Your Global Automation Partner



IO-Link Devices Commissioning



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1 About these instructions

The instructions describe the setup, functions and use of the system, and help you to commission Turck IO-Link devices. Read this manual carefully before using the system. This is to avoid potential damage to people, property, or the device. Keep the manual in a safe place as long as the system is in use.

1.1 Target groups

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

1.2 Explanation of symbols used

The following symbols are used in these instructions:

	DANGER DANGER indicates a dangerous situation with high risk of death or severe injury if not avoided.
	WARNING WARNING indicates a dangerous situation with medium risk of death or severe in- jury if not avoided.
	CAUTION CAUTION indicates a dangerous situation of medium risk which may result in minor or moderate injury if not avoided.
!	NOTICE NOTICE indicates a situation which may lead to property damage if not avoided.
i	NOTE NOTE indicates tips, recommendations and useful information on specific actions and facts. The notes simplify your work and help you to avoid additional work.
	CALL TO ACTION This symbol denotes actions that the user must carry out.
₽	RESULTS OF ACTION This symbol denotes relevant results of actions.

1.3 Other documents

Besides this document the following material can be found on the Internet at www.turck.com:

- Data sheets
- Instructions for use
 - Instructions for use BL...-4IOL...
 - Instructions for use TBEN-S2-4IOL
 - Instructions for use TBEN-L...-8IOL
 - Instructions for use FEN20-4IOL
 - Instructions for use TBPN-L...
 - Instructions for use TBIP-L...
 - Instructions for use IO-Link devices
- IO-Link parameter manuals
- Safety manuals
- Approvals



1.4 Feedback about these instructions

We make every effort to ensure that these instructions are as informative and as clear as possible. If you have any suggestions for improving the design or if some information is missing in the document, please send your suggestions to **techdoc@turck.com**.



2 Notes on the product

2.1 Product identification

This manual applies to all IO-Link-capable Turck devices.

2.2 Turck service

Turck supports you with your projects, from initial analysis to the commissioning of your application. The Turck product database under www.turck.com contains software tools for programming, configuration or commissioning, data sheets and CAD files in numerous export formats.

The contact details of Turck subsidiaries worldwide can be found on p. [161].



3 For your safety

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

3.1 Intended use

IO-Link is a digital point-to-point connection for use in industrial automation applications. IO-Link-capable sensors and actuators can be set in an advanced manner and operated via the IO-Link interface. Cyclic process data and acyclic data can be exchanged and energy transferred between an IO-Link master and an IO-Link device.

With IO-Link, different devices (e.g., a temperature sensor and a linear position sensor) on an input module. For further information, refer to the device-specific instructions for use.



4 System description IO-Link

IO-Link is a fieldbus-independent communication interface for sensors and actuators. A digital, serial point-to-point connection transmits signals and energy among any networks, fieldbus systems, or backplane bus systems.

Each IO-Link system consists of an IO-Link master and an IO-Link device (e.g., sensor, I/O hub, valve manifold). An IO-Link master has at least one IO-Link port (channel). An IO-Link device can be connected to each port. The system components are connected to each other via standard 3-wire (Class A) or 5-wire (Class B) unshielded cables, depending on the port specification.

IO-Link technology is described in the "IO-Link Interface and System Specification" and IEC 61131-9. IO-Link-capable devices comply with either the V1.0 specification or the V1.1 specification.

The properties, functions, and parameters of the IO-Link devices are shown in an electronic device description (IODD). The IODDs for Turck devices can be downloaded via the Turck Software Manager and are also available free of charge at www.turck.com. The IODDs of all devices are structured in the same way and contain the following information for system integration:

- Communication properties
- Device parameters with value range and default value
- Identification, process, and diagnostic data
- Device data
- Text description
- Image of the device
- Manufacturer's logo

The structure of the IODD is specified by the IO-Link specification and is the same for all IO-Link devices. The IODD structure is based on indexes. In the IODD, fixed indexes are assigned to the communication properties, device parameters, identification, process, diagnostic, and device data, via which the parameters can be controlled. Some indexes are further subdivided by subindexes.

4.1 Features

- Point-to-point connection (max. cable length: 20 m)
- Unshielded standard 3-wire or 5-wire cables
- Cyclical process data transmission
- Acyclic transfer of data, e.g., device data and events
- Communication between the IO-Link master and IO-Link devices is possible in three transmission rates
- Parallel exchange of the device data without affecting the process data
- Communication through 24 V pulse modulation, standard UART protocol



4.2 System architecture

At least one IO-Link master and one IO-Link device (e.g. sensor or actuator) are required for IO-Link communication. IO-Link master and IO-Link device are interconnected via an unshielded 3-wire or 5-wire standard cable. The setting can be carried out with a configuration tool or via the fieldbus level.

The IO-Link master establishes the connection between IO-Link device and the higher-level control system. An IO-Link master can have several IO-Link ports. Only one IO-Link device can be connected to each port.

Devices with a digital switching input or output can also be integrated into automation systems via IO-Link I/O hubs.

Standard tools and functions are provided for the integration, commissioning and configuration of the IO-Link communication.



Fig. 1: IO-Link system overview



4.3 Operating principle

IO-Link is a digital point-to-point connection between an IO-Link master and an IO-Link device. Process data and other information such as parameters and diagnostic messages are transferred with a 24 V pulse modulation via a combined switching status and data channel (C/Q).

IO-Link communication is independent of the fieldbus used.

4.4 Operating modes

The operating mode can be set separately at any port of the IO-Link master.

Two operating modes are available for the IO-Link master:

- IO-Link mode: IO-Link communication possible
- Standard I/O mode (SIO): digital I/O communication

IO-Link communication is implemented via the switching and communication cable (C/Q).



Fig. 2: IO-Link communication via C/Q

During initialization the ports of the IO-Link master behave like a normal digital input. The IO-Link devices are operated in SIO mode as digital switching input and switching output. A command of the higher-level IO-Link master establishes IO-Link communication in IO-Link mode. This command is called the "Wake-up request".

4.4.1 IO-Link mode

In IO-Link mode communication takes place between an IO-Link master and an IO-Link device. Communication always starts from the IO-Link master.

Transmission speed between IO-Link master and IO-Link device

Three transmission rates are defined in the IO-Link specification:

- COM1: 4,8 kBaud
- COM2: 38,4 kBaud
- COM3: 230,4 kBaud

Each device supports only one transmission rate, an IO-Link master supports all transmission rates. The transfer time of the cyclical process data is determined by the telegram length as well as the delay times in the device and the master. With a transmission rate of 38.4 kBaud and a telegram length of 2 byte the transmission time is typically 2.3 ms.

Response times

The response time of the IO-Link system provides information on the frequency and speed of the data transmission between IO-Link master and IO-Link device. This response time depends on the following factors:

- Minimum cycle time: Intervals defined in the IODD in which the IO-Link master addresses the IO-Link device. Different minimum cycle times can be defined for different devices.
- Internal processing time of the IO-Link master and the IO-Link device



Cyclical and Acyclical Communication

The data exchanged between IO-Link master and the IO-Link device can be divided into cyclical process data and acyclical data. Process data and value states are transferred cyclically. Acyclical data is transferred separately to cyclic process data. Acyclical data includes device data, parameter functions and events such as diagnostic information, which is only transferred on request. The two communication types are independent of each other and do not interact.

Cyclical communication	
Process data	Value status (port qualifier)
 032 bytes of process data possible per device (each input and output) Process data size determined by the device 	The Port Qualifier indicates whether the process data is valid or not.
Acylical communication	
Device data	Value status (port qualifier)
 Parameters, identification data or diagnostic information Data exchange on request of the IO-Link master Device data can be written to the device or 	 Device indicates event to master: Error messages and warnings Master indicates event to device: e.g. cable break or communication abort

Combining IO-Link devices with different specifications

Only devices of specification V1.0 can be operated on IO-Link masters of specification V1.0. Devices of specification V1.0 and V1.1 can be operated on IO-Link masters of specification V1.1.

	IO-Link device V1.0	IO-Link device V1.1
IO-Link master V1.0	х	-
IO-Link master V1.1	х	Х



Data Storage Mode



NOTE

Data storage mode is only available for devices complying with the IO-Link specification V1.1. IO-Link devices in accordance with IO-Link specification V1.0 do not support data storage.

Data storage mode makes it possible to replace IO-Link devices without the need for a reconfiguration.

The IO-Link master or the IO-Link device save the device parameters set in the previous configuration. In data storage mode the parameter data memories of IO-Link master and IO-Link device are synchronized. If data storage mode is activated in the IO-Link master, the master writes the stored device parameters to the new device after a device is replaced. The application can be restarted without having to perform a new configuration.



Fig. 3: Data storage mode – general principle, Para. IOLD = parameters of the IO-Link device

4.4.2 Standard I/O mode (SIO mode)

In standard I/O mode IO-Link devices behave like digital sensors or actuators. In this mode the devices only send input or output data to the higher-level instance. IO-Link access to the device is not possible.

4.5 IO-Link configuration in PROFINET

SIDI (Simple IO-Link Device Integration) enables IO-Link devices in PROFINET applications to be configured directly in the programming environment (e.g. TIA Portal). The Turck IO-Link devices are integrated in the GSDML file of the TBEN, TBPN and FEN20 series IO-Link masters and can be set in the programming environment as submodules of a modular I/O system. During this process, the user has access to the device properties and parameters. The scope of the device and functions differs depending on the version of the GSDML file. For some SIDI devices, not all parameters are available.

A customized SIDI can also be created on request.



5 Connection

A Turck IO-Link master has one or more ports for connecting IO-Link devices. The IO-Link devices are connected to the ports of the IO-Link master via unshielded 3-wire or 5-wire standard cables. The maximum cable length is 20 m.

The IO-Link specification distinguishes between two types of ports with a different power supply for IO-Link masters.

- Port Class A: The functions of pins 2 and 5 are manufacturer-specific. For example, pin 2 can be assigned an additional digital channel.
- Port Class B: An additional galvanically isolated supply voltage is provided via pins 2 and 5. Class B IO-Link ports are suitable for connecting IO-Link devices that have an increased power requirement. A standard 5-wire cable is required to use the additional supply voltage.

Adapters are available for connecting Port Class B devices to Port Class A masters (ID 6629515 and 6629516).

- 5.1 Wiring diagrams
- 5.1.1 IO-Link master

IO-Link master Port Class A wiring diagram

Pin	Pin assignment	Wiring diagram
Pin 1	V ₁ +	2
Pin 2	Manufacturer-specific (e.g., additional digital chan- nel)	
Pin 3	V ₁ -	5 4
Pin 4	C/Q	
Pin 5	n. c.	

IO-Link master Port Class B wiring diagram

Pin	Pin assignment	Wiring diagram
Pin 1	V ₁ +	2
Pin 2	V ₂ +	
Pin 3	V ₁ -	$1\left(\begin{array}{c} 0 \\ 0 \\ 0 \\ \end{array}\right)$ 3
Pin 4	C/Q	5 4
Pin 5	V ₂ -	

5.1.2 IO-Link device

IO-Link device Class A wiring diagram

Pin	Pin assignment	Wiring diagram
Pin 1	V ₁ +	
Pin 2	not specified	
Pin 3	V ₁ -	3 (• • •) 1
Pin 4	C/Q	5 4
Pin 5	n. c.	

IO-Link device Class B wiring diagram

Pin	Pin assignment	Wiring diagram
Pin 1	V ₁ +	
Pin 2	V ₂ +	
Pin 3	V ₁ -	3 (● ● ●) 1
Pin 4	C/Q	5 4
Pin 5	V ₂ -	_



6 Configuration and commissioning

Set the IO-Link master to IO-Link mode (see device-specific instructions for use).

If the port is set to IO-Link mode, the IO-Link master attempts to establish communication with the IO-Link device. IO-Link communication is established in IO-Link mode by means of a wakeup request from the higher-level IO-Link master. The IO-Link master first attempts to establish transmission with the highest defined data transmission rate. If communication cannot be established, the master automatically attempts to establish communication at the next lowest data transmission rate.

The transmission starts when the master receives feedback from the device. First, the communication parameters are exchanged. If necessary, parameters stored in the system are transferred from the IO-Link master to the device. The cyclic exchange of process data and value status then begins.

IO-Link devices can be commissioned via a Turck IO-Link master on various types of controller. In PROFINET systems, the GSDML file of the IO-Link master is required for this purpose. The GSDML files for the Turck devices are available free of charge for download at www.turck.com.

In Ethernet/IP systems, the EDS file of the IO-Link master is required for this purpose. The EDS files for the Turck devices are available for download at www.turck.com.

The following examples describe the configuration of IO-Link devices. The following scenarios are possible:

- Configure devices via a PC using a configuration tool
 - Configure with IO-Link USB adapter
 - Configure with IO-Link master
 - Set with IO-Link master and IODD configurator
- Configure devices via the fieldbus level
 - Configure with programmable gateway and CODESYS 2
 - Configure with programmable gateway and CODESYS 3
 - Configure with Siemens controller in Simatic Manager
 - Configure with Siemens controller in the TIA Portal
 - Configure with Allen-Bradley controller in Studio 5000
- Configure devices via the fieldbus level with extended GSDML file

6.1 Setting devices via a PC using a configuration tool

IO-Link devices can be configured via a PC using a configuration tool (e.g., PACTware). All the required Turck software components can be downloaded via the Turck Software Manager.

The Turck Software Manager is available free of charge at www.turck.com.



6.1.1 Setting using a USB adapter and configuration tool

Software used

This example uses the following software:

- PACTware 4.1 configuration tool
- IODD interpreter configuration software
- DTM for USB IO-Link adapter USB-2-IOL-0002
- IODD for temperature sensor TS720-2UPN8-H1141

Hardware used

- TS720-2UPN8-H1141
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- USB-IO-Link adapter USB-2-IOL-0002

Setup



Fig. 4: Application example — setup

Example: configuring the device

- Start the IODD interpreter.
- Click on Add IODD.
- Select IODD for TS720-2UPN8-H1141 in the following window.
- Add IODD for temperature sensor TS720-2UPN8-H1141 by clicking on **Open**.

adawanich								In	stallierte IO)Ds	_		
Hersteller	Gerāt	Hersteller-ID	Gerāte-ID	Dateiversion	Release- datum	IO-Link Revision	IODD Datei	CRC Stempel				IODD	hinzufügen
ā.										~		IODD Sammlu	ng hinzufügen (Zi
Offnen												IODDs aus IOI	Dfinder hinzufüge
÷ → * ↑	- « IOD	D_IOL_TS_PLUS > Tu	urck-TS72x-2UPN8-	IODD-V01.2130-2021	1222	~	Ō	□ Turck-TS72x	-2UPN8-IOD	D-V			
Organisieren 🔻	Neuer (Ordner							•	?			
	^	Name	^		Är	iderungsdatum	Тур	∽ Gr	öße				Löschen
Schnellzugrit	ff	Turck-TS72x-2U	IPN8-20211222-IOE	DD1.1.xml	22	.12.2021 13:48	XML-Dok	ument	177 KB				
Dekument	ж 											Ał	tualisieren
Dokument	e //												
Downloads													
Downloads Bilder	5 x												
Downloads Bilder Musik	5 x x												
 Downloads Bilder Musik Videos 	5 A A												
 Downloads Bilder Musik Videos OneDrive 	5 x* x*												
 Downloads Bilder Musik Videos OneDrive Dieser PC 	s * *												
 Downloads Bilder Musik Videos OneDrive Dieser PC 3D-Objekte 	s * *												
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Downloads Dider Musik Videos OneDrive Dieser PC JD-Objekte Bilder Desktop Boktop	s 🖈 *												

Fig. 5: Adding IODD for TS720-2UPN8-H1141 in the IODD interpreter

- Launch PACTware.
- Add a USB adapter: right-click on Host PC \rightarrow Add device.



Fig. 6: Adding a device in PACTware



Select the IO-Link USB Master 2.0 IO-Link interface.

Device for							×
All Devices (2/2 DTMs)							
Enter text to search			•	Find Clear			
Device 🔺	Protocol	Vendor	Group	Device Version	FDT version	DTM version	
HART Communication	HART	CodeWrig	not specifi	1.0.52 / 2015-03	1.2.0.0	1.0.52 / 201	
👷 IO-Link USB Master 2.0	IO-Link	IO-Link	not specifi	2.01.0010 / 2016	1.2.1.0	2.01.0010 /	
*							

Fig. 7: Adding a USB IO-Link adapter



Start the topology scan to find devices connected to the IO-Link adapter: Right-click on the IO-Link adapter → Click on Topology Scan.



Fig. 8: Starting the topology scan



 Search for devices u 	ising the topol	logy scan: Click on Sea	arch.		
📑 Topology Scan					\times
Scan Path					
\HOST PC\IO-Link U	JSB Master 2.	0			
Scan Tree					
Device tag	Address	Device type (DTN			
👼 IO-Link USB I	*	IO-Link USB Mas			
			No issues f	or selected	d node
<		>			
Clo	se	Settings			

Fig. 9: Topology scan — find devices



Select IODD for the connected device if the device is not automatically detected (see red mark).

🚺 Topology Scan					\times
Scan Path		-			
\HOST PC\IO-Link USB Master 2.0	Issue: Select a D	IM			
Scan Tree	Device Type	Matching % 🔻	Support level		
Device tag Address Device type (DTM) Message	🚷 IO-Link minimal device IO	70	Generic		
다. 🛱 IO-Link USB I 🖌 IO-Link USB Maste	🗞 TS720-2UPN8TS721-2U	31	Specific		
🛄 💷 Unknown 🚺 🛛 Unknown Device Select a DTM					
	Mara Sava assign	ment for all day	icor of came tune		
		intent for all dev	ices of same type		
	Semantic ID	Scan info	Device Type info		^
	IO-Link Revision	17	17		
	🗉 Vendor Id	317	317		
	🔀 Device Id	131074	131073		
	Firmware Revision	1.0.2.0	*		
	Hardware Revision	2028B	.*		
	Function Id	0	.*		~
Close Settings				Apply	

Fig. 10: Topology scan — select IODD

• Apply the settings to the configuration: Click on Apply \rightarrow Close the topology scan.



Establish a connection between the IO-Link device and the PC by right-clicking on the device.



Fig. 11: Connect



► Start expert mode: right-click on the adapter → Click on Additional functions → Experten Modus.



Fig. 12: Start expert mode

Select the IO-Link Parameters menu item.



🖗 IO-Link USB Master 2	.0 Experten Mo	odus				
	IO-Link IO-Link-to- Interface:	USB Inte Furck US	Master 2.(rface B IO-Link Mas) ster V1.1		
Overview Device Information IO-Link Process Data IO-Link Parameter IO-Link Data Storage SIO Configuration About	IO-Link Co IO-Link M Target C Actual C	mmunica ode ycle Time ycle Time	ation 0,0 ms 2,2 ms	IO-Link Mode IO-Link Preoperate SIO Mode	 Commi SIO Mo 	unication ode
	IO-Link Paramete Read Write	r Data Index 0 0 Error	Subindex 0 0 0	Display () binary ()) hex ()	decimal () asci
	Event Data	1		Save Event	s	Clear Events
	Number	Instance	Mode	Event Code		Hex values
	1	AL	MSG-SINGLE	Device in Preoperate	State	0x5B 0x0024
	2	DL	ERR-GOING	Connection establis	shed	0xBA 0x00
	3	AL	MSG-SINGLE	Fallback was succe	ssful	0x5B 0x0023
	4	AL	MSG-SINGLE	Reset was succes	sful	0x5B 0x0022
	5	AL	MSG-SINGLE	Device in Preoperate	State	0x5B 0x0024
	6	DL	ERR-GOING	Connection establis	shed	0xBA 0x00

Fig. 13: PACTware expert mode — IO-Link parameters

The adjustable parameters can be found in the device-specific IO-Link parameter manuals or in the IODD finder. The parameter manuals contain a description of the IODD and are available for download at www.turck.com. The IODD finder can be viewed at ioddfinder.io-link.com.



Name	Index (dec.)	Index (hex.)	Sub- index (dec.)	Sub- index (hex.)	Subindex access supported	Access	Byte. Bit Offset	Bit length	Data Type	Value	Default	Description
Display of measured value	85	0x55	0	0x0	True	read/ write	0.0	8	Ulnteger	06	0	The refresh time can be adjusted. The display can be rotated by 180° or dis- abled. In dis- abled. In dis- abled state, the measured value is dis- played tem- porarily when pressing the set button.
										0		50 ms refresh time
										1		200 ms refresh time
										2		600 ms refresh time
										3		50 ms refresh time/display rotated by 180°
										4		200 ms refresh time/display rotated by 180°
										5		600 ms refresh time/display rotated by 180°
										6		disabled

Example: The command "Rotate the display and set the measured value update time" is controlled via index **85**.

Fig. 14: Excerpt from the parameter manual for sensor TS720-...-H1141 (example: set the display)



œ

Information

Variable id	V_DISPLAY_UPD
Variable name	Display of Measured Value
Index	85
Description	The refresh time can be adjusted or disabled. In disabled state, the measured value is displayed temporarily when pressing the set button.
Default value	200 ms Refresh Time
Data type	UIntegerT
Bit length	8 bit
Access rights	ReadWrite
Raw values	50 ms Refresh Time: 0 200 ms Refresh Time: 1 600 ms Refresh Time: 2 Disabled: 3

Fig. 15: Excerpt from the IODDfinder for sensor TS720-...-H1141 (example: measured value display)



- Set the number format for the index (here: **85**).
- Read out the value of the **Measured value display** parameter.
- ➡ The default value **0** preset in the device is displayed in the display field (highlighted in red) (50 ms measured value update time).

IO-Link USB Master 2	.0 Experten Mo	odus							
	IO-Link IO-Link-to- Interface:	USB Inte Turck US	Master 2.0 rface B IO-Link Mast	ter V1.1					
Overview Device Information IO-Link Process Data IO-Link Parameter IO-Link Data Storage SIO Configuration About	IO-Link Co IO-Link M Target C Actual C	mmunica ode ycle Time ycle Time	ation 0,0 ms 2,2 ms	IO-Link Mode IO-Link Preoperate SIO Mode	 Comr SIO N 	nunication Iode			
	IO-Link Pa Paramete Read Write	rameter Index 85	Subindex D	lisplay Obinary () hex () decimal ascii			
	Error ok								
	Event Data	a		Save Ever	its	Clear Events			
	Number	Instance	Mode	Event Code		Hex values			
	1	AL	MSG-SINGLE	Fallback was succ	essful	0x5B 0x0023			
	2	AL	MSG-SINGLE	Reset was succe	ssful	0x5B 0x0022			
	3	AL	MSG-SINGLE	Device in Preoperate	e State	0x5B 0x0024			
		DL	LAR-GOING	Connection establ	ancu				

Fig. 16: Reading out parameters



► Rotate the display 180° and set a measured value update time of 50 ms: Set the index value to 03 → Write.

🖗 IO-Link USB Master 2	.0 Experten Mo	odus			
	IO-Link IO-Link-to- Interface:	USB Inte Turck US	Master 2.(rface B IO-Link Mas) ter V1.1	
Overview	IO-Link Co	mmunica	ation		
	-IO-Link M	ode			
IO-Link Parameter IO-Link Data Storage	Target C	ycle Time	IO-Link Mode 🔶 Co	ommunication	
SIO Configuration About	Actual C	ycle Time	2,2 ms	IO-Link Preoperate	
				SIO Mode SI	IO Mode
	IO-Link Pa	rameter			
	Paramete	r Data —			
	, aramete	Index	Subindex I	Display Obinary Ohex	(o) decimal () ascii
				, , , , , , ,	0
	Read	85		3	
	Write	85	0	3	
		Error	ok		
	-Event Data	a		Save Events	Clear Events
	Number	Instance	Mode	Event Code	Hex values
	1	AL	MSG-SINGLE	Device in Preoperate State	0x5B 0x0024
	2	DL	ERR-GOING	Connection established	0xBA 0x00
	3	AL	MSG-SINGLE	Fallback was successful	0x5B 0x0023
	4	AL	MSG-SINGLE	Reset was successful	0x5B 0x0022
	5	AL	MSG-SINGLE	Device in Preoperate State	0x5B 0x0024
	6	DL	ERR-GOING	Connection established	0xBA 0x00

Fig. 17: Setting parameters for the display and measured value update time



6.1.2 Setting with IO-Link master and configuration tool

Software used

- PACTware 4.1 configuration tool
- IODD interpreter configuration software
- IODD for temperature sensor TS720-2UPN8-H1141

Hardware used



NOTE As an alternative to the BL67-GW-EN gateway with BL67-4IOL IO-Link master module, all Turck IO-Link masters can be used.

- BL67-GW-EN multiprotocol gateway (IP address: 192.168.1.254)
- IO-Link master module BL67-4IOL with base module BL67-B-4M12
- Temperature sensor TS720-2UPN8-H1141 (connected to port 1 of the IO-Link master)
- Sensor cable RKC4.4T-2-RSC4.4T/TXL

Setup



Fig. 18: Application example — setup

Example: configuring the device

- Start the IODD interpreter.
- Click on Add IODD.
- Select IODD for TS720-2UPN8-H1141 in the following window.
- Add IODD for temperature sensor TS720-2UPN8-H1141 by clicking on Open.

auswanien								Inst	allierte IODDs	
Hersteller	Gerāt	Hersteller-ID	Gerāte-ID	Dateiversion	Release- datum	IO-Link Revision	IODD Datei	CRC Stempel		IODD hinzufügen
Öffnen									>	IODD Sammlung hinzufügen
← → × ↑	<mark> </mark> « 100	D_IOL_TS_PLUS > Tu	urck-TS72x-2UPN8	-IODD-V01.2130-2021	11222	~	۹ 5	Turck-TS72x-2	UPN8-IODD-V	IODDs aus IODDfinder hinzuf
Organisieren 👻	Neuer	Ordner						==	• 🔟 የ	
	^	Name	^		Änd	lerungsdatum	Тур	✓ Gröf	e	Löschen
Schnellzugr	# 	Turck-TS72x-2U	JPN8-20211222-IO	DD1.1.xml	22.1	2.2021 13:48	XML-Doku	ment	177 KB	Aktualisieren
🔮 Dokumen	te 🖈									
🕹 Download	s 🖈									
📰 Bilder	*									
👌 Musik										
Videos										
len OneDrive										
	- 1									
Dieser PC										
Dieser PC 3D-Objekt	e									
Dieser PC 3D-Objekt Elder	e									
Dieser PC 3D-Objekt Bilder	e									
Dieser PC Dieser PC Dobjekt Bilder Desktop	te v									
 Dieser PC 3D-Objekt Bilder Desktop Dokumen 	te Datein	ame: Turck-TS72x-2U	JPN8-20211222-IO	DD1.1.xml			~ I0I	DD Dateien (*.xm	I) ~	

Fig. 19: Adding IODD for TS720-2UPN8-H1141 in the IODD interpreter

- ► Launch PACTware.
- Add IODD to PACTware (View \rightarrow Device Catalog \rightarrow Update Device Catalog).
- ► Add an Ethernet interface (right-click on HOST PC → Add device).



Fig. 20: Adding a device in PACTware



Select the **BL Service Ethernet** Ethernet interface.

Device for										
All Devices	All Devices									
Device 🔺	Protocol	Vendor	Group	Device Versior	FDT version	DTM version				
💳 BL Service Ethernet	BL Service Eth	Turck	DTM specific	1.0.0 / 2007-06	1.2.0 Addendu	1.00.2107 / 2015-08-06				
The service RS232	BL Service	Turck	DTM specific	1.0.0 / 2007-06	1.2.0 Addendu	1.00.2107 / 2015-08-06				
HART Communication	HART	CodeWrights GmbH	FDT	1.0.52 / 2015-0	1.2.0 Addendu	1.0.52 / 2015-03-17				
🖗 IO-Link USB Master 2.0	IO-Link	IO-Link	FDT	2.00.0002 / 20:	1.2.1	2.00.0002 / 2013-08-19				
🖗 PROFIBUS Master DP-V1	Profibus DP/V	Trebing & Himstedt Prozessa	FDT	3.0.0.8 / 2008-0	1.2.0 Addendu	3.0.0.8 / 2008-07-31				
BL Service Ethernet Com	DTM									
					01	Canad				
					OK	Cancel				

Fig. 21: Add the BL Service Ethernet



► Add BL67-GW-EN via the Ethernet interface bus address management: right-click on the Ethernet interface (here: TCP: 192.168.1.50) →
Additional functions → Busaddress management.

PACTware	е		
File Edit	V	iew Project Device Extras Window Help	
i 🗋 🧀 🔒 é	3 6	P- 😫 🐚 🗖 🕸 🕸 VO 🤹 💐 🎸 🔟	
Project		4 ×	
Device tag		Addres 🛈 🕸 Device type (DT)	
📕 HOST PC			
TCP:192	* *	Connect Disconnect	
	© ₽	Load from device Store to device	
		Parameter Measured value Simulation Diagnosis	
		Display channels Channels	
		Topology Scan Diagnostic Scan Up-/Download-Manager Print ►	-
		Additional functions	Compare offline
L	Ŷ	Add device Exchange device	Compare online Set value
	8	Delete device	Scan list
		Properties <tcp:192.168.1.50>BL Service Ethernet</tcp:192.168.1.50>	Identification About / Update DTM
			Busaddress management
			Browser

Fig. 22: Start bus address management



Find the BL67 gate	way (search icon)	and add it to the	project (cylinder icon).
--------------------	-------------------	-------------------	--------------------------

TCP:	:192.168.1.50 Bu	saddress manager	ment			×		
1	Device type	BL Servic	e Ethernet		TURC	-		
2	Description	BL Servic	e over ethernet co	ommunication DT	M Industrial Automat	ion		
🚍 🗸 😰 🕼 😺 🦃 💷 🖃 🗐 🖳 🖆 🔹 🛛 Busaddress management								
Online available devices Add devices manually								
LAN-V	/erbindung 3 (192.)	168.1.50/255.255.255	.0)			-		
D	evice type	Online ID	IP address	Netmask	Gateway	Ethe		
BI	L67-GW-EN (>= VI	N 03-00) 150001F	192.168.1.254	255.255.255.0	192.168.1.1	00:0		
Plann	ed devices					Þ		
D	evice type	Online ID	Busaddress	Designation ('Ta	ag') Device	shoi		
🕸 Disco	onnected		ок	Cance	el Apply			

Fig. 23: Add a gateway to the project

• Confirm the message Add DTMs for all connected devices with OK.



NOTE

The info icon can be used to query the respective firmware version of the gateway and the IO-Link master.



Start the topology scan to find devices connected to the IO-Link adapter: right-click on IO-Link USB Master 2.0 → Topology Scan.



Fig. 24: Starting the topology scan



► If the topology scan finds a DTM instead of an IODD, load IODD manually: right-click on device → Exchange device.

📑 Topology Scan									
Scan Path									
\HOST PC\ <tcp:192.16< td=""><td>58.1.50>BL</td><td>. Ser 03-(</td><td>00)\<01,01/BL67-4IC</td><td>)L>BL67</td><td>7-4IOL</td></tcp:192.16<>	58.1.50>BL	. Ser 03-(00)\<01,01/BL67-4IC)L>BL67	7-4IOL				
Scan Tree									
Device tag		Address	Device type (DTM)		Message				
🖙 💳 01/BL67-4IOL	~	01	BL67-4IOL						
···曰 호 IO-Link 0	*		IO-Link 0						
TS-400-21 IDM	lark as no	t scanned	TC 100-2UPN8X-H1	.141TS					
₹ IO-Link 1	vchange c	levice							
₹ IO-Link 2 L	P IO-Link 2 Exchange device k 2 A A A								
÷ IO-LINK 5 S	tore to de	vice	K 3		_				
	TM functi	ons	•						
•					4				
	se			Set	ttings				

Fig. 25: Replacing the DTM with IODD



Select IODD for temperature sensor TS720-2UPN8-H1141.

• Confirm with **OK**.

Device for						
All Devices						
Device 🔺	Protocol	Vendor	Group	Device Versior	FDT version	DTM version
No-Link minimal device IOI	IO-Link	IO-Link (IODDs)	FDT	V1.0 / 2010-01	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
RI360P0-QR24-HESG25x3-I	IO-Link	Turck (IODDs)	FDT	V00.01 / 2014-	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
RI360P0-QR24M0-IOLX2-H	IO-Link	TURCK (IODDs)	FDT	V00.0006 / 201	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
TS-400-2UPN8X-H1141TS	IO-Link	Turck (IODDs)	FDT	V00.0303 / 201	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
TS-400-LI2UPN8X-H11411	IO-Link	Turck (IODDs)	FDT	V00.0303 / 201	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
TS-400-LUUPN8X-H1141T	IO-Link	Turck (IODDs)	FDT	V00.0303 / 201	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
TTM IODD1.1	IO-Link	Turck (IODDs)	FDT	V01.2000 / 201	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
🕙 UPROX-3 IODD1.1	IO-Link	Turck (IODDs)	FDT	V00.0002 / 201	1.2.0 Addendu	3.6.0.3902 / 2016-11-11
C:\ProgramData\IO-Link\Generic IO-Link Device DTM\IO-Link DDs\317\131072-IODD1.0.1\Turck-TS-2UPN8X-H1141-20111123-						
[] IODD1.0.1.xml					ОК	Cancel

Fig. 26: Select IODD


- Close the topology scan.
- ► Connect the host PC and IO-Link device by right-clicking on the IO-Link device → Connect.

PACTware	
File Edit Vie	w Project Device Extras Window Help
i 🗋 💕 🛃 🎒	🗗 - 😫 🍋 🗖 🖳 🖳 🖳 🖳 💷
Project	中 ×
Device tag	① <u>↓</u> ↓ Channel
HOST PC	
► 15720	Connect
*	Disconnect
	Get device state
<u>@</u>	Load from device
₿ L L L L L L L L L L L L L	Store to device
	Parameter
	Measured value
	Simulation
	Diagnosis
	Print
	Additional functions
堂	Add device
	Exchange device
<u>\$</u>	Delete device
	Properties TS720-2UPN8TS721-2UPN8 IODD1.1

Fig. 27: Connect



▶ In the tree structure, double-click the IO-Link device to display the parameters.

**** TS-400-2UPN8X-H1141TS-	500-2UPN8X-H1141 IODD1.0.1 # Para	imeter	- • ×
🗧 Vendor Turck			TURCK
Product TS-400-2UPN	8X-H1141 Sponsored by		Industrial Automation
	2 3 3 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
Menu	Name	Value	Default value
- Identification - Parameter	General settings		
- Observation	··· IO-Link write protection	Off 🗸	Off
Process data	Reset to default state	Reset to default state	
 Process data structure Events 	Reset	Reset	
Info	 Display of measured value 	50 ms refresh time 👻	50 ms refresh time
	- Unit	°C 🗸	°C
	- Offset correction	0 °C	0°C
	Programming lock	Off 🗸	Off
	Output settings		
	- Switching output mode	PNP -	PNP
	Output 1		
	Output 2		
	<		>
Connected 🔋 Data	a set & Device		

Fig. 28: IO-Link parameters



Set the Display of measured value parameter in the drop-down menu to 50 ms refresh time/display rotate 180°.



Fig. 29: Set the measured value display



• Write parameters to the device: click on the icon (highlighted in red).

TS-400-2UPN8X-H1141TS-	500-2UPN8X-H1141 IODD1.0.1 # Para	meter						
\varTheta Vendor Turck			TURCK					
Product TS-400-2UPN8X-H1141 Product id 6840017								
D D 0 40 🕸 🗹	1 🔊 🗟 隆 🏨 🖷 🛇 🗉 (
Menu	Name	Value	Default value					
- Identification Parameter	General settings							
Observation	- IO-Link write protection	Off 🗸	• Off					
Process data	··· Reset to default state	Reset to default state						
Process data structure Events	·· Reset	Reset]					
- Info	Display of measured value	0 (50 ms refresh time)	50 ms refresh time					
	··· Unit	°C -	· °C					
	··· Offset correction	0 °C	0°C					
	- Programming lock	Off 🗸	· Off					
	Output settings							
	- Switching output mode	PNP -	PNP					
	Output 1							
	Output 2							
	< [>					
Connected 💱 Data	set & Device							

Fig. 30: Writing parameters to the device



6.1.3 Set with IO-Link master and IODD configurator

The IODD configurator can be used to configure devices either generically or specifically via a web browser. No other tool is required.



NOTE

The IODD configurator is available for the following IO-Link masters with the following firmware versions: TBEN-L...-8IOL (from V3.3.0.0), TBEN-S2-4IOL (from V3.4.0.0), and FEN20-4IOL (from V1.1.0.0).

Software used

- Turck Service Tool V3.2.2
- Web browser
- IODD for read/write head TN-Q40-IOL2-H1141

The Turck Service Tool can be downloaded free of charge at www.turck.com.

Hardware used

- IO-Link master TBEN-S2-4IOL (IP address: 192.168.1.27)
- RF read/write head TN-Q40-IOL2-H1141
- Sensor cable RKC4.4T-2-RSC4.4T/TXL





Fig. 31: Application example — setup



Setting the IP address

- Connect the IO-Link master to a PC using an Ethernet cable.
- Open the Turck Service Tool.
- Click on Search or press [F5].
- ⇒ The Turck Service Tool displays the connected devices.

Opening a web server

- To open the web server via a web browser, enter 192.168.1.27 in the address bar of the web browser.
 - Alternatively, double-click on the IP address in the Turck Service Tool.

= Turck	Service Tool, Vers. 3.2	2.2												-	- 🗆 🗙
Yc	our Global Auto	omation I	Partner										-	URG	ск
Search (F	F5) Change (F2) V	Vink (F3) Act	tions (F4)	ipboard Langu	N . Iage E	xpert view ON	Start DHCP (F6)	E Configur	IP ation (F7) ARG	EE (F8) BE	EP (F9)	Close			Columns
No	MAC address	Name	IP address	Netmask	Gateway	Mode	Device	Version	Adapter	ARGEE	Pr	Kemel	BE	Turck, DCP	
- 1	00:07:46:1D:9A:AB	tbens4iol	<u>192.168.1.27</u>	255.255.255.0	0.0.0.0	PGM_DHCP	TBEN-S2-4IOL	3.4.0.0	192.168.1.99	supported		3.7.6.0	-	DCP, Turck	
		l		1											
Found 1 D	evice.														

Fig. 32: Opening the IP address



\Rightarrow The web server opens.

MAIN	DOCUMENTATION	IODD CONFIGURATOR
------	---------------	-------------------



Fig. 33: Web server — IO-Link master



A login is required in order to edit settings via the web server. The default password is "password".



MAIN

DOCUMENTATION

NOTE To ensure greater security, Turck recommends changing the password after the first login.

- Enter the password in the Login field on the start page of the web server.
- Click Login.

Example: configure the device generically

IODD CONFIGURATOR

- Click on IODD CONFIGURATOR in the top menu bar.
- Devices connected to the IO-Link master are displayed in the sidebar.
- ⇒ The device is automatically configured generically.

INTERN \$2-4IOL	IODD Config	urator					
 Port 1 - device connected Port 2 - no device 	₽► ► Read Write L	ead IODD Websearch Print					
 Port 3 - no device Port 4 - no device 	Identification Process data	Identification Vendor: Generic Device: Generic device Process data - V01.0000 / 2020-05-28 (© 2020, Werner Turck GmbH Co. & Kit Generic IODD loaded					
	Active events	Info					
		Vendor Name	Turck				
	Event history	Vendor Text	www.turck.com				
		Product Name	TN-Q40-IOL2-*				
		Product ID	100004174				
		Product Text	Compact HF RFID IO-Link device				
		Serial Number	0000001				
		Hardware Version	1.0.0				
		Firmware Version	2.2.4				
		Application Specific Tag	00 00 00 00 00 00 00 00 00 00 00 00 00				
		Direct parameters 1: Process Data Input Length	31				
		Direct parameters 1: Process Data Output Length	31				
		Direct parameters 1: Vendor ID	317				
		Direct parameters 1: Device ID	2162691				
		Direct parameters 1: IO-Link Version ID	17				

Fig. 34: Generically configured device



Example: configure the device specifically

The device can be configured specifically using either Load IODD or Websearch.

Configure via Load IODD:

- click on the device in the sidebar.
- Click on Load IODD.

IODD Configurator									
	E)	S	Ē						
Read Write	Load IODD	Websearch	Print						

Fig. 35: Load IODD — IODD configurator

- ▶ In the following window, find and select the IODD on the local hard drive.
- Add the IODD by clicking on **Open**.



Fig. 36: Select IODD

⇒ The device is configured specifically.



The **Websearch** feature is only available if the PC is connected to the Internet and the firewall does not block access.

Configure via Websearch:

Click on Websearch.



Fig. 37: Web search — IODD configurator

- ⇒ The IODD is automatically loaded from the IO-Link IODD database.
- ⇒ The device is configured specifically.

INTERN \$2-4IOL	IODD Config	jurator		
 Port 1 - device connected Port 2 - no device Port 3 - no device 	Read Write	Inlink IODD Print Vendor: Turck		
Nort 4 - no device	Parameter	Device: TN-Q40-IOL2-H1141 RFID read write module 13.56MHz V1.7 / 2020-11-09 (Copyright 2020, TURCK) Device identification		
	Process data	Vendor Name	Turck	
	Processdata	Vendor Text	www.turck.com	
	Structure	Product Name Product ID	100004174	
	Active events	Product Text	Compact HF RFID IO-Link device	
	Event history	Serial Number Firmware Version	2.2.4	
		Hardware Version	1.0.0	
		Application Specific Tag Device Description: Function Tag		?
		Device Description: Location Tag		?
		Device Access Locks: Parameter (write) Access Lock		
		Device Access Locks: Data Storage Lock Device Access Locks: Local Parameterization Lock		
		Device Access Locks: Local User Interface Lock		

Fig. 38: Specifically configured device



Set parameters

- Click on **Parameter** in the left-hand, device-specific menu bar.
- Read data from the device: Click on **Read**.
- Write data to the device (grayed out without any changes): Click on Write.

	<u>Config</u>	urato	r				
Read V	▶ Write E	G → ×port	-Ð Import	්? Unlink IODD	(금) Print		
Identifi	cation	Ve De	endor: ` evice: 1	Turck [N-Q40-IOL:	2-H1141		
Paran	arameter Vendor: Turck Device: TN-Q40-IOL2-H114 RFID read write module 13.56MHz V1.7 / 2020-11-09 (Copyright 2020, TI Parameters Docess data SIO PARAMETERS Reader parameter SIO: C/Q1 PIN SIO Operating Mode Reader parameter SIO: Compare Data C/Q1 Transponder memory address to Reader parameter SIO: C/Q1 Polarity Reader parameter SIO: C/Q1 Polarity Reader parameter SIO: C/Q1 Q2 Outp Time Reader parameter SIO: Q2 PIN SIO O Mode Reader parameter SIO: Compare Data C/Q1 value Reader parameter SIO: C/Q1 Q2 Outp Time Reader parameter SIO: C/Q1 Noto D Mode Reader parameter SIO: Compare Data C/Q1 value				56MHz t 2020, TURCK)		
Process	s data	SIO P Rea	ARAMET	ERS meter SIO: C/Q*	1 PIN SIO	Transponder	
Proces Struc	sdata ture	Op Rea C/G	erating Mo ader parar Q1 Transp	ode neter SIO: Com onder memory a	pare Data Mode - address to read	0	?
Active e	events	Rea C/G	ader parar)1 value	neter SIO: Com	pare Data Mode -	0 Output "close" if condition = true	?
Event h	nistory	Rea Rea Tim	ader parar ader parar 1e	neter SIO: C/Q ⁺ neter SIO: C/Q ⁺	1 Q2 Output Hold	Data hold time = 0ms	· ?
		Rea Mo Rea	ader parar de ader parar	neter SIO: Q2 F neter SIO: Com	PIN SIO Operating pare Data Mode -	Transponder 0	✓?
		Q2 Rea Q2	Transpon ader parar value	der memory ade neter SIO: Com	dress to read pare Data Mode -	0	· ·
		Rea SYST	ader parar EM COM	neter SIO: Q2 F MAND	Polarity	Output "close" if condition = true	?
		Sta	ndard Co	mmand		DEVICE RESET	
		Sta	ndard Co	mmand		RESTORE FACTORY SETTING	S

Fig. 39: Parameters — IODD configurator



6.2 Configuring devices using the control program

IO-Link devices can be commissioned via a Turck IO-Link master on various controllers. The GSDML file of the IO-Link master is required for configuration with a Siemens controller in PROFINET. The GSDML file is available for download at www.turck.com.

The EDS file of the IO-Link master is required for configuration with an Allen-Bradley controller via Ethernet/IP. The EDS file is available for download at www.turck.com.

6.2.1 Commissioning with BL... and programmable gateway in CODESYS 2

Software used

CODESYS 2.3.9.35 with library BLxx_PG_PB.lib

Hardware used

- Programmable gateway BL67-PG-EN
- IO-Link master module BL67-4IOL with BL67-B-4M12
- Temperature sensor TS720-2UPN8-H1141, connected to IO-Link channel 1
- Sensor cable RKC4.4T-2-RSC4.4T/TXL

Setup



Fig. 40: Application example — setup



Example: configure the device generically



NOTE The IO-Link master BL...-4IOL can only be configured generically. The connected devices must be configured separately.



NOTE Information on the IO-Link master can be found in the instructions for use.

• Configure hardware in CODESYS.

Fig. 41: Configure hardware in CODESYS



Set the module properties of the IO-Link master BL67-4IOL.

Fig. 42: Set parameters





Fig. 43: Reading out process data in online mode



6.2.2 Commissioning with BL... and TX500 in CODESYS 3

Software used

- CODESYS 3.5 SP8 Patch 1
- GSDML file for BL67-GW-EN

Hardware used

- Multiprotocol gateway BL67-GW-EN
- IO-Link master module BL67-4IOL with base module BL67-B-4M12
- Temperature sensor TS720-2UPN8-H1141, connected to IO-Link channel 1
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Visual HMI/PLC combination device TX507

Setup



Fig. 44: Application example — setup



Example: configure a device



NOTE The IO-Link master BL...-4IOL can only be configured generically. The connected devices must be configured separately.

NOTE

Information on the IO-Link master can be found in the instructions for use.

► Configure hardware in CODESYS.



Fig. 45: Configure hardware in CODESYS



- Double-click on the IO-Link master.
- Select parameters.

+ 7 X	BL67_4IOL X							 Messages - Total 1 error(s), 1 warning(s), 2 	2 messa 👻 👎
GlobalTextList	General	Madula Information							
👔 Library Manager								Description	Pro
Project Settings	PIVIO MODUle Parameters	Ident Number 16#4	IARRR00					 No coverner ordenade contigured i 	BLO.
	PNIO Module I/O Mapping	Slot Number	1						
s • 4 X	Status	User-Defined Parameters:							
Device (TX507-P3CV01)	Information	Set All Default Values	Read A	II Values	Write All Values				
PLC Logic	Information								
C Application		Parameters	Value	Allowed val	ues		-		
- ImagePool		IO-Link port parameter							
- 🎁 Library Manager		module parameterization	activate	01					
PLC_PRG (PRG)		Port config. validation Ch1	no validation	023					
📼 🎆 Task Configuration		IO-Link mode Ch1	activated	02					
🖶 🍪 MainTask		Data storage mode Ch1	activated	03					
D PLC_PRG		Cycle time Ch1	0.8 ms	0 8 16 24 32	40 48 56 64 66 68 70 72 74 76 78	80 82 84 86 88 90 92 94 96 98 100 102 104 106 1	08 110 112 114 116 118 120 122 124 126 128 129 130 13		
🗟 🎡 Profinet_CommunicationTask		Revision Ch1		01					
PN_Controller.CommCycle		Activate Quick Start-Up Ch1	no	01			-		
S Profinet IOTask		Activate output Ch1	no	01					
E SVISU TASK		Process data diagnostic Ch1	no	01					
(UsuElems.Visu_Prg		Event filter Ch1	off	03					
TextList		Input data mapping Ch1	direct	03					
🗉 🙀 Visualization Manager		Input data length Ch1		0123456	7 15				
Visualization		Output data mapping Ch1	drect	03					
(fill Ethernet (Ethernet)		Output data length Ch1		0123456	7 15			°	
- III PN Controller (PN-Controller)		Port config. validation Ch2	no validation	023					
. III BL67 GW EN VN 03 00 (BL67-GW-E		IO-Link mode Ch2	activated	02					
B 8167 4101 (B 67-4101)		Data storage mode Ch2	activated	03					
· ····		Cycle time Ch2	0.8 ms	0 8 16 24 32	40 48 56 64 66 68 70 72 74 76 78	80 82 84 86 88 90 92 94 96 98 100 102 104 106 1	08 110 112 114 116 118 120 122 124 126 128 129 130 13		
		Revision Ch2		01					
		Activate Quick Start-Up Ch2	no	01					
		Activate output Ch2	no	01					
		Process data diagnostic Ch2	no	01					
		Event filter Ch2	off	03					
		Input data mapping Ch2	drect	03					
		Input data length Ch2		0123456	7 15				
		Output data mapping Ch2	direct	03					
		Output data length Ch2		0123456	7 15				
		Port config. validation Ch3	no validation	023					
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Fig. 46: Set parameters



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■ ☐ BL67-GW-EN_TX507								
🖹 🤣 🌉 Device [connected] (TX507-P3CV01)	General	Channels						
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Application [run]	PNIO Module Parameters	🗐 ᡟ		Inputs	%IB			
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- 📶 Library Manager	PNIO MODULE I/O Mapping			IO-Link	%IB	USINT		1
PLC_PRG (PRG)	Status			Input v	%IX	BOOL		TRUE
Task Configuration				Input v	%IX	BOOL		FALSE
🖃 🥩 MainTask	Information			Input v	%IX	BOOL		FALSE
PLC_PRG				Input v	%IX	BOOL		FALSE
Profinet_CommunicationTask				Overcur	%IX	BOOL		FALSE
PN_Controller.CommCycle				Overcur	%IX	BOOL		FALSE
Profinet_IOTask				Overcur	%IX	BOOL		FALSE
🖻 🥩 VISU_TASK				Overcur	%IX	BOOL		FALSE
VisuElems.Visu_Prg		□		Input d	%IB	ARRAY		
TextList				Input d	%IB	BYTE		51
🗈 🔂 Visualization Manager				Input d	%IB	BYTE		196
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🖃 😏 🛐 Ethernet (Ethernet)		■ •		Input d	%IB	ARRAY		
🖻 😏 🏢 PN_Controller (PN-Controller)		H		Input d	%IB	ARRAY		
🖻 🧐 BL67_GW_EN (BL67-GW-EN)		B -		Input d	%IB	ARRAY		
		±		Input d	%IB	ARRAY		
		±		Input d	%IB	ARRAY		
		<u> </u>		Outputs	%QB			
		÷.		Digital I	%QB	. USINT		0
				Reserviert	%QB	. USINT		0
				Input d	%QB	ARRAY		
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		<u>ا</u>		Output	%QB	ARRAY		

In online mode, the process data can be read out if an IO-Link device is connected.

Fig. 47: Reading out process data in online mode



Commissioning with TBEN and TX507 in CODESYS 3 6.2.3

Software used

- CODESYS 3.5 SP8 Patch 1
- GSDML file for TBEN-S2-4IOL

Hardware used



NOTE

As an alternative to the IO-Link block module TBEN-S2-4IOL, the IO-Link block modules TBEN-L...-8IOL or FEN20-4IOL can be used.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- IO-Link master TBEN-S2-4IOL
- Temperature sensor TS720-2UPN8-H1141, connected to IO-Link channel 1
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Visual HMI/PLC combination device TX507



Fig. 48: Application example — setup

Example: configure the device generically

Configure hardware in CODESYS.

Configuration and commissioning Configuring devices using the control program



Fig. 49: Configure hardware





• Assign slots of the TBEN IO-Link master: right-click on the slot \rightarrow Select **Plug Device...**.

The last three slots are for diagnostics, bytes, and module status.



Fig. 50: IO-Link master — assigning slots



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evice:						
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B-IIII Profine	t IO					
	Diagnostics Turck	SW=SW V 1.4	.7. HW=HW 1			
_	-					
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Fig. 51: Select diagnostics



- Assign IO-Link ports: right-click on the slot \rightarrow **Plug Device**.
- Select Port configuration generic.

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lug Device				
me: Diagnostics				
ction:				
) Append device 👩 Insert device	💿 Plug device 💿 U	pdate device	e	
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🗄 📴 Port configuratio	onspecific			
7 Group by category				
Display all versions (for experts or	nhu)			
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nformation:				
	1	Please select	a device from the list above,	
 (You can select another target n 	node in the navigator w	hile this wind	dow is open.)	
 (You can select another target n 	node in the navigator w	hile this wind	dow is open.)	Disc Davice

Fig. 52: Selecting generic configuration



• Configure the port.

Hill Diagnostics Hill IN_1_WO	RD X									
General	Channels									
	Variable	Mapping	Channel	Address	Туре	Default Value	Unit	Description		
PNIO Module Parameters	🍫		Input data word 0	%IW52	UINT					
PNIO Module I/O Mapping										
Status										
Information										
				Reset	Mapping	Always update va	riables:	Use parent device setting	9	•
	🍫 = Create new variable	~i∳ = Ma	p to existing variable							

Fig. 53: Configure the port



> monto + 3 x → Back Connected (0,702/*2003) →
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Despiration PND Modele Parameters * O implication Sature * O implication Implication * O implication Implica
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Reset Mapping Always update variables: Use parent device setting
Image: Second
Hessages 4 (1997) (1997

The process values can be monitored in online mode.

Fig. 54: Process values in online mode



Example: configure the device specifically



NOTE The IO-Link master TBEN-S2-4IOL can be configured specifically. The connected devices can be configured via the configuration program of the controller.

• Configure hardware in CODESYS.

BL67-GW-EN_TX507.project* - CODESYS					
Eile Edit View Project Build Online Debug Tools Window Help					
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	FI TBEN_52_410L X				
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Project Settings	Options	Station Status			
	IOxS				
Devices 👻 🕂 🗙	PNIO Parametera	IP Parameter			
BL67-GW-EN_TX507	The second s	IP Address 192 . 168 .	1 . 10		
B- Device (TX507-P3CV01)	PNIO I/O Mapping	Subnet Mask 255 . 255 . 2	55 . 0		
I PLC Logic					
QP Application	Status	Default Gateway 0 . 0 .	0.0		
	Tefermetice.	Communication			
	Information	Send Clock (ms)	Wate	thdea (ms)	2 🔺
Task Configuration					
AinTask		Reduction Ratio 1	VLAN	N ID	0 🚔
PLC_PRG		Phase - 🔻			
🗐 🍪 Profinet_CommunicationTask					
PN_Controller.CommCycle		RT Class RT Class 1		•	
Profinet_IOTask					
E 😫 VISU_TASK		User-Defined Parameters			
VisuElems.Visu_Prg		Set All Default Values	Read All	Values	Write All Values
TextList					
Visualization Manager		Parameters	Value	Allowed values	
Ethernet (Ethernet)		PROFINET configuration			
Enternet (Enternet) PN Controller (PN-Controller)		Output behav. at communic. loss	set to 0	0 2	
		Deactivate all diagnostics	no	01	
Basic (Basic)		Deactiv. load voltage diagn.	no	01	
<pre> <empty> (<empty>)</empty></empty></pre>		Deactivate I/O-ASS. Force Mode	no	01	
<pre>~ K <empty> (<empty>)</empty></empty></pre>		Fieldbus configuration			
<pre>~ K <empty> (<empty>)</empty></empty></pre>		Deactivate Modbus TCP	no	01	
<pre>C <empty> (<empty>)</empty></empty></pre>		Deactivate EtherNet/IP	no	01	
<pre>C <empty> (<empty>)</empty></empty></pre>		Deactivate PROFINET	10	0.1	
<pre>C <empty> (<empty>)</empty></empty></pre>		Dedcuvate web server	10	01	
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Fig. 55: Configure hardware



• Assign slots of the TBEN IO-Link master: right-click on the slot \rightarrow Select **Plug Device...**.

The last three slots are for diagnostics, bytes, and module status.



Fig. 56: IO-Link master — assigning slots



	Select	Diagn	ostics.
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		- (100 Call							
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Fig. 57: Example: Select diagnostics



- Assign IO-Link ports: right-click on the slot \rightarrow **Plug Device**.
- Select Port configurationspecific.

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Fig. 58: Select specific configuration



• Configure the port.

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Fig. 59: Configure the port



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ormation: Please select a device from the list above,	
Please select a device from the list above.	
(You can select another target node in the navigator while this window is open.)	

Fig. 60: Select IO-Link device



- 6 X

Select device parameters.

BL67-GW-EN_TX507.project* - CODESYS					
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101k	(Massage Tatal O arrente) 2 warrene(e) 5 messa
	A TS_xxx_LL2UPN8X_family x	<			 Messages - Total o erfor(s), 2 warmig(s), 5 messa • • • X
CabelTauti int	General				
	General	Module Information:			Description Project
Draig Hanage	PNIO Module Parameters	Ident Number 16#00492302			
Project Seturgs					
	PNIO Module I/O Mapping	Slot Number 3			
Devices v A X	Status	User-Defined Parameters:			
0.66/-GW-EW_1X50/		Sat All Default Values	Write All Values		
 Device (1X507+9CV01) ENR as a second se	Information				
		Parameters	Value	Allowed values	
Application		Station parameter			
- Imagerool		Operation mode	10 Jink with family compatible device	012248	
Lorary Manager		Data storage mode	desctivated clear	0.3	
PLC_PRG (PRG)		Curla time	automatic	0.16 32 48 64 68 72 76 80 84 88 92 96 100 104 108 112 116 120 124 128	
Task Connguration		Perision	V1.0	0 1	
Panask		Activate Ovick Start J In	10	8.1	
		Proversi insuit data invalid	diamontic caparated	0.1	
B WS Profinet_CommunicationTask		Process input data invalu	extifications and warnings	0.2	
- @ PN_Controler.CommCyde		Vender ID	217	0.65525	
- Sectore Julian		Period ID	131073	0.00000	
H SS VISU_TASK		Device 10	151072	0.1	
······································		Device parameter	active	01	
lextust		10-Liek with protection	0#	8.1	
• • • • • • • • • • • • • • • • • • •		Dirplay of many red value	50 ms refresh time	0.6	
- a visuaization		These	10	0.0	
Ethernet (Ethernet)		Officet correction for diait1	C	65	
 PN_Controller (PN-Controller) 		Drogramming lock	0	0.2	
= +U IBEN_52_4IOL (IBEN-52-4IOL)		Programming lock	Date	0.12	
Basic (Basic)		Output 2 / Examina	Husternia 6 maties, permally apage	0.122	
Compty> (<empty>)</empty>		Output 2 / Parformance in the quest of prohe fault	off	0125	
IS_XXX_LI2UPN8X_family (IS-XXX-LI2UPN8X-family)		Output 2 / Performance in the event of properation	10100	5305 50415	
<empty> (<empty>)</empty></empty>		Colput 2 / Switchport/ upper limit value [128015103]	13190	5396.00415	
<empty> (<empty>)</empty></empty>		Collables dates (with the state of the states and	1/104	5120.00139	
Diagnostics (Diagnostics)		Switching delay (switchpoint, whole entrance)	0	0.500	
ingji io⊥sin_irensi (uokin krensi) - ∰∭ Modde_status (Modde status)					
		•		•	
e					
Cross Reference List					- 4 X
Name: 🔹 🗣 🔍 📰 🗧 🕨 🗃					
Symbol POU Variable Access Type Address Location Obia	ct Comm				
synamic recess type mounds bocation obje					
				Last build: 🔕 0 🚸 1 🛛 Pr	ecomple: • Current user: (nobody)

Fig. 61: Select device parameters

With the specific configuration, the IO-Link devices can be set specifically in addition to the parameters of the IO-Link master. When the application is started in the controller, the settings are transferred via PROFINET to the device.

The process values can be monitored in online mode.

He Edit View Broject Build Online Debug Iools Window Help	68			
Devices v A X	II TS_xxx_LI2UPN8X_family >	<		
B = - [2] BL67-GW-EN_TX507				
 S Device [connected] (TX507-P3CV01) 	General	Module Information:		
- Di PLC Logic	DNIO Medule Recomptore	Ident Number IC 400 402002		
Application [run]	Pivio Piodule Paralileters	10400492302		
ImagePool	PNI0 Module I/0 Mapping	Slot Number 3		
Library Manager				
PLC_PRG (PRG)	Status	User-Defined Parameters:		
Task Configuration		am Sat All Default Values am/III Read All Values	aniii Write All Values	
i 🔅 MainTask	Information	An Sec All Delabit Values	- Mill write Air values	
- del PLC_PRG		Parameters	Value	Allowed values
Se Profinet_CommunicationTask		Charling and the		
- @ PN_Controler.CommCycle		Constant and a	10 tale with fearly server this do too	010040
Profinet_IOTask		Operation mode	departmented along	012340
III 😸 VISU_TASK		Cude time	a demotio	
· 他 VisuElems.Visu_Prg		Cyce the	automatic	0 10 32 46 64 66 72 76 80 64 66 92 96 100 104 108 112 116 120 124 128 129 131 132 133 134 135 136 137 136 139 140 141 142 143 1
TextList		Activate Origh Street Lie	V1.0	0.1
* 🔁 Visualization Manager		Activate Quick start-op	yes descent and a second second	0.1
d Visualization		Process input data invalid	diagnostic generated	0.1
= G III Ethernet (Ethernet)		Deacovate diagnosocs	notifications and warnings	0.5
= 🤤 🏥 PN_Controller (PN-Controller)		Vendor ID	31/	0.65555
• (1) TBEN_S2_4LOL (TBEN-S2-4LOL)		Device 10	151072	0.1
- G III Basic (Basic)		Device parametrization via GSD	active	01
-K <empty> (<empty>)</empty></empty>		Device parameter	04	
EII TS_xxx_LI2UPN8X_family (TS-xxx-LI2UPN8X-family)		Direlaw of more and unlike	to an article time	0.1
<empty> (<empty>)</empty></empty>		their	Soms relies i une	0.0
C <empty> (<empty>)</empty></empty>		Officet correction for diait1	C	03
Diagnostics (Diagnostics)		Drogramming lock	off	0.2
IO_Link_Events (IO-Link Events)		Fridylania grock	Date:	0.1
		O deut 2 / E mating	Pier	0.12
		Output 2 / Parformance in the quest of prohe fault	off	0.1
		Output 2 / Suithpoint/upper lexit uplue [1290_15102]	19190	0.1
		Colput 2 / Switchport/ upper limit value [128015103]	18190	5396.00/413
		Culput 2 / Release purity lower limit value [128013103]	17104	3120.00139
		Switching delay (switchpoint) window endance)	0	0.000
r m y		٠ [200	
Cross Reference List				+ ∓ X
Name: 🔹 💌 💌 🗐 💭 📢 🏓 🍘	_			
Messages - Total 0 error(s), 2 warning(s), 5 message(s) 🔛 Watch 1 🌆 Breakpoint	its			

Fig. 62: Process values in online mode



6.2.4 Commissioning with TBEN-L...-8IOL and TBEN-L5-PLC-1... in CODESYS 3

Software used

- CODESYS 3.5 SP14 Patch 2
- GSDML file for TBEN-L...-8IOL
- Package for TBEN-L5-PLC-1...

Hardware used



NOTE

As an alternative to the IO-Link block module TBEN-S2-4IOL, the IO-Link block modules TBEN-L...-8IOL or FEN20-4IOL can be used.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- TBEN-L5-PLC-10
- IO-Link master TBEN-L...-8IOL
- TS720-2UPN8-H1141
- Sensor cable RKC4.4T-2-RSC4.4T/TXL



Fig. 63: Application example — setup



Example: configure the device generically

• Configure hardware in CODESYS.



Fig. 64: Configure hardware



• Assign slots of the TBEN IO-Link master: right-click on the slot \rightarrow Select **Plug Device...**

The last four slots are intended for diagnostics, IO-Link events, VAUX Control, and module status.



Fig. 65: IO-Link master — assigning slots



	Select	Diagn	ostics.
--	--------	-------	---------

Action:										
Anneni	d device 🔊 Insert devi	ce 🔘 Plug de	evice 🧖	Undate devi	ce					
	0									
evice:								 	 	
endor:	<all vendors=""></all>									
Name		Vendor	Versi	on						
≓∭ F	ieldbusses									
6	Profinet IO Modu	le								
	- 🗐 Diagnostics	Turck	SW=S	W V 1.4.7, HV	V=HW 1					
) Group) by category									
Z Group) by category av all versions (for expert	s only)								
/ Group) by category ay all versions (for expert	s only)								
✔ Group □ Displa □ Displa) by category y all versions (for expert yy outdated versions	s only)								
✔ Group] Displa] Displa) by category ay all versions (for expert ay outdated versions m:	s only)								
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Group Displa Displa formatio) by category ny all versions (for expert ny outdated versions in: u can select another targ	s only) et node in the n	navigato	Please select	<i>t a device r</i>	from the list above	2,			

Fig. 66: Select diagnostics


- Assign IO-Link ports: right-click on the slot \rightarrow **Plug Device**.
- Select Port configuration generic.

Plug Device			23
			/200
Name: Diagnostics			
Action:			
Append device Insert device Plug of the sector of the s	ice 🔘 Update device		
Device:			
Vendor: <all vendors=""></all>			•
Name	Vendor Version		
Fieldbusses			
Profinet IO Module			
🖹 🚞 Port configuration generic			
🖮 🚞 Port configuration specific			
Crown by estagony			
Group by category Display all versions (for experts only)			
Display all versions (for experts only)			
Information:			
	riease select a device from the list above,		
 (You can select another target node in the 	vigator while this window is open.)		
		Plua Device Close	5

Fig. 67: Selecting generic configuration



• Configure the port.



Fig. 68: Configure the port



The process values can be monitored in online mode.

TBEN-ES-PEC-TO_TOE.project - CODESTS					
File Edit View Project Build Online Debug Tools W	(indow Help				
) 🖆 🔚 🚭 🗠 斗 询 🛍 📉 🖊 🌿 📕 🗐 🤺	14 14 🖶 🔤 - 🗗 🛗 端 💖 🔸 🛽	• 📲 🕼 📲 🖇 🔶 🧱 🛒 1	7		
evices 🗸 🗸 🖌 TBEN	L5_8IOL B IO_Link_Port_1_1 X	Device			
TBEN-1.5-PLC-10_IOL		-			
General	Find	Filter Show all		- 4	 Add FB for IO channel.
PLC Logic	Variable	Mapping Channel	Address	Type	Current Value
PNIO Mode	ule I/O Mapping	Input data word 0	9/LTI//Q	LIINT	32769
Library Manager		Input data word o	%IR20	Enumeration of BVTE	600D
PLC_PRG (PRG)		Output data word 0	%OW2	LIINT	0
Task Configuration	n	Outputs CS	%TR21	Enumeration of BVTE	6000
🖹 🎲 MainTask	·· · · · · · · · · · · · · · · · · · ·	00000000	/01021	Enameradori or prine	0000
PLC_PRG					
🗣 🍪 Profinet_CommunicationTask					
PN_Controller.CommCycle					
Profinet_IOTask					
🖶 😏 🏢 Local_IO (Local IO)					
- 🚱 🖬 🕕 DXP (DXP)					
- 🖓 🗑 Diagnostics (Diagnostics)					
- 😏 🛤 🕕 VAUX_control (VAUX control)					
- 😏 🖬 🗍 Module_status (Module status)					
😔 🟅 COM0					
- 😌 🚡 COM1					
- 😔 🚡 CANbus					
🖹 🍤 🔟 Ethernet (Ethernet)					
🖹 🍤 🏢 PN_Controller (PN-Controller)					
🖹 😏 📶 TBEN_L5_8IOL (TBEN-L5-8IOL)					
- 😏 🗐 Basic (Basic)					
- ତ 🛤 🕕 IO_Link_Port_1_1 (IN 1 WORD/C					
- 记 🖬 🕕 IO_Link_Port_2_1 (DI)					
– 🥵 🛱 🕕 IO_Link_Port_3_1 (K50L2 IO-Link					
- 🖓 🛤 🕕 IO_Link_Port_4_1 (DI)					
- 🖓 🛤 🗊 IO_Link_Port_5_Class_B_1 (DI)					
- 🥵 🛱 🕕 IO_Link_Port_6_Class_B_1 (TBIL					
- 🕬 🗊 IO_Link_Port_7_Class_B_1 (DI)					
- 🖓 🛤 🗊 IO_Link_Port_8_Class_B_1 (DI)					
- 记 🖬 🕕 Diagnostics_2 (Diagnostics)					
IO_Link_Events					
VAUX_control_1					
Mandala status 1					

Fig. 69: Online mode — monitoring process values



Example: configure the device specifically



NOTE The IO-Link master TBEN-L...-8IOL can be configured specifically. The connected devices can be configured via the configuration program of the controller.

To configure the device specifically, the GSDML file must have SIDI.

• Configure hardware in CODESYS.

▼ ₽ X <mark>/</mark> TBEN_L5_8IOL X						
PLC-10_IOL					1	
ce (TBEN-Lx-PLC-1x) General	Station Name then	I58iol				
PLC Logic Ontions	Station Status					
Application					1	
Library Manager IOxS						
PLC_PRG (PRG)	IP Parameter					
Task Configuration PNIO I/O Mapping	IP Address	192 168 1	222			
🖻 🕸 MainTask	IF Address	152 . 100 . 1				
PNIO IEC Objects	Subnet Mask	255 . 255 . 255	. 0			
Profinet_CommunicationTask	Default Gateway	0.0.0	. 0			
PN_Controller.CommCycle Status						
The (The)	Communication					
LEDS (LEDS)	Send Clock (ms)	1 ~	Watchdog	g (ms)	3 🜩	
DXP (DXP)	Reduction Ratio	1 ~	VLAN ID		0 🜲	
Diagnostics (Diagnostics)	Dhana					
VAUX control (VAUX control)	Phase	- ~				
Module status (Module status)						
COMO	RT Class	RT Class 1		\sim		
COM1	Settings					
CANbus	Set all default va	lues	Read all value	29	Write all value	•
Ethernet (Ethernet)			jiceaa an raia			
PN_Controller (PN-Controller)	Parameters		Value	Datatype	Allowed values	Description
BEN_L5_8IOL (TBEN-L5-8IOL)	PROFINET configuration					
Basic (Basic)	Output behav, at o	ommunic, loss	set to 0	BitArea		
IO_Link_Port_1	Deactivate all diag	nostics	no	Bit		
IO_Link_Port_2	Deactiv, load volta	oe diagn.	no	Bit		
IO_Link_Port_3	Deactivate I/O-AS	S. Force Mode	no	Bit		
IO_Link_Port_4	LED-behavior (PWF) at V2 undervoltage	areen	Bit		
IO_Link_Port_5_Class_B	Fieldbus configuration					
IO_Link_Port_6_Class_B	Deactivate Modbus	TCP	no	Bit		
IO_Link_Port_7_Class_B	Deactivate EtherNe	et/IP	no	Bit		
IO_Link_Port_8_Class_B	Deactivate PROFIN	ET	no	Bit		
Diagnostics_1	Deactivate WEB se	rver	no	Bit		
IO_Link_Events						

Fig. 70: Configure hardware



• Assign slots of the TBEN IO-Link master: right-click on the slot \rightarrow Select **Plug device...**

The last four slots are intended for diagnostics, IO-Link events, VAUX Control, and module status.



Fig. 71: IO-Link master — assigning slots



	Select	Diagn	ostics.
--	--------	-------	---------

me:	Name Action: Device: Vendor: Name Vendor: Warders> Name Vendor:	Plug Device					and the second sec		
cton: Append device Insert device Plug device Update device evere: ereder: Call vendors> Name Vendor Version Image: Plug device Image: Vendor Version Image: Vendor Vendor Version Image: Vendor Ve	Action: Appendencies Insent device Imply and device Imply device Imply and device Imply	ame:							
<pre>Papend device @ Insert device @ Plug device @ Update device evice: evice: evice: evice: ************************************</pre>	Append device insert device Plug device Update device Device:	Action:							
evice: endor: Call vendors> Name Vendor Vension Fieldbusses Field	Perice: Vendor: Vendor: Peldbusss Profinet 10 Profinet 10 Module Profinet 10 Module <td>) Append de</td> <td>vice 👩 Insert device</td> <td>Plug de</td> <td>vice 🕐 Update device</td> <td></td> <td></td> <td></td> <td></td>) Append de	vice 👩 Insert device	Plug de	vice 🕐 Update device				
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Relative body set Variable Image: Control of the cont	Name Vendors> Name Vendor Profinet 10 Profinet 10 Image: Profinet 10 Module Image: Profinet 10 Module	/ender:	Musee damas						
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Image: Profinet IO Module		⊟ ∭ Field	busses						
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Group by category Display all versions (for experts only) Display outdated versions formation: Please select a device from the list above.			- 🗊 Diagnostics	Turck	SW=SW V 1.4.7, HW=HW 1	1			
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	You can select another target node in the navigator while this window is open.)								
	You can select another target node in the navigator while this window is open.)								
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	You can select another target node in the navigator while this window is open.)								
	You can select another target node in the navigator while this window is open.)								
You can select another target node in the navigator while this window is open.)		You can	select another target r	node in the n	avigator while this window is or	pen.)			
		- (100 Call							
Plug Device Ck	Plug Device C							Plug Device	Close

Fig. 72: Example: Select diagnostics



- Assign IO-Link ports: right-click on the slot \rightarrow **Plug Device**.
- Select Port configurationspecific.

Plug Device						_
ame: Diagnostics						
Action:						
Append device 🔘 Insert device 🔘 Plug	device 🕞 Upda	ate device				
evice:						
/endor: <a>Ali vendors>						
Name	Vendor \	Version				
= 🕤 Fieldbusses						
😑 🋲 Profinet IO						
Profinet IO Module						
Port configuration generic	1					
Port configurationspecific						
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Group by category Display all versions (for experts only) Display outdated versions nformation:	Plea	nse select a	device from the list abov	е.		
Group by category Display all versions(for experts only) Display outdated versions nformation:	Plea	nse select a	device from the list abov	е.		
Group by category Display all versions (for experts only) Display outdated versions nformation:	Plea	ase select a	device from the list abov	е,		
Group by category Display all versions (for experts only) Display outdated versions information:	Plea	nse select a	device from the list abov	e.		
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Group by category Display all versions (for experts only) Display outdated versions nformation: (You can select another target node in the	Plea navigator while	ase select a	device from the list abov	е.		

Fig. 73: Select specific configuration



	Configure the port.
--	---------------------

eneral	Channels							
	Variable	Mapping	Channel	Address	Туре	Default Value	Unit	Description
NIO Module Parameters			Input data word 0	%IW52	UINT			
NIO Module I/O Mapping								
tatus								
nformation								
								,

Fig. 74: Configure the port



Select IO-Link device.

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Fig. 75: Select IO-Link device



Select device parameters.



Fig. 76: Select device parameters

With the specific configuration, the IO-Link devices can be set specifically in addition to the parameters of the IO-Link master. When the application is started in the controller, the settings are transferred via PROFINET to the device.



The process values can be monitored in online mode.

ices 👻 🗸 🖌	TBEN_L5_BIOL)_Link_Port_1_1 🗙 🏢	Device				
TBEN-L5-PLC-10_IOL		Find		Filter Channell			Add EP for IO channel
🖹 😏 🛄 Device [connected] (TBEN-Lx-PLC-1x)	General	FIIId		Filter Show all		• *	Add r B for to channel.
PLC Logic	PNIO Module I/O Manning	Variable	Mapping	Channel	Address	Туре	Current Value
Grant Control (1997)	The house yo happing	• • • • • • • • • • • • • • • • •		Input data word 0	%IW9	UINT	32769
Library Manager	Status	🍫		Inputs PS	%IB20	Enumeration of BYTE	GOOD
PLC_PRG (PRG)		* @		Output data word 0	%QW2	UINT	0
Task Configuration	Information			Outputs CS	%IB21	Enumeration of BYTE	GOOD
AainTask							
PLC_PRG							
Profinet_CommunicationTask							
PN_Controller.CommCycle							
Profinet_IOTask							
LEDs (LEDs)							
Local_IO (Local IO)							
DXP (DXP)							
- CHAIN Diagnostics (Diagnostics)							
VAUX_control (VAUX control)							
Module_status (Module status)							
Ethernet (Ethernet)							
Element (Enterler, (Di Controllor)							
• • • • • • • • • • • • • • • • • • •							
• Clink Port 6 Class B 1 (TBI)							
C III IO Link Port 8 Class B 1 (DI)							
IO Link Events							
VAUX control 1							
Module status 1							

Fig. 77: Online mode — monitoring process values



6.2.5 Commissioning with BL... and Siemens controller in Simatic Manager (V5.5)

Software used

- Siemens STEP7 V5.5 (Simatic Manager)
- GSDML file for BL67-GW-EN

Hardware used

- Multiprotocol gateway BL67-GW-EN
- IO-Link master module BL67-4IOL with base module BL67-B-4M12
- Temperature sensor TS720-2UPN8-H1141, connected to IO-Link channel 1
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Siemens controller S7, e.g. CPU 315-2PN/DP

Setup



Fig. 78: Application example — setup



Example: configure the device generically



NOTE The IO-Link master BL...-4IOL can only be configured generically. The connected devices must be configured separately.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- Configure the hardware in the Simatic Manager.
- Describe I/O addresses.

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					111
(1) turck-bl67					
Slot 🚺 Module	Order number	I Address	Q address	Diagnostic Address	Comment
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X1 FN-10				2041*	
XT F1 Rut 1				2040*	
X1 F2 Rvt 2				2039*	
1 BL67-4IOL	6827386	015	015		

Fig. 79: Describe I/O addresses in the Simatic Manager



Double-click on the IO-Link master.





Fig. 80: Set parameters



In online mode, the process data can be read out if an IO-Link device is connected.

Fig. 81: Reading out process data in online mode





6.2.6 Commissioning with TBEN and Siemens controller in Simatic Manager (V5.5)

Software used

- Siemens STEP7 V5.5 (Simatic Manager)
- GSDML file for TBEN-S2-4IOL

Hardware used

•	

NOTE

As an alternative to the IO-Link block module TBEN-S2-4IOL, the IO-Link block modules TBEN-L...-8IOL or FEN20-4IOL can be used.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- IO-Link master TBEN-S2-4IOL
- Temperature sensor TS720-2UPN8-H1141, connected to IO-Link channel 1
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Siemens controller S7, e.g. CPU 315-2PN/DP



Fig. 82: Application example — setup



Example: configure the device specifically



NOTE

The IO-Link master TBEN-S2-4IOL can be configured specifically or generically. The connected Turck devices can be configured via the control program.

- Configure the hardware in the Simatic Manager.
 - Assign the device ports of the TBEN IO Link master.



Fig. 83: Assign device ports



- Double-click on 2IN.
- Select parameters.



Fig. 84: Select parameters for 2IN



- Double-click on **DI**.
- Select parameters.



Fig. 85: Select parameters for DI



In online mode, the process data can be read out if an IO-Link device is connected.

Monitor/Modi	fy - 2IN - (R-/S2)			x				
Online via assigned	ICPU services							
Path: Test_I	OLINK\SIMATIC 300(1)\	CPU 315-2 PN/D	P					
Address	Address Symbol Display format Status value Modify value							
1 PEW 256		HEX	W#16#332C					
🗙 🛛 Row Not Effe	ective Update Fo	orce Symbol with F	-5					
⊢ Run conditionally		tely						
Monitor	🔐 Status V	/alue 📗 🗖	Enable Peripheral	Outputs				
- Modifu								
- moally	Modify V		I/U Display					
Strigger			۵	RUN				
Close				Help				

Fig. 86: Read out process data



Setting device parameters

The GSDML file for TBEN devices can be used to set the parameters for IO-Link devices.

General Addresses Parameters		
	Value	
Parameters Station parameter Deration mode Data storage mode Cycle time Excision Activate Quick Start-Up Process input data invalid Deactivate diagnostics Vendor ID Device parameter Device parameter Device parameter Device parameter Device parameter Offset correction [in digit] Programming lock Switching output mode Output 2 / Performance in the Output 2 / Switchpoint/ upper Output 2 / Release point/ lower	IO-Link with family compatible device deactivated, clear automatic V1.0 yes diagnostic generated notifications and warnings 317 131072 active Off 50 ms refresh time 'C 0 Off PNP Hysteresis function, normally open Off 18190 17184 0	

Fig. 87: Set device parameters

With the specific configuration, the IO-Link devices can be set specifically in addition to the parameters of the IO-Link master. When the application is started in the controller, the settings are transferred via PROFINET to the device.



In online mode, the process data of the connected device can be read out.

Ű	Mor	nitor/Modi	fy - 2IN -	(R-/S2)					х
Ο	nline v	via assigned	CPU serv	ices					
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Γ	Address Symbol Display format Status value Modify value								
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	୍ୱ	Trigger					A		
							×	MING	
	Clo	ose						Help	
	010								

Fig. 88: Read out process data



6.2.7 Commissioning with BL... and Siemens controller in the TIA Portal V13 SP1

Software used

- Siemens STEP 7 V13 Professional (TIA Portal) SP1 Update 5
- GSDML file for BL67-GW-EN

Hardware used



Information on the IO-Link master can be found in the instructions for use.

- Multiprotocol gateway BL67-GW-EN
- IO-Link master module BL67-4IOL with base module BL67-B-4M12
- Temperature sensor TS720-2UPN8-H1141, connected to IO-Link channel 1
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Siemens S7-300 controller, e.g., CPU 315-2PN/DP

Setup



Fig. 89: Application example — setup



Example: configure the device generically



NOTE The IO-Link master BL...-4IOL can only be configured generically. The connected devices must be configured separately.

• Configure the hardware in the TIA Portal.



Fig. 90: Configure hardware



Select the operating mode for the IO-Link ports.

Fig. 91: IO-Link ports — setting the operating mode

In online mode, the process values can be monitored if an IO-Link device is connected.

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2		%IW2	Hex	16#0100			
3		%IW4	Hex	16#0000			
4		%IW6	Hex	16#0000			
5		<hinzufügen></hinzufügen>					
1							

Fig. 92: Online mode — monitoring process values



6.2.8 Commissioning with TBEN and Siemens controller in the TIA Portal

Software used

- Siemens STEP 7 V13 Professional (TIA Portal) SP1 Update 5
- GSDML file for TBEN-S2-4IOL

Hardware used



NOTE

As an alternative to the IO-Link block module TBEN-S2-4IOL, the IO-Link block modules TBEN-L...-8IOL or FEN20-4IOL can be used.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- IO-Link master TBEN-S2-4IOL
- IODD for temperature sensor TS720-2UPN8-H1141
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Siemens S7-300 controller, e.g., CPU 315-2PN/DP

Setup



Fig. 93: Application example — setup



Example: configure the device specifically



NOTE The IO-Link master TBEN-S2-4IOL can be configured specifically. The connected devices can be configured via the control program.

• Configure the hardware in the TIA Portal.



Fig. 94: Configure hardware



Select the operating mode for the IO-Link ports.

Fig. 95: IO-Link ports — setting the operating mode



NOTE When a specific module is selected, the I/O addresses are automatically displayed.

• Select the IO-Link device for the desired port.

Via Stemens - Kaunmawiretuserbaegerenscreensnotsvor	LIS711av135p1_1500_16ENS2_410	L_V200/S7TiaV13Sp1_1500_TBENs2	2_4IOL_V200								-
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Card Reader/USB memory	General IO tags Sys	tem constants Texts								1	
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	Diagnostics addresses									1	
		Operation mode:								1	
		Cycle time:	automatic							1	
										1	
										1	
										1	
		Device parameter								1	
		IO-Link write protection:	Off	-							
		Display of measured value:	50 ms refresh time	-							
		Unit:	'C	-							
✓ Details view		Offset correction [in digit]:	0								
		Programming lock:	Off								
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Fig. 96: Select IO-Link device



1	1 1/ 10 91 90 2						
i	Name	Adresse	Anzeigeformat	Beobachtungswert	Steuerwert	9	Kommenta
1		%IW10	Hex	• 16#3214			
2		%IW2	Hex	16#0100			
3		%IW4	Hex	16#0000			
4		%IW6	Hex	16#0000			
5		<hinzufügen></hinzufügen>					

The process values can be monitored in online mode.

Fig. 97: Online mode — monitoring process values



6.2.9 Commissioning with TBEN-L...-8IOL and Siemens controller in TIA Portal V16

Software used

- Siemens STEP 7 V16 Professional (TIA Portal) Update 1
- GSDML file for TBEN-L...-8IOL

Hardware used



NOTE

As an alternative to the IO-Link block module TBEN-L...-8IOL, the IO-Link block modules TBEN-S2-4IOL can be used.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- IO-Link master TBEN-L...-8IOL
- TS720-2UPN8-H1141
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Siemens controller S7-1500, e.g., CPU 1513-1 PN

Setup



Fig. 98: Application example — setup



Example: configure the device generically



The number of input words and output words of the IO-Link device can be found in the data sheet, the IO-Link parameter manual, or the IODDfinder.

• Configure the hardware in the TIA Portal.

oject Edit View Insert Online Options Too	ols Window Help (* ± 🚮 🔃 🖬 🚆 🏹 Go onl	ine 🖉 Go offline 🔐 🖪 🖉 🛪	Search in project	N								Totall	y Integ	rated Automation PORT
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			^	, 11	Module	Rack	Slot	I address	Q address	s Type	Article no.	Firmware	Co	✓ Catalog
 S7V16_1500_Tben-L5-8IOL_IOLinkDevice_Profi 			-		▼ tbenl58iol	0	0			TBEN-L5-BIOL	6814017	SWV 1.7.17		<search> #1</search>
Add new device	60		-		PNHO	0	0 X1			turck-tben-I5-8iol				
d Devices & networks	ense				Basic_1	0	Basic	03	01	Basic				Pinter Colle
[] PLC_1 [CPU 1513-1 PN]					IN 1 WORD/OUT 1 WORD_1	0	IO-Lin	. 45	23	IN 1 WORD/OUT 1				Head module
Device configuration					DI_1	0	IO-Lin			DI				Module
S Online & diagnostics					TBIL-M1-16DXP_1	0	IO-Lin	. 67	45	TBIL-M1-16DXP				
 Program blocks 	_				DI_2	0	IO-Lin			DI				
 Lig Technology objects 		-			DI_3	0	IO-Lin			DI				
External source files					K50L2 IO-Link_1	0	IO-Lin		69	K50L2 IO-Link				
PLC tags					DI_4	0	IO-Lin			DI				
Log PLC data types			1		DI_5	0	IO-Lin			DI				
Watch and force tables					Diagnosen_1	0	Diagn.	827		Diagnostics				
Online backups					IO-Link Events_1	0	IO-Lin	. 2891		IO-Link Events				
Traces					VAUX Control_1	0	VAUX .		1011	VAUX control				
 Device proxy data 					Modulstatus_1	0	Modu	9293		Module status				
Program info														
PLC supervisions & alarms														
PLC alarm text lists														
Local modules														
Im Distributed I/O														
Ungrouped devices														
Security settings			~											
Cross-device functions	< II	> 100%	💌 <u></u>	<									>	
Common data	IN 1 WORD/OUT 1 WORD 1 [II	1 WORD/OUT 1 WORD]								70 Properties	1 Info D Di	agnostics		
Documentation settings										- roperties		agnostics		
Languages & resources	General IO tags Sy	stem constants Texts												
Zersion control interface	General	Medule parameters												
Card Reader/USB memory	Inputs Module parameters	Station parameter												
	I/O addresses													
		Operation mode:	IO-Link without validation											
		Data storage mode:	deactivated, clear			_							•	
		Cycle time:	automatic									1	•	
		Revision:	automatic										•	
		Activate Quick Start-Up:	no										•	
	-	Process input data invalid:	diagnostic generated										-	
		Deactivate diagnostics:	notifications and warnings										-	
2		Vendor ID:	0											
× Details view		Device ID:	0	_										
- Details New	-	Serve is.												

Fig. 99: Configure hardware



Select the operating mode for the IO-Link ports.

Fig. 100: IO-Link ports — setting the operating mode



Example: configure the device specifically



The IO-Link master TBEN-L...-8IOL can be configured specifically. The connected devices can be configured via the control program.

• Configure the hardware in the TIA Portal.



Fig. 101: Configure hardware

Select a specific device for the IO-Link ports.



Fig. 102: IO-Link ports — setting the operating mode





NOTE When a specific module is selected, the I/O addresses are automatically displayed. The grayed-out fields are preset for simplified configuration.

The process values can be monitored in online mode.

S 7	/V16_1	500_Tben-L5-8IO	L_IOLinkDevice_	ProfiNet_V1.0.0.	0 ▶ PLC_1 [CPU '	1513-1 PN] 🕨 Wa	tch and f	orce tables 🔸 Watch table_1				
₫	# # I I 7, 10 ₽ 1° °°											
-	i	Name	Address	Display format	Monitor value	Modify value	4	Comment				
1		"Tag_5"	%IW4	Hex	16#0013							
2			<add new=""></add>									

Fig. 103: Online mode — monitoring process values



6.2.10 Commissioning with TBEN and Allen-Bradley controller in Rockwell

When commissioning via EDS file, only the process data of the inputs and outputs can be viewed. Configuration via EDS file is not possible. The IO-Link master and IO-Link devices can be configured using the PACTware configuration tool and the web server.

Software used

- Studio 5000 Logix Designer Version 30.00.00 Mini Edition
- EDS file for TBEN-L...-8IOL

Hardware used



NOTE As an alternative to the IO-I i

As an alternative to the IO-Link block module TBEN-L...-8IOL, the IO-Link block modules TBEN-S2-4IOL can be used.



NOTE

Information on the IO-Link master can be found in the instructions for use.

- IO-Link master TBEN-L...-8IOL
- Pressure sensor PS510-16V-LI2UPN8
- Temperature transmitter TTM
- Laser distance sensor Q4X
- Sensor cable RKC4.4T-2-RSC4.4T/TXL
- Allen-Bradley controller, e.g. Compact GuardLogix 5370 Safety Controller

Setup



Fig. 104: Application example — setup



Incorporating the EDS file

- Studio Logix 5000 Designer \rightarrow Open the created project.
- Under Controller Organizer \rightarrow , click on Ethernet once.
- Under Tools \rightarrow , click on EDS Hardware Installation Tool.

Logix Designer - DEMO_RSV30_L30ERMS_TBEN_L5_8IOL_V001 [1769-L30ERMS 30.11]

File Edit View Search Logic Communications Tools Window Help Options... 8 🖬 🗃 🖨 - ※ �� 🖻 ち 🖙 Security Offline 🛛 🗸 🔲 RUN Safety C OK 1 No Forces Documentation Languages... Energy Storage a ∎ 1/0 No Edits D Import ٠ Safety Unlocked 0.0 Export Controller Organizer EDS Hardware Installation Tool Controller DEMO_RSV30_L30ERMS_TBEN_L5_8IOL Controller Tags Motion 🛅 Controller Fault Handler --- Power-Up Handler Plug-In Manager... 🖮 📥 Tasks 🖨 🖓 Main Task Custom Tools... 🗄 🕞 MainProgram ControlFLASH SafetyTask 🗄 💁 SafetyProgram Compare Tool Unscheduled - Motion Groups Ungrouped Axes Add-On Instructions 🚊 🖂 Data Types User-Defined Add-On-Defined 🗄 🚂 Predefined Module-Defined Trends Logical Model in the I/O Configuration - 1769 Bus 🖮 🚠 Ethernet 1769-L30ERMS DEMO_RSV30_L30ERMS_TBEN_L5_8IOL_VC

Fig. 105: Opening the EDS Hardware Installation Tool

⇒ The Rockwell Automation's EDS Wizard window opens.


- Click on Next \rightarrow Select Register EDS file(s).
- Click on Next.
- ▶ In the **Register a directory of EDS files** window, click on → **Browse...**.
- ► The **Find folder** window opens.
- Find and select an EDS file in the folder structure.
- Confirm the selection with **OK**.

Rockwell Automation's EDS Wizard		×
Registration Electronic Data Sheet file(s) will be added to your system for use in Rockwell Au	utomation applications.	
Register a single file Register a directory of EDS files In folder: Brow	vse	
Г	Ordner suchen	×
• If there is an icon file (ico) with the same name as the file(s) you are reg then this image will be associated with the device. To perfo		^
	PACTware DTM	>
	ОК	Abbrechen

Fig. 106: Find and select the EDS file

- Confirm the following windows with **Next**.
- Click on Finish.



Example: integrate the module generically via the EDS file

► Right-click on Ethe	rnet → odel uratio us 1769-	New Module on L30ERMS DEMO_	RSV30_L30ERMS_T	BEN_L5_8IOL
⊟	IJ	New Module		L5 BIOL VC
		Import Module. Discover Modul	 es	
	B	Paste	Ctrl+V	
		Properties	Alt+Enter	
		Print	•	

Fig. 107: Create a new module

⇒ The Select Module Type window opens.



• Under Module Type Vendors Filters \rightarrow , select TURCK.

Select the corresponding module (here: **TBEN-L5-8IOL**) by double-clicking.

Enter Search Text for Mo	dule Type Clear Filters]			
Module Type Cate Analog CIP Motion Convert Communication Communications Ac Controller	gory Filters ter dapter			*	Module Type Vendor R Reliance Electric SMC Corporation Sprecher+Schuh TURCK Zebra Technologies
Catalog Number	Description	Vendor	Category		
6814012	TBEN-I 4-16DXP	TURCK	Communications Adapter		
100002462	TBEN-L4-4RFID-8DXP	TURCK	Communications Adapter		
6814062	TBEN-L4-8DIN-8DON	TURCK	Communications Adapter		
6814010	TBEN-L4-8DIP-8DOP	TURCK	Communications Adapter		
6814082	TBEN-L4-8IOL	TURCK	Communications Adapter		
6814037	TBEN-L4-EN1	TURCK	Communications Adapter		
6814085	TBEN-L5-16DIP	TURCK	Communications Adapter		
6814087	TBEN-L5-16DOP	TURCK	Communications Adapter		
100000759	TBEN-L5-16DOP-01	TURCK	Communications Adapter		
6814088	TBEN-L5-16DXP	TURCK	Communications Adapter		
10000836	TBEN-L5-4RFID-8DXP	TURCK	Communications Adapter		
6814086	TBEN-L5-8DIP-8DOP	TURCK	Communications Adapter		
100000758	TBEN-L5-8DIP-8DOP-01	TURCK	Communications Adapter		
6814017	TBEN-L5-8IOL	TURCK	Communications Adapter		
6814035	TBEN-L5-EN1	TURCK	Communications Adapter		
100002463	TBEN-LL-4RFID-8DXP	TURCK	Communications Adapter		
6814021	TBEN-S1-4DIP-4DOP	TURCK	Communications Adapter		
6814020	TBEN-S1-8DIP	TURCK	Communications Adapter		
6814034	TBEN-S1-8DIP-D	TURCK	Communications Adapter		
6814022	TBEN-S1-8DOP	TURCK	Communications Adapter		
6814023	TBEN-S1-8DXP	TURCK	Communications Adapter		
6814031	TBEN-S2-2COM-4DXP	TURCK	Communications Adapter		
6814029	TBEN-S2-2RFID-4DXP	TURCK	Communications Adapter		
6814025	TBEN-S2-4AI	TURCK	Communications Adapter		

Close on Create

Fig. 108: Select a module

⇒ The New Module window opens.



 Set the New Module 	e and IP address (here	:: 192.168.1.30)			×
General* Conn Type: Vendor: Parent:	ection Module Info Internet 6814017 TBEN-L5-8IOL TURCK Local	Protocol Port Configu	ration		
Name: Description:	tben&iol	~	Ethemet Address O Private Network: IP Address: O Host Name:	192.168.1. + 192 . 168 . 1 . 3	D
Revision: Electronic K	2.007 eying: Compatible Module : Exclusive Owner	Change			
Status: Creating			ОК	Cancel	Help

Fig. 109: Set the name and IP address

- ► Click on Module Definition → Change
- ⇒ The **Module Definition*** window opens.



▶ Under Size, select INT (integer) from the drop-down menu.

Confirm	with	0V
Comm	WILLI	UR.

Type: Vendor:	Module Definit	tion*						×
Parent:	Revision:	2	~	007	+			
Name:	Electronic Keying:	Comp	atible Mod	lule		~		
Description:	Connections:	38				58		* *
	Name	- j		Size		Tag S	uffix	1 . 30
	Exclusive Owne	r	Input:	173	-INT ~	1	tben8iol:11	
Module Defir Revision: Electronic K	Select a connect	tion 🔽						
Connections					OK		Canad	_
l		_	Ch	ange	UK		Cancel Help	

Fig. 110: Select the data type

- Confirm the **Change module definition** window with **Yes**.
- Close the **New Module** window with **OK**.
- ⇒ The IO-Link master TBEN... appears under **Controller Organizer**.





- Click on the icon next to Offline.
- Click on **Go Online** in the context menu.





Click on Download.

onnect	ed To Go	Online							>
Options	General	Date/Time	Major Faults	Minor Faults	Project	Nonvola	atile Memory		
Conditi	on: The o	pen project d	loesn't match th	e project in the	controlle	r.			
Connec	ted Contra	oller:							
	Contra	oller Name:	Test_L5K_2RF	ID					
	Contr	oller Type:	1769-L30ERMS	6/A Compact G	iuardLogio	® 5370 \$	Safety		
	Comm	Path:	AB_ETHIP-1\1	92.168.1.22\C	ompactBu	is\0			
	Secu	Number:	No. Protection						
Offline	Project:	ny.	NO TIOLECTOIT						
Online	Contro	oller Name	DEMO RSV30	130ERMS T	BEN 15		01		
	Contr	oller Type:	1769-L30ERMS	Compact Gua	rdLogix®	5370 Saf	fety		
	File:		jekte\DEMO_	RSV30_L30E	RMS_TB	EN_L5_8	IOL_V001.AC	D	
	Serial	Number:	<none></none>						
	Secu	ity:	No Protection						
				i i i					1
					Downlo	ad	belect Hile	Cancel	Help

Fig. 112: Download window

₽ The **Download** window opens.



Click on **Download**.

Condition: The	Download offline pro	oject RMS_TBEN_L5_8IOL_V001' to the controller.	
Connected Con	Connected Controlle	er:	
Con	Name:	Test_L5K_2RFID	
Con	Type:	1769-L30ERMS/A Compact GuardLogix® 5370	
Con	Path:	AB_ETHIP-1\192.168.1.22\CompactBus\0	
Seri	Serial Number:	60ADB902	
Sec	Security:	No Protection	
Offline Project: Con Con	1 The controller is Remote Program	in Remote Run mode. The mode will be changed to prior to download.	0
File Seri Seq	DANGER: This construction of the synchronized construction of the synchronized construction of the synchronized of the synchronized of the synchronized construction of the synchronized constructi	ontroller is the system time master. Servo axes in ntrollers, in this chassis or other chassis, may be	
	DANGER: Unexp	ected hazardous motion of machinery may occur.	
	Some devices ma not loaded to the	aintain independent configuration settings that are e device during the download of the controller.	
	Verify these dev have been prope mode.	ices (drives, network devices, 3rd party products) erly loaded before placing the controller into run	
	Failure to load pr and unexpected	roper configuration could result in misaligned data equipment operation.	
	Download	Cancel Help	

- Fig. 113: Download configurations to the device
- ➡ The configurations are being downloaded to the device. When the download is complete, a query window opens.





Fig. 114: Download complete

The process data can be viewed under **Controller Tags**.

Controller Organizer 🗸 🕂 🗙	Controller Tags - DEMO_RSV30_L30ERMS_TBEN_L5_8	IOL_V001(controller)					
Controller DEMO RSV30_L30ERMS_TBEN_L5_8IOL_V001	Scope: DEMO_RSV30_ ~ Show: All Tags				✓ Y. Enter Name Filter		_
Controller Fault Handler	Name	TE 🗸 Value 🔶	Force Mask +	Style	Data Type	Class	T
Power-Up Handler	+ tben8iol:01	{}	{}		_0030:6814017_402E1D26	Standard	ſ
🖶 📹 Tasks	- tben8iol:11	{}	{}		_0030:6814017_D83206A7	Standard	i.
🚊 🚭 Main Task	- tben8iol:I1.Data	{}	{}	Decimal	INT[173]	Standard	ſ
👜 🕞 MainProgram	+ tben8iol:11.Data[0]	1	1	Decimal	INT	Standard	ſ.
E SafetyTask	+ tben8iol:I1.Data[1]	0		Decimal	INT	Standard	ſ
i 🛃 SafetyProgram	+ tben8iol:11.Data[2]	2#0000 0000 0100 0101		Binary	INT	Standard	ſ
Unscheduled	+ tben8iol:11.Data[3]	2#0010 0000 1011 0100		Binary	INT	Standard	t
E	+ tben8iol:I1.Data[4]	0		Decimal	INT	Standard	ſ.
Ungrouped Axes	+ tben8iol:11.Data[5]	0		Decimal	INT	Standard	t
Add-On Instructions	+ tben8iol:11.Data[6]	0		Decimal	INT	Standard	t
Data types	+ tben8iol:11.Data[7]	0		Decimal	INT	Standard	ſ.
Christer Delined	+ tben8iol:11.Data[8]	0		Decimal	INT	Standard	ſ.
Add-On-Defined	+ tben8iol:11.Data[9]	. 0		Decimal	INT	Standard	ſ.
Predefined	+ tben8iol:11.Data[10]	0		Decimal	INT	Standard	ſ.
Module-Defined	+ tben8iol:11.Data[11]	0		Decimal	INT	Standard	ſĽ.
Trends	+ tben8iol:11.Data[12]	0		Decimal	INT	Standard	ſ.
h. Logical Model	+ tben8iol:11.Data[13]	0		Decimal	INT	Standard	ſ.
= 🔄 I/O Configuration	+ tben8iol:11.Data[14]	0		Decimal	INT	Standard	t.
1769 Bus	+ tben8iol:11.Data[15]	0		Decimal	INT	Standard	ſĽ.
[0] 1769-L30ERMS DEMO_RSV30_L30ERMS_TBEN_L5_8IOL	+ tben8iol:11.Data[16]	0		Decimal	INT	Standard	ſ.
는움 Ethernet	+ tben8iol:11.Data[17]	0		Decimal	INT	Standard	ſ.
- T769-L30ERMS DEMO_RSV30_L30ERMS_TBEN_L5_8IOL_VC	+ tben8iol:11.Data[18]	0		Decimal	INT	Standard	ſ
6814017 tben8iol	+ tben8iol:11.Data[19]	2#0100 1111 0010 1010		Binary	INT	Standard	t
	+ tben8iol:11.Data[20]	0		Decimal	INT	Standard	ſ
	+ tben8iol:11.Data[21]	0		Decimal	INT	Standard	ſ.
	+ tben8iol:11.Data[22]	0		Decimal	INT	Standard	t
	+ tben8iol:11.Data[23]	0		Decimal	INT	Standard	t
	+ tben8iol:11.Data[24]	0		Decimal	INT	Standard	ſ.
	+ tben8iol:11.Data[25]	0		Decimal	INT	Standard	t
	+ tben8iol:11.Data[26]	0		Decimal	INT	Standard	ſ.
	+ tben8iol:11.Data[27]	0		Decimal	INT	Standard	Ť
	+ tben8iol:11.Data[28]	0		Decimal	INT	Standard	t
	A Nonitor Tags (Edit Tags /				INT	- incient -	Т
	I Cinomicor rays A contrags /						

Fig. 115: View process data



7 Setting

The following examples describe the setting of IO-Link devices during operation. The following scenarios are possible:

- Setting with programmable gateway from VN03-00 and CODESYS 3
- Setting with programmable gateway and CODESYS 2
- Setting with Siemens controller in Simatic Manager
- Setting with Siemens controller in the TIA Portal

7.1 Setting devices using the control program with the function block

IO-Link devices can be set and configured via the higher-level controller. An IO-Link function block is required for this purpose. The function block is provided by the controller manufacturer. Depending on the software version of the programming environment, the function and execution of the IO-Link function block may differ. To do this, observe the manufacturer's information on the programming environment and the IOL_CALL function block.

The IO-Link function block IOL_CALL is specified in the IO-Link specification "IO-Link Integration Part 1- Technical Specification for PROFIBUS and PROFINET".





NOTE

Depending on the controller manufacturer, the function blocks may deviate from the specification, e.g. in the representation and use of the variables used (example: Siemens function block IO_Link_Device for TIA Portal). For more information, refer to the documentation of the respective controller manufacturer.









Fig. 118: Function block IOL_CALL for CODESYS3

Function block IOL_CALL: input variables

The following description of the function block variables is partially taken from the IO-Link specification.

Name in accordance with IO-Link specification	Data type	Meaning
REQ	BOOL	$0 \rightarrow 1 \rightarrow 0$: Send command
ID	DWORD	 Address of the IO-Link master module Siemens CPU 300, 400 (PROFIBUS/PROFINET): Start address of the input data of the IO-Link master module 3 S CODESYS: Addressing the IO-Link master Siemens CPU 1200, 1500 (PROFIBUS/ PROFINET): Hardware identifier of the IO-Link master module Siemens CPU 300, 400 (PROFIBUS/PROFINET): Start address of the input data of the IO-Link master module
ITFMODULE	DWORD	Device name of the IO-Link master
INDEX_CAP	INT	Function block instance: 251254
RD_WR	BOOL	0: Write access 1: Write access
ENTITY_PORT	INT	Address of the IO-Link port to be accessed.
FI_INDEX	INT	Constant value (65098): Defines the access as IO-Link function block IOL_CALL
IOL_INDEX	INT	Number of the IO-Link index which has to be read or written
IOL_SUBINDEX	INT	Number of the IO-Link sub index has to be read or written
LEN	INT	Length of the data to be read or written
RECORD_IOL_DATA		Source or destination for the data to be read/written



Function block IOL_CALL: output variables

The following description of the function block variables is partially taken from the IO-Link specification.

Name in accordance with IO- Link specification	Data type	Meaning
DONE_VALID	BOOL	0: Command was not executed. 1: Command was executed.
BUSY	BOOL	0: Command is currently not executed. 1: Command is currently executed.
ERROR	BOOL	0: No error present 1: Error while reading or writing.
STATUS	DWORD	Communication error status: status of the acyclic communication [> 120]
IOL_STATUS	DWORD	IO-Link error message: Error in the communication between IO-Link master ad IO-Link device [> 121]
LEN	INT	Length of the read data

IOL_CALL – communication error status

The status of the acyclic communication contains 4 byte and is structured as follows:

Byte 3		Byte 2	Byte 1	Byte 0	
Manufacturer specific identifier (not always applicable)		0×80 Specifies the error as an error of acyclic communication.	Error code/ status code	Vendor specific identi- fier (not always applic- able)	
Status Code	Nam	ne	Meaning		
0xFF000000	TIM	EOUT	Internal error in the cor	mmunication with the	
0x00FFF00	INV	ALID_HANDLE	module		
0x00FFFE00	HAN BUF	NDLE_OUT_OF_ FERS	-		
0x00FFFD00	HAN UNA	NDLE_DESTINATION_ AVAILABLE			
0x00FFFC00	HAN	NDLE_UNKNOWN			
0x00FFFB00	HAN	NDLE_METHOD_			
	INV	ALID			
0xXX80A0XX	MAS	STER_READ_ERROR	Error while reading		
0xXX80A1XX	MAS	STER_WRITE_ERROR	Error while writing		
0xXX80A2XX	MAS FAIL	STER_MODULE_ LURE	Failure of the IO-Link m possible	aster, bus failure	
0xXX80A6XX	MAS	STER_NO_DATA	No data received		
0xXX80A7XX	MAS	STER_BUSY	IO-Link master busy		
0xXX80A9XX	MAS SUP	STER_FEATURE_NOT_ PORTED	Function not supported	d by IO-Link master.	
0xXX80AAXX	MAS UNA	STER_RESOURCE_ AVAILABLE	IO-Link master not available.		



Status Code	Name	Meaning
0xXX80B0XX	ACCESS_INVALID_INDEX	Index invalid, wrong INDEX_CAP used
0xXX80B1XX	ACCESS_WRITE_ LENGTH_ERROR	Length of data to be written can not be handled from the module, wrong module accessed.
0xXX80B2XX	ACCESS_INVALID_ DESTINATION	Wrong slot accessed
0xXX80B03XX	ACCESS_TYPE_CONFLICT	IOL_CALL invalid
0xXX80B5XX	ACCESS_INVALID_INDEX	Error in IOL_CALL sequence
0xXX80B6XX	ACCESS_DENIED	IOL-Link master module refuses the access.
0xXX80C2XX	RESOURCE_BUSY	The IO-Link master module is busy or is wait-
0xXX80C3XX	RESOURCE_UNAVAILABLE	ing for an answer of the connected IO-Link device.
0xXX8901XX	INPUT_LEN_TOO_SHORT	The index to be read contains more data than defined in the input variable "LEN".

IOL_CALL - IOL_STATUS

The IOL_STATUS consists of 2 byte Error Code (IOL_M Error_Codes, according to "IO-Link Integration Part 1- Technical Specification for PROFIBUS and PROFINET") and 2 byte Error Type (according to "IO-Link Interface and System").

Byte 3		Byte 2	Byte 1	Byte 0				
IOL_M-Error-Code			IOL-Error Type					
IOL_M Error Code	Desi spec	gnation acc. to ification	Meaning					
0x0000	No e	error	No error					
0x7000	IOL_	CALL Conflict	Unexpected write-request, read request ex- pected					
0x7001	Wro	ng IOL_CALL	Decoding error					
0x7002	Port	blocked	The accessed port is occupied by another task					
	rese	rved						
0x8000	Time	eout	Timeout, IOL master or IOL device port busy					
0x8001	Wro	ng index	Error: IOL index < 32767 or > 65535 selected					
0x8002	Wro	ng port address	Port address not available					
0x8003	Wro	ng port function	Port function not available					
	rese	rved						



IOL Error Type	Designation acc. to specification	Meaning
0x1000	COM_ERR	Communication error Possible source: the addressed port is para- meterized as digital input DI and is not in IO-Link mode
0x1100	I_SERVICE_TIMEOUT	Timeout in communication, device does not respond in time
0x5600	M_ISDU_CHECKSUM	Master reports checksum error, access to device not possible
0x5700	M_ISDU_ILLEGAL	Device can not respond to master request
0x8000	APP_DEV	Application error in the device
0x8011	IDX_NOTAVAIL	Index not available
0x8012	SUBIDX_NOTAVAIL	Sub-Index not available
0x8020	SERV_NOTAVAIL	The service is temporarily not available.
0x8021	SERV_NOTAVAIL_LOCCTRL	Service temporarily not available, device is busy (e. g. teaching or parameterization of the device via the master active)
0x8022	SERV_NOTAVAIL_DEVCTRL	Service temporarily not available, device is busy (e. g. teaching or parameterization of the device via DTM or PLC etc. active)
0x8023	IDX_NOT_WRITEABLE	Access denied, index cannot be written
0x8030	PAR_VALOUTOFRNG	Parameter value out of the valid range
0x8031	PAR_VALGTLIM	Parameter value above upper limit
0x8032	PAR_VALLTLIM	Parameter value value below the lower limit
0x8033	VAL_LENOVRRUN	Length of data to be written does not match
0x8034	VAL_LENUNDRUN	the length defined for this parameter
0x8035	FUNC_NOTAVAIL	Function not available in the device
0x8036	FUNC_UNAVAILTEMP	Function not available in the device
0x8040	PARA_SETINVALID	Invalid parameter: Parameters not consistent with other parameters in the device.
0x8041	PARA_SETINCONSIST	Inconsistent parameters
0x8082	APP_DEVNOTRDY	Application not ready, device busy
0x8100	UNSPECIFIC	Vendor specific, according to device docu-
0x81010x8FFF	VENDOR_SPECIFIC	mentation



7.1.1 Setting with programmable gateway and CODESYS 3

IO-Link devices can be set with a programmable gateway from VN03-00 and CODESYS. The IO-Link function block IOL_CALL is required for this purpose. The function block is contained in the library for programmable gateways BLxx_PG_PB.lib. The library is part of the target support package for BLxx-PG-EN and is available free of charge at www.turck.com.

For information on configuring the IO-Link master with CODESYS, refer to the device-specific instructions for use.

Software used

- CODESYS 3.5 SP8 Patch 1
- Example program for an application in CODESYS (available on request from Turck)

Hardware used

- Programmable gateway BL67-PG-EN (VN03.00)
- IO-Link master module BL67-4IOL with base module BL67-B-4M12
- Temperature sensor TS720-2UPN8-H1141 (connected to port 1 of the IO-Link master)



Fig. 119: Application example — setup

Example: read out product names

The required parameter values for configuring the IO-Link device can be found in the IODD-finder or in the device-specific IO-Link parameter manual.

Name	Index (dec.)	Index (hex.)	Sub- Index (dec.)	Sub- Index (hex.)	Subindex access supported	Access	Byte. Bit- offset	Bit Len- gth	Data Type	Value	Default	Description
Min Cycle Time	0	0x0	3	0x3	True	read	2.0	8	UInteger			
IO-Link Ver- sion ID	0	0x0	5	0x5	True	read	4.0	8	UInteger		17	
Vendor ID 1	0	0x0	8	0x8	True	read	7.0	8	UInteger			
Vendor ID 2	0	0x0	9	0x9	True	read	8.0	8	UInteger			
Device ID 1	0	0x0	10	0xA	True	read	9.0	8	UInteger			
Device ID 2	0	0x0	11	0xB	True	read	10.0	8	UInteger			
Device ID 3	0	0x0	12	0xC	True	read	11.0	8	UInteger			
Standard Command	2	0x2	0	0x0	True	write	0.0	8	UInteger	0159		System command
										128		Device Reset
										129		Application Reset
										130		Restore Fact- ory Settings
Parameter (write) Access Lock	12	0xC	1	0x1	False	read/ write	0.0	1	Boolean	false/ true		Device access locks
Data Storage Lock	12	0xC	2	0x2	False	read/ write	0.1	1	Boolean	false/ true		Device access locks
Local Para- meterization Lock	12	0xC	3	0x3	False	read/ write	0.2	1	Boolean	false/ true		Device access locks
Local User Interface Lock	12	0xC	4	0x4	False	read/ write	0.3	1	Boolean	false/ true		Device access locks
Vendor Name	16	0x10	0	0x0	True	read	0.0	512	String		Turck	Vendor name
Vendor Text	17	0x11	0	0x0	True	read	0.0	512	String		www. turck. com	Additional manufacturer information
Product Name	18	0x12	0	0x0	True	read	0.0	512	String			Manufac- turer's device designation
Product ID	19	0x13	0	0x0	True	read	0.0	512	String			Ident-No.
Product Text	20	0x14	0	0x0	True	read	0.0	512	String			Device category
Serial Number	21	0x15	0	0x0	True	read	0.0	128	String			Device serial number

Fig. 120: Excerpt from the parameter manual for temperature sensor TS720-...-H1141 (example: read out product names)



Θ

Information

Variable id	V_ProductName
Variable name	Product Name
Index	18
Description	Complete product name.
Default value	TS720-2UPN8-H1141
Data type	StringT
Access rights	ReadOnly
Fixed length	64
Encoding	UTF-8

Fig. 121: Excerpt from the IODDfinder for temperature sensor TS720-...-H1141 (example: product name)



Read out values (example: read out the product names of the temperature sensor): Control variables as follows:

Variable	Value	Meaning
RD_WR	0	Read access
SLOT	1	Position of the IO-Link master module in the BL67 station
INDEX_CAP	251	Function block instance
Entity_Port	1	The IO-Link device is connected to port 1.
IOL_INDEX	0x12	Index for display parameters
LEN	0x20	32 bytes are read out



Fig. 122: Entering input variables for read access



• Enable read access via a rising edge on IOL_REQ.

PLC_PRG X H BL67_410L		
Device.Application.PLC_PRG		
Expression Type	e Value	Prepared value A
9 00_CALL_0	LIO.IOL_CALL	—— Ï
Ø IOL_REQ BOOL	L TRUE	
w IOL_Indexcap INI	251	
I DL_RD_WR BOOL	FALSE	
♦ IOL_EntityPort USIN	Π 1	
♦ IOL_IOL_Index	18	
🔷 IOL_IOL_Subindex USIN	п 0	
INT INT	20	
IOL_Busy BOOL	FALSE	
IDL_Error BOOL	FALSE	
🚸 IOL_Status DWO	DRD 0	
IDL_IOL_Status DWO	DRD 0	
🖸 IOL_RD_Len INT	19	
😟 🆸 IOL_Record_IOL_Data 🛛 🗛	AY [0231] OF	
1 IOL CALL 0		
IOLC LID.IOL CALL		
IOL REQ TRUE xReq xDoneValid TRUE		
BL67_4IOL itfModule xBusy IOL_Busy FALSE		
IOL_IndexCap 251 IIndexCap xError IOL_Error FALSE		
IOL_RD_WR FAISE XRD_WR dwStatus IOL_Status 0		
IOL_EntityPort 1 usiEntityPort dwIOL_Status IOL_IOL_Status 0		
IOL_IOL_INdex 18 uiIOL_Index iRD_Len IOL_RD_Len 19		
IOL_IOL_Subindex 0 usiIOL_Subindex		
ADR(IOL_Record_IOL_Data)pbyRecord_IOL_Data		
IOL_Len 20 iLen		

Fig. 123: Enable read access

RET



The product name is displayed in the "READ" data array as a hexadecimal code.

			_	
sion			Туре	Value
IOL_Record_IOL_Data			ARRAY [0231]	OF
IOL_Record_IOL_Data[0]			BYTE	84
IOL_Record_IOL_Data[1]			BYTE	83
IOL_Record_IOL_Data[2]			BYTE	45
IOL_Record_IOL_Data[3]			BYTE	52
IOL_Record_IOL_Data[4]			BYTE	48
IOL_Record_IOL_Data[5]			BYTE	48
Ø IOL_Record_IOL_Data[6]			BYTE	45
IOL_Record_IOL_Data[7]			BYTE	50
IOL_Record_IOL_Data[8]			BYTE	85
IOL_Record_IOL_Data[9]			BYTE	80
IOL_Record_IOL_Data[10]			BYTE	78
IOL_Record_IOL_Data[11]			BYTE	56
IOL_Record_IOL_Data[12]			BYTE	88
IOL_Record_IOL_Data[13]			BYTE	45
IOL_Record_IOL_Data[14]			BYTE	72
IOL_Record_IOL_Data[15]			BYTE	49
IOL_Record_IOL_Data[16]			BYTE	49
IOL_Record_IOL_Data[17]			BYTE	52
IOL_Record_IOL_Data[18]			BYTE	49
IOL_RECORD_IOL_Data[19]			BYIE	U
IOL_Record_IOL_Data[20]			BYTE	0
IOL_Record_IOL_Data[21]			BYTE	0
1 IOL	CALL 0			
IOLC LIC	. IOL CALL	1		
IOL_REQ FALSE xReq	xDoneValid	FALSE		
BL67_4IOL — itfModule	xBusy	- IOL_Busy FALSE		
IOL_IndexCap 251 iIndexCap	xError	- IOL_Error FALSE		
IOL_RD_WR FALSE xRD_WR	dwStatus	-IOL_Status 0		
IOL_EntityPortusiEntityPort	dwIOL_Status	-IOL_IOL_Status	0	
IOL_IOL_Index 18 uiIOL_Index	iRD_Len	-IOL_RD_Len 19		
IOL_IOL_Subindex 0 usiIOL_Subindex				
ADR (IOL_Record_IOL_Data)pbyRecord_IOL_Da	ta			
IOL_Len 20 iLen				

Fig. 124: Process data array "READ"



Example: write values

The required parameter values of the IO-Link device can be found in the IODDfinder or in the device-specific IO-Link parameter manual.

Na	me	Index (dec.)	Index (hex.)	Sub- index (dec.)	Sub- index (hex.)	Subindex access supported	Access	Byte. Bit Offset	Bit length	Data Type	Value	Default	Description
Di me val	splay of easured lue	85	0x55	0	0x0	True	read/ write	0.0	8	Ulnteger	06	0	The refresh time can be adjusted. The display can be rotated by 180° or dis- abled. In dis- abled state, the measured value is dis- played tem- porarily when pressing the set button.
											0		50 ms refresh time
											1		200 ms refresh time
											2		600 ms refresh time
											3		50 ms refresh time/display rotated by 180°
											4		200 ms refresh time/display rotated by 180°
											5		600 ms refresh time/display rotated by 180°
					-						6		disabled

Fig. 125: Excerpt from the parameter manual for sensor TS720-...-H1141 (example: set the display)



Ø

Information

Variable id	V_DISPLAY_UPD
Variable name	Display of Measured Value
Index	85
Description	The refresh time can be adjusted or disabled. In disabled state, the measured value is displayed temporarily when pressing the set button.
Default value	200 ms Refresh Time
Data type	UIntegerT
Bit length	8 bit
Access rights	ReadWrite
Raw values	50 ms Refresh Time: 0 200 ms Refresh Time: 1 600 ms Refresh Time: 2 Disabled: 3

Fig. 126: Excerpt from the IODDfinder for sensor TS720-...-H1141 (example: measured value display)



Write values (example: rotate the display of temperature sensor TS720-...-H1141 180°, set the measurement update time to 200 ms): Control variables as follows:

Variable	Value	Meaning
RD_WR	1	Write access
SLOT	1	Position of the IO-Link master module in the BL67 station
INDEX_CAP	251	Function block instance
ENTITY_PORT	1	The IO-Link device is connected to port 1.
IOL_INDEX	0x55	Index for display parameters
LEN	1	1 byte is written



Fig. 127: Enter input variables for write access



- Enter a value of 5 in Array WRITE to rotate the display 180° and set the measured value update time to 200 ms.
- Enable write access via a rising edge on REQ.



Fig. 128: Enable write access



7.1.2 Setting with programmable gateway and CODESYS 2

IO-Link devices can be set with a programmable gateway up to version 2 and CODESYS. The IO-Link function block IOL_CALL is required for this purpose. The function block is contained in the library for programmable gateways BLxx_PG_PB.lib. The library is part of the target support package for BLxx-PG-EN and is available free of charge at www.turck.com.

For information on configuring the IO-Link master with CODESYS, refer to the device-specific instructions for use.

Software used

- CODESYS 2.3 with library BLxx_PG_PB.lib
- Example program for an application in CODESYS (available on request from Turck)

Hardware used

- Programmable gateway BL20-PG-EN
- IO-Link master Module BL20-E-4IOL
- Temperature sensor TS720-2UPN8-H1141 (connected to port 1 of the IO-Link master)
- IO-Link I/O hub TBIL-M1-16DIP (connected to port 4 of the IO-Link master)

Setup



Fig. 129: Application example — setup

Example: read out product names

The required parameter values for configuring the IO-Link device can be found in the IODD-finder or in the device-specific IO-Link parameter manual.

Name	Index (dec.)	Index (hex.)	Sub- index (dec.)	Sub- index (hex.)	Subindex access supported	Access	Byte. Bit- offset	Bit Len- gth	Data Type	Value	Default	Description
Min Cycle Time	0	0x0	3	0x3	True	read	2.0	8	UInteger			
IO-Link Ver- sion ID	0	0x0	5	0x5	True	read	4.0	8	UInteger		17	
Vendor ID 1	0	0x0	8	0x8	True	read	7.0	8	UInteger			
Vendor ID 2	0	0x0	9	0x9	True	read	8.0	8	UInteger			
Device ID 1	0	0x0	10	0xA	True	read	9.0	8	UInteger			
Device ID 2	0	0x0	11	0xB	True	read	10.0	8	UInteger			
Device ID 3	0	0x0	12	0xC	True	read	11.0	8	UInteger			
Standard Command	2	0x2	0	0x0	True	write	0.0	8	UInteger	0159		System command
										128		Device Reset
										129		Application Reset
										130		Restore Fact- ory Settings
Parameter (write) Access Lock	12	0xC	1	0x1	False	read/ write	0.0	1	Boolean	false/ true		Device access locks
Data Storage Lock	12	0xC	2	0x2	False	read/ write	0.1	1	Boolean	false/ true		Device access locks
Local Para- meterization Lock	12	0xC	3	0x3	False	read/ write	0.2	1	Boolean	false/ true		Device access locks
Local User Interface Lock	12	0xC	4	0x4	False	read/ write	0.3	1	Boolean	false/ true		Device access locks
Vendor Name	16	0x10	0	0x0	True	read	0.0	512	String		Turck	Vendor name
Vendor Text	17	0x11	0	0x0	True	read	0.0	512	String		www. turck. com	Additional manufacturer information
Product Name	18	0x12	0	0x0	True	read	0.0	512	String			Manufac- turer's device designation
Product ID	19	0x13	0	0x0	True	read	0.0	512	String			Ident-No.
Product Text	20	0x14	0	0x0	True	read	0.0	512	String			Device category
Serial Number	21	0x15	0	0x0	True	read	0.0	128	String			Device serial number

Fig. 130: Excerpt from the parameter manual for the IO-Link I/O hub TBIL-M1-16DIP (example: read out product names)



Θ

Information

Variable id	V_ProductName
Variable name	Product Name
Index	18
Description	Complete product name.
Default value	TS720-2UPN8-H1141
Data type	StringT
Access rights	ReadOnly
Fixed length	64
Encoding	UTF-8

Fig. 131: Excerpt from the IODDfinder for temperature sensor TS720-...-H1141 (example: product name)



Read out values (example: read out the product names of the IO-Link I/O hub): Control variables as follows:

Variable	Value	Meaning
RD_WR	0	Read access
SLOT	1	Position of the IO-Link master module in the BL67 station
INDEX_CAP	251	Function block instance
Entity_Port	4	The IO-Link device is connected to port 4.
IOL_INDEX	0x12	Index for display parameters
LEN	0x20	32 bytes are read out



Fig. 132: Entering input variables for read access



Enable read access via a rising edge on xREQ.

Fig. 133: Enable read access





The product name is displayed in the READ data array as a hexadecimal code.

Fig. 134: Process data array "READ"



Example: write values

The required parameter values of the IO-Link device can be found in the IODDfinder or in the device-specific IO-Link parameter manual.

Name	Index (dec.)	Index (hex.)	Sub- index (dec.)	Sub- index (hex.)	Subindex access supported	Access	Byte. Bit Offset	Bit length	Data Type	Value	Default	Description
Display of measured value	85	0x55	0	0x0	True	read/ write	0.0	8	Ulnteger	06	0	The refresh time can be adjusted. The display can be rotated by 180° or dis- abled. In dis- abled state, the measured value is dis- played tem- porarily when pressing the set button.
										0		50 ms refresh time
										1		200 ms refresh time
										2		600 ms refresh time
										3		50 ms refresh time/display rotated by 180°
										4		200 ms refresh time/display rotated by 180°
										5		600 ms refresh time/display rotated by 180°
										6		disabled

Fig. 135: Excerpt from the parameter manual for sensor TS720-...-H1141 (example: set the display)



Ø

Information

Variable id	V_DISPLAY_UPD
Variable name	Display of Measured Value
Index	85
Description	The refresh time can be adjusted or disabled. In disabled state, the measured value is displayed temporarily when pressing the set button.
Default value	200 ms Refresh Time
Data type	UIntegerT
Bit length	8 bit
Access rights	ReadWrite
Raw values	50 ms Refresh Time: 0 200 ms Refresh Time: 1 600 ms Refresh Time: 2 Disabled: 3

Fig. 136: Excerpt from the IODDfinder for sensor TS720-...-H1141 (example: measured value display)



Write values (example: rotate the display of temperature sensor TS720-...-H1141 180°, set the measurement update time to 200 ms): Control variables as follows:

Variable	Value	Meaning
RD_WR	1	Write access
SLOT	1	Position of the IO-Link master module in the BL67 station
INDEX_CAP	251	Function block instance
ENTITY_PORT	1	The IO-Link device is connected to port 1.
IOL_INDEX	0x55	Index for display parameters
LEN	1	1 byte is written



Fig. 137: Enter input variables for write access





- Enter a value of 5 in Array WRITE to rotate the display 180° and set the measured value update time to 200 ms.
- Enable write access via a rising edge on REQ.



Fig. 138: Enable write access



7.1.3 Setting with Siemens S7-1200 or S7-1500 Controller and TIA Portal

IO-Link devices can be set and configured via a Turck IO-Link master on a Siemens S7-1200 or S7-1500 controller and STEP7 V12 or STEP7 V13 TIA Portal. This requires the IO-Link function block IOL_DEVICE and the GSDML file of the IO-Link master. The function block is contained in the IO_Link_Library_v13_SP1 library. The library is available on the website of the controller manufacturer. The GSDML file is available for download at www.turck.com.

For information on configuring the IO-Link master with STEP7 V13 TIA Portal, refer to the device-specific instructions for use.

Software used

- Siemens STEP 7 V13 Professional (TIA Portal) SP1 Update 5
- GSDML file of the IO-Link master
- Example program (available on request from Turck)

Hardware used



NOTE

As an alternative to the IO-Link block module TBEN-S2-4IOL, the IO-Link block modules TBEN-L...-8IOL or FEN20-4IOL can be used.

- Siemens S7 controller, e.g. with CPU 1513-1-PN
- IO-Link master TBEN-S2-4IOL
- Temperature sensor TS720-2UPN8-H1141 (connected to port 1 of the IO-Link master)





Fig. 139: Application example — setup

Example: configuring the device

The required parameter values of the IO-Link device can be found in the IODDfinder or in the device-specific IO-Link parameter manual.

Name	Index (dec.)	Index (hex.)	Sub- index (dec.)	Sub- index (hex.)	Subindex access supported	Access	Byte. Bit Offset	Bit length	Data Type	Value	Default	Description
Display of measured value	85	0x55	0	0x0	True	read/ write	0.0	8	UInteger	06	0	The refresh time can be adjusted. The display can be rotated by 180° or dis- abled. In dis- abled state, the measured value is dis- played tem- porarily when pressing the set button.
										0		50 ms refresh time
										1		200 ms refresh time
										2		600 ms refresh time
										3		50 ms refresh time/display rotated by 180°
										4		200 ms refresh time/display rotated by 180°
										5		600 ms refresh time/display rotated by 180°
										6		disabled

Fig. 140: Excerpt from the parameter manual for sensor TS720-...-H1141 (example: set the display)


Ø

Information

Variable id	V_DISPLAY_UPD
Variable name	Display of Measured Value
Index	85
Description	The refresh time can be adjusted or disabled. In disabled state, the measured value is displayed temporarily when pressing the set button.
Default value	200 ms Refresh Time
Data type	UIntegerT
Bit length	8 bit
Access rights	ReadWrite
Raw values	50 ms Refresh Time: 0 200 ms Refresh Time: 1 600 ms Refresh Time: 2 Disabled: 3

Fig. 141: Excerpt from the IODDfinder for sensor TS720-...-H1141 (example: measured value display)



The sequences are visualized in the example program in the monitoring table "IOL1P1".

Read out values (example: read out the product names of the temperature sensor): Control variables as follows:

Variable	Value	Meaning
RD_WR	0	Read access
CAP	251	Function block instance
PORT	1	The temperature sensor is connected to port 1.
IOL_INDEX	18	Index for display parameters
LEN	32	32 bytes are read out

\$ 7	TiaV13Sp1_1500_TBENs2	_4IOL_V200 → PLC_	1 [CPU 1513-1 PN	N] 🕨 Watch and	force tables 🔸	Beobachtungstal	pelle_IOL_	_1P1	_ 🖬 🖬 🗙
10	9 🔮 😼 🔓 👂 🕫 🌮	©0n ⊳ 1							
	i Name		Address	Display format	Monitor value	Modify value	9	Comment	
1	// IO-Link Master 1 - Port 1 - Pro	cess input data status bi	ts of status byte m+	0 and m+2:					^
2	"IOL_1_PROCESS_DAT	A".IN_STATUS_DI1	%DB10.DBX0.0	Bool	FALSE				
з	"IOL_1_PROCESS_DAT	A".IN_STATUS_DXP2	%DB10.DBX0.1	Bool	FALSE				
4	"IOL_1_PROCESS_DAT	A".IN_STATUS_DVS1	%DB10.DBX2.0	Bool	FALSE				
5	"IOL_1_PROCESS_DAT	A".IN_DIAG_ERR_DXP2	%DB10.DBX132.1	Bool	FALSE				
6									
7	// IO-Link Master 1 - Port 1 - Pro	cess output control bit of	f control byte n+0:						=
8	"IOL_1_PROCESS_DAT	A".OUT_CONTROL_DXP2	%DB10.DBX172.1	Bool	FALSE				=
9									
10	// IO-Link Master 1 - Port 1 - Pro	cess input data of byte m	n+2 and m+3:						
11	"Tag_5"		%IW4	DEC	0				
12	"IOL_1_PROCESS_DAT	A".IN_PROCESSDATA_P1	%DB10.DBW148	DEC	0				
13									
14	// IO-Link Master 1 - Port 1 - Pro	cess output data of byte	n+2 and n+3:						
15	"Tag_7"		%QW4	Hex	16#0000				
16	"IOL_1_PROCESS_DAT	A".OUT_PROCESSDATA	%DB10.DBW304	Hex	16#0000				
17									
18	// IO-Link Master 1 - Port 1 - IO-I	Link Call configuration:							
19	"IOL_1P1_PARA_DATA"	.ID	%DB1.DBW2	DEC	266				
20	"IOL_1P1_PARA_DATA"	.INDEX_CAP	%DB1.DBW4	DEC	251				
21	"IOL_1P1_PARA_DATA"	.ENTITY_PORT	%DB1.DBW8	DEC	1				
22									
23	// IO-Link Master 1 - Port 1 - IO-	Link Call parameter data	set:				_		
24	"IOL_1P1_PARA_DATA"	.REQ	%DB1.DBX0.0	Bool	FALSE	FALSE		L.	
25	"IOL_1P1_PARA_DATA"	.RD_WR	%DB1.DBX6.0	Bool	FALSE				
26	"IOL_1P1_PARA_DATA"	.IOL_INDEX	%DB1.DBW10	DEC	0	18		L	
27	"IOL_1P1_PARA_DATA"	.IOL_SUBINDEX	%DB1.DBW12	DEC	0				
28	"IOL_1P1_PARA_DATA"	.LEN	%DB1.DBW246	DEC	0	32		L	
29									
30	// IO-Link Master 1 - Port 1 - IO-	Link Call parameter data	feedback:			_	_		
31	"IOL_1P1_PARA_DATA"	.DONE_VALID	%DB1.DBX248.0	Bool	FALSE				
32	"IOL_1P1_PARA_DATA"	.BUSY	%DB1.DBX248.1	Bool	FALSE				
33	"IOL_1P1_PARA_DATA"	.ERROR	%DB1.DBX248.2	Bool	FALSE				
34	"IOL_1P1_PARA_DATA"	.STATUS	%DB1.DBD250	Hex	16#0000_0000				
35	"IOL_1P1_PARA_DATA"	.IOL_STATUS	%DB1.DBD254	Hex	16#0000_0000				
36	"IOL_1P1_PARA_DATA"	.RD_LEN	%DB1.DBW258	DEC	0				
37									~

Fig. 142: Entering input variables for read access



• Enable read access via a rising edge on **REQ**.

The read data is displayed in the **Observational value** column.

67Tia	V13Sp1_1500_TBENs2_4IOL_V200 →	PLC_1 [CPU 1513-1 P	N] > Beobachtu	Ings- und Forcetal	oellen ▶ Beoba	chtungsta	belle_IOL_1P
¥ .	₩ 🗤 🗓 71 % % % 🕞 1	Address	Display format	Monitor value	Modify value	4	Comment
3 // 10	O-Link Master 1 - Port 1 - 10-Link Call paramete	r data set:	Display format	Wontor value	would value	/	connient
4	"IOL 1P1 PAPA DATA" DEO	NDR1 DRV0.0	BOOL	FALSE	FALSE		
		%DB1 DBX6.0	BOOL		FALSE		
6		%DB1 DBM10	DEZ	18	18		
7		%DB1 DBW10	DEZ	0	0		
2 8		%DB1 DBW246	DEZ	222	232		
9		/6001.00W240	002	232	232		•
- D // 10	O-Link Master 1 - Port 1 - IO-Link Call paramete	rdata feedback:					
1	"IOL 1P1 PARA DATA".DONE VALID	%DB1.DBX248.0	BOOL	FALSE			
2	"IOL 1P1 PARA DATA".BUSY	%DB1.DBX248.1	BOOL	FALSE		ň	
3	"IOL 1P1 PARA DATA".ERROR	%DB1.DBX248.2	BOOL	FALSE		ā	
4	"IOL 1P1 PARA DATA".STATUS	%DB1.DBD250	Hex	16#0000 0000		Ā	
5	"IOL_1P1_PARA_DATA".IOL_STATUS	%DB1.DBD254	Hex	16#0001_0000		ă	
6	"IOL_1P1_PARA_DATA".RD_LEN	%DB1.DBW258	DEZ	0		- C	
7						ă	
8 // 10	O-Link Master 1 - Port 1 - IO-Link Call Read/Write	e data:					
9	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[0] %DB1.DBB14	Zeichen	'T'	'\$00'		N
0	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[1] %DB1.DBB15	Zeichen	'S'	'\$00'		Ň
1	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA	A[2] %DB1.DBB16	Zeichen	9		ā	-
2	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA	A[3] %DB1.DBB17	Zeichen	'7'		ā	
3	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA	A[4] %DB1.DBB18	Zeichen	'2'			
4	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[5] %DB1.DBB19	Zeichen	'0'			
5	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[6] %DB1.DBB20	Zeichen	9			
6	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA	A[7] %DB1.DBB21	Zeichen	'2'			
7	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[8] %DB1.DBB22	Zeichen	'U'			
8	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[9] %DB1.DBB23	Zeichen	'P'			
9	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[10] %DB1.DBB24	Zeichen	'N'			
0	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[11] %DB1.DBB25	Zeichen	'8'			
1	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[12] %DB1.DBB26	Zeichen	'X'			
2	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[13] %DB1.DBB27	Zeichen	2			
3	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[14] %DB1.DBB28	Zeichen	'H'			
4	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A 🔳 %DB1.DBB29	Zeichen	✓ '1'			
5	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[16] %DB1.DBB30	Zeichen	'1'			
5	"IOL_1P1_PARA_DATA".RECORD_IOL_DAT/	A[17] %DB1.DBB31	Zeichen	'4'			
7	"IOL 1P1 PARA DATA".RECORD IOL DATA	A[18] %DB1.DBB32	Zeichen	'1'			

Fig. 143: Data read in the Observational value column



Write values (example: rotate the display of temperature sensor TS720-...-H1141 180°, set the measurement update time to 50 ms): Control variables as follows:

Variable	Value	Meaning
RD_WR	1	Write access
CAP	251	Function block instance
PORT	1	The IO-Link device is connected to port 1.
IOL_INDEX	85	Index for display parameters
LEN	1	1 byte is written

S7TiaV13Sp1_1500_TBENs2_4IOL_V200 > PLC_1 [CPU 1513-1 PN] > Beobachtungs- und Forcetabellen > Beobachtungstabelle_IOL_1P1

1	🤹 🐓 🎚 🥕 🐔 🌮 🖤 🖤						
	i Name	Address	Display format	Monitor value	Modify value	4	Comment
23	// IO-Link Master 1 - Port 1 - IO-Link Call parameter data	set:					
24	"IOL_1P1_PARA_DATA".REQ	%DB1.DBX0.0	BOOL	FALSE	FALSE	🗹 🔼	
25	"IOL_1P1_PARA_DATA".RD_WR	%DB1.DBX6.0	BOOL	TRUE	TRUE	🗹 🔺	
26	"IOL_1P1_PARA_DATA".IOL_INDEX	%DB1.DBW10	DEZ	85	85	🗹 🔺	
27	"IOL_1P1_PARA_DATA".IOL_SUBINDEX	%DB1.DBW12	DEZ	0	0	🗹 🔼	
28	"IOL_1P1_PARA_DATA".LEN	%DB1.DBW246	DEZ	1	1	🗹 🔼	
29							
30	// IO-Link Master 1 - Port 1 - IO-Link Call parameter data	feedback:					
31	"IOL_1P1_PARA_DATA".DONE_VALID	%DB1.DBX248.0	BOOL	FALSE			
32	"IOL_1P1_PARA_DATA".BUSY	%DB1.DBX248.1	BOOL	FALSE			
33	"IOL_1P1_PARA_DATA".ERROR	%DB1.DBX248.2	BOOL	FALSE			
34	"IOL_1P1_PARA_DATA".STATUS	%DB1.DBD250	Hex	16#0000_0000			
35	"IOL_1P1_PARA_DATA".IOL_STATUS	%DB1.DBD254	Hex	16#0001_0000			
36	"IOL_1P1_PARA_DATA".RD_LEN	%DB1.DBW258	DEZ	0			
37							
38	// IO-Link Master 1 - Port 1 - IO-Link Call Read/Write data:						
39	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA 🔳	%DB1.DBB14	DEZ 💽	• 3	3	🗹 🔺	
40	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[1]	%DB1.DBB15	DEZ	0	0		
41	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[2]	%DB1.DBB16	DEZ	0	0		
42	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[3]	%DB1.DBB17	DEZ	0	0		
43	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[4]	%DB1.DBB18	DEZ	0	0		
44	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[5]	%DB1.DBB19	DEZ	0	0		
45	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[6]	%DB1.DBB20	DEZ	0	0		
46	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[7]	%DB1.DBB21	DEZ	0	0		
47	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[8]	%DB1.DBB22	DEZ	0	0		
48	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[9]	%DB1.DBB23	DEZ	0	0		
49	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[10]	%DB1.DBB24	DEZ	0	0		
50	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[11]	%DB1.DBB25	DEZ	0	0		
51	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[12]	%DB1.DBB26	DEZ	0	0		
52	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[13]	%DB1.DBB27	DEZ	0	0		
53	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[14]	%DB1.DBB28	DEZ	0	0		
54	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[15]	%DB1.DBB29	DEZ	0	0		
55	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[16]	%DB1.DBB30	DEZ	0	0		
56	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[17]	%DB1.DBB31	DEZ	0	0		
57	"IOL_1P1_PARA_DATA".RECORD_IOL_DATA[18]	%DB1.DBB32	DEZ	0	0		

Fig. 144: Enter input variables for write access



7.1.4 Setting with Siemens S7-300/400 and STEP7 V5.5 Controllers

IO-Link devices can be set and configured via a Turck IO-Link master on a Siemens S7-300/400 and STEP7 V5.5 controller. This requires the IO-Link function block IOL_CALL and the GSDML file of the IO-Link master. The function block is available from the controller manufacturer. The GSDML file is available for download at www.turck.com.

For information on configuring the IO-Link master with STEP7 V5.5, refer to the device-specific instructions for use.

Software used

- Siemens STEP7 V5.5 (Simatic Manager)
- GSDML file for BL67-GW-EN
- Example program (available on request from Turck)

Hardware used

- Multiprotocol gateway BL67-GW-EN (VN03-00)
- Base module BL67-B-4M12 with IO-Link master module BL67-4IOL
- TS720-2UPN8-H1141
- Siemens S7 controller, e.g. CPU 315-2 PN/DP



Fig. 145: Application example — setup

Example: configuring the device

The required parameter values of the IO-Link device can be found in the IODDfinder or in the device-specific IO-Link parameter manual.

Name	Index (dec.)	Index (hex.)	Sub- index (dec.)	Sub- index (hex.)	Subindex access supported	Access	Byte. Bit Offset	Bit length	Data Type	Value	Default	Description
Display of measured value	85	0x55	0	0x0	True	read/ write	0.0	8	Ulnteger	06	0	The refresh time can be adjusted. The display can be rotated by 180° or dis- abled. In dis- abled. In dis- abled state, the measured value is dis- played tem- porarily when pressing the set button.
										0		50 ms refresh time
										1		200 ms refresh time
										2		600 ms refresh time
										3		50 ms refresh time/display rotated by 180°
										4		200 ms refresh time/display rotated by 180°
										5		600 ms refresh time/display rotated by 180°
										6		disabled

Fig. 146: Excerpt from the parameter manual for sensor TS720-...-H1141 (example: set the display)



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Information

Variable id	V_DISPLAY_UPD
Variable name	Display of Measured Value
Index	85
Description	The refresh time can be adjusted or disabled. In disabled state, the measured value is displayed temporarily when pressing the set button.
Default value	200 ms Refresh Time
Data type	UIntegerT
Bit length	8 bit
Access rights	ReadWrite
Raw values	50 ms Refresh Time: 0 200 ms Refresh Time: 1 600 ms Refresh Time: 2 Disabled: 3

Fig. 147: Excerpt from the IODDfinder for sensor TS720-...-H1141 (example: measured value display)

Name	Index (dec.)	Index (hex.)	Sub- Index (dec.)	Sub- Index (hex.)	Subindex access supported	Access	Byte. Bit- offset	Bit Len- gth	Data Type	Value	Default	Description
Min Cycle Time	0	0x0	3	0x3	True	read	2.0	8	UInteger			
IO-Link Ver- sion ID	0	0x0	5	0x5	True	read	4.0	8	UInteger		17	
Vendor ID 1	0	0x0	8	0x8	True	read	7.0	8	UInteger			
Vendor ID 2	0	0x0	9	0x9	True	read	8.0	8	UInteger			
Device ID 1	0	0x0	10	0xA	True	read	9.0	8	UInteger			
Device ID 2	0	0x0	11	0xB	True	read	10.0	8	UInteger			
Device ID 3	0	0x0	12	0xC	True	read	11.0	8	UInteger			
Standard Command	2	0x2	0	0x0	True	write	0.0	8	UInteger	0159		System command
										128		Device Reset
										129		Application Reset
										130		Restore Fact- ory Settings
Parameter	12	0xC	1	0x1	False	read/	0.0	1	Boolean	false/		Device access
(write) Access Lock						write				true	_	locks
Data Storage Lock	12	0xC	2	0x2	False	read/ write	0.1	1	Boolean	false/ true		Device access locks
Local Para- meterization Lock	12	0xC	3	0x3	False	read/ write	0.2	1	Boolean	false/ true		Device access locks
Local User Interface Lock	12	0xC	4	0x4	False	read/ write	0.3	1	Boolean	false/ true		Device access locks
Vendor Name	16	0x10	0	0x0	True	read	0.0	512	String		Turck	Vendor name
Vendor Text	17	0x11	0	0x0	True	read	0.0	512	String		www. turck. com	Additional manufacturer information
Product Name	18	0x12	0	0x0	True	read	0.0	512	String			Manufac- turer's device designation
Product ID	19	0x13	0	0x0	True	read	0.0	512	String			Ident-No.
Product Text	20	0x14	0	0x0	True	read	0.0	512	String			Device category
Serial Number	21	0x15	0	0x0	True	read	0.0	128	String			Device serial number

Fig. 148: Excerpt from the parameter manual for the IO-Link I/O hub TBIL-M1-16DIP (example: set the display)

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Information

Variable id	V_ProductName
Variable name	Product Name
Index	18
Description	Complete product name.
Default value	TS720-2UPN8-H1141
Data type	StringT
Access rights	ReadOnly
Fixed length	64
Encoding	UTF-8

Fig. 149: Excerpt from the IODDfinder for temperature sensor TS720-...-H1141 (example: product name)



The processes are visualized in the HMI variable table in the example program. The process data is shown in the variable tables **Sensor1** and **Sensor2**.

Read out values (example: read out the product names of the IO-Link I/O hub):

• Control variables as follows:

Variable	Value	Meaning
RD_WR	0	Read access
ID	30	Start address of the output data of the module accord- ing to the hardware configuration
INDEX_CAP	251	Function block instance
ENTITY_PORT	4	The IO-Link I/O hub is connected to port 4.
IOL_INDEX	0x12	Index for display parameters
LEN	32	32 bytes are read out

1	👪 Var - [HMI @BLxx-4IOL\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(3) ONLINE]										
	👪 Table Edit Insert PLC Variable View Options Window Help										
	1	Address		Symbol	Display forma	Status value	Modify value	•			
1		// sensor 1:									
2		ED 30			HEX	DW#16#9001F3A9	// process data raw				
3		AB 30			HEX	B#16#FF	B#16#FF				
4		DB249.DBX 6	5.1	"State sensor 1".RD_WR	BOOL	false	// 0=read. 1=write parameter	=			
5		DB249.DBX 6	5.2	"State sensor 1".REQ	BOOL	true	// 0->1 start call	_			
6		DB249.DBX 6	5.3	"State sensor 1".DONE_VALID	BOOL	false					
7		DB249.DBX 6	5.4	"State sensor 1".BUSY	BOOL	false					
8		DB249.DBX 6	6.5	"State sensor 1".ERROR	BOOL	false					
9		// IOL Call parar	mert	ter for sensor 1:							
10		DB249.DBD 8	3	"State sensor 1".ID	DEC	L#30	L#30				
11		DB249.DBW 1	12	"State sensor 1".CAP	DEC	251	251				
12		DB249.DBW 1	4	"State sensor 1".PORT	DEC	4	4				
13		DB249.DBW 1	6	"State sensor 1".IOL_INDEX	HEX	W#16#0012	W#16#0012				
14		DB249.DBW 1	8	"State sensor 1".IOL_SUBINDEX	DEC	0	0				
15		DB249.DBW 2	20	"State sensor 1".LEN	DEC	0	0				
16		DB249.DBW 3	30	"State sensor 1".LEN_READ_MAX	DEC	232	232				
17		DB249.DBD 22	2	"State sensor 1".STATUS	HEX	DW#16#00000000					
18		DB249.DBD 20	6	"State sensor 1".IOL_STATUS	HEX	DW#16#00000000					
19		DB249.DBW 3	32	"State sensor 1".RD_LEN	DEC	1					
20		// sensor 2:						-			
BL	x-4]	OL\SIMATIC 30	00(1	l)\\S7-Programm(3)		• R	UN Abs < 5.2	11.			

Fig. 150: Entering input variables for read access



• Enable read access via a rising edge on **REQ**.

🔐 .Var - [HMI @BLxx-4IOL\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(3) ONLINE]							
	📓 Iable Edit Insert PLC Variable View Options Window Help						
-12	1	D 🛩 🖬 🧧		Ē	<u></u>	/ker	
	1	Address	Symbol	Display forma	Status value	Modify value	
1		// sensor 1:					
2		ED 30		HEX	DW#16#9001F3A9	// process data raw	
3		AB 30		HEX	B#16#FF	B#16#FF	
4		DB249.DBX 6.1	"State sensor 1".RD_WR	BOOL	false	// 0=read. 1=write parameter	=
5		DB249.DBX 6.2	"State sensor 1".REQ	BOOL	true	// 0->1 start call	=
6		DB249.DBX 6.3	"State sensor 1".DONE_VALID	BOOL	true		
7		DB249.DBX 6.4	"State sensor 1".BUSY	BOOL	false		
8		DB249.DBX 6.5	"State sensor 1".ERROR	BOOL	false		
9		// IOL Call paramer	ter for sensor 1:				
10		DB249.DBD 8	"State sensor 1".ID	DEC	L#30	L#30	
11		DB249.DBW 12	"State sensor 1".CAP	DEC	251	251	
12		DB249.DBW 14	"State sensor 1".PORT	DEC	4	4	
13		DB249.DBW 16	"State sensor 1".IOL_INDEX	HEX	W#16#0012	W#16#0012	
14		DB249.DBW 18	"State sensor 1".IOL_SUBINDEX	DEC	0	0	
15		DB249.DBW 20	"State sensor 1".LEN	DEC	32	32	
16		DB249.DBW 30	"State sensor 1".LEN_READ_MAX	DEC	232	232	
17		DB249.DBD 22	"State sensor 1".STATUS	HEX	DW#16#00000000		
18		DB249.DBD 26	"State sensor 1".IOL_STATUS	HEX	DW#16#0000000		
19		DB249.DBW 32	"State sensor 1".RD_LEN	DEC	1		
20		// sensor 2:					-
BLx	x-4]	IOL\SIMATIC 300(1)\\S7-Programm(3)		🔶 R	UN Abs < 5.2	11.

Fig. 151: Enable read access

The read data is displayed in the process data table **Sensor1**.

🕍 .Var - [Sensor 1 @BLxx-4IOL\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(3) ONLINE]						- • •	
	ΙI	able <u>E</u> dit	Insert PLC Variable View Options Window Help				_ 8 ×
P	1	0 🖻 日		9 er	47 66 M	lkar	
	1	Address	Symbol	Display format	Status value	Modify value	•
1		DB1.DBB 0	"A1".Container_A1[1]	CHARACTER	· ·	B#16#00	
2		DB1.DBB 1	"A1".Container_A1[2]	CHARACTER	'B'	B#16#00	
3		DB1.DBB 2	"A1".Container_A1[3]	CHARACTER	T	B#16#00	
4		DB1.DBB 3	"A1".Container_A1[4]	CHARACTER	Ľ	B#16#00	=
5		DB1.DBB 4	"A1".Container_A1[5]	CHARACTER	2	B#16#00	
6		DB1.DBB 5	"A1".Container_A1[6]	CHARACTER	'M'	B#16#00	
7		DB1.DBB 6	"A1".Container_A1[7]	CHARACTER	'1'	B#16#00	
8		DB1.DBB 7	"A1".Container_A1[8]	CHARACTER	2	B#16#00	
9		DB1.DBB 8	"A1".Container_A1[9]	CHARACTER	'1'	B#16#00	
10		DB1.DBB 9	"A1".Container_A1[10]	CHARACTER	'6'		
11		DB1.DBB 10	A1".Container_A1[11]	CHARACTER	'D'		
12		DB1.DBB 11	"A1".Container_A1[12]	CHARACTER	Т		
13		DB1.DBB 12	2 "A1".Container_A1[13]	CHARACTER	'P'		
14		DB1.DBB 13	A1".Container_A1[14]	CHARACTER	2		
15		DB1.DBB 14	A1".Container_A1[15]	CHARACTER	'Η'		
16		DB1.DBB 15	i "A1".Container_A1[16]	CHARACTER	'1'		
17		DB1.DBB 10	a "A1".Container_A1[17]	CHARACTER	'1'		
18		DB1.DBB 17	/ "A1".Container_A1[18]	CHARACTER	'4'		
19		DB1.DBB 18	A1".Container_A1[19]	CHARACTER	'1'	B#16#00	
20 DB1.DBB 19 "A1".Container_A1[20] CHARACTER B#16#00						-	
BL	x-4	IOL\SIMATIC	300(1)\\S7-Programm(3)		🔶 R	UN	Abs < 5.2

Fig. 152: Data read in the Sensor1 variable table



Write values (example: rotate the display of temperature sensor TS720-...-H1141 180°, set the measurement update time to 200 ms): Control variables as follows:

Variable	Value	Meaning
RD_WR	1	Write access
ID	1	Position of the IO-Link master module in the BL67 sta- tion
INDEX_CAP	251	Function block instance
ENTITY_PORT	1	The IO-Link device is connected to port 1.
IOL_INDEX	0x55	Index for display parameters
LEN	1	1 byte is written

👪 .Var - [HMI @BLxx-4IOL\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(3) ONLINE]							
	📓 Iable Edit Insert PLC Variable View Options Window Help						
÷	1		3 & BR 🗠 🗠 🗙 🖁 🕅	2	20 60 M 100 M	lla	
	^	Address	Symbol	Display format	Status value	Modify value	^
1		// sensor 1:					
2		ED 30		HEX	DW#16#9001F3AD	// process data raw	
3		AB 30		HEX	B#16#FF	B#16#FF	
4		DB249.DBX 6.1	"State sensor 1".RD_WR	BOOL	true	// 0=read. 1=write parameter	=
5		DB249.DBX 6.2	"State sensor 1".REQ	BOOL	false	// 0->1 start call	
6		DB249.DBX 6.3	"State sensor 1".DONE_VALID	BOOL	true		
7		DB249.DBX 6.4	"State sensor 1".BUSY	BOOL	false		
8		DB249.DBX 6.5	"State sensor 1".ERROR	BOOL	false		
9		// IOL Call param	erter for sensor 1:				
10		DB249.DBD 8	"State sensor 1".ID	DEZ	L#30	L#30	
11		DB249.DBW 12	"State sensor 1".CAP	DEZ	251	251	
12		DB249.DBW 14	"State sensor 1".PORT	DEZ	1	1	
13		DB249.DBW 16	"State sensor 1".IOL_INDEX	HEX	W#16#0055	W#16#0055	
14		DB249.DBW 18	"State sensor 1".IOL_SUBINDEX	DEZ	0		
15		DB249.DBW 20	"State sensor 1".LEN	DEZ	1	1	
16		DB249.DBW 30	"State sensor 1".LEN_READ_MAX	DEZ	0		
17		DB249.DBD 22	"State sensor 1".STATUS	HEX	DW#16#00000000		
18		DB249.DBD 26	"State sensor 1".IOL_STATUS	HEX	DW#16#00000000		
19		DB249.DBW 32	"State sensor 1".RD_LEN	DEZ	0		
20		// sensor 2:					-
BL	x-4	IOL\SIMATIC 300	(1)\\S7-Programm(3)		🔶 R	UN Abs < 5.2	11.

Fig. 153: Enter input variables for write access



• Enter the value **5** to be written in the variable table under **Control value** to rotate the display by 180° and set the measured value update time to 200 ms.

	.Va	r - [Sensor	1	@BLxx-4IOL\SIMATIC 300(1)\CPU	315-2 PN/DP\S7	-Programm(3)	ONLINE]		- • ×	
No.	Ī	able <u>E</u> dit	Ī	nsert P <u>L</u> C V <u>a</u> riable <u>V</u> iew <u>O</u> pt	tions <u>W</u> indow	<u>H</u> elp			_ 8 ×	
-0	1	0 🖻			° <u>.</u> 2 k?		Sy 6€ w	66° 147 ///		
	1	Address		Symbol	Display format	Status value	Modify value		•	-
1		DB1.DBB	0	"A1".Container_A1[1]	HEX	B#16#05	B#16#05			
2		DB1.DBB	1	"A1".Container_A1[2]	HEX	B#16#00	B#16#00			
3		DB1.DBB	2	"A1".Container_A1[3]	HEX	B#16#00	B#16#00			
4		DB1.DBB	3	"A1".Container_A1[4]	HEX	B#16#00	B#16#00		E	
5		DB1.DBB	4	"A1".Container_A1[5]	HEX	B#16#00	B#16#00			
6		DB1.DBB	5	"A1".Container_A1[6]	HEX	B#16#00	B#16#00			
7		DB1.DBB	6	"A1".Container_A1[7]	HEX	B#16#00	B#16#00			1
8		DB1.DBB	7	"A1".Container_A1[8]	HEX	B#16#00	B#16#00			
9		DB1.DBB	8	"A1".Container_A1[9]	HEX	B#16#00	B#16#00			
10		DB1.DBB	9	"A1".Container_A1[10]	HEX	B#16#00				
11		DB1.DBB	10	"A1".Container_A1[11]	HEX	B#16#00				
12		DB1.DBB	11	"A1".Container_A1[12]	HEX	B#16#00				
13		DB1.DBB	12	"A1".Container_A1[13]	HEX	B#16#00				
14		DB1.DBB	13	"A1".Container_A1[14]	HEX	B#16#00				
15		DB1.DBB	14	"A1".Container_A1[15]	HEX	B#16#00				
16		DB1.DBB	15	"A1".Container_A1[16]	HEX	B#16#00				
17		DB1.DBB	16	"A1".Container_A1[17]	HEX	B#16#00				
18		DB1.DBB	17	"A1".Container_A1[18]	HEX	B#16#00				
19		DB1.DBB	18	"A1".Container_A1[19]	HEX	B#16#00	B#16#00			
20		DB1.DBB	19	"A1".Container_A1[20]	ZEICHEN		B#16#00		-	
BL	x-4]	IOL\SIMAT	IC 3	00(1)\\S7-Programm(3)				🚸 RUN	Abs < 5.2	1

Fig. 154: Enter the control value for index 85 (0x55)



Enable write access via a rising edge on **REQ**.

📸 .Var - [HMI @BLxx-4IOL\SIMATIC 300(1)\CPU 315-2 PN/DP\S7-Programm(3) ONLINE]								
Ľ	📓 Iable Edit Insert PLC Variable View Options Window Help							
E	×				Sales an ea ai	llar		
		Address	Symbol	Display format	Status value	Modify value	•	
1		// sensor 1:						
2		ED 30		HEX	DW#16#9001F3A9	// process data raw		
3		AB 30		HEX	B#16#FF	B#16#FF		
4		DB249.DBX 6.1	"State sensor 1".RD_WR	BOOL	true	// 0=read. 1=write parameter		
5		DB249.DBX 6.2	"State sensor 1".REQ	BOOL	true	// 0->1 start call		
6		DB249.DBX 6.3	"State sensor 1".DONE_VALID	BOOL	true			
7		DB249.DBX 6.4	"State sensor 1".BUSY	BOOL	false			
8		DB249.DBX 6.5	"State sensor 1".ERROR	BOOL	false			
9		// IOL Call paramer	ter for sensor 1:					
10)	DB249.DBD 8	"State sensor 1".ID	DEZ	L#30	L#30		
11	I	DB249.DBW 12	"State sensor 1".CAP	DEZ	251	251		
12	2	DB249.DBW 14	"State sensor 1".PORT	DEZ	1	1		
13	3	DB249.DBW 16	"State sensor 1".IOL_INDEX	HEX	W#16#0055	W#16#0055		
14	ł	DB249.DBW 18	"State sensor 1".IOL_SUBINDEX	DEZ	0			
15	5	DB249.DBW 20	"State sensor 1".LEN	DEZ	1	1		
16	5	DB249.DBW 30	"State sensor 1".LEN_READ_MAX	DEZ	0			
17	7	DB249.DBD 22	"State sensor 1".STATUS	HEX	DW#16#0000000			
18	3	DB249.DBD 26	"State sensor 1".IOL_STATUS	HEX	DW#16#0000000			
19)	DB249.DBW 32	"State sensor 1".RD_LEN	DEZ	0			
20)	// sensor 2:					Ŧ	
BL	xx-4	IOL\SIMATIC 300(1)\\S7-Programm(3)		• R	UN Abs < 5.2	//.	

Fig. 155: Enable write access



8 Operation

The communication system operates with a 24 V signal. If transmission is unsuccessful, the telegram is automatically repeated twice. If the second retry is not successful, the IO-Link master detects a communication interruption. The error is automatically reported to the higher-level controller.

IO-Link devices can be set application-specific or operated without special settings. If no settings are required in the IO-Link device, the signals are forwarded directly to the higher-level control system.



Fig. 156: Overview — operating IO-Link devices

For more information on operating the IO-Link masters and IO-Link devices, refer to the device-specific instructions for use.



8.1 Combining Turck IO-Link devices



NOTE All IO-Link block modules (TBEN..., TBPN..., FEN20...) support SIDI. The BL... IO-Link master modules do not support SIDI.

Device	Version	TBEN-L -8IOL	TBEN-S -4IOL	TBPN 2IOL	BL67-4IOL	BL20- E-4IOL	FEN20- 4IOL
LIQ25	1.0	х	х	х	х	х	Х
RI360P	1.0	Х	Х	Х	Х	х	Х
B2N360- Q42	1.0	х	Х	х	х	х	Х
PC	1.0	х	х	х	х	х	х
PS	1.0	х	х	х	х	х	Х
TS	1.0	Х	х	Х	Х	х	X
EZ-ARRAY	1.0	х	х	Х	х	х	Х
FM(X)-IM	1.0	х	х	х	х	х	x
RUU	1.1	х	х	х	х	х	х
DF-G1	1.1	х	х	х	х	х	х
TBIL-M1	1.1	х	х	х	х	х	x
TTM	1.1	х	х	х	х	х	х
Uprox IO- Link	1.1	х	х	х	х	х	Х
BCT	1.1	х	х	х	х	х	Х
Q4X	1.1	Х	Х	х	х	Х	Х
LE	1.1	Х	Х	х	х	х	Х
LTF	1.1	х	х	х	х	х	Х
TL50	1.1	х	х	х	х	х	Х
NIC	1.1	Х	х	х	х	х	Х
IM12- CCM	1.1	х	х	х	х	Х	Х
PT	1.1	х	х	х	х	х	Х
NCLS	1.1	х	х	х	х	х	Х
LS5	1.1	х	х	х	х	х	х
BI/NI	1.1	х	х	х	х	х	Х
TBIL-S	1.1	х	х	х	х	х	Х
LRS	1.1	х	х	х	х	х	х
Q5X	1.1	х	х	х	х	х	Х
QS	1.1	х	х	х	х	х	х
K50	1.1	х	х	х	х	х	Х
FS	1.1	Х	х	х	х	Х	Х
LUS	1.1	х	х	х	х	х	х
REM	1.1	х	х	х	х	х	х
RES	1.1	Х	х	х	х	Х	Х



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