

# TNSLR-Q130-EN HF read/write head

Instructions for Use



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# 1 About these Instructions

These instructions describe the setup, functions and use of the product and help you to operate the product according to its intended purpose. Read these instructions carefully before using the product. This will prevent the risk of personal injury and damage to property. Keep these instructions safe during the service life of the product. If the product is passed on, pass on these instructions as well.

#### 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

The following symbols are used in these instructions:

	<b>DANGER</b> DANGER indicates a hazardous situation with a high level of risk, which, if not avoided, will result in death or serious injury.
	<b>WARNING</b> WARNING indicates a hazardous situation with a medium level of risk, which, if not avoided, will result in death or serious injury.
	<b>CAUTION</b> CAUTION indicates a hazardous situation with a medium level of risk, which, if not avoided, will result in moderate or minor injury.
!	<b>NOTICE</b> CAUTION indicates a situation which, if not avoided, may cause damage to property
i	<b>NOTE</b> NOTE indicates tips, recommendations and important information about special ac tion steps and issues. The notes simplify your work and help you to avoid additiona work.
	MANDATORY ACTION This symbol denotes actions that the user must carry out.
⇒	<b>RESULT OF ACTION</b> This symbol denotes the relevant results of an action.

#### 1.3 Other documents

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

- Data sheet
- Declarations of conformity
- Approvals

#### 1.4 Naming convention

Read/write devices in the HF are called "read/write heads" and "readers" in the UHF area. "Tag", "transponder" and "mobile data memory" are common synonyms for "data carriers".

#### 1.5 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

These instructions apply to the following HF read/write heads:

- TNSLR-Q130-EN
- 2.2 Scope of delivery

The delivery consists of the following:

- Read/write head
- Quick Start Guide
- 2.3 Turck service

Turck supports you in your projects – from the initial analysis right through to the commissioning of your application. The Turck product database at www.turck.com offers you several software tools for programming, configuring or commissioning, as well as data sheets and CAD files in many export formats.

The contact data for Turck branches is provided at [> 127].



## 3 For your safety

The product is designed according to state of the art technology. Residual hazards, however, still exist. Observe the following safety instructions and warnings in order to prevent danger to persons and property. Turck accepts no liability for damage caused by failure to observe these safety instructions.

#### 3.1 Intended use

The HF read/write head with an integrated RFID interface is used as a means of contactless data exchange with the HF tags in the Turck RFID system. The operating frequency of the device is 13.56 MHz, according to the standard ISO 15693, NFC type 5.

The read/write head uses the integrated RFID interface to communicate directly with the control unit or other higher-level systems. The device can be connected to the Ethernet fieldbus systems PROFINET, Modbus TCP and EtherNet/IP.

The device must only be used as described in these instructions. Any other use is not in accordance with the intended use. Turck accepts no liability for any resulting damage.

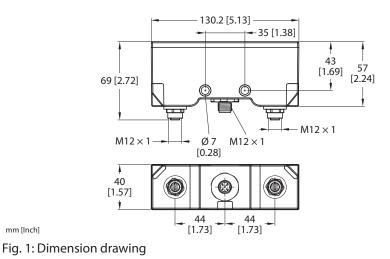
#### 3.2 General safety instructions

- The device must only be fitted, installed, operated, parameterized and maintained by trained and qualified personnel.
- The device meets the EMC requirements for the industrial areas. When used in residential areas, take measures to prevent radio frequency interference.
- Only use the device in compliance with the applicable national and international regulations, standards and laws.
- Any extended stay within the area of radiation of the HF read/write head may be harmful to health. Maintain a minimum distance of 20 cm from the actively radiating surface of the read/write head.



#### Product description 4

#### Device overview 4.1



#### 4.1.1 Indication elements

The device has the following LED displays:

- PWR: Power supply
- BUS: Bus connection
- ERR: Diagnostics
- P1/P2: Ethernet
- HF: Air interface
- AT: Autotune
- WINK: Wink command

#### 4.2 Properties and characteristics

mm [lnch]

- HF read/write head with integrated interface as a PROFINET device, Ethernet/IP device or Modbus TCP slave
- ISO 15693, NFC type 5
- Integrated Ethernet switch
- Supports 10 Mbps/100 Mbps
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully encapsulated module electronics
- Protection class IP67
- Integration in PLC systems without the use of a special function module
- Up to 128 bytes of user data per read/write cycle per channel as well as use of fragments for larger data volumes
- Data interface for convenient use of the RFID functions
- Integrated web server
- LEDs and diagnostics



## 4.3 Functional principle

The read/write heads are used as a means of contactless data exchange with tags. During this process, the control unit sends commands and data to the read/write head via the interface and receives the appropriate response data back from the read/write head. Examples of such commands include reading the UIDs of all RFID tags within the reading area or writing a specific production date to an RFID tag. To communicate with the tag, the data is coded by the read/write head and transferred via an electromagnetic field, which at the same time supplies the tags with power.

A read/write head contains a transmitter and a receiver, a port to the interface and a coupling element (coil antennas) for communicating with the tag. Inductive coupling is used for the transmission process between the read/write head and the tag in devices designed for the HF range.

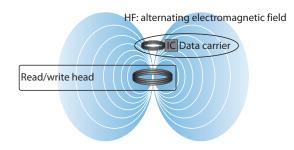


Fig. 2: Functional principle of HF RFID

The coupling element in the read/write head generates an electromagnetic AC field. This produces a transmission window as a so-called air interface in which the data exchange with the tag takes place. The size of the transmission window depends on the combination of read/write heads and tags.

Every Turck read/write head can communicate with a number of different Turck tags. To do this, the read/write head and tags must each work within the same frequency range. Depending on their power and the frequency in use, the devices have a range of a few millimeters up to several meters. The specified maximum distance between the read/write heads represents values measured under laboratory conditions, free from any influences caused by surrounding materials. The achievable distances may be different due to component tolerances, mounting location in the application, ambient conditions and the effect of materials (particularly metal).

#### 4.4 Functions and operation modes

The device enables the execution of different commands such as Inventory (single-tag and multitag applications), read, write and password protection. Additional functions are provided to optimize the speed, for the system to self trigger as well as for backup and restore operations. In every write or read cycle, up to 128 bytes can be transferred on each channel to the controller. The data must be fragmented in order to transfer more than 128 bytes.

The device enables passive HF tags to be read or written in single and multitag operation. For this the device forms a transmission zone that varies in size and range according to the tags used and the operating conditions of the application. Refer to the data sheets for the applicable maximum read/write distances.



#### 4.4.1 Multiprotocol technology

The device can be used in the following Ethernet protocols:

- Modbus TCP
- EtherNet/IP
- PROFINET

The required Ethernet protocol is either automatically detected or manually selected.

#### Automatic protocol detection

The automatic protocol detection enables the multiprotocol device to run on all three of the above Ethernet systems without any intervention by the user (i.e. without any reprogramming).

During the system startup phase (snooping phase), the device detects which Ethernet protocol requests a connection and adjusts to the corresponding protocol. After that the other protocols only allow read access to the device.

#### Manual protocol selection

The user can also select the protocol manually. In this case, the snooping phase is skipped and the device is permanently set to the selected protocol. The other protocols only allow read access to the device.

#### Protocol-dependent functions

The device supports the following Ethernet protocol-specific features:

#### PROFINET

- Fast Startup (FSU), prioritized startup
- Topology detection
- Address allocation with LLDP
- Media redundancy protocol (MRP)
- S2 redundancy

#### EtherNet/IP

- QuickConnect (QC)
- Device Level Ring (DLR)

#### Ethernet ports used

Port	Protocol	
00022	SFTP	
00053	DNS TCP	
00067	DHCP	
00080	HTTP	
00093	PROFINET DCP	
00502	Modbus TCP	
58554	Turck Services	



#### 4.4.2 Data transfer to the PLC

In every write or read cycle, up to 128 bytes can be transferred on each channel. The data must be fragmented in order to transfer more than 128 bytes. The amount of write or read data transferred per cycle can be set as follows for the different Ethernet protocols:

PROFINET	EtherNet/IP	Modbus TCP
<ul> <li>8 bytes</li> <li>16 bytes (default setting)</li> <li>32 bytes</li> <li>64 bytes</li> <li>128 bytes</li> </ul>	<ul> <li>16 bytes</li> <li>64 bytes</li> <li>128 bytes (default setting)</li> </ul>	<ul> <li>128 bytes (permanently set)</li> <li>Adjustable fragment size:</li> <li>8 bytes</li> <li>16 bytes (default setting)</li> <li>32 bytes</li> <li>64 bytes</li> </ul>
		128 bytes

#### 4.4.3 RFID channels — operating modes

Various data interfaces can be selected for the RFID channels:

- HF compact
- HF extended

Different functions are available to the user, depending on the selected data interface.

#### HF compact mode

**HF compact** mode is suitable for transferring smaller data volumes of up to 128 bytes (e.g. UID) in single-tag applications.

#### HF extended mode

**HF extended** mode contains all the functions provided in **HF compact** mode. It is also possible with fragmentation to transfer more than the set data size per write or read cycle (example: 128 bytes). The operating mode is suitable for single-tag and multitag applications.



#### NOTE

Not all commands are supported in multitag mode.

The user can set a command timeout to define the time for the execution of a command.

**HF extended** mode enables the use of Continuous mode for the repeated execution of an Inventory, tag info, read or write command. In continuous mode the read/write head executes the command autonomously. In this case, the read data is stored in the internal memory of the device. The memory operates as a FIFO memory.



#### 4.4.4 RFID commands

The device can perform the following commands and functions. A complete description of the commands is provided under "Settings".

- Idle
- Inventory
- Read
- Write
- Write and Verify
- Continuous Mode
- Read buffer (Cont. mode)
- Stop continuous mode
- Read/write head identification
- Tag info
- Direct read/write head command
- Set read/write head password
- Reset read/write head password
- Set tag password
- Set tag protection
- Get HF tag protection status
- Set perma lock
- Reset
- Read AFI from HF tag
- Read DSFID from HF tag
- Write AFI to HF tag
- Write DSFID to HF tag
- Lock AFI in HF tag
- Lock DSFID in HF tag
- Delete Buffer (Cont. mode)

#### 4.4.5 Loop counter function

The loop counter function is provided for rapid command processing. The loop counter function only requires two PLC cycles to execute a command repeatedly (flow chart see [> 122]). This increments the loop counter to execute a command repeatedly. At least four PLC cycles are required in conventional command processing. In order to execute a command repeatedly with conventional command processing, a command has to be reset and then set again. The loop counter function is provided for special commands. If the command was successfully executed, the command code is output in the response data.

#### 4.4.6 Automatic calibration

The read/write head is provided with the "Automatic calibration" function. After power up, the read/write head checks whether its resonance frequency is affected by metal in the environment. If there is an effect caused by metal, the oscillating circuit adjusts its frequency to restore the optimum resonance frequency. If the effect caused by metal is too high, the read/write head can no longer tune the resonance frequency. The metal takes too much energy from the field. Due to the reduce range communication between the read/write head and the tag is no longer possible.



## 4.5 Technical accessories

Dimension drawing	Туре	ID	Description
$\begin{array}{c} 14.4 [0.56] \\ \hline 14.4 [0.56] \\ \hline 14 [0.55] \\ \hline 15 [0.87] \\ \hline 15 [0.87] \\ \hline 15 [0.87] \\ \hline 11.7 [0.46] \\ \hline 11.8 [0.57] \\ \hline 11.8 [0.57]$	MB-Q130WD	A900166	Mounting bracket, see www.turck.com
2.7 [0.10] [1.58] mm[lnch] - 74.8 [2.94]			
M12 x 1 $ \circ$ 15 $ \sim$ 14 11.5 + 42 - 42 - 50 + 50 + 50 + 50 + 50 + 50 + 50 + 50	RKC4.4T- 2/TXL	6625503	Connection cable; M12 female connector, straight, 4-pin, cable length 2 m, jacket material: PUR, black; chemical, UV and oil-resist- ant, flame-retardant, silicone, PVC and LABS-free; halogen-free; spark-resistant; particularly abra- sion-resistant; protection class IP67, IP69K; other cable lengths and versions available, see www.turck.com
M12 x 1 0 14.5 0 14.5 M12 x 1	RSSD-RSSD- 4414-2M	6441405	Connection cable; M12 male con- nector, straight, D-coded, 4-pin, cable length: 2 m, jacket material: PUR, green; UV-resistant; oil-resist- ant; flame-retardant; silicone, PVC and LABS-free; halogen-free; cU- Lus approval; RoHS-compliant; protection class IP67; other cable lengths and versions available, see www.turck.com
M12x 1 0 14.5	RSSD-RJ45S- 4416-2M	6441631	Connection cable; M12 male con- nector, straight, D-coded, RJ45 plug, straight, 4-pin, cable length: 2 m, jacket material: PUR, green; oil-resistant; flame-retardant; halo- gen-free; UL approval; RoHS-com- pliant; PNO-compliant; other cable lengths and versions available, see www.turck.com



# 5 Installing

You will need the following mounting accessories for the installation:

- 2 × M6 × 50 screws (DIN 931 A4)
- 2 × serrated lock washers 6.9J (DIN 6798 A4)
- 2 × M6 nuts (DIN 935 A4)

The following accessories are available as options:

Mounting bracket MB-Q130WD (ID: A900166)

#### 5.1 Mounting the device

- Mount the device using the corresponding mounting accessories.
- Maintain a minimum distance of 390 mm between two read/write heads.
- Avoid placing the read/write head in close proximity to metal.
- Metal objects must not interrupt the transmission zone.
- Protect the device from heat radiation, rapid temperature fluctuations, severe contamination, electrostatic charge and mechanical damage.

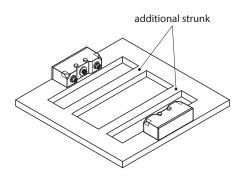


## 5.2 Installing devices on metal

When mounted on metal, the read/write heads can interfere with one another (e.g. due to coupling of the electromagnetic field to a metal support).

Interference can be avoided as follows:

- Increase the distance between two read/write heads.
- Fit one or more iron struts between the read/write heads.



#### Fig. 3: Mounting with iron struts

Place non-metallic spacers underneath the read/write heads.

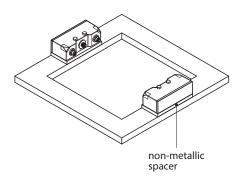


Fig. 4: Mounting with spacers



# 6 Connection

6.1 Connecting the device to Ethernet

The device has an integrated autocrossing switch with two 5-pin female connectors for connecting to the Ethernet.



#### Fig. 5: Ethernet connections

 Connect the device to Ethernet in accordance with the pin assignment below (max. tightening torque: 0.8 Nm)

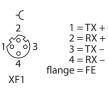


Fig. 6: Ethernet IN pin assignment

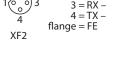


Fig. 7: Ethernet OUT pin assignment

1 = RX +

2 = TX +

#### 6.2 Connecting the power supply

The device has a 5-pin M12 connector for connecting to the power supply.

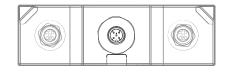


Fig. 8: Power supply connection

• Connect the device to the power supply in accordance with the pin assignment below (max. tightening torque: 0.8 Nm).

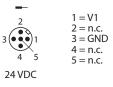


Fig. 9: Pin assignment for the power supply connection



# 7 Commissioning

7.1 Adjusting network settings

The network settings can be adjusted via TAS or the web server.

7.1.1 Adjusting network settings via TAS

The device is factory set to IP address 192.168.1.254 and does not have a PROFINET device name. The network settings can be adjusted via TAS (Turck Automation Suite). TAS is available free of charge at www.turck.com.

- Connect the device to a PC via the Ethernet interface.
- Open TAS.
- Click Scan network.

TA	AS → VIEW / FEATURE → NETWORK														
	Q	<b>•</b> ••	Ø					<b>(</b>	⇒						
	Scan network	Add device	Edit device	Change PW	FW Update	Set clock	Global PW	Export CSV	Import CSV	Print	Help				
	Actions	s <mark>?</mark>		Device type	/ feature <mark>?</mark>	PN	device me	IP address	Adapt	er addr	ess	Address mode ?	MAC address	Subnet mask / Gateway	Version

#### Fig. 10: TAS — home screen

- $\Rightarrow$  TAS displays the connected devices.
- Select the device.
- Click Edit device.





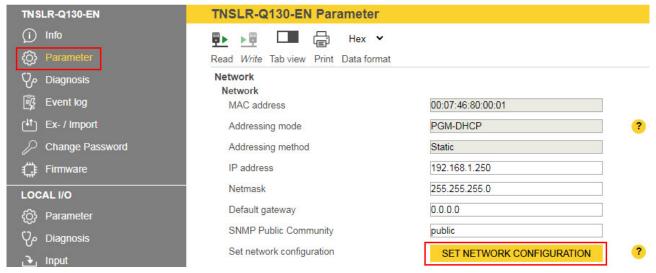
Clicking the IP address of the device opens the web server.

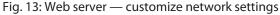


Edit network set	tings
PN device name	turck-tnslr-q130-en
IP address	192.168.1.250
Default gateway	0.0.0.0
Subnet mask	255.255.255.0
Take care, that the IP a	address isn´t used by any other devices or switches

#### Fig. 12: TAS — edit network settings

- 7.1.2 Adjusting network settings via the web server
  - Open the web server.
  - Log into the device as administrator.
  - Click on **Parameters**.
  - Under Network, change the IP address and if necessary also the subnet mask and default gateway.
  - Write the new IP address, subnet mask and default gateway via SET NETWORK CONFIG-URATION to the device.







## 7.2 Connecting the device to a Modbus master with CODESYS

#### Naming convention

Turck uses the terms "Modbus client" and "Modbus server" according to Modbus Organization. The following description uses the terms "Modbus TCP Master" and "Modbus TCP Slave" only because of the naming in CODESYS.

#### Hardware used

This example uses the following hardware components:

- HF read/write head TNSLR-Q130-EN-H1147 (IP address 192.168.1.52)
- Turck HMI TX707-P3CV01 (Modbus master)

#### Software used

This example uses the following software:

CODESYS 3.5.12.1 (download free of charge from www.turck.com)

#### Requirements

- The programming software has been opened.
- A new project has been created.
- The controller has been added to the project.



#### 7.2.1 Connecting the device with the controller

To connect the device to the controller, the following components must first be added in CODESYS:

- Ethernet adapter
- Modbus TCP master
- Modbus TCP slave

Adding an Ethernet adapter

- ▶ Right-click **Device** (**TX707-P3CV01**) in the project tree.
- Select Add device.

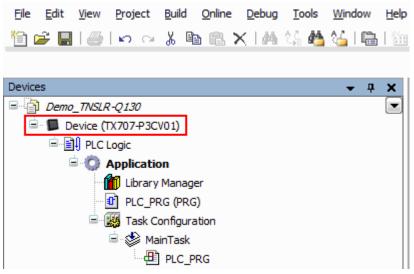


Fig. 14: Project tree



- ⇒ The Add device window opens
- Select Ethernet adapter.
- Click Add device.

Devices - 4 ×	Add Davira
	Add Device
Device (TX707-P3CV01)	Name:
E III PLC Logic	
O Application	Action:
1 Library Manager	Append device      Insert device      Plug device      Update device
PLC_PRG (PRG)	String for a fulltext search Vendor: <all vendors=""></all>
🖻 🌃 Task Configuration	String for a fulltext search Vendor: <all vendors=""></all>
PLC_PRG	Name Vendor Version Description
	B → Miscellaneous
	🖻 🕤 Fieldbusses
	B-GN CANbus
	₽ - Brot EtherCAT
	Ethernet Adapter
	Ethernet Turck 3.5.7.20 Ethernet Link.
	- 🗊 Ethernet Turck 3.5.11.0 Ethernet Link.
	🗄 - 😓 EtherNet/IP
	Modbus
	🖻 - 🛲 Profinet IO
	☑ Group by category ☑ Display all versions (for experts only)
	Please select a device from the list above.
	(You can select another target node in the navigator while this window is open.)
	Add Device Close
	Add Device Close

Fig. 15: Adding an Ethernet adapter

⇒ The Ethernet adapter appears as **Ethernet (Ethernet)** in the project tree.



#### Adding a Modbus master

- ▶ Right-click **Ethernet (Ethernet)** in the project tree.
- Select Add device.
- Double-click the **Modbus TCP Master**.
- ⇒ The Modbus master appears as **Modbus\_TCP\_Master** in the project tree.

Eile Edit View Project Build Online Debug Tools Window Hel	
🎦 🚅 📕   🍏   い つ よ 階 億 🗙   🗛 🎼   箇・音	幽 (행) ♥ ▶ ■ ♥ [대 앤 앱 앱 전 (+ + = 2)
Devices 👻 🕂 🗙	🔂 Add Device
Bemo_TNSLR-Q130         ■ Device (TX707-PSCV01)         ■ ① PLC Logic         □ PLC_PRG (PRG)         □ @ UC_PRG (PRG)         □ @ WanTask         □ @ Ethernet (Ethernet)	Name:       Nettor:         Vendor:       Call vendors>         Name:       Vendor         Vendor:       Call vendors>         Image:       Fieldbusse         Image:       Fieldbusse         Image:       Master         Station:       Station:         Image:       Vendor:         Vendor:       Vendor         Vendor:       Stations GmbH         Modbus TCP Master       Stations GmbH         Modbus TCP Slave Device       Stations GmbH         Image:       Image:         Image:       Profinet 10
	Image: Comparison of the second s
	Information:  Name: Modula TCP Master Version: 55.8.00 Order Number: -  Append selected device as last child of
	Ethernet  (You can select another target node in the navigator while this window is open.)
	Add Device Close
Cross Reference List	

Fig. 16: Adding a Modbus master



#### Adding a Modbus slave

- Right-click **Modbus TCP master** in the project tree.
- Select Add device.
- Double-click **Modbus TCP slave**.
- ⇒ The Modbus slave appears as **Modbus\_TCP\_Slave** in the project tree.

	☆   田   ゆ ゆ → ■ ♥ ( こう ☆ ) 分 Add Derice Name: Modua_TOP_Master Actorn: ● Append derice ① Inset derice ② Pirce	g device 🕐 Update device			×
E 🗱 Task Configuration	String for a fulltext search	Vendor: <all vendors=""></all>			•
iii - S MainTask 	Name	Vendor	Version	Description	
in ∰ Ethernet (Ethernet) ∰ Moduu_TCP_Master (Nodus TCP Master)	ModbusTCP Slave Device     ModbusTCP Slave Device     ModbusTCP Slave Device     ModbusTCP Slave Device     Profinet IO	35 - Smart Software Solutions GmbH 35 - Smart Software Solutions GmbH 35 - Smart Software Solutions GmbH 35 - Smart Software Solutions GmbH	3.5.5.0 3.5.10.0 3.5.12.0 3.5.14.0	A device that works as a Modus TCP Slave. A device that works as a Modus TCP Slave. A device that works as a Modus TCP Slave. A device that works as a Modus TCP Slave.	
	Group by category 📝 Display all versions	s(for experts only) 📝 Display outdated	versions		
	(You can select another target node in the select another target node	re navigator while this window is open.)	Please :	elect a device from the list above.	
					Add Device Close

#### Fig. 17: Adding a Modbus slave

- 7.2.2 Renaming a Modbus slave
  - Click Modbus slave in the project tree.
  - Press F2.
  - Adjust the name of the slave in the project tree of the application.

Devices 🗸 🗸	<b>д</b>	×
Demo_TNSLR-Q130		
🖃 🗊 Device (TX707-P3CV01)		
🖹 🗐 PLC Logic		
🖹 💮 Application		
🖓 📶 Library Manager		
PLC_PRG (PRG)		
🖻 🎆 Task Configuration		
🖻 🍪 MainTask		
PLC_PRG		
🖻 🕤 Ethernet (Ethernet)		
🚊 👔 Modbus_TCP_Master (Modbus TCP Master)		
···· 🚹 TNSLR_Q130 (Modbus TCP Slave)		

Fig. 18: Renaming a Modbus slave



#### 7.2.3 Setting up network interfaces

- Click Device  $\rightarrow$  Scan network.
- Select Modbus master and confirm with **OK**.

<u>File Edit View Project Build Online Debug Tools Window H</u> elp			
🎦 🚅 🛢   🎒   ロ ロ 🌾 ங 🛍 🗙   🖓 🍪 🎽	- 🖞 🛗 😻 🔅 🕠 💡 📲 🔻	(≣ %i 4i 8i   ⇔   <b>∭</b>   ≓   V	
Devices v 4 X	Device X		
□ <u>Device</u> (TX707.+93CV01)	Communication Settings	Scan network   Gateway -   Device -	
III PLC Loge     Image: I	Applications		
Library Manager     DIC_PRG (PRG)	Backup and Restore		
i = ∰ Task Configuration i ∰ MainTask	Files		
PLC_PRG =- fil Ethernet (Ethernet)	Log	Gateway	328.801A] (active)
Modbus_TCP_Master (Modbus TCP Master)     Modbus_TCP_Master (Modbus TCP Slave)	PLC Settings	Select Device	
	PLC Shell	Select the network path to the controller:	
	Users and Groups	□- 💑 e Gateway-1 (scanning)	Device Name:  Scan network TX707-P3CV01 Andres Mink
	Access Rights		_Andres Wink Device Address: 0328,801A
	Interface Parameters		Block driver:
	Task Deployment		UDP E
	Status		channels: 4
	Information		Target ID: 10CD 0207
			Target Name: Turck/ARM/WinCE
			TV Target Type:
			4096
			OK Cancel

Fig. 19: Setting up a network interface to the Modbus master

- Double-click **Ethernet**.
- Open the **Network Adapter** dialog in the **General** tab via the ... button.
- Enter the IP address of the Modbus master.

Devices 👻 👎 🗶	Device 🔐 Ethernet 🗙	
Demo, TKSR 4/2132     Demo, TKSR 4/213     TKSR 4/2132     Modbag TCP Master)     Demo, TKSR 4/213     TKSR 4/2132     Modbag TCP Master)     Demo, TKSR 4/213	General Status Ethernet Device I/O Mapping Information	Interface: br0
		Network Adapters           Interfaces:           Name         Description           IP Address           Io         127.0.1           eth0         0.00.0           eth1         0.00.0           eth2         0.00.0           bh2         0.00.0
		IP Address 192 . 168 . 1 . 26 Subnet Mask 255 . 255 . 255 . 0 Default Gateway 192 . 168 . 1 . 1 MAC Address 00.07.46.25.04.76 OK Cancel

Fig. 20: Modbus master – Entering the IP address (here: 192.168.1.25)



#### 7.2.4 Modbus TCP slave – Setting the IP address

- Double-click the Modbus TCP slave.
- In the **General** tab enter the IP address of the slave.

```
<u>File Edit View Project Build Online Debug Tools Window Help</u>
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                                                 - ₽ X
Devices
                                                            📁 Device 🛛 🚹 Ethernet
                                                                                        TNSLR_Q130 X
Demo_TNSLR-Q130
                                                      -
   🖮 🗊 Device (TX707-P3CV01)
                                                            General
                                                                                           Modbus-TCP
     PLC Logic
                                                                                            Slave IP Address:
                                                                                                                   192 . 168 . 1 . 52
                                                            Modbus Slave Channel
        🖹 🔘 Application
             👘 Library Manager
                                                                                            Response Timeout (ms):
                                                                                                                   1000
                                                            Modbus Slave Init
             PLC_PRG (PRG)
                                                                                                                   502
                                                                                            Port:
             🔣 Task Configuration
                                                            ModbusTCPSlave Parameters
              🗄 🍪 MainTask
                   PLC_PRG
                                                            ModbusTCPSlave I/O Mapping
     Ethernet (Ethernet)
        ė. 👔
                   TCD
                                                            Status
              TNSLR_Q130 (Modbus TCP Slave)
                                                            Information
```

Fig. 21: Modbus slave – Entering the IP address (here: 192.268.1.52)



#### 7.2.5 Defining Modbus channels (registers)

Defining channel 0 (input data)

- Double-click the Modbus TCP slave.
- ▶ In the Modbus slave channel tab, select Add channel.
- Enter the following values:
- Name of channel
- Access type: Read holding registers
- Offset: 0x0000
- Length: 64 registers (128 bytes)
- Confirm with **OK**.

```
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```

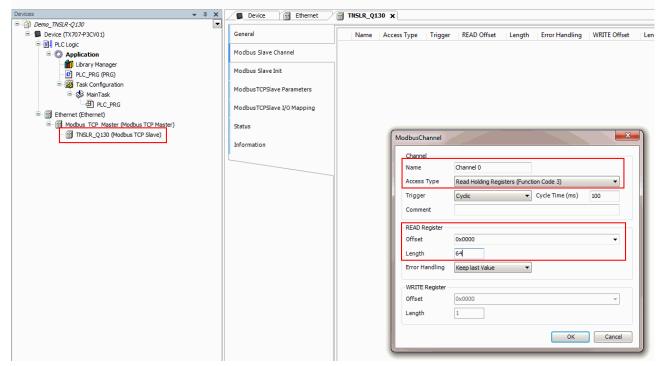


Fig. 22: Defining READ registers



#### Defining channel 1 (output data)

- Double-click the Modbus TCP slave.
- In the Modbus slave channel tab, select Add channel.
- Enter the following values:
- Name of channel
- Access type: Write multiple registers
- Offset: 0x0800
- Length: 64 registers (128 bytes)
  - Confirm with **OK**.

Devices 👻 🕂		TNSLR_Q130	×						
Demo_TNSLR-Q130									
	General	Name	Access Type	Trigger	READ Offset	Length	Error Handling	WRITE Offset	Length
Application	Modbus Slave Channel	0 Channel 0	Read Holding Registers (Function Code 03		16#0000	64	Keep last Value	10 10000	
Library Manager		1 Channel 1	Write Multiple Registers (Function Code 16	) Cyclic, t#100ms				16#0800	64
PLC_PRG (PRG)	Modbus Slave Init								
🖃 🎆 Task Configuration	ModbusTCPSlave Parameters								
🖹 🆃 MainTask	Piolous repsiave parameters								
PLC_PRG	ModbusTCPSlave I/O Mapping								
() Ethernet (Ethernet)     () Ethernet (Modbus TCP Master)									
Modbus_TCP_Master (Modbus TCP_Master)	Status		(			×			
INSER_Q130 (Hodbus TCP stave)	Information		ModbusChannel			×			
			Channel						
			Name Channel 1						
		_				_			
				sters (Function Code 16		•			
			Trigger Cydic	Cycle Time	e (ms) 100				
			Comment						
			READ Register						
			Offset 0x0000			-			
			Length 0						
			Error Handling Keep last Value	*					
			WRITE Register						
			Offset 0x0800			•			
			Length 64						
					ОК Са	incel			

Fig. 23: Setting the WRITE registers

Changing channel addresses

- Double-click the Modbus TCP slave.
- Click the Modbus TCP slave I/O image tab.
- Enter the address in the corresponding table column.

#### Ele Edit Yew Broject Build Online Debug Tools Window Help 19 De Balles in a Sine a Sine a Sine Sine Sine Balline Balles & Sine a Sine

Devices v 4 ×	Device Ethernet	TNSLR_Q130 X						
Device (TX707-P3CV01)	General	Find		Filter Show a		•		
PLCLogic     Application	Modbus Slave Channel	Variable	Mapping	Channel Channel 0	Address %IW50	Type ARRAY [063] OF WORD	Unit	Description Read Holding Registers
Library Manager	Modbus Slave Init	⊞ <b>5</b> ø		Channel 1		ARRAY [063] OF WORD		Write Multiple Registers
i⊒ - [ﷺ Task Configuration i⊒ - ॐ MainTask	ModbusTCPSlave Parameters							
PLC_PRG 	ModbusTCPSlave I/O Mapping							
Modbus_TCP_Master (Modbus TCP Master)     Modbus TCP Slave)	Status							
	Information							

Fig. 24: Changing channel addresses



- 7.2.6 Connecting the device online with the controller
  - Select device.
  - Click Online  $\rightarrow$  Login.

#### 7.2.7 Reading out process data

The process data can be interpreted using mapping if the device is connected online with the controller.

- Double-click the Modbus TCP slave.
- Click the Modbus TCP slave I/O mapping tab.
- ⇒ The process data mapping is displayed.

ices 👻 🔻 🗙	Device 🗗 Ethernet	TNSLR_Q130 ×								
Demo_TNSLR-Q130	1	Find		ilter Show all						
	General	THU		inter Show all		-			_	
Gradient (Section (Sectio	Modbus Slave Channel	Variable N	lapping	Channel	Address	Туре	Current Value	Prepared Value	Unit	Description
Application [run]		🛱 🍫		Channel 0	%IW50	ARRAY [063] OF WORD				Read Holding Registe
Library Manager     D PLC_PRG (PRG)	Modbus Slave Init	iii - ₩p		Channel 0[0]	%IW50	WORD	0			0x0000
E K Configuration		B- *		Channel 0[1]	%IW51	WORD	0			0x0001
	ModbusTCPSlave Parameters	iii - ₩p		Channel 0[2]	%IW52	WORD	256			0x0002
PLC PRG		- *•		Channel 0[3]	%IW53	WORD	8			0x0003
Elternet (Ethernet)	ModbusTCPSlave I/O Mapping			Channel 0[4]	%IW54	WORD	0			0x0004
O Modbus_TCP_Master (Modbus TCP Master)		- *•		Channel 0[5]	%IW55	WORD	5			0x0005
Modbus_TCP_Master (Modbus TCP Master)	Status	- *•		Channel 0[6]	%IW56	WORD	0			0x0006
		iiii iiiiiiiiiiiiiiiiiiiiiiiiiiiiiiii		Channel 0[7]	%IW57	WORD	32896			0x0007
	Information			Channel 0[8]	%IW58	WORD	0			0x0008
		😟 😟 🧤		Channel 0[9]	%IW59	WORD	0			0x0009
		B- *		Channel 0[10]	%IW60	WORD	0			0x000A
		B-*9		Channel 0[11]	%IW61	WORD	0			0x000B
		B- 🏘		Channel 0[12]	%IW62	WORD	1248			0x000C
		10 - Ng		Channel 0[13]	%IW63	WORD	1			0x000D
		B *		Channel 0[14]	%IW64	WORD	44555			0x000E
		B- 10		Channel 0[15]	%IW65	WORD	35102			0x000F
		B 10		Channel 0[16]	%IW66	WORD	0			0x0010
		B- 10		Channel 0[17]	%IW67	WORD	0			0x0011
				Channel 0[18]	%IW68	WORD	0			0x0012
				Channel 0[19]	%IW69	WORD	0			0x0013
		B . No		Channel 0[20]	%IW70	WORD	0			0x0014
		B- 19		Channel 0[21]	%IW71	WORD	0			0x0015
		· · · · · ·		Channel 0[22]	%IW72	WORD	0			0x0016
		B- 10		Channel 0[23]	%IW73	WORD	0			0x0017
				Channel 0[24]	%IW74	WORD	0			0x0018
		B-10		Channel 0[25]	%IW75	WORD	0			0x0019
		B. 49		Channel 0[26]	%IW76	WORD	0			0x0015
		B-10		Channel 0[27]	%IW77	WORD	0			0x001R
		B. 19		Channel 0[27]	%IW78	WORD	0			0x001C
		B-19		Channel 0[20]	%IW79	WORD	0			0x001C
		B - 10		Channel 0[29] Channel 0[30]	%IW80	WORD	0			0x001D 0x001E
		E 19		Channel 0[30] Channel 0[31]	%IW81	WORD	0			0x001E
				Channel 0[31] Channel 0[32]	%IW82	WORD	0			0x0020

Fig. 25: Process data



## 7.2.8 Modbus TCP – Mapping

## RFID channels — parameter data

Description	Register		Bit offset	Bit length
	Channel 1	Channel 2		
Operating mode	0xB000	0xB012	0	8
Select tag type	0xB000	0xB012	8	8
Bypass time	0xB001	0xB013	0	16
HF: Multitag mode	0xB002	0xB014	4	1
HF: Heartbeat read/write head	0xB002	0xB014	5	1
RS-485 bus terminating resistor	0xB002	0xB014	6	1
Automatic tuning of read/write head	0xB002	0xB014	7	1
Deactivate diagnostic HF read/write head tuning	0xB002	0xB014	8	1
Diagnostic input filter	0xB002	0xB014	15	1
HF idle mode	0xB003	0xB015	0	8
Command repetitions in the event of an error	0xB004	0xB016	0	8
HF: Command in continuous mode	0xB004	0xB016	8	8
HF: Length in continuous mode	0xB005	0xB017	0	16
HF: Address in continuous mode	0xB006	0xB018	0	32
Length of read data	0xB010	0xB022	0	16
Length of write data	0xB011	0xB023	0	16



#### RFID channels — process input data

Description	Register		Bit offset	Bit length
	Channel 1	Channel 2		
Response code	0x0000	0x004C	0	14
Error	0x0000	0x004C	14	1
Busy	0x0000	0x004C	15	1
Tag in detection range	0x0002	0x004E	0	1
HF read/write head switched on	0x0002	0x004E	8	1
Continuous mode active	0x0002	0x004E	9	1
Loop counter	0x0001	0x004D	0	8
Read/write head not tuned	0x0002	0x004E	4	1
Parameter is not supported by the read/write head	0x0002	0x004E	5	1
Read/write head reports error	0x0002	0x004E	6	1
Expected read/write head not connected	0x0002	0x004E	7	1
Length	0x0003	0x004F	0	16
Error code	0x0004	0x0050	0	16
Tag counter	0x0005	0x0051	0	16
Data (bytes) available	0x0006	0x0052	0	16
Read fragment no.	0x0007	0x0053	0	8
Write fragment no.	0x0007	0x0053	8	8
Read data byte 0	0x000C	0x0058	0	8
Read data byte 1	0x000C	0x0058	8	8
Read data byte 2	0x000D	0x0059	0	8
Read data byte 3	0x000D	0x0059	8	8
	•••			8
Read data byte 14	0x0013	0x005F	0	8
Read data byte 15	0x0013	0x005F	8	8
				8
Read data byte 64	0x002C	0x007B	0	8
Read data byte 65	0x002C	0x007B	8	8
		0x0000		8
Read data byte 126	0x004B	0x0097	0	8
Read data byte 127	0x004B	0x0097	8	8



#### RFID channels — process output data

Description	Register		Bit offset	Bit length
	Channel 1	Channel 2		
Command code	0x0800	0x084C	0	16
Loop counter	0x0801	0x084D	0	8
Start address	0x0802	0x084E	0	32
Length	0x0804	0x0851	0	16
UID length	0x0805	0x0851	0	8
Timeout	0x0806	0x0852	0	16
Read fragment no.	0x0807	0x0853	0	8
Write fragment no.	0x0807	0x0853	8	8
Write data byte 0	0x080C	0x0858	0	8
Write data byte 1	0x080C	0x0858	8	8
				8
Write data byte 14	0x0813	0x085F	0	8
Write data byte 15	0x0813	0x085F	8	8
	•••			8
Write data byte 64	0x0813	0x0878	0	8
Write data byte 65	0x0813	0x0878	8	8
				8
Write data byte 126	0x084B	0x0897	0	8
Write data byte 127	0x084B	0x0897	8	8

## RFID diagnostic data

Description	Register		Bit offset	Bit length
	Channel 1	Channel 2		
Overvoltage at power supply terminal VAUX	0x098	0x00AA	7	1
Parameter error	0x098	0x00AA	6	1
Configuration via the DTM active	0x098	0x00AA	5	1
Memory full	0x098	0x00AA	4	1
Read/write head not tuned	0x09A	0x00AC	4	1
Parameter is not supported by the read/write head.	0x09A	0x00AC	5	1
Read/write head reports error	0x09A	0x00AC	6	1
Expected read/write head not connected	0x09A	0x00AC	7	1



#### Module status — diagnostic messages

Description	Register	Bit offset	Bit length
Force mode active in the DTM	0x00BE	14	1
Undervoltage V1	0x00BE	9	1
Undervoltage V2	0x00BE	7	1
Module diagnostics available	0x00BE	0	1
Internal error	0x00BE	10	1
ARGEE program active	0x00BE	1	1



## 7.3 Connect the device to an EtherNet/IP scanner using RSLogix

Hardware used

This example uses the following hardware components:

- Rockwell controller CompactLogix L30ER
- HF read/write head TNSLR-Q130-EN

#### Software used

This example uses the following software:

- Rockwell RSLogix
- EDS file for TNSLR-Q130-EN (download free of charge from www.turck.com)

#### Requirements

- The programming software has been opened.
- A new project has been created.
- The controller has been added to the project.

#### 7.3.1 Installing an EDS file

The EDS file is available free of charge for download from www.turck.com.

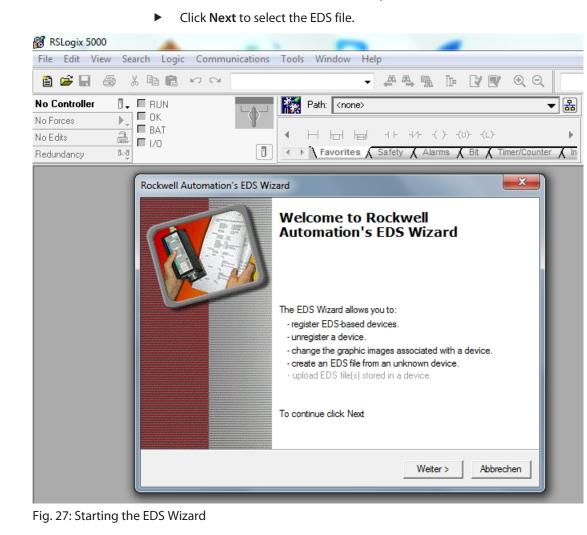
👸 RSLogix 5000			
File Edit View Search Logic Communications	Too	ls Window Help	
		Options	QQ
No Controller		Security	
	Ģ	Documentation Languages	
No Edito II BAT		Import •	
Redundancy		Export	imer/Counter 🔏 In
	405		
	<b>9</b> 1	EDS Hardware Installation Tool	
		Motion •	
		Custom Tools	
	100	Translate PLC-5/SLC 2.0	
	đ	Co <u>n</u> trolFLASH	
	Ø.	Logix5000 Clock Update Tool	
		Logix5000 Task Monitor	
	۲	DeviceNet Tag <u>G</u> enerator	
		Co <u>m</u> pare Tool	
		RSLogix 5000 IEC61131-3 Translation Tool	
	P	Tag <u>D</u> ata Monitor Tool	
	ţ,	Tag <u>U</u> pload Download Tool	
	þ	RSLogix5000 Data Preserved Download Tool	

Fig. 26: Opening the EDS Hardware Installation Tool

<sup>•</sup> Include an EDS file: Click Tools  $\rightarrow$  EDS Hardware Installation Tool.



The wizard for the installation of EDS file opens.





Select the Register an EDS file(s) option and confirm with Next.	
👹 RSLogix 5000	
File Edit View Search Logic Communications Tools Window Help	
No Controller       Image:	
Rockwell Automation's EDS Wizard         Options         What task do you want to complete?         Image: Complete and EDS file(s).	
This option will add a device(s) to our database.  Unregister a device.  This option will remove a device that has been registered by an EDS file from our database.  C Create an EDS file.	
<ul> <li>This option creates a new EDS file that allows our software to recognize your device.</li> <li>Upload EDS file(s) from the device. This option uploads and registers the EDS file(s) stored in the device.</li> </ul>	
< Zurück Weiter > Abbrechen	

Fig. 28: Option selection — registering an EDS file(s)



- Select EDS file: Select single file or folder (example: single file).
- Enter a path for the memory location of the EDS file.
- Confirm with Next.
- ⇒ The installation wizard guides you through the further installation.

File       Edit       View       Search       Logic       Communications       Tools       Window       Help         No       Controller       Image: Communication	👸 RSLogix 5000	
No Controller       Image: Second secon	File Edit View Searc	ch Logic Communications Tools Window Help
No Forces   No Edits   BAT   Redundancy   Boy     Registration   Bectronic Data Sheet file(s) will be added to your system for use in Rockwell     Automation applications.     Image:     Register a single file     Register a directory of EDS files     Look in subfolders     Named:   Browse   If there is an icon file (ico) with the same name as the file(s) you are registering then this image will be associated with the device.	🗎 🖻 🖬 🎒 🐰	
Registration       Electronic Data Sheet file(s) will be added to your system for use in Rockwell Automation applications.            • Register a single file         • Register a directory of EDS files         • Look in subfolders         Named:	No Forces	
<zurück weiter=""> Abbrechen</zurück>		Registration       Image: Second Data Sheet file(s) will be added to your system for use in Rockwell Automation applications.         Image: Second Data Sheet file(s) will be added to your system for use in Rockwell Automation applications.         Image: Second Data Sheet file(s)         Image: Second Data Sheet file(

Fig. 29: Selecting an EDS file

- 7.3.2 Connecting the device with the controller
  - Right-click I/O configuration  $\rightarrow$  Ethernet.
  - Click New module.
  - Select Turck under Module type vendor filters.
  - Select TNSLR-Q130-EN.
  - Confirm the selection with **Create**.
  - Assign a module name.
  - Enter the IP address of the device.
  - ► Select an integer as a format for the input data and output data: Click Change → In the following window select INT.
  - Optional: Set the connection and port configuration.

The device appears in the project tree.



## 7.3.3 Connecting the device online with the controller

- Select the controller.
- Click Go online.
- In the following window click (Connect to go online) Download.
- Confirm all the subsequent messages.

## 7.3.4 Reading out process data

►

Select Controller tags in the project tree.

RSLogix 5000 - TBEN_S2_2REID_4DXP_Demo_V100 [1]	760_I 20EP 20 121*
File Edit View Search Logic Communications	
	🗸 🦀 🍇 🙀 🔃 📝 🖭 🍕 📿 🛛 Select a Language 🗸 🥥
Rem Run     Image: Controller OK       No Forces     Image: Controller OK       No Edits     Image: Controller OK       Image: Controller OK     Image: Controller OK <tr< th=""><th>Path:       AB_ETH-1\192.168.1.58       ▼         ▲       H       H       ++       <t< th=""></t<></th></tr<>	Path:       AB_ETH-1\192.168.1.58       ▼         ▲       H       H       ++       + <t< th=""></t<>
Controller Organizer       Image: Controller TBEN_S2_2RFID_4DXP_Demo_V100         Controller Tags       Controller Tags         Controller Fault Handler       Power-Up Handler         Image: Power-Up Handler       Image: Power-Up Handler         Image: Power-Defined       Image: Power-Defined         Image: Power-Defined       Image: Power-Up Handler         Image: Power-Defined       Image: Power-Up Handler         Image: Power-Up Handler       Image: Power-Up Handler	

#### Fig. 30: Controller tags in the project tree



Parameter data (tben\_2rfid:C), input data (tben\_2rfid:I1) and output data (tben\_2rfid:O1) can be accessed.

RSLogix 5000 - TBEN_S2_2RFID_4DXP_Demo_V100 [1]	769-L30ER 20.12]* - [Controller Tags - TBEN_S2_2RFID_4DXP	_Demo_V100(con <mark>troller)]</mark>	
File Edit View Search Logic Communication	ons Tools Window Help		
"∎ 🖆 🖶 🎒 👗 🖿 🛤 💼 🕫 🖙	- 🏕 🕰 🙀 💽 📝 🛒 🔍	R Select a Language	<b>-</b> 🧶
Rem Run     Image: Controller OK       No Forces     Image: Controller OK       No Edits     Image: Controller OK       Image: Controller OK     Image: Controller OK	Path:         AB_ETH-1\192.168.1.58           ▲         →         →         →         ↓ </td <td>► E</td> <td></td>	► E	
Controller Organizer - 4 X	Scope: DTBEN_S2_2RFII - Show: All Tags		• 7
Controller Tags	Name	<b>⊑</b> ₿ ∆   Value	🗲 Force Mask 💉 Style
Controller Fault Handler	+ tben_2rfid:C		{}
Power-Up Handler	+ tben_2rfid:11		{}
Tasks			{}
i			

Fig. 31: Access to parameter data, input data and output data

Example: process input data — tag in the detection range of the read/write head

In the following example a tag is located in the detection range of the read/write head. The process data can be interpreted using mapping.

RSLogix 5000 - TBEN_S2_2RFID_4DXP_D	emo_V100 [1769-L30ER 20.12]* - [Controller Tags - TBE	N_S2_2RFID_4DXP_Demo_V100(controller)	1			-	
🌛 File Edit View Search Logic C	communications Tools Window Help						
		🛛 📝 🛒 🔍 🔍 🛛 Select a Language	s 👻 💓				
Bree Bree							
No Forces	Path: AB_ETH-1\192.168.1.58	▼ 品					
No Edits		-(U)					
No Edits 🔒 📕 Battery OK	Favorites Add-On A Safety						
	Favorites & Add-On & Safety	A Alarms A Bit A Timer/C					
Controller Organizer 🛛 👻 🕂 🗙	Scope: DTBEN_S2_2RFII - Show: All Tags			• 7	7. Enter Name Filter		
Controller TBEN_S2_2RFID_4DXP_[	Name	=s 🛆 Value	<ul> <li>Force</li> </ul>	Mask + Style	Data Type	Description	Constant
Controller Tags	+ tben 2rfid:C		{}	{}	0030:6814029		
Controller Fault Handler	- tben_2rfid:11		{}	{}	_0030:6814029		
Power-Up Handler			0	Decimal	BOOL		
	- tben 2rfid:11.Data		{}	{} Decimal	INT[191]		
Hain Lask	+ tben 2rfid:11.Data[0]		0	Decimal	INT		
Unscheduled Programs	+ tben_2rfid:11.Data[1]		0	Decimal	INT		
	+ tben_2rfid:11.Data[2]		0	Decimal	INT		
Ungrouped Axes	- tben 2rfid:11.Data[3]		65	Decimal	INT		
Add-On Instructions	tben 2rfid:11.Data[3].0		1	Decimal	BOOL		
	tben_2rfid:11.Data[3].1		0	Decimal	BOOL		
User-Defined	tben_2rfid:11.Data[3].2		0	Decimal	BOOL		
🕣 🙀 Strings	tben 2rfid:11.Data[3].3		0	Decimal	BOOL		
	tben 2rfid:11.Data[3].4		0	Decimal	BOOL		
👜 🔙 Predefined	tben_2rfid:11.Data[3].5		0	Decimal	BOOL		
🗄 🚂 Module-Defined	tben_2rfid:11.Data[3].6		1	Decimal	BOOL		
🗀 Trends	tben 2rfid:11.Data[3].7		0	Decimal	BOOL		
🗄 🔄 I/O Configuration	tben 2rfid:11.Data[3].8		0	Decimal	BOOL		
🖨 🌐 1769 Bus	1 0 C UI D 1 (0) 0		0	Decimal	BOOL		
[] [0] 1769-L30ER TBEN_S2_2F	tben_2rfid:I1.Data[3].10		0	Decimal	BOOL		
⊡~器 Ethernet	tben 2rfid:11.Data[3].11		0	Decimal	BOOL		
1769-L30ER TBEN_S2_2RFIE	tben 2rfid:11.Data[3].12		0	Decimal	BOOL		
6814029 tben_2rfid	tben_2rfid:11.Data[3].13		0	Decimal	BOOL		
	tben_2rfid:I1.Data[3].14		0	Decimal	BOOL		
۰	tben_2rfid:I1.Data[3].15		0	Decimal	BOOL		
	+ tben 2rfid:11.Data[4]		8	Decimal	INT		
	+ tben 2rfid:11.Data[5]		0	Decimal	INT		
	+ tben_2rfid:11.Data[6]		1	Decimal	INT		
	+ tben_2rfid:11.Data[7]		0	Decimal	INT		
	+ tben 2rfid:11.Data[8]		-32640	Decimal	INT		
	+ tben 2rfid:11.Data[9]		02040	Decimal	INT		
	+ tben_2rfid:11.Data[10]		0	Decimal	INT		
	+ tben 2rfid:11.Data[11]		0	Decimal	INT		
<	Monitor Tags / Edit Tags /			1.5 collinar			

#### Fig. 32: Process input data — example

#### 7.3.5 EtherNet/IP — mapping

Description	Assembly instance	Value (words)
Input	103	191
Output	104	154



#### 7.3.6 Activating QuickConnect (QC)

The devices support QuickConnect. With QuickConnect, the controller can connect to Ethernet/ IP nodes in less than 500 ms after the EtherNet/IP network power supply is switched on. This requires the devices to start up quickly, particularly with fast tool changes on robot arms, e.g. in the automobile industry.

The start-up time for the RFID interfaces is less than 150 ms.

QuickConnect can be activated via the web server of the device or in RSLogix via Configuration Assembly or Class Instance Attribute.

•	N
	A

NOTE

Activating QuickConnect will automatically adjust all necessary port properties.

Port property	State	
Autonegotiation	Deactivated	
Transmission speed	100BaseT	
Duplex	Full duplex	
Тороlоду	Linear	
AutoMDIX	Deactivated	

Notes on the correct connection of the Ethernet cables in QuickConnect applications are provided in the chapter QuickConnect and Fast Start-up Applications.

#### Activating QuickConnect via configuration assembly

The configuration assembly is part of the assembly class of the device.

- Configure the configuration assembly in RSLogix.
- ► Activate QuickConnect via byte 9, bit 0 = 1 in the controller tags.

#### Activating QuickConnect via the Class Instance Attribute

Activate QuickConnect via Class Instance Attribute as follows:

Class	Instance	Attribute	Value
0xF5	0x01	0x0C	0: Deactivated (de- fault) 1: Activated

Activating QuickConnect via the web server

- Click Parameter  $\rightarrow$  Activate QuickConnect  $\rightarrow$  Yes.
- ➡ The settings required for QuickConnect are found under port properties. Unsaved changes are indicated by the pen icon.
- Click Write.
- ⇒ The changed parameters are written to the device.



## 7.4 Connecting the device to a PROFINET master using the TIA Portal

The following example describes the connection of the device to a Siemens controller in PROFINET with the SIMATIC STEP7 Professional V15 programming software (TIA Portal).

Hardware used

This example uses the following hardware components:

- Siemens S7-1500 controller
- HF read/write head TNSLR-Q130-EN

#### Software used

This example uses the following software:

- SIMATIC STEP7 Professional V15 (TIA Portal)
- GSDML file for TNSLR-Q130-EN (download free of charge from www.turck.com)

Requirements

- The programming software has been opened.
- A new project has been created.
- The controller has been added to the project.



#### 7.4.1 Installing a GSDML file

The GSDML file is available free of charge for download from www.turck.com.

► Include a GSDML file: Click **Options** → **Manage device description files (GSD)**.



Fig. 33: Installing a GSDML file

- Install a GSDML file: Enter the memory location of the GSDML file and click Install.
- ⇒ The device is entered in the hardware catalog of the programming software.

Manage general station description files X								
Installed GSDs GSDs in the project								
Source path: C:\Users\andres.baeker\Desktop\TNSLR-Q130\Demo_TNSLR_Q130\AdditionalFiles\GSD								
Content of imported path								
File	Version	Language	Status	Info				
GSDML-V2.35-Turck-TNSLR_Q130	V2.35	English, Ger	Already installed	TBEN Line T				
<				>				
			Delete Install	Cancel				

Fig. 34: Select a GSDML file



#### 7.4.2 Connecting the device with the controller

- Select the read/write head from the hardware catalog and drag it into the hardware window.
- Connect the device with the controller in the hardware window.

Project Edit View Insert Online Options Tools Wind Project Edit View Insert Online Options Tools Wind	un mep II: II: II: II: II: II: II: II: II: II:	Totally Integrated Automation PORTAL
Project tree	【 Demo_TNSLR_Q130 → Devices & networks _ 🖉 ■ 2	K Hardware catalog 🖉 🗊 🕨
Devices	P Topology view 🔥 Network view 👔 Device view	Options
18 III III III III III III III III III I		Catalog
Demo_TNSLR_Q130		
Add new device		dearch> MI MI
Devices & networks	PLC_1 turck-tnsfr-q130	Filter Profile: <all></all>
PLC_1 [CPU 1513-1 PN]	CPU 1513-1 PN TNSLR-Q130	Controllers
Device configuration	PLC_1 CUTURE	▶ 🛅 HM
Q Online & diagnostics		PC systems
Program blocks		Drives & starters
Technology objects	PNAE_1	Image Network components
External source files		Detecting & Monitoring
PLC tags		Distributed I/O
Co PLC data types		Power supply & distribution
Watch and force tables		Field devices
Online backups		<ul> <li>Other field devices</li> </ul>
Traces		Additional Ethernet devices
Device proxy data		✓ Im PROFINETIO
B Program info		Drives
PLC supervisions & alarms	6	Encoders
PLC alarm text lists		Gateway
Local modules		- 🕞 10
Distributed I/O		Image: State St
Ungrouped devices		Hans Turck GmbH + Co. KG
Security settings		Lumberg Automation
Common data		🕨 🧊 Molex
Cocumentation settings		TURCK
Languages & resources		Turck
<ul> <li>Online access</li> </ul>		- Turck
Displaylhide interfaces		BEEP
COM <4> [RS232/PPI multi-master cable]	185	BL20
COM [RS232/PPI multi-master cable]		▶ 🛅 BL67
D-Link DUB-1312/1332 USB3.0 to Gigabit Ethernet Ad		CODESYS3
A Update accessible devices		EXCOM
Display more information		FEN20
plc-1513pn-1 [192.168.1.4]		TBEN-L
<ul> <li>Image: The second second</li></ul>	Properties 🗓 Info 🚺 Diagnostics 📑 🖬	TBEN-S
Online & diagnostics		
Gard Reader/USB memory	General Cross-references Compile	TNSLR-Q130
	Show all messages	Sensors
		Valves

Fig. 35: Connecting the device with the controller

## 7.4.3 Assigning the PROFINET device name

- Select Online accesses  $\rightarrow$  Online & diagnostics.
- Select Functions  $\rightarrow$  Assign PROFINET device name.
- Assign the required PROFINET device name.

Project Edit View Insert Online Options Tools Window	Help		
📑 🎦 🔒 Save project 🚊 🐰 🗐 🏦 🗙 🏷 한 (주 한 🖥 🗓	🔢 🔛 🕼 🚿 Go online 🖉 Go offli	o offline 🏭 🖪 🖪 🗙 🚽 🔢 <eerch in="" projects="" td="" 🚂<=""><td></td></eerch>	
Project tree 🔲 🖣		USB3.0 to Gigabit Ethernet Adapter 🔸 turck-tnsir-q130 [192.168.1.100] 🕨 turck-tnsir-q130 [192.168.1.100] [192.168.1.100] 💶 🖬	■×
Devices			
	General	Assign PROFINET device name	- 1
o sti	▼ Functions		
▼ Demo_TNSLR_Q130	Assign IP address		
Add new device	Assign PROFINET device na	Configured PROFINET device	
a Devices & networks	Reset to factory settings		
		PROFINET device name: turck-tnsIr-q130	
Device configuration		Device type: TNSLR-Q130-H1147-EN	
<ul> <li>Online &amp; diagnostics</li> </ul>			
Program blocks			
Technology objects			
External source files			
PLC tags			
C PLC data types		Device filter	
Watch and force tables		Device filter	
Online backups		Only show devices of the same type	
Traces		Only show devices with bad parameter settings	
Device proxy data	1		
Program info		Only show devices without names	
PLC supervisions & alarms	-	- Accessible devices in the network:	
PLC alarm text lists			
Local modules		IP address MAC address Device PROFINET device name Status	
Distributed I/O			
Grouped devices			
Security settings			
Common data			
Documentation settings			
Languages & resources			
▼ 🙀 Online access			
Y Display/hide interfaces		LED flashes Update list Assign name	
COM <4> [RS232/PPI multi-master cable]			
COM [RS232/PPI multi-master cable]			
D-Link DUB-1312/1332 USB3.0 to Gigabit Ethernet Ad			
Pipelane accessible devices			
Display more information	<		
<ul> <li>implc-1513pn-1 [192.168.1.4]</li> <li>implc-1513pn-1 [192.168.1.4]</li> </ul>			-
[] turck-tnslr-q130 [192.168.1.100]     [] Online & diagnostics		Properties Diagnostics	-
Conline & diagnostics     Grand Reader/USB memory	General Cross-references	ces Compile	
<ul> <li>Card Readenospimemory</li> </ul>			_

Fig. 36: Assigning the PROFINET device name



#### 7.4.4 Set the IP address in the TIA Portal

- Select **Device View**  $\rightarrow$  **Properties** tab  $\rightarrow$  **Ethernet addresses**.
- Assign the required IP address.

Project Edit View Insert Online Options Tools Window           Image: Contract C		line 🎝 🖪 🖪 🕼 🗶 🖃 🛄 🤜	iearch in project>			
Project tree 🔲 🖣	Demo_TNSLR_Q130 → Ungroup	oed devices → turck-tnslr-q130	TNSLR-Q130]			_ # =×
Devices				📲 Topology view	Network view	Device view
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	turck-tnslr-q130 [TNSLR-Q130 💌	💷 📅 🚄 🗄 🔲 🔍 🛓			Device overview	
ž l				^	-	
Demo_TNSLR_Q130		•			₩ Module turck-tns	R Ir-g130 0
Add new device	and the second se				PN-IO	
🕺 📥 Devices & networks					HF komp	
8 • 1 PLC_1 [CPU 1513-1 PN]	Sec.				128 Byte	
Device configuration						schreiben_1 0
Online & diagnostics					120 byte	o o
Program blocks						0
Technology objects		-				v
External source files		P-reservations.			,	
PLC tags		A Contraction of a				
Eg PLC data types						
Watch and force tables						
Online backups			-			
🕨 📴 Traces						
Device proxy data						
Program info				~		
PLC supervisions & alarms	<		> 100%	• 🔟	<	>
PLC alarm text lists						
Local modules	turck-tnslr-q130 [TNSLR-Q130]			Properties	🗓 Info 📃 Diagr	nostics
Distributed I/O	General IO tags Syste	em constants Texts				
Ungrouped devices	▼ General					^
🕨 📷 Security settings	Catalog information	Ethemet addresses				
Common data	▼ PROFINET interface [X1]	Interface networked with				
Documentation settings	General					
Languages & resources	Ethernet addresses	Subnet:	PN/IE 1			
Online access	Advanced options		Add.new.subnet			
Y Display/hide interfaces	Identification & Maintenance					
COM <4> [R5232/PPI multi-master cable]	Hardware interrupts	IP protocol				
COM [RS232/PPI multi-master cable]	Module parameters	if protocol				
D-Link DUB-1312/1332 USB3.0 to Gigabit Ethernet Ad			<ul> <li>Set IP address in the project</li> </ul>			
Display more information						
<ul> <li>Display more information</li> <li>plc-1513pn-1 [192.168.1.4]</li> </ul>			IP address: 192 . 168 . 1 . 100			
turck-tnsir-g130 [192.168.1.100]	F.		Subnet mask: 255 . 255 . 255 . 0			
Q. Online & diagnostics		-	Synchronize router settings with IO controller	·		
Card Reader/USB memory			Use router			
Card Readenosa memory			Router address: 0 . 0 . 0 . 0			
			IP address is set directly at the device			
		PROFINET				
< III >	4		Generate PROFINET device name automatically			
✓ Details view		PROFINET device name:	turck-tnslr-q130			
		Converted name:	turck-tnslr-q130			
		Device number:	1			
		bettee humber.				

Fig. 37: Assigning the IP address

- 7.4.5 Connecting the device online with the controller
  - Start online mode (connect online).
  - ⇒ The device was successfully connected to the controller.
- 7.4.6 Setting module parameters
  - Select Device view  $\rightarrow$  Device overview.
  - Select the module to be set.
  - Click Properties  $\rightarrow$  General  $\rightarrow$  Module parameters.
  - Set the **station parameters**.

#### 7.4.7 PROFINET – Mapping

The PROFINET mapping is the same as the data mapping described in the "Settings" chapter.



# 8 Setting

## 8.1 Parameter data

Byte no.	Bit										
	7	6	5	4	3	2	1	0			
0	Operatin	Operating mode (Mode)									
1	Select tag	Select tag type (TAGTYPE)									
2	Bypass ti	Bypass time (BYPASS)									
3											
4	AT	AT TERM Reserved ANTI									
5	DID							DXD			
6	HFIDLEM	ODE									
7	Reserved										
8	Comman	d repetitio	ns (CRET)								
9	Comman	id in contin	uous mode	(CCM)							
10	Length ir	n continuou	ıs mode (LC	EM)							
11											
12	Reserved										
13											
14											
15											
16											
17											
18											
19											
20											
21											
22											
23											
24											
25											
26											
27	Reserved										
28											
29											
30											
31											
32	Length o	f write data	(WDS)								
33											
34	Length o	f read data	(RDS)								
35											



## 8.1.1 Meaning of the parameter bits

The default values of the firmware, the DTM and the EDS file are shown in **bold**. The default values for PROFINET may vary.

Designation	Meaning
Operating mode (OMRFID)	0: Deactivated <b>1: HF compact</b> 2: HF advanced
Tag type (TAGTYPE)	0: Automatic HF tag detection 1: NXP lcode SLIX 2: Fujitsu MB89R118 3: TI Tag-it HF-I Plus 4: Infineon SRF55V02P 5: NXP lcode SLIX-S 6: Fujitsu MB89R119 7: TI Tag-it HF-I 8: Infineon SRF55V10P 9: Reserved 10: Reserved 10: Reserved 11: NXP lcode SLIX-L 12: Fujitsu MB89R112 13: EM4233SLIC 14: NXP SLIX2 15: TI Tag-it HFI Pro 16: Turck sensor tag 17: Infineon SRF55V02S 18: Infineon SRF55V10S 19: EM4233 20: EM4237 21: EM4237 SLIC 22: EM4237 SLIX 23: EM4033
Bypass time (BYPASS)	Bypass time in ms, adjustable from 4…1020 ms, default setting: 200 ms
Automatic tuning of read/write head (AT)	<b>0: Automatic tuning off</b> 1: Automatic tuning on
Multitag mode (ANTI)	<b>0: Multitag mode off</b> 1: Multitag mode on
Diagnostic input filter (DID)	<b>0: All diagnostic messages on</b> 1: Diagnostic messages off
Deactivate diagnostic HF read/ write head tuning (DXD)	0: Diagnostic messages of the read/write head on 1: Diagnostic messages of the read/write head off
Idle mode (HFIDLEMODE)	Defines which data is to be displayed (not available in the EDS file). <b>0: UID</b> 1: 8 bytes of user memory 2: UID and 8 bytes of user memory 3: UID and 64 bytes of user memory
Command repetitions in the event of a fault (CRET)	Number of command repetitions after a fault signal, default setting: 2
HF: Command in continuous mode (CCM)	<b>0x01: Inventory</b> 0x02: Read 0x03: Tag info 0x04: Write

Designation	Meaning
HF: Length in continuous mode (LCM)	Number of bytes that still have to be read or written in continuous mode, default setting: 8
Length of write data (WDS)	Size of the write data, default setting depends on the selected interface and field- bus
Length of read data (RDS)	Size of the read data, default setting depends on the selected interface and field- bus

#### 8.1.2 Selecting the tag type

In multitag applications select a tag type for executing the read and write commands. Automatic tag detection is not supported for the read and write commands in multitag mode.



#### 8.1.3 Setting the bypass time

Due to the expansion of the HF transmission zone the tag may drop out momentarily during a write or read operation and then later return again. The period between the drop out and the return to the transmission zone must be bridged so that the write or read operation is completed. The bypass time is the time between the dropout and the return to the detection range. The **Bypass time** parameter takes up one word in the parameter data image and is stated in ms.

The bypass time can be set between 4...1020 ms. The bypass time parameter depends on the components used, the write/read distances, the speed of the tag to the read/write head and other external factors.

The following figure shows the typical characteristics of the sensing range and the path covered by the read/write head. A shows the section to be bridged:

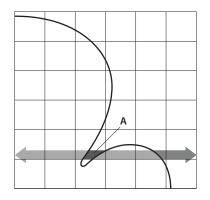


Fig. 38: Detection range of a read/write head

Retaining the default setting



- Retaining the default setting: If startup is successful, the parameter does not have to be adjusted to the application. If startup is not successful, a fault signal appears.
- If the fault signal appears, adjust the bypass time. If it is not possible to adjust the bypass time, reduce the speed or data volume.

The information "Recommended distance" and "Maximum distance" is provided in the product-specific data sheet.

Adapting the bypass time to the application

- Measure the required bypass time on site. The LEDs of the read/write head and the TP status bit of process input data indicate whether the tag is in the sensing range or not.
- Enter the required bypass time.



## 8.2 Process input data

## Process input data — HF compact operating mode

Byte no.		Bit								
PROFINET	Modbus EtherNet/ IP	7	6	5	4	3	2	1	0	
0	0	Response	code (RESC)		·				·	
1	1									
2	2	Loop coun	ter for rapio	d processing	g (RCNT)					
3	3	Reserved								
4	4	TNC1	TRE1	PNS1	XD1				TP	
5	5							CMON	TON	
6	6	Length (LE	N)							
7	7									
8	8	Error code	(ERRC)							
9	9	_								
10	10	Tag counte	er (TCNT)							
11	11	_								
12	24	Read data	byte 0							
13	25	Read data	byte 1							
14	26	Read data	byte 2							
15	27	Read data	byte 3							
16	28	Read data	byte 4							
17	29	Read data	Read data byte 5							
18	30	Read data								
19	31	Read data	byte 7							



## Process input data — HF Advanced operating modes

Byte no.		Bit								
PROFINET	Modbus EtherNet/ IP	7	6	5	4	3	2	1	0	
0	0	Response	code (RESC)							
1	1									
2	2	Loop coun	ter for rapid	processing	J (RCNT)					
3	3	Reserved								
4	4	TNC1	TRE1	PNS1	XD1				TP1	
5	5							CMON	TON	
6	6	Length (LE	N)							
7	7									
8	8	Error code	(ERRC)							
9	9									
10	10	Tag counte	er (TCNT)							
11	11									
12	12	Data (byte	s) available	(BYFI)						
13	13									
14	14	Read fragn	nent no.							
15	15	Write fragr	nent no.							
16	16	Reserved								
17	17	Reserved								
18	18	Reserved								
19	19	Reserved								
20	24	Read data	byte 0							
21	25	Read data	byte 1							
22	26	Read data	byte 2							
23	27	Read data	byte 3							
24	28	Read data	byte 4							
25	29	Read data	byte 5							
26	30	Read data	byte 6							
27	31	Read data	byte 7							
146	151	Read data	byte 127							



## 8.2.1 Meaning of the status bits

#### Default values are shown in **bold**.

Designation	Maaning
Designation	Meaning
Response code (RESC)	Display of the last command executed Contains in bit 14: ERROR
	<ul> <li>0: No (the last command was executed successfully.)</li> </ul>
	1: Yes (an error occurred during command execution.)
	<ul> <li>Contains in bit 15: BUSY</li> <li>0: No (execution of a command completed)</li> <li>1: Yes (command active but not yet completed; system is waiting for execution, e.g. on tag within the detection range)</li> </ul>
Loop counter for rapid pro- cessing (RCNT)	Output of the command code requested by the loop counter
Expected read/write head not connected (TNC1)	0: Read/write head expected by the system connected 1: Read/write head expected by the system not connected
Error reported by read/write head (TRE1)	<b>0: No error</b> 1: Fault signal of the read/write head
Parameter not supported by read/write head (PNS1)	<b>0: No error</b> 1: Parameter is not supported by the read/write head
HF read/write head not tuned (XD1)	<b>0: No error</b> 1: Read/write head not tuned
Tag in detection range (TP)	<b>0: No tag in the detection range of the read/write head</b> 1: Tag in the detection range of the read/write head
HF read/write head switched on (TON)	<b>0: Read/write head switched off</b> 1: Read/write head switched on
Continuous (presence sensing mode) active (CMON)	0: Continuous mode not active 1: Continuous mode active
Length (LEN)	Display of the length of the read data
Error code (ERRC)	Display of the specific error code if the error bit (TRE1) is set.
Tag counter (TCNT)	<ul> <li>Display of the detected tags. With multitag applications, only tags that are read for an inventory command are counted. In single-tag applications, all tags that are detected by the read/write head are counted. The tag counter is reset by the following commands:</li> <li>Inventory (exception: single-tag applications)</li> <li>Continuous mode</li> <li>Reset</li> </ul>
Data (bytes) available (BYFI) (Only available for HF Advanced)	Shows the number of bytes in the FIFO memory of the read/write head. Ascending: new data read by a tag or received by the device Descending: command execution completed Fault signal 0xFFFF: memory overfilled, risk of loss of new data
Read fragment no. (RFN) (Only available for HF Advanced)	If the data to be read exceeds the size of the read data memory, the data is split into max. 256 fragments. The fragments are numbered consecutively from 1 to 255. From fragment number 256, numbering begins again at 1. The sending of a fragment is confirmed by the device if the read fragment no. appears in the pro- cess input data. After the confirmation, the next fragment is read. 0: No fragmentation In idle mode, the size of the fragments is specified. With a read command, the number of fragments that contain data is specified.

Designation	Meaning
Write fragment no. (WFN) (Only available for HF Advanced)	If the data that is to be written exceeds the size of the write data memory, the data is split into max. 256 fragments. The fragments are numbered consecutively from 1 to 255. From fragment number 256, numbering begins again at 1. The sending of a fragment is confirmed by the device if the write fragment no. appears in the process input data. Following confirmation, the next fragment is written. 0: No fragmentation In idle mode, the size of the fragments is specified. With a write command, the number of fragments that contain data is specified.
Read data	User-defined read data

## 8.2.2 Use "Tag in detection range" bit or preload command

The Tag in detection range bit is set automatically if a read/write device detects a tag.

All commands can be sent irrespective of whether the **Tag in detection range** bit (TP) is set. If no tag is present in the detection range when the command is sent, the command is executed by a rising edge at TP. A command is executed immediately if there is a tag in the detection range at the time of sending.

## 8.3 Process output data

#### Process output data — HF compact operating mode

Byte no.		Bit								
PROFINET	Modbus EtherNet/ IP	7	6	5	4	3	2	1	0	
0	0	Command	code (CMD	C)						
1	1									
2	2	Loop coun	ter for rapid	processing	(LCNT)					
3	3	Reserved								
4	4	Start addre	ess (ADDR)							
5	5									
6	6									
7	7									
8	8	Length (LE	N)							
9	9									
10	10	UID (SOUI	D) length							
11	11	Reserved								
12	24	Write data	byte 0							
13	25	Write data	byte 1							
14	26	Write data	byte 2							
15	27	Write data	byte 3							
16	28	Write data	byte 4							
17	29	Write data	byte 5							
18	30	Write data	Vrite data byte 6							
19	31	Write data	byte 7							



## Process output data — HF extended operating mode

Byte no.		Bit							
PROFINET	Modbus EtherNet/ IP	7	6	5	4	3	2	1	0
0	0	Command	code (CMD	C)					
1	1								
2	2	Loop coun	ter for rapid	processing	(LCNT)				
3	3	Reserved							
4	4	Start addre	ss (ADDR)						
5	5								
6	6								
7	7								
8	8	Length (LE	N)						
9	9								
10	10	UID (SOUID	) length						
11	11	Reserved							
12	12	Timeout (T	OUT)						
13	13								
14	14	Read fragm	ient numbe	r (RFN)					
15	15	Write fragn	nent numbe	er (WFN)					
16	16	Reserved							
17	17	Reserved							
18	18	Reserved							
19	19	Reserved							
20	24	Write data	byte 0						
21	25	Write data	byte 1						
22	26	Write data	byte 2						
23	27	Write data	byte 3						
24	28	Write data	byte 4						
25	29	Write data	byte 5						
26	30	Write data	Write data byte 6						
27	31	Write data	Write data byte 7						
139	151	Write data	byte 127						

## 8.3.1 Meaning of the command bits

Description	Meaning
Command code (CMDC)	Entry of the command code
Loop counter for rapid pro- cessing (LCNT)	Loop counter for repeated processing of a command 0: Loop counter off
Start address (ADDR) in bytes	Specification of the address to which a command is to be sent (e.g. memory area of a tag)
Length (LEN) in bytes	Specification of the length of the data to be read or written

Description	Meaning
Length of UID (SOUID) in bytes	<ul> <li>Inventory command:</li> <li>0: The actual length (bytes) of the transferred UID is transferred with an inventory.</li> <li>8: 8-byte UID feedback</li> <li>17: Feedback of an abbreviated UID.</li> <li>&gt; 8: Fault signal</li> <li>-1: NEXT mode (only available in single-tag applications): A tag is only ever read, written or protected if the UID is different from the UID of the last read or written tag.</li> <li>Other commands:</li> <li>The UID size should be entered in bytes if a particular tag is to be read, written or protected. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used.</li> <li>0: No specification of a UID/EPC to execute the command. Only one tag may be in the detection range of the read/write head.</li> <li>&gt; 0: UID length of the tag that is to be read, written or protected if a UID is present in the write data.</li> <li>-1: NEXT mode (only available in single-tag applications): A tag is only ever read, written or protected if the UID is different from the UID of the last read or written tag.</li> </ul>
Timeout (TOUT)	Time in ms in which a command is to be executed. If a command is not executed within the specified time, the device outputs a fault signal. 0: No timeout, command remains active until it is executed 1: Command is executed once (if there is already a tag in the detection range) > 165535: Time in ms Inventory: Command is executed once in the specified time (exception: Continuous mode).
Read fragment no. (RFN)	If the data to be read exceeds the size of the read data memory, the data is split into max. 256 fragments. The fragments are numbered consecutively from 1 to 255. From fragment number 256, numbering begins again at 1. The sending of a fragment is confirmed by the device if the read fragment no. appears in the pro- cess input data. After the confirmation, the next fragment is read. 0: No fragmentation In idle mode, the size of the fragments is specified. With a read command, the number of fragments that contain data is specified.
Write fragment no. (WFN)	If the data that is to be written exceeds the size of the write data memory, the data is split into max. 256 fragments. The fragments are numbered consecutively from 1 to 255. From fragment number 256, numbering begins again at 1. The sending of a fragment is confirmed by the device if the write fragment no. appears in the process input data. Following confirmation, the next fragment is written. 0: No fragmentation In idle mode, the size of the fragments is specified. With a write command, the number of fragments that contain data is specified.
Write data	User-defined write data or entry of a UID to select a specific tag for the command execution (if the <b>UID (SOUID) length</b> command parameter is greater than 0).



## 8.4 RFID channels — overview of commands

RFID commands are initiated via the command code in the process output data of an RFID channel. The commands can be executed with or without a loop counter function. The loop counter must be set individually for each new command.



#### NOTE

After commands are executed without the loop counter function, the device must be reset to the Idle state before a new command is sent.

• After a command is executed, send an idle command to the device.

Command	Command	code	possible for	
	hex.	dec.	HF compact	HF extended
Idle	0x0000	0	х	х
Inventory	0x0001	1	x	x
Inventory with loop counter	0x2001	8193	x	x
Read	0x0002	2	x	x
Reading with loop counter	0x2002	8194	x	x
Write	0x0004	4	x	x
Writing with loop counter	0x2004	8196	x	x
Writing with validation	0x0008	8	x	x
Continuous mode	0x0010	16	_	x*
Read data from buffer (cont. mode)	0x0011	17	_	Х
Read data from buffer (cont. mode) with loop counter	0x2011	8209	_	x
Stop Continuous (Presence Sensing) mode	0x0012	18	_	x*
Delete buffer (cont. mode)	0x0013	19	_	x
Switch off HF read/write head	0x0040	64	x	x
Read/write head identification	0x0041	65	x	x
Tag info	0x0050	80	x	x
Tag info with loop counter	0x2050	8272	x	x
Direct read/write head command	0x0060	96	x	x
Direct read/write head command with loop counter	0x2060	8288	x	x
Tune HF read/write head	0x0080	128	x	x
Read AFI from HF tag	0x0090	144	x	x
Write AFI to HF tag	0x0091	145	x	x
Lock AFI in HF tag	0x0092	146	x	x
Read DSFID from HF tag	0x0094	148	x	x
Write DSFID to HF tag	0x0095	149	x	x
Lock DSFID in HF tag	0x0096	150	x	x
Set read/write head password	0x0100	256	x**	x**
Reset read/write head password	0x0101	257	X**	x**
Set tag password	0x0102	258	X**	x**
Set tag password with loop counter	0x2102	8450	x**	X**
Set tag protection	0x0103	259	X**	X**
Set tag protection with loop counter	0x2103	8451	X**	x**
Get HF tag protection status	0x0104	260	x**	x**



Command	Command code		possible for	
	hex.	dec.	HF compact	HF extended
Set perma lock	0x0105	261	х	х
Set perma lock (lock) with loop counter	0x2105	8453	x	x
Reset	0x8000	32768	х	x

\* With automatic tag type detection continuous mode only supports the Inventory command.

\*\* The command is only supported by the chip types EM42 and NXP SLIX2 tags.



#### 8.4.1 Command: Idle

The data read and displayed by the tag can be set via the web server, DTM, PROFINET or Modbus register.

## Overview of output data

For a description of the output data, see [> 52].

Request	
Loop counter	Not required
Command code	0x0000 (hex.), 0 (dec.)
Read/write head address	Not required
JID length	Not required
Start address	Not required
Length	Not required
Command timeout	Not required
Write fragment no.	Not required
Read fragment no.	Not required
Write data	Not required

#### Overview of input data

Response	
Loop counter	See description of the input data
Response code	0x0000 (hex.), 0 (dec.)
Length	Length of the tag UID in the detection range
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	Size of the fragment
Read fragment no.	Size of the fragment
Read data, byte 0n	UID of the tag in the detection range



#### 8.4.2 Command: Inventory

Using the **Inventory** command, the read/write device searches for tags in the detection range and reads the UID. The inventory command can be executed in single-tag mode and in multitag mode. NEXT mode is only possible in single-tag mode.



NOTE

The command code for rapid processing with the loop counter is 0x2001 (hex.) or 8193 (dec.).

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0001 (hex.), 1 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Length	<ul> <li>0: The actual length (bytes) of the transferred UID is transferred with an inventory.</li> <li>&gt; 0:</li> <li>8: 8-byte UID feedback</li> <li>17: Feedback of an abbreviated UID</li> <li>&gt; 8: Fault signal</li> </ul>
	-1: NEXT mode (only available in HF single-tag applications): An HF tag is always only read, written or protected if the UID is different from the UID of the last read or written tag.
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

See description of the input data
0x0001 (hex.), 1 (dec.)
Length of the read data in bytes
See description of the input data
See description of the input data
See description of the input data
Ascending
0
See description of the input data
UID



#### 8.4.3 Command: Read

The **Read** command is used by the read/write head to read data from tags in the detection range. 128 bytes are transferred by default in a read process. Larger data quantities can be transferred in fragments. If a particular UID is specified, the read/write device reads the corresponding tags only. All other tags in the detection range are ignored in this case.



NOTE

The command code for rapid processing with the loop counter is 0x2002 (hex.) or 8194 (dec.).

Request Loop counter See description of the output data Command code 0x0002 (hex.), 2 (dec.) Memory area See description of the output data Read/write head address See description of the output data **UID** length The UID size should be entered in bytes if a particular tag is to be read. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used. 0: No entry of a UID for executing the command. Only one tag can be located in the detection range of the read/write device. > 0: UID length of the tag to be read if a UID is present in the write data. -1: NEXT mode: A tag is only ever read if the UID is different from the UID of the last read or written tag. Start address Start address of the memory area on the tag that is to be read (specification in bytes) Length Length of the data to be read in bytes Command timeout See description of the output data Write fragment no. 0 Read fragment no. See description of the output data Write data, UID of the tag to be read byte 0...(size of the UID -1) Write data, Not required byte (size of the UID)...127



Response	
Loop counter	See description of the input data
Response code	0x0002 (hex.), 2 (dec.)
Length	Length of the read data
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	increases during command execution
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data, byte 0n	read data



#### 8.4.4 Command: Write

The **Write** command is used by the read/write device to write data to tags in the detection range. 128 bytes are transferred in a write operation by default. Larger data quantities can be transferred in fragments. If a particular UID is specified, the read/write device writes the corresponding tags only. All other tags in the detection range are ignored in this case.



• With multitag applications, specify the UID of the tag that is to be written.

NOTE
The cor
0106 (-

The command code for rapid processing with the loop counter is 0x2004 (hex.) or 8196 (dec.).

Request	
Loop counter	See description of the output data
Command code	0x0004 (hex.), 4 (dec.)
Memory area	See description of the output data
Read/write head address	See description of the output data
UID length	<ul> <li>The UID size should be entered in bytes if a particular tag is to be written. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used.</li> <li>0: No entry of a UID for executing the command. Only one tag can be located in the detection range of the read/write device.</li> <li>&gt; 0: UID length of the tag to be written if a UID is present in the write data.</li> <li>-1: NEXT mode: A tag is only ever written if the UID is different from the UID of the last read or written tag.</li> </ul>
Start address	Start address of the memory area on the destination tag (spe- cified in bytes)
Length	Length of data to be written in bytes
Command timeout	See description of the output data
Write fragment no.	1: Using fragmentation 0: Do not use fragmentation
Read fragment no.	0
Write data, byte 0(size of the UID -1)	UID of the tag to be written
Write data, byte (size of the UID)127	Write data



Response	
Loop counter	See description of the input data
Response code	0x0004 (hex.), 4 (dec.)
Length	Length of the read data
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	Increases during command execution
Tag counter	See description of the input data
Write fragment no.	See description of the input data
Read fragment no.	0
Read data, byte 0127	Not required



#### 8.4.5 Command: Write and Verify

The **Write with validation** command writes a number of bytes defined by the user. The data written is also sent back to the interface and validated. When writing, up to 128 bytes are transferred by default. Larger data quantities can be transferred in fragments. The data written is validated in the interface only, and not sent back to the controller. If the validation fails, a fault signal is output. If the command is processed without a fault signal, the data has been validated successfully.



#### NOTE

• With multitag applications, specify the UID of the tag that is to be written.



#### NOTE

The command code for rapid processing with the loop counter is 0x2008 (hex.) or 8200 (dec.).

-	
Request	
Loop counter	See description of the output data
Command code	0x0008 (hex.), 8 (dec.)
Memory area	See description of the output data
Read/write head address	See description of the output data
UID length	<ul> <li>The UID size should be entered in bytes if a particular tag is to be written. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used.</li> <li>0: No entry of a UID for executing the command. Only one tag can be located in the detection range of the read/write device.</li> <li>&gt; 0: UID length of the tag to be written if a UID is present in the write data.</li> <li>-1: NEXT mode: A tag is only ever written if the UID is different from the UID of the last read or written tag.</li> </ul>
Start address	Start address of the memory area on the destination tag (specified in bytes)
Length	Length of data to be written in bytes
Command timeout	See description of the output data
Write fragment no.	1: Using fragmentation 0: Do not use fragmentation
Read fragment no.	0
Write data, byte 0(size of the UID -1)	Optional: UID of the tag to be written
Write data, byte (size of the UID)127	Write data



Response	
Loop counter	See description of the input data
Response code	0x0008 (hex.), 8 (dec.)
Length	Length of the read data
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	Increases during command execution
Tag counter	See description of the input data
Write fragment no.	See description of the input data
Read fragment no.	0
Read data, byte 0MIN (127, set length -1)	Not required



#### 8.4.6 Command: Continuous Mode



#### NOTE

Continuous mode is only available for single-tag applications. Automatic tag detection cannot be used in continuous mode. A specific tag type must be selected in the parameters.

In continuous mode, a user-defined command is sent to the read/write device and saved in the read/write device. The command is executed continuously if a tag enters the detection field of the read/write device (self-triggered). The following commands can be set in the parameters: **Write, Read, Inventory, Tag info**.

The command is executed continuously until the user stops continuous mode. Continuous mode can be stopped with a reset command.



## NOTE

The reset command resets all read data. After a restart of continuous mode, all data of the continuous mode already running is deleted.

Read/write devices in continuous mode send all command-related data to the interface. The data is stored in the FIFO memory of the interface and can be queried by the controller via the **Read data from buffer (cont. mode)** command.

Commands in continuous mode are triggered if the read/write device detects a tag. If there is a tag in the detection range of the read/write device when continuous mode is started, the command sent in continuous mode will not be executed until the next tag is present.

In continuous mode, the **Tag in detection range** signal is updated when the start address is set to 3.



### NOTE

The HF parameters: Address in continuous mode (ACM) and HF: Length in continuous mode (LCM) cannot be changed while continuous mode is running.



For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0010 (hex.), 16 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	<ul> <li>0: Grouping of the UIDs or USER data inactive, edge-triggered detection</li> <li>1: Grouping of the UIDs or USER data active, edge-triggered detection</li> <li>2: Not defined</li> <li>3: Grouping of the UIDs or USER data active, continuous de- tection (time-triggered via bypass time), tag in detection range supported</li> <li>&gt; 3: Not defined</li> </ul>
Length	Not required
Command timeout	Not required
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0010 (hex.), 16 (dec.)
Length	0
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	Increases during command execution
Tag counter	Increases with each read or written UID
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	See description of the input data



#### 8.4.7 Command: Read buffer (Cont. mode)



#### NOTE

NOTE

The command code for fast processing with the loop counter is 0x2011 (hex.) or 8209 (dec.).

The **Read data from buffer (cont. mode)** command can pass on data stored in the interface to the controller. Up to 16 Kbytes of data can be stored in a ring memory. Retrieved data is deleted from the ring memory. The command is required to transfer read data to the controller in continuous mode. The data is transferred to the controller in fragments of up to 128 bytes. The size of the fragments can be set by the user. A UID is not divided by fragment limits. If a UID does not fit completely in a fragment, it is automatically moved to the next fragment.



The **Read data from buffer (cont. mode)** command does not stop continuous mode.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0011 (hex.), 17 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Max. length of the data to be read by the device (≤ size of the data that the device has actually stored), entered in bytes
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0011 (hex.), 17 (dec.)
Length	Length of the read data. The data is specified in complete blocks.
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	Is reduced automatically after the command execution
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Read data



#### Data format in HF applications

In HF applications, the data is not formatted by a header. Several examples of HF data are listed below.

## Example: UID, grouping deactivated

Туре	Name	Meaning	
uint8_t	Data [8]	uint8_t UID [8]	

## Example: UID, grouping activated

Туре	Name	Meaning
uint8_t	Data [10]	uint8_t UID [8] uint16_t number of read processes

## Example: Successful read command (64 bytes)

Туре	Name	Meaning	
uint8_t	Data [64]	uint8_t read data [64]	

#### Example: Successful write command

Туре	Name	Meaning
uint8_t	Data [2]	uint16_t error code 0x0000

#### Example: Error when writing data

Туре	Name	Meaning
uint8_t	Data [2]	uint16_t error code 0x0201

#### 8.4.8 Command: Stop continuous mode

The **Stop continuous mode** command can be used to end continuous mode. The data in the buffer of the interface is not deleted after the command is executed and can still be called up via the **Read data from buffer (cont. mode)** command.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0012 (hex.), 18 (dec.)
Read/write head address	Not required
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0012 (hex.), 18 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



#### 8.4.9 Command: Delete Buffer (Cont. mode)

Using the **Delete buffer (cont. mode)** command, all data stored in the interface can be deleted.



**NOTE** The **Delete buffer (cont. mode)** command does not stop continuous mode.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0013 (hex.), 19 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0013 (hex.), 19 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



#### 8.4.10 Command: HF read/write head off

The **Switch off HF read/write head** command enables HF read/write heads to be switched off until a write or read command is present. It may be necessary to switch the read/write heads on and off to save energy or if the devices are fitted very close to one another and the detection ranges overlap. When a command is executed, the read/write heads are reactivated automatically. After the command has been executed, the read/write head needs to be switched off again.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0040 (hex.), 64 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0040 (hex.), 64 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



#### 8.4.11 Command: Read/write head identification

The **Read/write head identification** command scans the following parameters of the connected read/write head:

- ID ID
- Serial number
- Hardware version
- Firmware status

The parameters are summarized in the read/write head in the identification record.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0041 (hex.), 65 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Start address in the identification record, specification in bytes
Length	Length of the data to be queried 0: Read complete parameter set
Command timeout	Not required
Write fragment no.	Not required
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0041 (hex.), 65 (dec.)
Length	See description of the input data
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	increases with each read or written UID
Write fragment no.	0
Read fragment no.	See description of the input data
Read data, byte 019	ID: ARRAY [019] of BYTE
Read data, byte 2035	Serial number: ARRAY [015] of BYTE
Read data, byte 3637	Hardware version: INT16 (Little Endian)
Read data, byte 3841	Firmware status: ARRAY [0] of BYTE: V (0x56), x, y, z (Vx.y.z)
Read data, byte 42119	Not required



#### 8.4.12 Command: Tag info



**NOTE** The command code for rapid processing with the loop counter is 0x2050 (hex.) or 8272 (dec.).

The **Tag info** command enables the chip information of an HF tag to be queried. The command is only available with automatic detection. The data is queried from the GSI record of the tag.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0050 (hex.), 80 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Start address in the GSI record
Length	Length of the system data read (bytes) 0: All system data is read.
Command timeout	Not required
Write fragment no.	Not required
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0050 (hex.), 80 (dec.)
Length	See description of the input data
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data, byte 07	UID, MSB (always 0xE0)
Read data, byte 8	DSFID (data storage format identifier)
Read data, byte 9	AFI (application identifier)
Read data, byte 10	Memory size: Block number (0x000xFF)
Read data, byte 11	Memory size: Byte/block (0x000x1F)
Read data, byte 12	IC reference



## 8.4.13 Direct read/write head command



The command code for fast processing with the loop counter is 0x2060 (hex.) or 8288 (dec.).

A direct command can be used to send commands directly to the read/write device from the read/write head protocol. The commands are defined and interpreted via specifications in the read and write data.



#### NOTE

The read/write head protocol is not part of this documentation and has to be requested from and specially released by Turck. Questions on the read/write head protocol should be addressed to Turck.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0060 (hex.), 96 (dec.)
Read/write head address	See description of the output data
UID length	0
Start address	Not required
Length	Length of the description of the direct command in the write data, specification in bytes
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Description of the direct command

For a description of the input data, see [> 50].

## Response

nesponse	
Loop counter	See description of the input data
Response code	0x0060 (hex.), 96 (dec.)
Length	Length of the description of the direct command in the write data
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Response to the direct command



## Example: Direct command in HF applications (query read/write head version)

Request	
Loop counter	0
Command code	0x0060
Read/write head address	0
UID length	0
Start address	0
Length	2
Command timeout	200
Write fragment no.	0
Read fragment no.	0
Write data	0xE0 (CC), 0x00 (Cl) — see BL ident protocol
Response	
Loop counter	0
Response code	0x0060
Length	6
Error code	0
Tag in detection range	0
Data (bytes) available	0
Tag counter	0
Write fragment no.	0
Read fragment no.	0
Read data	0xE0 (CC), 0x00 (CI), 0x04, 0x06, 0xA1, 0x77

The BL ident protocol can be used to query the following information with the bytes written to:

Byte 5 — read/write head ID: 4

Byte 6 — hardware version: 6

- Byte 7 software version: x.y, x (A1)
- Byte 8 software version x.y, y (0x77)
- The entire software version information consists of byte 7 and byte 8 (A1v77).



## 8.4.14 Command: Tune HF read/write head



This command is available for the HF read/write heads TNLR-... and TNSLR-... only.

The **Read/write head tuning** command enables HF read/write heads to be tuned automatically to their ambient conditions. The tuning values are stored in the read/write head until the next voltage reset.

HF read/write head tuning is carried out automatically by default after each voltage reset.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0080 (hex.), 128 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	See description of the input data
Response code	0x0080 (hex.), 128 (dec.)
Length	2
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data, byte 0	Tuning value: TNLR: 0x000x0F TNSLR: 0x000x1F
Read data, byte 1	Received voltage value (0x000xFF)



## 8.4.15 Command: Read AFI from HF tag

The AFI (Application Family Identifier) byte of an HF tag can be read out using the **Read AFI** from HF tag command.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0090 (hex.), 144 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

For a description of the input data, see [> 50].

See description of the input data
0x0090 (hex.), 144 (dec.)
Not required
See description of the input data
0
See description of the input data
-

Not required

AFI

Read data, byte 0

Read data, bytes 1...(length -1)



## 8.4.16 Command: Write AFI to HF tag

The Write AFI to HF tag command writes an AFI (Application Family Identifier) byte to an HF tag.



## NOTE

It is not possible to write a locked AFI byte. The fault signal 0xF102 will appear (air interface error: timeout).

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0091 (hex.), 145 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data, byte 0	AFI
Write data, byte 1(length -1)	Not required

Response	
Loop counter	See description of the input data
Response code	0x0091 (hex.), 145 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.17 Command: Lock AFI in HF tag

The Lock AFI in HF tag command locks the AFI (Application Family Identifier) byte on an HF tag.



## NOTE

It is not possible to lock an already locked AFI byte. The fault signal 0xF102 will appear (air interface error: timeout).

For a description of the output data, see [> 52].

## Request

nequest	
Loop counter	See description of the output data
Command code	0x0092 (hex.), 146 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Res	ponse
nes	ponse

Response	
Loop counter	See description of the input data
Response code	0x0092 (hex.), 146 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.18 Command: Read DSFID from HF tag

The **Read DSFID from HF tag** command can be used to read the DSFID (Data Storage Format Identifier) byte of an HF tag.

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0094 (hex.), 148 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Response	
Loop counter	

Loop counter	See description of the input data
Response code	0x0094 (hex.), 148 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data, byte 0	DSFID
Read data, bytes 1(length -1)	Not required



## 8.4.19 Command: Write DSFID to HF tag

The **Write DSFID to HF tag** command writes a DSFID (Data Storage Format Identifier) byte to an HF tag.



## NOTE

It is not possible to write a locked DSFID byte. The fault signal 0xF102 will appear (air interface error: timeout).

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0095 (hex.), 149 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data, byte 0	DSFID
Write data, byte 1(length -1)	Not required

Response	
Loop counter	See description of the input data
Response code	0x0095 (hex.), 149 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.20 Command: Lock DSFID in HF tag

The **Lock DSFID** in **HF** tag command locks the DSFID (Data Storage Format Identifier) byte on an HF tag.



#### NOTE

It is not possible to lock a DSFID byte that has already been locked. The fault signal 0xF102 will appear (air interface error: timeout).

For a description of the output data, see [> 52].

Request	
Loop counter	See description of the output data
Command code	0x0096 (hex.), 150 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required

Dec	
ĸes	ponse

Response	
Loop counter	See description of the input data
Response code	0x0096 (hex.), 150 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.21 Command: Set read/write head password



**NOTE** The command is only available for applications with HF tags with chip types EM42... and NXP SLIX2.

The **Set read/write head password** command is a direct command used to set a password for read access, write access or a kill command. The password is stored temporarily in the memory of the read/write device. After the voltage of the read/write device is reset, the password must be set again in the read/write device. The password stored in the read/write device is automatically sent with a write command, a read command or a kill command so that the command can be executed on a protected tag.

In HF applications, the password function is available in single-tag mode only. A fault signal is output with multitag applications. To troubleshoot, set the **HF: Multitag** parameter to **0: Multitag mode off**. In order to use the password function in HF applications, the password in the tag and the read/write head must match. The default password is 0000 and must be set first in the read/write head before a new password can be assigned ( [> 84]).

For a description of the output data, see [> 52].

#### Request

Loop counter	See description of the output data
Command code	0x0100 (hex.), 256 (dec.)
Read/write head address	See description of the output data
UID length	Not required
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data, byte 03	Password: ARRAY [03] OF BYTE
Write data, byte 4127	Not required

Response	
Loop counter	See description of the input data
Response code	0x0100 (hex.), 256 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.22 Command: Reset read/write head password

The **Reset read/write head password** command directly resets a password for write access, read access or a kill command in the read/write head. The password function is switched off and passwords are no longer exchanged between the read/write device and the password function.

In HF applications, the password function is available in single-tag mode only. A fault signal is output with multitag applications. To troubleshoot, set the **HF: Multitag** parameter to **0: Multitag mode off**.

For a description of the output data, see [> 52].

See description of the output data
0x0101 (hex.), 257 (dec.)
See description of the output data
Not required
Not required
Not required
See description of the output data
0
See description of the output data
Not required

For a description of the input data, see [> 50].

#### Response

nesponse	
Loop counter	See description of the input data
Response code	0x0101 (hex.), 257 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.23 Command: Set tag password



NOTE

The command is only available for applications with HF tags with chip types EM42... and NXP SLIX2.



#### NOTE

The command code for fast processing with the loop counter is 0x2102 (hex.) or 8450 (dec.).

The **Set tag password** command sets a password in the tag. Tag protection is not activated until the **Set tag protection** command has also been carried out. When sending the command, only one tag can be located in the detection range of the read/write device. After the password is sent, other commands (e.g. **Set tag protection**) can be sent to the tag. The **Set tag password** command prevents a kill password from being set in the tag.

In HF applications, the password function is available in single-tag mode only. A fault signal is output with multitag applications. To troubleshoot, set the **HF: Multitag** parameter to **0: Multitag mode off**. In order to use the password function in HF applications, the password in the tag and the read/write head must match. The default password is 0000 and must be set first in the read/write head before a new password can be assigned (Command: Set read/write head password).

Request	
Loop counter	See description of the output data
Command code	0x0102 (hex.), 258 (dec.)
Read/write head address	See description of the output data
UID length	The UID size should be entered in bytes if a particular tag is to be protected. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used. 0: No entry of a UID for executing the command. Only one tag may be in the detection range of the read/write head. > 0: UID length of the tag to be protected if a UID is present in the write data. -1: NEXT mode: A tag is only ever protected if the UID is dif- ferent from the UID of the last read or written tag.
Start address	Not required
Length	Not required
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data, byte 03	Password: ARRAY [03] OF BYTE
Write data, byte 4127	Not required



Response	
Loop counter	See description of the input data
Response code	0x0102 (hex.), 258 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.24 Command: Set tag protection



NOTE

The command is only available for applications with HF tags with chip types EM42... and NXP SLIX2.



#### NOTE

The command code for rapid processing with the loop counter is 0x2103 (hex.) or 8451 (dec.).

The **Set tag protection** command is a direct command used to define the password protection for the tag. To do this, it must be specified whether read protection and/or write protection is to be set, and to which area of the tag the password applies. Protection for all areas is defined with one command. When sending the command, only one tag can be located in the detection range of the read/write device.

In HF applications, the password function is available in single-tag mode only. A fault signal is output with multitag applications. To troubleshoot, set the **HF: Multitag** parameter to **0: Multitag mode off**.

Read protection also always includes write protection.

The following restrictions apply to NXP-SLIX2 tags:

- The bits for the read and write protection must either be the same for the particular page or all read protection bits must be zero or all write protection bits must be zero.
- The bits must be set ensuring that there are no gaps between the bits or pages until the last bit or last page (page 19).

Example: Bit 4 in the first byte to bit 3 in the third byte are set, i.e. page 4...19 (block 16... 79) are protected, page 0...3 (block 0...15) are not protected.

Examples: FF FF 0F 00 FF FF 0F 00: all protected, FE FF 0F 00 FE FF 0F 00: all protected apart from page 0, 00 00 08 00 00 00 08 00: only last page protected

Page size: 1 page = 4 blocks = 128 bits, exception: Page 19 only has 3 blocks = 96 bits (block 79 is excluded from protection).

The error code 0x2502 is sent if the restrictions are not observed.

Request	
Loop counter	See description of the output data
Command code	0x0103 (hex.), 259 (dec.)
Read/write head address	See description of the output data
UID length	<ul> <li>The UID size should be entered in bytes if a particular tag is to be protected. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used.</li> <li>0: The command is executed for the tag which is located in the detection range of the read/write device.</li> <li>&gt; 0: UID length of the tag to be protected if a UID is present in the write data.</li> <li>-1: NEXT mode: A tag is only ever protected if the UID is different from the UID of the last read or written tag.</li> </ul>
Start address	Not required



Request	
Memory area	Possible values: USER memory (memory areas 1 and 3) Specification of memory area not required. The pages of the memory area are selected via byte 07 of the write data. A page consists of 4 blocks (16 bytes).
Length	8 byte
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data, byte 0	<ul> <li>EM4233 SLIC/NXP SLIX2:</li> <li>Bit 0: Write protection, page 0</li> <li>Bit 1: Write protection, page 1</li> <li>Bit 2: Write protection, page 2</li> <li>Bit 3: Write protection, page 3</li> <li>Bit 4: Write protection, page 4</li> <li>Bit 5: Write protection, page 5</li> <li>Bit 6: Write protection, page 6</li> <li>Bit 7: Write protection, page 7</li> </ul>
Write data, byte 1	EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 8 Bit 1: Write protection, page 9 Bit 2: Write protection, page 10 Bit 3: Write protection, page 11 Bit 4: Write protection, page 12 Bit 5: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15
Write data, byte 2	EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 16 Bit 1: Write protection, page 17 Bit 2: Write protection, page 18 Bit 3: Write protection, page 19 Bit 4: Reserved Bit 5: Reserved Bit 5: Reserved Bit 7: Reserved
Write data, byte 3	0
Write data, byte 4	EM4233 SLIC/NXP SLIX2: Bit 0: Read protection, page 0 Bit 1: Read protection, page 1 Bit 2: Read protection, page 2 Bit 3: Read protection, page 3 Bit 4: Read protection, page 4 Bit 5: Read protection, page 5 Bit 6: Read protection, page 6 Bit 7: Read protection, page 7



Request	
Write data, byte 5	EM4233 SLIC: 0 NXP SLIX2: Bit 0: Read protection, page 8 Bit 1: Read protection, page 9 Bit 2: Read protection, page 10 Bit 3: Read protection, page 11 Bit 4: Read protection, page 12 Bit 5: Read protection, page 13 Bit 6: Read protection, page 14 Bit 7: Read protection, page 15
Write data, byte 6	EM4233 SLIC: 0 NXP SLIX2: Bit 0: Read protection, page 16 Bit 1: Read protection, page 17 Bit 2: Read protection, page 18 Bit 3: Read protection, page 19 Bit 4: Reserved Bit 5: Reserved Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved
Write data, byte 7	0
Write data, byte 8127	Not required

See description of the input data
0x0103 (hex.), 259 (dec.)
Not required
See description of the input data
0
See description of the input data
Not required



## 8.4.25 Command: Get HF tag protection status



**NOTE** The command is only available for applications with HF tags with chip types EM42... and NXP SLIX2.

The **Get HF tag protection status** command queries with a direct command whether a specific area of the tag is password protected. When sending the command, only one tag may be in the detection range of the read/write head.

In HF applications, the password function is available in single-tag mode only. A fault signal is output with multitag applications. To troubleshoot, set the **HF: Multitag** parameter to **0: Multitag mode off**.

Request	
Loop counter	See description of the output data
Command code	0x0104 (hex.), 260 (dec.)
Read/write head address	See description of the output data
UID length	The UID size should be entered in bytes if a particular tag is to be protected. The UID must be defined in the write data (start byte: 0). The function of the length of the UID depends on the command used. 0: The command is executed for the tag that is in the detec- tion range of the read/write head. -1: NEXT mode: A tag is only ever protected if the UID is dif- ferent from the UID of the last read or written tag.
Start address	Not required
Length	8 byte
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required



Response code       0x0104 (hex.), 260 (dec.)         Length       Not required         Error code       See description of the input data         Tag in       See description of the input data         Data (bytes) available       See description of the input data         Tag counter       See description of the input data         Write fragment no.       0         Read fragment no.       EM4233 SLIC/NXP SLIX2:         Bit 0: Write protection, page 0       Bit 1: Write protection, page 1         Bit 2: Write protection, page 2       Bit 3: Write protection, page 2         Bit 3: Write protection, page 4       Bit 4: Write protection, page 4         Bit 6: Write protection, page 6       Bit 7: Write protection, page 6         Bit 7: Write protection, page 7       Bit 0: Write protection, page 6         Read data, byte 1       EM4233 SLIC 0         NXP SLIX2:       Bit 0: Write protection, page 10         Bit 1: Write protection, page 11       Bit 3: Write protection, page 12         Bit 6: Write protection, page 13       Bit 6: Write protection, page 13         Bit 6: Write protection, page 15       Bit 6: Write protection, page 15         Read data, byte 2       EM4233 SLIC 0         NXP SLIX2:       Bit 6: Write protection, page 15         Bit 6: Write protection, page 15       Bit 6:	Response	
LengthNot requiredError codeSee description of the input dataTag in detection rangeSee description of the input dataData (bytes) availableSee description of the input dataTag counterSee description of the input dataWrite fragment no.0Read fragment no.See description of the input dataRead fargment no.See description of the input dataBit 0: Write protection, page 0Bit 1: Write protection, page 1Bit 2: Write protection, page 1Bit 2: Write protection, page 2Bit 3: Write protection, page 3Bit 4: Write protection, page 4Bit 5: Write protection, page 5Bit 6: Write protection, page 5Bit 6: Write protection, page 6Bit 7: Write protection, page 7Read data, byte 1EM4233 SLIC: 0 NXP SLIX2:Read data, byte 1EM4233 SLIC: 0 NXP SLIX2:Bit 6: Write protection, page 10Bit 3: Write protection, page 11 Bit 4: Write protection, page 12 Bit 2: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2:Read data, byte 2EM4233 SLIC: 0 NXP SLIX2:Bit 0: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2:Bit 0: Write protection, page 17 Bit 2: Write protection, page 18 Bit 3: Write protection, page 19 Bit 4: ReservedBit 6: ReservedBit 7: ReservedBit 6: ReservedBit 7: ReservedBit 7: ReservedBit 7: Reserved<	Loop counter	See description of the input data
Error codeSee description of the input dataTag in detection rangeSee description of the input dataData (bytes) availableSee description of the input dataTag counterSee description of the input dataWrite fragment no.0Read fragment no.See description of the input dataRead data, byte 0EM4233 SLIC/NXP SLIX2: Bit 0: Write protection, page 0 Bit 1: Write protection, page 1 Bit 2: Write protection, page 2 Bit 3: Write protection, page 3 Bit 4: Write protection, page 4 Bit 5: Write protection, page 5 Bit 6: Write protection, page 6 Bit 7: Write protection, page 7Read data, byte 1EM4233 SLIC 0 NXP SLIX2: Bit 0: Write protection, page 10 Bit 3: Write protection, page 11 Bit 2: Write protection, page 12 Bit 3: Write protection, page 13 Bit 6: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2: Bit 6: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 16 Bit 1: Write protection, page 17 Bit 2: Write protection, page 18 Bit 3: Write protection, page 19 Bit 4: Reserved Bit 5: Reserved Bit 5: Reserved Bit 5: Reserved Bit 7: Reserved	Response code	0x0104 (hex.), 260 (dec.)
Tag in detection rangeSee description of the input dataData (bytes) availableSee description of the input dataTag counterSee description of the input dataWrite fragment no.0Read fragment no.See description of the input dataRead data, byte 0EM4233 SLIC/NXP SLIX2: Bit 0: Write protection, page 0 Bit 1: Write protection, page 1 Bit 2: Write protection, page 2 Bit 3: Write protection, page 2 Bit 3: Write protection, page 3 Bit 4: Write protection, page 4 Bit 5: Write protection, page 5 Bit 6: Write protection, page 5 Bit 6: Write protection, page 6 Bit 7: Write protection, page 7Read data, byte 1EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 10 Bit 1: Write protection, page 10 Bit 3: Write protection, page 11 Bit 2: Write protection, page 12 Bit 0: Write protection, page 12 Bit 3: Write protection, page 13 Bit 6: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 13 Bit 6: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 13 Bit 6: Write protection, page 14 Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0 NXP SLIX2: Bit 0: Write protection, page 16 Bit 1: Write protection, page 17 Bit 2: Write protection, page 18 Bit 3: Write protection, page 19 Bit 4: Reserved Bit 3: Reserved Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved Bit 7: Reserved	Length	Not required
detection range       See description of the input data         Tag counter       See description of the input data         Write fragment no.       0         Read fragment no.       See description of the input data         Read data, byte 0       EM4233 SLIC/NXP SLIX2:         Bit 0: Write protection, page 0       Bit 1: Write protection, page 1         Bit 2: Write protection, page 2       Bit 3: Write protection, page 3         Bit 3: Write protection, page 4       Bit 5: Write protection, page 4         Bit 5: Write protection, page 5       Bit 6: Write protection, page 6         Bit 7: Write protection, page 6       Bit 7: Write protection, page 7         Read data, byte 1       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 8         Bit 1: Write protection, page 8       Bit 1: Write protection, page 9         Bit 2: Write protection, page 10       Bit 3: Write protection, page 11         Bit 4: Write protection, page 12       Bit 5: Write protection, page 13         Bit 5: Write protection, page 13       Bit 6: Write protection, page 14         Bit 7: Write protection, page 15       Bit 0: Write protection, page 15         Read data, byte 2       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 16         Bit 7: Write protection, page 16       Bit 1: Write protection,	Error code	See description of the input data
Tag counterSee description of the input dataWrite fragment no.0Read fragment no.See description of the input dataRead data, byte 0EM4233 SLIC/NXP SLIX2: 	Tag in detection range	See description of the input data
Write fragment no.       0         Read fragment no.       See description of the input data         Read data, byte 0       EM4233 SLIC/NXP SLIX2:         Bit 0: Write protection, page 0       Bit 1: Write protection, page 1         Bit 2: Write protection, page 2       Bit 3: Write protection, page 2         Bit 3: Write protection, page 4       Bit 5: Write protection, page 4         Bit 5: Write protection, page 5       Bit 6: Write protection, page 6         Bit 7: Write protection, page 6       Bit 7: Write protection, page 7         Read data, byte 1       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 10         Bit 3: Write protection, page 11       Bit 3: Write protection, page 12         Bit 6: Write protection, page 13       Bit 6: Write protection, page 13         Bit 6: Write protection, page 14       Bit 7: Write protection, page 15         Read data, byte 2       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 14         Bit 7: Write protection, page 15       Bit 0: Write protection, page 16         Bit 1: Write protection, page 17       Bit 2: Write protection, page 18         Bit 3: Write protection, page 19       Bit 4: Reserved         Bit 5: Reserved       Bit 5: Reserved         Bit 6: Reserved       Bit 7: Reserved <td>Data (bytes) available</td> <td>See description of the input data</td>	Data (bytes) available	See description of the input data
Read fragment no.See description of the input dataRead data, byte 0EM4233 SLIC/NXP SLIX2: Bit 0: Write protection, page 0 Bit 1: Write protection, page 1 Bit 2: Write protection, page 2 	Tag counter	See description of the input data
Read data, byte 0       EM4233 SLIC/NXP SLIX2:         Bit 0: Write protection, page 0       Bit 1: Write protection, page 1         Bit 2: Write protection, page 2       Bit 3: Write protection, page 3         Bit 3: Write protection, page 4       Bit 5: Write protection, page 5         Bit 6: Write protection, page 6       Bit 7: Write protection, page 7         Read data, byte 1       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 8         Bit 1: Write protection, page 10       Bit 2: Write protection, page 11         Bit 3: Write protection, page 12       Bit 4: Write protection, page 12         Bit 4: Write protection, page 12       Bit 6: Write protection, page 13         Bit 6: Write protection, page 14       Bit 7: Write protection, page 15         Read data, byte 2       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 15         Read data, byte 2       EM4233 SLIC: 0         NXP SLIX2:       Bit 0: Write protection, page 16         Bit 7: Write protection, page 17       Bit 3: Write protection, page 17         Bit 3: Write protection, page 18       Bit 3: Write protection, page 19         Bit 4: Reserved       Bit 5: Reserved         Bit 5: Reserved       Bit 6: Reserved         Bit 6: Reserved       Bit 7: Reserved	Write fragment no.	0
Bit 0: Write protection, page 0         Bit 1: Write protection, page 1         Bit 2: Write protection, page 2         Bit 3: Write protection, page 3         Bit 4: Write protection, page 4         Bit 5: Write protection, page 5         Bit 6: Write protection, page 6         Bit 7: Write protection, page 7         Read data, byte 1         EM4233 SLIC: 0         NXP SLIX2:         Bit 0: Write protection, page 8         Bit 1: Write protection, page 10         Bit 3: Write protection, page 11         Bit 4: Write protection, page 12         Bit 5: Write protection, page 13         Bit 6: Write protection, page 14         Bit 7: Write protection, page 15         Read data, byte 2         EM4233 SLIC: 0         NXP SLIX2:         Bit 6: Write protection, page 13         Bit 7: Write protection, page 14         Bit 7: Write protection, page 15         Read data, byte 2         EM4233 SLIC: 0         NXP SLIX2:         Bit 0: Write protection, page 16         Bit 1: Write protection, page 17         Bit 2: Write protection, page 18         Bit 3: Write protection, page 19         Bit 4: Reserved         Bit 5: Reserved         Bit 6: Reser	Read fragment no.	See description of the input data
NXP SLIX2:Bit 0: Write protection, page 8Bit 1: Write protection, page 9Bit 2: Write protection, page 10Bit 3: Write protection, page 11Bit 4: Write protection, page 12Bit 5: Write protection, page 13Bit 6: Write protection, page 14Bit 7: Write protection, page 15Read data, byte 2EM4233 SLIC: 0NXP SLIX2:Bit 0: Write protection, page 16Bit 1: Write protection, page 17Bit 2: Write protection, page 18Bit 3: Write protection, page 19Bit 4: ReservedBit 5: ReservedBit 6: ReservedBit 7: ReservedBit 7: Reserved	Read data, byte 0	<ul> <li>Bit 0: Write protection, page 0</li> <li>Bit 1: Write protection, page 1</li> <li>Bit 2: Write protection, page 2</li> <li>Bit 3: Write protection, page 3</li> <li>Bit 4: Write protection, page 4</li> <li>Bit 5: Write protection, page 5</li> <li>Bit 6: Write protection, page 6</li> </ul>
NXP SLIX2: Bit 0: Write protection, page 16 Bit 1: Write protection, page 17 Bit 2: Write protection, page 18 Bit 3: Write protection, page 19 Bit 4: Reserved Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved	Read data, byte 1	<ul> <li>NXP SLIX2:</li> <li>Bit 0: Write protection, page 8</li> <li>Bit 1: Write protection, page 9</li> <li>Bit 2: Write protection, page 10</li> <li>Bit 3: Write protection, page 11</li> <li>Bit 4: Write protection, page 12</li> <li>Bit 5: Write protection, page 13</li> <li>Bit 6: Write protection, page 14</li> </ul>
Read data, byte 3 0	Read data, byte 2	NXP SLIX2: Bit 0: Write protection, page 16 Bit 1: Write protection, page 17 Bit 2: Write protection, page 18 Bit 3: Write protection, page 19 Bit 4: Reserved Bit 5: Reserved Bit 6: Reserved
	Read data, byte 3	0



Response	
Read data, byte 4	EM4233 SLIC/NXP SLIX2: Bit 0: Read protection, page 0 Bit 1: Read protection, page 1 Bit 2: Read protection, page 2 Bit 3: Read protection, page 3 Bit 4: Read protection, page 4 Bit 5: Read protection, page 5 Bit 6: Read protection, page 6 Bit 7: Read protection, page 7
Read data, byte 5	EM4233 SLIC: 0 NXP SLIX2: Bit 0: Read protection, page 8 Bit 1: Read protection, page 9 Bit 2: Read protection, page 10 Bit 3: Read protection, page 11 Bit 4: Read protection, page 12 Bit 5: Read protection, page 13 Bit 6: Read protection, page 14 Bit 7: Read protection, page 15
Read data, byte 6	EM4233 SLIC: 0 NXP SLIX2: Bit 0: Read protection, page 16 Bit 1: Read protection, page 17 Bit 2: Read protection, page 18 Bit 3: Read protection, page 19 Bit 4: Reserved Bit 5: Reserved Bit 5: Reserved Bit 6: Reserved Bit 7: Reserved
Read data, byte 7	0



## 8.4.26 Command: Set perma lock



**NOTE** The command code for rapid processing with the loop counter is 0x2105 (hex.) or 8453 (dec.).

The **Set perma lock** command permanently sets a complete memory block of the tag with a direct command and permanently locks it. When sending the command, only one tag can be located in the detection range of the read/write device.

The function is only available in single-tag mode. A fault signal is output with multitag applications. To troubleshoot, set the **HF: Multitag** parameter to **0: Multitag mode off**.

Request	
Loop counter	See description of the output data
Command code	0x0105 (hex.), 261 (dec.)
Read/write head address	See description of the output data
UID length	<ul> <li>0: The command is executed for the tag which is located in the detection range of the read/write device.</li> <li>&gt; 0: UID length of the tag to be locked if a UID is present in the write data.</li> <li>-1: NEXT mode: A tag is only ever protected if the UID is different from the UID of the last read or written tag.</li> </ul>
Start address	Address of the first bit in the block that is to be locked (EEPROM tag: 0, 4, 8, …, FRAM tags: 0, 8, 16, …)
Memory area	Possible values: USER memory (memory areas 1 4) Entry of the memory area not necessary
Length	Length of the data to be locked in bytes. Only multiples of the block size can be specified. 0: 1 Lock block
Command timeout	See description of the output data
Write fragment no.	0
Read fragment no.	See description of the output data
Write data	Not required



Response	
Loop counter	See description of the input data
Response code	0x0105 (hex.), 261 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



## 8.4.27 Command: Reset

The **Reset** command is used to reset the read/write device and interface. The input data, output data and the buffer are cleared.

For a description of the output data, see [> 52].

See description of the output data
0x8000 (hex.), 32768 (dec.)
See description of the output data
Not required
0: Software reset 1: Voltage reset
Not required
See description of the output data
0
See description of the output data
Not required

Response	
Loop counter	See description of the input data
Response code	0x8000 (hex.), 32768 (dec.)
Length	Not required
Error code	See description of the input data
Tag in detection range	See description of the input data
Data (bytes) available	See description of the input data
Tag counter	See description of the input data
Write fragment no.	0
Read fragment no.	See description of the input data
Read data	Not required



# 8.5 Setting the device via the web server



The web server always displays all setting options. All values are shown as decimal values.

The integrated web server can be used to set the device and send commands to the device. In order to be able to open the web server with a PC, the device and the PC must be in the same IP network.

## 8.5.1 Opening a web server

DOCUMENTATION

MAIN

The web server can be opened from a web browser or from TAS (Turck Automation Suite). Accessing the web server via TAS is described in the section entitled "Adjusting network settings."

The device is factory set to IP address 192.168.1.250. To open the web server via a web browser, enter http://192.168.1.250 in the address bar of the web browser.

Status information and network settings are displayed on the home page.

MAIN DOCOMENTATION		
TNSLR-Q130-EN	TNSLR-Q130-EN Info	
(i) Info		
(Ô) Parameter		
ۍ۔ Υρ Diagnosis	· · · · · · · · · · · · · · · · · · ·	
िंदु Event log		
[ <sup>1†</sup> ] Ex- / Import	OB COM	
	Multicentered LIE DEID Bandes	
Change Password	Multiprotocol, HF-RFID Reader	
Firmware	Device	
LOCAL I/O	Station information	
ے۔۔۔۔ (ُنَ) Parameter	Туре	TNSLR-Q130-EN
	ldent. no.	100004502
Corror Diagnosis	IP address	192.168.1.250
🕒 Input	Addressing mode	PGM-DHCP ?
🕐 Output	MAC address	00:07:46:80:00:01
	Revisions	
	Hardware revision	1 ?
	Firmware revision	1.0.19.9
	Bootloader revision	10.0.1.0
	EtherNet/IP revision	2.7.54.0
	PROFINET revision	1.7.27.0
	Modbus/TCP revision	2.4.11.0
	ARGEE revision	3.9.0.0
	Software build number	1377
	WEB revision	v1.6.11.0
	Special device properties	
	Production data	00 00 00 00 00 00 00 00 00 00 00 00 00

Fig. 39: Example: Web server — home page



## 8.5.2 Editing settings in the web server

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



## NOTE

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

- Click Login.
- Enter the password.
- Click Login.
- After the login, you have write access to input and output data and to parameter data.

## Example: Setting the operating mode

In the following example, the operating mode is set to HF Extended.

- Click Local I/O  $\rightarrow$  Parameter in the navigation bar on the left of the screen.
- Select **HF extended** mode from the **Operation mode** drop-down menu.
- Save settings: Click Write.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Parameter	
(j) Info ඟී Parameter	Read Write Tab view Print	
ပြာ Diagnosis ကြို့ Event log	RFID channel         Operation mode         HF extended           HF: Select Tag type         HF extended         HF extended           HF: Bypass time (*1ms)         200         200	✓ ✓ ?
<ul> <li> <sup>th</sup> Ex- / Import</li></ul>	HF: Multitag no Heart beat read/write head no	<ul><li>✓</li><li>?</li><li>✓</li><li>?</li></ul>
LOCAL I/O	HF: Autotuning read/write head no Deactivate HF read/write head detuned no diagnostic Deactivate diagnostics no	✓ ? ✓ ? ✓ ?
ິບ Diagnosis ເ≩ Input ເ_ Output	Command retries at failure 2 HF: Command in continuous mode Inventory HF: Length in continuous mode 8	· · · · · · · · · · · · · · · · · · ·
	HF: Address in continuous mode 0 HF: Idle mode UID	· · · · · · · · · · · · · · · · · · ·
	Length of read data     128 byte       Length of write data     128 byte	<ul><li>✓</li><li>?</li><li>?</li></ul>

Fig. 40: Setting parameters in the web server



## Example: Executing a read command

In the following example, 8 bytes of data are read from a tag.

- Click Local I/O  $\rightarrow$  Output in the navigation bar on the left of the screen.
- Enter the number of bytes to be read in the Length entry field (here: 8).
- Select the read command via the **Command code** drop-down menu: **0x0002 Read.**

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(i) Info	Hex Y	
දිටු Parameter	Tab view Print Data format	
ပ်ာ Diagnosis	RFID channel	
Event log	Response code Ux8002 Busy - Read	
 [ <sup>↓</sup> ] Ex- / Import	Tag present at read/write head no	?
Change Password	HF read/write head switched on yes	?
f. Firmware	Continuous (Presence sensing) mode active no	?
	Loop counter for fast processing 0	?
LOCAL I/O	Antenna detuned at HF read/write head no	?
ද්ලි Parameter	Parameter not supported by read/write head no	?
ටාagnosis	Length	?
ک Input	Error code -	?
🕐 Output	Tag counter 8	?
	Output values	
	Command code 0x0002 Read	
	Loop counter for fast processing 0	?
	Start address 0	?
	Length 8	?
	Length of UID/EPC 0	?

Fig. 41: Setting a read command in the web server

- ⇒ The receipt of the command is confirmed automatically in the input data under Input values → Response code with 0x8002 Busy Read.
- ⇒ The read command is executed as soon as a tag is present in the detection range of the read/write head.
- $\Rightarrow$  The read data can be called under Local I/O  $\rightarrow$  Input.



# 9 Operation

9.1 Executing a command and calling data



# NOTE

A command is successful when the response code is the same as the command code.

- Set the parameters for the command.
- Set command code.
- ⇒ Set the command code. The command is successful when the response code is the same as the command code and no error message is present.

## 9.2 Use fragmentation

If more data is read than the set size of the data interface, the fragment counter in the input data is incremented automatically.

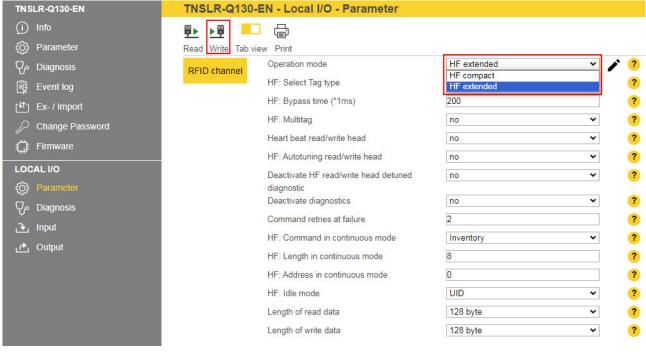
- To read more data: increase the fragment counter in the output data.
- Repeat the process until the read or write fragment No. in the input data equals 0.

If less data is read than the set size of the data interface, the fragment counter stays at 0.

## 9.2.1 Example: Using fragmentation in the web server — read

The following example describes the reading of 500 bytes in fragments of 128 bytes each.

- Open the web server of the device.
- Log into the device as administrator.
- Local I/O  $\rightarrow$  Parameter  $\rightarrow$  set Operation mode to HF extended.
- Click Write to save.







- Click Local I/O  $\rightarrow$  Output in the navigation bar on the left of the screen.
- ► Output values → Length: Enter the total number of bytes to be read (here: 500). Observe the size of the tag.
- Select the read command via the **Command code** drop-down menu: **0x0002 Read**.
- ⇒ The read command is executed as soon as a tag is present in the detection range of the read/write head.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex ¥	
දිටුි Parameter	Tab view Print Data format	
්ට Diagnosis මීද Event log	RFID channel Input values Response code 0x8002 Busy - Read	
	Tag present at read/write head no	?
	HF read/write head switched on yes	?
Change Password	Continuous (Presence sensing) mode active no	?
Firmware	Loop counter for fast processing 0	?
LOCAL I/O	Antenna detuned at HF read/write head no	?
දබු Parameter	Parameter not supported by read/write head no	?
Construction Diagnosis	Length 0	?
🕒 Input	Error code -	?
🔥 Output	Tag counter 0	?
	Data (Bytes) available 0	?
	Read fragment No. 0	?
	Write fragment No. 0	?
	Output values	
	Command code 0x0002 Read	
	Loop counter for fast processing D	?
	Start address 0	?
	Length 500	?

Fig. 43: Fragmentation – setting the read command



The following information is displayed in the input data (Input values):

- Response code: Read command successfully executed
- Data (bytes) available: Number of bytes that are still stored in the read/write head and are not yet displayed in the read data (here: 372)
- Read fragment No.: Sequential number of the next fragment to be read (here: 1)

#### The first 128 bytes of the input data are displayed under Input buffer.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex V	
දිටුි Parameter	Tab view Print Data format	
ට Diagnosis	RFID channel Input values	
Event log	Response code UXUUU2 Read	J
_, ∫ <sup>↓†</sup> ך Ex- / Import	Tag present at read/write head yes	?
Change Password	HF read/write head switched on yes	?
	Continuous (Presence sensing) mode active no	?
Firmware	Loop counter for fast processing 0	?
LOCAL I/O	Antenna detuned at HF read/write head no	?
O Parameter	Parameter not supported by read/write head no	?
ပြာ Diagnosis	Length 500	?
🕒 Input	- Error code	?
🛃 Output	Tag counter 1	?
	Data (Bytes) available 372	?
	Read fragment No. 1	?
	Write fragment No.	?
	Output values	17
	Command code 0x0002 Read	
	Loop counter for fast processing 0	?
	Start address D	] ?
	Length 500	?

Fig. 44: Fragmentation – input data



• At **Read fragment No.**, enter the sequential number of the next fragment to be read (here: 1).

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	- Hex Y	
<ol> <li>Parameter</li> </ol>	Tab view Print Data format	
ပြာ Diagnosis	RFID channel Response code	0x0002 Read
Event log	Tag present at read/write head	yes ?
[ <sup>↓</sup> ] Ex- / Import	HF read/write head switched on	yes ?
Change Password	Continuous (Presence sensing) mode active	no ?
: Firmware	Loop counter for fast processing	0 ?
LOCAL I/O	Antenna detuned at HF read/write head	no ?
රිටු Parameter	Parameter not supported by read/write head	no 🤊
ෆ් Diagnosis	Length	500 ?
🕒 Input	Error code	- ?
🔥 Output	Tag counter	1 ?
	Data (Bytes) available	244 ?
	Read fragment No.	2
	Write fragment No.	0 ?
	Output values	
	Command code	0x0002 Read 🗸
	Loop counter for fast processing	0 ?
	Start address	0 ?
	Length	500 ?
	Length of UID/EPC	0 ?
	Command timeout (*1ms)	0 ?
	Read fragment No.	1 ?
	Write fragment No.	0 ?

Fig. 45: Fragmentation – read second fragment



The following information is displayed in the input data (Input values):

- Response code: Read command successfully executed
- Data (bytes) available: Number of bytes that are still stored in the read/write head and are not yet displayed in the read data (here: 244)
- Read fragment No.: Sequential number of the next fragment to be read (here: 2)

#### The second 128 bytes of the input data are displayed under Input buffer.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex V	
O Parameter	Tab view Print Data format	
ပို့ Diagnosis	RFID channel Input values Response code 0x0002 Read	
Event log	Tag present at read/write head yes	?
[ <sup>↓†</sup> ] Ex- / Import	HF read/write head switched on yes	?
Change Password	Continuous (Presence sensing) mode active	?
Firmware	Loop counter for fast processing 0	?
LOCAL I/O	Antenna detuned at HF read/write head no	?
{Ô} Parameter	Parameter not supported by read/write head no	?
ပ် Diagnosis	Length 500	?
🕒 Input	Error code -	?
🔥 Output	Tag counter 1	?
	Data (Bytes) available 244	?
	Read fragment No. 2	?
	Write fragment No. 0	?

Fig. 46: Fragmentation – input data of the second fragment

- Repeat the operation until no more data is present in the read/write head.
- If no more data is present in the read/write head **Read fragment No.** will show the value
   0.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex V	
O Parameter	Tab view Print Data format	
ට් Diagnosis	RFID channel Response code 0x0002 Read	
👸 Event log	Tag present at read/write head	?
다 Ex- / Import	HF read/write head switched on ves	?
Change Password	Continuous (Presence sensing) mode active no	?
Firmware	Loop counter for fast processing 0	?
LOCAL I/O	Antenna detuned at HF read/write head no	?
(Ô) Parameter	Parameter not supported by read/write head on no	?
ට් Diagnosis	Length 500	?
🕒 Input	Error code -	?
🔥 Output	Tag counter 1	?
	Data (Bytes) available 0	?
	Read fragment No.	?
	Write fragment No. 0	?

Fig. 47: Fragmentation - no more data present



## 9.2.2 Example: Using fragmentation in the web server — write

The following example describes the writing of 500 bytes in fragments of 128 bytes each.

- Open the web server of the device.
- Log into the device as administrator.
- Local I/O  $\rightarrow$  Parameter  $\rightarrow$  set Operation mode to HF extended.
- Save the set operating mode by clicking on Write.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Parameter	
(j) Info		
<ộ} Parameter	Read Write Tab view Print	
ပ်ာ Diagnosis	Operation mode	HF extended  V
Event log	HF: Select Tag type	HF compact HF extended
 ۲۹۴۱ Ex- / Import	HF: Bypass time (*1ms)	200 ?
Change Password	HF: Multitag	no 🗸
a∰ Firmware	Heart beat read/write head	no 🗸
	HF: Autotuning read/write head	no 🗸
درمد ا/ه درگ Parameter	Deactivate HF read/write head detuned diagnostic	no 🗸 ?
ې Vo Diagnosis	Deactivate diagnostics	no 🗸
j⊋, Input	Command retries at failure	2 ?
🗠 Output	HF: Command in continuous mode	Inventory
	HF: Length in continuous mode	8
	HF: Address in continuous mode	0 ?
	HF: Idle mode	UID 🗸 🥐
	Length of read data	128 byte 🔹 🥐
	Length of write data	128 byte 🔹 ?

Fig. 48: Fragmentation - selecting the operating mode

NOTE



The tag must not leave the detection range of the read/write head during the write operation.

The write fragment number must always start with 1.



- Enter the first 128 bytes of write data under **Output buffer**.
- Click Local I/O  $\rightarrow$  Output in the navigation bar on the left of the screen.
- ► Output values → Length: Enter the total number of bytes to be written (here: 500). Observe the size of the tag.
- Under Write fragment No., enter the sequential number of the fragment with the write data (here: 1 to enable the write data fragmentation).
- Select the write command via the **Command code** drop-down menu: **0x0004 Write**.
- ⇒ The write command is executed as soon as a tag is present in the detection range of the read/write head. If a tag is already present in the detection range of the read/write head, the data is written directly and not stored in the read/write head.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex V	
O Parameter	Tab view Print Data format	
ပြာ Diagnosis ဖြို့ Event log	RFID channel Input values Response code 0x0000 Idle	
 ∫ <sup>↓†</sup> ] Ex- / Import	Tag present at read/write head no ?	
Change Password	HF read/write head switched on 0x0000 Idle	*
	Continuous (Presence sensing) mode active 0x0001 Inventory 0x0002 Read	
Firmware	Loop counter for fast processing 0x0004 Write	
LOCAL I/O	Antenna detuned at HF read/write head 0x0010 Continuous Mode	
{Ô} Parameter	Parameter not supported by read/write head 0x0011 Read buffer (Cont. Mode) 0x0012 Stop Continuous (Presence Sensing) Mode	
ې Diagnosis	0x0040 HF Read/write head off	
,⊋, Input	Englin 0x0041 Read/write head identification Error code 0x0050 Tag info	
📺 . 🕐 Output	0x0060 Direct read/write head command Tag counter 0x0080 Tune HF read/write head	
	Data (Bytes) available 0x0100 Set read/write head password 0x0101 Reset read/write head password	
	Read fragment No. 0x0102 Set tag password 0x0103 Set tag protection	
	Write fragment No. 0x0104 Get HF tag protection status	
	Ox0105 Set perma lock Output values Ox2001 Inventory with loop counter	-
	Command code 0x0000 Idle 🗸	
	Loop counter for fast processing 0	
	Start address 0 ?	
	Length 500	
	Length of UID/EPC 0	
	Command timeout (*1ms)	
	Read fragment No.	
	Write fragment No. 1	

Fig. 49: Fragmentation – executing a write command



The following information is displayed in the input data (Input values):

- Response code: 0x8004 Busy Write (write command active)
- Data (bytes) available: Number of bytes that are still stored in the read/write head and were not yet written to the tag
- Write fragment No.: Sequential number of the fragment with the write data (here: 1)

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	E Hex Y	
O Parameter	Tab view Print Data format	
ပုံ Diagnosis	RFID channel	
📆 Event log	Response code         0x8004 Busy - Write           Tag present at read/write head         no	2
[ <sup>1</sup> ] Ex- / Import		?
Change Password		?
-	Continuous (Presence sensing) mode active no	?
LOCAL I/O	Loop counter for fast processing 0 Antenna detuned at HF read/write head no	?
(Ô) Parameter	Parameter not supported by read/write head no	
ల్లు Diagnosis		?
ישר אושיוסטס ו€, Input	Error code -	?
	Tag counter D	?
🔥 Output	Data (Bytes) available 128	?
	Read fragment No.	?
	Write fragment No. 1	?

Fig. 50: Fragmentation – input data



- Enter the second 128 bytes of write data under **Output buffer**.
- Under Write fragment No., enter the sequential number of the next fragment with the write data (here: 2).

It is written directly if a tag is in the detection range. The data is stored in the read/write head if there is no tag in the detection range.

The tag must stay in the detection range until the command is fully executed. The device outputs a fault signal if the tag is removed from the detection range before the command has been completed.

TN SLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex 🗸	
දිටුි Parameter	Tab view Print Data format	
ပြာ Diagnosis	RFID channel Input values Response code	0x8004 Busy - Write
译 Event log	Tag present at read/write head	no ?
[ <sup>↓†</sup> ] Ex- / Import	HF read/write head switched on	yes ?
Change Password	Continuous (Presence sensing) mode active	no ?
Firmware	Loop counter for fast processing	0
LOCAL I/O	Antenna detuned at HF read/write head	no ?
දරාූි Parameter	Parameter not supported by read/write head	no ?
ပြာ Diagnosis	Length	0 ?
🕒 Input	Error code	- ?
🔥 Output	Tag counter	0
	Data (Bytes) available	256 ?
	Read fragment No.	D ?
	Write fragment No.	2
	Output values Command code	0x0004 Write 🗸
	Loop counter for fast processing	0 ?
	Start address	0 ?
	Length	500 ?
	Length of UID/EPC	0 ?
	Command timeout (*1ms)	0
	Read fragment No.	0 ?
	Write fragment No.	2 ?

Fig. 51: Fragmentation – write second fragment



- Repeat the operation until all data is present on the read/write head.
- ➡ If the data was successfully written to the tag, the **Response code** changes to **0x0004** Write.

TNSLR-Q130-EN	TNSLR-Q130-EN - Local I/O - Output	
(j) Info	Hex Y	
<ộ Parameter	Tab view Print Data format	
ට්යgnosis	RFID channel	
Event log	Response code 0x0004 Write	?
[바] Ex- / Import	Tag present at read/write head no no	•
Change Password		•
- ≓∰: Firmware	Continuous (Presence sensing) mode active	?
	Loop counter for fast processing 0	?
<ul> <li>Parameter</li> </ul>	Antenna detuned at HF read/write head no	?
	Parameter not supported by read/write head no	?
ပြာ Diagnosis	Length 0	?
င္ Input	Error code -	?
🕐 Output	Tag counter 4	?
	Data (Bytes) available 0	?
	Read fragment No.	?
	Write fragment No. 4	?

Fig. 52: Fragmentation — no more data present in the read/write head



## 9.3 Using NEXT mode

NEXT mode can only be used in HF single-tag applications. A HF tag is always only read, written or protected if the UID is different from the UID of the last read or written tag.

## 9.3.1 Example: using NEXT mode for a read command

✓ Requirement: Tag A and tag B have a different UID.

- Set the read command in the process output data.
- Set NEXT mode: Specify the value -1 in the process output data under **UID Length**.

Tag A is in the detection range of the read/write head. The controller sends a read command to the read/write head in NEXT mode.

The read/write head reads data from tag A once.

The controller sends a second read command to the read/write head in NEXT mode. The read/ write head will not read data when tag A is within the read/write head detection range.

The read/write head reads data from tag B when tag B is within the read/write head detection range.

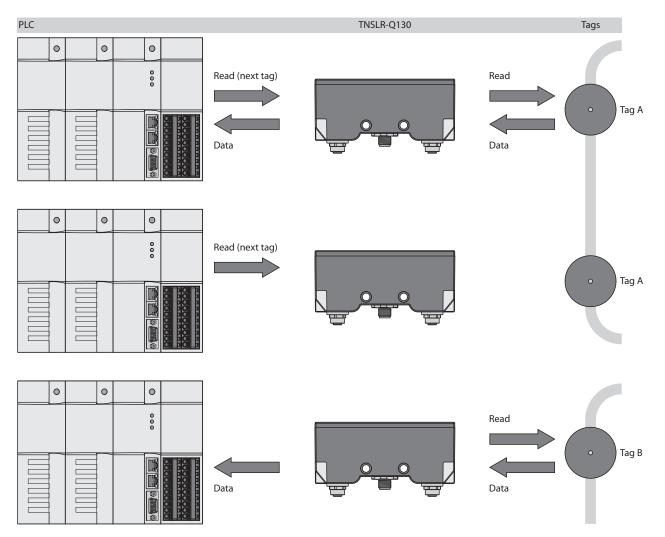


Fig. 53: NEXT mode (layout)



#### 9.4 Using the Inventory command and continuous mode

Inventory command and continuous mode differ in terms of their data transfer to the PLC system. Continuous mode is suitable for high-speed applications, in which a command (e.g. read or write) is to be performed repeatedly. Repeated execution of the same command by the controller is unnecessary.

The following lists the most important differences between an Inventory command and continuous mode:

Inventory	Continuous mode		
Triggered reading of UID	<ul> <li>Repeated reading of UIDs</li> <li>Automatic repetition of the same command (e.g. inventory, read, write)</li> </ul>		
Data is displayed in the read data after the command has ended.	Data must be read from the memory of the in- terface with a separate command.		
No buffering on the read/write head	No buffering on the read/write head		
Terminate command:	Terminate command:		
1. Timeout	1. Timeout		
2. Automatically after command execution	2. Separate command		



## 9.5 LEDs

PWR LED	Meaning
off	No voltage or undervoltage at V1
green	Voltage at V1 error-free
BUS LED	Meaning
off	No voltage present
green	Connection to a master present
Green flashing	Device is operational
red	IP address conflict or Modbus connection timeout
Red flashing	Wink command active
Red/green flashing	Auto-negotiation and/or DHCP/BootP search of the settings
ERR LED	Meaning
off	No voltage present
green	No diagnostics, device free of errors
red	Diagnostics present
	<b>u</b> :
P1 and P2 LEDs	Meaning
off	No Ethernet connection
green	Ethernet connection established, 100 Mbit/s
Green flashing	Data transfer, 100 Mbit/s
yellow	Ethernet connection established, 10 Mbit/s
Yellow flashing	Data transfer, 10 Mbit/s
HF LED	Meaning
green	Ready for operation
Green flashing (1 Hz)	HF field (read/write head antenna) switched off
Green flashing (2 Hz)	Tag in detection range
	5 5
AT LED	Meaning
Yellow flashing (2 Hz)	Too much metal in the vicinity of the read/write head, range signific- antly reduced
Wink LED	Meaning
White flashing	Wink command active



## 9.6 Software Diagnostics Messages

#### 9.6.1 Diagnostic messages – Gateway functions

Byte no.	Bit							
	7	6	5	4	3	2	1	0
0	V2							DIAG
1		FCE				СОМ	V1	

### Meaning of the diagnostic bits

Designation	Meaning
V2	Undervoltage at power supply terminal V2
DIAG	Module diagnostics available
FCE	Force mode in the DTM active
COM	Internal error
V1	Undervoltage at power supply terminal V1



# 9.7 Reading error codes

The error codes are part of the process input data.

Error code (hex)	Error code (dec)	Meaning
0x8000	32768	Channel not active
0x8001	32769	Read/write head not connected
0x8002	32770	Memory full
0x8003	32771	Block size of the tag not supported
0x8004	32772	Length larger than the size of the read fragment
0x8005	32773	Length larger than the size of the write fragment
0x8100	33024	Parameter undefined
0x8101	33025	"Operating mode" parameter outside of the permissible range
0x8102	33026	"Tag type" parameter outside of the permissible range
0x8103	33027	"Operating mode" parameter in continuous mode outside of the permissible range
0x8104	33028	"Length" parameter in continuous mode outside of the permissible range
0x8105	33029	Size of the write fragment outside of the permissible range
0x8106	33030	Size of the read fragment outside of the permissible range
0x81FD	33021	"Bypass time" parameter outside of the permissible range
0x81FE	33022	Address in continuous mode outside of the permissible range
0x81FF	33023	No read/write head selected
0x8200	33280	Command code unknown
0x8201	33281	Command not supported
0x8202	33282	Command not supported in HF applications
0x8204	33284	Command for multitag application with automatic tag detection not supported
0x8205	33285	Command for applications with automatic tag detection not supported
0x8206	33286	Command only supported for applications with automatic tag de- tection
0x8207	33287	Command not supported for multitag application
0x8208	33288	Command not supported in HF bus mode
0x8209	33289	Length outside of the permissible range
0x820A	33290	Address outside of the permissible range
0x820B	33291	Length and address outside of the permissible range
0x820C	33292	No tag found
0x820D	33293	Timeout
0x820E	33294	Next command not supported in multitag mode
0x820F	33295	Length of the UID outside of the permissible range
0x8210	33296	Length outside of the tag specification
0x8211	33297	Address outside of the tag specification
0x8212	33298	Length and address outside of the tag specification



Error code (hex)	Error code (dec)	Meaning
0x8213	33299	Memory area of the tag outside of the permissible range
0x8214	33300	Read/write head address outside of the permissible range
0x8215	33301	Value for timeout outside of the permissible range
0x8300	33536	"Continuous mode" command not activated
0x8301	33537	Grouping not supported in HF applications
0x8302	33538	Grouping not supported for read commands
0x8304	33540	Grouping not supported for write commands
0x8305	33541	HF: Length in continuous mode infringes the block limits
0x8306	33542	HF: Address in continuous mode infringes the block limits
0x8307	33543	HF: Length in continuous mode outside of the permissible range
0x0801	2049	Write or read error
0x2200	8704	Automatic tuning active
0x2201	8705	Automatic tuning failed
0x2202	8706	Read/write head not tuned
0x2500	9472	Password function of the tag not supported
0x2501	9473	Password function not supported by read/write head
0x2900	10496	Address outside of the block limits
0x2901	10497	Length outside of the block limits
0xC000	49152	Internal error (response of the read/write head too short)
0xC001	49153	Command not supported by read/write head version
0xB0	45	HF read/write head reports error
0xB048	45128	Error when switching on the HF read/write head
0xB049	45129	Error when switching off the HF read/write head
0xB060	45152	Error with the advanced parameter setting of the HF read/write head
0xB061	45153	Error with the parameter setting of the HF read/write head
0xB062	45154	Read/write head error when executing an inventory command
0xB067	45159	Read/write head error when executing a lock block command
0xB068	45160	Read/write head error when executing a read multiple block com- mand
0xB069	45161	Read/write head error when executing a write multiple block com- mand
0xB06A	45162	Error when reading the system information
0xB06B	45163	Error when reading the protection status of the tags
0xB0AD	45229	Error when setting the read/write head address
0xB0BD	45245	Error when setting the transfer rate
0xB0DA	45274	Error with the "Tag in detection range" function
0xB0E0	45280	Error when reading the read/write head version



Error code (hex)	Error code (dec)	Meaning
0xB0E1	45281	Error when reading the advanced read/write head version
0xB0F1	45297	Error with automatic read/write head tuning
0xB0F8	45304	Error when resetting a command in continuous mode
0xB0FA	45306	Error when outputting the response code
0xB0FF	45311	Error when resetting the read/write head
0xB0B3	45235	Error when setting the tag password
0xB0B6	45238	Error when setting the write or read protection
0xB0B8	45240	Error when reading the protection status of the memory area on the tag
0xB0C3	45251	Error when setting the password in the read/write head
0xD106	53510	Error with the tag function
0xF0	61	ISO 15693 error
0xF001	61441	ISO 15693 error: Command not supported
0xF002	61442	ISO 15693 error: Command not detected, e.g. incorrect input format
0xF003	61443	ISO 15693 error: Command option not supported
0xF00F	61455	ISO 15693 error: undefined error
0xF010	61456	ISO 15693 error: Addressed memory area not available
0xF011	61457	ISO 15693 error: Addressed memory area locked
0xF012	61458	ISO 15693 error: Addressed memory area locked and not writable
0xF013	61459	ISO 15693 error: Write operation not successful
0xF014	61460	ISO 15693 error: Addressed memory area could not be locked
0xF0A00xF0DF	6160061663	Air interface error
0xF101	61697	Air interface error: CRC error
0xF102	61698	Air interface error: Timeout
0xF110	61712	Air interface error: Tag does not have the expected UID
0xF201	61953	HF read/write head faulty
0xF202	61954	HF read/write head: Error in command execution
0xF204	61956	HF read/write head: Transmission error, check syntax
0xF208	61960	Power supply of the HF read/write head too low
0xF20A	61962	HF read/write head: Command code unknown
0xFFFE	65534	Timeout on the RS485 interface
0xFFFF	65535	Command aborted



# 10 Troubleshooting

If the device does not function as expected, first check whether ambient interference is present. If there is no ambient interference present, check the connections of the device for faults.

If there are no faults, there is a device malfunction. In this case, decommission the device and replace it with a new device of the same type.



## 11 Maintenance

-

#### 11.1 Updating the firmware via web server

DOCUMENTATION

NOTICE

Interruption of the power supply during the firmware update **Device damage due to faulty firmware update** 

- Do not interrupt the power supply to the device during the firmware update.
- ► Do not reset the power supply during the firmware update.
- Open the web server.
- Log into the device as administrator. The default password for the web server is "password".
- ► Click Firmware → SELECT FIRMWARE FILE.
- Select a new firmware file and load it by clicking **Open**.

MAIN DOCON	ILMIATION		
TNSLR-Q130-EN		TNSLR-Q130-EN Firmw	are
(j) Info		Firmware revision	1.0.19.9
දිලි} Parameter ට්ල Diagnosis		SELECT FIRMWARE FILE	
🛱 Event log	_	UPDATE FIRMWARE	ļ
( <sup>11</sup> ) Ex- / Import	O Öffnen	0	×
🔎 Change Pas	<sup>s\</sup> ← → * ↑	🖌 « Desktop » FW Update	<ul> <li>・</li> <li>・</li></ul>
Firmware	Organisieren 🔻	Neuer Ordner	E • 🔳 😧
LOCAL I/O (i) Parameter i) Diagnosis i Input i Output	<ul> <li>Schnellzugrif</li> <li>Creative Close</li> <li>OneDrive</li> <li>OneDrive</li> <li>Dieser PC</li> <li>3D-Objekte</li> </ul>	ud Files	
		Dateiname: TNSLRVbdat	<ul> <li>✓ Alle Dateien (*.*) ✓</li> <li>Öffnen Abbrechen</li> </ul>

Fig. 54: Web server — Firmware update

- Click Update Firmware and start the firmware update.
- Restart the device after the update process is complete by clicking **OK**.



## 12 Repair

The device is not intended for repair by the user. The device must be decommissioned if it is faulty. Observe our return acceptance conditions when returning the device to Turck.

#### 12.1 Returning devices

If a device has to be returned, bear in mind that only devices with a decontamination declaration will be accepted. This is available for download at

https://www.turck.de/en/return-service-6079.php

and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.



# 13 Disposal

X

The devices must be disposed of properly and do not belong in the domestic waste.



# 14 Technical Data

Technical data	
Electrical data	
Operating voltage	1830 VDC
Data transfer	Inductive coupling
Operating frequency	13.56 MHz
Radio communication and protocol standards	ISO 15693, NFC type 5
Output function	Read/write
Mechanical data	
Mounting condition	Non-flush
Ambient temperature	-40+70 °C
Storage temperature	-40+85 °C
Housing material	Plastic, PPS-GF30, black
Material of active face	Plastic, PPS-GF30, black
Vibration resistance	55 Hz (1 mm)
Shock resistance	30 g (11 ms)
Protection class	IP67
System data	
Ethernet transfer rate	10 Mbit/s / 100 Mbit/s
Web server	Default: 192.168.1.254
Modbus TCP	
Addressing	Static IP, BOOTP, DHCP
Supported function codes	FC1, FC2, FC3, FC4, FC5, FC6, FC15, FC16, FC23
Number of TCP connections	8
EtherNet/IP	
Addressing	acc. to EtherNet/IP specification
Device Level Ring (DLR)	Supported
Input Assembly Instance	103
Number of input data (PAE)	248
Output Assembly Instance	104
Number of output data (PAA)	248
Class1 connections	10
Class3 connections	3
Configuration Assembly Instance	106
PROFINET	
Addressing	DCP
MinCycleTime	4 ms
Diagnostics	acc. to PROFINET alarm handling
Automatic addressing	Supported
Media Redundancy Protocol (MRP)	Supported
Number of input data (PAE)	Max. 512
Number of output data (PAA)	Max. 512



# 15 Appendix: flow charts showing the operation of the device

The flow charts explain the operation of the device as well as the processing of commands.

#### 15.1 Flow chart: command processing

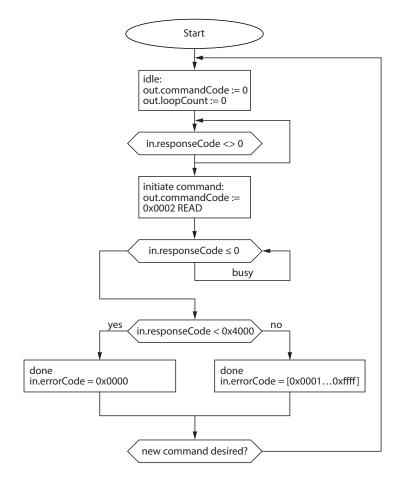


Fig. 55: Flow chart for command processing



15.1.1 Handling command execution with Busy and Error — sample code in CODESYS The following is a sample code for evaluation in the PLC program.

```
commandCode: INT;
responseCode: INT;
responseCodePrevious: INT;
commandCode:= 0x0002; (* READ *)
(* ... PLC cycle ... *)
IF (responseCode <> responseCodePrevious) THEN
IF (responseCode < 0) THEN
(* BUSY *)
ELSE
IF (responseCode == commandCode) THEN
(* success *)
ELSIF (0x8000 == commandCode) AND (0x0000 == responseCode) THEN
(* reset success *)
ELSE
(* error *)
END IF;
END IF;
responseCodePrevious:= responseCode;
END IF;
```



## 15.2 Flow chart: rapid command processing with loop counter

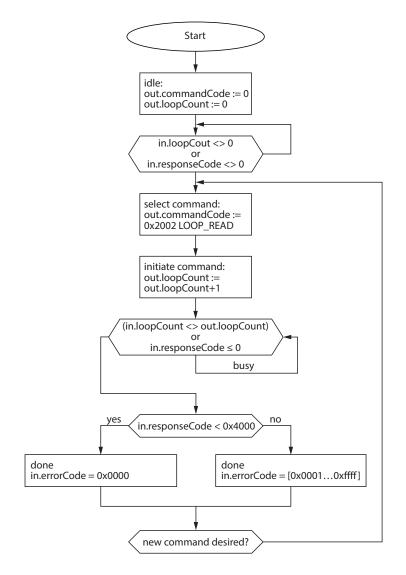
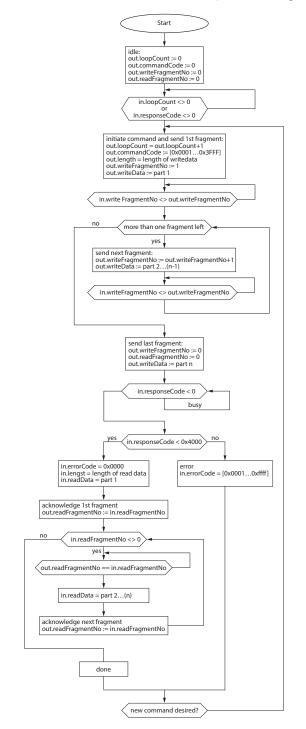


Fig. 56: Flow chart for fast command processing with loop counter



## 15.3 Flow chart: command processing with fragmentation







### 15.4 Flow chart: Continuous Mode with interruption before reading data

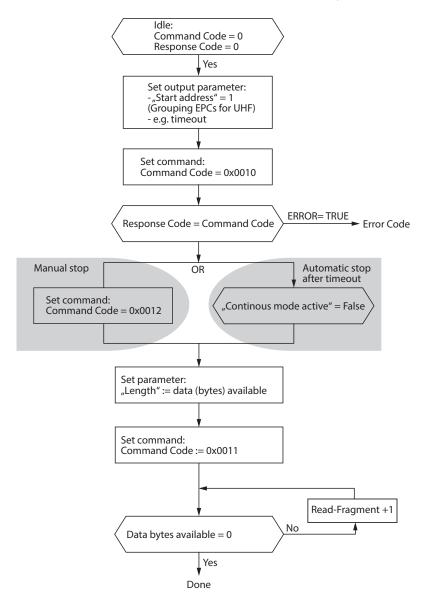
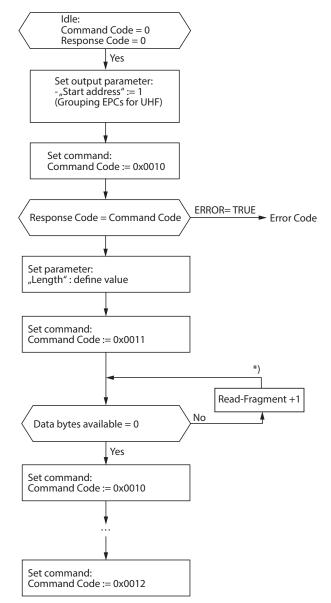


Fig. 58: Flow chart for Continuous Mode with interruption before reading data



### 15.5 Flow chart: Continuous Mode without interruption before reading data



\*) After increasing the Read Fragment No., the new data will be shown in the read data input.

Fig. 59: Flow chart for Continuous Mode without interruption before reading data



### 15.6 Flow chart: programming tags with a password

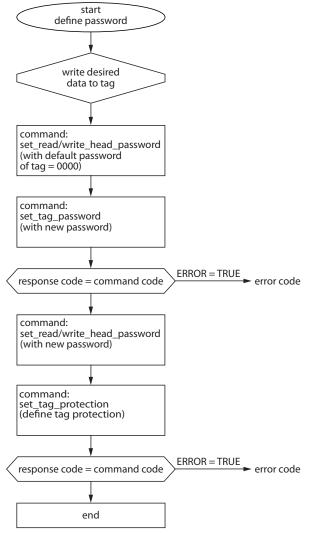


Fig. 60: programming tags with a password



# 16 Turck branches — contact data

Germany	Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr www.turck.de
Australia	Turck Australia Pty Ltd Building 4, 19-25 Duerdin Street, Notting Hill, 3168 Victoria www.turck.com.au
Austria	Turck GmbH Graumanngasse 7/A5-1, A-1150 Vienna www.turck.at
Belgium	TURCK MULTIPROX Lion d'Orweg 12, B-9300 Aalst www.multiprox.be
Brazil	Turck do Brasil Automação Ltda. Rua Anjo Custódio Nr. 42, Jardim Anália Franco, CEP 03358-040 São Paulo www.turck.com.br
Canada	Turck Canada Inc. 140 Duffield Drive, CDN-Markham, Ontario L6G 1B5 www.turck.ca
China	Turck (Tianjin) Sensor Co. Ltd. 18,4th Xinghuazhi Road, Xiqing Economic Development Area, 300381 Tianjin www.turck.com.cn
Czech Republic	TURCK s.r.o. Na Brne 2065, CZ-500 06 Hradec Králové www.turck.cz
France	TURCK BANNER S.A.S. 11 rue de Courtalin Bat C, Magny Le Hongre, F-77703 MARNE LA VALLEE Cedex 4 www.turckbanner.fr
Hungary	TURCK Hungary kft. Árpád fejedelem útja 26-28., Óbuda Gate, 2. em., H-1023 Budapest www.turck.hu
India	TURCK India Automation Pvt. Ltd. 401-403 Aurum Avenue, Survey. No 109 /4, Near Cummins Complex, Baner-Balewadi Link Rd., 411045 Pune - Maharashtra www.turck.co.in
Italy	TURCK BANNER S.R.L. Via San Domenico 5, IT-20008 Bareggio (MI) www.turckbanner.it
Japan	TURCK Japan Corporation ISM Akihabara 1F, 1-24-2, Taito, Taito-ku, 110-0016 Tokyo www.turck.jp



Korea	Turck Korea Co, Ltd. A605, 43, Iljik-ro, Gwangmyeong-si 14353 Gyeonggi-do www.turck.kr
Malaysia	Turck Banner Malaysia Sdn Bhd Unit A-23A-08, Tower A, Pinnacle Petaling Jaya, Jalan Utara C, 46200 Petaling Jaya Selangor www.turckbanner.my
Mexico	Turck Comercial, S. de RL de CV Blvd. Campestre No. 100, Parque Industrial SERVER, C.P. 25350 Arteaga, Coahuila www.turck.com.mx
Netherlands	Turck B. V. Ruiterlaan 7, NL-8019 BN Zwolle www.turck.nl
Poland	TURCK sp.z.o.o. Wroclawska 115, PL-45-836 Opole www.turck.pl
Romania	Turck Automation Romania SRL Str. Siriului nr. 6-8, Sector 1, RO-014354 Bucuresti www.turck.ro
Sweden	Turck AB Fabriksstråket 9, 433 76 Jonsered www.turck.se
Singapore	TURCK BANNER Singapore Pte. Ltd. 25 International Business Park, #04-75/77 (West Wing) German Centre, 609916 Singapore www.turckbanner.sg
South Africa	Turck Banner (Pty) Ltd Boeing Road East, Bedfordview, ZA-2007 Johannesburg www.turckbanner.co.za
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United Kingdom	TURCK BANNER LIMITED Blenheim House, Hurricane Way, GB-SS11 8YT Wickford, Essex www.turckbanner.co.uk
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