



Operating Manual

CM50I.EC IO-Link Master with EtherCAT

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	
	DANGER	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 CM50I 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:

EtherCAT® und TwinCAT® IO-Link

Registered trademarks of Beckhoff Automation GmbH c/o PROFIBUS User Organisation e.V. (PNO)

1.7 Software-Tools

Applied software Baumer Sensor Suite (BSS)

1.8 **Specifications**

Specification	Link
TwinCAT	www.beckoff.com
Version 3.1	
IO-Link	www.io-link.com
Version 1.1.2 of 07.2013	



INFO

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



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.
- 2. Secure against unwanted switchon.
- 3. Ensure that each pole is not live respectively under voltage.
- 4. 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.

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.

Operating Manual

4 Description

4.1 Device

CM50I.EC is a compact *EtherCAT* device in a plastic housing with IP67 protection.

Feature	Description	
Connection	For <i>EtherCAT</i> connection there are 2 x M12 slots (D-coded).	
Supply	Supply is via M12 power (L-coded 5-pin) and looped to the next.	
IO-Link	The device features also 8 x M12 IO-Link master slots (coded). IO-Link masters (Pin4 C/Q) enable individual parameterization, ei- ther in IO-Link or in SIO mode (DI, DO).	
	Additional digital inputs and outputs, as well as a permanent 24 V supply, are available for each slot (Pin2 I/Q).	
General information	EtherCAT: AoE, CoE, EoE, FoE	
	 Protection IP67 	
	 Tested on vibration and shocks 	





4.1.1 Product name nomenclature

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

CM50I	Product family
EC	Function
	EtherCAT

4.1.2 Device structure



X0 X7	Digital I/O or IO-Link	
	M12 A-coded	
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-coded 5-pin	
XD2	Power supply POWER OUT,	
	M12 L-coded 5-pin	
1	Rotary switch	
XF1	EtherCAT IN, Port 1, M12 D-	
XF2	coded	
	EtherCAT OUT, Port 2, M12 D-	
	coded	
2	Ground strap for functional	
	ground	

4.1.3 Pin assignment

M12 female connector A-encoding

X0 X7		
$\sqrt{\frac{2}{0}}$	Pin 1	L+
$10 \stackrel{5}{\circ} 03$	Pin 2	DI
	Pin 3	L-
4	Pin 4	C/Q
	Pin 5	n.a.

M12 male/female connector, POWER IN/OUT

XD1			XD2
(B)	Pin 1	US+	F
	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			
1/2	Pin 1	Tx +	
(0 5	Pin 2	Rx +	
4 3	Pin 3	Tx -	
	Pin 4	Rx -	
	Pin 5	n.a.	

4.1.4 Display elements



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

LED RUN LED ERR LED L/A1 LED L/A2 LED POWER UA LED POWER US

1

Also see about this

LED indicator [89]

4.2 EtherCat

4.2.1 EtherCAT communication

In automation technology, fieldbus systems have been established for many years. However, the strong demand for ever higher speeds brought the technology to its technical limits and new solutions had to be found.

Today, office-known Ethernet is present everywhere and at 100 MBit/s also very fast. According to the cabling and access rights used, this type of Ethernet is not real-time capable. *EtherCAT* remedied the problem.

EtherCAT®

The following applies to EtherCAT®:

- *EtherCAT* is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.
- EtherCAT means Ethernet for Controller and Automation Technology. It was originally developed by the company Beckhoff Automation GmbH and is now supported and further developed by EtherCAT Technology Group (ETG). ETG is the world's largest international user and manufacturer association for Industrial Ethernet.
- *EtherCAT* is an open, IEC- standardized fieldbus based on Ethernet. It fulfills the user profile for industrial real-time systems.
- In contrast to classic Ethernet, *EtherCAT* communication provides I/O data exchange at 100 Mbit/s in full duplex mode, while the telegram is passing the *EtherCAT* slaves. As a telegram reaches the data of many subscribers in the send and receive direction in this way, *EtherCAT* has a user data rate of over 90 %.
- The process data optimized *EtherCAT* is transmitted straight in the Ethernet telegram. This in turn may consist of several sub-telegrams, each providing a section for saving the process image.

Transmission medium

EtherCAT utilizes Ethernet as transmission medium. Standard CAT5 cables are used. Cable lengths of up to 100 m between 2 users are feasible.

EtherCAT networks may only integrate *EtherCAT* components. Related supporting *EtherCAT* components are required for implementing topologies that deviate from the line structure.

Network hubs cannot be used.

4.3 IO-Link

IO-Link defines a standard where 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 IO-Link devices or for reading parameters, measured values and diagnostic data from IO-Link devices.

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.

4.3.1 Data storage

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.

4.4 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.

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

Bus data		
Fieldbus protocol		EtherCAT
Connection		4-pin M12, D- coded
Transmission rate		100 Mbit/s
Addressing		Auto-Increment, Fixed-Position
Specification		ETG.5001.6220 S
Supported protocol	ADS over EtherCAT	AoE
	CANopen over EtherCAT	CoE
	Ethernet over EtherCAT	EoE
	File access over EtherCAT	FoE
Diagnostic function	EtherCAT state machine	ESM
	Emergency messaging	EMCY
SYNC-Manager		4
FMMU		8
OPC UA-Server		
OPC UA-Server	According to IO-Link Compan- ion Specification	Yes
Transport		UA TCP, UA Secure Conversation, UA Binary Encoding
Server profile		Micro Embedded Device
Protocol		OPC UA TCP
User access	Read-only Read and write	Anonymous Username/password
Number of sessions		2
Number of subscriptions per session		2
Number of monitored items per session		20
Minimum release interval		100 ms
Maximum number of sessions/ clients		5
Data encoding		UA binary
Energy monitoring	Current and voltage	Yes
Temperature monitoring		Yes
IO-Link		
Operating voltage IO-Link de- vices		24 V 🗆
Voltage range IO-Link devices		20 30 V 🗆

CM50I.EC | V1

IO-Link		
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 □
0 0	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-coded
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-coded
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 actuator		MOSFET with current mea- surement
Connection		5-pin M12, A-coded
Cable cross-section M12		≤0.75 mm2
Cable length		≤30 m

Output (DO)	it (DO)		
Total current	Per port	≤4 A	

Derating sensor current US/ actuator current UA



III. 2: Derating sensor current US/ actuator current UA



Derating total current, sensor power supplies/outputs total current

III. 3: Derating total current, sensor power supplies and total current, outputs



Derating current per sensor supply/output

III. 4: 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	III			
evel 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)							
A	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 PCE 组件部分 印刷电路板	3 反	x	0	0	0	0	0
Connection Terminal 接线端子 / 拧	/ Screws	x	0	0	0	o	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).
- Protected site to prevent connection cables from being torn off accidentally.

6.2 Dimensions



III. 5: Dimensions in mm

6.3 Mounting distance







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

⚠ WARNING

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.



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. 7: 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 [22]).

INFO

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

6.4.1 Functional ground

S_ INFO

Use a conductive screw to 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 [▶ 116]

6.4.2 Addressing lid



III. 9: 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



INFO

Factory defaults: Rotary switch position is 000.

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



Address range 1 ... 999 x1 Rotary switch (units)

	,	•	,
x10	Rotary switch	(tens	5)
x100	Rotary switch	(huno	dreds)

Tab. 1: Rotary switch for addressing

Using Explicit Device ID requires setting the Device IDs.

Position/	Web					
area	server	JSON	OPC UA	MTQQ	Description	
0	_ *	_ *	_ *	_ *	Standard operation	<i>EtherCAT ID</i> can be assigned via mailbox (Explicit Device ID).
1 99	- *	- *	_ *	_ *	EtherCAT ID	<i>EtherCAT ID</i> is set to value of rotary switch.
100 910	- *	- *	- *	- *	Reserved *	
911	Disabled	Disabled	Disabled	Disabled	Secure Mode	Fieldbus communication in stan-
912	- *	Disabled	Disabled	Disabled	IIoT mode disabled	dard operation
913	Disabled	Disabled	_ *	_ *	Web server and JSON disabled	
914	Enabled	Enabled	Enabled	Enabled	Enables all IIoT pro- tocols and web server.	
915-978	- *	- *	- *	- *	Reserved	
979	Enabled	Enabled	enabled (up to FWV1.05) disabled (FWV1.06 and later)	enabled (up to FWV1.05) dis- abled(FW V1.06 and later)	Restore default	 Sequence of actions only for this rotary switch position: Disconnect device from power supply. Set switch to position 979. Connect device to power supply. Wait until reset is completed. Disconnect device from power supply. ST LED flashing green: Device is performing reset. ST LED is on green continuous: Reset completed.

Position/ area	Web server	JSON	OPC UA	MTQQ	Description	
						 Set switch to position 000 or any other required.
						 Connect device to power supply.
980-999	_ *	_ *	_ *	- *	Reserved *	

* Last protocol setting is retained.



_ INFO

Reserved switch positions do n ot enable fieldbus communication, see LED indicator [> 89].

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.

Ċ_ INFO

Rotary switch values are only re-adopted after a power reset!

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.

_ INFO

For appropriate tightening torque see Addressing lid [23].

7.1.2 Sensors and actuators

Connection of M12 female connector





III. 10: 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.



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.



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

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

7.1.3 EtherCAT communication

Connection of M12 female connector



III. 11: Example of M12 connection (EtherNet/IP Bus)

M12 0.6 Nm	Joseph P. Joseph P. Starting	ArtNo. 7000-99102-0000000
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Also see about this

Pin assignment [> 9]





ר' 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)

▲ CAUTION

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





III. 14: Cable connection

M12	0,6 Nm	Joneth P P	ArtNo. 7000-99102-0000000
-----	--------	------------	------------------------------



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

8 Commissioning

\Lambda WARNING

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 EtherCAT

EtherCAT networks comprise at least the following components:

- 1 EtherCAT-master
- 1 or more slaves
- Ethernet cables and connectors for user connection

8.1.1 Integrating the device into Beckhoff TwinCAT V3

Twin- CAT® *System Manager* provides an example for both configuration and system integration to a Beckhoff TwinCAT control unit. Detailed proceedings depend on the applied project planning software.

When using other control units and project planning software, please see the related documentation.

ESI file installation

Instruction:

a) Download ESI files at <u>www.baumer.com</u>.

b) Copy ESI file to the TwinCAT directory.

Standard path: C:\TwinCAT\3.1\Config\Io\EtherCAT

Result:

✓ The installed devices are accessible at next TwinCAT System Manager boot up.

8.1.2 Device implementation

Device implementation is either manually or by automated scan.



Prior to connecting devices to the EtherCAT network, the EtherCAT system must be in a safe zero-current status.

Solution Explorer • 4 × ○ ○ ☆ 'o - 司 ▶ -Search Solution Explorer (Ctrl+ü) ۰ م Solution 'CM50I.EC Project' (1 project) CM50I.EC Project 4 SYSTEM ⊳ A MOTION ⊳ PLC SAFETY C++ I/O 📲 Devices EtherCAT_Master Add New Item... Ins 🛟 Image 눱 Add Existing Item... Shift+Alt+A Image-Info 🕏 SyncUnits ⊳ X Remove Del 🕒 Inputs Change NetId... Outputs Save EtherCAT_Master As... 🛄 InfoData ⊳ 📸 Mappings Append EtherCAT Cmd Append Dynamic Container Online Reset **Online Reload** Online Delete 👯 Scan Change Id... Change To ۲ Copy Ctrl+C ጽ Cut Ctrl+X Paste Ctrl+V Paste with Links Independent Project File H • Disable

Automated device scan

III. 15: Automated device scan

a) Power on and start the TwinCAT System Manager in Config mode.

- b) Switch on supply voltage.
- c) Scan the device.

Adding device manually



III. 16: Adding device manually

a) Power on and start the TwinCAT System Manager in Config mode.

b) Switch on supply voltage.

Insert EtherCAT Device X		
Search:	Name: Box 1 Multiple: 1 🖨	OK
Туре:	Baumer IVO GmbH & Co. KG Baumer CM50I CM50I.EC Beckhoff Automation GmbH & Co. KG Beckhoff Automation GmbH & Co. KG	Cancel Port A D B (Ethernet) C
	Extended Information Show Hidden Devices Sho	w Sub Groups

Add device to tree structure

III. 17: Add device to tree structure

a) Select device.

b) Click OK.

Required device settings

Once being scanned or added manually the device appears in the TwinCAT tree.
Solution Explorer 👻 👎 🗙	CM50I +¤ ×			
○ ○ ☆ °o - @ ≠ <mark>-</mark>	General EtherCAT DC	Process Data Slots	Startup CoE - Online I	Diag History Online
Search Solution Explorer (Ctrl+ ü)	General EtherCAT DC Name: CM501 Object Id: 0x0302 Type: CM501 Comment:	Process Data Slots EC 0001 EC	Startup CoE - Online I	Diag History Online
	Disa	bled	Crea	e symbols
 RxPDO Mapping of Digital Outputs WcState InfoData Mappings 	Name PD (I/Q Pin2 + C/Q Pi New Message Availab State of IO-Link Port)	0nline n4) le Flag (0 (1	Type UINT BIT USINT USINT	Size > Addr 2.0 39.0 0.1 41.0 1.0 42.0 1.0 43.0
III. 18: Device settings	State of IO-Link Port)		USINT	1.0 44.0

8.1.3 Explicit Device ID

Explicit Device ID is used for EtherCAT function HotConnect.

There are two options for setting the *identification value*:

- using rotary switch
- writing on EEPROMs

Identification value settings using the rotary switch

Set identification value on tab EtherCAT.

This value is compared to the value set by the rotary switches.

Solution Explorer 🔹 🕂 🗙	CM50I 🗢 🗙	
○ ○ ☆ ĭo - ฮī ⊁ <mark></mark>	General EtherCAT DC Process Data Slots Startup CoE - Online Diag History Onli	ne
Search Solution Explorer (Ctrl+ü)		
 Galaxie Constant Galaxie CM50I.EC Project' (1 project) Galaxie CM50I.EC Project CM50I.EC Project CM50I.EC Project 	Type: CMSULEC Product/Revision: 67 / 1 Auto Inc Addr: 0	
	EtherCAT Addr: 🔲 1001 ≑ Advanced Settings	
SAFETY	Identification Value: 0	
96. C++	Previous Port: Master ~	
 ✓ ✓ I/O ✓ ✓ Devices ✓ EtherCAT_Master ✓ Image ✓ Image-Info ✓ SyncUnits ✓ Inputs ✓ InfoData ✓ CM50I.EC ✓ TxPDO Mapping of Digital Inputs ✓ TxPDO Mapping of Status Data 	http://www.baumer.com	
instruction:		

a) EtherCAT-Select device CM50I.EC.

b) On tab EtherCAT select Advanced Settings....

Advanced Settings			×
General Behavior Timeout Settings Identification FMMU / SM Init Commands Distributed Clock ESC Access	Identification Identification ADO None Configured Station Alias (ADO 0x0012) Explicit Device Identification (ADO 0x0134) Data Word (2 Bytes) Value:	ADO (hex): Dx0134	OK Abbrechen

a) Select Identification > Explicit Device Identification.

b) Define address at Value.

Advanced Settings			×
Advanced Settings General Behavior Timeout Settings Identification FMMU / SM Init Commands Mailbox Distributed Clock ESC Access	Behavior Startup Checking Check Vendor Id Check Product Code Check Revision Number Check Serial Number Check Identification Process Data Use RD/WR instead of RW	State Machine Auto Restore States Wait for WcState is Ok Relnit after Communication Error Log Communication Changes Final State OP SAFEOP OP PREOP OINIT Info Data	×
	 ☐ Include WC State Bit(s) ☐ Frame Repeat Support ☐ Clear Invalid Input Data General ☐ No AutoInc - Use 2. Address ☐ AutoInc only - No Fixed Address Watchdog ☐ Set Multiplier (Reg. 400h): ☐ Set PDI Watchdog (Reg. 410h): ☐ Set SM Watchdog (Reg. 420h): 	Include State Include Ads Address Include AoE NetId Include Channels Include DC Shift Times Include Object Id 2498 1000 ms: 100.000 ms: 100.000 1000 ms: 100.000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 1000 10000 10000 1000 1000 100	
			OK Abbrechen

a) Under *General > Behavior* tick checkbox *Check Identification*.

b) Click OK.

c) Switch off the device and set the same identification value using the rotary switches.

d) Switch device power on again.

e) Compile project and download to PLC.

Identification value setting via EEPROM

Set identification value on tab EtherCAT.

This value is compared to the value set in EEPROM.

Solution Explorer 🔹 👎 🗙	CM50I ⊰	×							
© ⊃ ☆ [•] o - 司 ≠ <u>-</u>	General	EtherCAT	DC	Process Data	Slots	Startup	CoE - Online	Diag History	Online
Search Solution Explorer (Ctrl+ü)			0.450						
 ☑ Solution 'CM50I.EC Project' (1 project) ☑ CM50I.EC Project ☑ SYSTEM ☑ MOTION 	Type: Produc Auto Ir EtherC	ct/Revision: nc Addr: :AT Addr: []	67 / 1 0 1001			Ac	dvanced Settin	35	
▶ 🛄 PLC	Identif	ination Value:	0	×					
C++	Previo	us Port:	Maste	er				~	r -
▲ 🔄 I/O ▲ 🍓 Devices									
✓ ➡ EtherCAT_Master ↓ Image									
≜ Image-Info									
SyncUnits									
Outputs									
InfoData									
CM50I.EC	http://	www.baumer	.com						
TxPDO Mapping of Digital Inputs TxPDO Mapping of New Messages Avail TxPDO Mapping of New Messages Avail	a								
P 🛄 IXPDO Mapping of Status Data									
a) EtherCAT-Select device (CM50I.E	C.							

b) On tab EtherCAT select Advanced Settings....

Advanced Settings		×
General Behavior Timeout Settings Identification FMMU / SM Init Commands Ostributed Clock ESC Access	Identification Identification ADO None Configured Station Alias (ADO 0x0012) Explicit Device Identification (ADO 0x0134) Data Word (2 Bytes) ADO (hex): Walue:	OK Abbrechen
a) Se	elect Identification > Explicit Device Identification.	

b)Define address at **Value**.

Advanced Settings			×
General Behavior Timeout Settings Identification FMMU / SM Init Commands Mailbox SC Access Configured Station ESC Access Configured Station Mainced Link Det Smart View Hex Editor FPGA Memory	Configured Station Alia Actual Value (EPROM): Actual Value (Register): New Value:	Write to E ² PROM (power cycle required to refresh regi	ster)
			OK Abbrechen

a) Select Configured Station Alias.

b) At New Value, set the same identification value that was previously defined.

c) Click on *Write to E²PROM*.

Result:

✓ The address value in EEPROM has been saved.

General Behavior Behavior Startup Checking State Machine	Advanced Settings			×
 ☐ Identification ☐ Check Vendor Id ☐ Check Product Code ☐ Init Commands ☐ Check Revision Number ☐ Check Serial Number ☐ Check Identification ☐ Check Identification Process Data ☐ Use RD/WR instead of RW ☐ Include WC State Bit(s) ☐ Frame Repeat Support ☐ Clear Invalid Input Data ☐ General ☐ No Autoinc - Use 2. Address ☐ Include DC Shift Times ☐ Include DC Shift Times ☐ Include Object Id 	Advanced Settings General Behavior Timeout Settings Identification FMMU / SM Init Commands Mailbox Stributed Clock ESC Access	Behavior Startup Checking Check Vendor Id Check Product Code Check Revision Number Check Revision Number Check Serial Number Check Identification Process Data Use RD/WR instead of RW Include WC State Bit(s) Frame Repeat Support Clear Invalid Input Data General No AutoInc - Use 2. Address AutoInc only - No Fixed Address Watchdog	State Machine Auto Restore States Wait for WcState is Ok Relnit after Communication Error Log Communication Changes Final State OP SAFEOP in Config Mode SAFEOP PREOP Info Data Include State Include Ads Address Include Channels Include DC Shift Times Include Object Id	×
		Set Multiplier (Reg. 400h):	2498 - 1000 - 1000 - ms: 100.000	

a) Under *General > Behavior* tick checkbox *Check Identification*.

b) Click OK.

c) Switch device power on again.

d) Compile project and download to PLC.

8.1.4 AoE

The master device supports reading and writing of IO-Link parameters via AoE (ADS over EtherCAT).

Acyclic communication to the IO-Link device is executed via command ADS. The ADS address required comprises the NetID and the IO-Link master port number.

AoE NetID

The master device is given a AoE NetID of its own IO-Link master communication.

NetID is assigned by the configuration tool at:

CM50I.EC > Tab EtherCAT > Advanced Settings > Mailbox > AoE > NetId.

Advanced Settings		×
General Mailbox General G	ADS over EtherCAT (AoE) Generate NetId Mitialize NetId NetId: 169.254.168.158.2.2	
	ОК	Abbrechen

III. 19: AoE NetID

IO-Link master Port number

The individual IO-Link ports of the master device are assigned via the port number. Port numbers are assigned in ascending order from 0×1000 (4096dec).

Port	Port number	Hex	Dec
X0	1	0x1000	4096
X1	2	0x1001	4097
X2	3	0x1002	4098
X3	4	0x1003	4099
X4	5	0x1004	5000
X5	6	0x1005	5001
X6	7	0x1006	5002
X7	8	0x1007	5003

The following applies to the IO-Link master:

ADS Index Group

In IO-Link EtherCat integration xyz, the index group for the ADS command was set to 0xF302, as with CoE.

ADS Index Offset

Addressing index and subindex of the IO-Link request is saved in the index offset comprising 4 bytes. Split as follows:

- 2 Byte Index
- 1 Byte Reserverd
- 1 Byte Subindex

Example: When reading subindex 0x20 (32dec) from index 0x40 (64dec), index offset 0x00 40 00 20 is required.

8.1.5 EoE

Device supports EoE (Ethernet over Ethercat). To configure TwinCAT accordingly, go to tab *EtherCAT* and select *Advanced Settings*.

• CM50I.EC > Tab EtherCAT > Advanced Settings > Mailbox > EoE > NetId.

First, enter a valid DNS name and next a valid IP address.

- **INFO** Function *EoE* is enabled by default. Function is disabled by selecting *Virtual Ethernet Port*.

8.1.6 Firmware update via FoE

Requirements

- TwinCAT V2 or V3
- Existing TwinCAT configuration including EtherCAT slave update.

Firmware update (with TwinCAT V3)

Instruction:

- a) Open the "Online" page of the EtherCAT slave at TwinCAT and set it to status Pre-Op.
- b) Click on *Download*.



Download firmware update

- a) Select file type All Files (*.*).
- b) Download file ..._fwupdate.zip.
- c) Click open.

8 Commissioning

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		📙 СМ50	0I.EC_1.03.00-	V-00_fwupdate.zip	30.10.2023 14:41	ZIP-komprimierte	2.063 KB			
-										
	,									
			Dateiname:	CM50I.EC_1.03.00-V-00_f	wupdate.zip			All Files (*.*)		~
								Öffnen	Abbrech	en
										<u> </u>

III. 22: Open firmware update

Enter FoE name

a) In button *String* enter the name of the update file previously downloaded.

b) Click OK.

Edit FoE Name		×
String:	CM50I.EC_1.03.00-V-00_fwupdate	OK
Hex:	43 4D 35 30 49 2E 45 43 5F 31 2E 30 33 2E 3	Cancel
Length:	30	
Password (hex):	0000000	
// 02: Enter EsE #		

III. 23: Enter FoE name



Please wait until download is complete (approx. 1 minute). In TwinCAT there is no screen refresh while the download is running.

Open firmware update

a) Click on tab CoE - Online.

- b) Scroll down to object 5FFE:0 Update Firmware and open sub-object 5FFE:01 Reset and Update FW immediately.
- c) Double-click on sub-object **5FFE:01 Reset and Update FW immediately**, reset and update firmware immediately.

CM50I ↔ ×				
General EtherCAT	DC Process Data Slots S	itartup CoE - Onlin	e Diag History	Online
Update Lis	st 📃 Auto Update 🗹 S	ingle Update 🗹 Sh	ow Offline Data	
Advanced				
Add to Startu	Online Data	Module OD (AoE	Port): 0	
Index	Name	Flags	Value	Unit
<u>.</u>	Configuration Port X7	RO		
.	Digital Input and Status Data	RO		
	Digital Output and Status Data	RO		
	Update Firmware	WO		
5FFE:01	Reset and Update FW immediately	WO		
5FFF	Reset to Factory	WO		
÷ 6000:0	IO-Link In Port X0	RO		

III. 24: Open firmware update

Enter value

a) Any value within the range 1 ... 255.

b) Click **OK**.

Set Value Dial	og	×
Dec:	1	OK
Hex:	0x01	Cancel
Float:		
Bool:	0 1	Hex Edit
Binary:	01	1
Bit Size:	○1 ●8 ○16 ○32 ○64	0?

III. 25: Enter value

Start firmware update

Device starts firmware update. All LED status indicators at front are off.

After less than a minute, the device restarts with the new firmware, see CoE object **100A Soft**ware version of the manufacturer.

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.

$\dot{\gamma}_{-}$ 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 IO-Link master confguration

IO-Link master structure

The IO-Link master is a modular device with 8 slots.



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j_ INFO

Each slot corresponds to a female 4-pin M12.

The slot can be assigned a defeind number of process data (buffer size). The connected device specifies the process data length at a port.

• Select the correct module depending on the connected device.

	Module	ModuleIdent	Module	ModuleIdent E	Description
Port X0	IOL_8/0_I/O-Bytes	0×0000008	 Slot Empty 	0x00002100 C	Clear Slot (also constrain empty slots)
ink Port X1	IOL_0/8_I/O-Bytes	0x0000800	Digital_IN	0x00002101 E	Digital Input
t X2	IOL_8/8_I/O-Bytes	0x0000808	X Oigital_OUT	0x00002102 E	Digital Output
ort X3	IOL_16/16_I/O-Bytes	0x00001010	IOL_1/0_I/O-Bytes	0x0000001 K	IO-Link 1 Byte Input Process Data
ort X4	IOL_32/32_I/O-Bytes	0x00002020	OL_2/0_I/O-Bytes	0x0000002 K	IO-Link 2 Byte Input Process Data
ort X5	Digital_IN	0x00002101	OL_4/0_1/O-Bytes	0x0000004 K	IO-Link 4 Byte Input Process Data
Port X6	Digital_OUT	0x00002102	OL_8/0_I/O-Bytes	0x0000008 K	IO-Link 8 Byte Input Process Data
Port X7	Slot Empty	0x00002100	IOL_16/0_I/O-Bytes	0x00000010 K	IO-Link 16 Byte Input Process Data
			IOL_32/0_I/O-Bytes	0x0000020 K	IO-Link 32 Byte Input Process Data
			OL_0/1_I/O-Bytes	0x00000100 K	IO-Link 1 Byte Output Process Data
			OL_0/2_1/O-Bytes	0x00000200 K	IO-Link 2 Byte Output Process Data
			OL_0/4_1/O-Bytes	0x00000400 K	IO-Link 4 Byte Output Process Data
			OL_0/8_I/O-Bytes	0x00000800 K	IO-Link 8 Byte Output Process Data
			IOL_0/16_I/O-Bytes	0x00001000 K	IO-Link 16 Byte Output Process Data
			IOL_0/32_I/O-Bytes	0x00002000 K	IO-Link 32 Byte Output Process Data
			OL_1/1_I/O-Bytes	0x00000101 0	IO-Link 1 Byte Input / 1 Byte Output Process Dat
			IOL_2/2_I/O-Bytes	0x00000202 K	O-Link 2 Byte Input / 2 Byte Output Process Dat

III. 26: IO-Link master structure

Slot devices

Slot devices structure is according to the following diagram:

	Description
IOL_x/y_I/O-Bytes	Number of process data used for IO-Link device. The number should be equal to or greater than the process data length of the IO-Link device. • x: Input data

	Description	
	 y: Output data 	
Digital IN	Input Pin 4	
Digital OUT	Output Pin 4	
Slot disabled	If Pin 4 on Slot is not used.	

Module overview

Slot empty
Diginal_IN
Diginal_OUT
IOL_1/0_I/O-Byte
IOL_2/0_I/O-Byte
IOL_4/0_I/O-Byte
IOL_8/0_I/O-Byte
IOL_16/0_I/O-Byte
IOL_32/0_I/O-Byte
IOL_0/1_I/O-Byte
IOL_0/2_I/O-Byte
IOL_0/4_I/O-Byte
IOL_0/8_I/O-Byte
IOL_0/16_I/O-Byte
IOL_0/32_I/O-Byte
IOL_1/1_I/O-Byte
IOL_2/2_I/O-Byte
IOL_4/4_I/O-Byte
IOL_8/8_I/O-Byte
IOL_16/16_I/OByte
IOL_32/32_I/OByte

9.2 IO-Link master parameterization

Module parameters and individual ports can be set via tab Startup.

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Search Solution Explorer (CIII-10) P-1 I Solution CMSIEC Project Impact Data Comment I Solution CMSIEC Project Impact Picot Data Comment I Solution CMSIEC Project Picot Solution CMSIEC Project Picot Data Document I Picot Solution CMSIEC Project Picot Solution CMSIEC Project Picot Data Document I Picot Solution CMSIEC Project Picot Solution CMSIEC Project Picot Data Document Document </th <th>○ ○ ☆ Ĩo - ēī ₽</th> <th>General EtherCAT DC</th> <th>Process Data</th> <th>Slots Startup CoE - Onli</th> <th>ne Diag History Online</th>	○ ○ ☆ Ĩo - ēī ₽	General EtherCAT DC	Process Data	Slots Startup CoE - Onli	ne Diag History Online
Image: Solution (MoDLEC Project () project) Indiana Indiana <t< th=""><th>Search Solution Explorer (Ctrl+ü)</th><th>Transition Protocol</th><th>lader </th><th>Data</th><th>Connect</th></t<>	Search Solution Explorer (Ctrl+ü)	Transition Protocol	lader	Data	Connect
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PC BPC BPC CC 02/0003 Static 010 PPC NU N Ha LQU-DU Static On take-dim, thue-dn SAFETY PS CC 02/0003 Static 010 PPC NU N Ha LQU-DU Static On take-dim, thue-dn C++ PS CC 02/0003 not supported (N) PPC NU N ha LQU-DU Static On take-dim, thue-dn P PS CC 02/0003 not supported (N) PPC NU N ha LQU-DU Static On take-dim, thue-dn P PS CC 02/0003 not supported (N) PPC NU N has example on the top on top on the top on the top on t	MOTION	L PS LOE	0x2100:02 r	no filter (U)	Port X0 Pin 4 (Cu) - DI Hiter I Ime: U=n0 Hiter, IU=Ims, 3U=3ms, 5U=5ms, IUU=I Ums, ISU=ISms
SAFETY Set 50 GE GL 1004 Intel type in point (1) ord (PLC	C PS COE	0.2100.03	Static off (U)	For X0 Fin 4 (C4) - DO Static On Talse-on, true-on
C++ Ces 0.2 (1003 no hoter (10) Port X	SAFETY	C PS COE	0x2100:04	Not supported (4)	Port X0 Pin 2 (Kg) - bigital indoe: U+bigital input KV normaliy open, I+bigital input KV normaliy closed, 2+bigital Output, 3+static On, 4+Not supported
 UC Deficiency D	St. C++		0x2100.05	No filter (0)	For X0 Fin 2 (X0) - Di Filer Time, Onio Filer, TOF TIME, 30-3018, 30-3018, 100-1018, 130-1018
CMSDIEC C	⊿ 🕎 I/O	C PS CoE	0x2100:06	No Swap (U)	Fort AU byte Swap, U=No Swap, I=16 bit Swap, 2=32 bit Swap, 3=Full Swap Dext X1 be 4 (CO). PU lowed (she publish bench MO examples provide based based
Bend CAT Master B	⁴ ⁴ ¹	C PS CUE	0.2110.01	raise, bigital input NO hor	Port AT Prin + (Cox) · Di Invent, Taise-Digital input No homany open, aute-Digital input No homany closed
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image-info Color 6.210165 Notage/info Notage/info Notage/info Notage/info image-info Signal Color Signal Color Notage/info Notage/	Image	C PS CoE	0x2110:03	Not supported (4)	For X Finite (CQV) FOR State On rate on rate on rate on rate on rate of the ra
> SyncUnits PS Cole 0.21106 No Swap (0) Pot X1 byte Swap (0-b) Swap, 1-16 Bt Swap, 2-32 Bt Swap, 3-Ful Swap Swap (0, no maly cole > Inputs	Image-Info	PS CoE	0x2110:05	no filter (0)	Port X I'm 2 (Q), Di Biter Time: Onno liber 10-ino 3(1-2ms 5)n-5ms 5(1-5ms 150-15ms
Image: Section of the section of th	b 🤹 Synclinits	PS COE	0x2110:06	No Swap (0)	Part X1 Refs Super-Chan Super 1-16 Ref Super-Cardina, do-carda, roo-carda, roo-carda
> Outputs Cold Cold 2000 no filter (0) Pot X2 Pn 4 (CQ) - D) Filter Time: Oneo Filter, 10=-time, 30-3 ms, 50-5 ms, 100=10 ms, 150=15 ms > Cold Mapping of Digital Inputs E PS Cold Cold 2000 Static Of (0) Pot X2 Pn 4 (CQ) - D) Filter Time: Oneo Filter, 10=-time, 30-3 ms, 50-5 ms, 100=10 ms, 150=15 ms > Cold Mapping of Digital Inputs E PS Cold Cold 2000 no filter (0) Pot X2 Pn 4 (CQ) - D) Static One Filter, 10=-time, 30-3 ms, 50-5 ms, 100=10 ms, 150=15 ms > Cold Mapping of New Messages Availa E PS Cold Cold 2000 no filter (0) Pot X2 Pn 4 (CQ) - D) Tilter Time: Oneo Filter, 10=-time, 30-3 ms, 50-5 ms, 100=10 ms, 150=15 ms > The PDO Mapping of New Messages Availa E PS Cold Cold 2000 no filter (0) Pot X2 Pn 4 (CQ) - D0 Tilter Time: Oneo Filter, 10=-time, 30-3 ms, 50-5 ms, 100=10 ms, 150=15 ms > The PDO Mapping of Digital Outputs FS Cold Cold 20000 no filter (0) Pot X2 Pn 4 (CQ) - D0 Tilter Time: Oneo Filter, 10=-time, 30-3 ms, 50-5 ms, 100=10 ms, 150=15 ms FS Cold 20000 The PDO PS Cold 20000 No swap (0) Pot X3 Pn 4 (CQ) - D0 Static Dn filter-offit true=On FS Cold 20000 Cold 200000 PS<	b linnuts	C PS CoE	0x2120:01	False: Digital Input NO nor	Part X2 Pin d (CO) - Di Invert falsea Dirital Innut KO pomativo non true Dirital Innut KC pomally closed
 InfoDate InfoD Mapping of Digital Inputs InfoD Mapping of Digital Inputs InfoD Mapping of New Messages Available InfoD Mapping of New Messages Available InfoD Mapping of Digital Inputs InfoD Mapping of Digital Inputs InfoD Mapping of State Data InfoD Mapping of Digital Inputs InfoD Mapping of Digital Inputs InfoD Mapping of State Data InfoD Mapping of State Data InfoD Mapping of Digital Outputs InfoD Mapping of Digital Outputs InfoD Mapping of Digital Outputs InfoD Mapping of State Data InfoD Mapping of Digital Outputs InfoD Map	b Dutouts	C PS CoE	0x2120:02	no filter (0)	Part X2 Pr 4 (CQ) - DI Filter Time: Dano Filter 10=108 30-308 50-508 100=1008 150=1508
	b InfoData	C PS CoE	0x2120:03	Static off (0)	Port X2 Pin 4 (CQ) - DO Static On: false=off. true=on
 TriPO Mapping of Digital Inputs TriPO Mapping of Digital Inputs TriPO Mapping of Digital Inputs 	A CM50LEC	C PS CoE	0x2120:04	Not supported (4)	Port X2 Pin 2 (IQ) - Digital Mode: (I=Digital Input NO normally open, 1=Digital Input NC normally closed, 2=Digital Output, 3=Static On, 4=Not supported
Pi DD Mapping of New Messages Available Pi S Cold No State (0) Pi S Cold No State (0) Pi S Cold Output Mode Pi S Sista	Typpo Manning of Digital Inputs	C PS CoE	0x2120:05 r	no filter (0)	Port X2 Pin 2 (IQ) - DI Filter Time: 0=no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms
Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of status bala Import of the following of the follow	b TrPDO Mapping of New Mercager Availa	C PS CoE	0x2120:06	No Swap (0)	Port X2 Byte Swap: 0=No Swap, 1=16 Bit Swap, 2=32 Bit Swap, 3=Full Swap
 	Tribo Mapping of New Messages Available Tribo Mapping of Status Data	C PS CoE	0x2130:01 F	false: Digital Input NO nor	Port X3 Pin 4 (CQ) - DI Invert: false=Digital input NO normally open, true=Digital Input NC normally closed
 	Public Annual Status	C PS CoE	0x2130:02 r	no filter (0)	Port X3 Pin 4 (CQ) - DI Filter Time: 0=no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms
 ■ Induitier (InC_20/UPOPWE) ■ FS CoE © CoE	Madula 1 (IOL 9/0 I/O Potes)	C PS CoE	0x2130:03	Static off (0)	Port X3 Pin 4 (CQ) - DO Static On: False=off, true=on
A FOD PS CoE 0/21005 no filter (10) Pot X3 Pbr 2 (00) Pot X4 Pbr 4	T-T-T-T-T-T-T-T-T-T-T-T-T-T-T-T-T-T-T-	C PS CoE	0x2130:04	Not supported (4)	Port X3 Pin 2 (IQ) - Digital Mode: 0=Digital Input NO normally open, 1=Digital Input NC normally closed, 2=Digital Output, 3=Static On, 4=Not supported
Construction Constation Constation Construction Construction Cons		C PS CoE	0x2130:05 r	no filter (0)	Port X3 Pin 2 (IQ) - DI Filter Time: 0=no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms
P VXPU0 ISPS CoE 0.2140.01 Islae: Digital Input NO norm. Pott X4 Pn 4 (C0): DI Invert Take=Digital Input NO normally Open. Invest Digital Input NO normally Open. Image: Image	Module 2 (IOL_0/8_I/O-Bytes)	C PS CoE	0x2130:06	No Swap (0)	Port X3 Byte Swap: 0=No Swap, 1=16 Bit Swap, 2=32 Bit Swap, 3=Full Swap
Construction (10, 276, 276, 276, 276, 276, 276, 276, 276		C PS CoE	0x2140:01	false: Digital Input NO nor	Port X4 Pin 4 (CQ) - DI Invert: false=Digital Input NO normally open, true=Digital Input NC normally closed
p kt/PU CoE 0x2140/03 Static off (0) Pot X4 Pin 4 (CQ)- DO Static On: false=off, true=on b Bx2PDO CDE 0x2140/04 Static off (0) Pot X4 Pin 4 (CQ)- DO Static On: false=off, true=on c Mx4ub 4 (IQ) 15/(5 U/O Bxtu) CDE 0x2140/04 Not supported (4) Pot X4 Pin 2 (Q)- DO Static On: false=off, true=on	Module 3 (IOL_8/8_I/O-Bytes)	C PS CoE	0x2140:02 r	no filter (0)	Port X4 Pin 4 (CQ) - DI Filter Time: 0=no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms
KPDD F5 CoE 0x214004 Not supported (4) Pot X4 Pn 2 (0) - Digital Mode (9-Digital hour ND normally cosed, 2=Digital Output, 3=Static On, 4=Not supported	P 🛄 IXPDO	C PS CoE	0x2140:03	Static off (0)	Port X4 Pin 4 (CQ) - DO Static On: False=off, true=on
	P 📲 RxPDO	C PS CoE	0x2140:04 I	Not supported (4)	Port X4 Pin 2 (IQ) - Digital Mode: 0=Digital Input NO normally open, 1=Digital Input NC normally closed, 2=Digital Output, 3=Static On, 4=Not supported
Trivodule w (rot_rotrot_rotrotrotrotrotrotrotrotrotrotrotrotrotr	Module 4 (IOL_16/16_I/O-Bytes)	C PS CoE	0x2140:05 r	no filter (0)	Port X4 Pin 2 (IQ) - DI Filter Time: 0=no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms
EPDO LO PS CoE 0x2140.06 No Swap (0) Port X4 Byte Swap: 0=No Swap, 1=16 Bt Swap, 2=32 Bt Swap, 3=Full Swap	Þ 🛄 TxPDO	C PS CoE	0x2140:06	No Swap (0)	Port X4 Byte Swap: 0=No Swap, 1=16 Bit Swap, 2=32 Bit Swap, 3=Full Swap
👂 🏪 RxPDO 🔰 🔽 PS CoE 0x2150.01 false: Digital input N0 nor Port X5 Pin 4 (CQ) - DI Invert: false=Digital input N0 normally open, true=Digital input NC normally closed	RxPDO	C PS CoE	0x2150:01	false: Digital Input NO nor	Port X5 Pin 4 (CQ) - DI Invert: false=Digital Input NO normally open, true=Digital Input NC normally closed
Module 5 (IOL_32/32_1/V-Bytes) PS CoE 0x2150.02 no filter (0) Pott X5 Pin 4 (CQ) - DI Filter Time: 0-no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms	Module 5 (IOL_32/32_I/O-Bytes)	C PS CoE	0x2150:02 r	no filter (0)	Port X5 Pin 4 (CQ) - DI Filter Time: 0=no Filter, 10=1ms, 30=3ms, 50=5ms, 100=10ms, 150=15ms
kepto Isepto	👂 🛄 TxPDO	C PS CoE	0x2150:03	Static off (0)	Port X5 Pin 4 (CQ) - DO Static On: false=off, true=on

III. 27: Select object

Edit CANopen S	Startup Entry		×
Transition □ I -> P ☑ P -> S □ S -> 0	□ S → P □ O → S	Index (hex): 2140 Sub-Index (dec): 4 Validate Complete Access	OK Cancel
Data (hexbin):	Set Value Dialo	og X	Hex Edit
Validate Mask: Comment:	Dec: Hex:	4 OK gi 0x04 Cancel	Edit Entry
Index 更∽ 2140:0	Enum:	Not supported V Digital Input NO normally open Digital Input NC normally closed	
	Bool: Binary:	Digital Uutput Edit Static On 1	
	Bit Size:	○1 ●8 ○16 ○32 ○64 ○?	
<			>

III. 28: Value setting

Instruction:

a) Select object

b) If *ENUM* is supported you can call up a context menu for value setting.

Result:

✓ The settings are transmitted together with the configuration.

Module parameters

Pin/port-based IO layout defines the channel layout in the process data. This applies to both inputs and outputs.

Selection	Index	Subindex	Significance
0	0x2001	00	Port-based: Layout is sorted in ascending port or- der. [Default]
1			Pin-based: Layout is sorted in ascending pin order.

DO Substitute Mode

If fieldbus communication is interrupted, the predefined output status is present.

Selection	Index	Subindex	Significance
0	0x2002	01	Off [default value]
1			Power on
2			Last status

Port parameters Pin4 (C/Q) SIO mode and Pin2 (I/Q)

Digital I/O parameterization at ports X0... X7:

Selection	Index	Subindex	Significance
0	0x21n0	01	Port-based: Layout is sorted in ascending port or- der. [Default]
1			Pin-based: Layout is sorted in ascending pin order.

Tab. 2: Port X_ Pin4 (C/Q) SIO DI Invert

Selection	Index	Subindex	Significance
0	0x21n0	02	Without filter [default value]
10			1 ms
30			3 ms
50			5 ms
150			15 ms

Tab. 3: Port X_ Pin4 (C/Q) SIO DI Filter Time

Selection	Index	Subindex	Significance
0	0x21n0	04	Digital input NO (normally open)
1			Digital input NC (normally closed)
2			Digital output
3			Static digital output
4			Not supported [default value]

Tab. 4: Port X_ Pin2 (I/Q) Function

Selection	Index	Subindex	Significance		
0	0x21n0	05	Without filter [default value]		
10			1 ms		
30			3 ms		

Selection	Index	Subindex	Significance
50			5 ms
150			15 ms

Tab. 5: Port X_ Pin2 (I/Q) DI Filter Time

IO-Link master parameters

Selection	Description
Device ID	IO-Link Device ID
Vendor ID	Manufacturer ID of the IO-Link device
IO-Link revision	Version of implemented IO-Link specification (of the connected IO-Link device).
	 0: Plausibility check disabled
	 11: Plausibility check enabled
Cycletime	Cycle time aplied by master to this port. Any value other than zero will set IO-Link to manual mode:
	 0: as soon as possible
	• 32: 3.2 ms
	• 40: 4.0 ms
	■ 48: 4.8 ms
	■ 68: 6.8 ms
	■ 73: 10 ms
	■ 88: 16 ms
	■ 100: 20.8 ms
	■ 128: 32 ms
	■ 133: 40 ms
	■ 148: 64 ms
	■ 158: 80 ms
	■ 183: 120 ms
	• 188: 128 ms
Process data IN lenght	Number and structure of input data
Process data OUT lenght	Number and structure of outgoing data
Master control	IO-Link DataStorage functionality *
	 0x003 = No data memory [default value]
	 0x023 = Backup + Restore
	• 0x043 = Restore

Tab. 6: Configuration Data Port X_

* When switching to the *Restore* status, any device configurations previously saved in the device are discarded, especially when switching from *Backup&Restore* to *Restore*.

Upon initial connection in status *Restore* of a compatible device:

- Master is retrieving the DataStorage data (one-time backup) from the device,
- saves them and

 transmits them to each newly connected compatible device, compatible with different configuration (*Restore*).

9.3 General EtherCAT objects

Explanation of the elements:

Access	Read and/or write accesses:		
	 RO: read-only access 		
	 RW: Read and write access 		
Default	Preset value		
UINT	Data type Unsigned INT		

Device Type

Index	Name	Туре	Access	Default value	Significance
0x1000	Device Type	UINT32	RO	0x0000000	 Device type of the EtherCAT slave: The Lo-Word contains the CoE profile used (5001). The Hi-Word contains the module profile according to the modular device profile.

Error Register

Index	Name	Туре	Access	Default value	Significance
0x1001	Error Regis-	UINT32	RO	0x00000000	Error Register Object
	ter				Bit 0 = 1: Generic error
					Bit 1 = 1: Current error (SSC or ASC)
					Bit 2 = 1: Voltage error (LVS or LVA)
					Bit 3 6: Reserved
					Bit 7 = 1: Internal device error (IME)

Manufacturer Device Name

Index	Name	Туре	Access	Default value	Significance
0x1008	Name	VISIBLE STRING	RO	CM50I.EC	Device name of the EtherCAT slave

Manufacturer Hardware Version

Index	Name	Туре	Access	Default value	Significance
0x1009	Hardware version	VISIBLE STRING	RO	Actual hard- ware version	Hardware version of the Ether- CAT slave

Manufacturer Software Version

Index	Name	Туре	Access	Default value	Significance
0x100A	Software ver-	VISIBLE	RO	Actual	Firmware version of the Ether-
	sion	STRING		firmware ver-	CAT slave
				sion	

Identity Object

Index	Name	Туре	Access	Default value	Significance
0x1018:00	Identifiy ob- ject	UINT8	RO	0x04 (4dec)	Information of the slave
0x1018:01	Vendor ID	UINT32	RO	0x4F (79dec)	Vendor ID of EtherCAT slave device manufacturer
0x1018:02	Product code			0xDC70 (56432dec)	Product code of the EtherCAT slave
0x1018:03	Revision	-		0x00000000 (0dec)	Revision number of the Ether- CAT slave; the Low Word (bit 0-15) indicates the special termi- nal number, the High Word (bit 16-31) refers to the device de- scription
0x1018:04	Serial num- ber			0x0000000 (0dec)	 Serial number of EtherCAT slave the high word (bits 31-16) contains a consecutive number the upper byte of the low word (bits 15-8) contains the manufacturing week the lower byte of the low word (bits 7-0) contains the manufacturing year

Timestamp Object

Index	Name	Туре	Access	Default value	Significance
0x10F8	Timestamp Object	UINT64	RO	_	Local timestamp of the device in [ns]

Diagnosis History

				Default	
Index	Name	Туре	Access	value	Significance
0x10F3	Diagnosis History	RECOR D			
0x10F3:0	Diagnosis History	UINT8	RO	255	Highest supported subindex
0x10F3:1	Maximum Messages	UINT8	RO	0xFA (250dec)	Number of diagnosis messages which can be stored in the diag- nosis history (subindex 6 on- wards)
0x10F3:2	Newest Mes- sage	UINT8	RO	0	Subindex of the newest diagno- sis message (6-255)
0x10F3:3	Newest Ac- knowledged Message	UINT8	RW	0	Overwrite Mode (SI5, bit 4 = 0): Read = 0: When the message queue will be overwritten, the slave sets SI3 to 0. Writing = 0: The slave clears all messages, i.e. resets SI2, SI3, SI4 and SI5 bit 5* Writing = 15: The slave returns SDO abort with code 0x06090030 (Value range of pa- rameter exceeded) Writing = 6255: SI3 = written value (without checking)** Acknowledge Mode (SI5, bit 4 = 1): Read = 0: No messages have been acknowledged so far Read != 0: Subindex of latest ac- knowledged diagnosis message (6-69) Writing = 0: All acknowledged messages will be deleted Writing = 15: The slave returns SDO abort with code 0x06090032 (value of parameter written too low) Writing = 6255: Messages are acknowledged***
0x10F3:4	New Mes- sages Avail- able	BOOL	RO	0	Overwrite Mode: • 0: newest message was read

				Default	
Index	Name	Туре	Access	value	Significance
					 1: newest message was not read
					Acknowledge mode:
					 0: no unacknowledged mes- sage
					 1: diagnosis messages are available
0x10F3:5	Flags	UINT2	RW	0x0000 (0dec)	Flags to control sending and storing of diagnosis messages
					Bit 0: Enable Emergency send- ing
					0: default if device does not sup- port emergency sending
					1: new diagnosis messages shall be sent as emergency message
					Bit 1: Disable info messages
					0: Info messages are stored in the diagnosis message queue (default)
					1: Info messages will not be stored in the diagnosis message queue
					Bit 2: Disable warning messages
					0: Warning messages are stored in the diagnosis message queue (default)
					1: Warning messages will not be stored in the diagnosis message queue
					Bit 3: Disable error messages
					0: Error messages are stored in the diagnosis message queue (default)
					1: Error messages will not be stored in the diagnosis message queue
					Bit 4: Mode selection for diagno- sis history handling
					0: Overwrite Mode: old mes- sages are overwritten by new ones when buffer is full

Index	Name	Туре	Access	Default value	Significance
					1: Acknowledge mode: New messages do only overwrite messages which were acknowl- edged before
					Bit 5: Overwrite/Discard Informa- tion (read only) In Overwrite mode:
					1: unacknowledged messages have been overwritten (= buffer overrun) (SI3 is set to 0, too) In Acknowledge mode:
					1: message buffer is full with ac- knowledged messages and a new message is discarded
					Bit 615: reserved
0x10F3: 6-255	Diagnosis Message	OCTET 	RO		Diagnosis message buffer. Depending on SI1 the EtherCAT slave can store up to 250 mes- sages; the first message is stored in subindex 6, the second in subindex 7 and so on.
					When the queue is full, the EtherCAT slave shall overwrite subindex 6 and so on, that al- ways the latest maximum mes- sages (SI1) shall be accessible by the EtherCAT master.

*) Messages are deleted even if they were not acknowledged or read before.

**) All messages up to the age of the message which is in the written subindex are acknowledged. The slave does not check if those messages have been read before. The slave returns SDO abort with code 0x06090030 (value range of parameter exceeded) in the following case: If SI3 is written with a value of a Subindex which does not hold a message.

***) All messages up to the age of the message which is in the written subindex are acknowledged. The slave does not check if those messages have been read before. The slave returns SDO abort with code 0x06090030 (value range of parameter exceeded) in the following case: If SI3 is written with a value of a Subindex which does not hold a message.

Subindex 0: Highest supported subindex

The diagnostic history can comprise a maximum of as many diagnostic messages as specified in subindex 1: Maximum Messages. These can be retrieved with subindex 6. Subindex 0 indicates the highest subindex a diagnostic message is stored at.

Subindex 1: Maximum Messages

The diagnostic history can comprise as many diagnostic messages as specified here. The maximum value is 250.

Subindex 2: Newest Message

Subindex 2 can be used to retrieve the subindex the latest diagnostic message is stored at in the diagnostic history. The value should be within 6 and 255. 0 is returned if actually there are no diagnostic messages saved.

Subindex 3: Newest Acknowledged Message

This subindex contains the subindex of the latest confirmed diagnostic message. It can be both read and written. In both cases, the value meaning is according to the current mode.

Available modes are

- Overwrite (overwrite mode, subindex 5, bit 4 = 0) and
- Acknowledge (acknowledge mode, subindex 5, bit 4 = 1).

Overwrite mode:

Read = 0:

If the diagnostic message queue has been overwritten, the EtherCAT slave sets subindex 3 to 0.

Writing = 0:

When writing 0 to subindex 3, the EtherCAT slave will delete subindex 2, subindex 3, subindex 4 and subindex 5 bit 5 respectively sets them to 0.

If if not previously acknowledged or read, diagnostic messages will be deleted.

Writing = 1...5:

Slave returns SDO abort with error code 0x06090032 (written parameter value too low).

Writing = 6...255:

Subindex 3 = Value is overwritten (without verification). Acknowledge mode:

Read = 0:

So far no diagnostic messages have been acknowledged (Acknowledge).

Read != 0:

Subindex of the last acknowledged diagnostic message (6-255) Writing = 0: Every acknowledged diagnostic message is being deleted.

Writing = 1...5:

Slave returns SDO Abort with error code 0x06090032 (written parameter value too low).

Writing = 6...255:

Diagnostic messages are acknowledged (Acknowledge).



INFO

All diagnostic messages up to the age of the message present in the recently written subindex are acknowledged (Acknowledge). The EtherCAT slave does not verify whether the diagnostic messages have previously been read.

When writing a subindes number without diagnostic message into subindex 3, message, the slave will return SDO Abort with error code 0x06090030 (parameter value range exceeded).

Subindex 4: New Messages Available

Overwrite mode:

- 0: The recent diagnostic message has been read.
- 1: The recent diagnostic message has not been read.

Acknowledge mode:

- 0: No diagnostic message that has not been acknowledged is present.
- 1: Diagnostic messages present to be acknowledged.

Subindex 5: Flags

Bit 0: En	able emergency messages
0	Default if device cannot transmit emergency messages.
1	New diagnostic messages are transmitted as emergency messages.
Bit 1: Dis	able info messages
0	Info messages are saved in the diagnostic message queue.
1	Info messages are not saved the diagnostic message queue.
Bit 2: Dis	able warning messages
0	Warning messages are saved the diagnostic message queue.
1	Warning messages are not saved the diagnostic message queue
Bit 3: Dis	able error messages
0	Error messages are saved in the diagnostic message queue.
1	Error messages are not saved in the diagnostic message queue.
Bit 4: Mo	de selection for reaction to buffer overflow in diagnostic history
0	Overwrite mode: when buffer capacity is full, previous diagnostic messages are over- written by new ones.
1	Acknowledge mode: Previous messages are only overwritten by new ones if previ- ously having been acknowledged.
Bit 5: Ov	erwrite and discard information (read only)
In overwr	ite mode:
1	Diagnostic messages not acknowledged are overwritten (= buffer overflow). Subindex 3 has been set to 0.

Bit 5: Ov	3it 5: Overwrite and discard information (read only)							
In ac- knowl- edge mode:								
1	Diagnostic message buffer is full wit acknowledged messages, reason why incoming diagnostic messages are discarded.							

Subindex 6-255: Diagnosis Message

Subindex 6-255: Diagnosis message buffer

According to subindex 1, an EtherCAT slave can save up to 250 diagnostic messages. The first message is saved in subindex 6, the second in subindex 7 and so on.

When the buffer is full, the EtherCAT slave overwrites subindex 6 etc. so that recent diagnostic messages remain accessible to the EtherCAT master. Their exact number is specified in subindex 1.

9.4 Bit mapping and device process data

When used in a EtherCAT master system, the Baumer EtherCAT IO-Link master assigns such objects in the address area of the EtherCAT master. Process data come in the following structure:

TxPDO/RxPDO IO-Link slot Assignment

Process data assignment for digital channels or IO-Link device on pin 4.

- A slot being set to Digital IN or Digital OUT is assigned one byte of process data. The slotspecific status channel is available in the entire process data, i.e. in *TxPDO Mapping of digital Inputs* or *RxPDO Mapping of digital Outputs*.
- If the slot is set to IOL_x / y_I / O Byte, process dara are assigned a certain number of bytes corresponding to the type (input/output) and size (x/y).

	Input/output										
Byte 0	Byte 1	Byte 2					Byte 31				
Process	Process	Process	_	-	-	-	Process				
data byte 0	data byte 1	data byte 2					data byte				
							31				

TxPDO Digital input assignment

Process data assignment to digital inputs on pin 4 and pin 2.

Pin4 (C/Q) +	- Pin2 (I/Q) -	Port-based	data layou	ut
--------------	----------------	-------------------	------------	----

	Eingangsbyte n										
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				
	Input byte n+1										
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7				

Eingangsbyte n										
Port X4	Port X4	Port X5	Port X5	Port X6	Port X6	Port X7	Port X7			
Pin 4	Pin 2	Pin 4	Pin 2	Pin 4	Pin 2	Pin 4	Pin 2			

Tab. 7: Port-based data layout_digital inputs pin 4 and pin 2

Pin4 (C/Q) + Pin2 (I/Q) - Pin based data layout

	Input byte n									
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7			
Port X0 Pin 4	Port X1 Pin 4	Port X2 Pin 4	Port X3 Pin 4	Port X4 Pin 4	Port X5 Pin 4	Port X6 Pin 4	Port X7 Pin 4			
	Input byte n+1									
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7			
Port X0 Pin 2	Port X1 Pin 2	Port X2 Pin 2	Port X3 Pin 2	Port X4 Pin 2	Port X5 Pin 2	Port X6 Pin 2	Port X7 Pin 2			

Tab. 8: Pin-based data layout_digital inputs pin 4 and pin 2

TxPDO digital output assignment

Process data assignment to digital outputs on pin 4 and pin 2.

Pin4 (C/Q) + Pin2 (I/Q) - Port-based data layout

Input byte n											
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				
	Input byte n+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. 9: Port-based data layout_digital inputs pin 4 and pin 2

Pin4 (C/Q) + Pin2 (I/Q) - Pin based data layout

Input byte n								
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	
Port X0 Pin 4	Port X1 Pin 4	Port X2 Pin 4	Port X3 Pin 4	Port X4 Pin 4	Port X5 Pin 4	Port X6 Pin 4	Port X7 Pin 4	
			Input b	yte n+1				
Bit 0	Bit 1	Bit 2	Bit 3	Bit 4	Bit 5	Bit 6	Bit 7	
Port X0 Pin 2	Port X1 Pin 2	Port X2 Pin 2	Port X3 Pin 2	Port X4 Pin 2	Port X5 Pin 2	Port X6 Pin 2	Port X7 Pin 2	

Tab. 10: Pin-based data layout_digital inputs pin 4 and pin 2

TxPDO assignment of New available messages

Overwrite Mode	0: newest message was read				
	1: newest message was not read				
Acknowledge Mode	0: no unacknowledged message				

1: diagnosis messages are available which can be acknowledged

TxPDO assignment of status data

One status byte available for each port.

State of IO-Link Port X_:

Input byte n	0: Port disabled			
	1: SIO mode digital input			
	2: SIO mode digital output			
	3: IO-Link communication enabled			
	4: IO-Link communication disabled			

State of IO-Link Port n_(n represents the Subindex/Module position):

Bit 03 IO-Link	0x00 (0dec)	Port Inactive
State	0x01 (1dec)	Siomode Digital In
	0x02 (2dec)	Siomode Digital Out
	0x03 (3dec)	Communication OP
	0x04 (4dec)	Communication STOP
Bit 47 Error-	0x00 (0dec)	No Error
Code	0x10 (16dec)	Watchdog Error
	0x20 (32dec)	Buffer Overflow
	0x30 (48dec)	Invalid Device ID
	0x40 (64dec)	Invalid Vendor ID
	0x50 (80dec)	Invalid IO-Link Revision
	0x60 (96dec)	Invalid Frame Capability
	0x70 (112dec)	Invalid Cycle Time
	0x80 (128dec)	Invalid Length processdata
	0x90 (144dec)	Invalid Length processdata
	0xA0 (160dec)	No Device deteced
	0xB0 (172dec)	Error PreOP

9.5 Distributed Clocks (DC)

Device supports transmission of DC messages and can act as a reference clock. Internal time stamps are limited to 32 bits.

Advanced Settings		×
General Mailbox Assign to local μC Latch ESC Access	Distributed Clock Cyclic Mode Operation Mode: Image: Pree Run Image: Pree Run<	
	SYNC 1 O Sync Unit Cycle Cycle Time (µs): 4000 O SYNC 0 Cycle x 1 Shift Time (µs): 0 Enable SYNC 1 Use as potential Reference Clock	OK Abbrechen
		OK Abbrechen

Synchronization of the local device ports with DC id not provided.

9.6 Object directory

9.6.1 IO-Link master settings

Digital IO layout configuration:

Index	Name	Туре	Access	Default	Significance
0x2001	PD Layout Con-	UNIT8	RW	0	• 0: Port-based
	figuration				1: Pin-based

'∽_ INFO

After device restart the changes made at the web server are adopted.

DO Substitute Configuration:

Index	Name	Туре	Access	Default	Significance
0x2002:0	DO Substitute Configuration	RECOR D			
0x2002:0	Highest supported subindex	UINT8	RO	1	

Index	Name	Туре	Access	Default	Significance
0x2002:1	DO Substitue	UINT8	RW	0	• 0: Off
	Mode				2: Hold last

9.6.2 IO-Link port settings

Digitale Ports

Index	Name	Туре
0x2100	Configuration Port X0 Parameter	RECORD
0x2110	Configuration Port X1 Parameter	
0x2120	Configuration Port X2 Parameters	-
0x2130	Configuration of port X3 parameters	-
0x2140	Configuration of port X4 parameters	-
0x2150	Configuration Port X5 parameters	-
0x2160	Configuration of port X6 parameters	-
0x2170	Configuration Port X7 Parameters	

Tab. 11: IO-Link-Port Class A/B

Parameter 0x21n0 (n = ports X0 ... X7).

DO Substitute Configuration:

Index	Name	Туре	Access	Default	Significance
0x21n:00	Port Xn Parame- ter	UNIT8	RO	5	
0x21n:01	Pin 4 (C/Q)	BOOL	RW	FALSE	 0x00 (0dec) Digital Input (NO)
					 0x01 (1dec) Digital Input in- verted (NC)
0x21n0.2	Digital input filter	UINT8	RW	0x00	 0x00 (0dec) No filter
	Pin 4 (C/Q)				 0x0A (10dec) 1ms filter
					 0x1E (30dec) 3ms filter
					 0x32 (50dec) 5ms filter
					 0x64 (100dec) 10ms filter
					 0x96 (150dec) 15ms filter
0x21n0.3	Reserved	_	-	_	_
0x21n0.4	Digital Mode Pin2	UINT8	RW	0x04	 0x00 (0dec) Digital Input (NO)
	(I/Q)			(4dec)	 0x01 (1dec) Digital Input in- verted (NC)
					 0x02 (2dec) Digital Output
					 0x03 (3dec) Static ON (24V)
					 0x04 (4dec) Deaktiviert
0x21n0.5	Digital Input Filter	UINT8	RW	0x0A	 0x00 (0dec) = No filter
	Pin2 (I/Q)			(10dec)	 0x0A (10dec) = 1 ms filter

Index	Name	Туре	Access	Default	Significance
					 0x1E (30dec) = 3 ms filter
					 0x32 (50dec) = 5 ms filter
					 0x64 (100dec) = 10 ms filter
					 0x96 (150dec) = 15 ms
0x21n0.6	IO-Link Process	UINT8	RW	0	 0 = No Swap
	Data Swap				 1 = 16 Bit Swap
					 In case of odd data length the last byte will not be touched 2 = 32 Bit Swap
					 In case the data length is not on 4 byte boundary 3 byte, swap of byte x with x+2. x+1 will not be touched 3 byte, swap of byte x with x+2. x+1 will not be touched 1 byte, byte will not be touched 3 = Full Swap

9.6.3 Device reset

Firmware Update

Index	Name	Туре	Access	Default	Significance
0x5FFF	Reset to Factory	UNIT8	WO	_	1: Device Config
					2: Network Config
					 3: Application Config
					 4: Factory reset

9.7 Industrial Internet of Things (IIoT)

9.7.1 JSON

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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	-

No.	REST API URL	Description	Support ing
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	
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

No.	REST API URL	Description	Support ing
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
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

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
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

Vendor-specific JSON settings

9.7.2 MQTT

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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
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

No.	MQTT topics	Description
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)

9.7.3 OPC UA

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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 .

9.7.3.1 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://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:

- \Rightarrow 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 ? ×	Add Server ? X
Configuration Name CM50I	Configuration Name CM50I
PKI Store	PKI Store Default 🗸
Discovery Advanced Endpoint Filter: No Filter Image: Contract of the second	Discovery Advanced Server Information Endpoint Url opc.tcp://192.168.0.250:4840 Reverse Connect Security Settings Security Settings Security Policy None Message Security Mode Authentication Settings
	Anonymous Username Password Certificate
Username Store Password Certificate Private Key	Private Key Session Settings Session Name
Connect Automatically OK Cancel	Connect Automatically OK Cancel

III. 29: 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. 30: OPC-UA-Server - Device information model

The following figure shows an excerpt of an IO-Link port information model.
🗸 💑 Port X7 > 🚞 Alarms > i Capabilities Configuration > 🗸 💑 Device > i Alarms DeviceAccessLocks DeviceHealth 5 DeviceID > 🚞 General HardwareRevision Identification Manufacturer > 뤚 MethodSet MinCycleTime Model NodeVersion > 💑 ParameterSet ProductID ProductText ProfileCharacteristic RevisionID SerialNumber SoftwareRevision VendorID VendorText DeviceConfigurationDisabled Diagnostics > i Configuration Current > CurrentPin1 > CurrentPin2 > CurrentPin4 > 🚞 Flags > i Temperature > i Voltage Information > 💑 MethodSet NodeVersion > 💑 ParameterSet

- Galarierset
 SIOProcessData
 - > In Pin2ProcessData
- > 🚞 Statistics
- > 🚞 Statistics
- VendorlD
- III. 31: OPC-UA-Server Port information model

9.7.3.2 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				₽×
👻 🎵 Proje	ect			
🗸 🗸 🗸	ervers			
2	🔉 CM50I 🛛 🗖	-		
	Documents 🛛 🤇	Q	Connect	
1	🕽 Data Acce 🏅	×	Disconnect	
	<i>b</i>	2	Properties	
	i i	2	Change User	
Address Space	•	-	Remove	₽×
🈏 No Highlig	ght			-

III. 32: 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	admin	Store	
Password	•••••		
Certificate			
Private Key			
	OK	Cance	4

III. 33: 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			₽×			
😏 No Hig	hlight			-			
III. 34: Acc	 bjects DeviceSet CM50I.PN Configuration DeviceConfigurat DeviceInformatio DeviceManual DeviceRevision Sector Forcing GetForcingID GetForcingID OutputPin2 OutputPin4 DeviceRevision 	ion n eld	Rebrowse Call				
Call C	GetForcingID on Forcing					?	×
Output	Arguments						
Name	Value			Data	Туре	Descrip	otion
Force Id	2527038128			UInt3	2		
Message	Forcing ID has been assign		Save as	String	1		
Status	0			Int32			
Result							
Succeede	d						
				Call		Class	

III. 35: Dialog window of the *GetForcingID* method

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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.



III. 36: Accessing method OutputPin2

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

9.7.3.3 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. 12: Device identification

😏 No Highlight 🔹	#	Server	Node Id	Display Name	Value	Datatype
C Root	1	CM50I	NS6 Numeric 161	Manufacturer	"en", "Baumer"	LocalizedText
X 🛱 Objects	2	CM50I	NS6 Numeric 166	ManufacturerUri	www.baumer.com	String
	3	CM50I	NS6 Numeric 162	Model	"en", "CM50I.PN"	LocalizedText
V 🙀 DeviceSet	4	CM50I	NS6[Numeric]167	ProductCode	11261571	String
🗸 💑 CM50I.PN	5	CM50	NS6[Numeric]164	RevisionCounter SerialNumber	I 60400000000070659	Int32 String
Configuration	7	CM50	NS6INumericI165	SoftwareRevision	V1 3 0	String
> 📥 DeviceConfiguration	I.	CITISOT	resolutionericitos	Solution	11010	String
> 💑 DeviceInformation						
DeviceManual						
DeviceRevision						
> 📤 Forcing						
HardwareRevision						
> 臱 IOLinkMaster						
> 뤚 MaintenanceInformation						
Manufacturer						
ManufacturerUri						
> 👶 MethodSet						
Model						
🚕 ParameterSet						
> 🚕 ProcessDataMonitor						
ProductCode						
RevisionCounter						
SerialNumber						
SoftwareRevision						
> 🗀 Status						
> 👶 Server						
> 🛅 Types						
> 🛅 Views						

III. 37: Device identification

9.7.3.4 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-	Variable	read	2 °C	Temperature hysteresis, unit: 0.1 °C
teresis				If the limit is exceeded by tempera- ture, temperature must first drop be- low again by the hysteresis value to cancel diagnostics.
UnderTempera- 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. 13: Device specific configuration parameters

😏 No Highlight	-	#	Server	Node Id	Display Name	Value	Datatype
🛅 Root	~	1	CM50I	NS6 Numeric 2057	CurrentHysteresis	10	UInt16
Y 🛅 Objects		2	CM50I	NS6 Numeric 2050	OverTemperature	70	Float
× 🐣 DeviceSet		3	CM50I	NS6 Numeric 2058	OverVoltageL	30000	Int32
		5	CM50I	NS6 Numeric 2051	TemperatureHyster	2	Float
		6	CM50I	NS6 Numeric 2049	UnderTemperature	-25	Float
		7	CM50I	NS6 Numeric 2060	UnderVoltageL	17000	Int32
		9	CM50	NS6INumerici2062	VoltageHysteresis	300	UInt52
> 🙀 DeviceInformation		l -					
DeviceManual							
DeviceRevision							
> 🍋 Forcing							
HardwareRevision							
Y 💫 IOLinkMaster							
> 🗀 Alarms							
> 🛅 Capabilities							
DeviceID							
> 🚞 Diagnostics							
> 🚞 Identification							
> 🚞 Management							
MasterConfigurationDisabled							
> 🜏 MethodSet							
✓ A ParameterSet							
> ApplicationSpecificTag							
CurrentHysteresis							
EngineeringUnits							
> 💷 FunctionTag							
> 🔲 LocationTag							
> MasterType							
MaxNumberOfPorts							
Max PowerSupply							
MeanTemperature							
MeanVoltagel							
MaanVoltageL							
> Over lemperature							
> UverVoltageL							
> OverVoltageL2							
> 🛀 SumCurrentL							
> 🔘 SumCurrentL2							
> 🔘 TemperatureHysteresis							
> 🔘 UnderTemperature							
> 💷 UnderVoltageL							
> 💷 UnderVoltageL2							
> 🔘 VoltageHysteresis							

III. 38: 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- Pin1, UnderCurrent- Pin2, UnderCurrentPin4	Variable	read	0	Warning level for minimum current limit at pin 1, pin 2 or pin 4, unit: 1mA 0: monitoring not enabled

Tab. 14: Port-specific configuration parameters

9	No Highlight	•	#	Server	Node Id	Display Name	Value	Datatype
	Root	^	1	CM50I	NS6 Numeric 34860	OverCurrentPin1	0	Int32
\sim	🗀 Obiects		2	CM50I	NS6 Numeric 34862	OverCurrentPin2	0	Int32
	V 🐣 DeviceSet		3	CM50I	NS6INumeric[34804	UpderCurrentPin4	0	Int32
			5	CM50I	NS6 Numeric 34863	UnderCurrentPin2	ŏ	Int32
			6	CM50I	NS6 Numeric 34865	UnderCurrentPin4	0	Int32
	> 🙀 DeviceConfiguration							
	> 🚕 DeviceInformation							
	DeviceManual							
	DeviceRevision							
	> 💑 Forcing							
	HardwareRevision							
	🗸 👶 IOLinkMaster							
	> 🚞 Alarms							
	> 🚞 Capabilities							
	DeviceID							
	> 🛅 Diagnostics							
	> 🛅 Identification							
	> 🛅 Management							
	MasterConfigurationDisabled							
	> 🚕 MethodSet							
	> 👶 ParameterSet							
	🗸 👶 Port X0							
	> 🚞 Alarms							
	> 🛅 Capabilities							
	> 🛱 Configuration							
	> 🐣 Device							
	DeviceConfigurationDisabled							
	Configuration							
	> UverCurrentPin2							
	> 🛄 OverCurrentPin4							
	> 💷 UnderCurrentPin1							
	> 🔲 UnderCurrentPin2							
	> 🔲 UnderCurrentPin4							

III. 39: Port-specific configuration parameters

9.7.3.5 Process data

The OPC UA server provides nodes including process data. For example, in node **Pin2Pro**cessData 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. 15: Process data

Mo Highlight 🔹	#	Server	Node Id	Display Name	Value
Root ^	1	CM50I	NS6 Numeric 33340	Pin2ProcessData	false
Objects	2	CIVIDUI	N50Numeric(5554)	PIN4PIOCESSData	Taise
Y 💑 DeviceSet					
Y 🚕 CM50I.PN					
> 🚞 Configuration					
> 👶 DeviceConfiguration					
> 뤚 DeviceInformation					
DeviceManual					
DeviceRevision					
> 💑 Forcing					
HardwareRevision					
🗸 💑 IOLinkMaster					
> 🚞 Alarms					
> 🚞 Capabilities					
DeviceID					
Diagnostics					
> 🗀 Identification					
> 🛅 Management					
MasterConfigurationDisabled					
> 💑 MethodSet					
> 💑 ParameterSet					
Y 💑 Port X0					
> 🛅 Alarms					
> 🧰 Capabilities					
> 🚞 Configuration					
DeviceConfigurationDisabled					
> 🛅 Diagnostics					
> 🧰 Information					
> 💑 MethodSet					
NodeVersion					
> 💑 ParameterSet					
 SIOProcessData 					
> Pin2ProcessData					
> Pin4ProcessData					
<i>III. 40:</i> Process data					

9.7.3.6 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. 16: Device-specific (calculated) measured values

9	No Highlight 🗸 🗸	#	Server	Node Id	Display Name	Value	D
6	Root	1	CM50I	NS6 Numeric 2052	SumCurrentL	114	Int32
~	🗀 Objects	2	CM50I	NS6 Numeric 2053	SumCurrentL2	0	Int32
	🗸 💑 DeviceSet	4	CM50	NS6INumerici2055	MeanVoltageL	24037	Int3
	🗸 臱 CM50I.PN	5	CM50I	NS6 Numeric 2056	MeanVoltageL2	24180	Int3
	> 🛅 Configuration						
	> 뤚 DeviceConfiguration						
	> 💑 DeviceInformation						
	DeviceManual						
	DeviceRevision						
	> 뤚 Forcing						
	HardwareRevision						
	Y 💑 IOLinkMaster						
	> 🖨 Alarms						
	> 🗀 Capabilities						
	DeviceID						
	> Diagnostics						
	> Undentification						
	Management						
	EurotionTag						
	MasNumberOfPorts						
	MaxPowerSupply						
	> MeanTemperature						
	> MeanVoltageL						
	> MeanVoltageL2						
	> OverTemperature						
	> 🔘 OverVoltageL						
	> OverVoltageL2						
	> 💷 SumCurrentL						
	> CumCurrentL2						
	> 🕘 TemperatureHysteresis						
	> 🔘 UnderTemperature						
	> 💷 UnderVoltageL						
	> 🔲 UnderVoltageL2						
	> 🔲 VoltageHysteresis						

III. 41: 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. 17: Port specific measuring values

😏 No Highlight	• #	Server	Node Id	Display Name	Value	Datatype
🛅 Root 🧳	1	CM50I	NS6 Numeric 34836	CurrentPin1	31	Int32
✓ ☐ Objects	2	CM50I	NS6 Numeric 34837	CurrentPin2	0	Int32
V A DeviceSet	3	CM50I	NS6 Numeric 34838	CurrentPin4	0	Int32
	5	CM50	NS6INumericI34855	Max TemperaturePin2	36.7	Float
V 🙀 CMBULPIN	6	CM50I	NS6 Numeric 34856	Max TemperaturePin4	36.7	Float
> Configuration	7	CM50I	NS6 Numeric 34851	MinVoltagePin1	24022	Int32
> 💑 DeviceConfiguration	8	CM50I	NS6 Numeric 34852	MinVoltagePin2	-162	Int32
> 뤚 DeviceInformation	9	CIVIDUI	NS0/Numeric/34853	WinvoltagePin4	-103	Int32
DeviceManual						
DeviceRevision						
> 뤚 Forcing						
HardwareRevision						
✓						
> 🛱 Alarms						
> 🛄 Management						
MasterConfigurationDisabled						
> 💑 MethodSet						
> 🚕 ParameterSet						
🛩 👶 Port X0						
> 🛅 Alarms						
> 🚞 Capabilities						
> 🛅 Configuration						
> 🚣 Device						
DeviceConfigurationDisabled						
Nodeversion						
V ipp ParameterSet						
> 🖾 ActualCycleTime						
> 🔲 Baudrate						
> 🔲 CurrentPin1						
> 🔲 CurrentPin2						
> 🥥 CurrentPin4						
III. 42: Port specific measuring values						

9.7.3.7 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 protec- tion, Bit 3: Overvoltage protection, Bit 4: Overcurrent, Bit 5: Undercurrent Bit 0: Overtemperature Bit 1: Undertemperature
			Bit 2: OvervoltageBit 3: Undervoltage

Node ID	Node class	Access	Description
			 Bit 4: Watchdog
			0: Diagnosis not active
			1: Diagnosis active

Tab. 18: Port-specific diagnostics



9.7.3.8 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. 19: Port specific statistical information

😏 No Highlight	-	#	Server	Node ld	Display Name	Value	Datatype
🛅 Root	^	1	CM50I	NS6 Numeric 34842	MaxCurrentPin1	38	Int32
V 🛱 Objects		2	CM50I	NS6 Numeric 34843	MaxCurrentPin2	10	Int32
× 🐣 DeviceSet		3	CM50I	NS6 Numeric 34844	MaxCurrentPin4	0	Int32
		5	CM50I	NS6INumericI34846	MinCurrentPin2	0	Int32
		6	CM50I	NS6 Numeric 34847	MinCurrentPin4	ō	Int32
		7	CM50I	NS6 Numeric 34854	MaxTemperaturePin1	36.7	Float
> 💑 DeviceConfiguration		8	CM50I	NS6 Numeric 34855	Max TemperaturePin2	30.7	Float
> 🚕 DeviceInformation		10	CM50I	NS6INumericI34857	MinTemperaturePin1	28.8	Float
DeviceManual		11	CM50I	NS6 Numeric 34858	MinTemperaturePin2	28.8	Float
DeviceRevision		12	CM50I	NS6 Numeric 34859	MinTemperaturePin4	28.8	Float
> 뤚 Forcing		14	CM50I	NS6 Numeric 34848	MaxVoltagePin1	23545	Int32 Int32
HardwareRevision		15	CM50I	NS6 Numeric 34850	MaxVoltagePin4	23111	Int32
🗸 👶 IOLinkMaster		16	CM50I	NS6 Numeric 34851	MinVoltagePin1	24022	Int32
> 🛅 Alarms		17	CM50I	NS6 Numeric 34852	MinVoltagePin2	-162	Int32
> 🛅 Capabilities		10	CIVIDUI	N30/Numeric/54655	MinvoltagePin4	-135	Int52
DeviceID							
> Diagnostics							
> Construction							
> 🖨 Management							
MasterConfigurationDisabled							
Masterconnigurationorsablea MethodSet							
> 😝 Port XU							
> op Port XI							
> 💑 Port X2							
> 💑 Port X3							
> 💑 Port X4							
> 💑 Port X5							
> 👶 Port X6							
> 👶 Port X7							
Statistics							
✓							
✓ i Current							
> MaxCurrentPin1							
> MaxCurrentPin2							
> MaxCurrentPin4							
MinCurrentDin1							
MinCurrentDin2							
MinCurrentPin4							
VINCUITENTPIN4							
> 🛄 IOLInk							
V 🛄 Iemperature							
> 💷 MaxTemperaturePin1							
> 🔲 MaxTemperaturePin2							
> 💷 MaxTemperaturePin4							
> 🔘 MinTemperaturePin1							
> 🥥 MinTemperaturePin2							
> 🕥 MinTemperaturePin4							
🗸 🗀 Voltage							
> 🔲 MaxVoltagePin1							
> 🕘 MaxVoltagePin2							
> 🕘 MaxVoltagePin4							
> MinVoltagePin1							

III. 44: Port specific statistical information

9.7.3.9 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 converted into a decimal number. The table shows how to convert. Value 0 disables the function
	<u> </u>		
NtpClientUpdateCon- figuration	Variable	Write	Method for writing the nodes Ntp- ClientServerIpAddress and Ntp- ClientServerIpAddressFallback

Tab. 20: 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:

- \Rightarrow You have OPC UA client.
- ⇒ 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.





✓ Dialog window Call NtpClientUpdateConfiguration on NtpClient pops up:

Call NtpClientUpda	teConfiguration on NtpClient		?	Х
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. 47: 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 ? ×				×
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
Name Status Result Succeeded	Value	DataType Int32	Descrip	tion

III. 48: 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 EtherCAT
- LED indicator POWER
- EtherCAT diagnostic messages

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. 49: 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. 21: 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
💋 Red	Flashing at 1 Hz	Overload/short circuit in sensor supply 24 V + Pin1
	Off	Pin 2 is not assigned or disabled

Tab. 22: 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. 23: LED indicator DI pin 4

PIN 4 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 4
💋 Red	Flashing at 1 Hz	Overload/short circuit in sensor supply 24 V + Pin1
	Off	Pin 4 is not assigned or disabled

Tab. 24: LED indicator DO pin 4

Pin 4 IO-Link mode

Indicator	Status	Description
	On continuous	IO-Link in status <i>Operate</i> .
Green		
2	Flashing at 1 Hz	 Device is not connected
Green		 No communication with connected device.
<u>//</u>	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		
%	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. 25: LED indicator IO-Link mode Pin 4

10.1.4 BUS RUN- and CfgF LED

• RUN-LED indicates the bus status

LED indicator RUN

Indicator	Status	Description
	On continuous	Device in OPERATIONAL mode
Green		
<u>//.</u>	Short flash at long interval	Device in SAFE-OPERATIONAL mode
Green	(Single flash)	
// .	Flashing at 2 Hz	Device in PRE-OPERATIONAL mode
Green		
	Off	Device in INIT mode

Tab. 26: LED indicator RUN

LED display Flashing green

Troubleshooting

Instruction:

- Check the PLC operating status.
 - ERR-LED indicates the status of PLC configuration.

ERR LED indicator

Indicator	Status	Description
7 .	Flashing at 2.5 Hz	Configuration error
Red		
7 .	Long pause (Single flash)	Slave device application has autonomously
Red		changed the EtherCAT status
7 .	Flash-flash pause (Double	Timeout at application watchdog
Red	flash)	
	Off	Device EtherCAT communication is opera- tional

Tab. 27: ERR LED indicator

LED indicator red

Troubleshooting

• Check PLC configuration.

10.1.5 LED indicator L/A1/LA2

RUN ERR	L/A1	L/A2	UA US
			POWER

 L/A1 and L/A2 (Link/Activity) indicate the EtherCAT communication status at the respective port.

LED indicator L/A1 and L/A2

LED indicator	LED status	Description
	On continuous	Device
Green		 is connected to the EtherCAT network
		 does not transmit/receive EtherCAT frames
% .	Flashing	Device
Green		 is connected to the EtherCAT network
		 is transmitting/receiving EtherCAT frames
	Off	Device not conntected to the EtherCAT net- work.

Tab. 28: LED indicator L/A1 and L/A2

LED indicator off

Troubleshooting

Instruction:

• Check the line connections.

10.1.6 LED status indicator



• ST indicates the overall device status.

LED indicator ST

Indicator	Status	Description
	On continuous	Regular FW is running. Error-free operation.
Green		
7	Flashing at 4 Hz	The process requested by rotary switch posi-
Green		tion is being executed. Do not switch off de- vice.
% .	Flashing at 2 Hz	Invalid rotary switch position. System does not
Red		start.
	On continuous	Initialization error. Error during device initializa-
Red		tion.
		 HW issues,
		 no valid configuration,
		 COM FW not found
		 rotary switch operation failed, etc.

Tab. 29: 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-Anzeige POWER US and UA



The power LEDs indicate the supply status

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

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

LED indicator POWER US

Tab. 30: 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
7	Flashing at 4 Hz	UA >30 V
Red		overvoltage
	Off	UA <11 V
		no voltage

Tab. 31: LED indicator POWER UA



INFO

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

10.2 EtherCAT diagnostic messages

Diagnostics via object 0x10F3 Ring buffer for saving up to 250 diagnostic messages.

All events having triggered device telegrams are logged.

Potential messages

- EtherCAT system diagnostics generated by IO-Link master:
 - Information
 - Warning
 - Error
- IO-Link events transmitted from connected IO-Link device to master.

In addition, each diagnostic message comes with a time stamp [ns] in object 0x10F8 (Timestamp Object).

Emergency telegrams

Emergency telegrams are messages actively transmitted from the device to the EtherCAT master if a specific event has occurred. This is CoE- based service without acknowledgement.

Device-related diagnostic messages

Error Identifier	EtherCAT Diag Code	EtherCAT Emergency (5 Bytes)	Meaning
0x0100	0xFF00E800	0x0X, 0x00, 0x00, 0x01,0x00	Undervoltage Us
0x0101	0xFF01E800	0x0X, 0x00, 0x00, 0x01,0x01	Overvoltage Us
0x0102	0xFF02E800	0x0X, 0x00, 0x00, 0x01,0x02	Overtemperature
0x0103	0xFF03E800	0x0X, 0x00, 0x00, 0x01,0x03	Overload at Us
0x0104	0xFF04E800	0x0X, 0x00, 0x00, 0x01,0x04	Overload at Ua
0x0105	0xFF05E800	0x0X, 0x00, 0x00, 0x01,0x05	Undertemperature
0x0106	0xFF06E800	0x0X, 0x00, 0x00, 0x01,0x06	Undervoltage Ua
0x0107	0xFF07E800	0x0X, 0x00, 0x00, 0x01,0x07	Overvoltage Ua
0x0108	0xFF08E800	0x0X, 0x00, 0x00, 0x01,0x08	Force mode active

Tab. 32: Device-related diagnostic messages



EtherCAT Telegram: First byte:

a) 0x00 for diagnostics occurred and

b) 0x01 for disappearing diagnostics.

Port-related diagnostic messages

Error Identifier	EtherCAT Diag Code	EtherCAT Emergency (5 Bytes)		Meaning
0x1800	0x0001E002	0xE0, 0x02, 0xXX, 0x18, 0x00	0x002C	No device (communicfation)
0x1801	-	0xE0, 0x02, 0xXX, 0x18, 0x01	0x0001	Startup parametrization error
0x1802	-	0xE0 0x02, 0xXX, 0x18, 0x02	0x0002	Incorrect Vendor ID
0x1803	-	0xE0, 0x02, 0xXX, 0x18, 0x03	0x0003	Incorrect DeviceID
0x1804		0xE0, 0x02, 0xXX, 0x18, 0x04	0x0004	Short circuit at pin 4 (IOL)
0x1805		0xE0, 0x02, 0xXX, 0x18, 0x05	0x0005	Overtemperature
0x1806		0xE0, 0x02, 0xXX, 0x18, 0x06	0x0006	Short circuit at pin 1
0x1807		0xE0, 0x02, 0xXX, 0x18, 0x07	0x0007	Overcurrent at pin 1
0x1808		0xE0, 0x02, 0xXX, 0x18, 0x08	0x0008	Device Event overflow
0x1809		0xE0, 0x02, 0xXX, 0x18, 0x09	0x0009	Backup inconsistency – memory out of range
0x180A	-	0xE0, 0x02, 0xXX, 0x18, 0x0A	0x000A	Backup inconsistency – identity fault
0x180B	-	0xE0, 0x02, 0xXX, 0x18, 0x0B	0x000B	Backup inconsistency – Data storage error
0x180C		0xE0, 0x02, 0xXX, 0x18, 0x0C	0x000C	Backup inconsistency – upload fault
0x180D		0xE0, 0x02, 0xXX, 0x18, 0x0D	0x000D	Backup inconsistency – down- load fault
0x180E		0xE0, 0x02, 0xXX, 0x18, 0x0E	0x000E	Class B power (pin 2) missing or undervoltage

Error Identifier	EtherCAT Diag Code	EtherCAT Emergency (5 Bytes)		Meaning
0x180F		0xE0, 0x02, 0xXX, 0x18, 0x0F	0x000F	Class B power (pin 2) short cir- cuit
0x1810		0xE0, 0x02, 0xXX, 0x18, 0x10	0x0010	Short circuit at pin 2
0x1811		0xE0, 0x02, 0xXX, 0x18, 0x11	0x0011	Short circuit at pin 4 (digital out)
0x1812	-	0xE0, 0x02, 0xXX, 0x18, 0x12	0x0012	Overcurrent at pin 2
0x1813		0xE0, 0x02, 0xXX, 0x18, 0x13	0x0013	Overcurrent at pin 4 (digital out)
0x6000		0xE0, 0x02, 0xXX, 0x60, 0x00	0x0014	Invalid cycle time
0x6001		0xE0, 0x02, 0xXX, 0x60, 0x01	0x0015	Revision fault – incompatible protocol version
0x6002		0xE0, 0x02, 0xXX, 0x60, 0x02	0x0016	ISDU batch failed
0xFF26		0xE0, 0x02, 0xXX, 0xFF, 0x26	0x0017	Port status changed – Use "SMI_PortStatus" service for port status in detail
0xFF27		0xE0, 0x02, 0xXX, 0xFF, 0x27	0x0018	Data Storage upload completed and new data object available
0xFF31		0xE0, 0x02, 0xXX, 0xFF, 0x31	0x0019	DL: Incorrect Event signalling

Tab. 33: Port-related diagnostic messages

INFO EtherCAT Telegram: First byte:

a) 0xE002 + port number + error code for the occurred diagnostics,

b) 0x0000 + port number + error code for disappearing diagnostics.

11 Web server

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

				💠 English 🔻 🔒 Logged in as: Guest 🛛 About
Baumer				
Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
間 11261571 CM50LPN	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				
Settings / Maintenance				
User Administration				
📾 Sign In				

III. 50: Web server

ׂ∽_ 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>

	🔶 Ergin * E	Logged in as: Guest About
Baumer		
Baamer		
Station Name / Station Type	Collapse all Expand all	
I 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	۵
IO-Link Master Port X3		
IO-Link Master Port X4	Sign in	
IO-Link Master Port X5		
III IO-Link Master Port X6		
IO-Link Master Port X/		
Settings (Maintenance		
Generation		

Change password

NOTICE

Ensure data security!

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

Station Name / Station Type	Collapse all Expand all		
11261571 CM50LPN			
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	
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 Baumer		2	2	4 English * A Logged in as: Guest Nood
Battion Name Battion Type II 1281571 CMS0LPN II 10-Link Master Port XD Banner Eberin 6G OM30-L05301 HV YUN II 0-Link Master Port X1 II 0-Link Master Port X2 II 0-Link Master Port X3 II 0-Link Master Port X5 II 0-Link Master Port X7 ID 0-Link Master Port X7 II 0-Link Master Port X5 II 0-Link Master Port X6 II 0-Link Master Port X7 ID 0-Link Master Port X7 ID 0-Link Master Port X7 II 0-Link Master Port X7	STATUS Cottypes all Expand all Vendor information Device information Maintenance information Device status	PARAMETERS	DIAGNOSTICS	MANTENANCE

III. 51: 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 the 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

Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
I 1261571 CM50LPN	Collapse all Expand all			🔁 Refres
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 IO-Link Master Port X4	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				
- Sgr II				



11.4.1 STATUS menu

The Status menu item contains the following sub-items:



III. 53: 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/Mainte-***nance* | *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. 54: 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	STATUS		PARAMETERS		DIAGI	NOSTICS		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	Key 👻	Y Description	* 7	Channel	▼ ▼ Severit	ty	т 🍸 Туре	▼ Ţ Time	• 7
IO-Link Master Port X3	IO-Link master event	No Device (communication)		0	🔮 Fa	ault	🔄 Occured	0001:08:22:5	l .
IO-Link Master Port X4									
IO-Link Master Port X6									
IO-Link Master Port X7									
Digital IO Channels									
Settings / Maintenance									
User Administration									
I Sign Out									

III. 55: Diagnostics menu item

11.4.4 MAINTENANCE menu

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

				💠 English 🔻 🔒 Logged in as: Admin 🛛 About
Baumer				
Station Name / Station Type	STATUS	PARAMETERS	DIAGNOSTICS	MAINTENANCE
圈 11261571 CM50I.PN	Collapse all Expand all			
IO-Link Master Port X0	 Erase diagnostics history 			
Baumer Electric AG OM30-L0350.HV.YUN	Erase 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				
Digital IO Channels				
E Settings / Maintenance				
User Administration				
Sign Out				

III. 56: 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			
I 1261571 CM50I.PN	Collapse all Expand all				
IO-Link Master Port X0 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-I ink/SIO Status				
IO-Link Master Port X4					
III. 57: 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. 58: 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
<i>III.</i>	. 59: 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
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, Connector M8	
- Serial number		R245.85343	
- Hardware revision		01.00.01	
- Firmware revision		01.01.09	

III. 60: IO-Link Master Port - Information

IO-Link device information

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

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

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

Parameter designation	Description
Manufacturer text	Manufacturer text IO-Link device
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 🔁 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			Digital output	

III. 61: 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 				

III. 62: IO-Link master port - Configuration - IQ behavior (pin 2)

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	~
Output current limitation for DIO			No digital input filter	
			1ms	
Port Functions - Pin 1			5ms	
 Port Diagnostics 			10ms	
			15ms	

III. 63: 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.



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. 64: 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).

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 D	isable Forcing	0
Pin 2 DO				0
Pin 2 DI				0
Format			Hexadecimal	~

III. 65: 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		
Pin 4 DI			0
Pin 2 DO			0
Pin 2 DI			0
Format			Hexadecimal ~

III. 66: 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
I1261571 CM50I.PN	Collapse all Expand all	
IO-Link Master Port X0	▼ Input data	
IO-Link Master Port X1		N-M-4
IO-Link Master Port X2	Port XU Pin 4 (Channel UU)	Lisadied
IO-Link Master Port X3	Port X0 Pin 2 (Channel 10)	Disabled
IO-Link Master Port X4		
IO-Link Master Port X5	 Allow forcing outputs 	
IO-Link Master Port X6	Output data	
IO-Link Master Port X7		
Digital IO Channels		
E Settings / Maintenance		
User Administration		
📓 Sign Out		

III. 67: 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. 68: 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.	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. 69: 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.

				English • Cogged in as Admin About
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			265.255.255.0
IO-Link Master Port X4	Gateway IP address			0.0.0.0
IO-Link Master Port X5				
IO-Link Master Port X7				
Digital IO Channels				
User Administration				
I Sign Out				
nl#/io-linkmaster port xő				

III. 70: 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
国 11261571 CM50LPN	Collapse all Expand all			C2 Refresh
Baumer Electric AG OM30-L0350.HV.YUN	 Maintenance information 			
IO-Link Master Port X1		Maintenance	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	lastellation data (usas mes del)		2022.02.02	
IO-Link Master Port X6	instaliation date (yyyy-nin-od)		2023-03-03	
IO-Link Master Port X7	Contact information		Smith	
Digital IO Channels	Description		First Teststation	n
📾 Settings / Maintenance	Last service date (yyyy-mm-dd)		2024-03-03	
圖 User Administration 圖 Sign Out	Next service date (yyyy-mm-dd)		2025-03-03	
	Apply			

III. 71: 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			C2 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	 Maintananas information 			
IO-Link Master Port X4	• Wantenance Information			
IO-Link Master Port X5	- Name		Station 123	
IO-I ink Master Port X6	- Installation location		Hall 123 Smith	
IC-Link Master Port X7	- Description		First Teststation	
	- Last service date (yyyy-mm-dd)		2024-03-03	
Digital IO Channels	- Next service date (yyyy-mm-dd)		2025-03-03	
EXAMPLE A Settings / Maintenance	 Device status 			
User Administration	 Device status 			

Sign Out

III. 72: 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.

					🌐 English 🔻 🔒 Logged in as: Admin 🛛 Abou
Baumer					
Station Name / Station Type	DEVICE CONFIGURATION	MAINTENANCE INFORMATION		FIRMWARE	FACTORY RESET
H 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		CM50LPN		
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					
Sign Out					

III. 73: 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).

I 131371 CMGG PM Contenue Execution I Ischark Master Port XI - Factor settings of Contenuity of Isternation on Postformation, NTP settings, OPC UAI ULink Master specific tags, etc. I Ischark Master Port XI - Delete atored device information on QP settings, OPC UAI ULink Master specific tags, etc. I Ischark Master Port XI - Delete atored device information on QP settings, OPC UAI ULINK Master specific tags, etc. I Ischark Master Port XI - Delete atored device information and IP Address Configuration, Name Of Station, etc. I Ischark Master Port XI - Delete atored atories treatings of Contenuitation and Parameters, IoLink Data Storage, etc. I Ischark Master Port XI - Delete atored atories atored atores I Ischark Master Port XI - Delete atored atores I Ischark Master Port XI - Delete atored atores I Ischark Master Port XI - Delete at otored attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete at attrings I Ischark Master Port XI - Delete attrings I Ischark Master Port XI - Delete attrings	Station Name / Station Type	DEVICE CONFIGURATION	MAINTENANCE INFORMATION	FIRMWARE	FACTORY RESET
II (Link Master PortX) Businer Electric AG OMSLIGSUM YUM Delete stored device information, NTP settings, QPO UA/OLink Master specific tags, etc. Delete stored device information ag. Device Manteranoo Information, NTP settings, QPO UA/OLink Master specific tags, etc. Delete stored device information ag. Device Manteranoo Information, NTP settings, QPO UA/OLink Master specific tags, etc. Delete stored device information ag. Device Manteranoo Information, NTP settings, QPO UA/OLink Master specific tags, etc. Delete stored device information ag. Device Manteranoo Information, NTP settings, QPO UA/OLink Master specific tags, etc. Delete stored application parameters eg., Port Configuration, Name Of Station, etc. Delete stored application parameters eg., Port Configuration and Parameters, IO-Link Data Storage, etc. Delete al al cord settings Delete al al cord settings Delete al al cord settings Delete settings Delete settings Delete settings Delete al al cord settings Delete settings Delete settings Delete settings Delete al al cord settings Delete settings Delete settings Delete settings Delete al al cord settings Delete settings Delete settings Delete al al cord settings Delete settings D	I 11261571 CM50I.PN	Collapse all Expand all			
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ID Link Master Port X2 Delete stored network adapter settings e.g. Communication and IP Address Configuration, Name Of Station, etc. Delete stored network adapter settings e.g. Communication and Padress Configuration, Name Of Station, etc. Delete stored application parameters g.g. Port Configuration and Padress Configuration, Name Of Station, etc. Delete al stored settings Delete setings Delete settings	IO-Link Master Port X1	Delete stored device information e.g. Device Main	tenance Information, NTP settings, OPC UA IO-Link Master specific	tags, etc.	
In Unix Master Port XA Delete stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application and Parameters, IO-Link Data Storage, etc. Delete al stored application <li< td=""><td>IO-Link Master Port X2</td><td>O Delete stored network adapter settings e.g. Comm</td><td>nunication and IP Address Configuration, Name Of Station, etc.</td><td></td><td></td></li<>	IO-Link Master Port X2	O Delete stored network adapter settings e.g. Comm	nunication and IP Address Configuration, Name Of Station, etc.		
I O Lirk Master Port XS Delete al stored settings I O Lirk Master Port X7 Delete al stored settings I O Lirk Master Port X7 Delete as settings I D Lirk Master Port X7 Delete as settings I D Lirk Master Port X7 Delete as settings I D Lirk Master Port X7 Delete as settings I D Lirk Master Port X7 Delete as settings I D Lirk Master Port X7 Delete as settings I D Lirk Master Port X7 Delete as settings	IO-Link Master Port X4	Delete stored application parameters e.g., Port Co	onfiguration and Parameters, IO-Link Data Storage, etc.		
IP OLink Master Port X7 Delete settings Restart IP Digital IO Onamels IP OLink Assistance IP OLink Assistance IP User Administration IP OLink Assistance IP OLink Assistance IP Sign Out IP OLink Assistance IP OLink Assistance	IO-Link Master Port X5	O Delete all stored settings			
Bight IO Channels Getings / Maintenance User Atministration Sign Out	IO-Link Master Port X7	Delete settings Restart			
Betings / Maintenance User Atministration Sign Out	Digital IO Channels				
E User Administration	🖾 Settings / Maintenance				
Be Sign Out	User Administration				
	👪 Sign Out				

III. 74: Factory reset

11.8 **User administration**

User administration can only be carried out with admin rights.

Default at delivery uses admin as administrator with password private.



In the system with running fieldbus, the administrator default password can be edited at the control unit.

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

+ Click on Logout.

				🏶 English	 Logged in as: Admin About
Baumer					
Station Name / Station Type		USE	R ADMINISTRATION		
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 	v
IO-Link Master Port X2	Operator	Operator		2	
IO-Link Master Port X3	SamSmith	Maintenance		*	
IO-Link Master Port X4	admin	Admin		🔤 🕜	
IO-Link Master Port X5	✓ Add new user				
BI IO. Link Master Port X7	Usemame	Password	Userrole	Actions	
Dinital IO Channels	Username	Password	Operator	× 📤	
Settings / Maintenance					
User Administration					
Sign Out					

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.

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. 76: Assembly wrench

PRODUCTS AND ACCESSORIES

You will encounter a large product selection at: https://www.baumer.com

13.2 Glossary

Term	Significance
AoE	ADS over EtherCAT
Bus-Run-LED	LED for signaling the bus status.
CfgF-LED	LED for signaling correct/incorrect configuration.
Byte	iTerm from IEC 61158. Corresponds to 1 byte or 8 bits.
DHCP	Dynamic Host Configuration Protocol
	DHCP enables dynamic server distribution of IP address and configuration information to clients. As a rule, the DHCP server provides the client with at least this basic information:
	 IP address
	 Subnet mask
	 Standard gateway
CIP	Common Industrial Protocol
	Common Industrial Protocol is an application protocol of automation tech- nology. It supports fieldbus transition into networks of industrial Ethernet and IP. This industrial protocol utilizes EtherNet/IP in the application layer as interface between fieldbus and control unit, I/O, etc.

Term	Significance
CoE	CANopen over EtherCAT
DI	Digital Input
DIP switch	Dual in-line package/switch with two parallel rows of connections.
DO	Digital output/digital output
EDS	Electronic Data Sheet (electronic data sheet)
	EDS files are external files with device information. EDS files provide the necessary information for device parameter access to change configuration.
EMCY	Emergency messaging
EMC	Electromagnetic compatibility
EN	European standard
EoE	Ethernet over EtherCAT
ESD	Electrostatic discharges
ESI-File	Device description (EtherCAT-Slave-Information) in the form of an XML file provided by the manufacturer.
ESM	The EtherCAT slaves status control is via EtherCAT-State-Machine. Ac- cording to the status, several functions can be accessed or executed in the EtherCAT slave. Particularly during slave start-up, different stages require transmission of specific commands by the EtherCAT master.
ETG	EtherCAT Technology Group
	ETG is the world's largest international user and manufacturer association for Industrial Ethernet.
EtherCAT	Ethernet for Controller and Automation Techology
	EtherCAT was originally developed by the company Beckhoff Automation GmbH and is now supported and further developed by EtherCAT Technol- ogy Group (ETG).
EtherCAT-Master	The EtherCAT master is the I/O controller. It must support MDP.
EtherNet/IP	Ethernet Industrial Protocol
	Open standard for industrial networks supporting cyclic and acyclic mes- sage transmission and operating on standard Ethernet communication chips and physical media.
Ethernet-Frame	Every Ethernet frame (data packet) comprises sender address (source) and recipient address (destination). When receiving a frame, the recipient's receiving unit compares the MAC destination address against its own MAC address. The frame content is only passed to the higher level if the addresses match. If they don't, the frame is discarded.
FE	Functional earth
FMMU	Fieldbus Memory Management Unit
FoE	File access over EtherCAT
IGMP	Internet Group Management Protocol (IGMP) is a network protocol of the In- ternet protocol family to organize multicast groups. IGMP uses Internet Pro- tocol (IP) as a part of IP on all hosts supporting IP multicast reception.

Term	Significance
ΙΙοΤ	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
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 IOL	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.
IP	Internet Protocol
	Protocol used for data transmission within a network, e.g. from one com- puter to another within the internet or intranet. Every computer in the net- work is unambiguously identified by its IP address. In data transmission from one computer to another, data is broken down into small packets of in- formation, each including the addresses of both sender and recipient. These packets may arrive at their destination in different ways via the net- work and also in different order. A specific protocol, the so-called Transmis- sion Control Protocol [TCP] restores the correct packet order.
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	Media Access Control Address
	Hardware address of network components used for unambiguous identifica- tion within the network.
MDP	Modular Device Profile (Modular device profile)
MQTT	Client-server protocol
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
ODVA	ODVA is an international association for open and compatible information and communication technologies in automation technology. e.g. EtherNet/ IP, DeviceNet, CompoNet and ControlNet,
OUT	Output
PDO	Process data objects are user data expected in the application or transmit- ted to slave.
PELV	Protective Extra Low Voltage
Power LED	LED for signaling the power supply
PROFINET	Process Field Network

Term	Significance
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.
RPI	Requested packet interval
	The interval at which the EtherNet/IP target is transmitting process data to scanner.
SDO	Service Data Objects
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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