Codes

IOL M Error Codes (2 bytes)		
Error Code	Designation according to specification.	Description
0x0000	No error	no error
0x7000	IOL_CALL conflict	Unexpected write request, read request expected
0x7001	Wrong IOL_CALL	Decoding error
0x7002	Port blocked	Port blocked by another task
	Reserved	-
0x8000	Timeout	Timeout, IOL master or IOL device ports busy
0x8001	Wrong index	Error: IOL index specified <32767 or >65535
0x8002	Wrong port address	Port address not available
0x8003	Wrong port function	Port function not available
	Reserved	-

Tab. 23: IOL M Error Codes

FB IO_LINK_DEVICE - Parameter IOL_STATUS / IOL Error Types

IOL Error Types (2 bytes)		
Error Code	Designation according to specification.	Description
0x1000	COM_ERR	Communication error
		Potential cause:
		The addressed port is parameterized as DI and not in IO-Link mode
0x1100	I_SERVICE_TIMEOUT	Communication timeout, maybe device reply delayed
0x5600	M_ISDU_CHECKSUM	Master is reporting checksum error, de- vice not accessible
0x5700	M_ISDU_ILLEGAL	Device cannot process master request
0x8000	APP_DEV	Device application error
0x8011	IDX_NOTAVAIL	Index not available
0x8012	SUBIDX_NOTAVAIL	Subindex not available
0x8020	SERV_NOTAVAIL	Service temporarily unavailable
0x8021	SERV_NOTAVAIL_LOCCTRL	Service temporarily unavailable, device busy (e.g. on-device teaching/ parametrization is active)
0x8022	SERV_NOTAVAIL_DEVCTRL	Service temporarily unavailable, device busy (e.g. device teaching/parameteriza- tion via DTM/PLC etc is active)
0x8030	PAR_VALOUTOFRNG	Parameter value outside valid range
0x8031	PAR_VALGTLIM	Parameter value exceeds maximum limit
0x8032	PAR_VALLTLIM	Parameter value below minimum limit

IOL Error Types (2 bytes)			
Error Code	Designation according to specification.	Description	
0x8033	VAL_LENOVRRUN	Length of the data to be written does not	
0x8034	VAL_LENUNDRUN	match the defined parameter length	
0x8035	FUNC_NOTAVAIL	Function in device unavailable	
0x8036	FUNC_UNAVAILTEMP	Function in device temporarily unavailable	
0x8040	PARA_SETINVALID	Set parameter invalid: May not match the general device parameterization	
0x8041	PARA_SETINCONSIST	Set parameter not consistent	
0x8082	APP_DEVNOTRDY	Application not ready, device busy	
0x8100	UNSPECIFIC	Manufacturer-specific according to device	
0x8101 bis 0x80FF	VENDOR_SPECIFIC	documentation	

Tab. 24: IOL Error Types

9.6 Basic settings

9.6.1 Topology

PROFINET offers numerous functions as well as options for diagnostics and maintenance based on the existing topology or utilizing knowledge of this topology.

All *CM50I.PN* support the topology settings and automatic topology recognition by the Engineering Tool.

The section below describes how to set the *CM50I.PN* topology. The settings for connected neighboring devices are made via the ports **X1 P1** and **X1 P2**, which represent the physical interfaces.

Tab *Port interconnection* | *Partner port* provides under menu item *Partner port* a list of all ports for the devices in the project.

CM50I.PN [(CM50I.PN]						🔍 Properties	🗓 Info 🚺 🗓 Diagnostics	
General	IO tags	Syst	tem constants	Texts					
 General 			Dent inter						
Catalog	information		> > Fortintero	connection					
 PROFINET in 	nterface [X1]		Local port:						
General									
Ethernet	t addresses			Local port	t: CM50I.PN\CM50I.PN [X1]\f	Port 1 [X1 P1 R]			
▼ Advance	ed options				Medium:	Copper			
Interfa	ace options				Cable name:				
Media	a redundancy				Cable liame.				
▼ Real ti	time settings								
10	cycle								
 Port 1 	[X1 P1 R]								
Ge	eneral		1						
Por	irt interconnectio	<u>n</u> 1	1						
Por	rt options								
 Port 2 	2 [X1 P2 R]	۲	1						
Ge	eneral		Partner port:						
Por	rt interconnectio	n							
Por	rt options				Monitoring of partner por	rt is not possible			
Identificatio	on & Maintenanc	e			Alternative partners				
Hardware in	nterrupts			Partner por	t: Any partner				
					Medium				
					Wearann.				
						 Cable length: 			
						<100 m			-
						 Signal delay: 			
						0.600			μs
			4						

III. 49: Topology description

CM50I.PN [CM50I.PN]				Risperties	🗓 Info 追 🗓 Diagnostics	
General IO tags Sys	tem constants Texts					
▼ General	Dent internet ation					*
Catalog information	> For Interconnection					=
▼ PROFINET interface [X1]	Local port:					
General						
Ethernet addresses	Local port:	S7-1200-Station_1				
 Advanced options 		▼ Lm PLC_1				
Interface options		▼ PROFINET-Sch	nittstelle_1			
Media redundancy		Port_1				
 Real time settings 		Port_2				
IO cycle						
 Port 1 [X1 P1 R] 						
General						
Port interconnection						
Port options						
✓ Port 2 [X1 P2 R]						
General	Partner port:					
Port interconnection						
Port options						
Identification & Maintenance					C Edit	
Hardware interrupts	Partner port:	Any partner				
		Medium:				
			Cable length:			
			<100 m			-
			🔵 Signal delay:			
						µs 🗸

III. 50: Topology description

Module identification in the network

PNIO devices identify by ther MAC address and the respective module type.

Putting several modules of the same type into operation requires them to be clearly differentiated from one another.

Using the following path and selecting the *PN/IE_1* network in the network view, you can search for available users *Online* | *Assign PROFINET device name*.



III. 51: Identify individual modules in the network

Assign	PROFINET devic	e name.				_			×
	-		Configured PRO	FINET dev	ice				
			PROFINET devid	ce name:	cm50i.pn			-	
1			Dev	vice type:	CM50I.PN				
			Online access						
			Type of the PG/PC i	interface:	PN/IE				
			PG/PC i	interface:	I enovo LISB Ether	met			n
						ince .			<u>•</u>]
			Device filter						
			🛃 Only show	devices of t	ne same type				
			Only show	devices with	n bad parameter setti	ings			
			Only show	devices with	nout names				
		Anna Shin day	inne in the metriculu						
		IP address	MAC address	Device	PROFINET device na	me	Status		
		0.0.0.0	9C-C9-50-01-B0-A7	CM50I.PN	-	<u>^</u>	No device na	me assigned	
		<							>
						Upda	te list	Assign nam	e
Onlin	e status information	n:							
0	Search complete	d. 0 of 1 devices w	ere found.						
0	Search complete	d. 0 of 1 devices w	ere found.						
0	Search complete	d. 1 of 2 devices w	ere found.						
<				1111					
								Close	

III. 52: Identify individual modules in the network

Device identifies by flashing. The LEDs of the selected CM50I.PN start flashing.

Instruction:

- a) | Mark the available module.
- b) Select option *LED flashing*.

Also see about this

■ LED indicator [▶ 114]

9.6.2 PROFINET device name

Assigning the PROFINET device name

Once having clearly identified a module, you can assign it a name.

The PNIO controller will automatically assign the IP addres via *DCP* (*Discovery and Configuration Protocol*). Address and name resolution are only managed via the name remanently saved in this module. *Instruction:*

- a) Select module.
- b) Click Assign name.

Assign PROFINET device n	ame.					>					
		Configured PRO	FINET dev	ice							
		configured Pilo									
		PROFINET devic	e name:	cm50i.pn							
		Dev	ice type:	CM50I.PN							
		Online access									
		Type of the PG/PC i	nterface:	🖳 PN/IE		•					
	PG/PC interface: 🔛 Lenovo USB Ethernet 💌 🤄										
		Device filter									
		🛃 Only show	devices of th	ie same type							
		Only show	devices with	bad parameter settings							
		Only show	devices with	outnames							
	Accessible devices in the network:										
	IP address	MAC address	Device CMEOL PN	PROFINET device name	Status						
	192.100.0.250	3C-C3-50-01-80-A/	CIVIDOLTIN	embolph							
.											
Flash LED											
					Indata list						
					ipuate list	Assign name					
Online status information:											
Search completed. 0) of 1 devices wer	e found.				<u>^</u>					
 Search completed. 0 Search completed 1 	of 1 devices wer	e found. e found									
	or 2 devices wer	e lound.				×					
			1111								
						Close					

III. 53: PROFINET device name

TIA Portal now indicates the module CM50I.PN and the new assigned device name..

IP address assignment

You can assign an IP address to module *CM50I.PN* which will not be stored in the module. To do so, enter the required IP address and the subnet mask to be used.

CM50I.PN [CM50I.PN]			Q Properties	🗓 Info 追 🎚 Diagnostics	
General IO tags Sys	stem constants Texts				
✓ General Catalog information	Ethemet addresses				*
 PROFINET interface [X1] 	Interface networked with				
General Ethernet addresses	Subnet:	PN/IE_1			-
Advanced options		Add new subnet			
Media redundancy					
 Real time settings 	IP protocol				
IO cycle		Cat IB address in the project			
 Port 1 [X1 P1 R] 		Set in address in the project			
General		IP address: 192 . 168 . 0 . 2			
Port interconnection	•	Subnet mask: 255 . 255 . 255 . 0			
Port options		Synchronize router settings with IO controller			
✓ Port 2 [X1 P2 R]	•	Use router			
General					
Port interconnection		Router address: 0.0.0.0			
Port options		IP address is set directly at the device			
Identification & Maintenance					
Hardware interrupts	PROFINET				
		Generate PROFINET device name automatically			
	PROFINET device name:	cm50i.pn			
	Converted name:	cm50i.pn			
	Device number	1			T
	bevice number.				

III. 54: IP address assignment

In tab Properties | General

• Double-click Ethernet addresses.

9.6.3 Default settings

Restore default

Function **Restore default - retain I&M data** will reset the module to the default settings while retaining the I&M data saved in the memory.

Proceed as follows:

Instruction:

- a) Click Connect online in the TIA Portal.
- b) Once connection has been established, select the related module.
- c) In the project navigator, open module MVK-MPNIO. Double-click Online & Diagnostics.
- d) Under tab *Functions* click *Restore default* to open a dialog window.
- e) Select Retain I&M data.
- f) Click button Reset.

Result:

✓ Module is reset to default.

Restore default - default parameters

Settings	Value
IP address	0.0.0.0
Subnet mask	0.0.0.0
Router address	0.0.0.0
PROFINET device name	Blank

Tab. 25: Restore default - default parameters

Restore default - I&M parameters

I&M parameters	Value
Installation ID	Blank
Location ID	Blank
Installation date	Blank
Description	Blank
Additional information	Blank

Tab. 26: Restore default - I&M parameters

Restore default - retain I&M data

CM50I.PN User Manual → Ung	rouped devices 🔸 CM501.PN [CN	ol.pn] -	_ 🖬 🖬 🗙
▼ Diagnostics	Posat to factory sattings		^
General	Neset to factory settings		=
Diagnostic status			
Channel diagnostics			
 PROFINET interface [X1] 	MAC	dress: 9C - C9 - 50 - 01 - B0 - A7	
▼ Functions	IP	dress: 192.168.0.2	
Assign IP address	DOCINET de la	cm50i pp	
Assign PROFINET device na	PROFINE I devic	name: ciriot.pri	
Reset to factory settings	-	Retain I&M data	
		🔿 Delete I&M data	
		Reset	
<			*

III. 55: Restore default - retain I&M data

Restore default - delete I&M data

The function **Restore default - delete I&M data** restores default settings in the module and at the same time deletes the I&M data stored in memory.

Proceed as follows:

- a) Click Connect online in the TIA Portal.
- b) Once connection has been established, select the related module.
- c) In the project navigator, open module *MVK-MPNIO*. Double-click *Online & Diagnostics*.
- d) Under tab *Functions* click *Restore default* to open a dialog window.
- e) enable selection *delete I&M data*.

f) Click button Reset.

Result:

✓ Module is reset to default.

Restore default - delete I&M data

Diagnostics General Diagnostic status Channel diagnostics PROFINET interface [X1]	et to factory settings	Z
PROFINET interface [X1]		
Functions Assign IP address Assign PROFINET device na Reset to factory settings	MAC address: IP address: PROFINET device name:	9C - C9 - 50 - 01 - 80 - A7 192 . 168 . 0 . 2 cm50i.pn Retain I&M data Delete I&M data Reset

III. 56: Restore default, delete I&M data

CM50I.PN User Manual → Ung	grouped devices → CM501.PN [CM501.PN]	_ ■ ■×
▼ Diagnostics	Percet to factory actions	
General	Reset to factory settings	
Diagnostic status		
Channel diagnostics		
PROFINET interface [X1]	MAC address: 9C - C9 - 50 - 01 - B0 - A7	
▼ Functions	IP address: 192.168.0.2	
Assign IP address	PROFINET device name: CM50ipn	
Assign PROFINET device na		
Reset to factory settings	Chetain I&M data Colline & diagnostics (0241:000055) This command resets the following data: PROFINET device name I Paddress SNMP parameters I &M data Do you really want to reset the module?	

III. 57: Restore default, delete I&M data - confirmation dialog

9.7 Media Redundancy Protocol (MRP) configuration

How to configure media redundancy is described in the engineering software manual.

This document describes a configuration via the Siemens TIA Portal Engineering Software.

Preparation:

Instruction:

- a) Set up a project in the TIA Portal.
- b) Add a **controller** with two ports or an additional *PROFINET Managed Switch*.
- c) Add the CM50I.PN device.
- d) Assign the CM50I.PN device to the controller (see MRP-Manager).

MRP manager setup

A ring configuration requires 2 ports of a *PROFINET Managed Switch* or *S7 CPU* to be configured as ring managers and all remaining users as clients.



III. 58: MRP manager setup

a) Select PROFINET Managed Switch.

- b) Navigate to menu item **PROFINET interface** | Advanced options | Media redundancy.
- c) Under Media redundancy role select Manager (Auto).
- d) | Enable the selectionenable *Diagnostics interrupts*.

CM501.PN User Manua	al ▶ Ur	ngroup	ed de	evices 🕨	CM50	1.PN [0	C M50	I.PN]							-		iХ
												2	Topology view	A Network view	Device	view	
	v1	-				De	avice	oveniew									
uur	-	3	-				svice										
						1	}	Module	Rack	Slot	I address	Q address	Туре	Article no.	Firmw	are	C
1914					=			CM50I.PN	0	0			CM50I.PN	11261571	V1.3.0		
5N501								 CM50I.PN device_1 	0	1			CM50I.PN device				
					_			SIO data / Module param.	0	11	23	23	SIO data / Module p.				
								Standard digital input	0	1 X0 (Standard digital inp				
								Standard digital output	0	1 X1 (Standard digital ou.				
								Deactivated	0	1 X2 (4		Deactivated				
	6		8					IO-Link In 02 bytes + PQI	0	1 X3 (58		IO-Link In 02 bytes				
		Bau Bau	mer					IO-Link Out 01 byte + PQI	0	1 X4 (910	45	IO-Link Out 01 byt				
						۰		IO-Link In/Out 02/02 byt	0	1 X5 (1114	67	IO-Link In/Out 02/0				
						_		IO-Link In/Out 08/02 byt	0	1 X6 (1524	89	IO-Link In/Out 08/0				
					_	•		IO-Link In/Out 08/02 byt	0	1 X7 (2534	1011	IO-Link In/Out 08/0				
								 CM50I.PN options_1 	0	2			CM50I.PN options				
								Qualifier DI	0	2 1	3536		Qualifier DI				
								Qualifier DO	0	2 2	3738		Qualifier DO				
								System state	0	2 3	3942		System state				
								MQTT	0	24			MQTT				
								OPC UA	0	2 5			OPC UA				
								JSON	0	2 6			JSON				
								Web server	0	27			Web server				
								Output forcing	0	28			Output forcing				
					~												
< III > 100%			·		. 🗉	•	۲.										>
CM50I.PN [CM50I.PN]]												Properties	🗓 Info 追 🗓 Diagr	nostics		-
General IO tag	s S	vstem	const	tants	Text	<u> </u>											_
= PDOEINET interface [V1]	1	,		curres	- Torre	<u> </u>											_
FROFINETIMEnace [A1] Conorol	1	~	>	Media	redund	dancy											_
General																	
Ethemet addresses																_	
 Advanced options 						MR	Pdoma	ain mrpdomain-1								-	
Media and under a					Media	redunda	ancy ro	le: Client								•	
Real time setting	-y					Rir	ng port	1: CM50I.PN [X1]\Port 1 [X1 P1	R]								
 Real time setting IO sures 	2					Dir	na nort	2: CM50LPN [X1]\Port 2 [X1 P2	p1								
= Port 1 [V1 P1 P]							ig pon										
Conorol			-					Diagnostics interrupts									
Bentintereen		=															
Port interconni Best estients	ection		-					Domain settings									
= Port 3 [V1 P3 P]																	
Bort interes	ection																
Port interconn	ection																
Port options																	
Hardware interrute	nance																
naroware interrupts		~															

Setting up MRP client

III. 59: Setting up MRP client

a) Select module CM50I.PN.

b) Navigate to menu item **PROFINET** interface | Advanced options | Media redundancy.

- c) Set *client* for *media redundancy role*.
- d) Activate *diagnostic alarms*.

Note: The CM50I.PN module must be located in the same MRP domain.

Setting up the MRP cycle times

If media redundancy has been set, the IO cycle times must be parameterized for each module.

According to the PLC, RT requirements and system advancement requires setting the IO cyle times and factors in the following window.

CM50I.PN [CM50I.PN]		Q Properties	🗓 Info 🚺 🗓 Diagnostics	
General IO tags Syste	m constants Texts			
▼ General				^
Catalog information	> > IO cycle			=
 PROFINET interface [X1] 	Update time			
General				
Ethernet addresses	 Calculate update time automatically 			
 Advanced options 	Set update time manually			
Interface options	Undata timo 4.000			
Media redundancy	4.000			
 Real time settings 				
IO cycle	Adapt update time when send clock changes			
Port 1 [X1 P1 R]				
 Port 2 [X1 P2 R] 	Watchdog time			
Identification & Maintenance				
Hardware interrupts	Accepted update cycles without			
	IO data: 3			•
	Watchdog time: 12.000			ms

III. 60: Setting up the MRP cycle times

- a) Navigate to menu item **PROFINET interface** | advanced options | media redundancy | IO cycle.
- b) Enter the parameter values: Update time and Accepted update cycles without IO data

Setting up MRP domain

PN/IE_1 [Ind	lustrial Ethern	net]							Q Properties	🗓 Info 📋 🗓 Diagnostics	
General	IO tags	Sys	tem constan	ts Texts							
▼ PROFINET Su General	ubnet		> > mrpc	domain-1							
 Domain i Symp. d 	management domains	_			ter laranteaute	1					_
✓ MRP d	omains		Neo	lia redundancy dom	in: mrpdomain	-1					_
▼ mr	pdomain-1			Converted na	ne: mrpdomain	-1					
	Devices		In	terfaces within the r	ng: 1						
Overview	v isochronous m	ode	Inte	rfaces outside the ri	ig: 1						
PLC_1.PROFI	INET IO-System (Num	ber of 'Manager (au	o)': 0						
		_		Number of manag	ers: 0						
		_		Number of clie	its: 1						
		_			Default d	omain					
					Redunda	ncy manager out	ide of the project				
					0	,					
			> > > D(evices							
		_									
		- 1	PROFINI	ET IO system							
			10 4	urtore							
		-	1 PLC	1 PROFINETIO-Syste	m (100)						
		- 1			(100)						
		_									
		_									
			Devices								
			PRO	FINET device name	MRP domain	MRP role	Ring port 1	Ring port 2			
			1 cm5	50i.pn	mrpdoma	Client 🗖	Port 1 [X1 P1 R]	The Port 2 [X1 P			
			2 plc_	1	mrpdomain-1	Not device in	. Port_1 [X1 P1 R]	Port_2 [X1 P2 R]			
<		>									
11 64.0.				n							

III. 61: Setting up MRP domain

- a) For an oview of ring users, navigate to menu item *Domain-Management* | *MRP-Domains* | *mrpdomain-1*.
- b) Assign the PROFINET Managed Switch to IO controller.
- c) Save the project.
- d) Click PNIE sub net.
 - ✓ Bus PLC_1.PROFINET IO-System (100) appears.
- e) Assign module MVK-MPNIO to the IO controller.

Result:

✓ All users of the ring configuration are listed under **Devices**.

Also see about this

B Media redundancy (MRP) [▶ 16]

9.8 Isochronous-Real-Time (IRT) configuration

IRT

You will find the procedure for configuring IRT operation in the manual for your engineering software.

This document describes a configuration via the *Siemens TIA Portal Engineering Software*. This communication type requires specialized real-time capable hardware components (IRT).



INFO

The device is no active user in IRT data exchange. It supports transmission of IRT telegrams without loss for synchronized fieldbus devices in the same Ethernet subnet.

Preparation:

a) Set up a project in the *TIA Portal*.

- b) Add an IRT-capable controller.
- c) Add the device.

d) Connect the PROFINET interfaces.



INFO

Make sure that media redundancy is not set (see chapter 8.7 "Media Redundancy Protocol (MRP) configuration").

IRT communication: Setting up the Sync master



INFO

This procedure describes the projecting of non-synchronized IRT communication. For how to set up clock-synchronized IRT communication please refer to the manual of your engineering software.

PLC_1 [CPU	15116	-1 PN]										_	•
								🚽 Topology view	.	Network	view	🛐 Device	view
PLC_1 [CPU 1511F-1 PN]	-		6	🔟 🔍 ±			Device o	overview					
						<u> </u>	1 N	Module	Rack	Slot	I address	Q address	Туре
									0	100			
ac)									0	0			
×.								PLC_1	0	1			CPU
								PROFINET-Schnittstelle_1	0	1 X1			PRO
100 0 1	2	3 4	5	61422		-			0	2			
profilschiene_0			_	_		•			0	3			
				7 15	23	-			0	4			
									0	5			
				14 22	31				0	6			
									0	7			
						~			0	8			
(III)	> 7	75%		•		. •	<						>
PLC_1 [CPU 1511F-1 PN]								Roperties	🔛 lr	nfo 追	🞖 Diagno	stics	
PLC_1 [CPU 1511F-1 PN] General IO tags S	ystem	consta	nts	Texts				Roperties	i Ir	nfo 追	🞖 Diagno	stics	
PLC_1 [CPU 1511F-1 PN] General IO tags S General	ystem	consta	nts	Texts				🖳 Properties	1 Ir	nfo 追	🖁 Diagno	stics	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe	ystem	consta	nts Synchi	Texts				Roperties	L Ir	nfo 追	🖁 Diagno	stics	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe PROFINET interface [X1]	ystem	consta	nts Synch	Texts				C Properties		nfo 🚺	🖁 Diagno	stics	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe PROFINET interface [X1] General	ystem	consta	nts Synch	Texts ronization		Sync-Doma	in 1	C Properties		nfo 🚺	Diagno	stics	
PLC_1 [CPU 1511F-1 PN] General IO tags General Fail-safe PROFINET interface [X1] General F-parameters	ystem	consta	nts Synchi	Texts ronization Sync		Sync-Doma	in_1	C Properties		nfo 🚺	Diagnos	stics ain settings	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe PROFINET interface [X1] General F-parameters Ethernet addresses	ystem	constat	nts Synch	Texts ronization Sync	domain:	Sync-Doma Sync mast	in_1 er	C Properties		nfo 追	Diagno:	stics ain settings	
Ceneral IO tags S General IO tags S General Fail-safe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization	ystem	constat	nts Synchi	Texts ronization Sync Synchroniza	domain: ation role: RT class:	Sync-Doma Sync mast RT,IRT	in_1 er	Properties		nfo	Diagno:	stics ain settings	
Ceneral IO tags S General IO tags S General Failsafe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode	ystem	constant > >	nts Synchi	Texts ronization Sync Synchroniza	domain: stion role: RT class:	Sync-Doma Sync mast RT,IRT	in_1 er	Properties		nfo 主	Diagno:	ain settings	
PLC_1 [CPU 1511F-1 PN] General IO tags General Failsafe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode Advanced options	ystem	constar	nts Synchi	Texts ronization Sync Synchroniza	c domain: ation role: RT class:	Sync-Doma Sync mastr RT,IRT	in_1 er	Properties		nfo 👔	Diagno:	ain settings	
PLC_1 [CPU 1511F-1 PN] General IO tags General Fail-safe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode Advanced options Interface options	ystem	consta	nts Synchi	Texts ronization Sync Synchroniza	: domain: ation role : RT class:	Sync-Doma Sync mastr RT,IRT	in_1 er	Properties		nfo 1	Uiagno:	ain settings	
LC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode Advanced options Interface options Media redundancy	ystem	constat	nts Synchi	Texts ronization Synchroniza	c domain: stion role: RT class:	Sync-Doma Sync mastr RT,IRT	in_1 er	Properties		nfo 1	Diagno:	ain settings	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode ✓ Advanced options Interface options Interface options Media redundancy ✓ Real time settings	ystem	constal	nts Synchi	Texts ronization Synchroniza	c domain: ation role: RT class:	Sync-Doma Sync mastr RT,IRT	in_1 er	Properties		nfo 👔	Diagno	ain settings	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe * PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode * Advanced options Interface options Media redundancy * Real time settings IO communication IO communication	ystem	constal	nts Synchi	Texts ronization Sync Synchroniza	c domain: ation role: RT class:	Sync-Doma Sync mastr RT,IRT	in_1 er	Properties		nfo 👔	Diagno	ain settings	
PLC_1 [CPU 1511F-1 PN] General IO tags S General Fail-safe PROFINET interface [X1] General F-parameters Ethernet addresses Time synchronization Operating mode Advanced options Interface options Media redundancy Real time settings IO communication Synchronization	ystem	constan	nts Synchi	Texts ronization Sync Synchroniza	c domain: ation role: RT class:	Sync-Doma Sync mast RT,IRT	in_1 er	Properties		nfo 👔	Diagno	ain settings	

III. 62: IRT communication: Setting up the Sync master

a) Double click Controller PLC_1.

b) Navigate to menu item Advanced Options | Real time settings | Synchronisation.

c) For Synchronisation role select Sync-Master.

						_ 🗗	≡×
	2	Topolog	gy view	🔒 Netv	vork view	Device vie	w
rview							
ule	Rack	Slot	I address	Q address	Туре	Article no	s.
M50I.PN	0	0			CM50I.PN	1126157	1 ^
CM50I.PN	0	01			CM50I.PN		
M50I.PN device_1	0	1			CM50I.PN device		
SIO data / Module param	. 0	11	23	23	SIO data / Module	e p	=
Standard digital input	0	1 X0 (Standard digital	inp	
Standard digital output	0	1 X1 (Standard digital	ou	
Deactivated	0	1 X2 (4		Deactivated		
IO-Link In 02 bytes + PQI	0	1 X3 (58		IO-Link In 02 byte	s	
IO-Link Out 01 byte + PQI	0	1 X4 (910	45	IO-Link Out 01 by	t	
IO-Link In/Out 02/02 byt	0	1 X5 (1114	67	IO-Link In/Out 02	/0	
IO-Link In/Out 08/02 byt	0	1 X6 (1524	89	IO-Link In/Out 08	10	
IO-Link In/Out 08/02 byt	0	1 X7 (2534	1011	IO-Link In/Out 08	lo	
M50I.PN options_1	0	2			CM50I.PN options	;	
Qualifier DI	0	21	3536		Qualifier DI		~
		1111					>
		🔍 Prop	erties	🚺 Info	追 🗓 Diagnost	ics	= -
							-
1					Domains	ettings	
						c currige	
	Iview Ule IM50LPN Ch50LPN Standard digital input Standard digital input Standard digital output Deactivated IO-Link In0 2 bytes + POI IO-Link In10 to 88/02 byt IO-Link In10 ut 08/02 byt IO-Link In10 ut 08/02 byt ID-Link In10 ut 08/02 byt	view ule Rack MSOLPN 0 CMSOLPN 0 CMSOLPN 0 Standard digital output 0 Standard digital output 0 Deactivated 0 IO-Link In/Out 02/02 byt 0 IO-Link In/Out 08/02 byt 0 IO-Link In/OUT 08	Propolog Niew Rack Slot MSOLPN 0 0 • CM50LPN 0 0 1 1 1 Slot data / Module param 0 1 Standard digital input 0 1 XX0 (Standard digital output 0 1 XX1 (Deactivated 0 1 XX2 (IO-Link In 2b ytes + PQI 0 1 XX4 (IO-Link In/Out 02/02 byt 0 1 XX5 (IO-Link In/Out 08/02 byt 0 1 XX7 (MS0LPN options_1 0 2 Qualifier DI 0 2 1	Image: Sign of the second	Propology view Metw view Iaddress Q address MSOLPN 0 0 0 CM50LPN 0 0 1 CM50LPN 0 1 23 Standard digital input 0 1 X0 (1 Deactivated 0 1 X2 (4 1 IO-Link In 02 bytes + PQI 0 1 X3 (58 1 IO-Link In/Out 08/02 byte. 0 1 X5 (1114 67 IO-Link In/Out 08/02 byte. 0 1 X5 (1524 89 IO-Link In/Out 08/02 byte. 0 1 X7 (2534 1011 MSOLPN options_1 0 2 1 3536 Uwalifier DI Image: Similar Simil	Image: Topology view Metwork view Image: Topology view Qaddress Type Image	Image: Propology view Metwork view Image: Propology view <thi< td=""></thi<>

IRT communication: Setting up Sync-Slave

III. 63: IRT communication: Setting up Sync-Slave

Also see about this

Isochronous-Real-Time (IRT) [▶ 17]

9.9 Simple Network Management Protocol (SNMP)

Transmitting SNMP request

Request	On request, Baumer CM50I.PN will transmit a SNPM message.				
	SNMPv2-MIB:sysDescr.0 Objekt (1.3.6.1.2.1.1.1.0)				
Response	Device response structure:				
	Baumer, CM50I, ArtNo., HW version, SW version, MAC address.				

9.10 Industrial Internet of Things (IIoT)

9.10.1 JSON

JSON standard settings

No.	REST API URL	Description	Support ing
1	GET /iolink/v1/gateway/identification	Identification of the gateway	Yes
2	GET /iolink/v1/gateway/capabilities	Capabilities of the gateway	Yes
3	GET /iolink/v1/gateway/configuration	Read network configuration of the gate- way	Yes
4	POST /iolink/v1/gateway/configura- tion	Write network configuration of the gate- way	Yes
5	POST /iolink/v1/gateway/reset	Reset the gateway including all masters	-
6	POST /iolink/v1/gateway/reboot	Reboot the gateway including all masters	-
7	GET /iolink/v1/gateway/events	Event log containing all events from gate- way, masters, ports, and devices	Yes
8	GET /iolink/v1/masters	Get all available master number keys and identification information	Yes
9	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ capabilities	Capabilities of the master	Yes
10	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ identification	Read identification of the master	Yes
11	POST /iolink/v1/masters/\$MAS- TER_NUMBER/ identification	Write identification of the master	Yes
12	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ports	Get all available port number keys	Yes
13	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ports/ \$PORT_NUM- BER/capabilities	Read capability information of the speci- fied port	Yes
14	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ports/ \$PORT_NUM- BER/status	Read status of the master	Yes
15	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ports/ \$PORT_NUM- BER/configuration	Read configuration of the specified port	Yes
16	POST /iolink/v1/masters/\$MAS- TER_NUMBER/ ports/\$PORT_NUM- BER/configuration	Write configuration of the specified port	Yes
17	GET /iolink/v1/masters/\$MAS- TER_NUMBER/ports/ \$PORT_NUM- BER/datastorage	Read data storage content of the specified port	Yes
18	POST /iolink/v1/masters/\$MAS- TER_NUMBER/ ports/\$PORT_NUM- BER/datastorage	Write data storage content of the specified port	Yes
19	GET /iolink/v1/devices	Address all devices of all masters	Yes

No.	REST API URL	Description	Support ing
20	GET /iolink/v1/devices/{deviceAlias}/ capabilities	Read capability information of the speci- fied device	Yes
21	GET /iolink/v1/devices/{deviceAlias}/ identification	Read identification information of the speci- fied device	Yes
22	POST /iolink/v1/devices/{de- viceAlias}/identification	Write identification information of the specified device	-
23	GET /iolink/v1/devices/{deviceAlias}/ processdata/ value?format=byteArray	Read process data value from the speci- fied device	Yes
24	GET /iolink/v1/devices/{deviceAlias}/ processdata/ getdata/value?for- mat=byteArray	Read process data input value from the speci- fied device	Yes
25	GET /iolink/v1/devices/{deviceAlias}/ processdata/ setdata/value?for- mat=byteArray	Read process data output value from the specified device	Yes
26	POST /iolink/v1/devices/{de- viceAlias}/processdata/ value	Write the process data output value to the specified device	Yes
27	GET /iolink/v1/devices/{deviceAlias}/ parameters/ {index}/value/?for- mat=byteArray	Read a specific parameter value and its sub- parameter values (if the parameter has com- plex type) with the given index of the device	Yes
28	GET /iolink/v1/devices/{deviceAlias}/ parameters/ {index}/subindices/ {subindex}/value/?format= byteArray	Read the value of a specific sub-parame- ter with the given index and subindex	Yes
29	GET /iolink/v1/devices/{deviceAlias}/ parameters/{parameterName}/ value/?format=byteArray	Read a specific parameter value with the gi- ven name	-
30	POST /iolink/v1/devices/{de- viceAlias}/parameters/ {index}/value	Write the parameter with the given index to the device	Yes
31	POST /iolink/v1/devices/{de- viceAlias}/parameters/ {parameter- Name}/value	Write the parameter with the given name to the device	-
32	POST /iolink/v1/devices/{de- viceAlias}/parameters/ {index}/ subindices/{subindex}/value	Write the sub-parameter with the given in- dex and subindex to the device	Yes
33	POST /iolink/v1/devices/{de- viceAlias}/parameters/ {parameter- Name}/subindices/{subParameter- Name}/ value	Write the sub-parameter with the given para- meter name and sub-parameter name to the device	-
34	POST /iolink/v1/devices/{de- viceAlias}/ blockparametrization/?for- mat=byteArray	Read or write one or more parameters as a block	Yes
35	GET /iolink/v1/devices/{deviceAlias}/ events	Read event log from the specified device	Yes
36	GET /iolink/v1/mqtt/configuration	Read configuration of MQTT clients	Yes

No		Description	Support
INO.	RESTAPIORL	Description	ing
37	POST /iolink/v1/mqtt/configuration	Write configuration of MQTT clients	-
38	GET /iolink/v1/mqtt/topics	Read list of MQTT topics	-
39	POST /iolink/v1/mqtt/topics	Write list of MQTT topics	-
40	DELETE /iolink/v1/mqtt/topics/{topi- cID}	Delete a specific MQTT topic	-
41	GET /iolink/v1/mqtt/topics/{topicID}	Read a specific MQTT topic	-
42	GET /iolink/v1/mqtt/connectionstatus	Read connection status	Yes

Vendor-specific JSON settings

No.	REST API URL	Description	Support ing
43	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/diagnostics/ configuration	Diagnostic configuration of the master	Yes
44	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/diagnostics/ value	Diagnostic values of the master	Yes
45	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ statistics/current	Current statistic values of the specified port of the master	Yes
46	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ statistics/voltage	Voltage statistic values of the specified port of the master	Yes
47	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ statistics/temper- ature	Temperature statistic values of the speci- fied port of the master	Yes
48	GET /iolink/v1/vendor/masters/1/ ports/1/statistics/ stack	IO-Link stack statistic values of the speci- fied port of the master	-
49	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ diagnostics/con- figuration	Diagnostic configuration of the specified port of the master	Yes
50	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ diagnostics/cur- rent	Diagnostic current value of the specified port of the master	Yes
51	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ diagnostics/volt- age	Diagnostic voltage value of the specified port of the master	Yes

No.	REST API URL	Description	Support ing
52	GET /iolink/v1/vendor/masters/ \$MASTER_NUMBER/ports/ \$PORT_NUMBER/ diagnostics/tem- perature	Diagnostic temperature value of the speci- fied port of the master	Yes

9.10.2 MQTT



Ύ_ INFO

If MQTT is enabled, mandatory that JSON is activated as well.

MQTT settings

No.	MQTT topics	Description
1	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ gateway/ identification	Identification of the gateway
2	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ gateway/ capabilities	Capabilities of the gateway
3	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ gateway/ configuration	Network configuration of the gateway
4	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters	Get all available master number keys and identification information
5	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/diagnostics/ value	Diagnostic values of the master
6	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/diagnostics/ configuration	Diagnostic configuration of the master
7	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/capabilities	Capabilities of the master
8	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/identification	Identification of the master
9	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports	Get all available port number keys
10	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/capabilities	Read capability information of the speci- fied port
11	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/status	Read actual status of the specified port
12	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/configuration	Read/Write configuration of the specified port
13	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/diagnostics/ configuration	Diagnostic configuration of the specified port of the master

No.	MQTT topics	Description
14	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/diagnostics/ current	Diagnostic current value of the specified port of the master
15	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/diagnostics/ voltage	Diagnostic voltage value of the specified port of the master
16	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/diagnostics/ temperature	Diagnostic temperature value of the speci- fied port of the master
17	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/statistics/ current	Current statistic values of the specified port of the master
18	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/ masters/\$MASTER_NUMBER/ports/ \$PORT_NUMBER/statistics/ voltage	Voltage statistic values of the specified port of the master
19	\$MQTT_CLIENT_HEAD_TOPIC/iolink/v1/mas- ters/\$MASTER_NUMBER/ports/\$PORT_NUM- BER/statistics/ temperature	Temperature statistic values of the speci- fied port of the master
20	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/de- vices/\$DEVICE_ALIAS/processdata/value	Read/Write process data value from/to the specified device
21	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/de- vices/\$DEVICE_ALIAS/processdata/getdata/ value	Read process data input value from the speci- fied device
22	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/de- vices/\$DEVICE_ALIAS/processdata/setdata/ value	Read process data output value from the spe- cified device
23	\$MQTT_CLIENT_HEAD_TOPIC /iolink/v1/de- vices/\$DEVICE_ALIAS/events	Read event log from the specified device
24	\$MQTT_CLIENT_HEAD_TOPIC /Asset	Information about the publisher (network, ven- dor, firmware)
25	\$MQTT_CLIENT_HEAD_TOPIC /Online	Status of the publisher (online when con- nec- ted)

9.10.3 OPC UA



INFO

The devices shown in the screenshots serve as examples.

The device features OPC UA server. The OPC UA client can establish a connecton to the device for access to the following parameters:

- Device identification,
- configuration parameters,
- process data,
- measured values,
- diagnostic information,
- statistical information, etc.

The OPC UA client establishes connection using the following URL:

opc.tcp://IP-Adresse:4840

The IP address of the device is used for IP address .

9.10.3.1 OPC UA PC Client

The device integrates OPC UA server. The OPC UA client is for device communication.

For test purposes, you can use *UaExpert* from *Unified Automation GmbH*, for example: <u>https://</u><u>www.unifiedautomation.com</u>.

The OPC UA client has read access to the device using the authentication "Anonymous". The OPC UA client has read and write access to the device using the authentication "User name and Password", provided the related user has write rights.

Conneting to CM50I.PN

Condition:

- ⇒ You have OPC UA client.
- ⇒ For write access to the device, you need to know user name, password and have write access.
- ⇒ You know the device IP address.

Instruction:

- a) Start UaExpert.
- b) Create a new project via *File > New*.
- c) \Box Add new server by selecting **Server** r > **Add**.

Result:

✓ Dialog window *Add Server* is shown in tab *Discovery*.

Add Server ?	×	Mdd Server	? ×
Configuration Name CM50I		Configuration Name CM50I	
PKI Store Default	•	PKI Store Default	•
Discovery Advanced		Discovery Advanced	
Endpoint Filter: No Filter	•	Server Information	
Coal ServersOnNetwork Generation		Endpoint Url opc.tcp://192.168.0.250:4840 Reverse Connect	
✓ Global Discovery Server		Security Settings	
Geverse Discovery Couble click to Add Reverse Discovery > Gustom Discovery		Message Security Mode None	•
 ♦ Couble click to Add Server > ♥ O Recently Used 		Authentication Settings Anonymous 	
		Username	Store
Authentication Settings Anonymous		Certificate	
Username Store		O Private Key	
Certificate	-	Session Settings Session Name	
Private Key			
Connect Automatically		Connect Automatically	
OK Cano	cel	OK	Cancel

III. 64: Dialog window Add Server - tabs Discovery and Advanced

- a) In field Configuration Name enter a name for the configuration, e.g. Test.
- b) Select tab Advanced.
- c) In the *Server Information* area of the *Advanced* tab, enter the following in the *Endpoint Url* data field:

opc.tcp://<IP address>:4840

Enter the IP address of the device for <IP address>.

- d) In the Authentication Settings area, select the option Username/ Password if you want write access to the device or Anonymous if read access is sufficient.
- e) If you have selected option Username/Password, enter your user name and your password.
- f) Click OK.
 - In the project window, UaExpert enters the server under Project > Servers with the selected name.

g) Open server context menu (Test in the example) and select Connect.

Result:

✓ The connection is being established.

Client can access device parameters anonymously (read only) or with user name/password (read and write). User name and passwort are entered via web server.



The following figure shows an excerpt of the device information model.

III. 65: OPC-UA-Server - Device information model

×

The following figure shows an excerpt of an IO-Link port information model.

뤚 Port X7
> 🚞 Alarms
> 🛅 Capabilities
> 🛅 Configuration
🗸 👶 Device
> 🗀 Alarms
DeviceAccessLocks
> 🔲 DeviceHealth
DeviceID
> 🗀 General
HardwareRevision
> identification
Manufacturer
> 뤚 MethodSet
MinCycleTime
Model
NodeVersion
> 💑 ParameterSet
ProductID
ProductText
ProfileCharacteristic
RevisionID
SerialNumber
SoftwareRevision
VendorID
Vendorlext
 DeviceConfigurationDisabled DeviceConfigurationDisabled
V Diagnostics
> Configuration
Current
> CurrentPin1
> CurrentPin2
> 🕲 CurrentPin4
> 🛄 Flags
> 🛄 Iemperature
> 🛄 Voltage
> 🛄 Information
> 🧑 MethodSet
VodeVersion
> 🧛 ParameterSet
 SIOProcessData
> Pin2ProcessData
> I Statistics

> 🚞 Statistics

- VendorlD
- III. 66: OPC-UA-Server Port information model

9.10.3.2 Authentication

User log on

OPC UA use the same users and passwords as those documented in the web server description.

OPC UA server connection is established via user *guest* allowing read access to the OPC UA objects.

Project			₽×
🗸 📁 Project			
🗸 🃁 Servers			
🚫 CM50I	1.0		
🗸 🃁 Documents	S.	Connect	
🧊 Data Acce	×	Disconnect	
	2	Properties	
	2	Change User	
Address Space		Remove	₽×
😏 No Highlight	_		-

III. 67: Changing the user

For further actions, another user must be selected.

Instruction:

- a) User name <admin>
- b) Password <private>

💹 Change User - CM50I		?	×
Authentication Settings			_
Username Password	admin	Store Store	
Certificate			-
	ОК	Cancel	

III. 68: User name and password

Forcing

Digital outputs enable manual switching via OPC UA(Forcing).

Step 1

Create an ID from the device using the *GetForcingID* method.

Address Spa	ace			ð	×					
😏 No Hig	hlight				-					
🚞 Root					^					
🗸 🚞 ol	ojects									
Y 👶 DeviceSet										
~	💑 CM50I.PN									
	Configuration									
	> deviceConfigurat	ion								
	> 🙀 DeviceInformation	n								
	DeviceManual									
	DeviceRevision									
	 Forcing AssignedEers 	ala								
	Assigned Force	eia			1					
	> = OutputPip2	9	Rebrow	vse						
	> = OutputPin2	-	Call							
		_			_					
III. 69: Acce	essing GetForcingID-Metho	ode								
Call C	etForcingID on Forcing						?	×		
Output	Arguments									
Name	Value			I	DataT	ype D	escrip)	tion		
Force Id	2527038128			L L	JInt32					
Message	Forcing ID has been assign		Save as	s S	String					
Status	0			I	nt32					
Result										
Succeede	d									
			[C	all		Close			

- INFO

ForcingID is only valid for 10 seconds. Every access to *Forcing* will refresh validity to another 10 seconds.

Step 2

Set the digital outputs using methods OutpuPin2 respectively OutputPin4.

Add	ress Space				8	×			
9	🦩 No Highlight								
6	Root					^			
~	🚞 Objects								
	🗸 臱 DeviceSet								
	🗸 🚕 CM50I.PN								
	> 🚞 Configurati	ion							
> 🚕 DeviceConfiguration									
	> 뤚 DeviceInfor	mati	on						
	🔗 DeviceManu	Jal							
	DeviceRevisi	ion							
	👻 뤚 Forcing								
	> 🔘 Assigne	dFor	celd						
> = GetForcingID									
	> 🔍 Output	Pin2	_		1				
	> ≡∳ Output	Pin4	9	Rebrowse					
	> 🚕 Port X0		-	Call					
	🔰 🔔 Dort V1	l	_		-	-			

III. 71: Accessing method OutputPin2

This method expects as parameters the included *Forcing ID*, a bit mask and the data to be written.

9.10.3.3 Device identification

The device provides nodes for device identification. From this node, the OPC UA client for example will read the applied device firmware revision.

Node ID	Node class	Access	Description
Manufacturer	Variable	read	Device manufacturer
ManufacturerUri	Variable	read	Device manufacturer URL
Model	Variable	read	Device model designation
ProductCode	Variable	read	Device product code
RevisionCounter	Variable	read	Device Hardware Revision
SerialNumber	Variable	read	Device serial number
SoftwareRevision	Variable	read	Device firmware revision

Tab. 27: Device identification

5 No Highlight 🔹	#	Server	Node Id	Display Name	Value	Datatype
🔁 Root	1	CM50I	NS6 Numeric 161	Manufacturer	"en", "Baumer"	LocalizedText
	2	CM50I	NS6 Numeric 166	ManufacturerUri	www.baumer.com	String
	3	CM50I	NS6 Numeric 162	Model	"en", "CM50I.PN"	LocalizedText
Y 🙀 DeviceSet	4	CM50I	NS6 Numeric 167	ProductCode	11261571	String
🗸 💑 CM50I.PN	5	CM50	NS6[Numeric]163	RevisionCounter	E040000000000000	Int32
> 🚞 Configuration	7	CM50	NS6INumeric 165	SoftwareRevision	V1 3 0	String
> 🚣 DeviceConfiguration	·	CIVIDOI	Noopvaniency roo	Softwarencevision	1.5.0	Stilling
V DeviceKevision						
> 💑 Forcing						
HardwareRevision						
> 💑 IOLinkMaster						
> 🚣 MaintenanceInformation						
Manufacturer						
Manufacturer Iri						
Model						
🚕 ParameterSet						
> 뤚 ProcessDataMonitor						
ProductCode						
RevisionCounter						
SerialNumber						
SoftwarePerision						
> 🛄 Status						
> 💑 Server						
> 🛅 Types						
> 🛅 Views						

9.10.3.4 Configuration parameters

The OPC UA server provides nodes with device configuration parameters. For example, in node **OverTemperature** the OPC UA client can read out the maximum temperature limit.

Node ID	Node class	Access	Default	Description
CurrentHysteresis	Variable	read	10 mA	Current hysteresis, unit: mA
				If the limit is exceeded by current, current must first drop below again by the hysteresis value to cancel diag- nostics.
OverTemperature	Variable	read	70 °C	Maximum limit for port temperature, unit: 0.1 °C
OverVoltageL	Variable	read	30 V	Maximum power limit assigned to supply line 1 enabling monitoring of pins L+, DI, DO, DIO, IO-Link. Unit: mV
OverVoltageL2	Variable	read	30 V	Maximum power limit assigned to supply line 2, unit: mV
TemperatureHys- teresis	Variable	read	2 °C	Temperature hysteresis, unit: 0.1 °C If the limit is exceeded by tempera- ture, temperature must first drop be- low again by the hysteresis value to
				cancel diagnostics.
Under l'empera- ture	Variable	read	-25 °C	Minimum limit for por temperature, unit: 0.1C°

Node ID	Node class	Access	Default	Description
UnderVoltage L	Variable	read	18 V	Minimum power limit assigned to supply line 1 enabling monitoring of pins L+, DI, DO, DIO, IO-Link. Unit: mV
UnderVoltage L2	Variable	read	18 V	Minimum power limit assigned to supply line 2, unit: mV
Voltage Hystere- sis	Variable	read	300 mV	Voltage hysteresis, unit: mV If the limit is exceeded by voltage, voltage must first drop below again by the hysteresis value to cancel di- agnostics.

Tab. 28: Device specific configuration parameters

9	No Highlight	•	#	Server	Node Id	Display Name	Value	Datatype
	Root	^	1	CM50I	NS6 Numeric 2057	CurrentHysteresis	10	UInt16
\sim	🛅 Objects		2	CM50I CM50I	NS6 Numeric 2050	OverTemperature	70	Float
	🗸 臱 DeviceSet		4	CM50I	NS6 Numeric 2059	OverVoltageL2	30000	Int32
	🗸 💑 CM50I.PN		5	CM50I	NS6 Numeric 2051	TemperatureHyster	2	Float
	> 🛅 Configuration		6	CM50I CM50I	NS6 Numeric 2049	UnderTemperature	-25	Float
	> 🚣 DeviceConfiguration		8	CM50I	NS6 Numeric 2001	UnderVoltageL2	17000	Int32
	> 🚣 DeviceInformation		9	CM50I	NS6 Numeric 2062	VoltageHysteresis	300	UInt16
	DeviceManual							
	DeviceRevision							
	> 💑 Forcing							
	HardwareRevision							
	🗸 🚕 IOLinkMaster							
	> 🚞 Alarms							
	> 🚞 Capabilities							
	DeviceID							
	> 🚞 Diagnostics							
	> 🚞 Identification							
	> 🚞 Management							
	MasterConfigurationDisabled							
	> 뤚 MethodSet							
	🗸 읋 ParameterSet							
	> 🔘 ApplicationSpecificTag							
	✓							
	EngineeringUnits							
	> 💷 FunctionTag							
	> 💷 LocationTag							
	> 🔲 MasterType							
	> 💷 MaxNumberOfPorts							
	> 🕘 MaxPowerSupply							
	> 📟 MeanTemperature							
	> 💷 MeanVoltageL							
	> 🔘 MeanVoltageL2							
	> 🔘 OverTemperature							
	> 🕥 OverVoltageL							
	> 🕥 OverVoltageL2							
	> 💷 SumCurrentL							
	> 🔲 SumCurrentL2							
	> 🔘 TemperatureHysteresis							
	> 🔲 UnderTemperature							
	> 💷 UnderVoltageL							
	> 💷 UnderVoltageL2							
	> 💷 VoltageHysteresis							

III. 73: Device specific configuration parameters

Node ID	Node class	Access	Default	Description
OverCurrentPin1,	Variable	read	0	Warning level for maximum current
OverCurrentPin2,				limit at pin 1, pin 2 or pin 4, unit: 1mA
OverCurrentPin4				

Node ID	Node class	Access	Default	Description
UnderCurrent-	Variable	read	0	Warning level for minimum current
Pin1,				limit at pin 1, pin 2 or pin 4, unit: 1mA
UnderCurrent-				0: monitoring not enabled
Pin2,				
UnderCurrentPin4				

Tab. 29: Port-specific configuration parameters

✓ Mo Highlight ✓ # Server Node Id Display Name Value Datatype Image: Display Name Value Image: Display Name Value Datatype Image: Display Name Value Image: Display Name Value Datatype Image: Display Name Value Image: Display Name Value Datatype Image: Display Name Value Image: Display Name Value Image: Display Name Image: Display Name Image: Display Name Value Image: Display Name Image: Display Name
□ Root 1 CM501 N56 Numeric 34860 OverCurrentPin1 0 Int32 ✓ □ Objects 2 CM501 N56 Numeric 34862 OverCurrentPin2 0 Int32 ✓ □ Objects 3 CM501 N56 Numeric 34864 OverCurrentPin4 0 Int32 ✓ ➡ DeviceSet 4 CM501 N56 Numeric 34864 UnderCurrentPin4 0 Int32
✓ □ Objects 2 CM501 N56]Numeric]34862 OverCurrentPin2 0 Int32 ✓ ♣ DeviceSet 3 CM501 N56]Numeric]34864 OverCurrentPin4 0 Int32 ✓ ♣ DeviceSet 4 CM501 N56]Numeric]34861 UnderCurrentPin1 0 Int32
✓ ♣ DeviceSet 4 CM501 NS01Numeric134861 UnderCurrentPin1 0 Int32
V 🐁 CM50LPN 5 CM50I NS6[Numeric]34863 UnderCurrentPin2 0 Int32
Configuration 6 CM50I NS6 Numeric 34865 UnderCurrentPin4 0 Int32
> 👶 DeviceConfiguration
> 📥 DeviceInformation
DeviceManual
DeviceRevision
> 🏯 Forcing
V 📥 IOLinkMaster
Management Muse Granutice Disolded
MasterConfigurationDisabled
> 💑 MethodSet
> 💑 ParameterSet
Y 🚓 Port X0
> 🗀 Alarms
> 🧰 Capabilities
> 🦳 Configuration
> 👶 Device
DeviceConfigurationDisabled
✓ ☐ Diagnostics
✓
> 🔵 OverCurrentPin1
> 🔵 OverCurrentPin2
> 🔲 OverCurrentPin4
> 🕒 UnderCurrentPin1
> 🔲 UnderCurrentPin2
> UnderCurrentPin4

III. 74: Port-specific configuration parameters

9.10.3.5 Process data

The OPC UA server provides nodes including process data. For example, in node *Pin2ProcessData* the OPC UA client can read out a port value provided at pin 2.

Node ID	Node class	Access	Description
Pin2ProcessData	Variable	read	Process data at pin 2
Pin4ProcessData	Variable	read	Process data at pin 4

Tab. 30: Process data

🚱 No Highlight	• ;	# Server	Node Id	Display Name	Value
Root	A 1	CM501	NS6INumericI33340	Pin2ProcessData	false
🛁 Root	2	CM50I	NS6 Numeric 33341	Pin4ProcessData	false
V A DeviceSet					
 Configuration 					
DeviceManual					
DeviceRevision					
> 📤 Forcing					
HardwareRevision					
🗸 🚕 IOLinkMaster					
> 🛅 Alarms					
> 🛅 Capabilities					
DeviceID					
> 🚞 Diagnostics					
> 🚞 Identification					
> 🚞 Management					
MasterConfigurationDisabled					
> 💑 MethodSet					
> 💑 ParameterSet					
👻 📥 Port X0					
> 🦾 Alarms					
> 🧰 Capabilities					
> Configuration					
DeviceConfigurationDisabled					
Diagnostics					
> information					
MethodSet					
PinzProcessData					
III. 75: Process data					

9.10.3.6 Measured values

The OPC UA server provides nodes with calculated measured values. For example, in node **SumCurrentL** the OPC UA client can read in calculated total current of supply line 1.

Node ID	Node class	Access	Description
SumCurrentL	Variable	read	The total current calculated from indi- vidual measurements in supply line 1, unit: mA
SumCurrentL2	Variable	read	The total current calculated from indi- vidual measurements in supply line 2, unit: mA
MeanTemperature	Variable	read	Average temperature value assigned to the component, calculated from each temperature value individualls measured at the three chips. Unit: °C
MeanVoltageL	Variable	read	Average voltage in supply line 1, unit: mV
MeanVoltageL2	Variable	read	Average voltage in supply line 2, unit: mV

Tab. 31: Device-specific (calculated) measured values

9	No Highlight	•	#	Server	Node Id	Display Name	Value	Datatype
0	Root	~	1	CM50I	NS6 Numeric 2052	SumCurrentL	114	Int32
~	Diects		2	CM50I	NS6 Numeric 2053	SumCurrentL2	0	Int32
	V 🐣 DeviceSet		3	CM50I CM50I	NS6 Numeric 2054	Mean lemperature MeanVoltagel	34.6 24037	Float
			5	CM50I	NS6 Numeric 2056	MeanVoltageL2	24037	Int32
	> Configuration							
	> A DeviceConfiguration							
	DeviceManual							
	DeviceRevision							
	> 📥 Forcing							
	HardwareRevision							
	✓ 🚣 IOLinkMaster							
	> Alarms							
	> 🧰 Capabilities							
	Ø DeviceID							
	> iii Diagnostics							
	> 🛅 Identification							
	> 🛅 Management							
	MasterConfigurationDisabled							
	> 🚕 MethodSet							
	🗸 👶 ParameterSet							
	> ApplicationSpecificTag							
	> 🔘 CurrentHysteresis							
	> 💷 FunctionTag							
	> 💷 LocationTag							
	> 🏼 MasterType							
	> MaxNumberOfPorts							
	> 🏼 MaxPowerSupply							
	> 🍩 MeanTemperature							
	> 🍩 MeanVoltageL							
	> 🕘 MeanVoltageL2							
	> 🎱 OverTemperature							
	> 🍩 OverVoltageL							
	> 🍩 OverVoltageL2							
	> 🏼 SumCurrentL							
	> 🏼 SumCurrentL2							
	> 🍩 TemperatureHysteresis							
	> 🕘 UnderTemperature							
	> 💷 UnderVoltageL							
	> 🌑 UnderVoltageL2							
	> 🌑 VoltageHysteresis							
	76, Device energific (coloulated) means		ماريم					

III. 76: Device-specific (calculated) measured values

Node ID	Node class	Access	Description
CurrentPin1, CurrentPin2, CurrentPin4	Variable	read	Current measured at pin 1, pin 2 or pin 4, unit: mA
TemperaturePin1, TemperaturePin2, TemperaturePin4	Variable	read	Temperature measured at pin 1, pin 2 or pin 4, unit: °C
VoltagePin1, VoltagePin2, VoltagePin4	Variable	read	Voltage measured at pin 1, pin 2 or pin 4, unit: mA

Tab. 32: Port specific measuring values

😏 No Highlight 👻	#	Server	Node Id	Display Name	Value	Datatype
Root A	1	CM50I	NS6 Numeric 34836	CurrentPin1	31	Int32
× 🖻 Objects	2	CM50I	NS6 Numeric 34837	CurrentPin2	0	Int32
M A Druite Cet	3	CM50I	NS6 Numeric 34838	CurrentPin4	0	Int32
	4	CM50	NS6[Numeric]34854	Max TemperaturePin 1	30.7	Float
V 💑 CM50I.PN	6	CM50I	NS6INumericI34856	MaxTemperaturePin2	36.7	Float
Configuration	7	CM50I	NS6 Numeric 34851	MinVoltagePin1	24022	Int32
> 💑 DeviceConfiguration	8	CM50I	NS6 Numeric 34852	MinVoltagePin2	-162	Int32
> 뤚 DeviceInformation	9	CIVISUI	NS6 Numeric 34853	MinVoltagePin4	-153	Int32
DeviceManual						
DeviceRevision						
> 👶 Forcing						
HardwareRevision						
🗸 👶 IOLinkMaster						
> 🛅 Alarms						
> 🦳 Capabilities						
DeviceID						
> Diagnostics						
Management						
MasterConfigurationDisabled						
V op Port XU						
> 🛄 Alarms						
> 🛄 Capabilities						
> 🧰 Configuration						
> 💑 Device						
DeviceConfigurationDisabled						
> 🛅 Diagnostics						
> 🛅 Information						
> 🚕 MethodSet						
NodeVersion						
✓ Same ParameterSet						
> CtualCycleTime						
> 🔲 Baudrate						
> CurrentPin1						
> CurrentPin2						
CurrentPin4						
III. 77: Port specific measuring values						

9.10.3.7 Diagnostic tools

The *OPC UA* server provides nodes with diagnostic information. In node *DiagnosticsPin1*, the *OPC UA* client can read whether the device has identified presence of any over current at pin 1 of a port.

Node ID	Node class	Access	Description
DiagnosticsPin1, DiagnosticsPin2, DiagnosticsPin4	Variable	read	Diagnostics on pin 1, pin 2 or pin 4. The numerical value contains bit- coded information:
			 Bit 0: Short circuit,
			 Bit 1: Overload protection,
			 Bit 2: Overtemperature protection,
			 Bit 3: Overvoltage protection,
			 Bit 4: Overcurrent,
			 Bit 5: Undercurrent
			 Bit 0: Overtemperature
			 Bit 1: Undertemperature
			 Bit 2: Overvoltage
			 Bit 3: Undervoltage

	Node ID	Node c	lass	Access	Desc	ription	
					• B	it 4: Watchdog	
					0: Dia	agnosis not acti	ve
					1: Dia	agnosis active	
	Tab. 33: Port-specific diag	gnostics					
😏 No Highlight	•	# Serve	r Node	ld Disp	ay Name	Value	Datatype
 Root Objects Objects CM50LPI Conf DeviceSet Device Dev	N iguration ceConfiguration ceInformation eManual eRevision ng vareRevision kMaster larms lapabilities eviceID liagnostics dentification Management asterConfigurationDisabled MethodSet arameterSet ort X0 Alarms Capabilities Configuration Device DeviceConfigurationDisabled Diagnostics Configuration Device DeviceConfigurationDisabled Diagnostics Configuration Device DeviceConfigurationDisabled Diagnostics Configuration Device DeviceConfigurationDisabled Diagnostics Configuration Device DeviceConfigurationDisabled Diagnostics Configuration Device DeviceConfigurationDisabled Diagnostics Configuration Device DiagnosticsPin1 Configuration DiagnosticsPin2 Configuration DiagnosticsPin2 Configuration Configuration Configuration Configuration Configuration DiagnosticsPin2 Configuration DiagnosticsPin4	1 CM501 2 CM503 3 CM501	NS6 Numeric NS6 Numeric NS6 Numeric	34839 Diagnos 34840 Diagnos 34841 Diagnos	ticsPin2 ticsPin4		Int32 Int32 Int32

III. 78: Port-specific diagnostics

9.10.3.8 Statistics

The OPC UA server provides nodes with statistical information. In node **MaxCurrentPin1**, the OPC UA client can read at pin 1 of a port the maximum measured current.

Node ID	Node class	Access	Description						
Current									
MaxCurrentPin1, MaxCurrentPin2, MaxCurrentPin4	Variable	read	Maximum current at pin 1, pin 2 or pin 4 since value reset, unit: mA						
MinCurrentPin1, MinCurrentPin2, MinCurrentPin4	Variable	read	Minimum current at pin 1, pin 2 or pin 4 since value reset, unit: mA						
Temperature									
MaxTemperaturePin1, MaxTemperaturePin2, MaxTemperaturePin4	Variable	read	Maximum temperature at pin 1, pin 2 or pin 4 since value reset, unit: °C						
Node ID	Node class	Access	Description						
--	------------	--------	---	--					
MinTemperaturePin1, MinTemperaturePin2, MinTemperaturePin4	Variable	read	Minimum temperature at pin 1, pin 2 or pin 4 since value reset, unit: °C						
Voltage									
MaxVoltagePin1, MaxVoltagePin2, MaxVoltagePin4	Variable	read	Maximum voltage at pin 1, pin 2 or pin 4 since value reset, unit: mV						
MinVoltagePin1, MinVoltagePin2, MinVoltagePin4	Variable	read	Minimum voltage at pin 1, pin 2 or pin 4 since value reset, unit: mV						

Tab. 34: Port specific statistical information

9	No Highlight	-	#	Server	Node Id	Display Name	Value	Datatype
6	Root	^	1	CM50I	NS6 Numeric 34842	MaxCurrentPin1	38	Int32
\sim (🛅 Objects		2	CM50I	NS6 Numeric 34843	MaxCurrentPin2	10	Int32
	✓ ♣ DeviceSet		4	CM50I	NS6INumericI34845	MinCurrentPin4	9	Int32
	× 📥 CM50LPN		5	CM50I	NS6 Numeric 34846	MinCurrentPin2	ō	Int32
	> Configuration		6	CM50I	NS6 Numeric 34847	MinCurrentPin4	0	Int32
			2	CM50I	NS6 Numeric 34854	Max TemperaturePin 1	30.7	Float
	> DeviceConfiguration		9	CM50I	NS6 Numeric 34856	Max TemperaturePin4	36.7	Float
	 DeviceInformation DeviceMenual 		10	CM50I	NS6 Numeric 34857	MinTemperaturePin1	28.8	Float
	DeviceManual DeviceManual		11	CM50I	NS6 Numeric 34858	MinTemperaturePin2	28.8	Float
	DeviceRevision		13	CM50I	NS6INumericI34848	MaxVoltagePin1	24068	Int32
	> 😝 Forcing		14	CM50I	NS6 Numeric 34849	MaxVoltagePin2	23545	Int32
			15	CM50I	NS6 Numeric 34850	MaxVoltagePin4	23111	Int32
	V 😜 IOLINKIVIASTER		17	CM50I	NS6INumericI34852	MinVoltagePin2	-162	Int32
	> 🛄 Alarms		18	CM50I	NS6 Numeric 34853	MinVoltagePin4	-153	Int32
	> Capabilities							
	VeviceID							
	Diagnostics							
	> United in the second							
	> Management							
	MasterConfigurationDisabled							
	> 🙀 NethodSet							
	> Parameterset							
	> 🙀 Port XU							
	> 🐢 Port XI							
	> 🍋 Port X2							
	> 🐢 Port X3							
	> 💑 Port X4							
	> 💑 Port X5							
	> 💑 Port X6							
	> 📥 Port X7							
	 Statistics 							
	V Dort X0							
	Y 🗀 Current							
	> 🏼 MaxCurrentPin1							
	> 🏼 MaxCurrentPin2							
	> 🏼 MaxCurrentPin4							
	> 🏼 MinCurrentPin1							
	> 🏼 MinCurrentPin2							
	> 🍩 MinCurrentPin4							
	> 🛅 IOLink							
	✓ imperature							
	> 🕘 MaxTemperaturePin1							
	> 💷 MaxTemperaturePin2							
	> 🎯 MaxTemperaturePin4							
	> 🏼 MinTemperaturePin1							
	> 🔘 MinTemperaturePin2							
	> 🔘 MinTemperaturePin4							
	✓ image							
	> 🕘 MaxVoltagePin1							
	> 🕘 MaxVoltagePin2							
	> 🕘 MaxVoltagePin4							
	> MinVoltagePin1							
		w.						

III. 79: Port specific statistical information

9.10.3.9 NTP client configuration

The OPC UA server provides nodes for NTP client configuration.

Node ID	Node class	Access	Description
NtpClientServerIpAd-	Variable	Read / Write	 NTP server IP address
dress			 The NTP client uses the set IP address for retrieving the time in- formation from the NTP server.
			 The IP address must be con- verted into a decimal number. The table shows how to convert.
			 Value 0 disables the function.
NtpClientServerIpAd- dressFallback	Variable	Read / Write	 IP address of the NTP server (fallback)
			 The optional IP address if the NTP server is not accessible via the IP address in node Ntp- ClientServerIpAddress.
			 The IP address must be con- verted into a decimal number. The table shows how to convert.
			 Value 0 disables the function.
NtpClientUpdateCon- figuration	Variable	Write	Method for writing the nodes Ntp- ClientServerIpAddress and Ntp- ClientServerIpAddressFallback

Tab. 35: NTP client configuration

The following formula is used to convert the IP address into a decimal number. Starting from an IP address in the format **A.B.C.D**:

((A * 256 + B) * 256 + C) * 256 + D = IP address converted into a decimal number

Example: IP address 192.53.103.108:

((192 * 256 + 53) * 256 + 103) * 256 + 108 = 3224725356

NTP server example

NTP-Server ptbtime1.ptb.de of the German National Metrology Institute in Braunschweig with the IP address 192.53.103.108

Replacement NTP server (optional) is NTP server ptbtime2.ptb.de of the Physikalisch-Technische Bundesanstalt in Braunschweig with IP address 192.53.103.104

Condition:

- ⇒ You have OPC UA client.
- \Rightarrow You know user name and password and have write access.
- \Rightarrow You know the IP Address of an NTP Server.
- ⇒ You have converted the IP address of this NTP server into a decimal number, as described in chapter "NTP Client Configuration".
- ⇒ Connection to the MVK device has already been established.

Instruction:

a) In window Address Space pen context menu: Root > Objects > DeviceSet > [device name] > Configuration > NtpClient > NtpClientUpdateConfiguration.

Add	dress Space 🗗	×
9	No Highlight	•
	Root	^
~	🗀 Objects	
	🗙 👶 DeviceSet	
	🗸 👶 CM50I.PN	
	🗸 🛅 Configuration	
	> = 🔍 FactoryReset	
	> =🛛 InternetProtocolV4	
	> 🚕 NetworkInformation	
	🗸 👶 NtpClient	
	✓ i CurrentConfiguration	
	> 🍩 NtpClientServerlpAddress	
	> NtpClientServerlpAddressFallback	
	NtpClientUpdateConfiguration	
	InputArguments	
	OutputArguments	
	> 💑 SoftwareUpdate	
	> 💑 DeviceConfiguration	
	> 💑 DeviceInformation	
III. 8	80: NTP client update configuration	

b) In the context menu, select Call.



✓ Dialog window Call NtpClientUpdateConfiguration on NtpClient pops up:

Call NtpClientUpdateConfiguration on NtpClient ? ×				
Input Arguments				
Name	Value	DataType	Descrip	tion
ServerIpAddress	3224725356	UInt32		
ServerIpAddressFallback	3224725356	UInt32		
Output Arguments		, 		
Name	Value	DataType	Descrip	tion
Status		Int32		
Result				
		Call	Close	

III. 82: Dialog window for NTP client configuration

- a) In the *Input Arguments* area, enter the value 3224725356 in the input field *ServerIpAddress* for the IP address of the NTP server.
- b) In the *Input Arguments* area, enter 3224725352 in the *ServerIpAddressFallback* input field for the IP address of the replacement NTP server.
- c) Click Call.

If the function call was successful, the output field to the right of the status in the *Output Arguments* area displays the value 0 . A green bar with the text Succeeded is displayed in the *Result* area.

Both variables *ServerIpAddress* and *ServerIpAddressFallback* are now set. The device receives the current time from the time server via NTP and synchronizes its internal time.

Call NtpClientUpdateConfiguration on NtpClient ? X						
Input Arguments						
Name	Value	DataType	Descrip	tion		
ServerIpAddress	3224725356	UInt32				
ServerIpAddressFallback	3224725356	UInt32				
Output Arguments						
			_			
Name	Value	DataType	Descrip	tion		
Name Status	Value 0	DataType Int32	Descrip	tion		
Name Status Result	Value 0	DataType Int32	Descrip	tion		
Name Status Result Succeeded	Value 0	DataType Int32	Descrip	tion		
Name Status Result Succeeded	Value 0	DataType Int32	Descrip	tion		
Name Status Result Succeeded	Value 0	DataType Int32	Descrip	tion		

III. 83: Dialog window for NTP client configuration (successful)

10 Operation

10.1 LED indicator

The device provides clearly arranged indicators:

- LED indicator inputs / outputs
- LED indicator BUS
- LED indicator POWER
- Advanced LED indicator

The front LED indicators are correspondingly marked for clear assignment. Either indicated by continuous or flashing LEDs.

10.1.1 LED assignment to channel and pin

Each input and output is assigned an individual status indicator.

- LED channel **0**X (X= port number) is assigned to **pin 4**.
- LED channel 1X (X= port number) is assigned to pin 2.



10.1.2 LED flashing behavior



III. 84: LED flashing behavior

10.1.3 LED indicator for inputs and outputs



Each input and output is assigned an individual status indicator.

Pin 2 digital input DI

Indicator	Status	Description
Yellow	On continuous	Permanent configuration: DI (NO) visible in process data. 24 V
💋 Red	Flashing at 1 Hz	Overload/short circuit in sensor supply 24 V + Pin1
	Off	Pin 2 is not assigned or disabled

Tab. 36: LED indicator DI pin 2

PIN 2 digital output DO

Indicator	Status	Description
Yellow	On continuous	Permanent configuration: DO switchable by process data 24 V
Red	On continuous	Overload / short circuit at pin 2
<mark>≫</mark> Red	Flashing at 1 Hz	Overload/short circuit in sensor supply 24 V + Pin1
	Off	Pin 2 is not assigned or disabled

Tab. 37: LED indicator DO pin 2

Error at the input or output

In the event of error present at one of the inputs or outputs, the related LED at the M12 port will light up red.

Pin 4 digital input DI

Indicator	Status	Description
Yellow	On continuous	Permanent configuration: DI (NO) visible in process data 24 V
💋 Red	Flashing at 1 Hz	Overload/short circuit in sensor supply 24 V + Pin1
	Off	Pin 4 is not assigned or disabled

Tab. 38: LED indicator DI pin 4

Indicator	Status	Description
Yellow	On continuous	Permanent configuration: DO switchable by process data 24 V
Red	On continuous	Overload / short circuit at pin 4
💋 Red	Flashing at 1 Hz	Overload/short circuit in sensor supply 24 V + Pin1
	Off	Pin 4 is not assigned or disabled

PIN 4 digital output DO

Tab. 39: LED indicator DO pin 4

Pin 4 IO-Link mode

Indicator	Status	Description
	On continuous	IO-Link in status <i>Operate</i> .
Green		
7	Flashing at 1 Hz	 Device is not connected
Green		 No communication with connected device.
2	Flashing at 10 Hz	 IO-Link in status Pre-Operate during data
Green		storage
		 Validation failed. Connected IO-Link not compatible.
	On continuous	Overload / short circuit at pin 4
Red		
2	Flashing at 2 Hz	 Validation failed.
Red		 Connected IO-Link device for data storage
		is not compatible.
		 Data storage failed.
	Off	IO-Link connection deactivated.

Tab. 40: LED indicator IO-Link mode Pin 4

10.1.4 BUS RUN- and CfgF LED



- BUS RUN indicates the bus status.
- CfgF shows PLC configuration satus.

LED indicator BUS_RUN

Indicator	Status	Description
	On continuous	No configuration, no connection present
Red		
7	Flashing at 2 Hz	No data transfer
Red		

Indicator	Status	Description
	Off	Error-free operation

Tab. 41: LED indicator BUS_RUN

LED indicator CfgF

Indicator	Status	Description
Red	On continuous	 Channel, generic or advanced diagnostics available
		 Watchdog-Timeout
		 System error
%	Flashing at 1 Hz 3 s	DCP signal service initiated via bus
Red		
	Off	Error-free operation

Tab. 42: LED indicator CfgF

10.1.5 LED indicator LNK/ACT



 LNK/ACT LNK/ACT (Link/Activity) indicates the status of EtherCAT communication at each port.

LED indication LNK/ACT

LED indicator	LED status	Description
	On continuous	Connection to network present.
Green		
	Off	No connection to network.

Tab. 43: LED indication LNK/ACT

LED indicator ACT

LED indicator	LED status	Description
Yellow	Flashing	Device is transmitting / receiving Ethernet frames
	Off	The device is transmitting /receiving Ethernet frames

Tab. 44: LED indicator ACT

LED indicator off

This is what to do:

Instruction:

• Check the line connections.

10.1.6 LED status indicator



• ST indicates the overall device status.

LED indicator ST

Indicator	Status	Description
Green	On continuous	Regular FW is running. Error-free operation.
/// Green	Flashing at 4 Hz	The process requested by rotary switch posi- tion is being executed. Do not switch off de- vice.
💋 Red	Flashing at 1 Hz	Invalid rotary switch position. System does not start.
Red	On continuous	 Initialization error. Error during device initialization. HW issues, no valid configuration, COM FW not found rotary switch operation failed, etc.

Tab. 45: LED indicator ST

LED indicator flashing red

This is what to do:

Instruction:

- a) Select a valid position.
- b) Restart device.

10.1.7 LED

LED-Anzeige POWER US and UA



The power LEDs indicate the supply status

- **UA** actuator voltage
- US operating voltage

LED indicator POWER US

Indicator	Status	Description
	On continuous	18 V ≤ US ≤30 V
Green		error-free operation
	On continuous	11 V ≤ US ≤18 V
Red		undervoltage

Indicator	Status	Description
7 7.	Flashing at 4 Hz	US >30 V
Red		overvoltage
	Off	US <11 V
		no voltage

Tab. 46: LED indicator POWER US

LED indicator POWER UA

Indicator	Status	Description
	On continuous	18 V ≤ UA ≤30 V
Green		error-free operation
	On continuous	11 V ≤ UA ≤18 V
Red		undervoltage
%	Flashing at 4 Hz	UA >30 V
Red		overvoltage
	Off	UA <11 V
		no voltage

Tab. 47: LED indicator POWER UA



Fault-free operation is no longer guaranteed at US <18 V.

10.1.8 Advanced LED indicator

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BUS CfgF		UA US
	ACT1 ACT2	POWER

Device identification

LED	Indicator	Status	Description
CfgF		Flashing 3 times	Device identification
	Red	at 1 Hz	

Tab. 48: Advanced LED indicator, device identification

10.2 **PROFINET** Diagnostics

Alarm

CM501 transmits diagnostic information in the form of alarms based on *PROFINET* specification V2.3.



INFO

Diagnostics are signaled to the PLC in form of **inbound** or **outbound** alarms. For short-time alarms we recommend diagnstocis buffer at the PLC. Such diagnostic buffer allows for later evaluation of alarm details. If the PLC does not feature a diagnostics buffer it should be provided in the form of application software.

10.2.1 Device-specific diagnostic messages

Channel Error			
Туре	Description	Action	
0x0100	Sensor undervoltage	Check the sensor supply voltage of the device.	
0x0101	Sensor overvoltage	Check the sensor supply voltage of the device.	
0x0102	Device overtemperature	Remouve heat source.	
0x0103	Sensor current overload	Check current consumption of connected load.	
0x0104	Actuator current overload	Check current consumption of connected load.	
0x0105	Device undertemperature	Insulate device.	
0x0106	Actuator undervoltage	Check the device actuator supply.	
0x0107	Actuator overvoltage	Check the device actuator supply.	
0x0108	Force Mode Active	Deactivate Force mode via WebUI / OPC-UA / JSON.	
0x0109	Short circuit pin 4	Check wiring to the mating connector.	
0x010A	Short circuit pin 2	Check wiring to the mating connector.	
0x010B	Short circuit pin 1	Check wiring to the mating connector.	
0x010C	No actuator supply	Check the device actuator supply.	
0x010D	No Connection to NTP Server	Check SNTP parameters and connection to NTP	
		server.	
0x010E	NTP Syncronisation lost	Check connection to NTP server.	

Tab. 49: Device-specific diagnostic messages - error types, description and remedies

10.2.2 Diagnostic messages at IO-Link ports via IODD

Channel Error Type	Extended Channel Error Type	Description	Action
0x10 (16)	0x50E0 (20704)	IODD-on-Board: error in GSDML	Please contact <i>Baumer</i> .
0x10 (16)	0x50E0 (20704)	IODD-on-Board: general error	Please contact <i>Baumer</i> .
0x10 (16)	0x50E1 (20705)	IODD-on-Board: error in GSDML	Please contact <i>Baumer</i> .
0x10 (16)	0x50E2 (20706)	IODD-on-Board: error in GSDML	Please contact <i>Baumer</i> .
0x10 (16)	0x50E3 (20707)	IODD-on-Board: error in GSDML	Please contact <i>Baumer</i> .
0x10 (16)	0x50E4 (20708)	IODD-on-Board: error in GSDML	Please contact <i>Baumer</i> .

Channel Error Type	Extended Channel Error Type	Description	Action
0x10 (16)	0x50E5 (20709)	IODD-on-Board: invalid parame- ter value	Check device parameterization.
0x10 (16)	0x50E6 (20710)	IODD-on-Board: invalid parame- ter value	Check device parameterization.
0x10 (16)	0x50E7 (20711)	IODD-on-Board: invalid parame- ter value	Check device parameterization.

Tab. 50: Diagnostic messages at IO-Link ports via IODD - error types, meaning and action

10.2.3 Diagnostic messages at IO-Link ports

10.2.3.1 According to IO-Link integration guideline Edition 2

The listed diagnostics is available if the parameter for IO-Link event integration **Parameter 16** is set to **According to IO-Link integration guideline Edition 2**.

Channel Error Type	Extended Channel Error Type	IO-Link event code(s)	Description
0x9502	0x0000 – 0x7FFF	0x0000 – 0x7FFF	IO-Link master event.
			The <i>Extended Channel Error Type</i> corresponds to the original IO-Link event code.
0x9500	0x0000 – 0x7FFF	0x0000 – 0x7FFF	IO-Link device event.
			The <i>Extended Channel Error Type</i> corresponds to the original IO-Link event code.
0x9501	0x0000 – 0x7FFF	0x8000 – 0xFFF	IO-Link device event.
			The Extended Channel Error Type plus 0x8000 (32768) correspond to the origi- nal IO-Link event code.

Tab. 51: Diagnostic messages at IO-Link ports, according to IO-Link integration guideline Edition 2

The meaning of the IO-Link event codes can be found in the Profinet specification IO-Link Integration - Edition 2, Version 1.1 (IO-Link-Integration-for-PROFINET_Ed2_2832_V11_Feb20.pdf) or in the document IO-Link Interface and System, V1.1.3 (IOL-Interface-Spec_10002_V113_Jun19.pdf) of the IO-Link community.

11 Web server

The web server is a graphical tool with which you can obtain information about the device quickly and intuitively.

Baumer				💠 English 👻 🔒 Logged in as: Guest Abou
Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
I 11261571 CM50I.PN	Collapse all Expand all			Refresh
IO-Link Master Port X0	Vendor information			
IO-Link Master Port X1	Device information			
IO-Link Master Port X2	Device version			
IO-Link Master Port X3	Maintenance information			
IO-Link Master Port X5	Device status			
IO-Link Master Port X6				
IO-Link Master Port X7				
Digital IO Channels Settings / Maintenance				
User Administration				
🔛 Sign In				

III. 85: Web server

'ר'_ INFO

The devices shown in the screenshots serve as examples.

11.1 Starting the web server

Condition:

⇒ The current versions of the following browsers with HTML5 and ES5 are supported: Mozilla Firefox, Microsoft Edge, Google Chrome.

Instruction:

- a) Start the web browser.
- b) Enter the device IP address in the web browser.

Result:

✓ The start screen of the web server is the **Status** page.

11.2 Access and login

Username and password

Instruction:

 Enter the login data for user name and password at the first start: User name <admin> Password <private>

	🜩 English 💌 🔒 Loggerinau Guest	About
Baumer		
Station Name / Station Type	Collapse all Expand all	
11261571 CM50I.PN	▼ Sign in	
IO-Link Master Port X0	Usemame	
Baumer Electric AG OM30-L0350.HV.YUN	admin	
IO-Link Master Port X1	Password	
IO-Link Master Port X2	private	0
IO-Link Master Port X3	See 2	
IO-Link Master Port X5	- Marine - Contract -	
IO-Link Master Port X6		
IO-Link Master Port X7		
Digital IO Channels		
Settings / Maintenance		
User Administration		
圙 Sign In		

Change password

NOTICE

Ensure data security!

a) Change username and password after first login and after every restore default.

📕 📕 Baume	r		
Station Name / Station Type			
	Collapse all Expand all		
11261571 CM50I.PN	 Sign in 		
Mill IO-Link Master Port X0	Username		
IO-Link Master Port X1	admin		
IO-Link Master Port X2		Set password ×	
IO-Link Master Port X3			
IO-Link Master Port X4		First login detected. Please define an individual	
IO-Link Master Port X5	Sign out	password	
III IO-Link Master Port X6		New password 🗞	
IO-Link Master Port X7			
Digital IO Channels		Repeat new password	
Settings / Maintenance		Skip this dialog without changing password	
User Administration		and do not show again.	
🕍 Sign In			
		Apply	

11.3 Initial screen

Operating areas

The web server provides 4 operating areas.

1		2	2	4 ◆ Engleb * Ar Logged in as: Guest About	
Bation Kane Bation Kane Bation Type Bation Type Bation Kane Bation Type Bation Kane Bation Kane Bation Kane Bation Kane Bation Kane Port X2 Click Master Port X3 Click Master Por	STATUS Collapse al Expand al Vendor information Device information Device information Maintenance information Device status	PARAMETERS	DAGNOSTICS	MANTENANCE	

III. 86: Operating areas

1	System tree	Provides device and available sub functions.
2	Menu bar	The menu bar can be used to switch between the different pages of the device or the sub-function. In addition, the white highlighting indicates which page you are currently on.
3	Page content	This area displays the content of the selected page.
4	Header bar	Language and interface settings, system information.

11.4 Menu bar

The first line in the system tree provides device with article number and product name.

The menu bar comprises the following menu items:

- Status
- Parameter
- Diagnostic tools
- Preventive maintenance

				🌐 English 🔻 🔒 Logged in as: Guest 🛛 About
Baumer				
Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
11261571 CM50LPN	Collapse all Expand all			Q Refresh
IO-Link Master Port X0 Baumer Electric AG OM30-L0350.HV.YUN	 Vendor information 			
IO-Link Master Port X1	 Device information 			
IO-Link Master Port X2	 Device version 			
IO-Link Master Port X3	Maintenance information			
IO-Link Master Port X5	 Device status 			
IO-Link Master Port X6				
Digital IO Channels				
E Settings / Maintenance				
User Administration				
in sign in				

III. 87: Menu bar

11.4.1 STATUS menu

The *Status* menu item contains the following sub-items:

	STATUS	
Collapse all	Expand all	
Vendor infor	mation	
Device information		
Device version		
Maintenance information		
Device statu	IS	

III. 88: Status menu item

Manufacturer information

Manufacturer information displays the following information:

Parameter designation	Description
Manufacturer name	Fixed data from the manufacturer
Manufacturer address	Fixed data from the manufacturer
Manufacturer telephone	Fixed data from the manufacturer
Manufacturer URL	Website of the manufacturer

Device information

Device information displays the following information:

Parameter designation	Description
Order number	Article number of the device
Hardware name	Permanent article number of the device
Software name	Fieldbus designation of the device
Software number	Device manufacturing number

Device version

Device version displays the following information:

Parameter designation	Description
Hardware version	Hardware execution version
Software version	Software version run in the device
Website version	Web server version currently run in the device

Maintenance information



INFO

Maintenance information is read only. The fields are entered or changed via **Settings/Maintenance** *information*.

Maintenance information provides the following information:

Parameter designation	Description
Name	Device name, free text
Installation location	Name of place, free text
Contact information	Contact, free text
Description	Description, free text
Last maintenance date (yyyy-mm-dd)	Free date entry
Next maintenance date (yyyy-mm-dd)	Free date entry

IO-Link device information

IO-Link device information displays the following information:

Parameter designation	Description
1L Voltage [V]	Provides sensor voltage in volts
1L Current [A]	Provides sensor voltage in amperes
2L Voltage [V]	Provides actuator voltage in volts
2L Current [A]	Provides actuator voltage in amperes
Temperature [°C]	Display of the appliance temperature in Celsius
Total operating time [hh:mm:ss]	Operating time since the device was switched on
Number of starts	Number ofice restarts

11.4.2 Menu PARAMETERS

The *Parameters* menu item contains the following sub-items:



III. 89: Parameter menu

OPC UA

Users with admin and operator rights can change settings and enter the OPC UA port number. Guest users with read rights only.

OPC UA displays the following information:

Parameter designation	Description
Activate OPC UA Server	OPC UA server on the module active / passive
Allow OPC UA clients to write ISDU data	OPC UA client may write ISDU data (Indexed Service Data Unit) to the module on the IO-Link master
Allow OPC UA clients to write PDO data	OPC UA client may write PDO (process data objects) to the module on the IO-Link master
OPC UA port number	Display / definition of the OPC UA port

MQTT

Users with admin and operator rights can change settings and enter the IP address of the MQTT server. Guest users with read rights only.

MQTT displays the following information:

Parameter designation	Description
Enable MQTT	MQTT client on component active / passive
MQTT server IP address	MQTT server IP address
MQTT Client ID	Read/write MQTT client ID
Client head topic	Read/write MQTT topic
Topic for system data	Read/write MQTT topic

JSON

Users with admin and operator rights can activate and deactivate JSON. Guest users with read rights only.

JSON displays the following information:

Parameter designation	Description
Enable JSON	JSON interface on component active / passive

11.4.3 DIAGNOSTICS menu

The incoming and outgoing alarms of the master are displayed in the *Diagnostics* menu item.

The menu shows an overview of the diagnostic messages.

Depending on the setting in the *Please select an entry* drop-down menu, the following device diagnostics are displayed:

Enabled

- All pending diagnostics at the time of the web server call.
- All diagnoses that no longer exist are not displayed.

History

- All diagnostics from the retentive diagnostics memory that no longer exist are displayed.
- More than 40 diagnostics in the memory. The latest diagnostics overwrites the most previous one in the memory.

Station Name / Station Type	STAT	US	PARAMETERS	DIAGNOSTICS		MAINTENANCE	
H 11261571 CM50I.PN	Please select an entry:						
IO-Link Master Port X0		Active	~				
IO-Link Master Port X1							🚯 Refresh
IO-Link Master Port X2	Кеу	- T Description	T Channel	▼ ▼ Severity	т ү Туре	▼ Ÿ Time	• 7
IO-Link Master Port X3	IO-Link master event	No Device (communication)	0	😭 Fault	🔄 Occured	0001:08:22:53	
IO-Link Master Port X4							
IO-Link Master Port X5							
IO-Link Master Port X6							
IO-Link Master Port X7							
Bettinge / Maintenance							
User Administration							
III Sian Out							
,							

III. 90: Diagnostics menu item

11.4.4 MAINTENANCE menu

In the *Maintenance* menu item, users with admin and operator rights can delete the diagnostic memory.

Baumer				
Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
E 11261571 CM50I.PN Cola	pse all Expand all			
IO-Link Master Port X0	rase diagnostics history			
Baumer Electric AG OM30-L0350.HV.YUN	use diagnostics history			
IO-Link Master Port X2	Enabled			Erase
IO-Link Master Port X3				
IO-Link Master Port X4				
IO-Link Master Port X5				
IO-Link Master Port X6				
IO-Link Master Port X7				
Digital IO Channels				
User Administration				
Sign Out				

III. 91: Delete diagnostic memory

11.5 IO-Link master port

The system tree provides 8 IO-Link master ports (X0 ... X7) for individual selection. According to the user role, information is read only or enables configuration.

In active IO-Link communication, the IO-Link device name automatically appears under the relevant port.

Station Name / Station Type	STATUS	INFORMATION
■ 11261571 CM50I.PN	Collapse all Expand all	
Baumer Electric AG OM30-L0350.HV.YUN	 IO-Link Master Status 	
IO-Link Master Port X1	Pin 1 - Us Supply Status (L+)	
IO-Link Master Port X2	Pin 2 - DIO/AUX Power (ClassB) Status	
IO-Link Master Port X3	Pin 4 - IO-Link/SIO Status	
IO-Link Master Port X4		
III. 92: IO-Link Master Port X5		

11.5.1 STATUS menu

The IO-Link master status is displayed here in the *Status* menu.

STATUS	INFORMATION	CONFIGURATION
Collapse all Expand all		
 IO-Link Master Status 		
- State		Operate
- Quality		0x2
- Revision ID		0x11
- Baudrate		230.4 kbps
- Cycle time		1.0 ms
- Input data length		6
- Output data length		1
- Vendor ID		0x15E
- Device ID		0x25F

III. 93: IO-Link master port - IO-Link master status

If pin 4 is in IO-Link mode, all relevant IO-Link data including the I/O bytes of the device are displayed.

If pin 4 is in operation without a connected IO-Link device, it is displayed that no device is connected.

IO-Link Master Status

- Port function Digital input

III. 94: IO-Link master port - IO-Link master status for digital operation

If pin 4 is configured as a digital input, you can see it here.

Optional indication of:

- Status: Disabled
- Status: Digital input
- Status: Digital output

Port Status - Pin 1

Port status - pin 1 provides the following information

Parameter designation	Description
Temperature [°C]	Temperature in degrees Celsius
Voltage [V]	Voltage in Volts
Current [A]	Current in Ampere
Status	Pin status

Port Status - Pin 2

Port status - pin 2 provides the following information

Parameter designation	Description
Temperature [°C]	Temperature in degrees Celsius

Parameter designation	Description
Voltage [V]	Voltage in Volts
Current [A]	Current in Ampere
Status	Pin status

Port Status - Pin 4

Port status - pin 4 provides the following information

Parameter designation	Description
Temperature [°C]	Temperature in degrees Celsius
Voltage [V]	Voltage in Volts
Current [A]	Current in Ampere
Status	Pin status

11.5.2 INFORMATION menu

Menu item Information provides the following subitems:

STATUS	INFORMATION	CONFIGURATION	IO-LINK PARAM
Collapse all Expand all			
▼ IO-Link Device Information			
- Min cycle time		1.0 ms	
- Function ID		0	
- Number of profile IDs		1	
- Vendor name		Baumer Electric AG	
- Vendor text		www.baumer.com	
- Product name		OM30-L0350.HV.YUN	
- Product ID		11232075	
- Product text		Optical distance sensor, 0	Connector M8
- Serial number		R245.85343	
- Hardware revision		01.00.01	
- Firmware revision		01.01.09	



IO-Link device information

Technical data and manufacturer information of a connected and active IO-Link device is provided at the related master port.

"IO-Link device information" provides the following information:

Parameter designation	Description
Minimum. cycle time	Minimum process cycle time of IO-Link device
Function ID	Function ID IO-Link device
Number of profile IDs	Number of profiles supported by the IO-Link device
Manufacturer name	Manufacturer name IO-Link device
Manufacturer text	Manufacturer text IO-Link device

Parameter designation	Description
Product name	Product name IO-Link device
Product ID	Article number IO-Link device
Product text	Additional description IO-Link device
Serial number	Serial number
Hardware version	Hardware version
Firmware version	Firmware version

11.5.3 CONFIGURATION menu

Menu item *Configuration* of the selected IO-Link port provides the setting of pin 1, pin 2 and pin 4 and allows also for configuration.

Users with operator and admin rights can set the functions and behavior of pin 1, pin 2 and pin 4.

Users with service and maintenance rights have read rights.

Pin 4 can be deactivated or configured as an IO-Link master, input or output.

STATUS	INFORMATION	CONFIGURATION	IO-LINK PARAMETERS	PROCESS DATA
Collapse all Expand all				Save C Refresh
 Port Functions - Pin 4 				
Port function			IO-Link autostart	~
Digital input signal filter			Deactivated IO-Link manual configuration	
Output current limitation for DIO			IO-Link autostart	
			Digital Input, normally open	
Port Functions - Pin 2			Digital input, normally closed	
Port Functions - Pin 1				

III. 96: IO-Link master port - configuration (pin 4)

Pin 2 can be deactivated or configured as an input, output or DIO in *Automatic Mode*.

STATUS	INFORMATION	CONFIGURATION	IO-LINK PARAMETERS	PROCESS DATA
Collapse all Expand all				Save 🔇 Refresh
Port Functions - Pin 4				
 Port Functions - Pin 2 				
Port function			Automatic mode (DIO)	~
Digital input signal filter			No digital input filter	~
Output current limitation for DIO			2.0 A	~
Port Functions - Pin 1				
 Port Diagnostics 				



If pin 2 or pin 4 is configured as an input, the digital input filters can be set individually.

STATUS	INFORMATION	CONFIGURATION	IO-LINK PARAMETERS	PROCESS DATA
Collapse all Expand all				Save 🚷 Refresh
Port Functions - Pin 4				
 Port Functions - Pin 2 				
Port function			Automatic mode (DIO)	~
Digital input signal filter			No digital input filter	v
Output current limitation for DIO			No digital input filter	
			1ms 3ms	
Port Functions - Pin 1			5ms	
Port Diagnostics			10ms	
			15ms	

III. 98: IO-Link master port - Configuration - Setting digital input filters

11.5.4 IO-LINK PARAMETERS menu

In this menu item, the *ISDU (Index Service Data Unit)* of the device can be read and written during IO-Link operation. This primarily allows an IO-Link device to be evaluated or parameterized without a controller. The input can be made in both hex and ASCII format.

َنُ INFO

Observe the information in the IO-Link device manufacturer's manual.

Users with maintenance and admin rights can write ISDU values. Users with service rights have read rights.

STATUS	INFORMATION	CONFIGURATION	IO-LINK PARAMETERS	PROCESS DATA
Collapse all Expand all				
 ISDU Communication 				
Index				00
Subindex				00
Input data				00
Format			Hex	~
Read Write				
* All values are in hexadecimal without spaces.				
Clear history				

III. 99: IO-Link master port - IO-LINK PARAMETER

11.5.5 PROCESS DATA menu

In the *Process data* menu item, the current process data of the connected IO-Link device is continuously displayed if pin 4 of the corresponding port has been configured as an IOL port. Example: Port X2: Pin 4 (IO- Link Autostart) and Pin 2 (Digital output static on).

11 | Web server

STATUS	INFORMATION	CONFIGURATION	IO-LINK PARAMETERS	PROCESS DATA
Collapse all Expand all				
 Process Data 				
Pin 4 IOL Input				00,01,0f,42,fa,01
Pin 4 IOL Output				00
Force Pin 4 IOL Output Data		Write Disable	Forcing	0
Pin 2 DO				0
Pin 2 DI				0
Format			Hexadecimal	~

III. 100: IO-Link Master Port - PROCESS DATA

The current statuses of the digital inputs are displayed in this menu item. Example: Port X1: Pin 4 (DI) and pin 2 (DI)

	STATUS	CONFIGURATION	PROCESS DATA
	collapse all Expand all		
•	Process Data		
	Pin 4 DI		0
	Pin 2 DO		0
	Pin 2 DI		0
	Format		Hexadecimal ~

III. 101: IO-Link master port - Digital inputs - PROCESS DATA

11.6 Digital IO channels/ IO overview

In the *Configuration* menu of the selected IO-Link port, the setting of pin 2 and pin 4 on the selected port is displayed. Outputs can be set under certain conditions.

11.6.1 Input data

Each user can monitor the digital statuses of the inputs configured on the device.

Station Name / Station Type	IO OVERVIEW
■ 11261571 CM50I.PN	Collapse all Expand all
IO-Link Master Port X0	▼ Input data
IO-Link Master Port X1 IIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIIII	Port X0 Pin 4 (Channel 00)
IO-Link Master Port X3	Port X0 Pin 2 (Channel 10)
IO-Link Master Port X4	► Allow forcing outputs
IO-Link Master Port X6	► Output data
IO-Link Master Port X7	
Digital IO Channels Settings / Maintenance	
User Administration	
I Sign Out	

III. 102: Overview of input data

11.6.2 Output data

Allow outputs to be set

Users with admin, service and maintenance rights can allow the outputs to be set in this menu.

The right to do this is only granted if the device is not in an active fieldbus connection with the control unit. The control system has priority.

IO OVERVIEW	
Collapse all Expand all	
► Input data	
✓ Allow forcing outputs	
Allow forcing of output values when there is no data exchange with PLC. Disabled	Allow
► Output data	

III. 103: Allow outputs to be set

Setting output data

Guest users are not permitted to set the exits.

All other users (admin, operator, maintenance) can set the outputs.

As soon as the user (admin, operator, maintenance) logs out, the outputs go to 0.

As soon as a fieldbus is actively working with the device, the outputs go to 0 and then adopt the status that they receive from the controller.

IO OVERVIEW	
Collapse all Expand all	
► Input data	
✓ Allow forcing outputs	
Allow forcing of output values when there is no data exchange with PLC. Enabled	Allow
✓ Output data	
Port X0 Pin 4 (Channel 00)	Enabled
Port X1 Pin 4 (Channel 01)	Enabled
Port X2 Pin 4 (Channel 02)	Disabled
Port X3 Pin 4 (Channel 03)	Disabled
Port X4 Pin 4 (Channel 04)	Disabled
Port X5 Pin 4 (Channel 05)	Disabled
Port X6 Pin 4 (Channel 06)	Disabled
Port X7 Pin 4 (Channel 07)	Disabled
Port X0 Pin 2 (Channel 10)	Disabled

III. 104: Setting output data

11.7 Settings and maintenance

11.7.1 DEVICE CONFIGURATION menu

In Profinet, the address is usually assigned by the controller using DCP. Only the IP setting can therefore be read in the web server.

Baumer				
Station Name / Station Type	DEVICE CONFIGURATION	MAINTENANCE INFORMATION	FIRMWARE	FACTORY RESET
11261571 CM50I.PN	Collapse all Expand all			C2 Refresh
IO-Link Master Port X0	 Interface configuration status 			
IO-Link Master Port X1	Device IP address			192.168.0.250
IO-Link Master Port X2	Subnet mask			255.255.255.0
IO-Link Master Port X3	Gateway IP address			0.0.0
IO-Link Master Port X5				
IO-Link Master Port X6				
Digital IO Channels				
Settings / Maintenance				
Sign Out				

III. 105: Settings IP address Profinet

11.7.2 MAINTENANCE INFORMATION menu

Users with service, maintenance and admin rights can enter information about the device here.

Station Name / Station Type	DEVICE CONFIGURATION	MAINTENANCE INFORMATION	FIRMWARE	FACTORY RESET
圖 11261571 CM50I.PN	Collapse all Expand all			🔁 Refresh
■ IO-Link Master Port X0 Baumer Electric AG OM30-L0350 HV, YUN	✓ Maintenance information			
IO-Link Master Port X1		Maintenanc	e data changed	
IO-Link Master Port X2	Name		Station 123	
IO-Link Master Port X3	Installation location		Hall 123	
IO-Link Master Port X4	Installation date (www.mm.dd)		2023.03.03	
IO-Link Master Port X6	installation date (jyj) min doj		2023-03-03	
間 IO-Link Master Port X7	Contact information		Smith	
E Digital IO Channels	Description		First Teststation	n
Settings / Maintenance	Last service date (yyyy-mm-dd)		2024-03-03	
User Administration	Next service date (yyyy-mm-dd)		2025-03-03	
📾 Sign Out	Apply			

III. 106: Maintenance information setting

The maintenance information appears in the device in the *Status* menu item and *Maintenance information* submenu.

Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
圖 11261571 CM50I.PN	Collapse all Expand all			₹ 2 Refresh
IO-Link Master Port X0	Vendor information			
Baumer Electric AG OM30-L0350.HV.YUN				
IO-Link Master Port X1	Device information			
固 IO-Link Master Port X2	Device version			
IO-Link Master Port X3	 Maintenance information 			
IO-Link Master Port X4				
	- Name		Station 123	
IO-Link Master Port X5	- Installation location		Hall 123	
IO-Link Master Port X6	- Contact information		Smith	
IO-Link Master Port X7	- Description		First Teststation	
Digital IO Channels	 Last service date (yyyy-mm-dd) 		2024-03-03	
	 Next service date (yyyy-mm-dd) 		2025-03-03	
Settings / Maintenance				
User Administration	 Device status 			
Sian Out				

III. 107: Maintenance information status

11.7.3 FIRMWARE menu

This menu item displays the data of the firmware running on the device.

Users with service, maintenance and admin rights can upload new firmware, provided in ZIP folders, to the device here. After successful loading, the device checks the firmware container and starts automatically with the new firmware version.

Station Name / Station Type	DEVICE CONFIGURATION	MAINTENANCE INFORMATION		FIRMWARE	FACTORY RESET
11261571 CM50I.PN	Collapse all Expand all				
IO-Link Master Port X0	 Details of current active firmware 				
Baumer Electric AG OM30-L0350.HV.YUN	- Hardware name		CM50I,PN		
IO-Link Master Port X1	- Software version		V1.3.0		
IO-Link Master Port X2	- Kernel version		V1.2.0.20		
IO-Link Master Port X3	- Webpage version		2.0.0-V		
IO-Link Master Port X4	 Firmware update 				
IO-Link Master Port X5					
IO-Link Master Port X6	File				
IO-Link Master Port X7					Update
Digital IO Channels					
Settings / Maintenance					
User Administration					
Sian Out					
og. os.					

III. 108: Firmware

11.7.4 WORK RESET menu

In this menu item, users with service, maintenance and admin rights can reset the entire device or individual sub-areas (device information, network, application).

Station Name / Station Type	DEVICE CONFIGURATION	MAINTENANCE INFORMATION	FIRMWARE	FACTORY RESET
I1261571 CM50I.PN	Collapse all Expand all			
IO-Link Master Port X0 Baumer Electric AG OM30-L0350.HV.YUN	▼ Factory reset			
IO-Link Master Port X1	Delete stored device information e.g. Device Main	ntenance Information, NTP settings, OPC UA IO-Link Master speci	fic tags, etc.	
国 IO-Link Master Port X2 国 IO-Link Master Port X3	Delete stored network adapter settings e.g. Comr	munication and IP Address Configuration, Name Of Station, etc.		
IO-Link Master Port X4	O Delete stored application parameters e.g., Port C	onfiguration and Parameters, IO-Link Data Storage, etc.		
IO-Link Master Port X5	Delete ell'elected activities			
IO-Link Master Port X6	Delete all stored settings			
IO-Link Master Port X7	Delete settings Restart			
Digital IO Channels				
Bettings / Maintenance				
User Administration				
Sign Out				

III. 109: Factory reset

11.8 **User administration**

User administration can only be carried out with admin rights.

When the product is delivered, the administrator is called admin and has the password private.



INFO

The administrator default password can be changed from the control unit in the system with the field bus running.

Users log in and off in the system tree at the bottom left.

• Click on Logout.

Baumer				
Station Name / Station Type		USER ADMIN	IISTRATION	
I1261571 CM50I.PN	Collapse all Expand all			
IO-Link Master Port X0 Baumer Electric AG OM30-L0350.HV.YUN	▼ User list			
IO-Link Master Port X1	Username	▼ Userrole	 Actions 	*
IO-Link Master Port X2	Operator	Operator	2	
IO-Link Master Port X3	SamSmith	Maintenance	2- 2	
IO-Link Master Port X4	admin	Admin	<u></u>	
IO-Link Master Port X5	▼ Add new user			
IO-Link Master Port X6	Username	Password	Userrole Actions	
Divital IO Channels	Username	Password	Operator 🗸 🕹	
Settings / Maintenance				
User Administration				
Sign Out				

III. 110: User administration

12 Maintenance and cleaning

⚠ WARNING

Material damage due to defective or damaged appliances.

The function of the devices is not guaranteed.

a) Replace defective or damaged devices.

רֹי INFO

You can replace the device with the same type if maintenance is required.

a) Check whether the switch settings of the old and new device are identical.



INFO

Cleaning the appliance.

a) Only use oil-free compressed air or spirit.

b) Only use non-fibrous materials (e.g. leather cloth).

c) Do not use contact spray.

13 Annex

13.1 Accessories

13.1.1 Tools

Designation	Art. no.
M12 installation wrench set SW 13	11238694
M12 mounting wrench bit SW 17	11238695



III. 111: Assembly wrench

PRODUCTS AND ACCESSORIES

You can find a large selection of products at: <u>https://www.baumer.com</u>

13.2 Glossary

,	
Term	Description
Bus-Run-LED	LED for signaling the bus status.
CfgF-LED	LED for signaling correct/incorrect configuration.
Bytes	iTerm from IEC 61158. Corresponds to 1 byte or 8 bits.
DI	Digital Input
DIP switch	Dual in-line package/switch with two parallel rows of connections.
DO	Digital output/digital output
EMC	Electromagnetic compatibility
EN	European standard
ESD	Electrostatic discharges
FE	Functional earth
lloT	The Industrial Internet of Things (IIoT) is the industrial version of the Inter- net of Things (IoT). In contrast to the IoT, it does not represent consumer- oriented concepts, but focuses on the application of the Internet of Things in the manufacturing and industrial environment.
IN	Input

Term	Description
I&M data	For identification and maintenance (I&M), data records (data structures) have been defined for PROFIBUS, which must be implemented for all devices with DP-V1. These data structures are used to uniquely identify the field device and facilitate maintenance.
IO-Link	Standardized communication system for connecting intelligent sensors and actuators to an automation system
IRT	Isochronous real time/protocol for clock-synchronous activation of data and functions on different devices.
IP67	Ingress protection according to DIN EN 60529
IP address	Address for identification in an Ethernet network
LED	Light Emitting Diode
LNK/ACT-LED	Link/Activity LED for signaling Ethernet communication.
MAC address	MAC address stands for Media Access Control address and represents the unique identifier of a network interface. The MAC address is often also referred to as the physical address.
MRP	Media Redundancy Protocol/A protocol for the management of ring topolo- gies in a production plant. It is used to increase the availability of devices in the network.
n.c.	Not connected
OUT	Output
PELV	Protective Extra Low Voltage
Power-LED	LED for signaling the power supply
PROFINET	Process Field Network
PROFlenergy	PROFINET profile for energy management in production plants
PQI	The port qualifier information (PQI) provides status information about the IO-Link port or the device status.
SELV	Safety Extra Low Voltage with safe isolation.
Shared Device (SD)	Protocol extension of a PNIO device to establish simultaneous communica- tion relationships with several PNIO controllers.
SNMP	Simple Network Management Protocol/Protocol for simple monitoring and control of various network participants.
PLC	Programmable Logic Controller
UA	Actuator voltage
US	Sensor voltage
Validation IO-Link	Check for compatibility or identity of a connected IO-Link device.

Passion for Sensors

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