

MANUAL

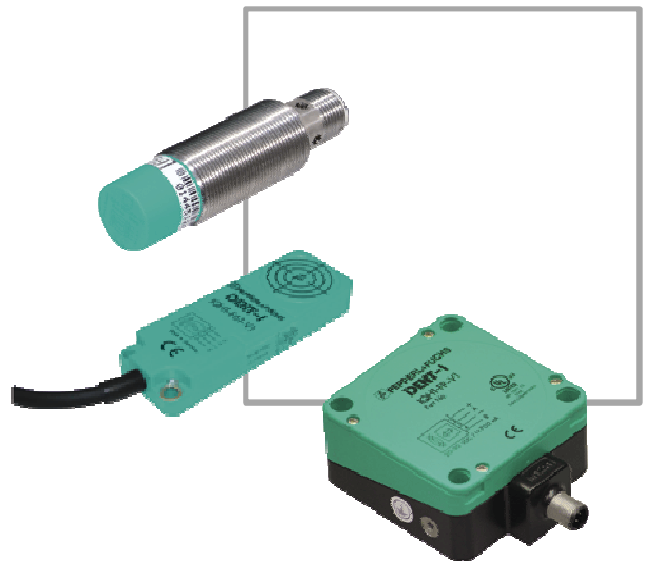
IO-Link RFID Reader, HF

13.56 MHz, ISO 15693

IQT1-18GM-IO-V1

IQT1-F61-IO-V1

IQT1-FP-IO-V1





The latest version of the General Terms of Delivery for Products and Services of the Electrical Industry set out by the German Electrical and Electronic Manufacturers' Association (ZVEI), and the "Extended Retention of Title" clause apply to this document.

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1 Introduction

Congratulations

You have decided to purchase a device from Pepperl+Fuchs. Pepperl+Fuchs develops, produces, and markets electronic sensors and interface modules worldwide for the automation technology market.

Please read the instruction manual carefully before installing this device and putting it into operation. The instructions and notes contained in this instruction manual will guide you step by step through the installation and commissioning procedures to ensure fault-free use of this product. By following the instructions in this manual, you:

- ensure safe operation of the device.
- can utilize the entire range of device functions.
- avoid faulty operation and associated errors.
- reduce costs associated with downtime and incidental repairs.
- increase the effectiveness and economic efficiency of your plant.

Store this instruction manual somewhere safe to ensure it is available for future work on the device.

After opening the packaging, please ensure that the device is intact and that the package is complete.

Symbols Used

The following symbols are used in this manual:



Important note!

You will find important information beside this symbol.



Handling instructions

Handling instructions are provided next to this symbol.

Contact

If you have any questions about the device, its functions, or accessories, please contact us at:

Pepperl+Fuchs GmbH
 Lilienthalstrasse 200
 68307 Mannheim, Germany
 Tel.: +49 (0)621 776-1111
 Fax: +49 (0)621 776-271111
 Email: fa-info@de.pepperl-fuchs.com

2 Declaration of Conformity

2.1 Declaration of Conformity

This product was developed and manufactured in line with the applicable European standards and Directives.



Important note!

A Declaration of Conformity may be requested from the manufacturer.

The product manufacturer, Pepperl+Fuchs GmbH, 68307 Mannheim, Germany, has a certified quality assurance system that conforms to ISO 9001.



2.2 FCC and IC Information

NOTICE:

This device complies with Part 15 of the FCC Rules and with Industry Canada license-exempt RSS standard(s).

Operation is subject to the following two conditions:

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received, including interference that may cause undesired operation.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

- (1) l'appareil ne doit pas produire de brouillage, et
- (2) l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.



Notice

Changes or modifications made to this equipment not expressly approved by the manufacturer may void the FCC authorization to operate this equipment.



Important note!

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

3 Safety

3.1 Safety-Relevant Symbols



Danger!

This symbol warns of an immediate and present danger.
Failure to observe this warning may result in personal injury or even death.



Warning!

This symbol warns of a potential fault or hazard.
Failure to observe this warning may result in personal injury or extensive damage to property.



Caution!

This symbol warns of a potential fault.
Failure to observe this warning may result in the device and/or any systems and plants connected to it malfunctioning or failing completely.

3.2 Intended Use

The read/write head is designed to identify RFID read-only and read/write tags within a defined frequency range and should only be used for this purpose.

Read through this manual carefully. Familiarize yourself with the device before installing, mounting, and operating it.

Always operate the device as described in these instructions to ensure that the device and the connected systems function correctly. The protection of operating personnel and of the plant is only guaranteed if the device is operated in accordance with its intended use.

3.3 General Safety Information

The device must only be operated by specialist personnel who have received the relevant training in accordance with this instruction manual.

If you open or modify the device yourself, not only are you endangering yourself and others but you will also void any warranty and absolve the manufacturer of any liability. Switch off the device if serious faults occur. Make sure that the device cannot be inadvertently switched on again. If the device needs to be repaired, return it to Pepperl+Fuchs.

The device may only be connected by a qualified electrical specialist. The same applies for any maintenance work that needs to be carried out when the system is live.

The operator is responsible for complying with all local safety regulations.

Store the device in the original packaging when not in use. This offers the device optimal protection against impact and moisture.

Ensure that the ambient conditions comply with regulations.



Important note!

Disposal

Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.

3.4 Special Safety Instructions

3.4.1 IQT1-*-IO-V1



Warning!

Processes started in an uncontrolled manner jeopardize the plant.

Before commissioning, ensure that there are no risks involved in using the device that may endanger the plant.

Power Supply

The read/write head is supplied with power via the IO-Link master. For technical details, refer to the product datasheet.

3.4.2 IQT1-18GM-IO-V1



Warning!

Hot parts!

Be careful not to burn your fingers when handling the device! After shutting down the device, wait at least half an hour before handling it.

4 Product Description

These products have RFID read/write heads with an IO-Link interface. The read/write heads write and read read/write tags within a frequency range of 13.56 MHz according to ISO 15693. The devices are connected via M12 plugs.



Figure 4.1 IQT1-18GM-IO-V1



Figure 4.2 IQT1-F61-IO-V1



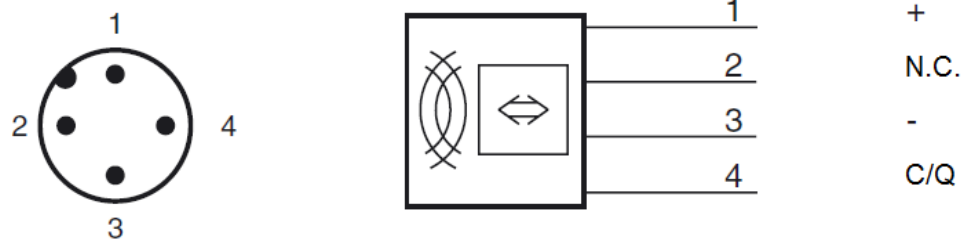
Figure 4.3 IQT1-FP-IO-V1

4.1 Indicators and Operating Elements

The IQH1-*-IO-V1 read/write heads have four LEDs in green/blue/yellow/red. The various indicators denote:

- Green LED:
 - Permanently on - Power on
 - Flashing - IO-Link communication active
- Blue LED: Transmission mode
- Yellow LED: Read/write operation successful
- Red LED: Fault

4.2 Connection



Pin 2 is not used.

The read/write head is connected via a point-to-point connection to the IO-Link master. According to the IO-Link standard, the connection line may be up to 20 meters long.

4.3 Accessories

You can connect the IQT1-*-IO-V1 read/write heads to any IO-Link master. The following IO-Link masters are available from Pepperl+Fuchs:

IO-Link-Master02-USB IO-Link master for connection to higher-level devices via USB

ICE1-8IOL-G60L-V1D Ethernet IO-Link module with eight inputs/outputs for connection to a higher-level system via Ethernet IP, Profinet, or EtherCat.

You can use any HF read/write tag that complies with ISO 15693.

An unshielded three- or four-wire cable with an M12 plug and a maximum length of 20 m can be used to connect the read/write head to the IO-Link master.

You can find suitable accessories on our website

<http://www.pepperl-fuchs.com>



Important note!

In the product search, simply enter the type designation for your read/write head. The product page contains a list of related products.

5 Installation

5.1 Storage and Transportation

Package the device for storage and transportation such that it is protected from impact and moisture. The original packaging provides optimum protection. Please also observe the permitted ambient conditions found in the technical datasheet.

5.2 Unpacking

Check the product for damage while unpacking. In the event of damage to the product, inform the post office or parcel service and notify the supplier.

Retain the original packaging in case you have to store or ship the device again at a later point.

Should you have any questions, please contact Pepperl+Fuchs.

5.3 Mounting and Connecting the Read/Write Head

Important note!



The read/write head is intended for mounting indoors. Do not mount the read/write head on metal surfaces. Maintain a **minimum distance of 50 mm** between the device and any metals.

If you want to mount multiple devices side by side, keep a **minimum distance of 210 mm** between them to avoid interference.

Ensure the device is mounted on a level surface.

Mounting and Connecting



1. Attach the IQT1-F61-IO-V1 read/write head using two screws or the IQT1-FP-IO-V1 using four screws by feeding the screws through the mounting holes in the housing. Attach the IQT1-18GM-IO-V1 read/write head using suitable mounting materials, e.g., nuts or mounting aids.
2. Connect the device to an IO-Link master that communicates with a higher-level system.

6 Operation

6.1 General Information about Tag Types

Read/Write Tag 13.56 MHz (Inductive)

Read/write tags in this frequency range offer a considerably higher reading speed than read/write tags for the 125 kHz system. Since this is a non-proprietary system, cost-effective read/write tags are available from many third-party manufacturers.

By using a command, you can tell the device which specific read/write tag to communicate with.

IQT1-*-IO-V1 read/write stations currently support the following read/write tags:

13.56 MHz/ISO 15693 Tag Types

Transponder-typ	Chiptyp	Details	Bezeichnung Pepperl+Fuchs	Zugriff	Bit
20	ISO 15693 konform	alle ISO-15693-konformen Datenträger	1	R/W Fixcode	- 64
21	I-Code SLI	Philips	IQC21	R/W Fixcode	896 64
22	Tag-it HF-I	'Plus' von Texas Instruments	IQC22	R/W Fixcode	2k 64
23	SRF55V02P	my-D von Infineon	IQC23	R/W Fixcode	2k 64
24	SRF55V10P	my-D von Infineon	IQC24	R/W Fixcode	10k 64
33	MB89R118	FRAM von Fujitsu	IQC33 2	R/W Fixcode	16k 64
35	I-Code SLI-S	NXP	IQC35	R/W Fixcode	1280 64
36	I-Code SLI-L	NXP	IQC36	R/W Fixcode	512 64
37	MB89R112	FRAM von Fujitsu	IQC37 3	R/W Fixcode	64k 64

Tabelle 6.1 Transpondertypen 13,56 MHz gem. ISO 15693

1. Dieser Transpondertyp dient dazu, die UID (Fixcode) aller von Pepperl+Fuchs unterstützten ISO 15693 konformen Transponder auszulesen.

2. Ausnahme: Blockgröße = 8 Byte
'Wordnum' muss Vielfaches von 2 sein (2 Blöcke à 4 Byte = 8 Byte)

3. Ausnahme: Blockgröße = 32 Byte
'Wordnum' muss Vielfaches von 8 sein (8 Blöcke à 4 Byte = 32 Byte)

The read/write tags usually have a 64 byte unique read-only code that has been defined by the manufacturer and can only be read, but not changed, by the user. In addition, most read/write tags have a memory bank (R/W user memory) that can be read and written. The size of this memory bank depends on the tag type. The memory bank of most read/write tags is divided into blocks that are 4 bytes in length. When a read/write command is issued, the start address and the requested number of data blocks or number of bytes are indicated for access purposes.

6.2 IO-Link

The IQT1-*/IO-V1 read/write heads support IO-Link version 1.1. SIO mode is not supported. The process data size is always 32 bytes in/out.

6.3 IO-Link Easy Mode

Easy mode enables the intuitive commissioning of the read/write head without a function block. The data for easy mode is split into parameters that are acyclically transferred into process data that is cyclically exchanged between the read/write head and the IO-Link master.

You can adjust the parameters of the read/write head that are defined by the IODD file via a configuration tool. The parameters are stored in the non-volatile memory of the reader until the next change. The read/write commands are also part of the set of parameters and are not transferred as cyclic process data. You can select the read/write command you want via the configuration tool from a list of possible read/write commands.

6.3.1 Command Overview

Easy mode supports the following read/write commands:

- Read the read-only code (UID)
- Read the user memory
- Write the user memory

The start address and desired number of data blocks are required to read and write the user memory. No further information is necessary to read the UID.

6.3.2 Data Structure of Easy Mode

Parameters

The following parameters are available for the read/write head.

Easy mode

This parameter defines which of the two modes of the read/write head is operated. At present, only easy mode is implemented.

Value range: true, false

Default value: true

Tag type

This parameter tells the read/write head which tag type to communicate with. The settings are stored in the non-volatile memory of the read/write head.

Value range: see Table 6.1

Default value: 99 (automatic)

Choose read command

This parameter defines the read command that the write/read head will perform at the next reading.

Value range: UID, user memory

Default value: UID

Choose write command

This parameter defines the write command that the read/write head will perform at the next writing.

Value range: user memory

Default value: user memory

Number of bytes [user memory]

This parameter defines the number of bytes that the next command reads from the user memory or writes to the user memory. The block length of the read/write tags being used and the maximum available data range of 28 bytes per cycle should be observed. Read/write tag type 37 cannot be used in easy mode as its block length of 32 bytes is larger than the maximum available data range.

Value range: 4, 8, 12, 16, 20, 24, 28

Default value: 4

Format: decimal

Starting address [user memory]

This parameter defines the start address from which the next command data is read from the user memory or written to the user memory. The block length of the read/write tag being used and the maximum available data range of 28 bytes per cycle should be observed. Read/write tag type 37 cannot be used in easy mode as its block length of 32 bytes is larger than the maximum available data range.

Value range: depends on the size of the user memory and the block length

Default value: 0

Format: hexadecimal

Autostart

This parameter defines whether or not the read command is carried out immediately when you turn on the read/write head without taking into account the control bits of the process data of the output frames.

Value range: true, false

Default value: true

Process Data

The process data consists of an output frame and an input frame. The output frame contains the data that is transferred cyclically from the IO-Link master to the reader. The input frame contains the data that is transferred back from the reader to the IO-Link master.

Output Frame

Byte	Contents							
0	0	0	0	0	0	0	Write	Read
1	Occupied							
2	Occupied							
3	Occupied							
4	Write data							
...	Write data							
31	Write data							

Byte 0 is composed of eight control bits. Six bits are currently unused.

Read: As long as the read bit value is set to true, the configured read command will be executed. If the Autostart parameter is set to true, the read bit will not be evaluated and the configured read command will always be executed.

Write: As long as the write bit value is set to true, the configured write command will be executed. If the Autostart parameter is set to true, the write bit will not be evaluated and the configured read command will always be executed.

Bytes 1, 2, and 3 are not used and are allocated zero, because some controls such as the Rockwell Collins controls operate on four bytes.

Write data: Bytes 4 to 31 contain the data in hexadecimal form, which is written by the read/write head to the read/write tag using the configured write command.

Input Frame

Byte	Contents							
0	0	0	0	0	Failure	Run	W.valid	R.valid
1	Frame length							
2	Occupied							
3	Occupied							
4	Read data/error code							
5	Read data/error string							
...	Read data/error string							
31	Read data/error string							

Byte 0 is composed of eight control bits. Four bits are currently unused.

Read valid: A rising edge indicates that new data has been read and is now available.

Write valid: A rising edge indicates that new data has been written.

Run: As long as the run bit value is set to true, a read or write command will be executed.

Failure: If the failure bit value is set to true, there is an error.

Frame length: Contains the number of valid bytes of data read in the input frame.

Bytes 2 and 3 are not used and are allocated zero, because some controls such as the Rockwell Collins controls operate on four bytes.

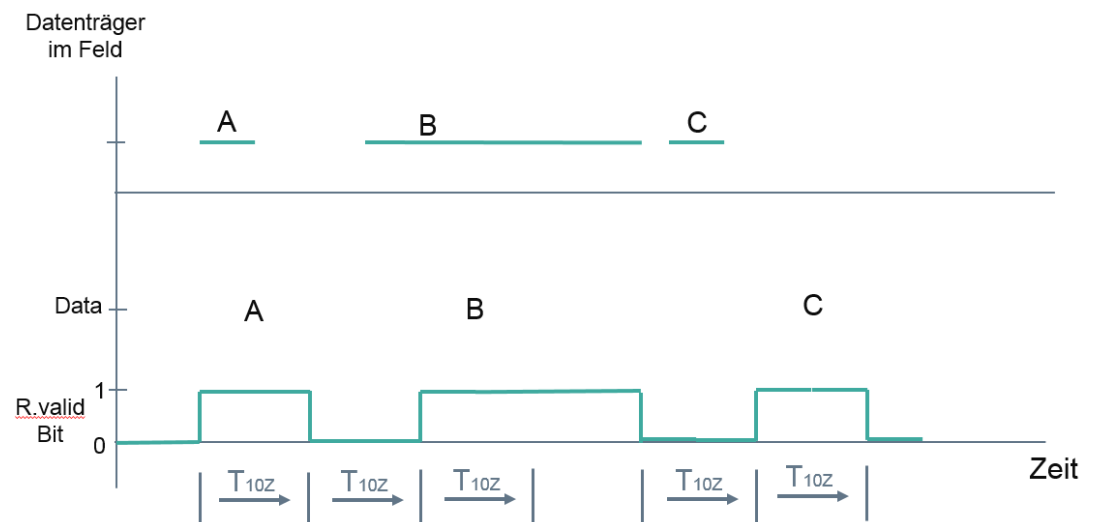
Read data: Bytes 4 to 31 contain the data in hexadecimal form, which is read by the read/write head from the read/write tag using the configured write command.

Error code: If an error occurs (failure = true), byte 4 contains an error code.

Error string: If an error occurs (failure = true), bytes 5 to 31 contain a human-readable error message in ASCII format.

6.3.3 Timing

Easy mode does not support a handshake. Instead, a simple counter is implemented. The IO-Link cycle time of the read/write head is 4 ms. The input frame is updated at least every ten cycles. You cannot change the number of cycles for the update. Therefore, new process data is available every 40 ms.



The image shows the basic, temporal reading behavior of the read/write head. The read bit in the output frame is true, meaning that the read/write head reads permanently. If read/write tag A now enters the detection range of the read/write head, the read valid bit changes from 0 to 1. Because the read/write tag leaves the detection range straight away, the read valid bit changes after 10 cycles, i.e., after 40 ms, from 1 back to 0. Read/write tag B now enters the detection range of the read/write head. Accordingly, its UID is read and after a further 40 ms is available in the input frame. Since the read/write tag remains in the detection range for longer, the read valid bit is still at 1 after 40 ms, since no change has occurred. Once read/write tag B has left the detection range, the read valid bit changes from 1 back to 0. Read/write tag C is in the detection range for only a very brief time. After a further 40 ms, its data becomes available in the input frame.

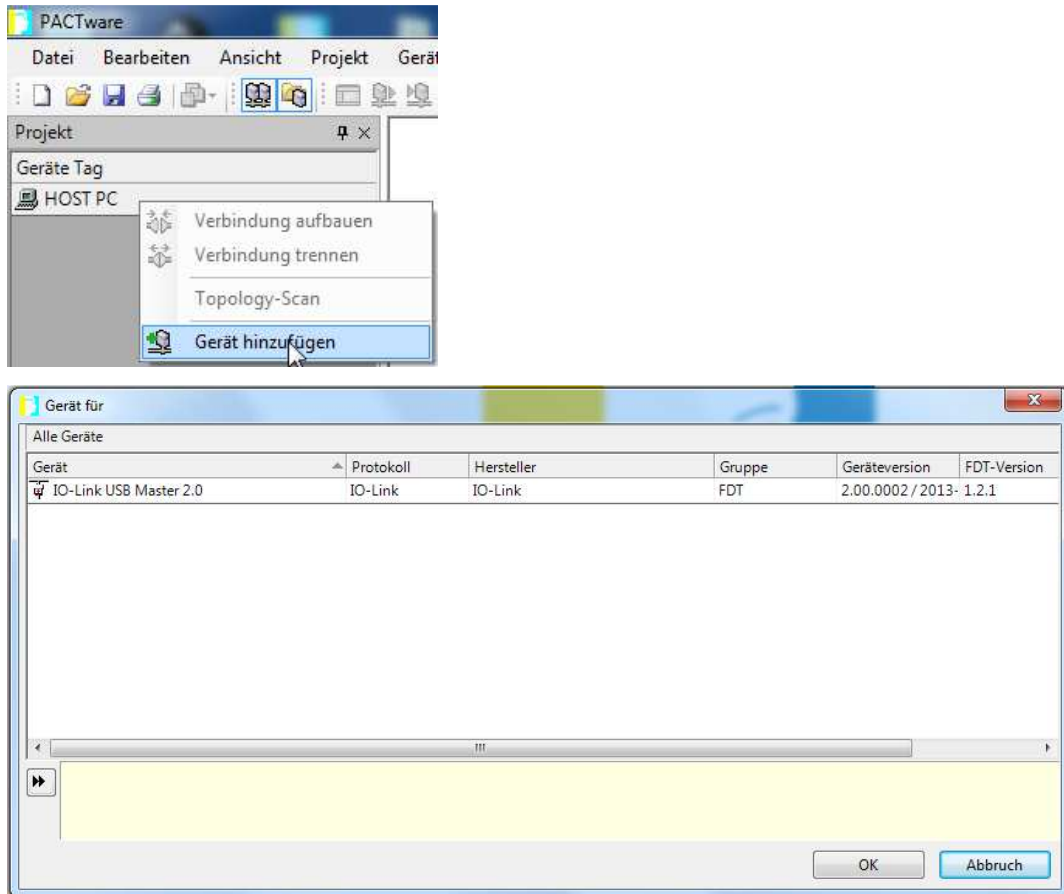
6.3.4 Application Example: Easy Mode with PACTware

In this section, you will learn how to use the read/write head with IO-Link Master02-USB. Connect the read/write head to the IO-Link master and then connect it to a PC using a USB

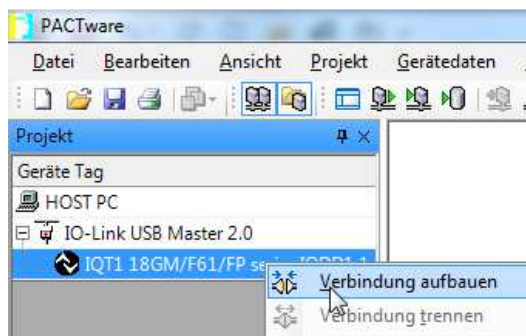
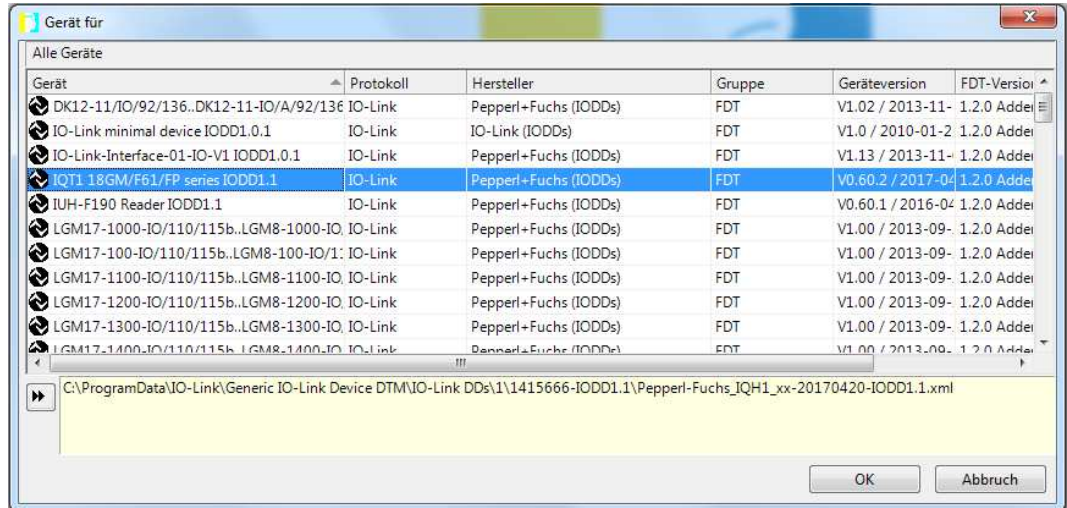
cable. The PACTware software is used to operate the system and can be downloaded [here](#) from the Pepperl+Fuchs website.

Install the software on your PC. Now install the driver for the IO-Link master and the IODD file for the read/write head on your computer. The driver and the IODD file can be found on the corresponding product page.

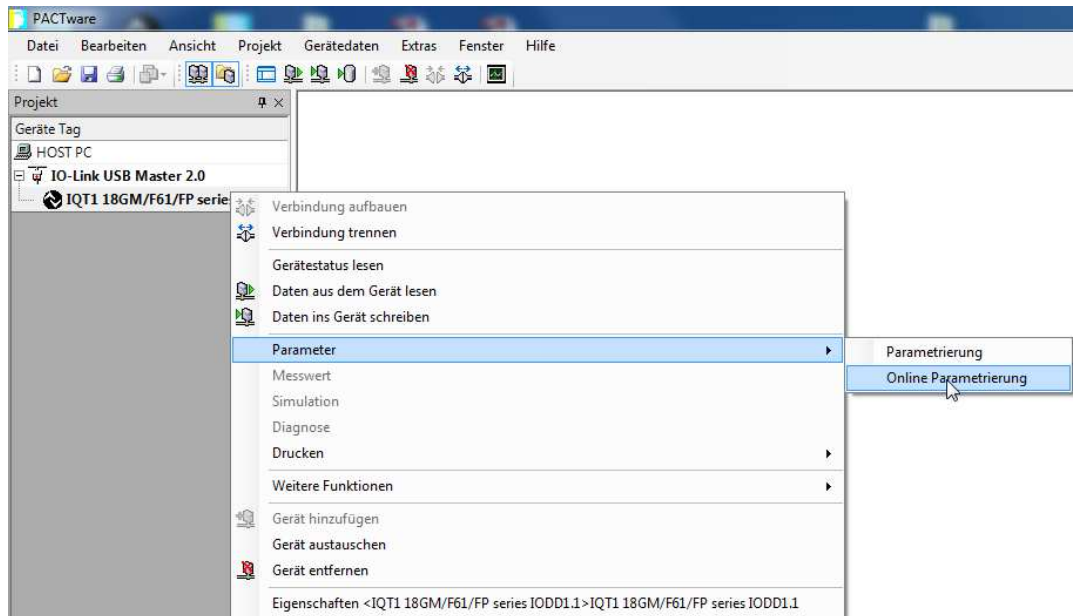
Now start the PACTware and connect to the IO-Link master.

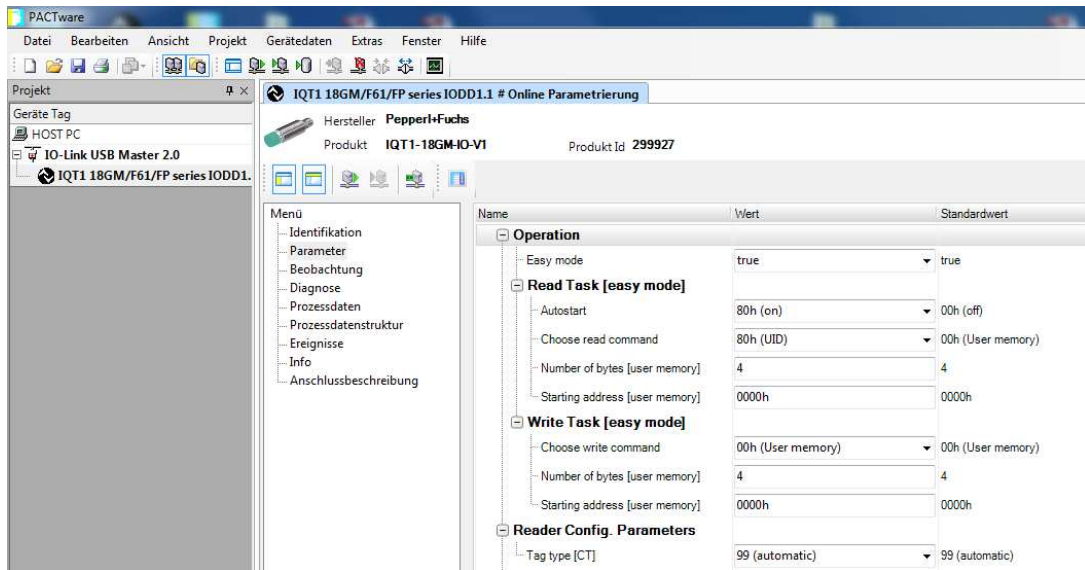


Next, add your read/write head in the same way and set up the connection to it.

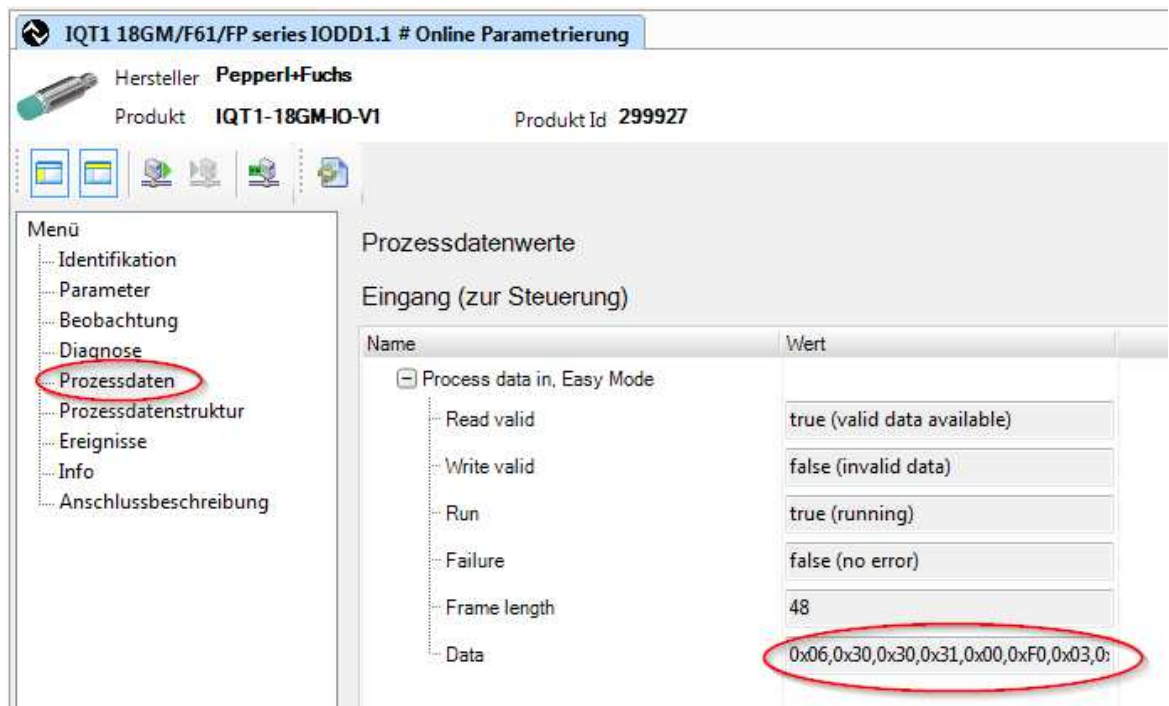


Select the Online Parameterization menu option.





The read/write head automatically starts reading the UID of the read/write tags. The data can be found in the input frame of the process data.



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Zentrale weltweit

Pepperl+Fuchs GmbH
68307 Mannheim · Deutschland
Tel. +49 621 776-0
E-Mail: info@de.pepperl-fuchs.com

Zentrale USA

Pepperl+Fuchs Inc.
Twinsburg, Ohio 44087 · USA
Tel. +1 330 4353555
E-Mail: sales@us.pepperl-fuchs.com

Zentrale Asien

Pepperl+Fuchs Pte Ltd.
Singapur 139943
Tel. +65 67799091
E-Mail: sales@sg.pepperl-fuchs.com

www.pepperl-fuchs.com

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