

TBEN-S2-2RFID-4DXP Compact RFID Interface

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 written for specifically trained personnel and must be read carefully by anyone entrusted with the installation, commissioning, operation, maintenance, disassembly or disposal of the device.

When using the device in Ex circuits, the user must also have an additional knowledge of explosion protection (IEC/EN 60079-14 etc.).

1.2 Explanation of symbols

The following symbols are used in these instructions:

| | DANGER DANGER indicates a hazardous situation with a high level of risk, which, if not avoided, will result in death or serious injury. |
|---|--|
| | WARNING WARNING indicates a hazardous situation with a medium level of risk, which, if not avoided, will result in death or serious injury. |
| | CAUTION CAUTION indicates a hazardous situation with a medium level of risk, which, if not avoided, will result in moderate or minor injury. |
| ! | NOTICE CAUTION indicates a situation which, if not avoided, may cause damage to property |
| 1 | NOTE NOTE indicates tips, recommendations and important information about special ac- tion steps and issues. The notes simplify your work and help you to avoid additional work. |
| | MANDATORY ACTION This symbol denotes actions that the user must carry out. |
| ⇔ | RESULT OF ACTION 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 (current version)
- 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 compact RFID interfaces:

TBEN-S2-2RFID-4DXP

2.2 Scope of delivery

The delivery consists of the following:

- Compact RFID interface
- Closure caps for M12 connectors
- 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 [> 286].



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 TBEN-S2-2RFID-4DXP block module is an RFID interface for use in the Turck BL ident system. The device is connected between the controller and the read/write device and transmits commands from the controller to the read/write devices. Read data is sent to the controller via the device.

The device supports the HF read/write heads from firmware version Vx.90 and UHF readers from firmware version FW 1.45.

Up to two BL ident read/write devices can be connected to the device in normal operation. In Bus mode it is possible to connect up to 32 bus-capable HF read/write heads per channel. Four universal digital channels are also provided. The multiprotocol interfaces can be connected to the Ethernet fieldbus systems PROFINET, Modbus TCP and EtherNet/IP.

Installation directly in the field is possible thanks to protection class IP65, IP67 IP67K. Devices with the Ex marking are suitable for use in the Ex area in zone 2 and zone 22.

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.
- Only use the device in compliance with the applicable national and international regulations, standards and laws.
- The device meets the EMC requirements for the industrial areas. When used in residential areas, take measures to prevent radio frequency interference.
- Change the default password of the integrated web server after the first login. Turck recommends the use of a secure password.

3.3 Notes on Ex protection

- When using the device in Ex circuits, the user must also have knowledge of explosion protection (IEC/EN 60079-14 etc.).
- Observe national and international regulations for explosion protection.
- Only use the device within the permissible operating and ambient conditions (see certification data and Ex approval specifications).

3.4 Requirements for Ex approval

- Only connect and disconnect circuits when no voltage is present.
- Connect the metal protective cover to the equipotential bonding in the Ex area.
- Ensure impact resistance in accordance with EN IEC 60079-0 alternative measures:
 - Install the device in the TB-SG-S protective housing (ID 100014866).
 - Install the device in an area offering impact protection (e.g. in the robot arm) and attach a warning sign: DANGER Do not connect or disconnect the device under power."
- Do not install the device in areas critically exposed to UV light.
- Prevent risks caused by electrostatic charge.
- Provide unused male connectors with suitable sealing or blanking caps in order to ensure protection class IP65, IP67 or IP69K The tightening torque for the M4 screws is 0.5 Nm.



4 Product description

The devices are designed with a fully potted housing with protection class IP65/ IP67/IP69K. Two RFID channels are provided for connecting read/write devices. Sensors and actuators can also be connected via four digital I/O channels. The terminals for the read/write devices and for digital I/Os are M12 female connectors. An M8 female connector is provided for the fieldbus connection.

4.1 Device overview

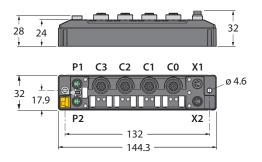


Fig. 1: Dimensions

4.1.1 Indication elements

The device is provided with the following LEDs:

- Power supply voltage
- Group and bus error
- Status
- Diagnostics

4.2 Properties and features

- PROFINET device, EtherNet/IP device or Modbus TCP slave
- PROFINET S2 system redundancy
- Integrated Ethernet switch
- Supports 10 Mbps/100 Mbps
- Glass fiber reinforced housing
- Shock and vibration tested
- Fully potted module electronics
- Protection class IP65/IP67/IP69K
- Integration in PLC systems without special function block
- Up to 128 bytes of user data per read/write cycle per channel as well as the use of fragments for larger data volumes with 16 kB FIFO memory
- Data interface for convenient use of the RFID functions
- HF Continuous bus mode with up to 32 HF read/write heads per channel
- Two channels with M12 connector for RFID
- Mixed operation of HF and UHF read/write heads and UHF readers
- Four universal digital channels as 0.5 A PNP inputs or outputs
- Integrated web server
- LEDs and diagnostics
- Programmable with FLC/ARGEE



4.3 Operating principle

The interfaces are provided with a multiprotocol fieldbus interface for Modbus TCP, EtherNet/IP and PROFINET. The fieldbus interface connects the RFID system to an (existing) fieldbus system as an EtherNet/IP device, Modbus TCP slave or PROFINET device. The interfaces are provided with a fieldbus interface and fieldbus-independent I/O electronics with an RFID interface. During operation the process data is exchanged between the fieldbus and RFID system and also diagnostic information generated for the controller. The read/write devices are connected to the interfaces via the RFID interfaces. The interface signals of up to four sensors and actuators can also be processed via four universal digital channels.

4.4 Functions and operation modes

The compact RFID interfaces transfer data between the RFID level (read/write device and tag) and the control level. HF read/write heads and UHF readers can be connected to the RFID channels. Parallel operation of HF read/write heads and UHF readers on the same device is also possible.

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.

Sensors and actuators can be connected to the universal digital channels. In all, up to four 3wire PNP sensors or four PNP DC actuators can be connected per input or output. The maximum output current per channel is 0.5 A.

4.4.1 Multiprotocol technology

The device can be used in the following three Ethernet protocols:

- Modbus TCP
- EtherNet/IP
- PROFINET

The required Ethernet protocol can be detected automatically or selected manually.

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).

The system detects during the startup phase ("snooping") of the system the Ethernet protocol requested to establish connection. The other protocols can only be used for 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 can only be used for read access to the device.



Protocol-dependent functions

The device supports the following Ethernet profile-specific functions:

PROFINET

- FSU (fast startup, prioritized ramp-up)
- Topology detection
- Address allocation with LLDP
- Media redundancy protocol (MRP)

EtherNet/IP

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

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 |
|---|---|---|
| 8 bytes | 16 bytes | 128 bytes (permanently set) |
| 16 bytes (default setting) 32 bytes 64 bytes 128 bytes | 64 bytes 128 bytes (default setting) | Adjustable fragment size: 8 bytes 16 bytes (default setting) 32 bytes 64 bytes 128 bytes |

4.4.3 RFID channels — operating modes

Different data interfaces can be selected for the RFID channels:

- HF compact
- HF extended
- HF bus mode
- UHF compact
- UHF 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

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



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 commands autonomously. Different data is stored in the internal memory of the interface. The memory operates as a FIFO memory.

HF bus mode

In HF bus mode up to 32 bus-capable read/write heads per RFID channel can be connected to the RFID module. An additional power supply may be required depending on the number and power consumption of connected read/write heads. A power consumption analysis of the connected read/write heads is required in order to determine the additional power supply required. A tool is provided at www.turck.com/hf-busmodus for calculating the power.

Every connected read/write head supplies a "**Tag present**" signal in HF bus mode. HF bus mode is suitable for static applications and very slow dynamic applications because a command can only be processed by one read/write head at a time.

In HF Continuous bus mode a command is performed simultaneously at all read/write heads in a bus topology. The logged data is stored in the ring memory of the module.



Fig. 2: HF bus mode setup



The following read/write heads can be used for HF bus mode:

- TN-M18-H1147/C53
- TB-M18-H1147/C53
- TN-M30-H1147/C53
- TB-M30-H1147/C53
- TN-CK40-H1147/C53
- TB-Q08-0.15-RS4.47T/C53
- TN-Q14-0.15-RS4.47T/C53
- TN-Q80-H1147/C53
- TN-R42TC-EX/C53
- TN-R42TC-EX/C65
- TNLR-Q80-H1147/C53
- TNSLR-Q42TWD-H1147/C53
- TNSLR-Q80WD-H1147/C53

HF bus mode supports the HF read/write heads from firmware version Vx.90.

Continuous bus mode supports HF read/write heads from firmware version Vx.93.

Firmware version V3.6.1.0 or higher is also required for Continuous bus mode on the TBEN-S module.

UHF compact mode

UHF compact mode enables up to 128 bytes of data to be transferred in single applications (e.g. EPC).

UHF extended mode

All functions of the **UHF compact** mode are included in **UHF extended** mode. It is also possible to transfer more than 128 bytes of data. The operation mode is suitable for single-tag and multitag applications. The user can set a command timeout to define the time for the execution of a command.

UHF extended mode enables the use of Presence sensing mode for the repeated execution of an Inventory, read or write command. In Presence sensing mode the UHF readers are automatically switched on or off and also carry out the commands automatically. In this case, the read data is stored in the internal memory of the interface. 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 in under "Settings".

- Idle
- Inventory
- Read
- Write
- Change EPC length and write new EPC (UHF)
- Write and Verify
- Continuous Mode
- Read buffer (Cont. mode)
- Stop Continuous (Presence Sensing) Mode
- UHF Continuous Presence Sensing Mode
- HF read/write head off
- Read/write head identification
- Get UHF read/write head status/error
- Tag info
- Direct read/write head command
- Get HF read/write head address
- Set HF read/write head address
- Tune HF Read/write head
- Set read/write head password
- Reset read/write head password
- Set tag password
- Set tag protection
- Get HF tag protection status
- Set perma lock
- Kill UHF tag
- Restore settings UHF read/write head
- Backup settings UHF read/write head
- 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 [> 280]). 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 Universal digital channels — functions

The device is provided with four universal digital channels, which can be used as inputs or outputs without any configuration required. In all, up to four 3-wire PNP sensors or four PNP DC actuators can be connected per input or output. The maximum output current per channel is 0.5 A.



4.4.7 Turck Field Logic Controller function (FLC ARGEE)

The device supports logic processing via the "Turck Field Logic Controller (FLC ARGEE)" function. This enables the device to implement small to medium-sized control tasks in order to reduce the load of the central controller. The FLCs can be programmed in the ARGEE engineering environment.

The device supports ARGEE 3 engineering environment from firmware version 3.6.0.0.

The ARGEE programming software can be downloaded free of charge from www.turck.com.

The "SW_ARGEE_Environment_Vx.x.zip" file also contains the documentation for the programming environment as well as the software.

4.5 Technical accessories

Optionally available accessories for mounting, connecting and parameter setting can be found in the Turck product database at www.turck.com. Accessories are not supplied with the device.



5 Installing

The device can be mounted on a DIN rail according to EN 60715 (TS35) or screwed on a mounting plate. Both combined mounting as well as single mounting are possible.

5.1 Installing a device in zone 2 and zone 22

The devices can be used in combination with the TB-SG-S (ID 100014866) protective housing set in zone 2 and zone 22. Combined mounting is not possible in zone 2 and zone 22



DANGER

Potentially explosive atmosphere Risk of explosion due to spark ignition Operation in zone 2 or zone 22:

- Only install the device if there is no potentially explosive atmosphere present.
- Observe the requirements for Ex approval.
- Screw on the housing. Use a Torx T8 screwdriver.
- Place the device on the base plate of the protective housing fasten both together on the mounting plate, see Attach TBEN-S modules to a mounting plate.
- Connect the device, see [> 23].
- ► Fit the housing cover and screw on as shown in the following figure. The tightening torque for the Torx T8 screw is 0.5 Nm.

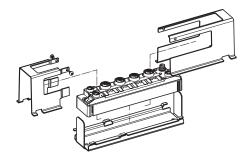


Fig. 3: Installing the device in the TB-SG-S protective housing



5.2 Mounting devices in combination

The TBNN-S0... adapters can be used to form groups of modules for mounting the devices in combination.

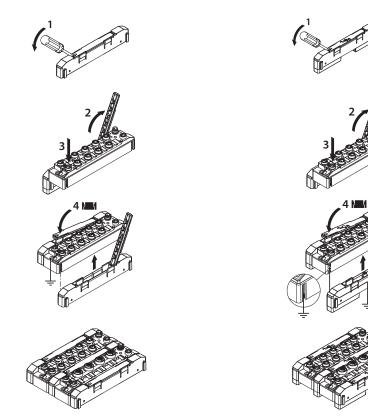


Fig. 4: Module groups for mounting on a mounting plate

Fig. 5: Module groups for mounting on a DIN rail (TS35)

- Undo locking lever (1) with a flat tool (e.g. screwdriver).
- Fully open the locking lever (2).
- Connect the TBEN-S module and adapter so that the spring of the adapter engages with the groove of the TBEN-S module (3).
- Push down the locking lever and close until the locking lever engages with an audible click (4).
- Repeat steps 1 to 4 until the module group is complete.



5.3 Mounting plate fixing

The devices can be fastened with two M4 screws to a pre-drilled mounting plate. The maximum tightening torque for the M4 screws is 1.0 Nm.

• The module or module cluster is attached as shown in the following figure.

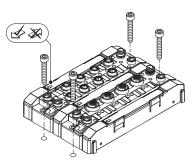


Fig. 6: Attaching the device to the mounting plate

5.4 DIN rail (TS35) mounting

The TBNN-S0-DRS adapters enable the device to be mounted individually or in a combination on a DIN rail (TS35).

NOTICE

Incorrect mounting

Incorrect grounding may cause malfunction

- Align the adapters so that the arrow on the locking lever points in the direction of the M8 Ethernet sockets.
- Connect the grounding contact of the adapter with the grounding contact of the module.
- Mount the adapters to the right and left of the module.
- Position the module or module combination on the DIN rail so that the recesses of the adapter surround the DIN rail (1).
- Close the rotating pin of the adapter with a screwdriver (2).
- Optional: Ground the device.

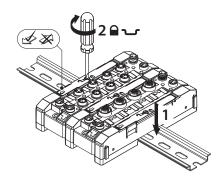


Fig. 7: Mounting the module combination on a DIN rail



NOTE

To increase stability on the DIN rail, end brackets can be mounted on the right and left of the module or the module combination.



5.5 Outdoor device installation

The device is UV resistant in accordance with DIN EN ISO 4892-2. Direct sunlight may cause material wear and changes in color. The mechanical and electrical properties of the device are not impaired.

- To prevent material wear and color changes: Protect the device from direct sunlight with protective panels.
- 5.6 Grounding the device
- 5.6.1 Grounding and shielding concept

The fieldbus and I/O area of the TBEN-S modules can be grounded separately.

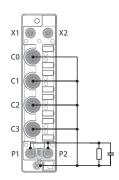


Fig. 8: Equivalent circuit, shielding concept

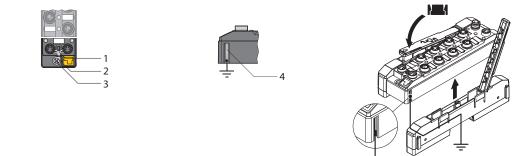


Fig. 9: Grounding clip (1), grounding ring (2) and metal screw (3) Fig. 11: Grounding the TBNN-S0-DRS... adapters

The grounding clip (1) on the M8 plug connectors for the fieldbus connection (P1, P2) connects the shield of the fieldbus cables.

The grounding ring (2) provides the shield on the flange of the M8 plug connectors for the fieldbus connection via an RC circuit.

Fig. 10: Grounding contact

When mounting the module on a mounting plate with TBNN-S0-STD connectors, the module is connected to the reference potential of the installation via a metal screw (3) through the lower mounting hole. The TBNN-S0-DRS adapters for mounting the TBEN-S modules on a DIN rail (TS 35) connect the grounding contact (4) of the modules with the DIN rail and thus FG.



5.6.2 Grounding the device (FG)

Grounding clip and grounding ring are connected together.

► If a common reference potential for I/O level and fieldbus level is not required: remove the grounding clip to disconnect the fieldbus shield.

Grounding the device — mounting on DIN rail

- When mounting on a DIN rail with the TBNN-S0-DRS adapters fasten the supplied metal screw on the lower mounting hole of the TBEN-S module.
- ➡ The shield of the fieldbus connection and the M8 flange of the I/O level are connected via the DIN rail with the reference potential of the installation.

Grounding the device — mounting on mounting plate

- When mounting on a mounting plate, fasten with an M4 metal screw.
- ➡ The shield of the fieldbus connection and the M8 flange of the I/O level are connected via the DIN rail with the reference potential of the installation.

Removing the grounding clip

• Push the grounding clip forward with a flat slot-head screwdriver and remove.

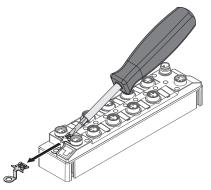


Fig. 12: Removing the grounding clip

Mounting the grounding clip

- Use a screwdriver to insert the grounding clip between the fieldbus connectors so that contact is made with the metal housing of the plug connectors.
- \Rightarrow The shield of the fieldbus cables is connected to the grounding clip.

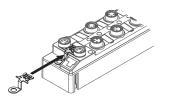


Fig. 13: Mounting the grounding clip



6 Connection



NOTICE

Penetration of liquids or foreign objects due to leaking connections Loss of protection class IP65/IP67/IP69K possible

- ► Tighten M8 male connectors with a tightening torque of 0.4 Nm.
- ▶ Tighten M12 male connectors with a tightening torque of 0.6 Nm.
- Only use accessories that guarantee the protection class.
- Provide unused male connectors with suitable sealing or blanking caps. The tightening torque for the M4 screws is 0.5 Nm.

6.1 Connecting a device in zone 2 and zone 22



DANGER

Potentially explosive atmosphere Risk of explosion due to spark ignition Operation in zone 2 or zone 22:

- Only connect and disconnect circuits when no voltage is present.
- Only use connection cables suitable for use in the potentially explosive areas.
- Use unused male connectors or provide them with suitable sealing or blanking caps. The tightening torque for the M4 screws is 0.5 Nm.
- Observe the requirements for Ex approval.



6.2 Connecting a device to Ethernet

The device is provided with an autocrossing switch with two 4-pin M8 Ethernet plug connectors for connecting to Ethernet.



NOTICE

Reversing the Ethernet and power supply cables This may destroy the module electronics

- When connecting the Ethernet and supply cables make sure that the correct M8 plug connectors are used:
 - Ethernet: P1 and P2

power supply: X1 and X2



Fig. 14: M8 Ethernet plug connectors for connecting the fieldbus

- Connect the device to the fieldbus according to the pin assignment below.
- Provide unused male connectors with suitable sealing or blanking caps. The tightening torque for the M4 screws is 0.5 Nm.

| -(| | -C | |
|--|--|---|---------------------------------------|
| $4 \bigcirc 0 \bigcirc 2$ $3 \bigcirc 0 \bigcirc 1$ | 1 = TX + 2 = RX + 3 = RX - 4 = TX - | $4 \bigcirc 0 \\ 3 \bigcirc 0 \\ 1 \end{bmatrix} 2$ | 1 = RX + 2 = TX + 3 = TX - 4 = RX - 4 |
| P1 | | P2 | |

Fig. 15: Ethernet connections — pin assignment of P1 and P2

- 6.2.1 QuickConnect and Fast Start-Up applications
 - Do not use crossover cables in QuickConnect and Fast StartUp applications.
 - Connect incoming Ethernet cables to P1.
 - Connect outgoing Ethernet cables to P2.



6.3 Connecting the power supply

The device is provided with two 4-pin M8 plug connectors for connecting the power supply. V1 and V2 are electrically isolated from each other.



NOTICE

Reversing the Ethernet and power supply cables This may destroy the module electronics

- When connecting the Ethernet and supply cables make sure that the correct M8 plug connectors are used:
 - Ethernet: P1 and P2

power supply: X1 and X2



Fig. 16: M8 plug connectors for connecting the power supply

- Connect the device to the power supply according to the pin assignment below.
- Provide unused male connectors with suitable sealing or blanking caps. The tightening torque for the M4 screws is 0.5 Nm.

| - | | -C |
|-------|---|--|
| 2 + 4 | $\begin{array}{l} 1 \ BN \ = V1 \ (+) \\ 2 \ WH \ = V2 \ (+) \\ 3 \ BU \ = GND \ V1 \\ 4 \ BK \ = GND \ V2 \end{array}$ | $4 \bigcirc 0 \bigcirc 2$ $3 \bigcirc 0 \bigcirc 1$ |
| X1 | | X2 |

Fig. 17: Pin assignment of the power supply connections

| Connection | Meaning | | |
|------------|--|--|--|
| X1 | Incoming voltage supply | | |
| X2 | Routing the voltage to the next node | | |
| V1 | /1 Supply voltage 1 (incl. electronics supply) | | |
| V2 | V2 Power supply 2 | | |



NOTE

The system voltage (V1) and the load voltage (V2) are supplied and monitored separately. If the voltage goes below the permissible lower limit, the sockets are disconnected according to the supply concept of the module type. If V2 goes below the permissible minimum voltage, PWR LED changes from green to red. If V1 goes below the permissible minimum, the LED goes out.



6.4 Connecting RFID read/write devices

The device has two 5-pin M12 plug connectors for connecting RFID read/write devices.



Fig. 18: M12 plug connector for connecting read/write devices

- Connect the read/write devices to the device as per the pin assignment shown below.
- Provide unused male connectors with suitable sealing or blanking caps. The tightening torque for the M4 screws is 0.5 Nm.

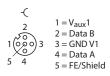


Fig. 19: RS485 — pin assignment of the read/write device connections

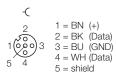


Fig. 20: .../S2500 connection cables - pin assignment of the read/write device connections



Fig. 21: .../S2501 connection cables — pin assignment of the read/write device connections

| -C | | |
|---|--|--|
| $1 \underbrace{\bigcirc 0 \\ 0 \\ 0 \\ 5 \\ 4}^{2} 3$ | 1 = RD 2 = BU 3 = BK 4 = WH 5 = shie | |

Fig. 22: .../S2503 connection cables - pin assignment of the read/write device connections



6.4.1 Connecting read/write heads for the HF bus mode

In HF bus mode up to 32 bus-capable read/write heads per RFID channel can be connected to the device. The user must determine by means of a power consumption analysis whether an additional power supply is required for the connected read/write heads (see information in the data sheet or tool at www.turck.com/hf-busmodus).

The maximum permissible length of the bus is 50 m.

Connecting read/write heads for HF bus mode in non-Ex areas

The following devices are required for bus mode in non-hazardous areas:

- VT2-FKM5-FKM5-FSM5 junction box (ID 6930573) for connecting several read/write heads to an RFID channel
- RSE57-TR2/RFID bus terminating resistor (ID 6934908)
- Optional: VB2-FKM5-FSM5.205-FSM5.305/S2550 junction box (ID 6936821) for feeding in an additional power supply
- RFID extension cables (e.g. RK4.5T-0.3-RS4.5T/S2503)
 - Connect the read/write head as per the figure below. The maximum length of the spur line is 2 m.
- Make allowance for the power supply, particularly at switch-on (see data sheet), as well as the maximum current carrying capacity of the lines (4 A).
- Make allowance for the voltage drop on the line. If necessary provide an additional power supply between the read/write heads using junction box VB2-FKM5-FSM5.205-FSM5.305/S2550.
- Connect a terminating resistor (e.g. RSE57-TR2/RFID) after the last read/write head.



Fig. 23: HF bus mode setup



Connecting read/write heads for HF bus mode in Ex areas



Information on the maximum cable lengths in Ex areas is provided in the data sheets of the connected read/write heads.

The following devices are required for bus mode in hazardous areas:

- TN-R42TC-EX/C53 read/write head (ID 100020167)
- TN-R42TC-EX/C65 read/write head (ID 100028462) with integrated bus terminating resistor
- .../S2500 RFID extension cables
- Operation in Zone 2/22:
 - VT2-FKM5-FKM5-FSM5 (ID 6930573) junction box for connecting several read/write heads to an RFID port
 - SC-M12/3GD safety clip (ID 6900390)
 - Optional: VB2-FKM5-FSM5.205-FSM5.305/S2550 junction box (ID 6936821) for feeding in an additional power supply
- Operation in Zone 1/21:
 - Ex-e terminal boxes



DANGER

Potentially explosive atmosphere Risk of explosion due to spark ignition Operation in Zone 2/22:

- Only connect the read/write heads if there is no potentially explosive atmosphere present or if the device is in a de-energized state.
- Protect the M12 male connector against accidental removal during operation using safety clip SC-M12/3GD.
- ▶ Protect the M12 male connector against mechanical damage.



DANGER

Potentially explosive atmosphere

Risk of explosion due to spark ignition

- When used in Zone 1/21, observe the instructions for use for the connected devices.
- Operation in Zone 2/22: Connect the read/write heads via VT2-FKM5-FKM5-FSM5 junction boxes as shown in the figure below (for max. tightening torque see the data sheet of the cable used). The maximum length of the spur line is 2 m.
- Operation in Zone 1/21: Connect the read/write heads via terminal boxes as shown in the figure below. The maximum length of the spur line is 2 m.
- Make allowance for the power supply, particularly at switch-on (see data sheet), as well as the maximum current carrying capacity of the lines (4 A).
- Make allowance for the voltage drop on the line. When used in Zone 2/22, provide an additional power supply between the read/write heads using junction box VB2-FKM5-FSM5.205-FSM5.305/S2550 if necessary. Up to 20 read/write heads can be connected without an additional power supply.
- Use the TN-R42TC-EX/C65 read/write head with an integrated bus terminating resistor as the last device. Do not connect a separate bus terminating resistor.



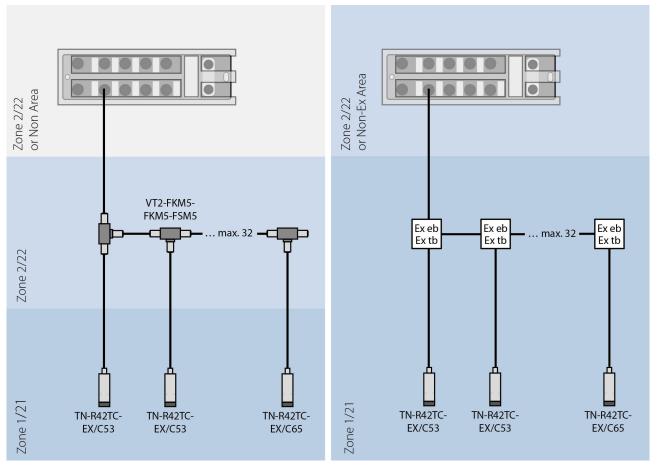


Fig. 24: System design



6.5 Connecting digital sensors and actuators

The device has two 5-pin M12 plug connectors for connecting digital sensors and actuators. Sensors and actuators can be connected to the DXP terminals in the following combinations:

- 2 digital inputs
- 2 digital outputs
- 1 digital input and 1 digital output



Fig. 25: M12 male connectors for connecting digital sensors and actuators

- Connect the sensors and actuators to the device as per the pin assignment below.
- Provide unused male connectors with suitable sealing or blanking caps. The tightening torque for the M4 screws is 0.5 Nm.



Fig. 26: Connections for digital sensors and ac-
tuators — pin assignmentFig. 27: Connections for digital sensors and ac-
tuators — wiring diagram

| Channel | Socket | Pin |
|-----------|--------|-----|
| DXP (Ch4) | C2 | 4 |
| DXP (Ch5) | C2 | 2 |
| DXP (Ch6) | C3 | 4 |
| DXP (Ch7) | C3 | 2 |

The channels are assigned to the sockets as follows:



7 Commissioning

The device is operational automatically once the cables are connected and the power supply is switched on.

Connected HF read/write heads are switched on automatically. Connected UHF readers are switched off automatically and are activated automatically when a command is executed (apart from Idle mode).

The Idle command (0x0000) is active in the default configuration. If an HF read/write head is connected and a tag is located in the detection range of the read/write head, the **Tag present** bit is set and the UID is output in the input data.

• Set the IP address of the device in order to carry out further commands.

If a UHF reader is connected, the device must be set:

- Set the IP address.
- Send command to UHF reader.

7.1 Setting the IP address

The device is factory set to IP address 192.168.1.254. A PROFINET device name has not yet been assigned. The IP address can be set via the Turck Service Tool, the DTM, the web server, a DHCP server or PROFINET DCP. The following example shows the setting of the IP address via the Turck Service Tool. The Turck Service Tool can be downloaded free of charge at www.turck.com.

- Connect the device to a PC via the Ethernet interface.
- Launch the Turck Service Tool.
- Click Search or press [F5].

| | Your Global Au | tomation P | artner | | | | TU | JR | СК | |
|---------------|----------------|------------------|---------------|--|--------------|---------|---------|-----------|----------|--|
| Search No. | MAC address | Wink (F3) Action | ons (F4) Clip | | Close Device | Version | Adapter | BEEP | Protocol | |
| | | | | | | | • | | | |
| | | | | | | | | | | |
| | | | | | | | | | | |

Fig. 28: Turck Service Tool — home screen



The Turck Service Tool displays the connected devices.

| Yo | bur Global Auto | omation P | artner | | | | | | | |
|----------|--|------------|--|------------------------------|------------------------|----------------------|------------------------------------|---------------------|------------------------------|---------------------|
| Search (| F5) Change (F2) W | | ons (F4) | _ | Expert vie | ew OFF Close | 1 | | | |
| No. | MAC address | Name | IP address | Netmask | Gateway | Mode | Device | Version | Adapter | Protocol |
| ■ 1 ■ 2 | 00:07:46:0C:CB:6A 00:07:46:25:00:9D | tben-2rfid | <u>192.168.1.5</u> <u>169.254.53.16</u> | 255.255.255.0 255.255.0.0 | 192.168.1.1 0.0.0.0 | PGM_DHCP PGM_DHCP | TBEN-S2-2RFID-4DXP TX507-P3CV01 | 0.1.13.7 2.7.1.0 | 192.168.1.60 192.168.1.60 | DCP, Turck Turck |

Fig. 29: Turck Service Tool — found devices

- Select the device.
- Click Change or press [F2].



NOTE

Virtual network adapters can cause communication problems when accessing the found devices.

Deactivate virtual network adapters.

| Yo | our Global Auto | mation Pa | irtner | | | | | | | |
|----------|-------------------|-----------|----------------------|-------------|-------------------|-------------|--------------------|----------|--------------|------------|
| Search (| F5) Change (F2) W | - | ns (F4) | - | • C Expert vie | w OFF Close | l | | | |
| No. | MAC address | Name | IP address | Netmask | Gateway | Mode | Device | Version | Adapter | Protocol |
| - 1 | 00:07:46:0C:CB:6A | | <u>0.0.0.0</u> | 0.0.0.0 | 0.0.0.0 | PGM_DHCP | TBEN-S2-2RFID-4DXP | 0.1.13.7 | 192.168.1.60 | DCP, Turck |
| = 2 | 00:07:46:25:00:9D | | <u>169.254.53.16</u> | 255.255.0.0 | 0.0.0.0 | PGM_DHCP | TX507-P3CV01 | 2.7.1.0 | 192.168.1.60 | Turck |

Fig. 30: Turck Service Tool — selecting the device to be addressed



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



- Change the IP address and if necessary the network mask and gateway.
- Accept the changes by clicking **Set in device**.

| Change device confi | guration 🗖 🖻 🔀 | | | | | | | |
|---------------------|----------------|--|--|--|--|--|--|--|
| Device name: | | | | | | | | |
| rfid | | | | | | | | |
| | | | | | | | | |
| IP configuration | | | | | | | | |
| MAC address | IP address | | | | | | | |
| 00:07:46:0D:77:2A | 192.168.1.51 | | | | | | | |
| | | | | | | | | |
| Netmask | Gateway | | | | | | | |
| 255.255.255.0 | 0.0.0.0 | | | | | | | |
| Set IP configurati | on tomporarily | | | | | | | |
| | ontemporany | | | | | | | |
| Status messages: | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| Set in device | Cancel | | | | | | | |
| Ser in device | Cancer | | | | | | | |

Fig. 31: Turck Service Tool — changing the device configuration



7.1.1 Checking and changing the addressing method in the web server

The addressing method via DHCP or PGM can be displayed and set via the web server.

► Display the set addressing method: Parameter → Addressing method

Addressing via DHCP is the default setting.

| TBEN-S | TBEN-S Gateway - Parame | ter |
|-------------------|---------------------------|---------------------------|
| i) Info | | |
| o Parameter | Write Channel view Print | |
| 🕞 Diagnosis | Network | |
| 🖗 Event log | MAC address | 00:07:46:10:ef:ae |
| Ex- / Import | Addressing mode | PGM-DHCP |
| 🔍 Change Password | Addressing method | DHCP |
| - Firmware | IP address | 192.168.1.254 |
| | Netmask | 255.255.255.0 |
| ීා Parameter | Default gateway | 0.0.0.0 |
| ~~ ⊡ Diagnosis | SNMP Public Community | public |
| 📩 🗸 | Set network configuration | SET NETWORK CONFIGURATION |
| 🚓 Output | SNMP Private Community | private |
| | LLDP status | Running |
| | LLDP MAC address 1 | 00:07:46:10:ef:af |
| | LLDP MAC address 2 | 00:07:48:10:ef:b0 |

Fig. 32: Displaying the set addressing method



Assigning a static IP address via PGM

If DHCP mode is active, a static IP address can be assigned as follows:

- Enter the IP address in the IP address field.
- Execute Set network configuration.
- ⇒ The IP address is assigned.

| TBEN-S | TBEN-S Gateway - Paramet | ter |
|-------------------|---------------------------|---------------------------|
| j) Info | ▶ ! □ | |
| | Write Channel view Print | |
| Diagnosis | Network Network | |
| § Event log | MAC address | 00:07:48:10:ef:ae |
| Ex- / Import | Addressing mode | PGM-DHCP ? |
| 🔍 Change Password | Addressing method | DHCP |
| Firmware | IP address | 192.168.1.254 |
| LOCAL I/O | Netmask | 255.255.255.0 |
| 🖏 Parameter | Default gateway | 0.0.0.0 |
| 🖓 Diagnosis | SNMP Public Community | public |
| tige tig input | Set network configuration | SET NETWORK CONFIGURATION |
| Ster Output | SNMP Private Community | private |
| | LLDP status | Running |
| | LLDP MAC address 1 | 00:07:46:10:ef:af |
| | LLDP MAC address 2 | 00:07:48:10:ef:b0 |

Fig. 33: Assigning the static IP address

Assigning an IP address via DHCP automatically

If the static mode is active, it is possible to switch to DHCP mode as follows:

- At Parameter click Network reset and reboot or Factory reset and reboot.
- Confirm the following dialog.
- ⇒ The reset is executed and DHCP mode is activated.

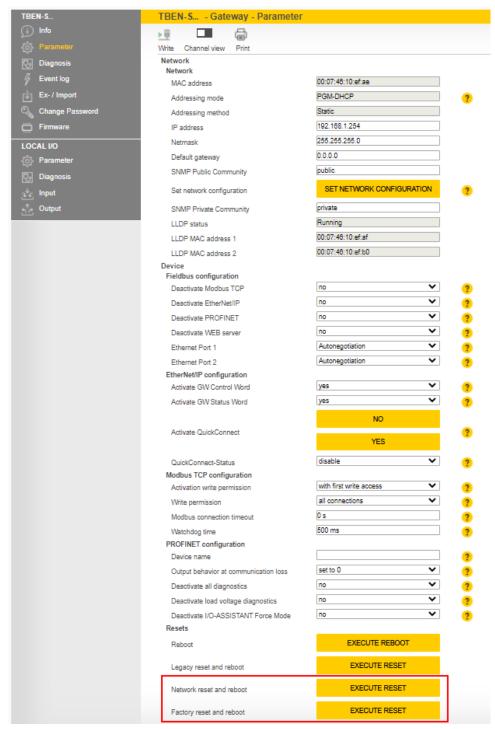


Fig. 34: Activating DHCP mode



7.2 Connecting the device to a Modbus master with CODESYS

Hardware used

This example uses the following hardware components:

- HF read/write head TN-Q80-H1147
- Turck HMI TX507-P3CV01 (Modbus master)
- TBEN-S2-2RFID-4DXP block module (IP address: 192.168.1.61)

Software used

This example uses the following software:

CODESYS 3.5.8.1 (available as a free download at 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** (**TX507-P3CV01**) in the project tree.

| <u>F</u> ile <u>E</u> dit <u>V</u> iew <u>P</u> roject <u>B</u> uild <u>O</u> nline <u>D</u> ebug <u>T</u> ools <u>W</u> indow <u>H</u> elp |
|---|
| 1월 🛩 🛃 몰 요 🗠 🐁 🖻 🛍 Ⅹ 🗛 🎎 唱 🏧 ▾ ៃ । 🎬 🧐 🧐 ∢ 🕞 🔳 🌂 대 대 대 왕 ♥ ☴ |
| |
| Devices 🗸 🗸 🛪 |
| □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ □ |
| 🖻 😳 Application |
| ImagePool |
| 1 Library Manager |
| PLC_PRG (PRG) |
| Task Configuration |
| 🗐 🛞 MainTask |
| LC_PRG |
| |
| UsuElems.Visu_Prg |
| TextList |
| Visualization Manager |
| |
| Visualization |
| 1 |

Fig. 35: Project tree



- Select Append device.
- Select Ethernet adapter.
- Click **Append device**.
- ⇒ The Ethernet adapter appears as **Ethernet (Ethernet)** in the project tree.

```
Bie Echt Yew Broject Buid Online Debug Tools Window Help
11 De Billerico ov X Par Ba X IAM Calina 11 De Calina Calina Calina Calina Calina Calina Calina Calina Calina Ca
```

| Devices 👻 म 🗙 | Add Device | -X- |
|---|---|--------------|
| Device (TX507-P3CV01) Device (TX507 | Name: Action: | |
| | Image: Control of Contro | |
| | Information: Please select a device from the list above. | |
| | (You can select another target node in the navigator while this window is open.) | |
| | 1 bbA | Device Close |

Fig. 36: Adding an Ethernet adapter



Adding a Modbus master

- Right-click **Ethernet (Ethernet)** in the project tree.
- Select Append device.
- Double-click the **Modbus TCP Master**.
- ⇒ The Modbus master appears as Modbus_TCP_Master (Modbus TCP Master) in the project tree.



| Devices 👻 🕂 🗙 | 1 Add Device | |
|--|--|------------------|
| = 🗿 Testaufbau_TBEN-S2-2RFID-4DXP | | |
| Device (TX507-P3CV01) | Name: Modbus_TCP_Master | |
| E PLC Logic | Action: | |
| Application | Append device Insert device Plug device Update device | |
| ImagePool | | |
| 👘 Library Manager | Device: | |
| LC_PRG (PRG) | Vendor: <all vendors=""></all> | • • |
| =-ﷺ Task Configuration =-☆ MainTask | Name Vendor Version | |
| PLC PRG | E- 🕤 Fieldbusses | |
| | 🗟 👄 EtherNet/IP | |
| UisuElems.Visu_Prg | S-Kill Modbus | |
| TextList | 🖨 📖 Modbus TCP Master | |
| Visualization Manager | Modbus TCP Master 3S - Smart Software Solutions GmbH 3.5.1.0 | |
| visualization | Modbus TCP Master 3S - Smart Software Solutions GmbH 3.5.6.0 | |
| Ethernet (Ethernet) | Modbus TCP Master 3S - Smart Software Solutions GmbH 3.5.8.10 | |
| | Kutt ModbusTCP Slave Device | |
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| | | |
| | Group by category | |
| | ♥ Goop by Category ♥ Display all versions (for experts only) | |
| | | |
| | ☑ Display outdated versions | |
| | Information: | |
| | Name: Modbus TCP Master | |
| | Vendor: 3S - Smart Software Solutions GmbH Categories: Modbus TCP Master | |
| | Version: 3.5.8.10 | \$\$ 1 |
| | 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. 37: Adding a Modbus master



Adding a Modbus slave

- ▶ Right-click Modbus_TCP_Master (Modbus TCP Master) in the project tree.
- Select Append device.
- Double-click **Modbus TCP slave**.
- ⇒ The Modbus slave appears as **Modbus_TCP_Slave** in the project tree.

| <u>File</u> | Edit | View | Project | <u>B</u> uild | <u>O</u> nline | <u>D</u> ebug | Tools | Window | Help |
|-------------|------|------|---------|---------------|----------------|---------------|--------|--------|-------------------------------------|
| 1 | 2 | 6 | 6 | χ η | h 🛍 🤇 | <144 | 25 E | 1 in - | 🖞 🕮 📽 🧐 🕞 💼 🤻 🗊 🕾 🕾 정 수 🛒 |

| Devices v 4 X | Add Device | |
|---------------------------------------|---|--|
| Testaufbau_TBEN-S2-2RFID-4DXP | | |
| | Name: Modbus_TCP_Slave | |
| | Action: | |
| - ImagePool | 💿 Append device 💿 Insert device 💿 Plug device 💿 Update device | |
| Library Manager | Device: | |
| PLC_PRG (PRG) | Vendor: <all vendors=""></all> | |
| Task Configuration | | · |
| 🗟 🏀 MainTask | Name Vendor Version | |
| PLC_PRG | E- 🗃 Fieldbusses | |
| 🖻 🍪 VISU_TASK | B-mut Modbus | |
| UsuElems. Visu_Prg | Modbus TCP Slave Modbus TCP Slave Single Solutions GmbH 3.5.1.0 | la l |
| - TextList | | |
| 🖲 - 🏭 Visualization Manager | Modbus TCP Slave 3S - Smart Software Solutions GmbH 3.5.4.0 Modbus TCP Slave 3S - Smart Software Solutions GmbH 3.5.7.0 | |
| Visualization | In Indudus for slave 35 - smart sortware solutions GmbH 3.5.7.0 | |
| Ethernet (Ethernet) | | |
| Modbus_TCP_Master (Modbus TCP Master) | | |
| | | |
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| | | |
| | | |
| | | |
| | Group by category | |
| | ✓ Display all versions (for experts only) | |
| | ✓ Display outdated versions | |
| | | |
| | Information: | |
| | Mame: Modbus TCP Slave Vendor: 3S - Smart Software Solutions GmbH | <u>^</u> |
| | Categories: Modbus TCP Slave | = |
| | Version: 3.5.7.0 Order Number: - | - |
| | | |
| | Append selected device as last child of | |
| | Modbus_TCP_Master | |
| | (You can select another target node in the navigator while this window is open.) | |
| | | |
| | | Add Device Close |
| Cross Reference List | | |

Fig. 38: Adding a Modbus slave



Renaming a Modbus slave 7.2.2

- ► Click Modbus slave in the project tree.
- ► Press [F2].
- Adjust the name of the slave in the project tree of the application.
- <u>File E</u>dit <u>View Project Build Online Debug Tools Window Help</u>

| <u>File Edit View Project Build Online Debug Tools Window</u> | Help |
|---|--|
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| | |
| Devices 👻 🕈 🗙 | Insert Device |
| E Testaufbau_TBEN-S2-2RFID-4DXP | |
| 🖻 📕 Device (TX507-P3CV01) | Name: Modbus_TCP_Slave_1 |
| 🖹 🗐 PLC Logic | Action: |
| Application | Append device () Insert device () Plug |
| ImagePool | |
| Library Manager | Device: |
| PLC_PRG (PRG) | Vendor: <all vendors=""></all> |
| 🚍 🎉 Task Configuration | Name Ven |
| 🖻 🕸 MainTask | Fieldbusses |
| PLC_PRG | i Modbus |
| | G Multi Modbus TCP Slave |
| VisuElems.Visu_Prg | Modbus TCP Slave 3S - |
| TextList | Modbus TCP Slave 35 - |
| 🕀 👘 Visualization Manager | Modbus TCP Slave 3S - |
| | |
| Ethernet (Ethernet) | |
| Modbus TCP Master (Modbus TCP Master) | |
| TBEN_S2_2RFID_4DXP | |
| | |

Fig. 39: Assigning a device name (here: TBEN-S2-2RFID_4DXP)



7.2.3 Setting up network interfaces

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

| es 🗸 🕂 X | Device 🗙 | | |
|--|---|--|--|
| ■ Device (TX507+3CV01) ■ ■] P.C.Logic ■ ③ Application → □] ImagePool | Communication Settings Applications | Scan network) Gateway - Device - | |
| Ibrary Manager IB PLC_PRG IB PLC_PRG IB PLC_PRG | Files Log PLC settings | Gateway Select Device | |
| CL_PMS VISUITASK VISUITASK | PLC shell Users and Groups Interface Parameters Task deployment Status Information | Select the network path to the controller: | Device Name: TXS0793CV01 Scan network Device Address: 030.1803C Wink Target Version: 1.0.4.0 Wink Target Vendor: Turds, Target ID: 10C0 0203 Target tame: Turds/ARM/WinCE TV |
| | | | Target Type: 4096 OK Cancel |

Fig. 40: 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.

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```

| Devices 👻 🕂 🗙 | Ethernet 🗙 | × |
|---------------------------------------|--|--|
| □ Testaufbau_TBEN-S2-2RFID-4DXP | | |
| 은 - Device [connected] (TX507-P3CV01) | General | Interface: |
| | General Ethernet Device Parameters Status Information | Interface: |
| | | IP Address 192 . 168 . 1 . 60 Subnet Mask 255 . 255 . 255 . 0 Default Gateway 192 . 168 . 1 . 1 MAC Address 00.07.46.25.00.53 |

Fig. 41: Modbus master — entering the IP address (here: 192.168.1.60)



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.

| | Device I Ethernet | |
|--|--|------------|
| Festaufbau, TREV-52-39700-0078 Peske (connected) (TX507-P3CV01) Peske | General Ethernet Device Parameters Status Information | Interface: |

Fig. 42: Modbus slave — entering the IP address (here: 192.268.1.61)



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 register (128 bytes)
 - Confirm with **OK**.

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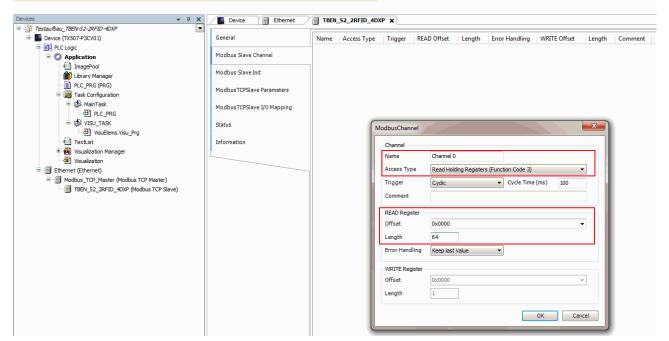


Fig. 43: Defining READ registers



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 register (128 bytes)
- Confirm with **OK**.

| evices – a X | Device 🔐 Ethernet | TBEN_52_2RFID_4 | XP X | | | |
|---|---|------------------|------|---------------------------------|-------------|--------|
| Image: Second | General General Modbus Slave Channel Modbus Slave Init Modbus TCPSlave Parameters Modbus TCPSlave 1/0 Mapping Status Information | Name Access Type | | 0x0000 64 Keep last Value | t Length Co | Commer |

Fig. 44: Setting 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.

| Elle Edit View Project Build Online Debug Tools Window H | jelp | | | | | | | | |
|--|---------------------------------------|------------------------------|---------|-----------|---------|---------------------|---------------|------|--------------------------|
| 1월 달 달 달 6 · · · · · · · · · · · · · · · · | • 🥵 ଔ → - = - ペ (≡ 93 | i 4⊒ +≣ 8 ¢ # | | | | | | | |
| Devices 👻 🗸 🗶 | Device 📑 Ethernet | TBEN_52_2RFID_4DXP | × | | | | | | |
| - D Testaufbau_TBEN-S2-2RFID-4DXP | | Channels | | | | | | | |
| Device (TX507-P3CV01) | General | | | | | | | | |
| E I PLC Logic | | Variable | Mapping | Channel | Address | Туре | Default Value | Unit | Description |
| 🖹 🔘 Application | Modbus Slave Channel | 🗏 🖷 – 🐐 | | Channel 0 | 😡 %IW0 | ARRAY [063] OF WORD | | | Read Holding Registers |
| - 💷 ImagePool | Modbus Slave Init | 😟 - 🍫 | | Channel 1 | 🔞 %QW0 | ARRAY [063] OF WORD | | | Write Multiple Registers |
| Library Manager | Modbus Slave Init | | | | | | | | |
| PLC_PRG (PRG) | ModbusTCPSlave Parameters | | | | | | | | |
| 🖹 🎆 Task Configuration | Housdarter Stave Futurneters | | | | | | | | |
| 🖹 🍪 MainTask | ModbusTCPSlave I/O Mapping | | | | | | | | |
| PLC_PRG | | | | | | | | | |
| 🖹 🍪 VISU_TASK | Status | | | | | | | | |
| VisuElems.Visu_Prg | | | | | | | | | |
| - 🖽 TextList | Information | | | | | | | | |
| 🗄 📳 Visualization Manager | · · · · · · · · · · · · · · · · · · · | | | | | | | | |
| Visualization | | | | | | | | | |
| 🖹 🍈 Ethernet (Ethernet) | | | | | | | | | |
| Modbus_TCP_Master (Modbus TCP Master) | | | | | | | | | |
| TBEN_S2_2RFID_4DXP (Modbus TCP Slave) | | | | | | | | | |

Fig. 45: Changing channel addresses



- 6 - X

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 image tab.
- ⇒ The process data is displayed.

| | - # X Device Ethernet | BEN_52_2RFID_4DXP X | | | | | | | | | |
|---|----------------------------|--------------------------|---------------|----------------------------|----------------|---------------------|---------------|---------------|------------------------|------------------------------|-----|
| _TBEN-S2-2RFID-40XP | General | Channels | | | | | | | | | |
| ice [connected] (TX507-P3CV01) C Logic | General | Variable | Mapping Ch | hannel | Address | Туре | Default Value | Current Value | Prepared Value Unit | Description | |
| Application (run) | Modbus Slave Channel | | | | Muturess | ARRAY [063] OF WORD | | Current value | Frepared value offic | Read Holding Registers | |
| ImagePool | | 1 H- 10 | | nannel 0 [0] | %IW0 | WORD | | 0 | | 0000: Kead Holding Kegisters | |
| Library Manager | Modbus Slave Init | 8.4 | | | %IW0 | WORD | | 0 | | Default | |
| Locary Manager PLC_PRG (PRG) | | | | nannel 0[1] | %IW1 | WORD | | 1 | | 0002: | |
| Task Configuration | ModbusTCPSlave Parameters | 8.4 | | nannel 0[2] nannel 0[3] | %IW2 %IW3 | WORD | | 8 | | 0002: | |
| ias comparation i≡-S MainTask | | · · · · | | nannel 0[3] | %IW4 | WORD | | 0 | | 0004: | |
| D PLC PRG | ModbusTCPSlave I/O Mapping | 8-10 | | nannel 0[5] | %IW5 | WORD | | 70 | | Translated Preset | |
| B S VISU_TASK | | 1 1 1 | | | %IW5 | WORD | | 0 | | 0006: | |
| - Bh VisuElems.Visu Pro | Status | 8.4 | | nannel 0[6] | | WORD | | 32896 | | 0007: | |
| visublems.visu_rig TextList | Information | 8-10 | | nannel 0[7] | %IW7 %IW8 | WORD | | 0 | | 0007: | |
| Instant I | Information | 8-10 | | nannel 0[8] | | WORD | | 0 | | 0009: | |
| Visualization Manager Visualization | | 8.39 | | nannel 0[9] | %IW9 | WORD | | 0 | | 0009: | |
| Ethernet (Ethernet) | | | | nannel 0[| %IW10 | | | 0 | | 0010: | |
| Modbus_TCP_Master (Modbus TCP Master) | | | | nannel 0[| %IW11 | WORD | | 1248 | | | |
| Hodous_ICP_Master (Modous ICP Master) TBEN S2_2RFID 40XP (Modbus TCP Slave) | | 8-10 | | nannel 0[| %IW12 | WORD | | 1240 | | 0012: 0013: | |
| - G III IBEN_52_2RFID_40XP (Modbus ICP Slave) | | 8.39 | | nannel 0[| %IW13 | WORD WORD | | 1 61303 | | 0013: 0014: | |
| | | 8.4 | | nannel 0[| %IW14 | WORD | | 43034 | | 0014: | |
| | | 8.9 | | nannel 0[| %IW15 | | | 0 | | | |
| | | 8-10 | | nannel 0[| %IW16 | WORD WORD | | 0 | | 0016: | |
| | | ** | | nannel 0[| %IW17 | | | 0 | | 0017: 0018: | |
| | | 8-10 | | nannel 0[| %IW18 | WORD | | 0 | | | |
| | | 8.9 | | nannel 0[| %IW19 | WORD | | 0 | | 0019: | |
| | | 8-10 | | nannel 0[| %IW20 | WORD | | 0 | | 0020: | |
| | | *** | | nannel 0[| %IW21 | WORD WORD | | 0 | | 0021: 0022: | |
| | | 8-10 | | nannel 0[| %IW22 | WORD | | 0 | | 0022: | |
| | | 8-19 | | nannel 0[| %IW23 %IW24 | WORD | | 0 | | 0023: | |
| | | 8-10 | | nannel 0[| | | | 0 | | 0024: | |
| | | | | nannel 0[| %IW25 %IW26 | WORD WORD | | 0 | | 0025: | |
| | | 8.39 | | nannel 0[| | | | 0 | | | |
| | | 8-19 | | nannel 0[| %IW27 | WORD | | 0 | | 0027: | |
| | | 1 10 10 | Ch | nannel 0[| %IW28 | WORD | | | | 0028: | |
| | | | | | | | | Reset Mappi | ng Always update varia | bles: Use parent device sett | ing |
| | | IEC Objects | | | | | | | | | |
| | | Variable | Advantage 170 | | | | | | | | |
| | | | Mapping Ty | | | | | | | | |
| | | ··· @ TBEN_S2_2RFID_4DXP | No Mo | odbusTCPSlav | e | | | | | | |
| | | 🍫 = Create new variable | 🍾 = Mapto | existing vari | able | | | | | | |
| | Watch 1 | r. | | | | | | | | | |
| | Expression | | | | | · | lication Typ | e Vali | | red value Execution poi | * |
| | concentration | | | | | Abb | Typ | van | riepa | nea variace Execution poi | |
| | | | | | | | | | | | |

Fig. 46: Process data

Testaufbau TREN-



7.2.8 Modbus TCP — mapping

RFID channels — parameter data

| Description | Register | | Bit offset | Bit length |
|---|-----------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Operating mode | 0xB000 | 0xB012 | 0 | 8 |
| Select tag type | 0xB000 | 0xB012 | 8 | 8 |
| Bypass time | 0xB001 | 0xB013 | 0 | 16 |
| HF: Multitag | 0xB002 | 0xB014 | 4 | 1 |
| HF: Heartbeat read/write head | 0xB002 | 0xB014 | 5 | 1 |
| Cable termination active | 0xB002 | 0xB014 | 6 | 1 |
| HF: 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 |
| HF bus mode: Activate read/write head 1 | 0xB00E | 0xB020 | 0 | 1 |
| | | | | 1 |
| HF bus mode: Activate read/write head 16 | 0xB00E | 0xB020 | 15 | 1 |
| HF bus mode: Activate read/write head 17 | 0xB00F | 0xB021 | 0 | 1 |
| | | | ••• | 1 |
| HF bus mode: Activate read/write head 32 | 0xB00F | 0xB021 | 15 | 1 |

RFID channels — process input data

| Description | Register | | Bit offset | Bit length |
|--------------------------------|-----------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| 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 |



| Description | Register | | Bit offset | Bit length |
|--|-----------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Antenna detuned | 0x0002 | 0x004E | 4 | 1 |
| Parameter not supported by read/write head | 0x0002 | 0x004E | 5 | 1 |
| Read/write head reports error | 0x0002 | 0x004E | б | 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/write head 1 — Tag in detection range | 0x000A | 0x0056 | 0 | 1 |
| | | | | 1 |
| Read/write head 16 — Tag in detection range | 0x000A | 0x0056 | 15 | 1 |
| Read/write head 17 — Tag in detection range | 0x000B | 0x0057 | 0 | 1 |
| | | | | 1 |
| Read/write head 32 — Tag in detection range | 0x000B | 0x0057 | 15 | 1 |
| 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 |

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RFID channels — process output data

| Description | Register | | Bit offset | Bit length |
|------------------------|-----------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Command code | 0x0800 | 0x084C | 0 | 16 |
| Loop counter | 0x0801 | 0x084D | 0 | 8 |
| Memory area (only UHF) | 0x0801 | 0x084D | 8 | 8 |
| Start address | 0x0802 | 0x084E | 0 | 32 |
| Length | 0x0804 | 0x0851 | 0 | 16 |
| Length UID/EPC | 0x0805 | 0x0851 | 0 | 8 |
| Antenna No. | 0x080A | 0x0856 | 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 0 | Channel 1 | | |
| Overvoltage VAUX | 0x0098 | 0x00AA | 7 | 1 |
| Parameterization error | 0x0098 | 0x00AA | 6 | 1 |
| Configuration via DTM active | 0x0098 | 0x00AA | 5 | 1 |
| Memory full | 0x0098 | 0x00AA | 4 | 1 |
| Read/write head 1 detuned | 0x009A | 0x00AC | 4 | 1 |
| Read/write head 2 detuned | 0x009A | 0x00AC | 12 | 1 |
| | | | 0 | 1 |
| Read/write head 31 detuned | 0x00A9 | 0x00BB | 4 | 1 |
| Read/write head 32 detuned | 0x00A9 | 0x00BB | 12 | 1 |
| Parameter not supported by read/ write head 1. | 0x009A | 0x00AC | 5 | 1 |
| Parameter not supported by read/ write head 2. | 0x009A | 0x00AC | 13 | 1 |
| | ••• | •••• | | 1 |
| Parameter not supported by read/ write head 31. | 0x00A9 | 0x00BB | 5 | 1 |
| Parameter not supported by read/ write head 32. | 0x00A9 | 0x00BB | 13 | 1 |
| Read/write head 1 reports error | 0x009A | 0x00AC | 6 | 1 |
| Error reported by read/write head 2 | 0x09A | 0x00AC | 14 | 1 |
| | | | | 1 |
| Error reported by read/write head 31 | 0x00A9 | 0x00BB | 6 | 1 |
| Error reported by read/write head 32 | 0x00A9 | 0x00BB | 14 | 1 |
| Expected read/write head 1 not connected | 0x009A | 0x00AC | 7 | 1 |
| Expected read/write head 2 not connected | 0x009A | 0x00AC | 15 | 1 |
| | | | | 1 |
| Expected read/write head 31 not connected | 0x00A9 | 0x00BB | 7 | 1 |
| Expected read/write head 32 not connected | 0x00A9 | 0x00BB | 15 | 1 |



Digital channels — input data

| Description | Register | Bit offset | Bit length |
|-----------------------|----------|------------|------------|
| Input value channel 4 | 0x00BC | 4 | 1 |
| Input value channel 5 | 0x00BC | 5 | 1 |
| Input value channel 6 | 0x00BC | 6 | 1 |
| Input value channel 7 | 0x00BC | 7 | 1 |

Digital channels — output data

| Description | Register | Bit offset | Bit length |
|------------------------|----------|------------|------------|
| Output value channel 4 | 0x0898 | 4 | 1 |
| Output value channel 5 | 0x0898 | 5 | 1 |
| Output value channel 6 | 0x0898 | 6 | 1 |
| Output value channel 7 | 0x0898 | 7 | 1 |

Digital channels — diagnostic messages

| Description | Register | Bit offset | Bit length |
|--|----------|------------|------------|
| Overvoltage at power supply connection VAUX channel 4/5 | 0x00BD | 2 | 1 |
| Overvoltage at power supply connection VAUX channel 6/7 | 0x00BD | 3 | 1 |
| Overvoltage at output (channel 4) | 0x00BD | 12 | 1 |
| Overvoltage at output (channel 5) | 0x00BD | 13 | 1 |
| Overvoltage at output (channel 6) | 0x00BD | 14 | 1 |
| Overvoltage at output (channel 7) | 0x00BD | 15 | 1 |

Module status — diagnostic messages

| Description | Register | Bit offset | Bit length |
|------------------------------|----------|------------|------------|
| DTM active in Force mode | 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 Connecting the device to an EtherNet/IP scanner using RSLogix

Hardware used

This example uses the following hardware components:

- Rockwell controller CompactLogix L30ER
- TBEN-S2-2RFID-4DXP block module
- HF read/write head TN-Q80-H1147

Software used

This example uses the following software:

- Rockwell RSLogix
- EDS file for TBEN-S2-2RFID-4DXP (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.

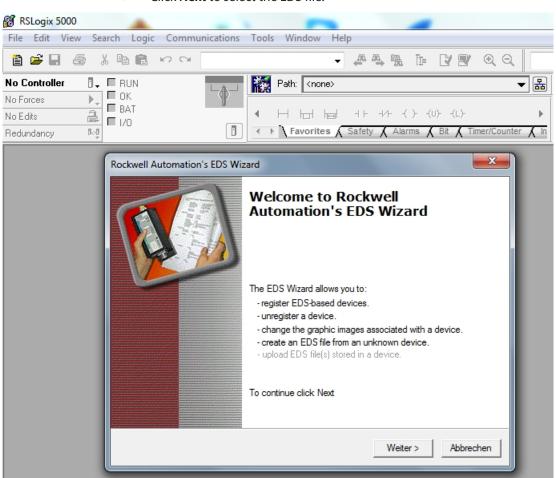
▶ Include an EDS file: Click Tools → EDS Hardware Installation Tool.

| RSLogix 5000 | | | | |
|--|-----|--|--------------|-----|
| File Edit View Search Logic Communications | Too | ols Window Help | | |
| 🗎 🖆 🛃 🎂 👗 🛍 💼 🕫 👓 👓 | | Options | QQ | |
| No Controller | | Security | <u> </u> | |
| No Controller | 9 | Documentation Languages | – | 뮮 |
| No Edits | | Import • | | • |
| Redundancy Ruj | | Export • | imer/Counter | χIn |
| | 9 | EDS Hardware Installation Tool | | |
| | | Motion | | |
| | | Custom Tools | | |
| | 10 | Translate PLC-5/SLC 2.0 | | |
| | đ | ControlFLASH | | |
| | | Logix5000 Clock Update Tool | | |
| | P | Logix5000 Task Monitor | | |
| | ۲ | DeviceNet Tag <u>G</u> enerator | | |
| | | Co <u>m</u> pare Tool | | |
| | | RSLogix 5000 IEC61131-3 Translation Tool | | |
| | | Tag <u>D</u> ata Monitor Tool | | |
| | p | Tag <u>U</u> pload Download Tool | | |
| | p | RSLogix5000 Data Preserved Download Tool | | |

Fig. 47: Opening the EDS Hardware Installation Tool



The wizard for the installation of EDS file opens.



Click Next to select the EDS file.

Fig. 48: Starting the EDS Wizard



| 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 □ □ BUN No Forces □ □ 0K |
| No Edits ■ Redundancy I/O |
| Rockwell Automation's EDS Wizard |
| Options What task do you want to complete? |
| Register an EDS file(s). This option will add a device(s) to our database. |
| C 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. This option creates a new EDS file that allows our software to recognize your device. |
| Upload EDS file(s) from the device. This option uploads and registers the EDS file(s) stored in the device. |
| |
| Zurück Weiter > Abbrechen |
| |

Fig. 49: 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.

| 👸 RSLogix 5000 | |
|---|--|
| File Edit View Search Logic Communications Tools Window Help | |
| | |
| | |
| Rockwell Automation's EDS Wizard | |
| Registration Electronic Data Sheet file(s) will be added to your system for use in Rockwell Automation applications. Image: Cook in subfolders Register a directory of EDS files Image: Cook in subfolders Named: Image: Cook in subfolders | |
| • 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. To perform an installation test on the file(s), click Next | |
| < Zurück Weiter > Abbrechen | |

Fig. 50: Selecting an EDS file



7.3.2 Connecting the device with the controller

• Right-click I/O configuration \rightarrow Ethernet.

| | | Click New mo | | | | | | |
|--|---|------------------|----------------|------------------------|----------|---------------|---------------|----------------|
| RSLogix 5000 - TE File Edit View | | | | | | | | - |
| 1 | | | | | | | | |
| 1668 | X 🖻 🖻 🖌 | | | <u>_</u> #A # <u>A</u> | 1 | | ct a Language | - 💹 |
| _ | ↓ □ RUN □ □ OK | | Path: AB_ETH-1 | \192.168.1.58 | | ▼ 👪 | | |
| No Forces | T E aur | T | | 41-44-4 |)(U)(L)- | • | | |
| | BAT 1/0 | | < ► Favorites | | | Bit K Timer/C | | |
| Controller Organizer | | - ∓ × | | | | | 1 | |
| Power-Up Tasks Tasks MainTask MainTask MainTask Motion Group Add-On Instr Add-On Instr Data Types Motion Group Motion Group Trends J/O Configur J/O Configur J/O Configur | rr Tags rr Fault Handler p Handler Program uled Programs ips ed Axes ructions ined Defined ation 69-L30ER TBEN_S New Module | 2_2RFID_4DXP_Der | | | | | | |

Fig. 51: Adding a new module



- Select Turck under Module type vendor filters.
- Select the TBEN-RFID module.
- Confirm the selection with **Create**.

| RSLogix 5000 - TBEN_S2_2RFID_4DXP_Demo_V100 [1] | 769-L30ER 20.11]* | |
|--|---|--|
| File Edit View Search Logic Communications | Tools Window Help | |
| | 🗸 🧍 🐴 强 🄃 📝 😰 🔍 🤇 Select a Language 🗸 | > |
| Offline B RUN No Forces C RUN No Edits BAT | Path: AB_ETH-1\192.168.1.58 <th< th=""> <th< td=""><td></td></th<></th<> | |
| Controller Organizer | Select Module Type Catalog Module Discovery Favorites Enter Search Text for Module Type Clear Filters | Hide Filters e Vendor Filters e Vendor Filters Category Communications / Communications / Commun |
| ່⊟-풂 Ethernet 월 1769-L30ER TBEN_S2_2RFID_4DXP_Demo. | 17 of 226 Module Types Found | Add to Favorites |
| | Close on Create | Create Close Help |
| < > | | |

Fig. 52: Selecting an EDS file for TBEN-S2-2RFID-4DXP



- Assign a module name.
- Enter the IP address of the device.

| RSLogix 5000 - TBEN_S2_2RFID_4DXP_Demo_V100 [1769-L: | 00ER 20.11]* | |
|--|--|---|
| File Edit View Search Logic Communications Tools | ; Window Help | |
| | 🗸 🦀 🍇 🚡 📴 📝 💇 🔍 🔍 Select a Language. | - 🥺 |
| Offline I RUN No Forces C RUN No Edits A I I/O | Path: AB_ETH-1\192.168.1.58 Image: Comparison of the state of th | |
| Controller Organizer | Description: | net Address rivate Network: 192.168.1. |
| Bus Size | Status: Creating | OK Cancel Help |

Fig. 53: Setting the module name and IP address



► Select an integer as a format for the input data and output data: Click Change → In the following window select INT.

| I Module Proper | ties: Local (6814029 2.7) | | | | | - (| | | | |
|-----------------|--|-----|----------|-------------------------|-------------|------|------|----------|---------------|---|
| General Conner | ction Module Info Internet Protocol Port Configurati | on | | | | | | | | |
| Туре: | 6814029 TBEN-S2-2RFID-4DXP | | | | | | | | | |
| Vendor: | Turck | | | | | | | | | |
| Parent: | Local | | | | | | | | | |
| Name: | tben_2rfid |] [| Ether | net Address | | | | | | |
| Description: | A | | P | rivate Network: 192.168 | 8.1. 20 | × | | | | |
| | | | () IF | Address: | | | | | | |
| | | | () н | ost Name: | | | | | | |
| | | | <u> </u> | | | | | | | |
| | - | ſ | | Module Definition* | | | | | | x |
| Module Defini | ition | | | | | - 1 | | | | |
| Revision: | 2.7 | | R | evision: 2 | - | 7 | 2 | | | |
| Electronic Ke | ying: Compatible Module | | E | ectronic Keying: Comp | patible Moo | lule | | • | | |
| Connections: | Exclusive Owner | | C | onnections: | | | | | | |
| | | | | Name | | Size | | Tag Su | iffix | |
| | | | | Exclusive Owner | Input: | 382 | SINT | 1 | tben_2rfid:I1 | |
| | Change | | | | Output: | 308 | SINT | <u> </u> | tben_2rfid:01 | _ |
| | | 1 | | Select a connection | | | INT | | | |
| Status: Offline | | OK | - | | | | | | | |
| 1 | | | | | | | | | | |
| | | | - | | | | | | | |
| | | | | | | | | | | |
| | | | | | | | ОК | | Cancel Help | |

Fig. 54: Selecting an integer as a format for the input data and output data



| Controller Organizer 🗸 4 🗙 | | |
|---|--|---|
| Controller TBEN_S2_2RFID_4DXP_Demo_V100 | New Module | |
| 🖉 Controller Tags | | |
| Controller Fault Handler | General* Connection Module Info Internet Protocol Port Configuration | |
| 🔤 Power-Up Handler | | |
| 🖶 🗠 🚔 Tasks | | |
| 🚊 👼 MainTask | Name Requested Packet Interval Input Type Input Trigger | |
| 🗄 🚔 MainProgram | Name (RPI) (ms) Input Type Input Trigger | |
| Unscheduled Programs | | |
| 🚊 🖂 Motion Groups | Exclusive Owner 20.0 🜩 1.0 - 3200.0 Unicast 🗸 Cyclic 🗸 | |
| 🛄 Ungrouped Axes | Exclusive Owner 20.0 🜩 1.0 - 3200.0 Unicast 💌 Cyclic 💌 | |
| Add-On Instructions | | |
| 🚊 🖂 Data Types | | |
| | | |
| 🛓 🚋 Strings | | |
| - 🙀 Add-On-Defined | | |
| 🖶 🚂 Predefined | | |
| 🔤 Module-Defined | | |
| Trends | | |
| 🗄 🖂 I/O Configuration | 🗐 Inhibit Module | |
| 🗄 🎹 1769 Bus | | |
| [1] [0] 1769-L30ER TBEN_S2_2RFID_4DXP_Der | Major Fault On Controller If Connection Fails While in Run Mode | |
| 🗄 🖧 Ethernet | Module Fault | |
| 1769-L30ER TBEN_S2_2RFID_4DXP_Demo | inocate i date | |
| | | |
| | | E |
| | | |
| | | |
| | | |
| | Status: Creating OK Cancel Help | |
| Bus Size | | |

• Optional: Set the connection and port configuration.

Fig. 55: Setting the connection

| Controller Organizer 🗸 🗸 🗙 | ((| x |
|--|--|---|
| E | New Module | |
| 🖉 Controller Tags | | |
| Controller Fault Handler | General* Connection Module Info Internet Protocol Port Configuration | |
| Power-Up Handler | | |
| 🚊 🔄 Tasks | Port Enable Link Status Auto- Speed Duplex Port | |
| 🖶 🚑 MainTask | For Enable Link Status Negotiate Selected Current Selected Current Diagnostics | |
| 🗄 🚔 MainProgram | Eth1 Eth2 Eth2 Eth2 Eth2 Eth2 Eth2 Eth2 Eth2 | |
| 📖 🛅 Unscheduled Programs | | |
| 🗄 🚔 Motion Groups | | |
| Ungrouped Axes | | |
| | | |
| 🗄 📇 Data Types | | |
| 🚂 User-Defined | | |
| ⊕ 🛺 Strings | | |
| - 🚂 Add-On-Defined | | |
| Generation Generation | | |
| Module-Defined | | |
| | | |
| ia in the second se | | |
| | Refresh communication. Set + | |
| Ethernet | | |
| 1769-L30ER TBEN_S2_2RFID_4DXP_Demo | | |
| 1103-LSOEK TBEN_32_2KFID_4DXP_DEINO | | |
| | | |
| | | |
| | | |
| | | |
| | Status: Creating OK Cancel Help | |
| Bus Size | | |

Fig. 56: Setting the port configuration



The device appears in the project tree.

| RSLogix 5000 - TBEN_S2_2RFID_4DXP_Demo_V10 | [1769-L30ER 20.11]* | - |
|---|--|-----------------------|
| File Edit View Search Logic Communicatio | s Tools Window Help | |
| 🗎 🖆 🖶 🎒 👗 🛍 🛍 🗠 🗠 🦳 | - # # <u>F</u> [] Ø 9 0 0 | Select a Language 👻 🧕 |
| Offline Image: Controller Organizer | Image: An and the state of | |
| Controller Organizer Controller Organizer Controller TBEN_S2_2RFID_4DXP_Demo_V100 Controller Tags Contr | er | |

Fig. 57: TBEN-S2-2RFID-4DXP in the project tree



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Ŧ

7.3.3 Connecting the device online with the controller

- Select the controller.
- Click Go online. RSLogix 5000 - TBEN_S2_2RFID_4DXP_Demo_V100 [1769-L30ER 20.11]* File Edit View Search Logic Communications Tools Window Help 🗎 🖆 🔚 🎒 👗 🛍 💼 🗠 🗠 🗸 🚑 🗛 🖪 📴 📝 🖳 🔍 🔍 Select a Language... Path: AB_ETH-1\192.168.1.58 - ₽ Offline 🛛 🗸 🔲 RUN No Forces Go Online H H H H ++ +/ -()- -(U)- -(L)-Þ No Edits Upload... + Favorites Add-On A Safety Alarms A Bit A Timer/C Download **μ** Χ Controller Organize Program Mode 100 🖃 😁 🔂 Controller Run Mode 🖉 Control Test Mode 🛅 Control 💼 Power-Clear Faults 🗄 🖂 Tasks Go To Faults 🚊 😽 MainTa 🗄 🕞 Mai Controller Properties 🔲 Unsche 🗄 😁 🔄 Motion Groups 🛄 Ungrouped Axes 🗀 Add-On Instructions 🗄 🖂 Data Types 🕞 🙀 User-Defined 🛓 🙀 Strings 🙀 Add-On-Defined

Fig. 58: Connecting the device online

6814029 tben_2rfid

....

🗓 [0] 1769-L30ER TBEN_S2_2RFID_4DXP_Der

🛲 1769-L30ER TBEN_S2_2RFID_4DXP_Demo

Þ

🖶 🚂 Predefined 🗄 🚂 Module-Defined

🖃 🚠 Ethernet

Module Defined Tags tben_2rfid:11 tben_2rfid:01 tben_2rfid:C

Offline

Trends

٠ -

Description

Status Module Fault



► In the following window click (Connect to go online) Download.

| RSLogix 5000 - TBEN_S2_2RFID_4DXP_Demo_V100 [1] | 769-L30ER 20.11]* | 5 |
|---|--|---|
| File Edit View Search Logic Communications | Tools Window Help | |
| 🗎 🛱 🖶 🏯 ½ 🗎 🛍 🕫 🖂 🦳 | 🗸 🦽 🍇 🙀 🔃 📝 🗟 🔍 🔍 Select a Language 🗸 🧶 | |
| Rem Run Run Mode Forces Controller OK No Edits H/D OK | Path: AB_ETH-1\192.168.1.58 H H </td <td></td> | |
| Controller Organizer | Connected To Go Online Options General Date/Time Major Faults Minor Faults File Nonvolatile Memory Vendor: Allen-Bradley Type: 1769-L30ER CompactLogix5330ER Controller Change Controller Revision: 20.12 Name: Controller Description: Chassis Type: enone> Slot: Ome Remote Run | |
| ben_2rfid:01 ben_2rfid:C Description Status Offline | | |
| Module Fault | | |

Fig. 59: Click Download

• Confirm all the subsequent messages.



7.3.4 Reading out process data

Select **Controller tags** in the project tree.

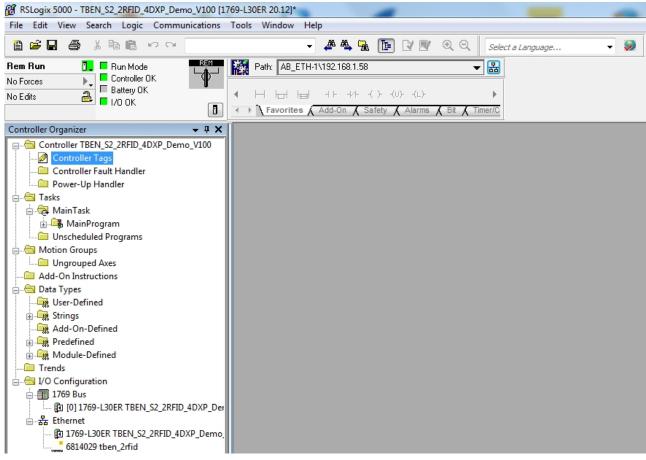


Fig. 60: Controller tags in the project tree

Parameter data (tben_2rfid:C), input data (tben_2rfid:l1) and output data (tben_2rfid:O1) can be accessed.







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.

| | emo_V100 [1769-L30ER 20.12]* - [Controller Tags -] | TBEN_S2_2RFID_4DXP_Demo_V100(controlle |)] | - | - | | - | |
|---------------------------------|---|--|--------|----|--------------------|---------------------|-------------|----------|
| | communications Tools Window Help | | | | | | | |
| 1 🖻 🖬 🍯 🐇 🖿 🖻 🗠 🗠 | · · · · · · · · · · · · · · · · · · · | 📭 📝 🛒 🔍 🔍 🛛 Select a Languag | e 👻 💹 | | | | | |
| m Run 🛛 🚺 🗖 Run Mode | Path: AB_ETH-1\192.168.1.58 | - 8 | | | | | | |
| Forces | Y | | | | | | | |
| Edits | < H ⊟ ⊟ +F +/F (|)(U)(L)- | | | | | | |
| 1/0 UK | Favorites Add-On A Safe | ety 🖌 Alarms 👗 Bit 👗 Timer/C | | | | | | |
| ntroller Organizer 🚽 🕂 🗙 | | | | | | 🝸 Enter Name Filter | | |
| Controller TBEN_S2_2RFID_4DXP_[| Scope: DTBEN_S2_2RFII - Show: All Tags | | | | | | Т | |
| Controller Tags | Name | _≡ △ Value | ◆ Fo | | Style | Data Type | Description | Constant |
| Controller Fault Handler | + tben_2rfid:C | | {} | {} | | _0030:6814029 | | |
| Power-Up Handler | - tben_2rfid:11 | | {} | {} | | _0030:6814029 | | |
| - Tasks | tben_2rfid:11.ConnectionFaulted | | 0 | | Decimal | BOOL | | |
| 🛓 👼 MainTask | - tben_2rfid:11.Data | | {} | {} | Decimal | INT[191] | | |
| 🖥 🕞 MainProgram | + tben_2rfid:11.Data[0] | | 0 |) | Decimal | INT | | |
| Unscheduled Programs | + tben_2rfid:11.Data[1] | | 0 | 1 | Decimal | INT | | |
| C Motion Groups | + tben_2rfid:11.Data[2] | | 0 | 1 | Decimal | INT | | |
| Ungrouped Axes | tben_2rfid:I1.Data[3] | | 65 | 1 | Decimal | INT | | |
| Add-On Instructions | tben_2rfid:11.Data[3].0 | | 1 | | Decimal | BOOL | | |
| 📇 Data Types | 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 | | |
| 🛶 Add-On-Defined | 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 | | | 0 | | Decimal Decimal | BOOL | | |
| 🗄 🗐 1769 Bus | -tben_2rfid:11.Data[3].8 | | | | Jecimal Decimal | | | |
| 😰 [0] 1769-L30ER TBEN_S2_2F | tben_2rfid:11.Data[3].9 | | 0 | | | BOOL | | |
| 🗄 🚠 Ethernet | tben_2rfid:11.Data[3].10 | | 0 | | Decimal | BOOL | | |
| 🖸 1769-L30ER TBEN_S2_2RFIE | tben_2rfid:11.Data[3].11 | | 0 | | Decimal | BOOL | | |
| 6814029 tben_2rfid | tben_2rfid:11.Data[3].12 | | 0 | | Decimal | BOOL | | |
| | tben_2rfid:11.Data[3].13 | | 0 | | Decimal | BOOL | | |
| 4 III | tben_2rfid:11.Data[3].14 | | 0 | | Decimal | BOOL | | |
| | tben_2rfid:11.Data[3].15 | | 0 | | Decimal | BOOL | | |
| | tben_2rfid:I1.Data[4] | | 8 | | Decimal | INT | | |
| | tben_2rfid:11.Data[5] | | 0 | 1 | Decimal | INT | | |
| | + tben_2rfid:11.Data[6] | | 1 | 1 | Decimal | INT | | |
| | + tben_2rfid:11.Data[7] | | 0 | 1 | Decimal | INT | | |
| | + tben_2rfid:I1.Data[8] | | -32640 | | Decimal | INT | | |
| | + tben_2rfid:11.Data[9] | | 0 | | Decimal | INT | | |
| | + tben_2rfid:11.Data[10] | | 0 | | Decimal | INT | | |
| | + then 2rfid:11.Data[11] | | 0 | | Decimal | INT | | |
| | Monitor Tags / Edit Tags / | | | | e sesentrad | | | |

Fig. 62: Process input data — example



7.3.5 EtherNet/IP — mapping

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

RFID channels — parameter data

| Description | Register | | Bit offset | Bit length |
|---|-----------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Operating mode | 0x000A | 0x0041 | 0 | 8 |
| Select tag type | 0x000B | 0x0042 | 0 | 8 |
| bypass time | 0x000C | 0x0043 | 0 | 16 |
| HF: Multitag | 0x000D | 0x0044 | 0 | 1 |
| HF: Heartbeat read/write head | 0x000E | 0x0045 | 0 | 1 |
| Cable termination active | 0x000F | 0x0046 | 0 | 1 |
| HF: Automatic tuning of read/write head | 0x0011 | 0x0047 | 0 | 1 |
| Deactivate diagnostic HF read/write head tuning | 0x0012 | 0x0048 | 0 | 1 |
| Diagnostic input filter | 0x0013 | 0x0049 | 0 | 1 |
| Command repetitions in the event of an error | 0x0014 | 0x004A | 0 | 8 |
| HF: Command in Continuous Mode | 0x0015 | 0x004B | 0 | 8 |
| HF: Length in Continuous Mode | 0x0016 | 0x004C | 0 | 16 |
| HF: Address in Continuous Mode | 0x0018 | 0x004E | 0 | 32 |
| Length of read data | 0x003C | 0x0072 | 0 | 16 |
| Length of write data | 0x003E | 0x0074 | 0 | 16 |
| HF bus mode: Activate read/write head 1 | 0x001C | 0x0052 | 0 | 1 |
| HF bus mode: Activate read/write head 2 | 0x001D | 0x0053 | 0 | 1 |
| HF bus mode: Activate read/write head 3 | 0x001E | 0x0054 | 0 | 1 |
| | | | | 1 |
| HF bus mode: Activate read/write head 32 | 0x003B | 0x0071 | 0 | 1 |

RFID channels — process input data

| Description | Word offset | | Bit offset | Bit length |
|--------------------------------|-------------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Response code | 0x0001 | 0x004D | 0 | 14 |
| Error | 0x0001 | 0x004D | 14 | 1 |
| Busy | 0x0001 | 0x004D | 15 | 1 |
| Tag in detection range | 0x0003 | 0x004F | 0 | 1 |
| HF read/write head switched on | 0x0003 | 0x004F | 8 | 1 |



| Description | Word offset | | Bit offset | Bit length |
|--|-------------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Continuous Mode active | 0x0003 | 0x004F | 9 | 1 |
| Loop counter | 0x0002 | 0x004E | 0 | 8 |
| Antenna detuned | 0x0003 | 0x004F | 5 | 1 |
| Parameter not supported by read/ write head | 0x0003 | 0x004F | 5 | 1 |
| Read/write head reports error | 0x0003 | 0x004F | 6 | 1 |
| Expected read/write head not connected | 0x0003 | 0x004F | 7 | 1 |
| Length | 0x0004 | 0x0050 | 0 | 16 |
| Error code | 0x0005 | 0x0051 | 0 | 16 |
| Tag counter | 0x0006 | 0x0052 | 0 | 16 |
| Data (bytes) available | 0x0007 | 0x0053 | 0 | 16 |
| Read fragment No. | 0x0008 | 0x0054 | 0 | 8 |
| Write fragment No. | 0x0008 | 0x0055 | 8 | 8 |
| Read/write head 1 — Tag in detection range | 0x000B | 0x0057 | 0 | 1 |
| | | | | 1 |
| Read/write head 16 — Tag in detection range | 0x000B | 0x0057 | 15 | 1 |
| Read/write head 17 — Tag in detection range | 0x000C | 0x0058 | 0 | 1 |
| | | | | 1 |
| Read/write head 32 — Tag in detection range | 0x000C | 0x0058 | 15 | 1 |
| Read data Byte 0 | 0x000D | 0x0059 | 0 | 8 |
| Read data Byte 1 | 0x000D | 0x0059 | 8 | 8 |
| Read data Byte 2 | 0x000E | 0x005A | 0 | 8 |
| Read data Byte 3 | 0x000E | 0x005A | 8 | 8 |
| | | | | 8 |
| Read data Byte 14 | 0x0014 | 0x0060 | 0 | 8 |
| Read data Byte 15 | 0x0014 | 0x0060 | 8 | 8 |
| | | | | 8 |
| Read data Byte 64 | 0x002D | 0x0079 | 0 | 8 |
| Read data Byte 65 | 0x002D | 0x0079 | 8 | 8 |
| | | | | 8 |
| Read data Byte 126 | 0x004C | 0x0098 | 0 | 8 |
| Read data Byte 127 | 0x004C | 0x0098 | 8 | 8 |



RFID channels — process output data

| Description | Word offset | | Bit offset | Bit length |
|-------------------------|-------------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Command code | 0x0001 | 0x004D | 0 | 16 |
| Loop counter | 0x0002 | 0x004E | 0 | 8 |
| Memory area (only UHF) | 0x0002 | 0x004E | 8 | 8 |
| Start address | 0x0003 | 0x004F | 0 | 32 |
| Length | 0x0005 | 0x0051 | 0 | 16 |
| Length UID/EPC | 0x0006 | 0x0052 | 0 | 8 |
| Read/write head address | 0x000B | 0x0057 | 0 | 8 |
| Timeout | 0x0007 | 0x0053 | 0 | 16 |
| Read fragment No. | 0x0008 | 0x0054 | 0 | 8 |
| Write fragment No. | 0x0008 | 0x0054 | 8 | 8 |
| Write data Byte 0 | 0x000D | 0x0059 | 0 | 8 |
| Write data Byte 1 | 0x000D | 0x0059 | 8 | 8 |
| | | •••• | ••• | 8 |
| Write data Byte 14 | 0x0014 | 0x0060 | 0 | 8 |
| Write data Byte 15 | 0x0014 | 0x0060 | 8 | 8 |
| | | •••• | ••• | 8 |
| Write data Byte 64 | 0x002D | 0x0079 | 0 | 8 |
| Write data Byte 65 | 0x002D | 0x0079 | 8 | 8 |
| | ••• | | ••• | 8 |
| Write data Byte 126 | 0x004C | 0x0098 | 0 | 8 |
| Write data Byte 127 | 0x004C | 0x0098 | 8 | 8 |



RFID diagnostic data

| Description | Register | | Bit offset | Bit length |
|--|-----------|-----------|------------|------------|
| | Channel 0 | Channel 1 | | |
| Overvoltage VAUX | 0x0099 | 0x00AB | 7 | 1 |
| Parameterization error | 0x0099 | 0x00AB | 6 | 1 |
| Configuration via DTM active | 0x0099 | 0x00AB | 4 | 1 |
| Buffer full | 0x0099 | 0x00AB | 4 | 1 |
| Read/write head 1 detuned | 0x009B | 0x00AD | 4 | 1 |
| Read/write head 2 detuned | 0x009B | 0x00AD | 12 | 1 |
| | ••• | ••• | 0 | 1 |
| Read/write head 31 detuned | 0x00AA | 0x00BC | 4 | 1 |
| Read/write head 32 detuned | 0x00AA | 0x00BC | 12 | 1 |
| Parameter not supported by read/ write head 1. | 0x009B | 0x00AD | 5 | 1 |
| Parameter not supported by read/ write head 2. | 0x009B | 0x00AD | 13 | 1 |
| | | ••• | ••• | 1 |
| Parameter not supported by read/ write head 31. | 0x00AA | 0x00BC | 5 | 1 |
| Parameter not supported by read/ write head 32. | 0x00AA | 0x00BC | 13 | 1 |
| Read/write head 1 reports error | 0x009B | 0x00AD | 6 | 1 |
| Error reported by read/write head 2 | 0x009B | 0x00AD | 14 | 1 |
| | | | | 1 |
| Error reported by read/write head 31 | 0x00AA | 0x00BC | 6 | 1 |
| Error reported by read/write head 32 | 0x00AA | 0x00BC | 14 | 1 |
| Expected read/write head 1 not connected | 0x009B | 0x00AD | 7 | 1 |
| Expected read/write head 2 not connected | 0x009B | 0x00AD | 15 | 1 |
| | ••• | | | 1 |
| Expected read/write head 31 not connected | 0x00AA | 0x00BC | 7 | 1 |
| Expected read/write head 32 not connected | 0x00AA | 0x00BC | 15 | 1 |



DXP channels — parameter data

| Description | Register | Bit offset | Bit length |
|--|----------|------------|------------|
| DXP 4 — manual reset of the output after overcurrent | 0x0076 | 0 | 1 |
| DXP 5 — manual reset of the output after overcurrent | 0x0077 | 0 | 1 |
| DXP 6 — manual reset of the output after overcurrent | 0x0078 | 0 | 1 |
| DXP 7 — manual reset of the output after overcurrent | 0x0079 | 0 | 1 |
| DXP 4 — active output | 0x007A | 0 | 1 |
| DXP 5 — active output | 0x007B | 0 | 1 |
| DXP 6 — active output | 0x007C | 0 | 1 |
| DXP 7 — active output | 0x007D | 0 | 1 |
| DXP 4 — advanced digital function | 0x007E | 0 | 1 |
| DXP 4 — input filter | 0x007E | 0 | 1 |
| DXP 4 — pulse extension (*10 ms) | 0x007F | 0 | 8 |
| DXP 5 — advanced digital function | 0x0082 | 0 | 1 |
| DXP 5 — input filter | 0x0083 | 0 | 1 |
| DXP 5 — pulse extension (*10 ms) | 0x0084 | 0 | 8 |
| DXP 6 — advanced digital function | 0x0086 | 0 | 1 |
| DXP 6 — input filter | 0x0087 | 0 | 1 |
| DXP 6 — pulse extension (*10 ms) | 0x0088 | 0 | 8 |
| DXP 7 — advanced digital function | 0x008A | 0 | 1 |
| DXP 7 — input filter | 0x0139 | 0 | 1 |
| DXP 7 — pulse extension (*10 ms) | 0x008B | 0 | 8 |

Digital channels — input data

| Description | Word offset | Bit offset | Bit length |
|-----------------------|-------------|------------|------------|
| Input value channel 4 | 0x00BD | 4 | 1 |
| Input value channel 5 | 0x00BD | 5 | 1 |
| Input value channel 6 | 0x00BD | 6 | 1 |
| Input value channel 7 | 0x00BD | 7 | 1 |

Digital channels — output data

| Description | Word offset | Bit offset | Bit length |
|------------------------|-------------|------------|------------|
| Output value channel 4 | 0x0099 | 4 | 1 |
| Output value channel 5 | 0x0099 | 5 | 1 |
| Output value channel 6 | 0x0099 | 6 | 1 |
| Output value channel 7 | 0x0099 | 7 | 1 |



Digital channels — diagnostic messages

| Description | Word offset | Bit offset | Bit length |
|---|-------------|------------|------------|
| Overvoltage at power supply connection VAUX channel 4/5 | 0x00BE | 2 | 1 |
| Overvoltage at power supply connection VAUX channel 6/7 | 0x00BE | 3 | 1 |
| Overvoltage at output (channel 4) | 0x00BE | 12 | 1 |
| Overvoltage at output (channel 5) | 0x00BE | 13 | 1 |
| Overvoltage at output (channel 6) | 0x00BE | 14 | 1 |
| Overvoltage at output (channel 7) | 0x00BE | 15 | 1 |

Module status — diagnostic messages

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



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 [> 24].

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.

New Module

| Type: Vendor: Parent: Name: | ETHERNET-MODULE Generic Ether Allen-Bradley Local TBEN_S2_2RFID_4DXP | met Module | ameters Assembly Instance: | Size: |
|--------------------------------------|---|-------------------|----------------------------------|--------------------------|
| Description: | ~ ~ | Input: Output: | 103 104 | 5 (16-bit) 2 (16-bit) |
| Comm Format | | | 106 | 14 (8-bit) |
| IP Address | ess: 192 . 168 . 1 . 107 | Status Input: | | |
| ⊖ Host Na | me: | Status Output: | | |
| 🗹 Open Modu | le Properties | ОК | Cano | cel Help |

Fig. 63: Configuring the configuration assembly in RSLogix

×



Activating QuickConnect via the Class Instance Attribute

Activate QuickConnect via Class Instance Attribute as follows:

| Class | Instance | Attribute | Value |
|-------|----------|-----------|--|
| 0xF5 | 0x01 | 0x0C | 0: Deactivated (default) 1: Activated |

Activating QuickConnect via the web server

• Click Parameter \rightarrow Activate QuickConnect \rightarrow Yes.

| BEN-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Gate | way - Parameter | |
|---------------------------|---|-------------------------|---|
|) Info | | | |
| S Parameter | Write Channel view Print | | |
| Diagnosis | Device Fieldbus configuration Deactivate Modbus TCP | no | 2 |
| Ex- / Import | Deactivate Houbus TCP | no 🗸 | ? |
| Change Password | Deactivate PROFINET | no 🗸 | ? |
| Firmware | Deactivate WEB server | no 🗸 | ? |
| OCAL I/O | Ethernet Port 1 | Autonegotiation 🗸 | ? |
| ္ဌိ Parameter | Ethernet Port 2 | Autonegotiation 🗸 | ? |
| 간 Diagnosis | EtherNet/IP configuration Activate GW Control Word | yes 🗸 | ? |
| ਪੁੱ_ Input ਨ੍ਰੇ Output | Activate GW Status Word | yes 🗸 | ? |
| | | NO | |
| | Activate QuickConnect | YES | ? |
| | QuickConnect-Status | disable 🗸 | ? |
| | Modbus TCP configuration | | |
| | Activation write permission | with first write access | ? |
| | Write permission | all connections | ? |

Fig. 64: Setting QuickConnect in the web server



- ➡ 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.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Gateway | - Parameter |
|---|---|-----------------------------|
| (i) Info | | |
| နှင့်} Parameter | Write Channel view Print | |
| ଫୁ Diagnosis ୫ Event log ↓ Ex- / Import | Device Fieldbus configuration Deactivate Modbus TCP Deactivate EtherNet/IP | no ~ ? |
| 🔍 Change Password | Deactivate PROFINET Deactivate WEB server | no ~ ? |
| LOCAL I/O | Ethernet Port 1 | 100 Mbps, full-duplex 🗸 Y |
| ႏွိုး Parameter | Ethernet Port 2 | 100 Mbps, full-duplex 👻 🧪 ? |
| 🕑 Diagnosis | EtherNet/IP configuration | |
| ⊲√د Input | Activate GW Control Word | yes 👻 ? |
| ് mput ഹീം Output | Activate GW Status Word | yes 👻 ? |
| <u>م</u> ر Output | Activate QuickConnect | NO YES |
| | QuickConnect-Status | enable 💉 🧨 ? |
| | Modbus TCP configuration | |
| | Activation write permission | with first write access 💙 ? |
| | Write permission | all connections |

Fig. 65: Activating QuickConnect in the web server



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 V13 programming software (TIA Portal).

Hardware used

This example uses the following hardware components:

- Siemens S7-1500 controller
- TBEN-S2-2RFID-4DXP block module
- HF read/write head TN-Q80-H1147

Software used

This example uses the following software:

- SIMATIC STEP7 Professional V13 (TIA Portal)
- GSDML file for TBEN-S2-2RFID-4DXP (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)**.

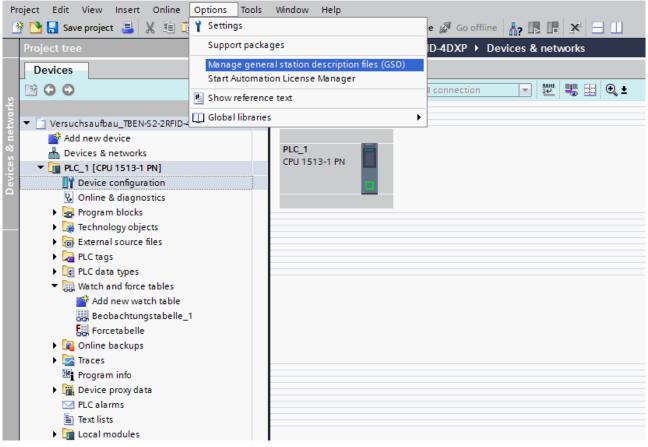


Fig. 66: Include the GSDML file



- 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.

| N | lanage g | general station description file | s | | | × | |
|--------------|----------|----------------------------------|---------|--------------|-------------------|-------|--|
| Source path: | | | | | | | |
| | Content | of imported path | | | | | |
| | | File | Version | Language | Status | Info | |
| | ~ | GSDML-V2.3-Turck-TBEN_S2_2RFI | V2.3 | English, Ger | Already installed | TBPN | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | < | | | | | > | |
| | | | | D | elete Install C | ancel | |

Fig. 67: Installing a GSDML file



7.4.2 Connecting the device with the controller

- Select the RFID interface from the hardware catalog and drag it to the hardware window.
- Connect the device with the controller in the hardware window.

| Project Edit View Insert Online Options Tools Project 📑 🚼 Save project 📑 🐰 🏥 🗊 🗙 🏹 🛨 (주문 | Window neip | Totally Integrated Automation PORTA |
|---|---|--|
| Project tree 🔲 📢 | Versuchsaufbau_TBEN-52-2RFID-4DXP > Devices & networks _ 🖬 = X | Hardware catalog 📰 🗊 🕽 |
| Devices | 🖉 Topology view 🔒 Network view 👔 Device view | Options |
| | Network 🔐 Connections HMI connection 🐨 🕮 🖷 🔍 🕹 | |
| | | |
| Versuchsaufbau_TBEN-S2-2RFID-4DXP | IO system: PLC_1.PROFINET IO-System (100) Price Price | ▼ Catalog |
| Add new device | ▼ \$71500/ET200MP-Station_1 | <earch> Nij Ni</earch> |
| A Devices & networks | PLC_1 = PLC_1 | 🖌 Filter |
| PLC_1 [CPU 1513-1 PN] | CPU 1513-1 PN GSD device_1 | Controllers |
| Device configuration | ILC_1 Transformer + turck-then-s2-2rlid-dop | 🔸 🧮 HMI |
| Online & diagnostics | | PC systems |
| Program blocks | | Drives & starters |
| Technology objects | PLC_1.PROFINETIO-Syste | Image Network components |
| External source files | | Detecting & Monitoring |
| PLC tags | | Distributed I/O |
| C PLC data types | | Power Supplies |
| Watch and force tables | | Im Field devices |
| Add new watch table | | Other field devices |
| Beobachtungstabelle_1 | | - PROFINETIO |
| E. Forcetabelle | | Drives |
| Online backups | | Encoders |
| Iraces | | 🕨 🥅 Gateway |
| 🗷 Program info | | General |
| Device proxy data | | |
| PLC alarms | | Hans Turck GmbH + Co. KG |
| Text lists | | Hilscher Gesellschaft für Systemautomation mbH |
| Local modules | | KUKA Roboter GmbH |
| Distributed I/O | | Im TURCK |
| Common data | | - Im Turck |
| Documentation settings | | Turck |
| Languages & resources | | TBEN-S |
| Online access | | TBEN-52-2CONH4DXP |
| Card Reader/USB memory | × I | TBEN-S2-2RFID-4DXP TBEN-S2-4IOL |
| | < II >> 100% >> | BEN-S2-4IOL |
| | | Ident Systems |
| | GSD device_1 [Device] 🔄 Properties 🚺 Info 🖞 Diagnostics 🖉 🖻 🔫 | Indent Systems Im Network Components |
| | General IO tags System constants Texts | Im PLCs & CPs |
| | General . | Sensors |
| | General | PROFIBUS DP |
| | | |
| | Name: GSD device_1 | |
| | Author: andres.backer | |
| | | |
| | Comment: | |
| | | |
| | | |
| | | |
| ✓ Details view | | |
| | | ✓ Information |
| Name | | Device: |
| Portal view Dev | es & ne 😳 Beobachtun | Connection to PLC_1 terminated. |

Fig. 68: 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.

| 📑 🞦 🔒 Save project 📇 💥 🗐 🗎 🗙 🏷 한 (레호 🔒 | Luc II | | | |
|--|---|--------------|------------------|---------|
| Project tree 🔲 🖣 Onli | | | | _ 🖬 🖬 🗙 |
| Devices | | | | |
| . 🖻 🖸 🖸 🔛 🔲 📑 🔮 🔻 Dia | Jiagnostics | | | ^ |
| iti i | General Assign name | | | |
| Versuchsauloau_ibelv-52-2krib-4bAr | unctions Assign IP address | | | |
| Add new device | Assign name Configured PROFINET device | | | |
| S ADD Devices a networks | Reset to factory settings | | | |
| | PROFINET device name: tben | | | |
| Device configuration | Device type: TBEN-52-2RFID-4DXP | | | |
| Solution State Solution State | | | | |
| Program blocks | | | | |
| Technology objects | | | | |
| External source files Del DLC tags | | | | |
| PLC data types | | | | |
| Watch and force tables | Device filter | | | |
| Add new watch table | | | | |
| Beobachtungstabelle_1 | Only show devices of the same type | | | |
| Forcetabelle | Only show devices with bad parameter settings | | | |
| Online backups | | | | |
| Traces | | | | |
| Program info | Accessible devices in the network: | | | |
| Device proxy data | IP address MAC address Device PROFINET device name Status | | | |
| PLC alarms | | | | |
| Text lists | | | | |
| Local modules | | | | |
| Distributed I/O | | | | |
| 🕨 🏹 Common data | | | | |
| Documentation settings | | | | |
| Languages & resources | < II > | | | |
| Online access | LED flashes Update list Assign name | | | |
| Y Display/hide interfaces | | | | |
| COM [RS232/PPI multi-master cable] | | | | |
| COM <4> [RS232/PPI multi-master cable] | | | | |
| COM <6> [RS232/PPI multi-master cable] PANGP Virtual Ethernet Adapter | | | | |
| PANGP Virtual Ethernet Adapter | | | | |
| ASIX AABATYAA USB 2.0 to Gigabit Ether waa | | | | |
| plate accessible devices Implic_1 [192.168.1.5] | | | | |
| Accessible device [192.168.1.5] | | | | |
| then [00-07-46-0C-CB-6A] | | | | |
| V. Online & diagnostics | | | | |
| Intel(R) Centrino(R) Ultimate-N 6300 AGN | | | | ~ |
| 🕨 🚺 Intel(R) Ethernet Connection I217-LM | | 💁 Properties | Info Diagnostics | |
| PC Adapter [MPI] | General IO tags System constants | | | |

Fig. 69: Assigning the PROFINET device name



7.4.4 Setting the IP address in the TIA Portal

- ► Select Device View → Properties tab → Ethernet addresses.
- Assign the required IP address.

| Project Edit View insert Online Options loois | 🗄 🖏 🛄 🔛 🔛 💋 Go online 🖉 Go offline 🛔 🔀 📰 🐺 🗶 💷 | | Totally Integrated Automation PORTA |
|---|--|--|---|
| Project tree 🔲 4 | Versuchsaufbau_TBEN-S2-2RFID-4DXP > PLC_1 [CPU 1513-1 PN] > Distributed I/O > PROFINET IO-System (100): PN/IE_1 > turc | ck-tben-s2-2rfid-4dxp _ ■ ■ × | Hardware catalog 👘 🗊 🖡 |
| Devices | | 🖉 Topology view 🔥 Network view 📑 Device view | Options |
| B 0 0 E = = | 🔥 turck-tben-3-27fd-4dop 💌 🗮 🛃 🛱 🛱 🕰 🛓 | Device overview | |
| | | > 100% > > 100% > > 100% > | Catalog Cearch> Katalog Search> Katalog Filter Filter Table Search> Catalog Filter Filter |

Fig. 70: 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.

| Project Edit View Insert Online Optio | | Window Help 5 1 1 1 2 3 4 5 60 online 🖉 Go offline 🛵 🖪 🗱 🛠 🖃 1 | | | Totally Integrated Automation PORTAL |
|---|------------|---|---|------------------------------------|---|
| Project tree | | Versuchsaufbau_TBEN-S2-2RFID-4DXP + Devices & networks | | _ # = × | Hardware catalog 🛛 🗊 🗎 🕨 |
| Devices | | | 😴 Topology view 🔒 N | etwork view | Options |
| 800 | | Network | | Network overview | |
| 2 | | | IO system: PLC_1.PROFINET IO-System (100) | | ✓ Catalog |
| Versuchsaufbau_TBEN-S2-2RFID-4DXP | × • | | | Pevice S71500/ET200MP-Station_1 | |
| Add new device | | PLC_1 | | PLC_1 | Filter |
| Devices & networks | | CPU 1513-1 PN TBEN-S2-2RFID | | GSD device_1 | |
| PLC_1 [CPU 1513-1 PN] | ~ | PLC_1 | | ✓ ▶ then | Controllers |
| Device configuration | | | | | ► HM |
| Online & diagnostics | | | | | PC systems |
| Program blocks | • | PLC_1.PROFINETIO-Syste | | | Government Governments |
| Technology objects | | | | | Image: Imag |
| External source files | | | | | P Detecting & Monitoring |
| PLC tags | • | | | | Distributed I/O |
| PLC data types | - | | | | · Caromer puppines |
| Watch and force tables | | | | | Field devices |
| Add new watch table | | | | | Cine of the services |
| Beobachtungstabelle_1 | | | | | PROFINETIO |
| Forcetabelle | | | | | Im Drives |
| Online backups | | | | | Encoders |
| 🕨 📴 Traces | | | | 0 | Gateway |
| Program info | | | | | General |
| Device proxy data | | | | | - III 10 |
| PLC alarms | | | | | Hans Turck GmbH + |
| Text lists | | | | | Hilscher Gesellschaft |
| Local modules | ~ | | | | KUKA Roboter GmbH |
| Distributed I/O | ~ | | | | TURCK |
| Online card data | | | | | - III Turck |
| 🕨 🥁 Common data | | | | | Turck |
| Documentation settings | | | | | |
| 🕨 📷 Languages & resources | | | | | TBEN-52-2C |
| Online access | | | | | TBEN-S2-2RF |
| 🍸 Displayhide interfaces | | | | | TBEN-52-4IOL |
| COM [RS232/PPI multi-master cable] |] 🔟 | | | | TBPN-Safe |
| COM <4> [RS232/PPI multi-master ca | s) | | | | Ident Systems |
| COM <6> [RS232/PPI multi-master ca | III | | | | Network Components |
| PANGP Virtual Ethernet Adapter | ** | | | | PLCs & CPs |
| ASIX AX88178A USB 2.0 to Gigabi | . 🔛 👘 | | | | Sensors |
| Update accessible devices | | | | | PROFIBUS DP |
| Image: block bl | | | | | |
| Accessible device [192.168.1.5] | | | | | |
| Image: | | ζ ΙΙ | > 100% | C II | |
| Intel(R) Centrino(R) Ultimate-N 6300 | - 20 | X II | | | 4 |
| Intel(R) Ethernet Connection I217-LM | м 💹 | | Properties | o 🛂 Diagnostics 👘 👘 🗸 | |
| PC Adapter [MPI] | | General Cross-references Compile | | | |
| < II | > | Show all messages | | | 1 |
| Details view | | w a v snow en messages | | | |
| | | I Message Go to ? Date | Time | | × Information |
| Name | | | 2016 3:47:52 PM | <u>^</u> | |
| | LA C | en fran III Baskaska | | | |
| Portal view Overview | an Devi | ces & ne 👸 Beobachtun | | Sonn | ected to PLC_1, address IP=192.1 |

Fig. 71: Online mode



7.4.6 Setting module parameters

- Choose Device view \rightarrow Device overview.
- Select the module to be set.
- Click Properties \rightarrow General \rightarrow Module parameters.
- Set the **Station parameters**.

| Versuchsaufbau_TBEN-S2-2RFID-4DXP > P | LC_1 [CPU 1513-1 PN] → Distributed I/O → PROFINET IO-System | (100): PN/IE_1 → tben | | _ # = × |
|---|---|--|---------------|---|
| | | a da | Topology view | Network view 🕅 Device view |
| 🏕 tben 💌 🖽 🕎 | 💪 🖽 🍳 ± | | a | Device overview |
| C III HF compact_1 [Module] General IO tags System constan Catelog information Inputs Module parameters VO addresses Hardware identifier HF: Hea HF: Auto Deactive HF: Leag | s Texts | > 100% | | Device overview Module Image: Compact 1 16 Byte read_1 16 Byte read_2 16 Byte read_2 |
| | mode: 0 | | | |

Fig. 72: Setting module parameters

7.4.7 PROFINET mapping

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



8 Setting

The device can be controlled, read and set via parameter data, process input data, process output data and diagnostic data. The following table shows the data mapping:

| Slot | Channel | Paramete | er data | Process input data | | Process ou | tput data | Diagnostic data | |
|------|------------------|----------|--------------------------|--------------------|----------------------------------|------------|---------------------|-----------------|---------------------|
| | | Bytes | Meaning | Bytes | Meaning | Bytes | Meaning | | |
| 0 | GW | 01 | Parameters GW | | | | | 01 | Diagnostics GW |
| 1 | 0 | 031 | Parameters RFID | 023 | Input data RFID | 023 | Output data RFID | 036 | RFID diagnostics |
| 2 | | 3233 | Length of read data | 24151 | Read data | | | | |
| 3 | | 3435 | Length of write data | | | 24151 | Write data | | |
| 4 | 1 | 3667 | Parameters RFID | 152175 | Input data RFID | 152175 | Output data RFID | 3676 | RFID diagnostics |
| 5 | | 6869 | Length of read data | 176303 | Read data | | | | |
| 6 | | 7071 | Length of write data | | | 176303 | Write data | | |
| 7 | 0 | | | 304339 | Diagnostics RFID channel 0 | | | | |
| | 1 | | | 340375 | Diagnostics RFID channel 1 | | | | |
| 8 | 47 | 7273 | Parameters DXP | 376377 | Input data DXP | 304305 | Output data DXP | 7273 | DXP diagnostics |
| 9 | 47 | | | 378379 | Error mes- sages DXP | | | | |
| 10 | 4 | 7475 | Extended DXP settings | | | | | | |
| 11 | 5 | 7677 | Extended DXP settings | | | | | | |
| 12 | 6 | 7879 | Extended DXP settings | | | | | | |
| 13 | 7 | 8081 | Extended DXP settings | | | | | | |
| 14 | Module status | | | 380381 | Module status | | | | |



8.1 RFID channels — parameter data

| Byte no. | Bit | | | | | | | | | | | | |
|----------|------------|---------------------------|-------------|------------|--------|--------|--------|--------|--|--|--|--|--|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | | |
| Channel | 0 | | - | | | | | | | | | | |
| 0 | Operatio | Operation mode (OMRFID) | | | | | | | | | | | |
| 1 | Select tag | Select tag type (TAGTYPE) | | | | | | | | | | | |
| 2 | Bypass tii | Bypass time (BYPASS) | | | | | | | | | | | |
| 3 | _ | | | | | | | | | | | | |
| 4 | AT | TERM | HB | ANTI | | | | | | | | | |
| 5 | DDI | | | | | | | DXD | | | | | |
| 6 | HFIDLEM | ODE | - | - | | 1 | | | | | | | |
| 7 | Reserved | | | | | | | | | | | | |
| 8 | Comman | d retries (C | RET) | | | | | | | | | | |
| 9 | HF: Comr | mand in Co | ntinuous N | /lode (CCM |) | | | | | | | | |
| 10 | HF: Lengt | th in Contir | nuous Mod | e (LCM) | | | | | | | | | |
| 11 | | | | | | | | | | | | | |
| 12 | HF: Addre | ess in Cont | inuous Mo | de (ACM) | | | | | | | | | |
| 13 | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | |
| 15 | | | | | | | | | | | | | |
| 16 | Reserved | | | | | | | | | | | | |
| 1726 | | | | | | | | | | | | | |
| 27 | Reserved | | | | | | | | | | | | |
| 28 | XCVR8 | XCVR7 | XCVR6 | XCVR5 | XCVR4 | XCVR3 | XCVR2 | XCVR1 | | | | | |
| 29 | XCVR16 | XCVR15 | XCVR14 | XCVR13 | XCVR12 | XCVR11 | XCVR10 | XCVR9 | | | | | |
| 30 | XCVR24 | XCVR23 | XCVR22 | XCVR21 | XCVR20 | XCVR19 | XCVR18 | XCVR17 | | | | | |
| 31 | XCVR32 | XCVR31 | XCVR30 | XCVR29 | XCVR28 | XCVR27 | XCVR26 | XCVR25 | | | | | |
| 32 | Length o | f read data | (RDS) | | | | | | | | | | |
| 33 | | | | | | | | | | | | | |
| 34 | Length o | f write data | (WDS) | | | | | | | | | | |
| 35 | | | | | | | | | | | | | |
| Channel | 1 | | | | | | | | | | | | |
| 3671 | Assignme | ent identica | al to chann | el 0 | | | | | | | | | |



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 |
|-------------------------------|--|
| Operation mode (OMRFID) | 0: Deactivated |
| | 1: HF compact |
| | 2: HF extended |
| | 3: HF bus mode |
| | 4: UHF compact |
| | 5: UHF extended |
| Tag type (TAGTYPE) | 0: Automatic HF tag detection |
| 5 71 3 | 1: NXP Icode SLIX |
| | 2: Fujitsu MB89R118 |
| | 3: TI Tag-it HF-I Plus |
| | 4: Infineon SRF55V02P |
| | 5: NXP Icode SLIX-S |
| | 6: Fujitsu MB89R119 |
| | 7: TI Tag-it HF-I |
| | 8: Infineon SRF55V10P |
| | 9: Reserved |
| | 10: Reserved |
| | 11: NXP Icode SLIX-L |
| | 12: Fujitsu MB89R112 |
| | 13: EM4233SLIC |
| | Read/write heads with firmware from Vx.91 also support: |
| | |
| | 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 41020 ms, |
| | default setting: 200 ms |
| HF: Automatic tuning of | 0: No (automatic tuning off) |
| read/write head (AT) | 1: Yes (automatic tuning on) |
| Termination active (TERM) | 0: Yes (bus terminating resistor activated) |
| remination delive (remi) | 1: No (bus terminating resistor deactivated) |
| | In HF bus mode the bus terminating resistor is activated by default. |
| III - I | |
| HF: Heartbeat read/write head | The device confirms its operational readiness with a signal sent at regular |
| (HB) | intervals to the controller. NOTE: A heartbeat slows down the system since a |
| | heartbeat and another command cannot be executed simultaneously. |
| | 0: No (heartbeat read/write head off) |
| | 1: Yes (heartbeat read/write head on) |
| HF: Multitag (ANTI) | 0: No (multitag mode off) |
| | 1: Yes (multitag mode on) |
| Deactivate all Diags (DDI) | 0: No (all diagnostic messages on) |
| | 1: Yes (all diagnostic messages off) |
| | ו וכא נמו ממטווטגור ווכאמערא טוו |



| Designation | Meaning |
|---|---|
| Deactivate diagnostic HF read/ write head tuning (DXD) | 0: No (diagnostic messages of the read/write head on) 1: Yes (diagnostic messages of the read/write head off) |
| HF: Idle mode (HFIDLEMODE) | Defines which data is to be displayed in idle mode (not available in the EDS file) 0: UID 1: 8 bytes of user memory 2: UID and 8 bytes of user memory 3: UID and 64 bytes of user memory 4: Deactivated |
| 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) | 0x01: Inventory 0x02: Read 0x03: Tag info 0x04: Write |
| HF: Length in Continuous Mode (LCM) | Number of bytes that still have to be read or written in Continuous Mode, default setting: 8 |
| HF: Address in Continuous Mode (ACM) | Start address of the UID or the USER memory area on the tag to be read or writ- ten, default setting: 0 |
| HF bus mode: Activate read/ write head (XCVR0XCVR31) | 0: No (deactivate read/write head) 1: Yes (activate read/write head) In HF bus mode all connected and addressed read/write heads are deactivated by default and must be activated in the parameters. |
| Length of read data (RDS) | Size of the read data, default setting depends on the selected interface and fieldbus |
| Length of write data (WDS) | Size of the write data, default setting depends on the selected interface and fieldbus |



8.1.2 HF applications — 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.

The tag types that can be selected depends on the firmware of the connected read/write head. The firmware version of the read/write head can be read with the **Read/write head identifica-tion** command.



NOTE

With firmware version of the interface up to 3.3.5.0, tags are only displayed in the web server, in the associated DTM as well as in the catalog and GSDML files that were detected by read/write heads with a firmware version up to Vx.90. The tags shown in the table below can be detected irrespective of this.

If a tag is selected that is not supported by the firmware of the connected read/write head, the RFID interface outputs the "Length out of tag specification" error.

The tag type does not have to be selected in single tag applications or when executing inventory commands in multitag applications if the read/write head detects the tags automatically.

| Tag | Firmware status Read/write head | Firmware status Interface | Selectable | Automatic detection possible | Indicated in the web server, DTM, GSDML and catalog files |
|-------------------|------------------------------------|------------------------------|------------|------------------------------------|--|
| 1: NXP Icode SLIX | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | Х |
| | ≥ Vx.91 | ≤ V3.3.5.0 | x | x | X |
| | ≤ Vx.90 | All | х | x | х |
| 2: Fujitsu | ≥ Vx.91 | ≥ V3.4.1.0 | х | x | х |
| MB89R118 | ≥ Vx.91 | ≤ V3.3.5.0 | х | x | х |
| | ≤ Vx.90 | All | х | х | х |
| 3: TI Tag-it | ≥ Vx.91 | ≥ V3.4.1.0 | x | х | х |
| HF-I Plus | ≥ Vx.91 | ≤ V3.3.5.0 | х | х | х |
| | ≤ Vx.90 | All | х | х | х |
| 4: Infineon | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | X |
| SRF55V02P | ≥ Vx.91 | ≤ V3.3.5.0 | x | x | X |
| | ≤ Vx.90 | All | x | x | Х |
| 5: NXP Icode | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| SLIX-S | ≥ Vx.91 | ≤ V3.3.5.0 | x | x | X |
| | ≤ Vx.90 | All | x | _ | Х |
| 6: Fujitsu | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | X |
| MB89R119 | ≥ Vx.91 | ≤ V3.3.5.0 | x | x | X |
| | ≤ Vx.90 | All | x | - | X |
| 7: TI Tag-it HF-I | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | X |
| | ≥ Vx.91 | ≤ V3.3.5.0 | х | x | Х |
| | ≤ Vx.90 | All | x | _ | X |
| 8: Infineon | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | X |
| SRF55V10P | ≥ Vx.91 | ≤ V3.3.5.0 | х | x | Х |
| | ≤ Vx.90 | All | x | _ | Х |
| | | | | | |



| Tag | Firmware status Read/write head | Firmware status Interface | Selectable | Automatic detection possible | Indicated in the web server, DTM, GSDML and catalog files |
|------------------|------------------------------------|------------------------------|------------|------------------------------------|--|
| 11: NXP Icode | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| SLIX-L | ≥ Vx.91 | ≤ V3.3.5.0 | x | x | x |
| | ≤ Vx.90 | All | х | _ | x |
| 12: Fujitsu | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | х |
| MB89R112 | ≥ Vx.91 | ≤ V3.3.5.0 | x | x | x |
| | ≤ Vx.90 | All | x | _ | x |
| 13: EM4233SLIC | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| | ≥ Vx.91 | ≤ V3.3.5.0 | х | x | х |
| | ≤ Vx.90 | All | х | - | х |
| 14: NXP SLIX2 | ≥ Vx.91 | ≥ V3.4.1.0 | х | х | х |
| | ≥ Vx.91 | ≤ V3.3.5.0 | - | х | - |
| | ≤ Vx.90 | All | - | - | _ |
| 15: Tl Tag-it | ≥ Vx.91 | ≥ V3.4.1.0 | _ | х | x |
| HFI Pro | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 16: Turck Sensor | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| Tag | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 17: Infineon | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| SRF55V02S | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | - | _ | _ |
| 18: Infineon | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| SRF55V10S | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 19: EM4233 | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 20: EM4237 | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 21: EM4237 SLIC | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 22: EM4237 SLIX | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | Х |
| | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |
| 23: EM4033 | ≥ Vx.91 | ≥ V3.4.1.0 | x | x | x |
| | ≥ Vx.91 | ≤ V3.3.5.0 | _ | x | _ |
| | ≤ Vx.90 | All | _ | _ | _ |



8.1.3 HF applications — 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:

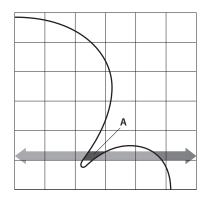


Fig. 73: Detection range of a read/write head

Retaining the default setting

The default setting for the bypass time is 200 ms. In HF bus mode the default value is 48 ms.

- Retaining the default setting: If the commissioning is successful, the parameter does not have to be adjusted to the application. If the commissioning is not successful, an error message will appear.
- If the error message 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 directly on location. The LEDs of the read/write head and the TP status bit indicate whether the read/write head is in the detection range or not.
- Enter the required bypass time.



8.1.4 HF applications — setting HF bus mode



NOTE

In HF bus mode a command is always only meant for one read/write head. While the command is being executed, there is no data communication with other read/write heads.

HF bus mode supports the HF read/write heads from firmware version Vx.90. Continuous HF bus mode supports the HF read/write heads from firmware version Vx.93. The read/write heads can be addressed as follows:

- Automatic addressing
- Annual addressing via the Set HF read/write head address command
- Manual addressing via the Turck Service Tool

The addresses must be assigned per channel from 1 to 32.

Addressing read/write heads automatically



NOTE

Turck recommends making the bus address of the read/write head visible on the device. The label on the cable can be used to mark the address on the read/write head. The appropriate labels can be ordered with ID 6936206.

Read/write heads with the default bus address 68 can be addressed automatically. For this to happen, the corresponding XCVR bit must be set in the parameter data.

- Switch on the RFID interface power supply.
- Activate the required read/write heads in the parameter data via the appropriate XCVR bit.
- Connect the read/write heads to the interface one after the other in a line.
- Addresses are allocated in ascending order to the read/write heads in the order in which the heads were connected. The lowest address is automatically assigned to the next read/write head with the default address 68 that is connected.
- ⇒ The addressing is successful if the LED of the read/write head is permanently lit.



Manually addressing read/write heads — setting the HF read/write head address command



NOTE

Turck recommends making the bus address of the read/write head visible on the device. The label on the cable can be used to mark the address on the read/write head. The appropriate labels can be ordered with ID 6936206.

For information on addressing the read/write heads via the RFID interface with the **Set HF read**/ write head address command see page [▶ 144]. With manual addressing via the **Set HF read**/ write head address command, the read/write heads must not be activated until the addressing is completed.



NOTE

For manual addressing, only one read/write head may be connected to each RFID channel at a time.

 Activate the required read/write heads in the parameter data via the appropriate XCVR bit.

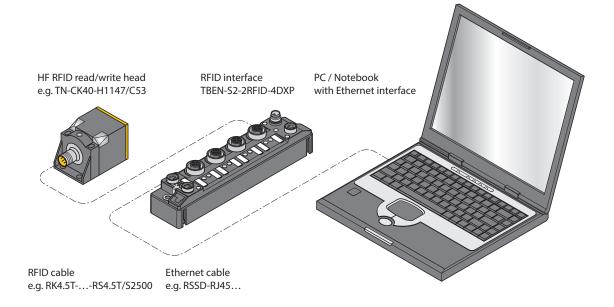


Fig. 74: Connecting the read/write head to a PC via the RFID interface



Manually addressing read/write heads using the Turck Service Tool



NOTE

Turck recommends making the bus address of the read/write head visible on the device. The label on the cable can be used to mark the address on the read/write head. The appropriate labels can be ordered with ID 6936206.

The following accessories are required to address the read/write heads in HF bus mode via the Turck Service Tool. Accessories are not supplied with the device and must be ordered separately.

Suitable interface converter, e.g. STW-RS485-USB (ID 7030354)

- Suitable power supply unit, e.g. STW-RS485-USB-PS (ID 7030355)
 - Connect the read/write head to the interface converter using a suitable connection cable (e.g. RK4.5T-2/S2500) according to the following color coding:

| STW-RS485-USB | /S2500 plug connectors | /S2501 plug connectors | /S2503 plug connectors |
|---------------|---------------------------|---------------------------|---------------------------|
| VCC | Brown (BN) | Brown (BN) | Red (RD) |
| GND | Blue (BU) | Blue (BU) | Black (BK) |
| RS485-A | White (WH) | Black (BK) | White (WH) |
| RS485-B | Black (BK) | White (WH) | Blue (BU) |

- Connect a USB cable to the interface converter (USB1.1 type B).
- Connect the open end of the USB cable to a free USB port on the PC (USB1.1 type A).
- Set the switches on the side of the interface converter for the termination to [ON].
- Connect the interface converter via the STW... power supply unit to a power supply.

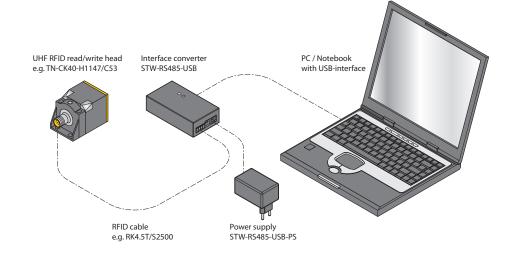


Fig. 75: Connecting the read/write head to a PC via the interface converter



- Open the Turck Service Tool.
- Click Actions or press [F4].
- Click Set HF RFID reader bus address.

| Turck Service | Tool, Vers. 3.0.1 | | | | | | | - | | - • × |
|----------------|-----------------------|---|-----------|----------------|-----|------|------------|---------|---------|----------|
| Your Glo | bal Automation Pa | rtner | | | | | | | TUI | ск |
| Search (F5) | Change (F2) Wink (F3 |) Actions (F4) | Clipboard | EN Language | - | | X Close | | | |
| No. MAC addr | ess Name | Network Factory Set clock Set HF R | reset | s address | vay | Mode | Device | Version | Adapter | Protocol |
| | | | | | | | | | | |
| Press "Search" | button to detect devi | | | | | | | | | |

Fig. 76: Selecting a function — set HF RFID reader bus address

The HF-RFID Reader Setup Tool window opens.

- Select the **COM port** to which the interface converter is connected.
- Click Read.
- ⇒ The found read/write head is displayed in the **Status message**.

| 📕 HF RFID Reader S | etup Tool | |
|--------------------|--|--|
| Serial port | COM4 | |
| Baud rate | 115200 ▼ | |
| Address | 0 | |
| | Read | |
| | Change | |
| | Set Default | |
| Status message | Reader found. Address: 0 Baud rate: 115200 | |

Fig. 77: Window — HF RFID Reader Setup Tool



- Enter the required **Address**.
- Click Change.
- ⇒ The new set address is displayed in the **Status message**.

| 📕 HF RFID Reader S | Setup Tool | |
|--------------------|---|---|
| Serial port | COM4 | |
| Baud rate | 115200 ▼ | |
| Address | 3 | |
| | Read | |
| | Change | |
| | Set Default | |
| Status message | Address changed to: 3 Baud rate changed to: 115200 | ו |

Fig. 78: Changing the read/write head address

 Activate the required read/write heads in the parameter data via the appropriate XCVR bit.



8.1.5 UHF applications — setting Continuous Presence Sensing Mode

- Set adaptions to the presence sensing behavior in the DTM.
- Optional: Set the grouping of the EPCs via the Start address parameter:
 0: Grouping inactive

1: Grouping active (same EPC is not detected, only the counter in the header is incremented)

- Execute the **Continuous Presence Sensing Mode** command.
- ⇒ The UHF-Reader head is switched to Presence Sensing Mode and sends all received data to the interface as soon as at least one tag is present in the detection range.
- ⇒ The data received by the UHF reader is stored in the FIFO memory of the interface.
- Send the Idle command (0x0000) to then read data from the buffer of the interface.



NOTE The **Continuous Presence Sensing Mode** command also stays active after the idle command is sent.

To pass on data from the FIFO memory of the interface to the controller, execute the Read buffer (Cont. mode) command (0x0011). The length of the data must be less than or equal to the value of the available data bytes (BYFI). Depending on the length of the data, the data is no longer used for grouping.



NOTE

With active grouping: Do not read data from the buffer until the number of available bytes is stable. If stable data has been collected, the command can be ended by a reset as the grouping is no longer based on the collected data, meaning that old EPCs are detected again.

- Do not perform a reset until the data has been read successfully from the buffer.
- ► To stop Continuous Presence Sensing Mode and clear the FIFO memory of the interface, send the **Reset** command (0x0800).

8.1.6 UHF applications — transferring reader settings

The backup function enables the settings of a UHF reader to be transferred, e.g. when a device is replaced.

- Execute the **Backup settings UHF read/write head** command.
- ⇒ The settings of the UHF reader are stored in the interface.
- ▶ Replace the UHF reader.
- Execute the **Restore settings UHF read/write head** command.
- ⇒ The data stored in the interface is transferred to the UHF reader.



8.2 RFID channels — process input data

Byte no. Bit PROFINET Modbus 7 6 5 4 3 2 1 0 EtherNet/ IP Channel 0 n + 0 0 Response code (RESC) incl. ERROR and BUSY n + 1 1 2 n + 2 Loop counter for rapid processing (RCNT) 3 n + 3 Reserved 4 n + 4 TNC1 TRE1 PNS1 XD1 ТΡ n + 5 5 CMON TON n + 6 6 Length (LEN) 7 n + 7 n + 8 8 Error code (ERRC) 9 n + 9 n + 10 10 Tag counter (TCNT) n + 11 11 n + 12 24 Read data Byte 0 n + 13 25 Read data Byte 1 n + 14 Read data Byte 2 26 n + 15 27 Read data Byte 3 n + 16 28 Read data Byte 4 n + 17 29 Read data Byte 5 n + 18 30 Read data Byte 6 n + 19 31 Read data Byte 7 ••• n + 139 151 Read data Byte 127 **Channel 1** n + 140... 152...303 Assignment identical to channel 0 279

Process input data — HF compact and UHF compact modes



Process input data — HF extended and UHF extended modes

| Byte no. | | Bit | | | | | | | |
|----------------|---------------------------|------------|----------------|--------------|----------|---|---|------|-----|
| PROFINET | Modbus EtherNet/ IP | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Channel 0 | | | | | | | | | |
| n + 0 | 0 | Response | code (RESC) | incl. ERROR | and BUSY | | | | |
| n + 1 | 1 | | | | | | | | |
| n + 2 | 2 | Loop cour | nter for rapio | d processing | (RCNT) | | | | |
| n + 3 | 3 | Reserved | | | | | | | |
| n + 4 | 4 | TNC1 | TRE1 | PNS1 | XD1 | | | | ТР |
| n + 5 | 5 | | | | | | | CMON | TON |
| n + 6 | 6 | Length (LE | N) | · | | | | | |
| n + 7 | 7 | | | | | | | | |
| n + 8 | 8 | Error code | (ERRC) | | | | | | |
| n + 9 | 9 | | | | | | | | |
| n + 10 | 10 | Tag count | er (TCNT) | | | | | | |
| n + 11 | 11 | | | | | | | | |
| n + 12 | 12 | Data (byte | s) available | (BYFI) | | | | | |
| n + 13 | 13 | | | | | | | | |
| n + 14 | 14 | Read fragr | nent No. (RF | N) | | | | | |
| n + 15 | 15 | Write frag | ment No. (W | /FN) | | | | | |
| n + 16 | 16 | Reserved | | | | | | | |
| n + 17 | 17 | Reserved | | | | | | | |
| n + 18 | 18 | Reserved | | | | | | | |
| n + 19 | 19 | Reserved | | | | | | | |
| n + 20 | 24 | Read data | Byte 0 | | | | | | |
| n + 21 | 25 | Read data | Byte 1 | | | | | | |
| n + 22 | 26 | Read data | Byte 2 | | | | | | |
| n + 23 | 27 | Read data | Byte 3 | | | | | | |
| n + 24 | 28 | Read data | Byte 4 | | | | | | |
| n + 25 | 29 | Read data | Byte 5 | | | | | | |
| n + 26 | 30 | Read data | Byte 6 | | | | | | |
| n + 27 | 31 | Read data | Byte 7 | | | | | | |
| | | | | | | | | | |
| n + 147 | 151 | Read data | Byte 127 | | | | | | |
| Channel 1 | | | | | | | | | |
| n + 148 295 | 152303 | Assignme | nt identical 1 | to channel (|) | | | | |



Process input data — HF bus mode

| Byte no. | | Bit | | | | | | | | | | | |
|----------------|---------------------------|-------------|----------------|-------------|-----------|------|------|------|------|--|--|--|--|
| PROFINET | Modbus EtherNet/ IP | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | | | | |
| Channel 0 | | | | | | | | | | | | | |
| n + 0 | 0 | Response of | ode (RESC) | incl. ERROR | and BUSY) | | | | | | | | |
| n + 1 | 1 | | | | | | | | | | | | |
| n + 2 | 2 | Loop coun | ter for rapic | processing | (RCNT) | | | | | | | | |
| n + 3 | 3 | Reserved | | | | | | | | | | | |
| n + 4 | 4 | TNC1 | TRE1 | PNS1 | XD1 | | | | TP | | | | |
| n + 5 | 5 | | | | | | | CMON | TON | | | | |
| n + 6 | 6 | Length (LE | N) | | | | | | | | | | |
| n + 7 | 7 | | | | | | | | | | | | |
| n + 8 | 8 | Error code | (ERRC) | | | | | | | | | | |
| n + 9 | 9 | | | | | | | | | | | | |
| n + 10 | 10 | Tag counte | er (TCNT) | | | | | | | | | | |
| n + 11 | 11 | | | | | | | | | | | | |
| n + 12 | 12 | Data (byte | s) available | (BYFI) | | | | | | | | | |
| n + 13 | 13 | | | | | | | | | | | | |
| n + 14 | 14 | Read fragn | nent No. (RF | N) | | | | | | | | | |
| n + 15 | 15 | Write fragr | nent No. (W | FN) | | | | | | | | | |
| n + 16 | 16 | Reserved | | | | | | | | | | | |
| n + 17 | 17 | Reserved | | | | | | | | | | | |
| n + 18 | 18 | Reserved | | | | | | | | | | | |
| n + 19 | 19 | Reserved | | | | | | | | | | | |
| n + 20 | 20 | TP8 | TP7 | TP6 | TP5 | TP4 | TP3 | TP2 | TP1 | | | | |
| n + 21 | 21 | TP16 | TP15 | TP14 | TP13 | TP12 | TP11 | TP10 | TP9 | | | | |
| n + 22 | 22 | TP24 | TP23 | TP22 | TP21 | TP20 | TP19 | TP18 | TP17 | | | | |
| n + 23 | 23 | TP32 | TP31 | TP30 | TP29 | TP28 | TP27 | TP26 | TP25 | | | | |
| n + 24 | 24 | Read data | Byte 0 | | | | | | | | | | |
| n + 25 | 25 | Read data | Byte 1 | | | | | | | | | | |
| n + 26 | 26 | Read data | Byte 2 | | | | | | | | | | |
| n + 27 | 27 | Read data | Byte 3 | | | | | | | | | | |
| n + 28 | 28 | Read data | Byte 4 | | | | | | | | | | |
| n + 29 | 29 | Read data | Byte 5 | | | | | | | | | | |
| n + 30 | 30 | Read data | Byte 6 | | | | | | | | | | |
| n + 31 | 31 | Read data | Byte 7 | | | | | | | | | | |
| | | | | | | | | | | | | | |
| n + 151 | 151 | Read data | Byte 127 | | | | | | | | | | |
| Channel 1 | | | | | | | | | | | | | |
| n + 152 303 | 152303 | Assignmer | it identical t | o channel 0 | | | | | | | | | |



8.2.1 Meaning of the status bits

| Designation | Meaning |
|---|---|
| Response code (RESC) | Display of the last command executed Contains in bit 14: ERROR 0: No (the last command was executed successfully) 1: Yes (an error occurred during command execution.) |
| | Contains in bit 15: BUSY 0: No (execution of a command completed.) 1: Yes (command active but not yet completed; system is waiting for execution, e.g. on tag within the detection range) |
| Loop counter for rapid processing (RCNT) | Output of the loop counter for the selected command code |
| Expected read/write head not connected (TNC1) | 0: No (read/write head expected by system connected) 1: Yes (read/write head expected by the system not connected (HF bus mode: At least one read/write head expected by system not connected) |
| Error reported by read/write head (TRE1) | 0: No (no error) 1: Yes (fault signal of the read/write head) (HF bus mode: fault signal from at least one read/write head) |
| Parameter not supported by read/write head (PNS1) | 0: No (no error) 1: Yes (parameter not supported by read/write head) (HF bus mode: Parameter not supported by at least one read/write head) |
| Read/write head not tuned (XD1) | 0: No (no error) 1: Yes (read/write head not tuned) (HF bus mode: at least one of the read/write heads not tuned) |
| Tag in the detection range of read/write head (TP) | 0: No (no tag in the detection range of the read/write head) 1: Yes (tag in the detection range of the read/write head) (HF bus mode: tag in the detection range of at least one read/write head) |
| HF read/write head switched on (TON) | 0: No (read/write head switched off) 1: Yes (read/write head switched on (HF bus mode: at least one read/write head switched on) |
| Continuous (Presence Sensing) Mode active (CMON) | 0: No (Continuous Mode not active) 1: Yes (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 (ERROR) is set |
| Tag counter (TCNT) | Display of the detected tags. With HF multitag applications and UHF, the rising edges of the tags that are read by an Inventory command are counted. In HF single-tag applications, all tags that are detected by the read/write head are counted. A tag that moves along the read/write head is not counted again if it only leaves the detection range momentarily and re-enters it (within the set bypass time). If a tag continuously remains within the detection range, it is also only counted once. Exceptions: Continuous Mode in bus mode is active or Continuous Mode with start address = 3 is active. The tag counter is reset by the following commands: Inventory (exception: HF single-tag applications) Continuous Mode Continuous Presence Sensing Mode |
| | Reset |



| Designation | Meaning |
|--|--|
| Data (bytes) available (BYFI) (available with HF Advanced and UHF Advanced only) | Shows the number of bytes in the FIFO memory of the interface. 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) (available with HF Advanced and UHF Advanced only) | 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 process input data. After the confirmation, the next fragment is read. 0: No fragmentation In idle mode, the size of the fragments is specified. When a read command is issued, the current fragment number of the read data is indicated. |
| 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. When a write command is issued, the current fragment number of the written data is indicated. |
| TP1TP32 | Tag in the detection range of the connected read/write head (available in HF bus mode only) |
| Read data | User-defined read data |

8.2.2 Tag in detection range (TP) — using bit or pre-loading the command

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

Apart from with some variants of Continuous Mode, the bit in HF applications is set by default in all operation modes as well as in idle mode.

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.



NOTE

If the HF read/write head detects a new tag in the detection range, the **Tag present bit** (TP) and the data (UID and/or read data) are set via the **HF: Idle mode** (UID and/or read data) are displayed simultaneously. If two tags are detected in quick succession, the TP bit may remain set. The data of the second tag (UID and/or read data) is displayed.



8.3 RFID channels — process output data

Process output data — HF compact and UHF compact operating modes

| Byte no. | | Bit | | | | | | | | |
|----------------|---------------------------|-------------|--------------------|---------------|-------------|----------------|-----|---|---|--|
| PROFINET | Modbus EtherNet/ IP | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| Channel 0 | | | | | 1 | | | | | |
| n + 0 | 0 | Command | ommand code (CMDC) | | | | | | | |
| n + 1 | 1 | | | | | | | | | |
| n + 2 | 2 | Loop coun | ter for rapid | processing | (RCNT) | | | | | |
| n + 3 | 3 | Memory ar | ea (DOM) — | - only availa | ble with UF | IF application | ons | | | |
| n + 4 | 4 | Start addre | ss (ADDR) | | | | | | | |
| n + 5 | 5 | | | | | | | | | |
| n + 6 | 6 | | | | | | | | | |
| n + 7 | 7 | | | | | | | | | |
| n + 8 | 8 | Length (LE | N) | | | | | | | |
| n + 9 | 9 | | | | | | | | | |
| n + 10 | 10 | Length of l | JID/EPC (SO | UID) | | | | | | |
| n + 11 | 11 | Reserved | | | | | | | | |
| n + 12 | 24 | Write data | Byte 0 | | | | | | | |
| n + 13 | 25 | Write data | Byte 1 | | | | | | | |
| n + 14 | 26 | Write data | Byte 2 | | | | | | | |
| n + 15 | 27 | Write data | Byte 3 | | | | | | | |
| n + 16 | 28 | Write data | Byte 4 | | | | | | | |
| n + 17 | 29 | Write data | Byte 5 | | | | | | | |
| n + 18 | 30 | Write data | Byte 6 | | | | | | | |
| n + 19 | 31 | Write data | Byte 7 | | | | | | | |
| | | | | | | | | | | |
| n + 139 | 151 | Write data | Byte 127 | | | | | | | |
| Channel 1 | | | | | | | | | | |
| n + 140 279 | 152303 | Assignmen | t identical t | o channel 0 | | | | | | |



Process output data — HF Advanced and UHF Advanced operating modes

| Byte no. | | Bit | | | | | | | |
|----------------|---------------------------|-------------|---------------|---------------|--------------|----------------|-----|---|---|
| PROFINET | Modbus EtherNet/ IP | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Channel 0 | | | | | | | | | |
| n + 0 | 0 | Command | code (CMD | C) | | | | | |
| n + 1 | 1 | | | | | | | | |
| n + 2 | 2 | Loop coun | ter for rapid | processing | (RCNT) | | | | |
| n + 3 | 3 | Memory ar | ea (DOM) — | – only availa | able with UH | IF application | ons | | |
| n + 4 | 4 | Start addre | ss (ADDR) | | | | | | |
| n + 5 | 5 | | | | | | | | |
| n + 6 | 6 | | | | | | | | |
| n + 7 | 7 | | | | | | | | |
| n + 8 | 8 | Length (LE | N) | | | | | | |
| n + 9 | 9 | | | | | | | | |
| n + 10 | 10 | Length of l | JID/EPC (SO | UID) | | | | | |
| n + 11 | 11 | Reserved | | | | | | | |
| n + 12 | 12 | Timeout (T | OUT) | | | | | | |
| n + 13 | 13 | | | | | | | | |
| n + 14 | 14 | Read fragm | nent No. (RF | N) | | | | | |
| n + 15 | 15 | Write fragn | nent No. (W | FN) | | | | | |
| n + 16 | 16 | Reserved | | | | | | | |
| n + 17 | 17 | Reserved | | | | | | | |
| n + 18 | 18 | Reserved | | | | | | | |
| n + 19 | 19 | Reserved | | | | | | | |
| n + 20 | 24 | Write data | Byte 0 | | | | | | |
| n + 21 | 25 | Write data | Byte 1 | | | | | | |
| n + 22 | 26 | Write data | Byte 2 | | | | | | |
| n + 23 | 27 | Write data | Byte 3 | | | | | | |
| n + 24 | 28 | Write data | Byte 4 | | | | | | |
| n + 25 | 29 | Write data | Byte 5 | | | | | | |
| n + 26 | 30 | Write data | Byte 6 | | | | | | |
| n + 27 | 31 | Write data | Byte 7 | | | | | | |
| | | | | | | | | | |
| n + 147 | 151 | Write data | Byte 127 | | | | | | |
| Channel 1 | | | | | | | | | |
| n + 148 295 | 152303 | Assignmen | t identical t | o channel (|) | | | | |



Process output data — HF bus mode operating mode

| Byte no. | | Bit | | | | | | | |
|----------------|---------------------------|-------------|---------------|---------------|--------------|----------------|--------------|-----|---|
| PROFINET | Modbus EtherNet/ IP | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Channel 0 | | | | | | | | - | |
| n + 0 | 0 | Command | code (CMD | C) | | | | | |
| n + 1 | 1 | | | | | | | | |
| n + 2 | 2 | Loop coun | ter for rapid | processing | (RCNT) | | | | |
| n + 3 | 3 | Memory ar | ea (DOM) — | - only availa | able with UH | HF application | ons | | |
| n + 4 | 4 | Start addre | ss (ADDR) | | | | | | |
| n + 5 | 5 | | | | | | | | |
| n + 6 | 6 | | | | | | | | |
| n + 7 | 7 | | | | | | | | |
| n + 8 | 8 | Length (LE | N) | | | | | | |
| n + 9 | 9 | | | | | | | | |
| n + 10 | 10 | Length of l | JID/EPC (SO | UID) | | | | | |
| n + 11 | 11 | Reserved | | | | | | | |
| n + 12 | 12 | Timeout (T | OUT) | | | | | | |
| n + 13 | 13 | | | | | | | | |
| n + 14 | 14 | Read fragm | nent No. (RF | N) | | | | | |
| n + 15 | 15 | Write fragn | nent No. (W | FN) | | | | | |
| n + 16 | 16 | Reserved | | | | | | | |
| n + 17 | 17 | Reserved | | | | | | | |
| n + 18 | 18 | Reserved | | | | | | | |
| n + 19 | 19 | Reserved | | | | | | | |
| n + 20 | 20 | Read/write | head addre | ess (ANTN) - | — only avail | able with H | F applicatio | ons | |
| n + 21 | 21 | Reserved | | | | | | | |
| n + 22 | 22 | Reserved | | | | | | | |
| n + 23 | 23 | Reserved | | | | | | | |
| n + 24 | 24 | Write data | Byte 0 | | | | | | |
| n + 25 | 25 | Write data | Byte 1 | | | | | | |
| n + 26 | 26 | Write data | Byte 2 | | | | | | |
| n + 27 | 27 | Write data | Byte 3 | | | | | | |
| n + 28 | 28 | Write data | Byte 4 | | | | | | |
| n + 29 | 29 | Write data | Byte 5 | | | | | | |
| n + 30 | 30 | Write data | Byte 6 | | | | | | |
| n + 31 | 31 | Write data | Byte 7 | | | | | | |
| | | | | | | | | | |
| n + 151 | 151 | Write data | Byte 127 | | | | | | |
| Channel 1 | | | | | | | | | |
| n + 152 303 | 152303 | Assignmen | t identical t | o channel 0 | | | | | |



8.3.1 Meaning of the command bits

| Description | Meaning |
|---|--|
| Command code (CMDC) | Entering of the command code |
| Loop counter for rapid pro- cessing (LCNT) | Loop counter for repeated processing of a command 0: Loop counter off |
| Memory area (DOM) — usable for UHF applications only (with HF applications, the setting has no effect) | 0: Kill password 1: EPC 2: TID 3: USER area 4: Access password 5: PC (defines the response length of the EPC) |
| Start address (ADDR) | Specification of the address in bytes from which a command is to be executed in the memory of the tag. Can be used as an alternative to activating the grouping. |
| Length (LEN) | Entering the length of the data to be read or written |
| Length of UID/EPC (SOUID) in bytes | Inventory command: 0: The actual length (bytes) of the transferred UID or EPC is transferred with an inventory. > 0 in HF applications: 8: Read out or write 8 bytes UID 17: Read out or write an abbreviated UID > 8: Fault signal |
| | -1: NEXT mode (only available 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. > 0 in UHF applications: EPC is output in full. Other commands (e.g. read or write): The UID or EPC size should be entered in bytes if a particular tag is to be read, written or protected. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length depends on the command used. 0: No entry of a UID/EPC for executing the command. Only one tag can be located in the detection range of the read/write device. > 0: EPC length of the tag that is to be read, written or protected if an EPC is present in the write data. -1: NEXT mode (only available in HF single-tag applications): A tag is always only read, written or protected if the UID or EPC is different from the UID or EPC of the last read or written tag. |
| 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 (HF applications): No timeout, command stays active until it is executed 0 (UHF applications): No timeout, command stays active until the first tag was read 1: Command is executed once (if there is already a tag in the detection range) > 165535: Time in ms HF inventory: Command is executed once in the specified time (exception: Continuous Mode) UHF inventory: Command remains active for the entire specified time |



| Description | Meaning |
|--------------------------|--|
| 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 process input data. After the confirmation, the next fragment is read. 0: No fragmentation In idle mode, the size of the fragments is specified. When a read command is issued, the fragment No. of the access to the read data of the next fragment is set. |
| 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. When a write command is issued, the fragment No. for the next fragment for the data to be written is set. |
| Read/write head address | HF bus mode: Address of the read/write head, if several bus-capable read/write heads are connected UHF: Values are ignored or set automatically. |
| Write data | User-defined write data or entry of a UID or EPC to select a specific tag for the command execution (if the "UID/EPC (SOUID) length" command parameter is greater than 0) |



8.4 Digital channels — parameter data

| Byte no. | Bit | | | | | | | | |
|----------|------|------|------|------|---|---|---|---|--|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| 0 | SRO7 | SRO6 | SRO5 | SRO4 | | | | | |
| 1 | OE7 | OE6 | OE5 | OE4 | | | | | |

8.4.1 Meaning of the parameter bits

Default values are shown in **bold**.

| Designation | Meaning |
|---|---|
| Manual reset after overcurrent (SRO) | 0: No (the output automatically switches back on after an overcurrent.) 1: Yes (the output only switches back on after the overcurrent is removed and the switch signal is reset.) |
| Activate output (OE) | 0: No (output deactivated) 1: Yes (output activated) |

8.5 Digital channels — setting extended parameters (EXT LEAN)

| Byte no. | Bit | | | | | | | | |
|----------|-------------|------------|----------------|---|---|---|---|---|--|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 | |
| 0 | DIFT | DMOD (Byte | DMOD (Byte 17) | | | | | | |
| 1 | IST (Byte 0 | .8) | | | | | | | |

8.5.1 Meaning of the parameter bits

Default values are shown in **bold**.

| Designation | Meaning |
|------------------------------|--|
| Input filter (DIFT) | The input filter determines how long a change at the input must be present be- fore it is transferred to the input data. 0: 0.2 ms 1: 3 ms |
| Extended digital mode (DMOD) | 0: Deactivated 1: Digital filter and impulse stretch activated |
| Impulse stretch (IST) | Impulse stretch: 02550 ms (adjustable in 10 ms steps), default value: 10 ms |



8.6 Digital channels — process input data

| Byte no. | Bit | | | | | | | |
|----------|------|------|------|------|---|---|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | DXP7 | DXP6 | DXP5 | DXP4 | | | | |
| 1 | | | | | | | | |

8.6.1 Meaning of the status bits

| Designation | Meaning | | |
|-------------|---|--|--|
| DXP4 | 0: Off (digital channel 1 not active) 1: On (digital channel 1 active) | | |
| DXP5 | 0: Off (digital channel 2 not active) 1: On (digital channel 2 active) | | |
| DXP6 | 0: Off (digital channel 3 not active) 1: On (digital channel 3 active) | | |
| DXP7 | 0: Off (digital channel 4 not active) 1: On (digital channel 4 active) | | |

8.7 Digital channels — process output data

| Byte no. | Bit | | | | | | | |
|----------|------|------|------|------|---|---|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | DXP7 | DXP6 | DXP5 | DXP4 | | | | |
| 1 | | | | | | | | |

8.7.1 Meaning of the command bits

Default values are shown in **bold**.

| Designation | Meaning | | | |
|-------------|---|--|--|--|
| DXP4 | 0: Off (switch off digital channel 1) 1: On (switch on digital channel 1) | | | |
| DXP5 | 0: Off (switch off digital channel 2) 1: On (switch on digital channel 2) | | | |
| DXP6 | 0: Off (switch off digital channel 3) 1: On (switch on digital channel 3) | | | |
| DXP7 | 0: Off (switch off digital channel 4) 1: On (switch on digital channel 4) | | | |



8.8 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.

| Inventory 0 x0001 1 x x x x x x Inventory with loop counter 0x2001 8193 x x x x x Read 0x0002 2 x x x x x x Read 0x0004 4 x x x x x x Write 0x0004 4 x x x x x x Write with loop counter 0x2004 8196 x x x x x x Change EPC length and write new 0x0007 7 - - - x x x Read buffer (Cont. mode) 0x0010 16 - x* x**** - x x x Read buffer (Cont. mode) 0x0011 17 - x x**** - x x x x x x x x x x x x x x x x x x x | Command | Comma | nd code | possible fo | r | | | |
|--|--|--------|---------|-------------|----|------|---|---|
| Inventory 0 x0001 1 x x x x x x Inventory with loop counter 0x2001 8193 x x x x x Read 0x0002 2 x x x x x x Read 0x0004 4 x x x x x x Write 0x0004 4 x x x x x x Write with loop counter 0x2004 8196 x x x x x x Change EPC length and write new 0x0007 7 - - - x x x Read buffer (Cont. mode) 0x0010 16 - x* x**** - x x x Read buffer (Cont. mode) 0x0011 17 - x x**** - x x x x x x x x x x x x x x x x x x x | | hex. | dec. | | | | | |
| Inventory with loop counter 0x2001 8193 x | Idle | 0x0000 | 0 | х | х | х | х | х |
| Read 0x0002 2 x x x x x Read with loop counter 0x2002 8194 x x x x x Write 0x0004 4 x x x x x x Write 0x0007 7 - - - x x Change EPC length and write new 0x0007 7 - - - x x Continuous Mode 0x0001 16 - x* x **** - x Read buffer (Cont. mode) 0x0011 17 - x x**** - x Read buffer (Cont. mode) 0x0012 18 - x**** - x Cycostniuous 0x0012 18 - x**** - x Delete Buffer (Cont. mode) 0x0013 19 - x x - - Read/write head off 0x0040 64 x <t< td=""><td>Inventory</td><td>0x0001</td><td>1</td><td>х</td><td>х</td><td>х</td><td>х</td><td>X</td></t<> | Inventory | 0x0001 | 1 | х | х | х | х | X |
| Read with loop counter 0x2002 8194 x x x x x x Write 0x0004 4 x x x x x x Write with loop counter 0x2004 8196 x x x x x x Change EPC length and write new EPC (UHF) 0x0007 7 - - - x x Continuous Mode 0x0010 16 - x* x**** - x Read buffer (Cont. mode) 0x0011 17 - x ***** - x Read buffer (Cont. mode) with loop 0x0012 18 - x* x**** - x Opelete Buffer (Cont. mode) 0x0020 32 - - - x x - x UHF Continuous Presence Sensing) 0x0020 32 - - - x x UHF Continuous Presence Sensing 0x0040 64 | Inventory with loop counter | 0x2001 | 8193 | х | х | х | х | Х |
| Write 0x0004 4 x x x x x x x Write with loop counter 0x2004 8196 x x x x x x Write with loop counter 0x0007 7 - - - x x EPC (UHF) 0x0008 8 x x x x x x Continuous Mode 0x0010 16 - x*** - x Read buffer (Cont. mode) 0x0011 17 - x x*** - x Read buffer (Cont. mode) 0x0012 18 - x* x*** - x Charge EPC (Iont. mode) 0x0013 19 - x x - x UHF Continuous Presence Sensing 0x0020 32 - - - x Mode 0x0041 65 x x x x x HF read/write head status/error <td>Read</td> <td>0x0002</td> <td>2</td> <td>Х</td> <td>Х</td> <td>Х</td> <td>Х</td> <td>Х</td> | Read | 0x0002 | 2 | Х | Х | Х | Х | Х |
| Write with loop counter0x20048196xxxxxxChange EPC length and write new EPC (UHF)0x00077xxWrite and Verify0x00088xxxxxxContinuous Mode0x001016-x*x****-xRead buffer (Cont. mode)0x001117-xx****-xRead buffer (Cont. mode) with loop counter0x01218-x*x****-xStop Continuous (Presence Sensing) Mode0x001319-xx-xDelete Buffer (Cont. mode)0x001319-xxxHF continuous Presence Sensing | Read with loop counter | 0x2002 | 8194 | х | х | Х | Х | X |
| Change EPC length and write new EPC (UHF)0x00077xxWrite and Verify0x00088xxxxxxContinuous Mode0x01016-x*x****-xRead buffer (Cont. mode)0x01117-xx****-xRead buffer (Cont. mode) with loop0x20118209-xx****-xRead buffer (Cont. mode)0x001218-x*x****-xStop Continuous0x001319-xx-x(Presence Sensing) Mode0x001319-xx-xDelete Buffer (Cont. mode)0x001032xMode0x001064xxxxxHF read/write head off0x00464xxxxxxGet UHF read/write head status/error0x02028258xxTag info0x005080xxxxxxxDirect read/write head command0x006096xxxxxxGet HF read/write head command0x0070112Get HF read/write head address0x0071113xxxTune HF read/wr | Write | 0x0004 | 4 | Х | Х | Х | Х | Х |
| EPC (UHF) Write and Verify 0x0008 8 x x x x x Continuous Mode 0x0010 16 - x* x**** - x Read buffer (Cont. mode) 0x0011 17 - x x**** - x Read buffer (Cont. mode) with loop 0x012 18 - x x**** - x Continuous 0x0012 18 - x* x**** - x Cher Sensing) Mode 0x0012 18 - x* x*** - x Delete Buffer (Cont. mode) 0x013 19 - x x - x UHF Continuous Presence Sensing 0x0020 32 - - - - - Mode 0x0040 64 x | Write with loop counter | 0x2004 | 8196 | Х | Х | Х | Х | Х |
| Continuous Mode0x001016- x^* x^{***} -xRead buffer (Cont. mode)0x001117-x x^{***} -xRead buffer (Cont. mode) with loop0x20118209-x x^{***} -xStop Continuous0x001218-x x^{***} -x(Presence Sensing) Mode0x001319-xx-xDelete Buffer (Cont. mode)0x002032xUHF Continuous Presence Sensing0x004064xxxxxxMode0x004165xxxxxxxGet UHF read/write head off0x00428258xxGet UHF read/write head error/status0x205080xxxxxxTag info0x005080xxxxxxxDirect read/write head command0x006096xxxxxxDirect read/write head address0x0070112Get HF read/write head address0x0071113xxxxxIncert HF read/write head0x0080128xxxxTune HF read/write head0x0080128xxx <td< td=""><td>Change EPC length and write new EPC (UHF)</td><td>0x0007</td><td>7</td><td>_</td><td>_</td><td>_</td><td>х</td><td>Х</td></td<> | Change EPC length and write new EPC (UHF) | 0x0007 | 7 | _ | _ | _ | х | Х |
| Read buffer (Cont. mode) 0x0011 17 - x x*** - x Read buffer (Cont. mode) with loop counter 0x2011 8209 - x x*** - x Stop Continuous (Presence Sensing) Mode 0x0012 18 - x* x*** - x Delete Buffer (Cont. mode) 0x0013 19 - x x - x UHF Continuous Presence Sensing Mode 0x0020 32 - - - - x HF read/write head off 0x0040 64 x x x x x x Get UHF read/write head status/error 0x0422 8258 - - - x x Get UHF read/write head error/status 0x2020 8272 x x x x x Tag info 0x0050 80 x x x x x x Direct read/write head command 0x0060 96 x x x x x x Get HF read/write head 0x0070 | Write and Verify | 0x0008 | 8 | Х | Х | Х | Х | Х |
| Read buffer (Cont. mode) with loop counter0x20118209-xx****-xStop Continuous (Presence Sensing) Mode0x001218-x*x****-xDelete Buffer (Cont. mode)0x01319-xx-xUHF Continuous Presence Sensing Mode0x002032xWide0x004064xxxxHF read/write head off0x004064xxxxxxxGet UHF read/write head status/error0x004266Get UHF read/write head error/status0x20428258xxxxTag info0x005080xxxxxxxxxxDirect read/write head command0x006096xxxxxxxxDirect read/write head0x0070112Get HF read/write head address0x0071113xxx <td>Continuous Mode</td> <td>0x0010</td> <td>16</td> <td>_</td> <td>X*</td> <td>X***</td> <td>_</td> <td>Х</td> | Continuous Mode | 0x0010 | 16 | _ | X* | X*** | _ | Х |
| counterStop Continuous (Presence Sensing) Mode0x001218-x*x****-xDelete Buffer (Cont. mode)0x001319-xx-xUHF Continuous Presence Sensing Mode0x002032xHF read/write head off0x004064xxxxRead/write head identification0x004165xxxxxxGet UHF read/write head status/error0x004266xxGet UHF read/write head error/status0x20428258xxxGet UHF read/write head error/status0x204080xxxxxxTag info0x005080xxxxxxxDirect read/write head command0x006096xxxxxxDirect read/write head command0x0070112xxxxGet HF read/write head address0x0071113xSet HF read/write head0x0080128xxxxTune HF read/write head0x0080128xxxxTune HF read/write head0x0080128xxxx <td>Read buffer (Cont. mode)</td> <td>0x0011</td> <td>17</td> <td>_</td> <td>х</td> <td>x***</td> <td>_</td> <td>X</td> | Read buffer (Cont. mode) | 0x0011 | 17 | _ | х | x*** | _ | X |
| (Presence Sensing) Mode Delete Buffer (Cont. mode) 0x0013 19 - x x - x UHF Continuous Presence Sensing Mode 0x0020 32 - - - - x HF read/write head off 0x0040 64 x x x - - - Read/write head identification 0x0041 65 x x x x x x Get UHF read/write head status/error 0x0042 66 - - - x x Get UHF read/write head error/status 0x2042 8258 - - - x x Get UHF read/write head error/status 0x2042 8258 - - - x x Tag info 0x0050 80 x x x x x x Direct read/write head command 0x0060 96 x x x x x Direct read/write head command 0x0060 8288 x x x x x x | Read buffer (Cont. mode) with loop counter | 0x2011 | 8209 | _ | х | X*** | - | Х |
| UHF Continuous Presence Sensing Mode0x002032xHF read/write head off0x004064xxxxRead/write head identification0x004165xxxxxxGet UHF read/write head status/error0x004266xxGet UHF read/write head error/status0x20428258xxTag info0x005080xxxxxxTag info with loop counter0x20508272xxxxxDirect read/write head command0x006096xxxxxDirect read/write head command0x0070112xxxGet HF read/write head0x0071113xGet HF read/write head0x0071113xTune HF read/write head0x0080128xxxx | Stop Continuous (Presence Sensing) Mode | 0x0012 | 18 | - | X* | X*** | - | Х |
| ModeHF read/write head off0x004064xxxxRead/write head identification0x004165xxxxxxGet UHF read/write head status/error0x004266xxGet UHF read/write head error/status0x20428258xxGet UHF read/write head error/status0x20428258xxTag info0x005080xxxxxxxTag info with loop counter0x20508272xxxxxxDirect read/write head command0x006096xxxxxxDirect read/write head command0x0070112xGet HF read/write head address0x0071113xSet HF read/write head0x0080128xxxx | Delete Buffer (Cont. mode) | 0x0013 | 19 | - | х | Х | - | х |
| Read/write head identification0x004165xxxxxxGet UHF read/write head status/error0x004266xxGet UHF read/write head error/status0x20428258xxTag info0x005080xxxxxxTag info with loop counter0x20508272xxxxxDirect read/write head command0x006096xxxxxDirect read/write head command0x20608288xxxxxGet HF read/write head0x0070112xGet HF read/write head address0x0071113xSet HF read/write head0x0080128xxxx | UHF Continuous Presence Sensing Mode | 0x0020 | 32 | - | - | - | - | Х |
| Get UHF read/write head status/error0x004266xxGet UHF read/write head error/status0x20428258xxwith loop counter0x005080xxxxxxTag info0x005080xxxxxxTag info with loop counter0x20508272xxxxxxDirect read/write head command0x006096xxxxxxDirect read/write head command0x20608288xxxxxxGet HF read/write head0x0070112xSet HF read/write head address0x0071113xxTune HF read/write head0x0080128xxxx | HF read/write head off | 0x0040 | 64 | х | х | х | _ | _ |
| Get UHF read/write head error/status0x20428258xxTag info0x005080xxxxxxxTag info with loop counter0x20508272xxxxxxDirect read/write head command0x006096xxxxxxDirect read/write head command0x20608288xxxxxxGet HF read/write head0x0070112xGet HF read/write head address0x0071113xTune HF read/write head0x0080128xxxx | Read/write head identification | 0x0041 | 65 | Х | х | Х | Х | Х |
| with loop counterTag info0x005080xxxxxxxTag info with loop counter0x20508272xxxxxxxDirect read/write head command0x006096xxxxxxxDirect read/write head command0x20608288xxxxxxGet HF read/write head0x0070112xSet HF read/write head address0x0071113xTune HF read/write head0x0080128xxxx | Get UHF read/write head status/error | 0x0042 | 66 | _ | _ | _ | Х | Х |
| Tag info with loop counter0x20508272xxxxxxDirect read/write head command0x006096xxxxxxDirect read/write head command0x20608288xxxxxxDirect read/write head command0x20608288xxxxxxGet HF read/write head0x0070112xGet HF read/write head address0x0071113xTune HF read/write head0x0080128xxxx | Get UHF read/write head error/status with loop counter | 0x2042 | 8258 | _ | _ | - | х | Х |
| Direct read/write head command0x006096xxxxxxDirect read/write head command0x20608288xxxxxxwith loop counter0x0070112xGet HF read/write head0x0070112xSet HF read/write head address0x0071113xTune HF read/write head0x0080128xxx | Tag info | 0x0050 | 80 | Х | x | х | х | X |
| Direct read/write head command0x20608288xxxxxxwith loop counterGet HF read/write head0x0070112xaddressSet HF read/write head address0x0071113xTune HF read/write head0x0080128xxx | Tag info with loop counter | 0x2050 | 8272 | х | х | х | х | х |
| with loop counterGet HF read/write head0x0070112xaddress0x0071113xSet HF read/write head address0x0071113xTune HF read/write head0x0080128xxx | Direct read/write head command | 0x0060 | 96 | х | х | х | х | х |
| address Set HF read/write head address 0x0071 113 - - x - - Tune HF read/write head 0x0080 128 x x x - - | Direct read/write head command with loop counter | 0x2060 | 8288 | х | х | х | Х | х |
| Tune HF read/write head 0x0080 128 x x x - | Get HF read/write head address | 0x0070 | 112 | _ | _ | х | - | _ |
| | Set HF read/write head address | 0x0071 | 113 | _ | _ | х | _ | _ |
| Read AFI from HF tag 0x0090 144 x x x | Tune HF read/write head | 0x0080 | 128 | х | х | х | _ | _ |
| | Read AFI from HF tag | 0x0090 | 144 | х | х | х | - | - |



| Command | Comman | nd code | possible for | r | | | |
|--------------------------------------|--------|---------|---------------|----------------|----------------|----------------|-----------------|
| | hex. | dec. | HF compact | HF extended | HF bus mode | UHF compact | UHF extended |
| Write AFI to HF tag | 0x0091 | 145 | х | х | х | - | - |
| Lock AFI in HF tag | 0x0092 | 146 | х | х | х | - | - |
| Read DSFID from HF tag | 0x0094 | 148 | х | х | х | - | - |
| Write DSFID to HF tag | 0x0095 | 149 | х | х | х | - | - |
| Lock DSFID in HF tag | 0x0096 | 150 | Х | Х | Х | - | - |
| Set read/write head password | 0x0100 | 256 | X** | X** | X** | Х | Х |
| Reset read/write head password | 0x0101 | 257 | X** | X** | X** | х | х |
| Set tag password | 0x0102 | 258 | x** | x** | x** | х | х |
| Set tag password with loop counter | 0x2102 | 8450 | X** | X** | X** | х | х |
| Set tag protection | 0x0103 | 259 | x** | x** | x** | х | х |
| Set tag protection with loop counter | 0x2103 | 8451 | X** | X** | X** | Х | Х |
| Get HF tag protection status | 0x0104 | 260 | X** | X** | X** | х | х |
| Set perma lock | 0x0105 | 261 | х | х | х | х | х |
| Set permanent lock with loop counter | 0x2105 | 8453 | х | х | х | x | x |
| Kill UHF tag | 0x0200 | 512 | - | - | _ | x | x |
| Kill UHF tag with loop counter | 0x2200 | 8704 | _ | _ | _ | х | х |
| Restore settings UHF read/write head | 0x1000 | 4096 | _ | _ | _ | х | х |
| Backup settings UHF read/write head | 0x1001 | 4097 | _ | _ | _ | х | х |
| Reset | 0x8000 | 32768 | х | х | х | х | х |

* 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.

*** The command is supported in HF Continuous bus mode.



8.8.1 Command: Idle

ΗF

The **Idle** command switches the interface to Idle mode. A previously executed command is reset. If a tag is in the detection range of a HF read/write head and single-tag mode is set, the **Tag in detection range** bit is set and the UID of the tag is indicated by default in the read data area.

The existing data is overwritten with the next tag in the detection range.

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

The following options are possible:

UID

- 8 bytes of user memory
- UID and 8 bytes of user memory
- UID and 64 bytes of user memory
- Deactivated

In HF bus mode, the address of the read/write head that reads the data is also output.

| • | NOTE |
|---|----------|
| | lf the H |

If the HF read/write head detects a new tag in the detection range, the **Tag present bit** (TP) and the data (UID and/or read data) are set via the **HF: Idle mode** (UID and/ or read data) are displayed simultaneously. If two tags are detected in quick succession, the TP bit may remain set. The data of the second tag (UID and/or read data) is displayed.

UHF

The **Idle** command switches the interface to Idle mode. A previously executed command is reset. By default, the UHF reader is switched off when the Idle command is activated and does not perform any action. If a tag is within the detection range of a UHF reader and Presence Sensing Mode is active, the **Tag in detection range** bit is set and the EPC and/or user data of the tag is displayed in the read data area.

The existing data is overwritten with the next tag in the detection range.

The configuration of the UHF reader can be used via the web server or DTM to set which data is read out and displayed from the tag.

The following options are possible:

- EPC
- User memory or part of the user memory
- EPC and user memory or part of the user memory
- Deactivated



Overview of output data

See description of the output data, p. [> 105].

| Request | |
|-------------------------|-------------------------|
| Loop counter | Not required |
| Command code | 0x0000 (hex.), 0 (dec.) |
| Read/write head address | Not required |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| Timeout | Not required |
| Write fragment No. | Not required |
| Read fragment No. | Not required |
| Write data | Not required |

Overview of input data

See description of the input data, p. [> 100].

| Response | |
|---|---|
| Loop counter | See description of the input data |
| Response code | 0x0000 (hex.), 0 (dec.) |
| Length | Length of the UID/EPC of the tag in the detection range |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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, bytes 0n | UID/EPC of the tag in the detection range |
| Tag in detection rangeData (bytes) availableTag counterWrite fragment No.Read fragment No. | See description of the input data See description of the input data See description of the input data Size of the fragment Size of the fragment |

Example: UID, HF bus mode

| Туре | Name | Meaning |
|---------|----------|--------------------------------|
| uint8_t | Data [8] | uint8_t UID [8] |
| uint8_t | Reserved | Reserved |
| uint8_t | Address | Address of the read/write head |

Example: successful read command (64 bytes), HF bus mode

| Туре | Name | Meaning | |
|---------|-----------|--------------------------------|--|
| uint8_t | Data [64] | uint8_t read data [64] | |
| uint8_t | Reserved | Reserved | |
| uint8_t | Address | Address of the read/write head | |



8.8.2 Command: Inventory

The **Inventory** command triggers the read/write device to search for tags in the detection range and to read the UID, EPC or, if activated in the UHF reader, the RSSI of the tags. 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.).

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 Length UID/EPC Not required Start address 1: Grouping of the EPCs active (UHF only) 0: Grouping of the EPCs inactive (UHF only) 0: The actual length (bytes) of the transferred UID or EPC is Length transferred with an inventory. > 0 in HF applications: 8: 8-byte UID feedback 1...7: Feedback of an abbreviated UID > 8: Fault signal -1: NEXT mode (only available 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. > 0 in UHF applications: EPC is output in full. Timeout

See description of the output data, p. [> 105].

See description of the input data, p. [> 100].

0

Not required

Response (HF)

Write data

Write fragment No.

Read fragment No.

| Response (HF) | | |
|---------------------------|-----------------------------------|--|
| Loop counter | See description of the input data | |
| Response code | 0x0001 (hex.), 1 (dec.) | |
| Length | Length of the read data in bytes | |
| 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 | Ascending | |
| Write fragment No. | 0 | |
| Read fragment No. | See description of the input data | |
| Read data, bytes 0n | UID | |
| | | |

See description of the output data

See description of the output data



| Response (UHF) | |
|------------------------|-----------------------------------|
| Loop counter | See description of the input data |
| Response code | 0x0001 (hex.), 1 (dec.) |
| Length | Length of the read data |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| Data (bytes) available | See description of the input data |
| Tag counter | Ascending |
| Write fragment No. | 0 |
| Read fragment No. | See description of the input data |
| Read data, bytes 0n | See example: UHF read data |

Data format in UHF applications

The UHF read data is formatted by means of a header. The header has the following structure:

| Туре | Name | Meaning | |
|---------|-------------|----------------------------|--|
| uint8_t | Size | Data size | |
| uint8_t | Block type | 1: UID/EPC/RSSI etc. | |
| | | 2: Read data | |
| | | Other values : reserved | |
| uint8_t | Data [size] | EPC/RSSI etc. or read data | |

The size of EPC/RSSI etc. depends on the settings of the reader.

Reading out the RSSI value

The RSSI value is output in binary code in 2 bytes and corresponds to the two's complement of the output binary code. Mapped to a signed integer, the 2 bytes output correspond to ten times the actual RSSI value. Refer to the following table for an example of the RSSI value:

| MSBLSB (decimal) | MSBLSB (binary) | Two's complement | RSSI (dBm) |
|---------------------|--------------------|------------------|------------|
| 252 253 | 11111100 11111101 | -771 | -77.1 |

Example: UHF read data (header and EPC, grouping deactivated)

| Туре | Name | Meaning | |
|---------|------------|------------------|--|
| uint8_t | Size | 12 | |
| uint8_t | Block type | 1 | |
| uint8_t | Data [14] | uint8_t EPC [12] | |



| Туре | Name | Meaning |
|---------|------------|---|
| uint8_t | Size | 14 |
| uint8_t | Block type | 1 |
| uint8_t | Data [14] | uint8_t EPC [12] |
| | | Uint16_t Number of read operations (LSB $ ightarrow$ MSB) [2] |

Example: UHF read data (header and EPC, grouping activated)

Example: UHF read data (header and EPC, grouping with RSSI activated)

| Туре | Name | Meaning |
|------------|---|---|
| uint8_t | Size | 16 |
| uint8_t | Block type | 1 |
| uint8_t | Data [18] | uint8_t EPC [12] uint16_t RSSI [2] |
| | | uint16_t Number of read operations (LSB $ ightarrow$ MSB) [2] |
| | | |
| Status bit | Contents | Meaning |
| 0 | Data size (EPC + number of read operations) | 2 bytes header |
| 1 | UHF memory range | |
| 313 | EPC | 12 bytes EPC |
| 14 | LSB | 2 bytes RSSI |
| 15 | MSB | |
| 16 | LSB | 2 bytes number of read operations |
| 17 | MSB | |

Example: UHF read data (header, EPC, grouping with RSSI, socket, time, phase activated)

| Туре | Name | Meaning |
|---------|------------|--|
| uint8_t | Size | 24 |
| uint8_t | Block type | 1 |
| uint8_t | Data [24] | uint8_t EPC [12] uint16_t RSSI (LSB \rightarrow MSB) uint16_t Slot (LSB \rightarrow MSB) uint32_t Time (LSB \rightarrow MSB) uint16_t Phase (LSB \rightarrow MSB) uint16_t Number of read operations (LSB \rightarrow MSB) |



8.8.3 Command: Read

The **Read** command causes the read/write device to read the data of tags in the detection range. 128 bytes are transferred in a read operation by default. Larger data volumes can be transferred in fragments. If a particular UID or EPC is entered, the read/write device only reads the appropriate tags. All other tags in the detection range are ignored in this case.



NOTE

The command code for fast 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 |
| Length UID/EPC | Enter UID or EPC size in bytes, if a particular tag is to be read. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: No entry of a UID/EPC for executing the command. Only one tag can be located in the detection range of the read/ write device. > 0: EPC length of the tag to be read if an EPC is present in the write data -1: NEXT mode: A tag is always only read if the UID/EPC is different to the UID/EPC of the last read or written tag. |
| Start address | Start address of the memory area on the tag to be read (entry in bytes) |
| Length | Length of the data to be read in bytes |
| Timeout | See description of the output data |
| Write fragment No. | 0 |
| Read fragment No. | See description of the output data |
| Write data, Byte 0(size of the UID/EPC - 1) | UID or EPC of the tag to be read |
| Write data, Byte (size of the EPC)127 | Not required |



| 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, bytes 0n | Read data |



8.8.4 Command: Write

The **Write command** causes 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 volumes can be transferred in fragments. If a particular UID or EPC is entered, the read/write device only writes the appropriate tags. All other tags in the detection range are ignored in this case.



• With multitag applications enter the UID or EPC of the tag to be written.

| NOTE |
|---------|
| The cor |
| 0106 (2 |

Request

The command code for fast 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 |
| Length UID/EPC | Enter UID or EPC size in bytes, if a particular tag is to be writ- ten. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: No entry of a UID/EPC for executing the command. Only one tag can be located in the detection range of the read/ write device. > 0: EPC length of the tag to be written if an EPC is present in the write data -1: NEXT mode: A tag is always only written if the UID/EPC is different to the UID/EPC of the last read or written tag. |
| Start address | Start address of the memory area on the tag to be written (entry in bytes) |
| Length | Length of the data to be written in bytes |
| Timeout | See description of the output data |
| Write fragment No. | 1: Use fragmentation 0: Do not use fragmentation |
| Read fragment No. | 0 |
| Write data, Byte 0(size of the UID/EPC - 1) | UID or EPC of the tag to be written |
| Write data, Byte (size of the EPC)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 | See description of the input data |
| detection range | |
| 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, bytes 0127 | Not required |



8.8.5 Command: Change EPC length and write new EPC (UHF)



NOTE

The maximum EPC length of a tag depends on the chip type. Refer to the appropriate data sheet for the length.

The **Change EPC length and write new EPC (UHF)** command causes the RFID module to automatically adapt the length for the EPC response set in the tag (change of the PC in the tag) and writes the EPC with this length to the tag. If a particular EPC is entered, the UHF reader only writes the appropriate tags. All other tags in the detection range are ignored in this case.

See description of the output data, p. [105].

| Request | |
|---|---|
| Loop counter | See description of the output data |
| Command code | 0x0007 (hex.), 7 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Reserved bytes in the write data for the EPC 0: Do not address the tag, read any tags in the air interface |
| Start address | Not required |
| Length | Length of the data to be written in bytes; must be even and ≤ 62 |
| Timeout | Not required |
| Write fragment No. | See description of the output data |
| Read fragment No. | 0 |
| Write data, Byte 0(length of the UID/EPC - 1) | EPC of the tag to be written |
| Write data, Byte (length of the UID/EPC)127 | New EPC with new length |

| Response | |
|------------------------|-----------------------------------|
| Loop counter | See description of the input data |
| Response code | 0x0007 (hex.), 7 (dec.) |
| Length | 0 |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| Data (bytes) available | See description of the input data |
| Tag counter | See description of the input data |
| Write fragment No. | See description of the input data |
| Read fragment No. | See description of the input data |
| Read data, bytes 0127 | Not required |



8.8.6 Command: Write and Verify

The **Write and Verify** command writes a number of bytes defined by the user. The written data is also sent back to the interface and verified. Up to 128 bytes are transferred by default in a write operation. Larger data volumes can be transferred in fragments. The written data is only verified in the interface and is not sent back to the controller. If the verification fails, an error message is output. If the command is processed without an error message, the data was verified successfully.



NOTE

• With multitag applications enter the UID or EPC of the tag to be written.



NOTE

The command code for fast 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 |
| Length UID/EPC | Enter UID or EPC size in bytes, if a particular tag is to be writ- ten. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: No entry of a UID/EPC for executing the command. Only one tag can be located in the detection range of the read/ write device. > 0: EPC length of the tag to be written if an EPC is present in the write data -1: NEXT mode: A tag is always only written if the UID/EPC is |
| | different to the UID/EPC of the last read or written tag. |
| Start address | Start address of the memory area on the tag to be written (entry in bytes) |
| Length | Length of the data to be written in bytes |
| Timeout | See description of the output data |
| Write fragment No. | 1: Use fragmentation 0: Do not use fragmentation |
| Read fragment No. | 0 |
| Write data, Byte 0(size of the UID/EPC - 1) | Optional: UID or EPC of the tag to be written |
| Write data, Byte (size of the EPC)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 |



8.8.7 Command: Continuous Mode



NOTE

In HF applications, 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). In HF bus mode, all activated bus-capable read/write heads continuously execute the command simultaneously. With HF, the following commands can be set in the parameters: **Write, Read, Inventory, Tag info**. With UHF, the **Write, Read** and **Inventory** commands can be executed in Continuous Mode. For UHF applications, the parameters for Continuous Mode must be set via the DTM directly in the UHF reader.

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 Continuous Mode is restarted, all data from 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 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 in the following cases:

- In Continuous Mode (HF), if 3 is set as the start address
- In HF Continuous bus mode, if 0 or 1 is set as the start address

The Tag in detection range signal is not updated in Continuous Mode for UHF readers.

NOTE The HF

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



| 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 |
| Length UID/EPC | Not required |
| Start address | UHF inventory 0: Grouping of the EPCs inactive, continuous detection 1: Grouping of the EPCs active, continuous detection >1: not defined HF inventory 0: Grouping of the UIDs or USER data inactive, edge-triggered detection 1: Grouping of the UIDs or USER data active, edge-triggered detection 2: Not defined 3: Grouping of the UIDs or USER data active, continuous detection (time-triggered via bypass time), tag in detectior range supported > 3: Not defined HF bus mode 0: Grouping of the UIDs or USER data inactive, continuous detection (time-triggered via bypass time), tag in detectior range supported > 3: Not defined HF bus mode 0: Grouping of the UIDs or USER data active, continuous detection (time-triggered via bypass time), tag in detectior range supported 1: Grouping of the UIDs or USER data active, continuous detection (time-triggered via bypass time), tag in detectior range supported 1: Grouping of the UIDs or USER data active, continuous detection (time-triggered via bypass time), tag in detectior range supported >2: not defined |
| Length | Not required |
| Timeout | Not required |
| Write fragment No. | 0 |
| Read fragment No. | See description of the output data |
| Write data | Not required |

See description of the output data, p. [> 105].

See description of the input data, p. [> 100].

-

| 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 | See description of the input data | |
| detection range | | |
| Data (bytes) available | Increases during command execution | |
| Tag counter | Increases with each read or written UID/EPC | |
| Write fragment No. | 0 | |
| Read fragment No. | See description of the input data | |
| Read data | See description of the input data | |



8.8.8 Command: Read buffer (Cont. mode)



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

The **Read buffer (Cont. mode)** command can pass on data stored in the interface to the controller. Up to 16 Kbyte of data can be stored in a ring memory. Fetched data is deleted from the ring memory. The command is required to transfer read data to the controller in Continuous Mode or in Continuous Presence Sensing 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 or EPC is not divided by fragment limits. If a UID or EPC does not fit completely in a fragment, it is automatically moved to the next fragment.



The Read buffer (Cont. mode) command does not stop Continuous Mode.

See description of the output data, p. [▶ 105].

| 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 | |
| Length UID/EPC | 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 | |
| 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 stated 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 automatically decreased after the execution of the command | |
| 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 UHF applications

The UHF read data is formatted by means of a header. The header has the following structure:

| Туре | Name | Meaning | |
|---------|-------------|---|--|
| uint8_t | Size | Data size | |
| uint8_t | Block type | 1: UID/EPC/RSSI etc. 2: Read data Other values : reserved | |
| uint8_t | Data [size] | EPC/RSSI etc. or read data | |

The size of EPC/RSSI etc. depends on the settings of the reader.

Example: UHF read data (header and EPC, grouping deactivated)

| Туре | Name | Meaning | |
|---------|------------|------------------|--|
| uint8_t | Size | 12 | |
| uint8_t | Block type | 1 | |
| uint8_t | Data [14] | uint8_t EPC [12] | |

Example: UHF read data (header and EPC, grouping activated)

| Туре | Name | Meaning |
|---------|------------|---|
| uint8_t | Size | 14 |
| uint8_t | Block type | 1 |
| uint8_t | Data [14] | uint8_t EPC [12] Uint16_t Number of read operations (LSB \rightarrow MSB) [2] |

Example: UHF read data (header, EPC, grouping with RSSI, socket, time, phase activated)

| Туре | Name | Meaning |
|---------|------------|--|
| uint8_t | Size | 24 |
| uint8_t | Block type | 1 |
| uint8_t | Data [24] | uint8_t EPC [12] uint16_t RSSI (LSB \rightarrow MSB) uint16_t Slot (LSB \rightarrow MSB) uint32_t Time (LSB \rightarrow MSB) uint16_t Phase (LSB \rightarrow MSB) uint16_t Number of read operations (LSB \rightarrow MSB) |



Data format in HF applications

In HF applications the data is not formatted by means of a header. Some 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 operations |

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 |

Example: UID, grouping deactivated, HF bus mode

| Туре | Name | Meaning |
|---------|----------|--------------------------------|
| uint8_t | Data [8] | uint16_t UID [8] |
| uint8_t | Reserved | Reserved |
| uint8_t | Address | Address of the read/write head |

Example: UID, grouping deactivated, HF bus mode

| Туре | Name | Meaning | |
|---------|-----------|--------------------------------|--|
| uint8_t | Data [64] | uint16_t UID [64] | |
| uint8_t | Reserved | Reserved | |
| uint8_t | Address | Address of the read/write head | |



8.8.9 Command: Stop Continuous (Presence Sensing) Mode

Continuous and Presence Sensing Mode can be stopped via the **Stop Continuous (Presence Sensing) Mode** command. The data stored in the buffer memory of the interface is not deleted and can still be queried by the controller via the **Read buffer (Cont. Mode)** command.

See description of the output data, p. [> 105].

| Request | |
|-------------------------|------------------------------------|
| Loop counter | See description of the output data |
| Command code | 0x0012 (hex.), 18 (dec.) |
| Read/write head address | Not required |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | See description of the input data |
| detection range | |
| 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 |



8.8.10 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.

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | See description of the input data |
| detection range | |
| 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 |



8.8.11 Command: UHF Continuous Presence Sensing Mode

In Continuous Presence Sensing Mode, a user-defined command (**Write**, **Read**, **Inventory**) can be sent to the UHF reader and saved there. In Continuous Presence Sensing Mode, the readers are automatically switched on as soon as a tag is located in the detection range. The duration of the scan interval and the on time can be adjusted in the settings of the UHF reader. The command is continuously executed until the user terminates Continuous Presence Sensing Mode by executing a reset command.



NOTE

The reset command resets all read data.

Readers in Continuous Presence 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 buffer (Cont. mode)** command. In Continuous Presence Sensing Mode the **Tag in detection range** signal is not permanently updated.

See description of the output data, p. [> 105].

| Request | |
|-------------------------|---|
| Loop counter | See description of the output data |
| Command code | 0x0020 (hex.), 32 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Not required |
| Start address | 0: Grouping inactive 1: Grouping active >1: not defined |
| Length | Not required |
| 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 | 0x0020 (hex.), 32 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| Data (bytes) available | Increases during command execution |
| Tag counter | Increases with each read or written UID/EPC |
| Write fragment No. | 0 |
| Read fragment No. | See description of the input data |
| Read data | See description of the input data |



8.8.12 Command: HF read/write head off

The **HF read/write head off** 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.

See description of the output data, p. [> 105].

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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 |
|-----------------------------------|
| 0x0040 (hex.), 64 (dec.) |
| Not required |
| See description of the input data |
| See description of the input data |
| |
| See description of the input data |
| See description of the input data |
| 0 |
| See description of the input data |
| Not required |
| |



8.8.13 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 contained in the read/write head in the identification record.

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Start address in the identification record, stated in bytes |
| Length | Length of the data to be scanned 0: Read complete parameter set |
| 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) availableSee description of the input data | | | |
| Tag counter | Increases with each read or written UID/EPC | | |
| Write fragment No. | 0 | | |
| Read fragment No. | See description of the input data | | |
| Read data, bytes 019 | ID: ARRAY [019] of BYTE | | |
| Read data, bytes 2035 | Serial number: ARRAY [015] of BYTE | | |
| Read data, bytes 3637 Hardware version: INT16 (Little Endian) | | | |
| Read data, bytes 3841 Firmware status: ARRAY [0] of BYTE: V (0x56), x, y, | | | |
| Read data, bytes 42119 | Not required | | |



8.8.14 Command: Get UHF read/write head status/error



The command is only available for UHF applications.

The **Get error/status of UHF read/write head** command enables error/status messages of a connected UHF reader to be read.



NOTE The command code for fast processing with the loop counter is 0x2042 (hex.) or 8258 (dec.).

| Request | | | | |
|--|---|--|--|--|
| pop counter See description of the output data | | | | |
| Command code | 0x0042 (hex.), 66 (dec.) | | | |
| Read/write head address | Not required | | | |
| Length UID/EPC | Not required | | | |
| Start address | rt address Address in the Get Status response record | | | |
| Length | Length of the data to be read from the Get Status response record 0: Read entire Get Status response record | | | |
| 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, p. [> 100].

| operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement) PA temperature: 1 byte, PA temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) Transmit power: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Antenna DC resistance: 4 bytes, resistance at the antenr port in Ω, LSBMSB | | |
|---|------------------------|--|
| Response code 0x042 (hex.), 66 (dec.) Length See description of the input data Error code See description of the input data Tag in See description of the input data detection range 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(Length - 1) Status general: 1 byte general status RF status: 1 byte status of the RF module Device status: 1 byte, defines the reason for starting the reac operation RF mode: 1 byte, defines the reason for starting the reac operation Trigger status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in °C (data format: 8 bit, two's complement) PA temperature: 1 byte, At temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Antenna DC resistance: 4 bytes, resistance at the antenn port in Ω, LSBMSB | Response | |
| Length See description of the input data Error code See description of the input data Tag in See description of the input data detection range 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(Length - 1) Status general: 1 byte general status RF status: 1 byte status of the RF module Device status: 1 byte, defines the reason for starting the reac operation Trigger status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement) P A temperature: 1 byte, At emperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) RF antenna temperature: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Antenna DC resistance: 4 bytes, resistance at the antenn port in Ω, LSBMSB | 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 0(Length - 1)Status general: 1 byte general statusBernore ConstructionRF status: 1 byte device-specific status informationBr status: 1 byte, trigger number of the RF modeI/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high)Ambient temperature: 1 byte, status of the inputs and outputs (0 = low, 1 = high)PA temperature: 1 byte, status of the inperature in °C (data format: 8 bit, two's complement)PA temperature: 1 byte, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's comple- ment)Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's comple- ment) | Response code | 0x042 (hex.), 66 (dec.) |
| Tag in See description of the input data detection range 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(Length - 1) Status general: 1 byte general status Read data, Byte 0(Length - 1) Status general: 1 byte, status of the RF module Device status: 1 byte, defines the reason for starting the reaco operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement) PA temperature: 1 byte, A temperature in °C (data format: 8 bit, two's complement) Transmit power: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, resistance at the antenr port in Ω , LSBMSB | Length | See description of the input data |
| detection range 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(Length - 1) Status general: 1 byte general status RF status: 1 byte status of the RF module Device status: 1 byte device-specific status information RF mode: 1 byte, defines the reason for starting the reac operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) RF antenna temperature: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Antenna DC resistance: 4 bytes, resistance at the antenn port in Ω, LSBMSB | 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 0(Length - 1)Status general: 1 byte general statusR F status: 1 byte status of the RF moduleDevice status: 1 byte device-specific status informationR F mode: 1 byte, defines the reason for starting the react operationTrigger status: 1 byte, trigger number of the RF modeI/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high)Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement)R F antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement)Transmit power: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement)Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) | 5 | See description of the input data |
| Write fragment No. 0 Read fragment No. See description of the input data Read data, Byte 0(Length - 1) Status general: 1 byte general status RF status: 1 byte status of the RF module Device status: 1 byte device-specific status information RF mode: 1 byte, defines the reason for starting the read operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in °C (data format: 8 bit, two's complement) PA temperature: 1 byte, PA temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) Transmit power: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Antenna DC resistance: 4 bytes, resistance at the antenr port in Ω, LSBMSB | Data (bytes) available | See description of the input data |
| Read fragment No. See description of the input data Read data, Byte 0(Length - 1) Status general: 1 byte general status RF status: 1 byte status of the RF module Device status: 1 byte device-specific status information RF mode: 1 byte, defines the reason for starting the reacorperation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement) PA temperature: 1 byte, PA temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) Re antenna temperature: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) | Tag counter | See description of the input data |
| Read data, Byte 0(Length - 1) Status general: 1 byte general status RF status: 1 byte status of the RF module Device status: 1 byte device-specific status information RF mode: 1 byte, defines the reason for starting the react operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement) PA temperature: 1 byte, PA temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) Transmit power: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) | Write fragment No. | 0 |
| RF status: 1 byte status of the RF module Device status: 1 byte device-specific status information RF mode: 1 byte, defines the reason for starting the read operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in ° (data format: 8 bit, two's complement) PA temperature: 1 byte, PA temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature i °C (data format: 8 bit, two's complement) Transmit power: 2 bytes, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) | Read fragment No. | See description of the input data |
| Jammer power: 2 bytes, input power at the RX port in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Channel: Number of the currently used channel (offset from the next available channel) Read data, byte (Length)127 Not required | | RF status: 1 byte status of the RF module Device status: 1 byte device-specific status information RF mode: 1 byte, defines the reason for starting the read operation Trigger status: 1 byte, trigger number of the RF mode I/O status: 1 byte, status of the inputs and outputs (0 = low, 1 = high) Ambient temperature: 1 byte, ambient temperature in °C (data format: 8 bit, two's complement) PA temperature: 1 byte, PA temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, antenna temperature in °C (data format: 8 bit, two's complement) RF antenna temperature: 1 byte, output power of the reader in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Reverse power: 2 bytes, returned reverse power in 1/10 dBm steps, LSBMSB (data format: 16 bit, two's complement) Antenna DC resistance: 4 bytes, resistance at the antenna port in Ω, LSBMSB (data format: 16 bit, two's complement) Channel: Number of the currently used channel (offset from the next available channel) |

Evaluating read data — general status

| Bit | Meaning |
|-----|---|
| 7 | Read/write head was reset (after reset). |
| 6 | Read/write head configuration damaged, default settings are used. |
| 5 | Test mode active |
| 1 | Tag present |



Evaluating read data — RF status

| Bit | Meaning |
|-----|---|
| 4 | Limit value for radiated power exceeded |
| 3 | No free channel present |
| 2 | Antenna resistance too high or too low |
| 1 | Reverse power too high |
| 0 | PLL not locked |

Evaluating read data — device status

| Bit | Meaning |
|-----|--|
| 4 | Error in message generation (in Polling mode outside of memory area) |
| 3 | Temperature warning |
| 2 | Temperature too high |
| 1 | Communication error |
| 0 | Configuration invalid. Command execution not possible. |

Evaluating read data — RF mode

| Value | Meaning | |
|-------|--|--|
| 0x00 | None (tag off) | |
| 0x01 | Mode 1: Trigger is digital signal (edge), Timeout | |
| 0x02 | Mode 2: Trigger is digital signal (edge), Timeout | |
| 0x03 | Mode 3: Trigger is digital signal (level), Timeout | |
| 0x04 | Trigger is a command | |
| 0x08 | Reserved | |
| 0x10 | DCU controlled read operation | |
| 0x20 | Continuous Mode | |
| 0x80 | Automatic trigger (Presence Sensing Mode) | |

Evaluating read data — I/O status

| Value | Meaning |
|-------|----------|
| 7 | Output 4 |
| 6 | Output 3 |
| 5 | Output 2 |
| 4 | Output 1 |
| 3 | Input 4 |
| 2 | Input 3 |
| 1 | Input 2 |
| 0 | Input 1 |



8.8.15 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 a HF tag to be queried. With HF applications, the command is available with automatic detection only. In UHF applications, the allocation class identifier, tag mask design identifier and tag model number are queried. The data is queried from the GSI record of the tag.

See description of the output data, p. [> 105].

| 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 | | |
| Length UID/EPC | Not required | | |
| Start address | Start address in the GSI record | | |
| Length | Length of the system data read (bytes) 0: All system data is read. | | |
| Timeout | Not required | | |
| Write fragment No. | Not required | | |
| Read fragment No. | See description of the output data | | |
| Write data | Not required | | |

| Response (HF) | |
|---------------------------|--|
| 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, bytes 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 |



| Response (UHF) | | | | |
|------------------------|---|--|--|--|
| 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, bytes 03 | First 32 bytes of the TID (tag class, manufacturer and chip type) | | | |
| Read data, bytes 4n | EPC (variable length) | | | |

Chip information on the UHF tags

| Name | TID memory | | | Size (Bits) | | |
|---------------------|-----------------------------------|----------------------|---------------------|-------------|-----|--------|
| | Allocation class identifier | Tag mask designer | Tag model number | EPC | TID | USER |
| Alien Higgs-3 | 0xE2 | 0x003 | 0x412 | 96480 | 96 | 512 |
| Alien Higgs-4 | 0xE2 | 0x003 | 0x414 | 16128 | 96 | 128 |
| NXP U-Code G2XM | 0xE2 | 0x006 | 0x003 | 240 | 64 | 512 |
| NXP U-Code G2XL | 0xE2 | 0x006 | 0x004 | 240 | 64 | _ |
| NXP U-Code G2iM | 0xE2 | 0x006 | 0x80A | 256 | 96 | 512 |
| NXP U-Code G2iM+ | 0xE2 | 0x006 | 0x80B | 128448 | 96 | 640320 |
| NXP U-Code G2iL | 0xE2 | 0x006 | 0x806, 0x906, 0xB06 | 128 | 64 | _ |
| NXP U-Code G2iL+ | 0xE2 | 0x006 | 0x807, 0x907, 0xB07 | 128 | 64 | _ |
| NXP U-Code 7 | 0xE2 | 0x806 | 0x890 | 128 | 96 | _ |
| NXP U-Code 7xm (2k) | 0xE2 | 0x806 | 0xF12 | 448 | 96 | 2048 |
| Impinj Monza 4E | 0xE2 | 0x001 | 0x10C | 496 | 96 | 128 |
| Impinj Monza 4D | 0xE2 | 0x001 | 0x100 | 128 | 96 | 32 |
| Impinj Monza 4QT | 0xE2 | 0x001 | 0x105 | 128 | 96 | 512 |
| Impinj Monza 5 | 0xE2 | 0x001 | 0x130 | 128 | 96 | _ |
| Impinj Monza R6 | 0xE2 | 0x001 | 0x160 | 96 | 96 | _ |
| Impinj Monza R6-P | 0xE2 | 0x001 | 0x170 | 128 | 96 | 64 |



8.8.16 Direct read/write head command



NOTE The command code for rapid 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 released specially by Turck. Questions on the read/write head protocol should be addressed to Turck.

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | 0 |
| Start address | Not required |
| Length | Length of the description of the direct command in the write data, specification in bytes |
| 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 |

| Response | |
|---------------------------|---|
| 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)

| 0 |
|--|
| 0x0060 |
| 0 |
| 0 |
| 0 |
| 2 |
| 200 |
| 0 |
| 0 |
| 0xE0 (CC), 0x00 (CI) — see BL ident protocol |
| |
| 0 |
| 0x0060 |
| 6 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| 0 |
| |
| |

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).



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

| Request | |
|-------------------------|--|
| Loop counter | 0 |
| Command code | 0x0060 |
| Read/write head address | 0 |
| Length UID/EPC | 0 |
| Start address | 0 |
| Length | 2 |
| Timeout | 200 |
| Write fragment No. | 0 |
| Read fragment No. | 0 |
| Write data | 0x02 (CMD), 0x00 (application) – see debus protocol |
| | |
| Response | |
| Loop counter | 0 |
| Response code | 0x0060 |
| Length | 12 |
| Error code | 0 |
| Tag in | 0 |
| detection range | |
| Data (bytes) available | 0 |
| Tag counter | 0 |
| Write fragment No. | 0 |
| Read fragment No. | 0 |
| Read data | 0x02, 0x00, 0x01, 0x02, 0x03, 0x04, 0x8B, 0x20, 0x00, 0x01, 0x00, 0x01 |

The read data can be interpreted via the debus protocol as follows:

| MSG | ERR | SNR0 | SNR1 | SNR2 | SNR3 | GTYP | VERS | HW |
|------|------|------|------|------|------|--------------|--------------|--------------|
| 0x02 | 0x00 | 0x01 | 0x02 | 0x03 | 0x04 | 0x8B 0x20 | 0x00 0x01 | 0x00 0x01 |

Serial number: 0x01020304

Device type: 0x208B

Software version: v1.00

Hardware version: v1.00



Example: Direct command in UHF applications (set output power)

• Read the set power from the RAM of the reader.

| Request | |
|-------------------------|------------------|
| Loop counter | 0 |
| Command code | 0x0060 |
| Read/write head address | 0 |
| Length UID/EPC | 0 |
| Start address | 0 |
| Length | 5 |
| Timeout | 200 |
| Write fragment No. | 0 |
| Read fragment No. | 0 |
| Write data | 0x09 8A 4A 03 01 |

Change output power: Write "30 dBm" power to the reader's RAM and flash memory. The sixth byte of the write data sets the power in dBm as a hexadecimal value.

| 0 |
|---------------------|
| 0x0060 |
| 0 |
| 0 |
| 0 |
| 6 |
| 200 |
| 0 |
| 0 |
| 0x09 8A 3C 03 01 1E |
| |



The following table provides assistance in converting the power values from dBm to mW.

| dBm | mW | dBm | mW |
|-----|------|-----|------|
| 1 | 1.25 | 16 | 40 |
| 2 | 1.6 | 17 | 50 |
| 3 | 2 | 18 | 63 |
| 4 | 2.5 | 19 | 80 |
| 5 | 3 | 20 | 100 |
| 6 | 4 | 21 | 125 |
| 7 | 5 | 22 | 160 |
| 8 | 6 | 23 | 200 |
| 9 | 8 | 24 | 250 |
| 10 | 10 | 25 | 316 |
| 11 | 13 | 26 | 400 |
| 12 | 16 | 27 | 500 |
| 13 | 20 | 28 | 630 |
| 14 | 25 | 29 | 800 |
| 15 | 32 | 30 | 1000 |



8.8.17 Command: Get HF read/write head address



NOTE The command is only available in HF bus mode.

The interface can query the addresses of all connected HF read/write heads via the **Get HF** read/write head address command. If a non-bus-compatible read/write head is connected, the device outputs a fault signal.

See description of the output data, p. [> 105].

| Request | |
|-------------------------|------------------------------------|
| Loop counter | See description of the output data |
| Command code | 0x0070 (hex.), 112 (dec.) |
| Read/write head address | Not required |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 0x0070 (hex.), 112 (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[number of the connec- ted read/write heads] | Addresses of the connected read/write heads (uint8_t) |
| Read data, byte [number of the connected read/write heads]127 | Not required |



8.8.18 Command: Set HF read/write head address



NOTE

The command is only available in HF bus mode.

Only one single bus-compatible read/write head can be connected to the interface during command execution.

Deactivate read/write heads before manual addressing via the parameter data so that automatic address assignment is not executed.

The **Set HF read/write head address** command can be used to set the address of bus-compatible HF read/write heads. Command execution is independent of the activation of or the address set for a read/write head. Any existing read/write head addresses are overwritten.

Permissible values are 1, 2...32, 68.



NOTE 68 is the default address of the read/write head. A bus-compatible read/write head with this address cannot be activated.

If a non-bus-compatible read/write head is connected, the device outputs a fault signal.

See description of the output data, p. [> 105].

| Request | | |
|-------------------------|---|--|
| Loop counter | See description of the output data | |
| Command code | 0x0071 (hex.), 113 (dec.) | |
| Read/write head address | Not required | |
| Length UID/EPC | Not required | |
| Start address | Not required | |
| Length | Not required | |
| Timeout | See description of the output data | |
| Write fragment No. | 0 | |
| Read fragment No. | See description of the output data | |
| Write data, byte 0 | New read/write head address (uint8_t), permissible values: 0, 132, 68 | |
| Write data, bytes 1127 | Not required | |

| Response | |
|------------------------|-----------------------------------|
| Loop counter | See description of the input data |
| Response code | 0x0071 (hex.), 113 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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 |



8.8.19 Command: Tune HF read/write head



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

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

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

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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) |



8.8.20 Command: Read AFI from HF tag

The AFI byte of an HF tag can be read out using the **Read AFI from HF tag** command.



NOTE The command is supported by HF read/write heads revision xV99 or later.

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 0x0090 (hex.), 144 (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 | AFI |
| Read data, Byte 1(Length - 1) | Not required |



8.8.21 Command: Write AFI to HF tag

The Write AFI to HF tag command writes an AFI byte to a HF tag.



NOTE

The command is supported by HF read/write heads revision xV99 or later.



NOTE

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

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | See description of the input data |
| detection range | |
| 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 |



8.8.22 Command: Lock AFI in HF tag

The Lock AFI in HF tag command locks the AFI byte on a HF tag.



NOTE The command is supported by HF read/write heads revision xV99 or later.



NOTE

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

See description of the output data, p. [> 105].

| Request | |
|-------------------------|------------------------------------|
| Loop counter | See description of the output data |
| Command code | 0x0092 (hex.), 146 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 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 |



8.8.23 Command: Read DSFID from HF tag

The **Read DSFID from HF tag** command can be used to read the DSFID byte of an HF tag.



NOTE The command is supported by HF read/write heads revision xV99 or later.

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 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, Byte 1(Length - 1) | Not required |



8.8.24 Command: Write DSFID to HF tag

The Write DSFID to HF tag command writes a DSFID byte to an HF tag.



NOTE The command is supported by HF read/write heads revision xV99 or later.



NOTE

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

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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, | Not required |
| byte 1(length - 1) | |

| 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 | See description of the input data |
| detection range | |
| 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 |



8.8.25 Command: Lock DSFID in HF tag

The Lock DSFID in HF tag command locks the DSFID byte on an HF tag.



NOTE

The command is supported by HF read/write heads revision xV99 or later.



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).

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 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 |



8.8.26 Command: Set read/write head password



NOTE

The command is only available for applications with UHF tags and the 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. With UHF applications, the password is stored in the memory of the interface. 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: multi-tag 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 of all in the read/write head before a new password can be assigned ([> 154]). The command is supported for chip type NXP SLIX2 of HF read/write heads with firmware version Vx.98 or higher.

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 Length UID/EPC Not required Start address Not required Length Not required Timeout See description of the output data Write fragment No. 0 Read fragment No. See description of the output data Write data, bytes 0...3 Password: ARRAY [0...3] OF BYTE Write data, bytes 4...127 Not required

See description of the output data, p. [> 105].

| 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 |



8.8.27 Command: Reset read/write head password



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

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

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**.

See description of the output data, p. [> 105].

| Request | |
|-------------------------|------------------------------------|
| Loop counter | See description of the output data |
| Command code | 0x0101 (hex.), 257 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 0x0101 (hex.), 257 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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 |



8.8.28 Command: Set tag password



NOTE

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



-

NOTE

The command code for rapid 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: multi-tag 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 of all in the read/write head before a new password can be assigned ([> 152]. The command is supported for chip type NXP SLIX2 of HF read/write heads with firmware version Vx.98 or higher.

| See description of the output data |
|---|
| 0x0102 (hex.), 258 (dec.) |
| See description of the output data |
| The UID or EPC size should be entered in bytes if a particular tag is to be protected. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: No entry of a UID/EPC for executing the command. Only one tag can be located in the detection range of the read/ write head. > 0: EPC length of the tag to be protected if an EPC is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC differs from the UID/EPC of the tag last read or written to. |
| Not required |
| Not required |
| See description of the output data |
| 0 |
| See description of the output data |
| Password: ARRAY [03] OF BYTE |
| 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 |



8.8.29 Command: Set tag protection



NOTE

The command is only available for applications with UHF tags and the 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.

NOTE

Write protection for UHF tags cannot be reversed.



| 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 |
| Length UID/EPC | The UID or EPC size should be entered in bytes if a particular tag is to be protected. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: The command is executed for the tag which is located in the detection range of the read/write device. > 0: EPC length of the tag to be protected if an EPC is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC differs from the UID/EPC of the tag last read or written to. |
| Start address | Not required |
| Memory area | Possible values: HF: USER memory (memory areas 1 and 3) UHF: PC and EPC (memory area 1), USER memory (memory area 3) |
| | UHF: The entire memory area selected is protected with a password. HF: 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 | UHF: 0 byte HF: 8 byte |
| Timeout | See description of the output data |
| Write fragment No. | 0 |
| Read fragment No. | See description of the output data |
| Write data, byte 0 | HF: 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 4: Write protection, page 4 Bit 5: Write protection, page 5 Bit 6: Write protection, page 6 Bit 7: Write protection, page 7 |
| | UHF: not required |



| HF: 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 |
|---|
| UHF: not required |
| HF: 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: Reserved Bit 7: Reserved |
| UHF: not required |
| 3 0 |
| HF: 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 |
| UHF: not required |
| HF: 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 |
| Bit 6: Read protection, page 14 |



| Request | |
|------------------------|---|
| Write data, byte 6 | HF: 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 UHF: not required |
| Write data, byte 7 | 0 |
| Write data, bytes 8127 | Not required |

| Response | |
|------------------------|-----------------------------------|
| Loop counter | See description of the input data |
| Response code | 0x0103 (hex.), 259 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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 |
| | |



8.8.30 Command: Get HF tag protection status



NOTE The command is only available for applications with the 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 can be located 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**.

See description of the output data, p. [> 105].

| 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 |
| Length UID/EPC | The UID or EPC size should be entered in bytes if a particular tag is to be protected. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: The command is executed for the tag which is located in the detection range of the read/write head. > 0: EPC length of the tag to be protected if an EPC is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC differs from the UID/EPC of the tag last read or written to. |
| Start address | Not required |
| Length | 8 byte |
| 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 | 0x0104 (hex.), 260 (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 |
| | |



| _ | |
|--|---|
| Response | |
| Read data, byte 0 | HF: 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 4: Write protection, page 4 Bit 5: Write protection, page 5 Bit 6: Write protection, page 6 Bit 7: Write protection, page 7 |
| | UHF: not required |
| Read data, byte 1 | HF: 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 |
| | UHF: not required |
| Read data, byte 2 | HF: 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 |
| Pood data buta 2 | UHF: not required |
| Read data, byte 3 Read data, byte 4 | 0 HF: 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 |



| Response | |
|-------------------|--|
| Read data, byte 5 | HF: 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 UHF: not required |
| Read data, byte 6 | HF: 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 UHF: not required |
| Read data, byte 7 | 0 |



8.8.31 Command: Set perma lock



Demuset

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

| tag: 0, 4, 8,, FRAM tag: 0, 8, 16,)Memory areaPossible values: | Request | |
|--|-------------------------|--|
| Read/write head address See description of the output data Length UID/EPC 0: The command is executed for the tag which is located in the detection range of the read/write device. > 0: EPC or UID length of the tag to be locked if an EPC or UID is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC differs from the UID/EPC of the tag last read or written to. Start address UHF: not required HF: Address of the first bit in the block to be locked (EEPROL tag: 0, 4, 8,, FRAM tag: 0, 8, 16,) Memory area Possible values: Image: HF: Kill password (memory areas 1 4) UHF: The entire memory (memory area 3) Access password (memory area 4) UHF: The entire memory area selected is locked irrevocably from write access. Kill password and access password are also locked irrevocably from read access. HF: Entry of the memory area not necessary Length HF: Length of the data to be locked in bytes. Only multiples of the block size can be specified. 0: 1 Lock block UHF: not required Timeout See description of the output data Write fragment No. 0 Read fragment No. See description of the output data | Loop counter | See description of the output data |
| Length UID/EPC 0: The command is executed for the tag which is located in the detection range of the read/write device. > 0: EPC or UID length of the tag to be locked if an EPC or UID is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC differs from the UID/EPC of the tag last read or written to. Start address UHF: not required HF: Address of the first bit in the block to be locked (EEPROL tag: 0, 4, 8,, FRAM tag: 0, 8, 16,) Memory area Possible values: ■ HF: USER memory (memory areas 1 4) ■ UHF: Kill password (memory area 1), PC and EPC (memor area 1), USER memory (memory area 3) Access password (memory area 4) UHF: The entire memory area selected is locked irrevocably from write access. Kill password and access password are also locked irrevocably from read access. HF: Length of the data to be locked in bytes. Only multiples of the block size can be specified. 0: 1 Lock block UHF: not required Timeout See description of the output data Write fragment No. 0 Read fragment No. See description of the output data | Command code | 0x0105 (hex.), 261 (dec.) |
| the detection range of the read/write device.> 0: EPC or UID length of the tag to be locked if an EPC or UID is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC differs from the UID/EPC of the tag last read or written to.Start addressUHF: not required HF: Address of the first bit in the block to be locked (EEPRO tag: 0, 4, 8,, FRAM tag: 0, 8, 16,)Memory areaPossible values: I HF: USER memory (memory areas 1 4) UHF: Kill password (memory area 1), PC and EPC (memor area 1), USER memory (memory area 3) Access password (memory area 4)UHF: The entire memory area selected is locked irrevocably from write access. Kill password and access password are also locked irrevocably from read access. HF: Entry of the memory area not necessaryLengthHF: Length of the data to be locked in bytes. Only multiples of the block size can be specified. 0: 1 Lock block UHF: not requiredTimeoutSee description of the output dataWrite fragment No.0Read fragment No.See description of the output data | Read/write head address | See description of the output data |
| HF: Address of the first bit in the block to be locked (EEPRO tag: 0, 4, 8,, FRAM tag: 0, 8, 16,)Memory areaPossible values: | Length UID/EPC | the detection range of the read/write device. > 0: EPC or UID length of the tag to be locked if an EPC or UID is present in the write data -1: NEXT mode: A tag is only ever protected if the UID/EPC |
| HF: USER memory (memory areas 1 4) UHF: Kill password (memory area 1), PC and EPC (memor area 1), USER memory (memory area 3) Access password (memory area 4) UHF: The entire memory area selected is locked irrevocably from write access. Kill password and access password are also locked irrevocably from read access. HF: Entry of the memory area not necessary Length HF: Length of the data to be locked in bytes. Only multiples of the block size can be specified. 0: 1 Lock block UHF: not required Timeout See description of the output data Write fragment No. See description of the output data | Start address | HF: Address of the first bit in the block to be locked (EEPROM |
| from write access. Kill password and access password are also locked irrevocably from read access. HF: Entry of the memory area not necessaryLengthHF: Length of the data to be locked in bytes. Only multiples of the block size can be specified. 0: 1 Lock block UHF: not requiredTimeoutSee description of the output dataWrite fragment No.0Read fragment No.See description of the output data | Memory area | HF: USER memory (memory areas 1 4) UHF: Kill password (memory area 1), PC and EPC (memory area 1), USER memory (memory area 3) Access password |
| of the block size can be specified. 0: 1 Lock block UHF: not requiredTimeoutSee description of the output dataWrite fragment No.0Read fragment No.See description of the output data | | also locked irrevocably from read access. |
| Write fragment No.0Read fragment No.See description of the output data | Length | 0: 1 Lock block |
| Read fragment No.See description of the output data | Timeout | See description of the output data |
| | Write fragment No. | 0 |
| Write data 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 | 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 |



8.8.32 Command: Kill UHF tag



The command is only available for UHF applications.



NOTE The command code for rapid processing with the loop counter is 0x2200 (hex.) or 8704 (dec.).

The **Kill UHF tag** command makes the tag memory unusable. After a kill command, the tag can neither be read nor written. A kill command cannot be reversed. A Kill password must be set beforehand in order to execute a Kill command (see [> 229]).

See description of the output data, p. [> 105].

Request

| nequest | |
|-------------------------|--|
| Loop counter | See description of the output data |
| Command code | 0x0200 (hex.), 512 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Enter UID or EPC size in bytes if a particular tag is to be deleted. The UID or EPC must be defined in the write data (start byte: 0). The function of the UID/EPC length is dependent on the command used. 0: No entry of a UID/EPC for executing the command. Only one tag can be located in the detection range of the read/write device. > 0: EPC length of the tag to be deleted if an EPC is present in the write data -1: NEXT mode: A tag is always only deleted if the UID/EPC is different to the UID/EPC of the last read or written tag. |
| Start address | Not required |
| Length | Not required |
| Timeout | See description of the output data |
| Write fragment No. | 0 |
| Read fragment No. | See description of the output data |
| Write data, bytes 03 | Password: ARRAY [03] OF BYTE |
| Write data, bytes 4127 | Not required |
| | |



| Response | |
|---------------------------|-----------------------------------|
| Loop counter | See description of the input data |
| Response code | 0x0200 (hex.), 512 (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 |



8.8.33 Command: Restore settings UHF read/write head



The command is only available for UHF applications.

The **Restore settings UHF read/write head** command restores the parameters of a connected UHF reader from a backup (e.g. after a device swap). Type and firmware version must be identical for both readers. To execute the command, a backup must be created beforehand via the **Backup settings UHF read/write head** command.

See description of the output data, p. [> 105].

| equest | |
|--|---|
| oop counter S | See description of the output data |
| ommand code 0 | 0x1000 (hex.), 4096 (dec.) |
| ead/write head address S | See description of the output data |
| ength UID/EPC | Not required |
| art address N | Not required |
| ength N | Not required |
| meout S | See description of the output data |
| rite fragment No. C |) |
| ead fragment No. S | See description of the output data |
| rite data N | Not required |
| art address N ength N meout S rite fragment No. C ead fragment No. S | Not required Not required See description of the output data D See description of the output data |

| Response | |
|------------------------|-----------------------------------|
| Loop counter | See description of the input data |
| Response code | 0x1000 (hex.), 4096 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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 |



8.8.34 Command: Backup settings UHF read/write head



The command is only available for UHF applications.

The **Backup settings UHF read/write head** command saves the current settings of the connected reader in the memory of the interface. The backup is retained also after the voltage of the interface is reset. The **Restore settings UHF read/write head** command can restore the backup data when a device is swapped. Type and firmware version must be identical for both readers.

See description of the output data, p. [> 105].

| Request | |
|-------------------------|------------------------------------|
| Loop counter | See description of the output data |
| Command code | 0x1001 (hex.), 4097 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Not required |
| Start address | Not required |
| Length | Not required |
| 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 | 0x1001 (hex.), 4097 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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 |



8.8.35 Command: Reset

The **Reset** command resets the read/write device and the interface. The input, output data and the buffer are cleared.

See description of the output data, p. [> 105].

| Request | |
|-------------------------|---------------------------------------|
| Loop counter | See description of the output data |
| Command code | 0x8000 (hex.), 32768 (dec.) |
| Read/write head address | See description of the output data |
| Length UID/EPC | Not required |
| Start address | 0: Software reset 1: Voltage reset |
| Length | Not required |
| 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 | 0x8000 (hex.), 32768 (dec.) |
| Length | Not required |
| Error code | See description of the input data |
| Tag in | See description of the input data |
| detection range | |
| 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 |



8.9 Setting RFID interfaces via the web server



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

The devices can be set and commands sent to the devices via the integrated web server. To open the web server with a PC, the device and the PC must be located in the same IP network.

8.9.1 Opening a web server

The web server can either be opened via a web browser or via the Turck Service Tool. The call of the web server via the Turck Service Tool is described in the section "Adjusting network settings".

The device is factory set to IP address 192.168.1.254. To open the web server via a web browser, enter http://129.168.1.254 in the address bar of the web browser.

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

| | | | | | TURCK |
|------------------|------------------------|---|--|------|-------|
| MAIN | UHF RFID CONFIG & DEMO | DOCUMENTATION | | LOGI | N ? |
| | | | | | |
| TBEN | N-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Gatewa | iy - Info | | |
| (i) | Info | | 3 | | |
| ŝ | Parameter | | | | |
| | Diagnosis | e e e e e e e e e e e e e e e e e e e | | | |
| · · · · | Event log | | WRON | | |
| | Ex- / Import | | | | |
| Q | Change Password | | | | |
| | Firmware | | | | |
| LOC | AL I/O | | | | |
| ૼૢૼૢૺ | Parameter | | | | |
| | Diagnosis | Multiprotocol, 2 RFID comm. and 4 digital in-/c | u tout | | |
| | Input | Multiprotocol, 2 Krib comm. and 4 digitar m-re | Julput | | |
| 5 [↑] r | Output | Device Station information | | | |
| | | Туре | TBEN-S2-2RFID-4DXP | | |
| | | ldent. no. | 6814029 | | |
| | | Firmware revision | 3.7.0.0 | | |
| | | Bootloader revision | 10.0.1.0 | | |
| | | EtherNet/IP revision | 2.7.53.0 | | |
| | | PROFINET revision | 1.7.22.0 | | |
| | | Modbus/TCP revision | 2.4.5.0 | | |
| | | WEB revision | 1.0.29.0 | | |
| | | Software build number | 1051 PGM-DHCP | | |
| | | Addressing mode Special device properties | FOM-DACK | ? | |
| | | Production data | 01 3d 00 03 00 00 47 4f 51 53 44 59 00 0 | ? | |

Fig. 79: Example: Web server — home page



8.9.2 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.

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

| MAIN UHF RFID CONFIG & DEMO | DOCUMENTATION | | |
|--|---|--------------------|--|
| TBEN-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Ga | teway - Info | |
| Into Into < | Multiprotocol, 2 RFID comm. and 4 digit | rarent | |
| చింది) Output | Device Station information | | |
| | Туре | TBEN-S2-2RFID-4DXP | |
| | Ident. no. | 6814029 | |
| | Firmware revision | 3.7.0.0 | |
| | Bootloader revision | 10.0.1.0 | |
| | EtherNet/IP revision | 2.7.53.0 | |
| | PROFINET revision | 1.7.22.0 | |
| | Modbus/TCP revision | 2.4.5.0 | |
| | WEB revision | 1.0.29.0 | |
| | Software build number | 1051 | |
| | | PGM-DHCP | |

Fig. 80: Login field on the home page of the web server (marked in red)



| TBEN-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Ga | teway - Info | |
|---|---|--|--|
| (i) Info | | | |
| ूर्ी हेर्नुहे Parameter | | | |
| ୍ଦ୍ୟ ଅନ୍ତି Diagnosis | C | | |
| File Stagnood File Stagnood File Stagnood | | | |
| | | TURU . | |
| Ex- / Import | | | |
| Change Password | | | |
| Firmware | | | |
| LOCAL I/O | | | |
| န့်္ခနဲ Parameter | | | |
| 🕑 Diagnosis | | | |
| | Multiprotocol, 2 RFID comm. and 4 digit | al in-/output | |
| പ് പ്ര് Output | Device | | |
| · | Station information | | |
| | Туре | TBEN-S2-2RFID-4DXP | |
| | ldent. no. | 6814029 | |
| | Firmware revision | 3.7.0.0 | |
| | Bootloader revision | 10.0.1.0 | |
| | EtherNet/IP revision | 2.7.53.0 | |
| | PROFINET revision | 1.7.22.0 | |
| | Modbus/TCP revision | 2.4.5.0 | |
| | WEB revision | 1.0.29.0 | |
| | Software build number | 1051 | |
| | Addressing mode | PGM-DHCP | |
| | Special device properties | | |
| | Production data | 01 3d 00 03 00 00 47 4f 51 53 44 59 00 0 | |
| Fig. 81: Web server — home page | e after the login | | |

• After the login, you have write access to input and output data and to parameter data.



Example: Setting the operation mode for channel 0

In the following example, the operating mode of channel 0 is set to RF extended.

- Click Local I/O \rightarrow Parameter in the navigation bar on the left of the screen.
- Select the RFID channel (here: **RFID channel 0**).

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RI | FID-4DXP - Local I/O - Parameter | | |
|-----------------------------|--|---|----------------------------|------------|
| j) Info | | Ē | | |
| {ွ်ို Parameter | Write Channel v | iew Print | | |
| ତି Diagnosis | RFID channel | Operation mode | HF extended | ~ (|
| Event log | 0 | HF: Select Tag type | automatic tag detection HF | ~ |
| γ - ↓ Ex- / Import | RFID channel | HF: Bypass time (*1ms) | 200 | (|
| Change Password | 1 | HF: Multitag | no | ~ |
| Firmware | | Heart beat read/write head | no | ~ |
| | DXP 4 | HF: Autotuning read/write head | no | ~ |
| .OCAL I/O လို့ Parameter | DXP 5 | Deactivate HF read/write head detuned diagnostic | no | ~ |
| ୍ତି Diagnosis | | Deactivate diagnostics | no | ~ |
| پ√د Input | DXP 6 | Command retries at failure | 2 | |
| | Division of the second se | HF: Command in continuous mode | Inventory | ~ |
| rr Output | DXP 7 | HF: Length in continuous mode | 8 | |
| | DAF / | HF: Address in continuous mode | 0 | |
| | | HF: Idle mode | UID | ~ |
| | | Length of read data | 128 byte | ~ |
| | | Length of write data | 128 byte | ~ |

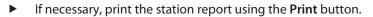
Fig. 82: Setting parameters in the web server



- Select **HF extended** mode from the **Operation mode** drop-down menu.
- Save settings: Click Write.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Parameter | | |
|---------------------------------|------------------|---|-----------------------------|---|
| j Info | <u>▶</u> | Ē | | |
| {ွ်} Parameter | Write Channel vi | iew Print | | |
| 🕑 Diagnosis | RFID channel | Operation mode | HF extended v deactivated | ? |
| Event log | 0 | HF: Select Tag type | HF compact | ? |
| , ך√ך Ex- / Import | RFID channel | HF: Bypass time (*1ms) | HF extended HF bus mode | ? |
| Change Password | 1 | HF: Multitag | UHF compact UHF extended | ? |
| \iint Firmware | | Heart beat read/write head | | ? |
| | DXP 4 | HF: Autotuning read/write head | no 🗸 | ? |
| LOCAL I/O {္ဂ်္ဒ္ဒ Parameter | DXP 5 | Deactivate HF read/write head detuned diagnostic | no 🗸 | ? |
| Diagnosis | | Deactivate diagnostics | no 🗸 | ? |
| ್ರ್ ್ ನ√್ರ Input | DXP 6 | Command retries at failure | 2 | ? |
| | | HF: Command in continuous mode | Inventory 🗸 | ? |
| தா்∂ Output | DXP 7 | HF: Length in continuous mode | 8 | ? |
| | DAI 7 | HF: Address in continuous mode | 0 | ? |
| | | HF: Idle mode | UID 🗸 | ? |
| | | Length of read data | 128 byte 🗸 | ? |
| | | Length of write data | 128 byte 🗸 | ? |

Fig. 83: Drop-down menu — operation mode



| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Parameter | r | |
|---------------------------------|-------------------|---|----------------------------|------|
| (i) Info | | Ē | | |
| <္ဂ်ို Parameter | Write Channel vie | ew Print | | |
| 🖓 Diagnosis | RFID channel | Operation mode | HF extended | × ? |
| 4 Event log | 0 | HF: Select Tag type | automatic tag detection HF | × ? |
| , ך√ך Ex- / Import | RFID channel | HF: Bypass time (*1ms) | 200 | ? |
| Change Password | 1 | HF: Multitag | no | × ? |
| — Firmware | | Heart beat read/write head | no | × ? |
| | DXP 4 | HF: Autotuning read/write head | no | × ? |
| LOCAL I/O {္က်} Parameter | DXP 5 | Deactivate HF read/write head detuned diagnostic | no | ~ · |
| 😳 Diagnosis | | Deactivate diagnostics | no | × (|
| ຼີິ ລູ√ _ເ _ Input | DXP 6 | Command retries at failure | 2 | ? |
| | Divit o | HF: Command in continuous mode | Inventory | × ? |
| പ്പം Output | DXP 7 | HF: Length in continuous mode | 8 | ? |
| | DAF 1 | HF: Address in continuous mode | 0 | ? |
| | | HF: Idle mode | UID | × (? |
| | | Length of read data | 128 byte | × (? |
| | | Length of write data | 128 byte | ~ · |

Fig. 84: Print station report



Example: Executing a read command

In the following example, 8 bytes of a tag are read by a read/write head connected to channel 0 of the interface.

- Click Local I/O \rightarrow Output in the navigation bar on the left of the screen.
- Select **RFID channel 0**.
- 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.**
- ⇒ The read command is sent.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2R | FID-4DXP - Local I/O - Output | |
|----------------------------|-----------------|--|---|
| j Info | ▶₽ | Ē | |
| {္က်ို Parameter | Write Channel v | | |
| 😳 Diagnosis | RFID channel | Input values | |
| لا Event log | 0 | Response code | 0x0000 Idle ? |
| , בעייי ר, Ex- / Import | RFID channel | Tag present at read/write head | no ? |
| Change Password | 1 | HF read/write head switched on | yes ? |
| - V change i assirera | | Continuous (Presence sensing) mode active | no ? |
| Firmware | DXP 4 | Loop counter for fast processing | 0x0000 Idle |
| LOCAL I/O | | Antenna detuned at HF read/write head x | 0x0001 Inventory 0x0002 Read |
| {ွ်} Parameter | DXP 5 | Parameter not supported by read/write head x | 0x0004 Write |
| 🕑 Diagnosis | | Error reported by read/write head x | 0x0007 Change EPC length and write new EPC (UHF) 0x0008 Write and Verify |
| ್ಷ-್ಕ್ Input | DXP 6 | Not connected to read/write head x | 0x0010 Continuous Mode 0x0011 Read buffer (Cont. Mode) |
| പ്പ് Output | | Length | 0x0012 Stop Continuous (Presence Sensing) Mode 0x0020 UHF Continuous Presence Sensing Mode |
| | DXP 7 | Error code | 0x0040 HF Read/write head off |
| | | Tag counter | 0x0041 Read/write head identification 0x0042 Get UHF read/write head status/error |
| | | Data (Bytes) available | 0x0050 Tag info 0x0060 Direct read/write head command |
| | | Read fragment No. | 0x0070 Get HF read/write head address |
| | | 5 | 0x0071 Set HF read/write head address 0x0080 Tune HF Read/write head |
| | | Write fragment No. Output values | 0x0100 Set read/write head password 0x0101 Reset read/write head password |
| | | Command code | 0x0000 Idle · ? |
| | | Loop counter for fast processing | 0 |
| | | Start address | <u> </u> |
| | | Length | 8 |
| | | Length of UID/EPC | 0 ? |
| | | Command timeout (*1ms) | 0 ? |
| | | Read fragment No. | 0 ? |
| | | Write fragment No. | 0 ? |
| | | Input buffer | · · · |
| | | Input buffer 0-7 | 00 00 00 00 00 00 00 00 |
| | | | |

Fig. 85: Setting the read command in the web server



The receipt of the command is confirmed automatically in the input data under Input values \rightarrow Response code with 0x8002 Busy – Read.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RI | FID-4DXP - Local I/O - Output | | |
|------------------------|------------------|--|-------------------------|---|
| j Info | <u>• -</u> | Ē | | |
| {ွ်} Parameter | Write Channel vi | iew Print | | |
| Cy Diagnosis | RFID channel | Input values | | |
| Event log | 0 | Response code | 0x8002 Busy - Read | ? |
| , ſ↓┐ Ex- / Import | RFID channel | Tag present at read/write head | no | ? |
| Change Password | 1 | HF read/write head switched on | yes | ? |
| Firmware | | Continuous (Presence sensing) mode active | no | ? |
| | DXP 4 | Loop counter for fast processing | 0 | ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no | ? |
| {္တို Parameter | DXP 5 | Parameter not supported by read/write head x | no | ? |
| 🖓 Diagnosis | | Error reported by read/write head x | no | ? |
| ఫ ^ٺ ∽ Input | DXP 6 | Not connected to read/write head x | no | ? |
| ∱் Output | | Length | 0 | ? |
| | DXP 7 | Error code | - | ? |
| | | 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 | 0 | ? |
| | | Start address | 0 | ? |
| | | Length | 8 | ? |
| | | Length of UID/EPC | 0 | ? |
| | | Command timeout (*1ms) | 0 | ? |
| | | Read fragment No. | 0 | ? |
| | | Write fragment No. | 0 | ? |
| | | Input buffer | | - |
| | | Input buffer 0-7 | 00 00 00 00 00 00 00 00 | |

Fig. 86: Input data



The read command is executed as soon as a tag is present in the detection range of the read/ write head.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RI | FID-4DXP - Local I/O - Output | | |
|------------------------|------------------|--|-------------------------|---|
| j Info | • E | | | |
| န့်္ပိန Parameter | Write Channel vi | | | |
| 🕑 Diagnosis | RFID channel | Input values | | 1 |
| Event log | 0 | Response code | 0x0002 Read | ? |
| , Lx- / Import | RFID channel | Tag present at read/write head | yes | ? |
| Change Password | 1 | HF read/write head switched on | yes | ? |
| - J Change F assirond | | Continuous (Presence sensing) mode active | no | ? |
| Firmware | DXP 4 | Loop counter for fast processing | 0 | ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no | ? |
| ႏွ်ိုး Parameter | DXP 5 | Parameter not supported by read/write head x | no | ? |
| 🕑 Diagnosis | | Error reported by read/write head x | no | ? |
| ي ^ٺ ح Input | DXP 6 | Not connected to read/write head x | no | ? |
| தீ⊉ Output | | Length | 8 | ? |
| | DXP 7 | Error code | - | ? |
| | | Tag counter | 3 | ? |
| | | Data (Bytes) available | 0 | ? |
| | | Read fragment No. | 0 | ? |
| | | Write fragment No. | 0 | ? |
| | | Output values | | • |
| | | Command code | 0x0002 Read 🗸 | ? |
| | | Loop counter for fast processing | 0 | ? |
| | | Start address | 0 | ? |
| | | Length | 8 | ? |
| | | Length of UID/EPC | 0 | ? |
| | | Command timeout (*1ms) | 0 | ? |
| | | Read fragment No. | 0 | ? |
| | | Write fragment No. | 0 | ? |
| | | Input buffer | | |
| | | Input buffer 0-7 | ff ff ff ff ff ff ff ff | |

Fig. 87: Input data with successfully executed read command



TBEN-S2-2RFID-4DXP TBEN-S2-2RFID-4DXP - Local I/O - Input ÷ ▶ 🗒 <िं} Parameter Write Channel view Print Input values Diagnosis **RFID** channel 0x0002 Read ? 0 Response code Event log yes ? Tag present at read/write head Ex- / Import RFID channel yes ? HF read/write head switched on 1 🔍 Change Password no ? Continuous (Presence sensing) mode active Firmware DXP 4 0 ? Loop counter for fast processing LOCAL I/O no Antenna detuned at HF read/write head x ? දි්රි Parameter DXP 5 Parameter not supported by read/write head x ? 🕑 Diagnosis no ? Error reported by read/write head x DXP 6 no ? Not connected to read/write head x <u>ි</u> Output 8 ? Length DXP 7 Error code ? 3 ? Tag counter 0 Module state ? Data (Bytes) available 0 ? Read fragment No. 0 Write fragment No. ? Input buffer ** Input buffer 0-7 00 00 00 00 00 00 00 00 Input buffer 8-15 00 00 00 00 00 00 00 00 00 Input buffer 16-23 00 00 00 00 00 00 00 00 Input buffer 24-31 00 00 00 00 00 00 00 00 Input buffer 32-39 00 00 00 00 00 00 00 00 Input buffer 40-47 00 00 00 00 00 00 00 00 00 Input buffer 48-55 00 00 00 00 00 00 00 00 00 Input buffer 56-63 00 00 00 00 00 00 00 00 Input buffer 64-71 00 00 00 00 00 00 00 00 Input buffer 72-79 00 00 00 00 00 00 00 00 00 Input buffer 80-87 00 00 00 00 00 00 00 00 Input buffer 88-95 00 00 00 00 00 00 00 00 00 Input buffer 96-103 00 00 00 00 00 00 00 00 Input buffer 104-111 00 00 00 00 00 00 00 00 Input buffer 112-119 00 00 00 00 00 00 00 00 Input buffer 120-127

The read data can be called at Local I/O \rightarrow Input.

Fig. 88: Read data

Example: Executing a command in bus mode

In the following example, the read/write head with address 2 is to read 8 bytes from a tag in HF bus mode. Two read/write heads are connected to channel 0 of the interface.

- Click Local I/O \rightarrow Parameter in the navigation bar on the left of the screen.
- Select **RFID channel 0**.
- Select **HF bus mode** from the **Operation mode** drop-down menu.
- Activate connected read/write heads 1 and 2.
- Click Write to write the set parameters to the device.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2R | FID-4DXP - Local I/O - Parameter | | | |
|--------------------------------|-----------------|---|----------------------------|----------|---|
| j Info | <u>▶</u> ■ | Ē | | | |
| {္မ်ို Parameter | Write Channel v | view Print | | | _ |
| 🕑 Diagnosis | RFID channel | Operation mode | HF bus mode | ~ / | ? |
| Event log | 0 | HF: Select Tag type | automatic tag detection HF | ~ | ? |
| , [↓] Ex- / Import | RFID channel | HF: Bypass time (*1ms) | 200 | | ? |
| Change Password | 1 | HF: Multitag | no | ~ | ? |
| Firmware | | Termination active | yes | ~ | ? |
| | DXP 4 | HF: Autotuning read/write head | no | ~ | ? |
| LOCAL I/O දိ္သို့ Parameter | DXP 5 | Deactivate HF read/write head detuned diagnostic | no | ~ | ? |
| Diagnosis | | Deactivate diagnostics | no | ~ | ? |
| వీ⊱_ Input | DXP 6 | Command retries at failure | 2 | | ? |
| చి మాలు ఆట్ | | HF: Command in continuous mode | Inventory | ~ | ? |
| | DXP 7 | HF: Length in continuous mode | 8 | | ? |
| | DAI 7 | HF: Address in continuous mode | 0 | | ? |
| | | HF: Idle mode | UID | ~ | ? |
| | | Length of read data | 128 byte | ~ | ? |
| | | Length of write data | 128 byte | ~ | ? |
| | | Head select | | | - |
| | | Activate read-write-head 1 | yes | <i>i</i> | ? |
| | | Activate read-write-head 2 | yes | ~ / | ? |
| | | Activate read-write-head 3 | no | ~ | ? |
| | | Activate read-write-head 4 | no | ~ | ? |
| | | Activate read-write-head 5 | no | ~ | ? |
| | | Activate read-write-head 6 | no | ~ | ? |

Fig. 89: Reading tags in HF bus mode — parameters



- Under Output values, select the read command (0x002 Read) from the Command code drop-down menu.
- Specify the length of the read data in the **Length** input field (here: **8**).
- Specify the read/write head address in the **Read/write head address** parameter (here: **2**).

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RI | FID-4DXP - Local I/O - Output | | |
|---------------------------|-----------------|--|--------------------|---|
| j Info | ▶員 | Ē | | |
| ႏွိုး Parameter | Write Channel v | | | |
| 🕑 Diagnosis | RFID channel | Input values | | |
| Event log | 0 | Response code | 0x8002 Busy - Read | ? |
| , [↓] Ex- / Import | RFID channel | Tag present at read/write head | no | ? |
| Change Password | 1 | HF read/write head switched on | yes | ? |
| Firmware | | Continuous (Presence sensing) mode active | по | ? |
| | DXP 4 | Loop counter for fast processing | 0 | ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no | ? |
| {်} Parameter | DXP 5 | Parameter not supported by read/write head x | no | ? |
| 😋 Diagnosis | | Error reported by read/write head x | no | ? |
| ਹੁ [⊥] ∕∽ੁ Input | DXP 6 | Not connected to read/write head x | no | ? |
| தீ≱ Output | | Length | 0 | ? |
| | DXP 7 | Error code | - | ? |
| | | 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 | 0 | ? |
| | | Start address | 0 | ? |
| | | Length | 8 | ? |
| | | Length of UID/EPC | 0 | ? |
| | | Read/write head address | 2 | ? |
| | | Command timeout (*1ms) | 0 | ? |
| | | Read fragment No. | 0 | ? |
| | | Write fragment No. | 0 | ? |

Fig. 90: Reading tags in HF bus mode — process output data



8.10 Testing and parameterizing RFID interfaces via the DTM

The device can be tested and assigned parameters with the DTM (Device Type Manager) via PACTware.

The different functions of the DTM are displayed by right-clicking the device in the project tree.

You can start the following functions:

- Parameters: Adapt parameters to the actual application
- Measured values: Display of the data read by the RFID interface
- Simulation: Set output parameter of the device for the function test
- Diagnostics: Display of the diagnostic messages of the device or the entire RFID system

8.10.1 Connecting the device with the PC

- Open PACTware.
- Right-click **Host PC** in the project tree.
- Click Add device.
- Select **BL Service Ethernet**.
- Confirm the selection with **OK**.

| PACTware - | - 🗆 🗙 |
|---|------------------|
| File Edit View Project Device Extras Window Help | |
| | |
| Project • × | (O) |
| Device tag 0 | Devi |
| B HOST PC | © Device catalog |
| Device for > | |
| All Devices (2/2 DTMs) | |
| | |
| Enter text to search | |
| Device Protocol Vendor Group Device Version FDT version DTM version | |
| BL Service Ethernet BL Servic., Turck DTM spe., 1.0.0 / 2007, 1.2.0.0 1.00.260., | |
| BL Service R5232 BL Service Turck DTM spe 1.0.0 / 2007 1.2.0.0 1.00.260 | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| BL Service Ethernet Com DTM | _ |
| | |
| | |
| | _ |
| OK Cancel | |
| · · · · · · · · · · · · · · · · · · · | _ |
| | |
| Image: Weight of the second | |

Fig. 91: Selecting an Ethernet adapter



- Right-click the Ethernet adapter in the project tree.
- Click Add device.
- ► Select TBEN-S2-2RFID-4DXP.
- Confirm the selection with **OK**.

| ect | | 4 × | | | |
|------------------|---------------------------------------|---|--|--------------|--|
| ice tag | Address 🚺 🖏 Device ty | pe Status | | | |
| HOST PC | | | | | |
| TCP:192.168.1.50 | 🖋 🕪 💳 BL Ser | rvic O | | | |
| | | | | | |
| | | Device for | | | |
| | | All Devices | | | |
| | | Device | Protocol Vendor | Group | Device Version FDT version DTI |
| | | TBEIN-31-40IP-400P TBEIN-S1-8DIP | BL Service Etherne Turck | DTM specific | 1.0.0 / 2008-01-1 1.2.0 Addendum 1.0 1.0.0 / 2008-01-1 1.2.0 Addendum 1.0 |
| | | TBEN-S1-8DIP-D | BL Service Etherne Turck | DTM specific | 1.0.0 / 2008-01-1 1.2.0 Addendum 1.0 1.0.0 / 2008-01-1 1.2.0 Addendum 1.0 |
| | | TBEN-S1-8DOP | BL Service Etherne Turck | DTM specific | 1.0.0 / 2008-01-1 1.2.0 Addendum 1.0 |
| | | TBEN-S1-8DXP | BL Service Etherne Turck | DTM specific | 1.0.0 / 2008-01-1 1.2.0 Addendum 1.0 |
| | | TBEN-S2-2COM-4DXP | BL Service Etherne Turck | DTM specific | 1.0.0 / 2015-09-1 1.2.0 Addendum 1.0 |
| | | TBEN-S2-2RFID-4DXP | BL Service Etherne Turck | DTM specific | 1.0.0 / 2016-06-1 1.2.0 Addendum 1.0 |
| | i i i i i i i i i i i i i i i i i i i | TBEN-S2-4AI | BL Service Etherne Turck | DTM specific | 1.0.0 / 2015-01-2 1.2.0 Addendum 1.0 |
| | | TBEN-S2-4AO | BL Service Etherne Turck | DTM specific | 1.0.0 / 2015-01-2 1.2.0 Addendum 1.0 |
| | | TBEN-S2-4IOL | BL Service Etherne Turck | DTM specific | 1.0.0 / 2015-01-2 1.2.0 Addendum 1.0 |
| | | TBPN-L1-FDIO1-2IOL | BL Service Etherne Turck | DTM specific | 1.0.0 / 2015-07-0 1.2.0 Addendum 1.0 |
| | | • | m | | E E |
| | | FwDwlBaudrate="9600" | adFile="dat" FWDownloadBinaryStart="262144" DWLOptions="142+" DataBase="C:\Program File ="TBEN-S2-2RFID-4DXP" WizFavorite="1130"/> | | wBIDtm\database\gwBLDTM Turck |
| | | | | | OK Cancel |

Fig. 92: Selecting TBEN-S2-2RFID-4DXP



- Enter the **IP address** of the device (example: 192.168.1.20).
- Enter the **IP address** of the device (example: 192.168.1.254).
- Optional: Enter the **designation** and **device description**.
- Confirm entries with OK.

| File Edit View Project Device Extra | | | | |
|-------------------------------------|-------------------------|------------|-----------------|---------------------|
| - D 💕 🖬 🖪 🗗 - 🔛 📭 🗄 🖬 🗠 🖄 | 🛛 😫 🦉 🍀 📓 🔜 | | | |
| Project | | 4 × | | |
| Device tag | Address 🚺 🐝 Device type | Status | | |
| HOST PC | | | | |
| TCP:192.168.1.50 | 🖉 🐠 💳 BL Servic | 0 | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | Device data | × |
| | | | IP address | Designation ('Tag') |
| | | | 192.168.1.20 | TBEN-S2-2RFID-4DXP |
| | | | 102.100.1.20 | Device short name |
| | | | | Device short name |
| | | | | |
| | | | | OK |
| | | | | |

Fig. 93: Entering the IP address

- ✓ The project tree is complete.
- Right-click the device in the project tree.
- Click Connect.
- ⇒ Once connected, you have read and write access to input and output data and to parameter data.

| PACTware | 1. | | | | |
|-------------------------|-------------|--------------|------|-------------|------------|
| File Edit View Projec | t Device I | Extras Windo | w He | elp | |
| : 🗋 💕 🛃 🎒 👘 - 🛙 🗱 |) 🍋 🗄 ք | 🕸 M 🗗 | 1 🔊 | 🗱 🔤 | |
| Project | | | | | 4 × |
| Device tag | | Address | 0 👬 | Device type | Status |
| 📕 HOST PC | | | | | |
| 🖃 🕶 TCP:192.168.1.50 | | | / ⊅ | 🔫 BL Servi | 0 |
| 🖃 🖛 192.168.1.20/TBEN-9 | 2-2RFID-4DX | • | / ⊅⊧ | TBEN-S2 | 0 |
| 📖 📮 😓 Modulbus | | | =0= | 🗧 Modulbu | |
| 🗆 🖃 💳 01/S2-2RFID-4D | XP | 01 | / ⇒ | Intern-S | 0 |
| ···· 호 UHF Ident 0 | | | =0= | 🜻 UHF Idei | |
| ्र UHF Ident 1 | | | =0= | 🜻 UHF Idei | |

Fig. 94: Complete project tree



8.10.2 Editing parameter data with the DTM — online parameterization

The parameter data can be changed and written to the device via the online parameterization.

- Right-click the device in the project tree.
- Click Online parameterization.

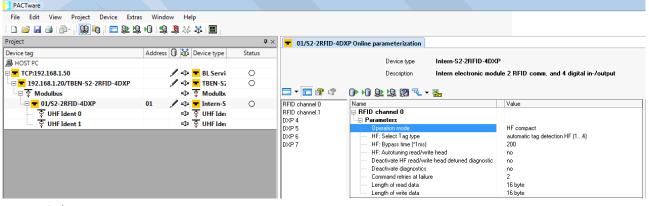


Fig. 95: Online parameterization

Example: Selecting an operating mode

- ▶ In the Online parameterization window, click the operating mode.
- Select the required operating mode from the drop-down menu.

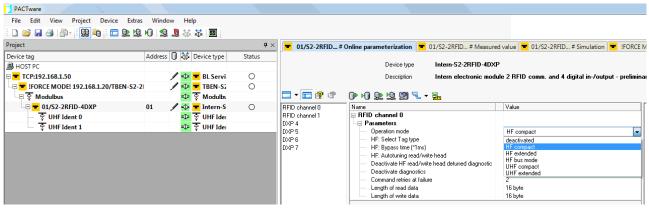


Fig. 96: Example — selecting an operation mode



8.10.3 Reading process input data with the DTM — measured value

The measured value function of the DTM allows the process input data to be read.

- Right-click the device in the project tree.
- Click Measured value.
- ▶ In the central window, select the required channel.
- ⇒ The process input data is displayed in the window on the right-hand side (example: The device is in idle mode).

| File Edit View Project Device Extras | | | | | | | |
|---|----------------------------------|---------------|--|--|------------------|---|-------------|
| D 💕 🚽 🦪 👘 - 🛛 🔛 👘 🗄 🗖 处 😟 roject Device tag | Address () () Device type | ₽ × Status | ■ 01/S2-2RFID-4DX | # Online parameterization | ■ 01/S2-2RFID-4 | DXP # Measured value | |
| HOST PC | | | | Device type | Intern-S2-2RFI | D-4DXP | |
| TCP:192.168.1.50 | 🖊 🖘 🔫 BL Servi | 0 | | Description | Intern electroni | c module 2 RFID comm | . and 4 dig |
| | 🖍 =ᢗ= 🔽 TBEN-S2 =ᢗ= 호 Modulbu | 0 | 🗖 • 🗖 😤 🕸 | De 🖫 🕶 🎆 | | | |
| | 01 | 0 | RFID channel 0 RFID channel 1 DXP 4 DXP 5 DXP 5 DXP 6 DXP 6 DXP 7 Module state | Name RFID channel 0 Input values Response code Tag present at read// Length Error code Tag counter Input buffer Input buffer Input buffer 0-7 Inp | | Value 0x0000 Idle no 0 0 3 000000000000000 00000000000 | ٠ |

Fig. 97: Measured value function of the DTM

8.10.4 Changing process output data with the DTM — simulation

The simulation function of the DTM allows the process output data to be changed.

- Right-click the device in the project tree.
- Click Simulation.
- ▶ In the central window, select the required channel.
- ⇒ The process output data is displayed in the window on the right-hand side (example: The device is in idle mode).

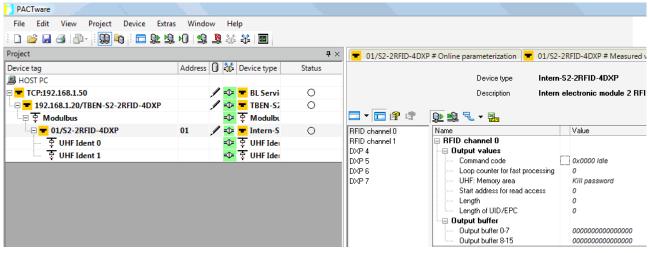


Fig. 98: Simulation function of the DTM



8.10.5 Evaluating diagnostics with the DTM

The diagnostics function of the DTM allows the diagnostics of all channels to be called up.

- Right-click the device in the project tree.
- Click Diagnostics.
- ▶ In the central window, select the required channel.
- ➡ The process output data is displayed in the window on the right-hand side (example: No diagnostics available).

| Project | | | ₽ × | 🔽 01/S2-2RFID-4D # Online parameterization 🔽 01/S2-2RFID-4D # Measured value 🔽 01/S2-2RFID-4D # Simulation |
|-------------------------------------|-------------|--------------|------------|--|
| Device tag | Address 🚺 👌 | Device type | Status | |
| HOST PC | | | | Device type Intern-S2-2RFID-4DXP |
| TCP:192.168.1.50 | 1 🗐 | BL Servi | 0 | Description Intern electronic module 2 RFID comm. and 4 digital in-/output |
| 🖃 💳 192.168.1.20/TBEN-S2-2RFID-4DXP | 1 🗐 | F TBEN-S2 | 0 | |
| | | > 호 Modulbu | | 🗖 🔻 🗖 😰 🖓 🛛 <u>D</u> 🖫 🦉 📲 |
| | | Intern-S | 0 | DXP channel Value |
| ्रू UHF Ident 0 | | > 호 UHF Idei | - | RFID channel 0 RFID channel 0 |
| · UHF Ident 1 | | > 😨 UHF Ide | | RFID channel 1 |
| γ 010 Benn 2 | | | | DXP 4 Overcurrent supply VAUX1 |
| | | | | DXP 5 - Parameterization error - DXP 6 - Configuration via DTM active - |
| | | | | DXP 7 Diagnostics head 1 |
| | | | | HF Read/write head address x detuned - |
| | | | | Parameter not supported by read/write head address x |
| | | | | Read/write head address x reports error |
| | | | | Expected read/wite head address x not connected - |
| | | | | HF Read/write head address x detuned - |
| | | | | Parameter not supported by read/write head address x - |
| | | | | Read/write head address x reports error |
| | | | | Expected read/write head address x not connected - |
| | | | | |
| | | | | Predu/wite read address x detured Parameter not supported by read/write head address x |
| | | | | Read/write head address x reports error - |
| | | | | Expected read/write head address x not connected - |
| | | | | Diagnostics head 4 |
| | | | | HF Read/write head address x detuned - |
| | | | | Parameter not supported by read/write head address x - Read/write head address x reports error - |
| | | | | Expected read/write head address x not connected - |
| | | | | - Diagnostics head 5 |
| | | | | HF Read/write head address x detuned - |
| | | | | Parameter not supported by read/write head address x |
| | | | | Read/write head address x reports error Expected read/write head address x not connected |
| | | | | Expected read/write head address x hot connected - |
| | | | | HF Read/write head address x detuned - |
| | | | | Parameter not supported by read/write head address x - |
| | | | | |
| | | | | Expected read/wite head address x not connected - |
| | | | | HF Read/wite head address x detuned - |
| | | | | Parameter not supported by read/write head address x = |
| | | | | Read/write head address x reports error - |
| | | | | Expected read/write head address x not connected - |
| | | | | Diagnostics head 8 |
| | | | | HF Read/write head address x detuned Parameter not supported by read/write head address x |
| | | | | Parameter not supported by read/write head address x - Read/write head address x reports error - |
| | | | | Expected read/write head address x not connected |
| | | | | |
| | | | | |

Fig. 99: Diagnostics function of the DTM



8.10.6 Example: Executing a read command with the DTM

In the following example, 8 bytes of a tag are read by a read/write head connected to channel 0 of the interface.

- Right-click the device in the project tree.
- Click Simulation.
- Select **RFID channel 0** in the central window.
- Setting the length: Double-click current value.
- Confirm all the subsequent messages.
- ⇒ The DTM starts force mode. In force mode, all input values are written directly to the connected device.
- Enter the **Length** in bytes (example: 8).
- Select the Command code from the drop-down menu (example: 0x0002 Read).

| RFID channel 0 | Name Value | |
|----------------|--|---|
| RFID channel 1 | 🛱 RFID channel 0 | |
| DXP 4 | | |
| DXP 5 | Response code 0x0002 Read | |
| DXP 6 DXP 7 | Tag present at read/write head address x ycs | 0 |
| Module state | Loop counter for fast processing O | |
| Module state | Ength 8 | |
| | Error code 0 | |
| | Tag counter 5 | |
| | | |

Fig. 100: Executing a read command — window: Simulation

The read data is displayed in the **Measured value** window. The data format is hexadecimal.

| 🗖 🕶 🔂 📽 | D 2 - 3 | | Measured value |
|----------------|--|---|----------------|
| RFID channel 0 | Name | Value | |
| RFID channel 1 | 🖶 RFID channel 0 | | |
| DXP 4 | | | |
| DXP 5 | Response code | 0x0002 Read | |
| DXP 6 | Tag present at read/write head address x | yes | 6 |
| DXP 7 | Loop counter for fast processing | 0 | |
| Module state | Loop counter for fast processing | 8 | |
| | Error code | 0 | |
| | Tag counter | 5 | |
| | | 5 | |
| | Input buffer 0-7 | 000000000000000000000000000000000000000 | |
| | Input buffer 8-15 | 000000000000000000000000000000000000000 | |

Fig. 101: Executing a read command — window: Measured value



8.11 Setting RFID interfaces with the RFID PC Demo software for Modbus TCP

The devices can be set and commands sent to the devices via the RFID PC Demo software for Modbus TCP. To be able to adjust the settings with a PC, the device and the PC must be on the same IP network.

The RFID PC Demo software for Modbus TCP is available free of charge for download at www.turck.com.

8.11.1 Establishing a connection

- Enter the IP address of the device on the home page.
- Click Connect.
- ⇒ The connection is established.

Write access to input, output and parameter data is possible after the connection has been established.

| Your Global Automation Partner | | | | TU | RCK |
|---|-----------------------------|---|------------------------------------|----------|-----------|
| IP Address : 192.168.1.11 Connect | Modbus cycle time(ms) : 100 | | | | English V |
| Channel 0 Channel 1 DXP Module Status View Data | | | | | |
| Parameters Read/Write Diagnostics | | | | | |
| Operation mode | ~ | | Head | Activate | ^ |
| HF: Select Tag type | | • | Head 1 - Activate read-write-head | | |
| HF: Bypass time (* 1ms) | | | Head 2 - Activate read-write-head | | |
| | | | Head 3 - Activate read-write-head | | |
| HF: Multitag | | | Head 4 - Activate read-write-head | | |
| HF: Heart beat read/write head | | | Head 5 - Activate read-write-head | | |
| Termination active | | | Head 6 - Activate read-write-head | | |
| HF: Autotuning read/write head | | | Head 7 - Activate read-write-head | | |
| Deactivate HF detuned diagnostic | | | Head 8 - Activate read-write-head | | |
| Deactivate diagnostics | | | Head 9 - Activate read-write-head | | |
| Command retries at failure | | | Head 10 - Activate read-write-head | | |
| | | | Head 11 - Activate read-write-head | | |
| HF: Command in continuous mode | ~ | | Head 12 - Activate read-write-head | | |
| HF: Idle mode | × | | Head 13 - Activate read-write-head | | |
| HF: Length in continuous mode | 0 | | Head 14 - Activate read-write-head | | |
| HF: Address in continuous mode | 0 | | Head 15 - Activate read-write-head | | |
| | | | Head 16 - Activate read-write-head | | |
| Refresh | Submit | | Head 17 - Activate read-write-head | | |
| | | | Head 18 - Activate read-write-head | | |
| | | | Head 19 - Activate read-write-head | | |
| | | | Head 20 - Activate read-write-head | | |
| | | | Head 21 - Activate read-write-head | | |
| | | | Head 22 - Activate read-write-head | | ~ |
| | | | | | |
| 28.06.2021 13:17:37 : [Info] Program loaded. | | | | | Clear |

Fig. 102: Launching RFID PC Demo for Modbus TCP



8.11.2 Editing settings

Example: setting the operation mode for channel 0

In the following example, the operating mode of channel 0 is set to RF extended.

- ► Channel 0 → Parameters → Operating mode: From drop-down menu 2: Select HF extended.
- Click Confirm.
- \Rightarrow The settings are saved.

| IP Address : | 192.168.1.11 | | | Disconnect | | Modbus cycle time(ms) : | 100 🜩 | |
|---------------|--------------|--------------|-----------|--------------------------|---------|-----------------------------------|--------------|----------|
| Channel 0 Cha | annel 1 DXP | Module State | ıs View D | ata | | | | |
| Parameters | Read/Write | Diagnostics | | | | | | |
| | | | | Operation | mode | 1: HF compact | | ~ |
| | | | | HF: Select Tag | g type | 0: deactivated 1: HF compact | | |
| | | | | HF: Bypass time | (*1ms) | 2: HF extended 3: HF bus mode | | |
| | | | | HF: M | ultitag | 4: UHF compact 5: UHF extended | | |
| | | | Н | F: Heart beat read/write | head | | | |
| | | | | Termination a | active | | \checkmark | |
| | | | Н | F: Autotuning read/write | head | | | |
| | | | Dead | ctivate HF detuned diag | nostic | | | |
| | | | | Deactivate diagn | ostics | | | |
| | | | | Command retries at f | failure | 2 | | ▲ ▼ |
| | | | HF: (| Command in continuous | mode | 0x01: Inventory | | ~ |
| | | | | HF: Idle | mode | UID | | ~ |
| | | | н | F: Length in continuous | mode | 8 | | • |
| | | | HF | : Address in continuous | mode | 0 | | - |
| | Refre | esh | | | | | Submit | |

Fig. 103: Setting the operation mode



Example: executing a read command

In the following example, 16 bytes of a tag are read by a read/write head connected to channel 0 of the interface.

- ► Channel 0 → Read/Write → Command code: Select the read command via the dropdown menu (0x0002 Read).
- Enter the number of bytes to be read in the **Length** entry field (here: **16**).
- Sending a read command: In the **Command** tab, click the **Confirm** button.

| arameters Read/Write Diag | nostics | | | | | | |
|----------------------------|------------------------|----------------------|---------|------------|------------|--------------|-----|
| | | Command code | | 0 | utput data | | |
| 0x0002 Read | | ~ | Address | Value(Dec) | Value(Hex) | Value(Ascii) | |
| | Loop counter | 0 | 0 | 0 | 00 | | |
| | Memory area (only UHF) | 0: Kill password 🗸 🗸 | 1 | 0 | 00 | | -11 |
| | Start address | 0 | 2 | 0 | 00 | | |
| | | | 3 | 0 | 00 | | 11 |
| | Length | 16 🔶 | 4 | 0 | 00 | | Ъ |
| | Length UID/EPC | 0 | 5 | 0 | 00 | | |
| | Timeout | 0 | 6 | 0 | 00 | | |
| | Read fragment no. | 0 | 7 | 0 | 00 | | |
| | - | | 8 | 0 | 00 | | 11 |
| | | 0 | 9 | 0 | 00 | | 11 |
| | Antenna no. | 0 | 10 | 0 | 00 | | 11 |
| Command Automatic | | | 11 | 0 | 00 | | 11 |
| Idle | Reset | Submit | 12 | 0 | 00 | | 11 |
| | | | 13 | 0 | 00 | | 11 |
| Read | Write | Inventory | 14 | 0 | 00 | | 11 |
| Use settings of the previo | us | | 15 | 0 | 00 | | |
| execution | | | 16 | 0 | 00 | | -1 |

Fig. 104: Setting a read command



| Respo | nse code | | | Input data | |
|--|----------|---------|------------|------------|--------------|
| 0x8002) Busy | | Address | Value(Dec) | Value(Hex) | Value(Ascii) |
| Error | 0 | 0 | 0 | 00 | |
| Busy | | 1 | 0 | 00 | |
| Tag within the detection range | • | 2 | 0 | 00 | |
| HF read/write head switched on | | 3 | 0 | 00 | |
| Continuous mode active | ă | 4 | 0 | 00 | |
| Loop counter | 0 | 5 | 0 | 00 | |
| Read/write head detuned | | 6 | 0 | 00 | |
| | 0 | 7 | 0 | 00 | |
| Parameter not supported by read/write head | • | 8 | 0 | 00 | |
| Read/write head reports error | • | 9 | 0 | 00 | |
| Expected read/write head not connected | • | 10 | 0 | 00 | |
| Length | 0 | 11 | 0 | 00 | |
| Error code | 0 | 12 | 0 | 00 | |
| Tag counter | 0 | 13 | 0 | 00 | |
| Data (bytes) available | 0 | 14 | 0 | 00 | |
| Read fragment no. | 0 | 15 | 0 | 00 | |
| Write fragment no. | 0 | 16 | 0 | 00 | |
| the agnor to. | v | 17 | 0 | 00 | |

⇒ The receipt of the command is confirmed under **Response code** with (0x8002) Busy.

Fig. 105: Receiving a read command



| Resp | onse code | Input data | | | | |
|--|-----------|------------|------------|------------|--------------|--|
| (0x0002) Read | | Address | Value(Dec) | Value(Hex) | Value(Ascii) | |
| Erro | r 🎱 | 0 | 84 | 54 | Т | |
| Bus | / 🥥 | 1 | 78 | 4E | N | |
| Tag within the detection range | • | 2 | 65 | 41 | A | |
| HF read/write head switched or | 1 | 3 | 0 | 00 | | |
| Continuous mode active | ă | 4 | 117 | 75 | u | |
| Loop counte | • | 5 | 70 | 46 | F | |
| | | 6 | 80 | 50 | Р | |
| Read/write head detuned | - | 7 | 0 | 00 | | |
| Parameter not supported by read/write head | | 8 | 114 | 72 | r | |
| Read/write head reports erro | r 🥥 | 9 | 67 | 43 | С | |
| Expected read/write head not connected | H 🕘 | 10 | 80 | 50 | P | |
| Length | n 16 | 11 | 18 | 12 | ٥ | |
| Error code | e 0 | 12 | 99 | 63 | с | |
| Tag counte | r 1 | 13 | 0 | 00 | | |
| Data (bytes) available | e 0 | 14 | 0 | 00 | | |
| Read fragment no | | 15 | 0 | 00 | | |
| Write fragment no | | 16 | 0 | 00 | | |
| | . 0 | 47 | • | 00 | | |

The read command is executed when there is a tag in the detection range of the read/write head. The read data is displayed in the **Input data** window.

Fig. 106: Input data for a successful read command

Example: Executing a command in bus mode

In the following example, the read/write head with address 1 is to read 8 bytes from a tag in HF bus mode. Two read/write heads are connected to channel 0 of the interface.

► Channel 0 → Parameters → Operating mode: From drop-down menu 3: Select HF bus mode.

| IP Address : 192 | 2.168.1.11 | Disconnect | odbus cycle time(ms) : 100 🜩 | |
|------------------|------------------------|----------------------------------|---|---------|
| Channel 0 Channe | el 1 DXP Module Status | View Data | | |
| Parameters Re | ad/Write Diagnostics | | | |
| | | Operation mode | 1: HF compact | ~ |
| | | HF: Select Tag type | 0: deactivated 1: HF compact 2: HF extended | |
| | | HF: Bypass time (*1ms) | 3: HF bus mode | |
| | | HF: Multitag | 4: UHF compact 5: UHF extended | |
| | | HF: Heart beat read/write head | | |
| | | Termination active | \checkmark | |
| | | HF: Autotuning read/write head | | |
| | | Deactivate HF detuned diagnostic | | |
| | | Deactivate diagnostics | | |
| | | Command retries at failure | 2 | |
| | | HF: Command in continuous mode | 0x01: Inventory | ~ |
| | | HF: Idle mode | UID | ~ |
| | | HF: Length in continuous mode | 8 | ÷ |
| | | HF: Address in continuous mode | 0 | ÷ |
| | Refresh | | Subn | nit |

Click Confirm.

Fig. 107: Setting HF bus mode



Channel 0 → Read/Write → Command code: Select the 0x0070 Get HF read/write head address command via the drop-down menu.

| Channel 0 Channel 1 DXP Module Status View Data | | | | | | | | | | | |
|---|---|---------------|-----------|----------|----------|--|--|--|--|--|--|
| Parameters | Read/Write | | | | | | | | | | |
| | Command code | | | | | | | | | | |
| 0x0070 Qu | 0x0070 Query HF read/write head address | | | | | | | | | | |
| | I | 0 | | - | | | | | | | |
| | Memory are | ea (only UHF) | 0: Kil | password | ~ | | | | | | |
| | | 0 | | - | | | | | | | |
| | | Length | 0 ÷ | | | | | | | | |
| | Leng | gth UID/EPC | 0 | | - | | | | | | |
| | | Timeout | 0 | | - | | | | | | |
| | Read | fragment no. | 0 | | - | | | | | | |
| | Write | fragment no. | 0 | | - | | | | | | |
| | | Antenna no. | 0 | | • | | | | | | |
| Command | Automatic | | | | | | | | | | |
| le | Idle Rese | | | Submit | | | | | | | |
| Re | ead | | Inventory | | | | | | | | |
| | Use settings of the previous execution | | | | | | | | | | |

Fig. 108: Getting HF read/write head addresses



| Respor | nse code | Input data | | | | | |
|--|----------|------------|------------|------------|--------------|--|--|
| (0x0070) Query HF read/write head address | | Address | Value(Dec) | Value(Hex) | Value(Ascii) | | |
| Error | 0 | 0 | 1 | 01 | ٥ | | |
| Busy | 0 | 1 | 4 | 04 | 0 | | |
| Tag within the detection range | 0 | 2 | 0 | 00 | | | |
| HF read/write head switched on | õ | 3 | 0 | 00 | | | |
| Continuous mode active | ă | 4 | 0 | 00 | | | |
| Loop counter | 0 | 5 | 0 | 00 | | | |
| Read/write head detuned | | 6 | 0 | 00 | | | |
| | | 7 | 0 | 00 | | | |
| Parameter not supported by read/write head | | 8 | 0 | 00 | | | |
| Read/write head reports error | • | 9 | 0 | 00 | | | |
| Expected read/write head not connected | 0 | 10 | 0 | 00 | | | |
| Length | 2 | 11 | 0 | 00 | | | |
| Error code | 0 | 12 | 0 | 00 | | | |
| Tag counter | 0 | 13 | 0 | 00 | | | |
| Data (bytes) available | 0 | 14 | 0 | 00 | | | |
| Read fragment no. | 0 | 15 | 0 | 00 | | | |
| Write fragment no. | 0 | 16 | 0 | 00 | | | |
| Bus Mode TP | | 17 | 0 | 00 | | | |
| BUS MODE 1P | | 18 | 0 | 00 | | | |

⇒ The addresses of the connected read/write heads are displayed in the input data.

Fig. 109: HF read/write head addresses

► Channel 0 → Parameter: Activate the connected read/write heads in the right window (here: read/write heads 1 and 4).

| IP Address : | 192.168.1.1 | 1 Disconnect N | lodbus cycle time | (ms) : 100 🖨 | | | | |
|--------------|----------------------------------|--------------------------------|-------------------|--------------|---------|---|------------------------------------|----------|
| Channel 0 Ch | nannel 1 DXP | Module Status View Data | | | | | | |
| Parameters | Read/Write | Diagnostics | | | | | | |
| | | Operation mode | 3: HF bus mode | • | ~ | | Head | Activate |
| | | HF: Select Tag type | 0: Automatic de | tection | ~ | • | Head 1 - Activate read-write-head | |
| | | HF: Bypass time (*1ms) | 200 | | | | Head 2 - Activate read-write-head | |
| | | HF: Multitag | | | | | Head 3 - Activate read-write-head | |
| | | 5 | | | | | Head 4 - Activate read-write-head | |
| | | HF: Heart beat read/write head | | | | | Head 5 - Activate read-write-head | |
| | | Temination active | | \checkmark | | | Head 6 - Activate read-write-head | |
| | | HF: Autotuning read/write head | | | | | Head 7 - Activate read-write-head | |
| | Deactivate HF detuned diagnostic | | | | | | Head 8 - Activate read-write-head | |
| | | Deactivate diagnostics | | | | | Head 9 - Activate read-write-head | |
| | | - | 2 | | | | Head 10 - Activate read-write-head | |
| | | Command retries at failure | 2 | | ÷ | | Head 11 - Activate read-write-head | |
| | | HF: Command in continuous mode | 0x01: Inventory | | \sim | | Head 12 - Activate read-write-head | |
| | | HF: Idle mode | UID | | \sim | | Head 13 - Activate read-write-head | |
| | | HF: Length in continuous mode | 8 | | * | | Head 14 - Activate read-write-head | |
| | | HF: Address in continuous mode | 0 | | ¢ | | Head 15 - Activate read-write-head | |
| | | | | | | | Head 16 - Activate read-write-head | |
| | Ref | resh | | Submit | | | Head 17 - Activate read-write-head | |
| | | | | | | | Head 18 - Activate read-write-head | |
| | | | | | | | Head 19 - Activate read-write-head | |

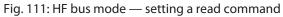
Click Confirm.

Fig. 110: Activating HF read/write heads



- Channel 0 \rightarrow Read/Write \rightarrow Command code: Select the read command (0x0002 Read).
- Enter the length of the read data (here: 8).
- Enter the read/write head address in the Antenna number field (here: 1).
- Click Confirm.

| Channel 0 Ch | annel 1 | 1 DXP | Module | Status | View | Data | | | |
|--------------|-------------------|------------|-----------|----------|------|-------|-------------|---|--|
| Parameters | Read | /Write | Diagnost | ics | | | | | |
| | Command code | | | | | | | | |
| 0x0002 Re | ead | | | | | | | ~ | |
| | | I | Lo | op cou | nter | 0 | | - | |
| | | Mer | nory area | (only U | HF) | 0: Ki | ll password | ~ | |
| | | | St | art addi | ess | 0 | | - | |
| | Length | | | | | | | - | |
| | Length UID/EPC | | | | | | | - | |
| | | | | Time | out | 0 | | - | |
| | | | Read fr | agment | no. | 0 | | - | |
| | | | Write fr | agment | no. | 0 | | - | |
| | | | A | ntenna | no. | 1 | | - | |
| Command | Auto | matic | | | | | | | |
| | Idle | | | Reset | | | Submit | | |
| | Read | | | Write | | | Inventory | | |
| | setting: ution | s of the p | previous | | | | | | |





➡ If a tag is present in the detection range of the set read/write head, the virtual LED in the Bus mode – TP window is lit green and the read data is displayed in the input data.

| Response coo | le | | Input data | |
|--|---------|------------|------------|--------------|
| (0x0002) Read | Address | Value(Dec) | Value(Hex) | Value(Ascii) |
| Error 🥥 | 0 | 224 | E0 | ? |
| Busy | 1 | 8 | 08 | 0 |
| Tag within the detection range | 2 | 1 | 01 | 0 |
| HF read/write head switched on | 3 | 68 | 44 | D |
| Continuous mode active | 4 | 99 | 63 | с |
| Loop counter 0 | 5 | 234 | EA | ? |
| | 6 | 79 | 4F | 0 |
| | 7 | 119 | 77 | w |
| Parameter not supported by read/write head | 8 | 0 | 00 | |
| Read/write head reports error | 9 | 0 | 00 | |
| Expected read/write head not connected | 10 | 0 | 00 | |
| Length 8 | 11 | 0 | 00 | |
| Error code 0 | 12 | 0 | 00 | |
| Tag counter 13 | 13 | 0 | 00 | |
| Data (bytes) available 0 | 14 | 0 | 00 | |
| Read fragment no. 0 | 15 | 0 | 00 | |
| Write fragment no. 0 | 16 | 0 | 00 | |
| _ | 17 | 0 | 00 | |
| Bus Mode TP | 18 | 0 | 00 | |
| Bus Mode - TP Channel : 0 | 19 | 0 | 00 | |
| 1 2 3 4 5 6 7 8 | 20 | 0 | 00 | |
| 00000000 | 21 | 0 | 00 | |
| 9 10 11 12 13 14 15 16 | 22 | 0 | 00 | |
| 00000000 | 23 | 0 | 00 | |
| 17 18 19 20 21 22 23 24 | 24 | 0 | 00 | |
| | 25 | 0 | 00 | |
| | 26 | 0 | 00 | |
| | 27 | 0 | 00 | |
| | 28 | 0 | 00 | |

Fig. 112: HF bus mode — tag in the detection range of read/write head 1



Example: Using automatic mode for command repetition

In automatic mode, commands are repeated by the Modbus master or a connected DXP. In the following example, 16 bytes of a tag are read cyclically in automatic mode by a read/write device connected to channel 0 of the interface.

• Click Channel 0 \rightarrow Read/Write \rightarrow Automatic \rightarrow Read.

| Channel 0 Channel 1 DXP Module Status | /iew Data |
|---------------------------------------|---------------------------|
| Parameters Read/Write Diagnostics | |
| | Command code |
| 0x0000 Idle | ~ |
| Loop counte | er 0 |
| Memory area (only UHF |) 0: Kill password \sim |
| Start addres | s 0 |
| Lengt | h 16 🖨 |
| Length UID/EP | c 0 😫 |
| Timeou | _{.t} 0 😫 |
| Read fragment no | 0 |
| Write fragment no |). O |
| Antenna no |). O |
| Command Automatic | |
| Read Write | Inventory |
| Using DXP | Once(HF) |
| DXP1 V Rising Edge | ~ |
| Command co | ount : 0 |
| DXP co | ount : 0 |
| Fig. 113: Automatic mode — read | |



➡ The read command is executed permanently or cyclically depending on the set Modbus cycle time.

| Respor | | Input data | | | | | |
|--|----|------------|------------|------------|--------------|--|--|
| 0x0002) Read | | Address | Value(Dec) | Value(Hex) | Value(Ascii) | | |
| Error | 0 | 0 | 239 | EF | ? | | |
| Busy | • | 1 | 239 | EF | ? | | |
| Tag within the detection range | 0 | 2 | 239 | EF | ? | | |
| HF read/write head switched on | ŏ | 3 | 239 | EF | ? | | |
| Continuous mode active | ŏ | 4 | 239 | EF | ? | | |
| Loop counter | | 5 | 239 | EF | ? | | |
| Read/write head detuned | | 6 | 239 | EF | ? | | |
| | | 7 | 239 | EF | ? | | |
| Parameter not supported by read/write head | | 8 | 239 | EF | ? | | |
| Read/write head reports error | • | 9 | 239 | EF | ? | | |
| Expected read/write head not connected | • | 10 | 239 | EF | ? | | |
| Length | 16 | 11 | 239 | EF | ? | | |
| Error code | 0 | 12 | 239 | EF | ? | | |
| Tag counter | 9 | 13 | 239 | EF | ? | | |
| Data (bytes) available | 0 | 14 | 239 | EF | ? | | |
| Read fragment no. | 0 | 15 | 239 | EF | ? | | |
| Write fragment no. | 0 | 16 | 0 | 00 | | | |
| | Ŭ | 17 | 0 | 00 | | | |

⇒ The read data is shown in the input data.

Fig. 114: Automatic mode — input data



| Channel 0 Channel 1 DXP | Module Status View | w Data |
|-------------------------|---------------------|-------------------------|
| Parameters Read/Write | Diagnostics | |
| | | Command code |
| 0x0002 Read | | ~ |
| | Loop counter | 0 |
| Memo | ory area (only UHF) | 0: Kill password \sim |
| | Start address | 0 |
| | Length | 16 🚖 |
| | Length UID/EPC | 0 |
| | Timeout | 0 |
| | Read fragment no. | 0 |
| | Write fragment no. | 0 |
| | Antenna no. | 0 |
| Command Automatic | | |
| Stop | Write | Inventory |
| Using DXP | | Once(HF) |
| DXP1 ~ | Rising Edge | ~ |
| | Command cour | nt: 16 |
| | DXP cour | nt: 0 |
| | | |

• Stopping the read command: Click Channel 0 \rightarrow Read/Write \rightarrow Automatic \rightarrow Stop.

Fig. 115: Automatic mode — stop read command

Example: Triggering RFID commands via a connected DXP

- Channel 0 \rightarrow Read/Write \rightarrow Automatic: Activate the Use DXP option.
- Set the required DXP channel in the drop-down menu (here: **DXP1**).
- ▶ In the drop-down menu, select the required edge trigger:
 - Rising edge: Change the DXP value from 0 to 1
 - DXP to 1: as long as the DXP is 1
 - Falling edge: Change the DXP value from 1 to 0

| hannel 0 Ch | annel 1 DXP | Module Status Vie | ew Data | | | | | |
|-------------|---|-------------------------|------------------|----------|--|--|--|--|
| Parameters | Read/Write | Diagnostics | | | | | | |
| | | | Command co | ode | | | | |
| 0x0002 Re | ead | | | ~ | | | | |
| | | Loop counter | 0 | * | | | | |
| | Mem | ory area (only UHF) | 0: Kill password | ~ | | | | |
| | | Start address | 0 | * | | | | |
| | | 16 | * | | | | | |
| | | 0 | + | | | | | |
| | | Timeout | 0 | + | | | | |
| | | Read fragment no. | 0 | - | | | | |
| | | Write fragment no. | 0 | + | | | | |
| | | Antenna no. | 0 | * | | | | |
| Command | Automatic | | | | | | | |
| | Read | Write | Inventory | | | | | |
| 🗸 Usin | g DXP | | Once(HF) | | | | | |
| DXP1 | ~ | Rising Edge | | \sim | | | | |
| | Rising Edge DXP high "1" Falling Edge | | | | | | | |
| | | Falling Edge DXP cou | int: 0 | | | | | |
| | | | • | | | | | |

Fig. 116: Automatic mode — using the DXP channel with a rising edge



8.11.3 Logging actions and data

Activating logging

- Click the Log button at the top right.
- Select the option.
- Click Apply.
- \Rightarrow All data is saved in a log file.

| | | | | English ~ |
|--|--------------|---------|------------|---------------------------------------|
| | | | | Option Enabling logging of Program |
| Re | esponse code | | Ir | Enabling logging of RFID data |
| (0x0000) Idle | | Address | Value(Dec) | Cancel Apply |
| Error | 4 | 0 | 0 | |
| Busy | 0 | 1 | 0 | 00 |
| Tag within the detection range | 0 | 2 | 0 | 00 |
| HF read/write head switched on | 0 | 3 | 0 | 00 |
| Continuous mode active | 0 | 4 | 0 | 00 |
| Loop counter | 0 | 5 | 0 | 00 |
| Read/write head detuned | • | 6 | 0 | 00 |
| Parameter not supported by read/write head | ă | 7 | 0 | 00 |
| Read/write head reports error | ă | 8 | 0 | 00 |
| | | 9 | 0 | 00 |
| Expected read/write head not connected | • | 10 | 0 | 00 |
| Length | 0 | 11 | 0 | 00 |
| Error code | 0 | 12 | 0 | 00 |
| Tag counter | 0 | 13 | 0 | 00 |
| Data (bytes) available | 0 | 14 | 0 | 00 |
| Read fragment no. | 128 | 15 | 0 | 00 |
| Write fragment no. | 128 | 16 | 0 | 00 |
| | | 17 | 0 | 00 |
| | | 10 | 0 | 00 |

Fig. 117: Activating logging



Opening the log

- In the Log file tab, click the Open button.
- Select the file.
- Click Open.

| Received Seq Ch | annel Time | Antenna No. | Command Code | Command | Response code | Busy | | ТР | Error | E |
|--|-----------------------------|--------------------|-----------------|---------|------------------|------|---|----|-------|---|
| - Open | | | | | | | × | | | |
| $\leftrightarrow \rightarrow \wedge \uparrow $ | Programme (x86) > TBEN RFII | D → Logs_RFID_Data | > Channel_0 | ٽ ~ | | | Q | | | |
| Organize - Ne | w folder | | | | 1 | | 0 | | | |
| , | Name | | Туре | Size | | | • | | | |
| 3D objects | Auto_Logs_RFID_Data | 07172020102015 : | | 247 KI | P | | | | | |
| Pictures | Auto Logs RFID Data | | | 247 N | | | | | | |
| | Auto_Logs_RFID_Data | | | 210 Ki | | | | | | |
| Desktop | Auto_Logs_RFID_Data | - / | | 47 KI | | | | | | |
| Documents | Auto_Logs_RFID_Data | | | 108 KI | | | | | | |
| 🖶 Downloads | Logs_RFID_Data_0703 | | JDAT | 2 KI | | | | | | |
| Music | Logs_RFID_Data_0717 | | JDAT | 52 KI | В | | | | | |
| Videos | Logs_RFID_Data_0805 | 2020084158.jdat | JDAT | 52 KI | в | | | | | |
| 🏪 Windows (C:) | Logs_RFID_Data_0806 | 2020094322.jdat | JDAT | 52 KI | В | | | | | |
| | Logs_RFID_Data_0807 | 2020075004.jdat | JDAT | 20 KI | В | | | | | |
| | Logs_RFID_Data_0812 | 2020090548.jdat | JDAT | 21 KI | В | | | | | |
| | Logs_RFID_Data_0813 | 2020073327.jdat | JDAT | 3 KI | В | | | | | |
| | Logs_RFID_Data_0813 | 2020081522.jdat | JDAT | 2 KI | В | | | | | |
| | Logs_RFID_Data_0813 | 2020073327.jdat | JDAT | 3 KI | В | | | | | |
| | Logs_RFID_Data_0813 | 2020081522.jdat | JDAT | 2 KI | В | | | | | |
| | | | | | | | | | | |
| | Logs_RFID_Data_0813 | 2020081522.jdat | JDAT | 2 KI | В | | | | | |

Fig. 118: Opening the log file

⇒ The log data is displayed.

| 0 Channel | 1 DXP Module Stat | us View Data | | | | | | | | | | | | | | | |
|-----------|-------------------|--------------|-----------------|-------------|-----------------|---------|------------------|-------|-------|-------|------------|--------|---------|-------------|-----|------------|------------------|
| 🕍 Oper | n 🚽 Save C | 5V | | | | | | | | | | | | | | Log File : | |
| | Received Seq | Channel | Time | Antenna No. | Command Code | Command | Response code | Busy | TP | Error | Error Code | Length | Timeout | Tag Counter | DXP | DXP Count | Read Data |
| | 23528 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 13 | 0 | 0 | E0 04 01 50 58 8 |
| | 23532 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 32770 | True | True | False | 0 | 16 | 0 | 15 | 0 | 0 | 00 00 00 00 00 0 |
| | 23533 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 15 | 0 | 0 | 12 34 56 78 9A B |
| | 23535 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 18 | 0 | 0 | E0 04 01 50 58 8 |
| | 23535 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 18 | 0 | 0 | E0 04 01 50 58 8 |
| | 23536 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 18 | 0 | 0 | 54 4E 41 00 75 4 |
| | 23539 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 20 | 0 | 0 | E0 04 01 50 58 8 |
| | 23539 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 20 | 0 | 0 | E0 04 01 50 58 8 |
| | 23542 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 23 | 0 | 0 | 12 34 56 78 9A B |
| 0 | 23542 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 23 | 0 | 0 | 12 34 56 78 9A B |
| 1 | 23543 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | True | False | 0 | 8 | 0 | 23 | 0 | 0 | E0 04 01 50 58 8 |
| 2 | 23544 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | True | False | 0 | 8 | 0 | 24 | 0 | 0 | E0 04 01 50 58 8 |
| 3 | 23545 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 25 | 0 | 0 | 12 34 56 78 9A B |
| 4 | 23546 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | True | False | 0 | 8 | 0 | 25 | 0 | 0 | E0 04 01 50 58 8 |
| 5 | 23548 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 26 | 0 | 0 | 54 4E 41 00 75 4 |
| 6 | 23549 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | True | False | 0 | 8 | 0 | 26 | 0 | 0 | E0 04 01 50 58 8 |
| 7 | 23550 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | False | False | 0 | 8 | 0 | 26 | 0 | 0 | E0 04 01 50 58 8 |
| 8 | 23551 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 32770 | True | False | False | 0 | 0 | 0 | 26 | 0 | 0 | 00 00 00 00 00 0 |
| 9 | 23552 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 27 | 0 | 0 | 54 4E 41 00 75 4 |
| 0 | 23553 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 28 | 0 | 0 | E0 04 01 50 58 8 |
| 1 | 23555 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 30 | 0 | 0 | 12 34 56 78 9A B |
| 2 | 23558 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 31 | 0 | 0 | E0 04 01 50 58 8 |
| 3 | 23558 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | True | False | 0 | 8 | 0 | 31 | 0 | 0 | E0 04 01 50 58 8 |
| 4 | 23560 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 32 | 0 | 0 | 54 4E 41 00 75 4 |
| 5 | 23563 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | False | False | 0 | 8 | 0 | 32 | 0 | 0 | E0 04 01 50 58 8 |
| 6 | 23619 | 0 | 08.13.2020 08:1 | 0 | 0 | ldle | 0 | False | True | False | 0 | 8 | 0 | 33 | 0 | 0 | E0 04 01 00 55 8 |
| 7 | 23622 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 32770 | True | False | False | 0 | 0 | 0 | 33 | 0 | 0 | 00 00 00 00 00 0 |
| в | 23624 | 0 | 08.13.2020 08:1 | 0 | 2 | Read | 2 | False | True | False | 0 | 16 | 0 | 34 | 0 | 0 | 00 00 00 00 00 0 |
| 9 | 23627 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | False | False | 0 | 8 | 0 | 34 | 0 | 0 | E0 04 01 00 55 8 |
| .0 | 23627 | 0 | 08.13.2020 08:1 | 0 | 0 | Idle | 0 | False | False | False | 0 | 8 | 0 | 34 | 0 | 0 | E0 04 01 00 55 8 |

Fig. 119: Example: Log data



8.12 Setting UHF readers

8.12.1 Setting UHF readers via the DTM

UHF readers can be assigned additional parameters via a DTM. No parameters can be set in UHF readers via the parameter data of the interface. The DTM for the specific device is available for download from www.turck.com.

A comprehensive description of the settings for UHF readers is provided in the instructions for use of the specific device.

8.12.2 Setting UHF readers via the web server

UHF readers can be set and commands sent to the readers via the web server.

- Open the web server and log in.
- Click UHF RFID CONFIG & DEMO to display and set the device parameters.

MAIN

UHF RFID CONFIG & DEMO DOCUMENTATION

RFID IDENT 0 - UHF DEVICE TN865-Q175L200-H1147 EU Diagnostics Ų, .∿¢. Import-/Export 5 ገ Application **RFID IDENT 1 - NO DEVICE** BL ident read/write head, 30 dBm, european version Device information Hardware Q175L200 Device type available Internal antenna available RS485 termination on/off switch 48299 Serial number R2000 Transceiver ASIC 1000001 (hex) Prefix customer ID Software 01.52 Firmware version

Fig. 120: Web server — home page UHF reader



- Click **Parameter** in the navigation bar on the left of the screen.
- ⇒ All parameters of the device are displayed.

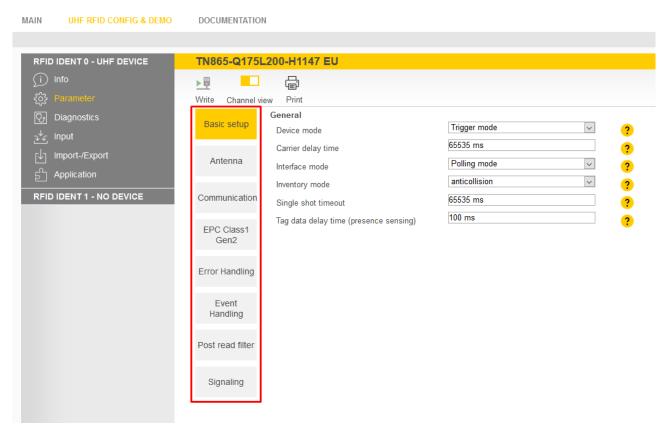


Fig. 121: Web server — UHF reader parameters



NOTE

The parameters are arranged in the web server in the same way as in the UHF DTM. The access level displayed in the web server corresponds to the Advanced level in the DTM.



8.12.3 Testing UHF readers via the web server

The UHF readers can be tested using the web server via the **Application** function.

- Click UHF RFID CONFIG & DEMO \rightarrow Application.
- ⇒ The RFID test, the UHF diagnostics and the command builder are provided in the application area:
 - **RFID test**: If the trigger is set to ON, the RF field is activated and tags can be read.
 - UHF diagnostics: The diagrams show the interference frequencies of all channels used.
 - Command builder: Use of the command builder is reserved for Turck Support and is not designed for setting device parameters or device operation.

| MAIN | UHF RFID CONFIG & DEMO |) | DOCUMENTA | TIC | N | |
|------------------|------------------------|----|------------------|------|---------|-----|
| | | | | | | |
| RFID | IDENT 0 - UHF DEVICE | | RFID Appl | lica | ation | |
| (i) | Info | | | C | | |
| ૼૢૺ | Parameter | | Report mode | Tr | igger | Fac |
| Ų, | Diagnostics | | RFID-Test | | RFID | -Te |
| ⊉ ⁴ ∽ | Input | | | | Set the | |
| r↓] | Import-/Export | | UHF Diag. | | 1. | 0 |
| வி | Application | | Ŭ | | 0. | 9 |
| RFID | IDENT 1 - NO DEVICE | ١. | Command builder | | | |
| | | | | | 0. | 8 |

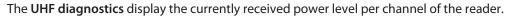
Fig. 122: Web server — RFID application





RFID test allows EPC information from tags to be displayed and read out in single-tag and multitag mode. The received RSSI values are displayed as a curve in relation to time.

Fig. 123: Example of RFID test: Detection a tag with the received RSSI values over time and the number of read operations



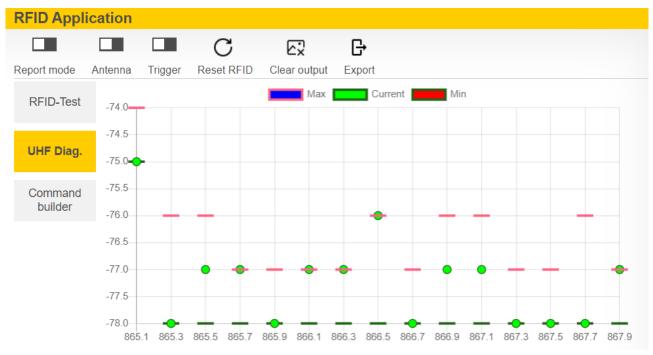


Fig. 124: Example of UHF diagnostics: received power levels per channel



9 Operation



NOTE The read and write data stored in the module is reset after a power reset.

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.

9.1.1 Typical times for command processing via a controller

The values shown in the following table are approximate values. The typical times for command execution depend on the following factors:

- Hardware configuration
- Software configuration
- Number of bus stations
- Bus cycle times

HF applications

| Command | System cycle time | Required time | Dependence on factors such as protocol, system etc. |
|--------------------|-------------------|---------------|---|
| Read 8 bytes | 4 ms | 10 ms | ≤ 20 % |
| Write 8 bytes | 4 ms | 10 ms | ≤ 20 % |
| Read 8 bytes | 20 ms | 60 ms | ≤ 20 % |
| Write 8 bytes | 20 ms | 60 ms | ≤ 20 % |
| Read 128 bytes | 4 ms | 40 ms | ≤ 20 % |
| Write 128 bytes | 4 ms | 50 ms | ≤ 20 % |
| Read 1 kByte | 4 ms | 700 ms | ≤ 20 % |
| Write 1 kByte | 4 ms | 800 ms | ≤ 20 % |
| Inventory (4 tags) | 4 ms | 300 ms | ≤ 10 % |



HF bus mode

The time required for the cyclical processing of a command depends on the time in which the tag is located in the detection range of the read/write head (bypass time). The default setting is 48 ms. The bypass time can be set by the user. If a different bypass time is set, the difference to the time required for processing the command must be added to or deducted from it.

The time in which all read/write heads can be addressed once by the interface is calculated as follows:

Number of read/write heads × bypass time

This time corresponds to the update rate for the **Tag in detection range** bit and must be taken into account when calculating the total time for processing the command.

The inventory command must be executed separately for all read/write heads.

| Command | System cycle time | Required time | Dependence on factors such as protocol, system etc. |
|---|-------------------|-------------------------------|--|
| Read UID at a read/write head when rising edge TP, tag in detection range | 4 ms | 24 ms | The bypass time must be added, depending on the system cycle time. |
| Read UID at a read/write head when rising edge TP, tag in detection range | 20 ms | 80 ms | _ |
| Read 112 bytes of different read/write heads sequen- tially, default bypass time (48 ms) | 4 ms | 180 ms per read/write head | The time for accessing the individual read/write heads varies. |

UHF applications

| Command | System cycle time | Required time | Dependence on factors such as protocol, system etc. |
|--|-------------------|---------------|--|
| Read 12 bytes EPC | 4 ms | 120220 ms | not detectable |
| Write 12 bytes EPC | 4 ms | 260400 ms | not detectable |
| Read 1 kByte | 4 ms | 2500 ms | ≤ 20 % |
| Write 1 kByte | 4 ms | 7300 ms | ≤ 20 % |
| Inventory (100 tags, read/ write head in report mode, dynamic application) | 4 ms | 5500 ms | ≤ 20 % |



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 → Parameters → Operation mode: Desired channel (here: Set RFID channel
 0) to HF extended.
- Click Write to save.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Parameter | |
|-------------------------|------------------|---|---------------|
| j Info | ▶ | Ē | |
| {ွ်} Parameter | Write Channel vi | | |
| 😲 Diagnosis | RFID channel | Operation mode | HF extended |
| Fvent log | 0 | HF: Select Tag type | HF compact ? |
| י רֶלן Ex- / Import | RFID channel | HF: Bypass time (*1ms) | HF extended ? |
| Change Password | 1 | HF: Multitag | UHF compact ? |
| Firmware | DXP 4 | Heart beat read/write head | no v ? |
| | DXP 4 | HF: Autotuning read/write head | no 💙 ? |
| နိုင်္ဂနဲ့ Parameter | DXP 5 | Deactivate HF read/write head detuned diagnostic | no ~ ? |
| 😳 Diagnosis | | Deactivate diagnostics | no 💙 ? |
| ∿∽ Input | DXP 6 | Command retries at failure | 2 ? |
| പ്പ് പ്പൂറ്റ് Output | | HF: Command in continuous mode | Inventory Y |
| <u></u> | DXP 7 | 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. 125: Fragmentation — selecting the operating mode



- 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.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Output | |
|--|-------------------|---|-------------------------------------|
| (i) Info | | | |
| ႏို္င္ငံ Parameter | Write Channel vi | | |
| ्रि Diagnosis य Event log | RFID channel 0 | Input values Response code | 0x8002 Busy - Read ? |
| , , , , , , , , , , , , , , , , , , , | RFID channel 1 | Tag present at read/write head HF read/write head switched on | yes ? |
| 🔋 🧉 | DXP 4 | Continuous (Presence sensing) mode active Loop counter for fast processing | 0 ? |
| LOCAL I/O දိဂ္ဂိန္ Parameter | DXP 5 | Antenna detuned at HF read/write head x Parameter not supported by read/write head x | no ? no ? |
| ତିୃ୶ Diagnosis ਤੁ [⊥] ୍ର Input | DXP 6 | Error reported by read/write head x Not connected to read/write head x | no ? no ? |
| ട്_് Output | DXP 7 | Length Error code | 0 ? |
| | | Tag counter Data (Bytes) available | 0 ? 0 ? |
| | | Read fragment No. 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 ? |

Fig. 126: 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 on the TBEN module 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.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Output | |
|---------------------|------------------|--|-------------------------|
| j Info | ▶₽ | Ē | |
| ႏွိုး Parameter | Write Channel vi | | |
| ି ଓଡ଼ି Diagnosis | RFID channel | Input values | |
| 4 Event log | 0 | Response code | 0x0002 Read |
| ך Ex- / Import | RFID channel | Tag present at read/write head | yes ? |
| Change Password | 1 | HF read/write head switched on | yes ? |
| | | Continuous (Presence sensing) mode active | no ? |
| Firmware | DXP 4 | Loop counter for fast processing | 0 ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no ? |
| {္က်} Parameter | DXP 5 | Parameter not supported by read/write head x | no ? |
| 🕑 Diagnosis | | Error reported by read/write head x | no ? |
| <u>್ಷ-</u> uput | DXP 6 | Not connected to read/write head x | no ? |
| | | Length | 500 ? |
| | DXP 7 | Error code | - ? |
| | | Tag counter | 1 |
| | | Data (Bytes) available | 372 ? |
| | | Read fragment No. | 1 |
| | | 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. | 0 ? |
| | | Write fragment No. | 0 ? |
| | | Input buffer | · · · |
| | | • Input buffer 0-7 | ff ff ff ff ff ff ff ff |
| | | | |

Fig. 127: Fragmentation — input data



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

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RI | FID-4DXP - Local I/O - Output | | |
|--------------------|------------------|--|---------------|---|
| j Info | | | | |
| {ွှိ} Parameter | Write Channel vi | | | |
| 🕑 Diagnosis | RFID channel | Input values | | |
| Event log | 0 | Response code | 0x0002 Read | ? |
| ך Ex- / Import | RFID channel | Tag present at read/write head | yes | ? |
| Change Password | 1 | HF read/write head switched on | yes | ? |
| - 13 - | | Continuous (Presence sensing) mode active | no | ? |
| Firmware | DXP 4 | Loop counter for fast processing | 0 | ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no | ? |
| <္မ်ွှိ Parameter | DXP 5 | Parameter not supported by read/write head x | no | ? |
| 🕑 Diagnosis | | Error reported by read/write head x | no | ? |
| ي⊸_ Input | DXP 6 | Not connected to read/write head x | no | ? |
| പ്പ്പ് Output | | Length | 500 | ? |
| | DXP 7 | Error code | - | ? |
| | | 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. 128: 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 on the TBEN module 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.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Output | | |
|-----------------------|------------------|--|----------|---|
| j Info | | Ē | | |
| {ွိ} Parameter | Write Channel vi | ew Print | | |
| 🕑 Diagnosis | RFID channel | Input values | 0.0002 D | |
| First log | 0 | Response code | | ? |
| , [√] Ex- / Import | RFID channel | Tag present at read/write head | yes | ? |
| ୍ରି Change Password | 1 | HF read/write head switched on | yes | ? |
| Firmware | | Continuous (Presence sensing) mode active | no | ? |
| | DXP 4 | Loop counter for fast processing | 0 | ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no | ? |
| <္ဂ်ို Parameter | DXP 5 | Parameter not supported by read/write head x | no | ? |
| 🕲 Diagnosis | | Error reported by read/write head x | no | ? |
| ⊋৺⊊ Input | DXP 6 | Not connected to read/write head x | no | ? |
| പ്പ് Output | | Length | 500 | ? |
| | DXP 7 | Error code | - | ? |
| | | Tag counter | 1 | ? |
| | | Data (Bytes) available | 244 | ? |
| | | Read fragment No. | 2 | ? |
| | | Write fragment No. | 0 | ? |

Fig. 129: Fragmentation — input data of the second fragment



- Repeat the operation until no more data is present on the TBEN module.
- ⇒ If no more data is present on the TBEN module, **Read fragment No.** will show the value **0**.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Output | |
|--------------------|------------------|--|---------------|
| (i) Info | <u>▶</u> | | |
| နိ္င်နဲ့ Parameter | Write Channel vi | ew Print | |
| 😋 Diagnosis | RFID channel | Input values | |
| 🖉 Event log | 0 | Response code | 0x0002 Read ? |
| ך, Ex- / Import | RFID channel | Tag present at read/write head | yes ? |
| Change Password | 1 | HF read/write head switched on | yes ? |
| | | Continuous (Presence sensing) mode active | no ? |
| Firmware | DXP 4 | Loop counter for fast processing | 0 |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no ? |
| င့်္ပိန် Parameter | DXP 5 | Parameter not supported by read/write head x | no ? |
| 😳 Diagnosis | | Error reported by read/write head x | no ? |
| ي∜ح Input | DXP 6 | Not connected to read/write head x | no ? |
| പ്പം Output | | Length | 500 ? |
| | DXP 7 | Error code | - ? |
| | | Tag counter | 1 ? |
| | | Data (Bytes) available | 0 ? |
| | | Read fragment No. | 0 ? |
| | | Write fragment No. | 0 ? |

Fig. 130: 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 → Parameters → Operation mode: Desired channel (here: Set RFID channel
 0) to HF extended.
- Save the set operating mode by clicking on Write.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2R | FID-4DXP - Local I/O - Parameter | | |
|----------------------------------|------------------|---|-----------------------------|------------|
| j Info | ▶₽ | Ē | | |
| <္မ်ို Parameter | Write Channel vi | ew Print | | |
| 🕑 Diagnosis | RFID channel | Operation mode | HF extended deactivated | ~ |
| 4 Event log | 0 | HF: Select Tag type | HF compact | |
| , ∫∫ Ex- / Import | RFID channel | HF: Bypass time (*1ms) | HF extended HF bus mode | |
| Change Password | 1 | HF: Multitag | UHF compact UHF extended | |
| Firmware | | Heart beat read/write head | | - |
| | DXP 4 | HF: Autotuning read/write head | no | • (|
| LOCAL I/O දဂ္ဂ်င္ငံ Parameter | DXP 5 | Deactivate HF read/write head detuned diagnostic | no | ~ |
| Diagnosis | | Deactivate diagnostics | no | ~ (|
| ູ√ _ເ Input | DXP 6 | Command retries at failure | 2 | |
| | DAT 0 | HF: Command in continuous mode | Inventory | · (|
| പ്പം Output | DXP 7 | 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. 131: 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 on the TBEN module.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2R | FID-4DXP - Local I/O - Output | |
|--------------------|-----------------|--|---|
| j Info | | Ē | |
| ို့္ခ်ို Parameter | Write Channel v | | |
| 😳 Diagnosis | RFID channel | Input values | |
| | 0 | Response code | 0x0000 Idle ? |
| Event log | | Tag present at read/write head | no o |
| [↓] Ex- / Import | RFID channel | HF read/write head switched on | ves |
| Change Password | | | |
| Firmware | | Continuous (Presence sensing) mode active | |
| | DXP 4 | Loop counter for fast processing | 0x0000 Idle |
| LOCAL I/O | | Antenna detuned at HF read/write head x | 0x0001 Inventory |
| ႏွိုး Parameter | DXP 5 | Parameter not supported by read/write head x | 0x0004 Write |
| 😳 Diagnosis | | Error reported by read/write head x | With and Verify With and Verify |
| √√ຼ Input | DXP 6 | | 0x0010 Continuous Mode |
| | DAI 0 | Not connected to read/write head x | 0x0011 Read buffer (Cont. Mode) 0x0012 Stop Continuous (Presence Sensing) Mode |
| പ്പ് Output | | Length | 0x0020 UHF Continuous Presence Sensing Mode |
| | DXP 7 | Error code | 0x0040 HF Read/write head off 0x0041 Read/write head identification |
| | | Tag counter | 0x0042 Get UHF read/write head status/error |
| | | Data (Bytes) available | 0x0050 Tag info 0x0060 Direct read/write head command |
| | | | 0x0070 Get HF read/write head address |
| | | Read fragment No. | 0x0071 Set HF read/write head address 0x0080 Tune HF Read/write head |
| | | Write fragment No. | 0x0100 Set read/write head password |
| | | Output values | 0x0101 Reset read/write head password |
| | | Command code | 0x0000 Idle Y |
| | | 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. | 1 ? |

Fig. 132: 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 on the TBEN module and were not yet written to the tag
- Write fragment No.: Sequential number of the fragment with the write data (here: 1)

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Output | |
|--|------------------|---|---------------------|
| (i) Info | | Ē | |
| ို္လ်ို Parameter | Write Channel vi | ew Print | |
| C Diagnosis | RFID channel | Input values Response code | 0x8004 Busy - Write |
| ∦ Event log Γ√η Ex- / Import | RFID channel | Tag present at read/write head | no |
| Change Password | 1 | HF read/write head switched on | yes |
| | DXP 4 | Continuous (Presence sensing) mode active Loop counter for fast processing | 0 no |
| LOCAL I/O දරුදි Parameter | DXP 5 | Antenna detuned at HF read/write head x Parameter not supported by read/write head x | no no |
| ତିୃ Diagnosis ୁ୰ _ଙ Input | DXP 6 | Error reported by read/write head x Not connected to read/write head x | no no |
| output Output | DXP 7 | Length Error code | - |
| | | Tag counter | 1 |
| | | Data (Bytes) available | 128 |
| | | Read fragment No. | 0 |
| | | Write fragment No. | 1 |

Fig. 133: 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 TBEN module 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.

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RI | FID-4DXP - Local I/O - Output | |
|---------------------|------------------|--|---------------------|
| j Info | | Ē | |
| နိ္င်္နဲ Parameter | Write Channel vi | | |
| Cy Diagnosis | RFID channel | Input values | 0x8004 Busy - Write |
| Fvent log | 0 | Response code | |
| [↓] Ex- / Import | RFID channel | Tag present at read/write head | no ? |
| Change Password | 1 | HF read/write head switched on | yes ? |
| 📅 Firmware | DXP 4 | Continuous (Presence sensing) mode active | no |
| | DXP 4 | Loop counter for fast processing | 0 ? |
| | | Antenna detuned at HF read/write head x | no ? |
| နို္င္တဲ့ Parameter | DXP 5 | Parameter not supported by read/write head x | no ? |
| 😳 Diagnosis | | Error reported by read/write head x | no ? |
| ఛి∠్ Input | DXP 6 | Not connected to read/write head x | no ? |
| ട്_്റ Output | | Length | 0 ? |
| | DXP 7 | Error code | - ? |
| | | Tag counter | 2 ? |
| | | Data (Bytes) available | 256 ? |
| | | Read fragment No. | 0 ? |
| | | 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. 134: Fragmentation — write second fragment



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

| TBEN-S2-2RFID-4DXP | TBEN-S2-2RF | FID-4DXP - Local I/O - Output | |
|----------------------|------------------|--|----------------|
| (i) Info | | | |
| န့်္ပိနဲ့ Parameter | Write Channel vi | iew Print | |
| 😋 Diagnosis | RFID channel | Input values | |
| Event log | 0 | Response code | 0x0004 Write ? |
| | RFID channel | Tag present at read/write head | yes ? |
| | 1 | HF read/write head switched on | yes ? |
| ····· | | Continuous (Presence sensing) mode active | no 🥐 |
| Firmware | DXP 4 | Loop counter for fast processing | 0 ? |
| LOCAL I/O | | Antenna detuned at HF read/write head x | no ? |
| နိုင္ပ်ိန် Parameter | DXP 5 | Parameter not supported by read/write head x | no ? |
| 😳 Diagnosis | | Error reported by read/write head x | no ? |
| ي√ي Input | DXP 6 | Not connected to read/write head x | no ? |
| എ^் Output | | Length | 0 ? |
| | DXP 7 | Error code | - ? |
| | | Tag counter | 3 |
| | | Data (Bytes) available | 0 |
| | | Read fragment No. | 0 ? |
| | | Write fragment No. | 4 |

Fig. 135: Fragmentation — no more data present on the TBEN module



9.3 Using commands with a loop counter function



The loop counter is only supported for fast execution commands.

- Setting the command: Enter the command code.
- Set the loop counter to 1.
- ⇒ The command was successfully executed if the same command code appears in the process input data as in the process output data. The RFID data is stored in the buffer of the interface.
- Repeating the command: Increase the loop counter in the output data by 1.
- ⇒ The command was successfully executed if the same loop counter value appears in the process input data as in the process output data. The RFID data is stored in the buffer of the interface.
- Setting a new command: Enter the new command code and set the loop counter to 0.

9.4 HF applications — using Continuous Mode

In Continuous Mode (HF) the read/write head can read or write up to 64 bytes (see the table for user data areas of the HF tags).

The following parameters must be set in Continuous Mode:

- Tag type
- Command in Continuous Mode
- Length in Continuous Mode
- Start address
- Optional: Start address in the process output data for activating the grouping
- With read or write command: Enter the tag type. Automatic tag detection is not possible.
- Select the command in Continuous Mode (CCM): Inventory, read, tag info and write are possible.
- Enter the length in Continuous Mode (LCM): Enter the length of the data to be read in bytes. The length must be a multiple of the block size of the tag used. The addressing of an odd byte number is not possible.
- Enter the start address for the command in Continuous Mode (ACM). The start address must be a multiple of the block size of the tag used. The addressing of an odd byte number is not possible.
- For a write command enter the data to be written in the write data area.
- Execute the **Continuous Mode** command.
- ⇒ The set command is preloaded and carried out for all active read/write heads as soon as a tag is in the field.
- The data received from the read/write head is queried cyclically and stored in the FIFO memory of the interface.
- Execute the **Idle** command (0x0000).
- To pass on data from the FIFO memory of the interface to the controller, execute the Read buffer (Cont. mode) command (0x0011). The length of the data must equal the value of the available data bytes (BYFI).
- ▶ To stop Continuous Mode, execute the Stop Continuous Mode command (0x0012).

or

• To stop Continuous Mode and clear the FIFO memory of the interface, send the **Reset** command (0x0800).



9.5 Using HF bus mode

9.5.1 Executing a command in HF bus mode

Set parameter data:

- Select **HF bus mode**.
- Activate connected read/write heads.

Set the output data:

- Set the start address for the command.
- Set the required read/write head address.
- Enter the command code.
- Send the command to the read/write head.

9.5.2 Replacing bus-capable read/write heads

- Remove the faulty read/write head.
- Connect a new read/write head with the default address 68 or 0 (factory setting .../C53).
- If multiple read/write heads are being replaced: Connect the read/write heads in the order of the connection, i.e. connect the read/write head with the lowest address first.
- Addresses are allocated in ascending order to the read/write heads in the order in which the heads were connected. The lowest address is automatically assigned to the next read/write head with the default address 68 that is connected.
- ➡ If the LED on the read/write head is permanently lit, this indicates that the addressing is complete.



9.5.3 HF Continuous bus mode — data query and speed

All activated read/write heads are triggered within a bypass time + wait time. The command is permanently stored once in the activated read/write heads. The set command (e.g. Inventory, Read, Write) in Continuous Mode is processed within this time. Only one read/write head sends data to the RFID interface during command execution of all activated read/write heads. The other read/write heads store the read data for a later query within the bus cycle of Continuous Mode. When the same read/write head detects a new tag, the data in the buffer of a read/write head is overwritten if it was not yet sent to the RFID interface. The time must therefore be allowed until the data of all read/write heads has been fetched. The maximum time required for this is based on the formula (bypass time + wait time) × number of activated read/write heads.

Possibilities of optimizing the speed of HF Continuous bus mode:

- Reduce the bypass time to suit the application
- Arrange the read/write heads into two channels or over several modules
- Reduce the data to the relevant part



NOTE

The repeated reading of the same tag is time-triggered. The grouping in the process output data can be activated in order to prevent the storing of the same UID or user data multiple times.

The read/write heads do not detect any tags between two queries and when sending data to the RFID interface. The following table describes the required wait times:

| Command | Wait time |
|-----------|-----------|
| Inventory | 15 ms |
| Read | 25 ms |
| Write | 35 ms |

The default bypass time in HF Continuous bus mode is 48 ms.

The following table shows when commands (CMD) are executed and data is exchanged (DATA).

- CMD: Command is executed.
- DATA: Data exchange
- DATA or CMD: If data is stored on the read/write head, the data is sent to the RFID module. If no data is stored on the read/write head, the command is executed.

| Read/write head | Pass 1 | | Pass 2 | | Pass 3 | | Pass n | |
|--------------------|----------------|--------------|----------------|--------------|----------------|--------------|----------------|--------------|
| Address 1 | DATA or CMD | No action | CMD | No action | CMD | No action | CMD | No action |
| Address 2 | CMD | No action | DATA or CMD | No action | CMD | No action | CMD | No action |
| Address 3 | CMD | No action | CMD | No action | DATA or CMD | No action | CMD | No action |
| Address n | CMD | No action | CMD | No action | CMD | No action | DATA or CMD | No action |
| Time | Bypass time | Wait time | Bypass time | Wait time | Bypass time | e Wait time | Bypass time | Wait time |



9.6 HF applications — using HF Continuous Bus Mode

In HF Continuous Mode the read/write head can read or write up to 64 bytes (see the table for user data areas of the HF tags).

The following parameters must be set in Continuous Mode:

- Tag type
- Command in Continuous Mode
- Length in Continuous Mode
- Start address for the command in Continuous Mode

Optional: Start address in the process output data for activating the grouping

- With read or write command: Enter the tag type. Automatic tag detection is not possible.
- Select the command in Continuous Mode (CCM): Inventory, read, tag info and write are possible.
- Enter the length in Continuous Mode (LCM): Enter the length of the data to be read in bytes. The length must be a multiple of the block size of the tag used. Odd bytes cannot be addressed.
- Enter the start address for the command in Continuous Mode (ACM). The start address must be a multiple of the block size of the tag used. Refer to the table below for the block size of the tags. Odd bytes cannot be addressed.
- Set the grouping function via the Start address in the process output data parameter if required: Set the value for the Start address parameter to 1. If the grouping function is activated and a UID or user data is still stored in the FIFO memory of the module, a UID or the same user data after the first read is no longer stored as a new read. With subsequent read operations only the address of the read/write head that has last read the tag and the number of read operations is updated.
- For a write command enter the data to be written in the write data area.
- Execute the **Continuous Mode** command.
- ⇒ The set command is preloaded and carried out for all active read/write heads as soon as a tag is in the field.
- With the read command and when querying UIDs, the data received by the read/write head is polled cyclically and stored in the FIFO memory of the interface:

| Туре | Name | Meaning |
|----------|----------|---|
| uint8_t | data[8] | uint8_t UID [8] |
| uint8_t | Reserved | |
| uint8_t | Address | Read/write head address |
| uint16_t | | Number of read operations (only if grouping is activated) |

- Execute the Idle command (0x0000). The Idle command does not stop Continuous Mode.
- To pass on data from the FIFO memory of the interface to the controller, execute the Read buffer (Cont. Mode) command (0x0011). The address of the read/write head used is also transferred in addition to the read data. The length of the available data in the FIFO memory is displayed in the input data at Data (bytes) available (BYFI). The length of the data must be consistent. Example: If UID, reserved byte and read/write head address are written to the FIFO memory for each tag, at least 10 bytes of data must be read from the buffer.



Data in the FIFO memory is not overwritten until it was transferred to the controller. New read operations are appended in the FIFO memory of the interface.

NOTE



► To stop Continuous Mode, execute the **Stop Continuous Mode** command (0x0012).

or

► To stop Continuous Mode and clear the FIFO memory of the interface, send the **Reset** command (0x0800).



NOTE

The data must be passed on regularly from the device to the parent level. No other data can be stored if the 16 Kbyte ring memory is full. The device outputs an error message.

User data areas of HF tags

Refer to the data sheets of the tags for the relevant chip types.

| Chip type | User data area | | | Access | Bytes per block |
|---------------------------------------|----------------|------------|--------------------------|------------|-----------------|
| | First block | Last block | Total memory in bytes | | |
| NXP SLIX2 | 0x00 | 0x4E | 316 | Read/write | 4 |
| NXP Icode SLIX | 0x00 | 0x1B | 112 | Read/write | 4 |
| NXP Icode SLIX-S | 0x00 | 0x27 | 160 | Read/write | 4 |
| NXP Icode SLIX-L | 0x00 | 0x07 | 32 | Read/write | 4 |
| Fujitsu MB89R118 Fujitsu MB89R118B | 0x00 | 0xF9 | 2000 | Read/write | 8 |
| Fujitsu MB89R112 | 0x00 | 0xFF | 8192 | Read/write | 32 |
| TI Tag-it HF-I Plus | 0x00 | 0x3F | 256 | Read/write | 4 |
| TI Tag-it HF-I | 0x00 | 0x07 | 32 | Read/write | 4 |
| Infineon SRF55V02P | 0x00 | 0x37 | 224 | Read/write | 4 |
| Infineon SRF55V10P | 0x00 | 0xF7 | 992 | Read/write | 4 |
| EM4233 | 0x00 | 0x33 | 208 | Read/write | 4 |
| EM4233 SLIC | 0x00 | 0x1F | 128 | Read/write | 4 |



9.7 Possibilities for command execution in HF bus mode

There are three ways of querying the UID in HF bus mode.

- Using HF bus mode in Idle
- Using HF bus mode with any command
- Use HF Continuous bus mode with Inventory, Read or Write

The following tables describe the benefits of the particular applications.

| Application | Functions | Notes |
|---|---|--|
| Using HF bus mode in Idle Mode Inventory and/or Read | No command via the controller required UID and/or data with read/write head address is automatically displayed in the input data. | If the cycle time of the controller is the longer than the time until a new tag is in the detection range of a read/write head: Data loss possible. Grouping of UIDs or user data only possible via the controller Read/write heads are active in succession |
| Using HF bus mode with any command | Commands must be sent to a read/write head individually. UID or data are displayed in the input data. | Can only be used for static applications because only one read/write head can execute a command. Grouping of UIDs or user data only possible via the controller No overwriting of data: Only one read/write head performs the particular command. Fragmenting of the data possible (max. 128 bytes per fragment) |
| Use HF Continuous bus mode with In- ventory, Read or Write | The command must be activated once by the controller. The read/write heads then execute the command simultaneously and continuously. The read data is stored with the read/write head address in the 16 Kbyte ring memory of the RFID module The Read buffer (Cont. Mode) command transfers the data to the controller. | The bus cycle time in Continuous Mode must be shorter than the time until a new tag is in the detection range of the same read/write head. If a tag enters the detection range of a different read/write head, this has no effect. Grouping in the RFID interface possible as long as the data was not yet sent to the controller All read/write heads are activated and save data (max. 64 bytes per read/write head. |



9.8 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.

9.8.1 Example: using NEXT mode for a read command

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

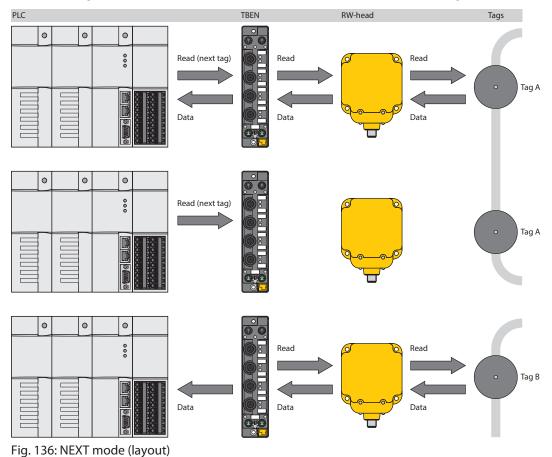
- Set read command in the process output data.
- Set NEXT mode: Enter the value -1 in the process output data at Length UID/EPC.

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

The read command tag is transferred from the interface to the read/write head. The read/write head reads the data of tag A once.

The controller sends a second read command in NEXT mode to the RFID interface. The read command is not transferred from the interface to the read/write head as long as tag A is in the detection range of the read/write head.

The read command is transferred from the interface to the read/write head if tag B is in the detection range of the read/write head. The read/write head reads the data of tag B.





99 Using the UHF password function

A write protection for EPC and USER memory area can be set with an access password. If a Kill password is set, the UHF tag can be mechanically destroyed with a Kill command. The access password and the Kill password can also be protected from read or write accesses.

9.9.1 Setting the access password

An access password can be used to set a temporary or permanent write protection for the EPC and USER memory areas.

Setting temporary write protection for the EPC and USER memory areas

- Write an access password with the following parameters to the tag:
 - Command code 0x0102 (Set tag password)
 - Password: 4 bytes in the output data
- Set an access password with the following parameters in the UHF reader:
 - Command code 0x0100 (Set read/write head password)
 - Password: 4 bytes in the output data
 - Protect individual memory areas with the following parameters:
 - Command code 0x0103 (Set tag protection)
 - Memory area: EPC or USER
- Protect the access password from read access:
 - Command code 0x0105 (Set perma lock)
 - Memory area: Access



NOTE

If an incorrect access password is used during write attempts, the corresponding area cannot be written because the tag will not respond to the write command. The device does not output a fault signal.

Setting permanent write protection for the EPC and USER memory areas

- Write an access password with the following parameters to the tag:
 - Command code 0x0102 (Set tag password)
 - Password: 4 bytes in the output data
- Set an access password with the following parameters in the UHF reader:
 - Command code 0x0100 (Set read/write head password)
 - Password: 4 bytes in the output data
- Permanently protect EPC or USER memory with the following parameters:



NOTE

After the Set perma lock (0x0105) command is set to the EPC or USER memory area, the data can no longer be changed.

- Command code 0x0105 (Set perma lock)
- Memory area: EPC or USER
- Protect the access password from read access:
 - Command code 0x0105 (Set perma lock)
 - Memory area: Access



9.9.2 Setting the Kill password

The **Kill UHF tag** command is used to make the tag unusable. After a kill command, the tag can neither be read nor written. A kill command cannot be reversed. A kill password must be set beforehand in order to execute a kill command.

- Transfer the kill password to the relevant memory area of the tag:
 - Password: Write data (0...3) with 4 bytes
 - Command code 0x0004 (Write)
 - Memory area: Kill password
- Deactivate the tag irrevocably:
 - Command code 0x0200 (Kill UHF tag)



NOTE

The tag can also be protected with an access password [> 228], so that a Kill command can only be executed with a valid access password in tag and reader.

9.10 Using the UHF password function

A write or read protection for the USER memory can be set with a password.

- Set a default password (0000) in the read/write head:
 - Command code 0x0100 (Set read/write head password)
 - Password: 0000
- Write a password with the following parameters to the tag:
 - Command code 0x0102 (Set tag password)
 - Password: 4 bytes in the output data
- Set a password with the following parameters in the read/write head:
 - Command code 0x0100 (Set read/write head password)
 Password: 4 bytes in the output data
- Select individual pages of the memory area via bytes 0...7 of the write data and protect with the following parameters:
 - Command code 0x0103 (Set tag protection)
 - Memory area: USER



9.11 Use CODESYS function blocks

Three function blocks are provided for the simple integration in (existing) CODESYS programs:

- FB_Compact
- FB_Extended
- FB_BusMode

| Function block | Operation mode |
|----------------|-----------------------------|
| FB_Compact | HF compact UHF compact |
| FB_Extended | HF extended UHF extended |
| FB_BusMode | HF bus mode |

The function blocks are part of the CODESYS package.

| FB_0 | Compact | |
|-------------------|---|---|
| xExecute | xDone | — BOOL |
| xAbort | xBusy | — BOOL |
| udiTimeOut | xError | — BOOL |
| eCommand | xAborted | — BOOL |
| rStatusMapping | eError | — ERROR |
| rContrlMapping | xTP | — BOOL |
| udiStartAddress | xRWHeadNotConnected | — BOOL |
| uiDataLength | uiDataRxLength | — UINT |
| pReadDataMapping | | |
| pWriteDataMapping | | |
| pDataTx | | |
| pDataRx | | |
| | xExecute xAbort udiTimeOut eCommand rStatusMapping rContrlMapping udiStartAddress uiDataLength pReadDataMapping pWriteDataMapping pDataTx | xAbort xBusy udiTimeOut xError eCommand xAborted rStatusMapping eError rContrlMapping xTP udiStartAddress xRWHeadNotConnected uiDataLength uiDataRxLength pReadDataMapping pWriteDataMapping pDataTx |

Fig. 137: FB_Compact function block

| | FB_E | xtended | |
|----------------------------------|-------------------|---------------------|---------|
| BOOL — | xExecute | xDone | — BOOL |
| BOOL — | xAbort | xBusy | — BOOL |
| UDINT — | udiTimeOut | xError | — BOOL |
| COMMAND — | eCommand | xAborted | — BOOL |
| REFERENCE TO Extended input_t — | rStatusMapping | eError | — ERROR |
| REFERENCE TO Extended output_t — | rContrlMapping | xTP | — BOOL |
| UDINT — | udiStartAddress | xRWHeadNotConnected | — BOOL |
| USINT — | usiUHFMemoryArea | uiTagCounter | — UINT |
| UINT — | uiDataLength | uiDataRxLength | — UINT |
| SINT — | siLengthOfUidEpc | | |
| POINTER TO BYTE | pReadDataMapping | | |
| POINTER TO BYTE | pWriteDataMapping | | |
| POINTER TO BYTE | pDataTx | | |
| POINTER TO BYTE | pDataRx | | |

Fig. 138: FB_Extended function block



| | FB_ | BusMode | |
|-------------------------------|-------------------|----------------------|-------------------|
| BOOL — | xExecute | xDone | — BOOL |
| BOOL — | xAbort | xBusy | — BOOL |
| UDINT — | udiTimeOut | xError | — BOOL |
| COMMAND — | eCommand | xAborted | — BOOL |
| REFERENCE TO BusModeInput_t — | rStatusMapping | eError | — ERROR |
| REFERENCE TO BusModeOutput_t | rContrlMapping | stTP | — BusModeTP_t |
| UDINT — | udiStartAddress | stRWHeadNotConnected | — BusModeRWHead_t |
| UINT — | uiDataLength | uiDataRxLength | — UINT |
| USINT — | usiRWHeadAddress | | |
| REFERENCE TO ChannelDiag_t | rDiagMapping | | |
| POINTER TO BYTE | pReadDataMapping | | |
| POINTER TO BYTE | pWriteDataMapping | | |
| POINTER TO BYTE | pDataTx | | |
| POINTER TO BYTE | pDataRx | | |

Fig. 139: FB_BusMode function block

Function blocks — input variables

| Name | Data type | Meaning |
|-----------------|--|---|
| xExecute | BOOL | $0 \rightarrow 1 \rightarrow 0$: Execute command $1 \rightarrow 0 \rightarrow 1$: Reset outputs The outputs can only be reset if an action was stopped, aborted by the user or if an error oc- curred beforehand. |
| xAbort | BOOL | $0 \rightarrow 1 \rightarrow 0$: Abort command execution. All outputs are reset to the initial value. |
| udiTimeOut | UDINT | Time in μ S, after which the function block automatically stops command execution |
| eCommand | COMMAND | Command code in hexadecimal format, [▶ 109] |
| rStatusMapping | REFERENCE TO Compact Input_t or Extended Input_t or BusMode Input_t | Start address of the process input data |
| rContrlMapping | REFERENCE TO Compact Out- put_t or Extended Out- put_t or BusMode Out- put_t | Start address of the process output data |
| udiStartAddress | UDINT | Start address for the selected command, e.g. start address in the memory of the tag |



| Name | Data type | Meaning |
|-------------------|-------------------------------|--|
| usiUHFMemoryArea | USINT | HF applications:Domain 05: User area of the tagOther: Reserved |
| | | UHF applications: Domain 0: Kill password Domain 1: EPC Domain 2: TID Domain 3: User memory Domain 4: Access password Domain 5: PC (size of EPC) Other: Reserved |
| uiDataLength | UINT | Length for the selected command, e.g. length of the data to be read or written |
| usiRWHeadAdress | USINT | Address of the read/write head that executes the command |
| siLengthOfUidEpc | SINT | Entry for the EPC or UID length for addressing a specific tag to be read or written. The UID or EPC must be defined in the write data. 0: Size of the EPC or UID not checked -1: NEXT mode: A tag is always only read if the UID or EPC is different from the UID or EPC of the last read or written tag. Only the values 0, -1 and 8 are possible in HF applications. |
| rDiagMapping | REFERENCE TO ChannelDiag_t | RFID diagnostic data |
| pReadDataMapping | POINTER TO BYTE | Start address in the input data (ARRAY[] OF BYTE) |
| pWriteDataMapping | POINTER TO BYTE | Start address in the output data (ARRAY[] OF BYTE) |
| pDataTx | POINTER TO BYTE | Write data (ARRAY[] OF BYTE) |
| pDataRx | POINTER TO BYTE | Read data (ARRAY[] OF BYTE) |

Function blocks — output variables

| Name | Data type | Meaning |
|----------|-----------|---|
| xDone | BOOL | 1: Command successfully executed 0: Command not executed |
| xBusy | BOOL | 1: Command active but not yet completed; system is waiting for execution, e.g. on tag in the detection area 0: No command active |
| xError | BOOL | 1: Error detected, command execution aborted 0: No error detected |
| xAborted | BOOL | 1: Command execution aborted by user 0: Command execution not aborted |
| eError | ERROR | Error code, [250] |
| хТР | BOOL | 1: Tag in detection range 0: No tag within the detection range |



| Name | Data type | Meaning |
|----------------------|----------------------|---|
| stTP | BusModeTP_t | 1: Tag in detection range 0: No tag within the detection range Each bit corresponds to a tag on an individual read/write head (max. 32 tags simultaneously). |
| xRWHeadNotConnected | BOOL | 1: No read/write head connected 0: Read/write head connected |
| stRWHeadNotConnected | BusModeRW- Head_t | 1: No read/write head connected 0: Read/write head connected Each bit corresponds to a read/write head (max. 32 read/write heads simultaneously). |
| uiTagCounter | UINT | Displays the number of detected tags. In HF multitag applications and in UHF applications, tags are only counted with an inventory command. In HF single-tag applications. all tags are counted by the detected read/write head. The tag counter is reset after the following commands: Inventory (exception: single-tag applications) Continuous Mode Continuous Presence Sensing Mode Reset |
| uiDataRxLength | UINT | Length for the selected command, e.g. length of the data read or written |
| siLengthOfUidEpc | SINT | Entry for the EPC or UID length for addressing a specific tag to be read or written. The UID or EPC must be defined in the write data. 0: Size of the EPC or UID not checked -1: NEXT mode: A tag is always only read if the UID or EPC is different from the UID or EPC of the last read or written tag. Only the values 0, -1 and 8 are possible in HF applications. |
| pReadDataMapping | POINTER TO BYTE | Start address in the input data (ARRAY[] OF BYTE) |
| pWriteDataMapping | POINTER TO BYTE | Start address in the output data (ARRAY[] OF BYTE) |
| pDataTx | POINTER TO BYTE | Write data (ARRAY[] OF BYTE) |
| pDataRx | POINTER TO BYTE | Read data (ARRAY[] OF BYTE) |



Example: Incorporating the function block

In order to run the function block, the package file for RFID interfaces must be installed.

• Call the Package Manager in CODESYS: Click **Tools** \rightarrow **Package Manager**.

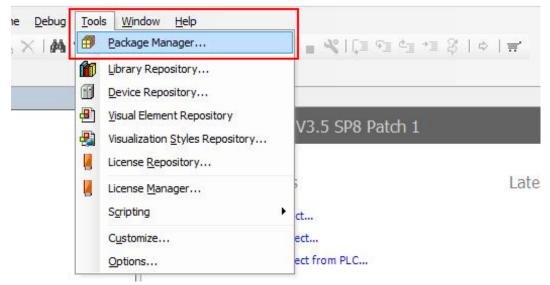


Fig. 140: Opening the Package Manager

• Select the package file for RFID interfaces and install.

| ame | Version | Installation date | Update info | license info | Uninsall | | | |
|------------------------|------------------------|-----------------------|---------------------|--------------------------|----------------------|---------------------|----------------------------|------|
| CODESYS Security Agent | 1.2.1.0 | 04.02.2021 | | No license required | | | | |
| CODESYS SoftMotion | 4.9.0.0 | 08.02.2021 | | No license required | Details. | | | |
| Device Reader | 1.0.0.5 | 01.11.2019 | 1 | No license required | Updates | \mathbf{X} | | |
| IIo IO | | | | | Obdates | | | |
| | Dieser PC > | Daten (D:) > Pro | dukte > TBEC > | TBEC-LL-4RFID-8DXP | > Funktionsbausteine | ت ~ ت | "Funktionsbausteine" durch | hs |
| IO Organisieren 🔻 🛛 🕅 | leuer Ordner | | | | | | | |
| MC OS OneDrive | | ^ 1 | lame | ^ | | Änderungsdatum Typ | o Größe | |
| OS 📃 Dieser PC | | | 🗊 RFID universal d | ata interface_V1.0.4.0.p | ackage | 11.07.2017 06:57 CO | DESYS Package 561 I | KB |
| TBI | | | | | | \setminus | | |
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| E. Desktop | | | | | | | \backslash | |
| 🔮 Dokumente | | ~ | | | | | \mathbf{A} | |
| ſ |)atei <u>n</u> ame: RF | ID universal data int | erface_V1.0.4.0.pac | kage | | ~ | Pack ge (*.package) | |
| | | | | | | | Ö <u>f</u> fnen Abbre | ache |

Fig. 141: Installing a Package file

After the installation has been successfully completed, the Package file is displayed as follows in the Package Manager:

| - | RFID universal data interface | 1.0.4.0 | 08.02.2021 | No license required |
|---|-------------------------------|---------|------------|---------------------|
| | | | | |

Fig. 142: Display of the Package file in the Package Manager



- ► Add the CODESYS library: Choose Add Library \rightarrow Turck \rightarrow Application \rightarrow RFID \rightarrow RFID universal data interface.
- Click **OK** to add the library to the project.

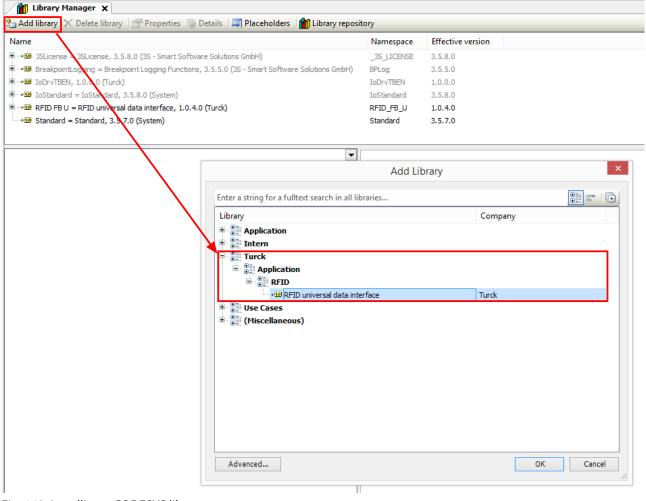


Fig. 143: Installing a CODESYS library



- Create program in which the function block can be called.
- Add **Box** from the CODESYS ToolBox to the project.
- Add FB_BusMode, FB_Compact or FB_Extended function block.

| DGRAM POU | | | |
|------------------------|--|--|--|
| R | | | |
| D VAR | | | |
| - | | | |
| Input Assistant | | | |
| input Assistant | | | |
| Text Search Categories | | | |
| Text Search Cottegones | | | |
| Variables | Name | Туре | Origin |
| Module Calls | | Library | CAA Device Diagnosis. |
| Instance Calls | 🗣 {} RFID_FB_U | Library | RFID universal data i. |
| Function Blocks | 🖻 🗀 RFID | | |
| Keywords | 🖻 🛅 Function Blocks | | |
| Conversion Operators | | FUNCTION_BLOCK | RFID universal data i. |
| | 🕮 📄 FB_Compact | FUNCTION_BLOCK | RFID universal data i. |
| | ■ 📄 FB_Extended | FUNCTION_BLOCK | RFID universal data i, |
| | Image: Here and the standard | Library | Standard, 3.5.15.0 (. |
| | D_VAR Input Assistant Text Search Categories Variables Module Calls Instance Calls Function Blocks Keywords | Input Assistant Text Search Categories Variables Module Calls Instance Calls Function Blocks Conversion Operators Name Name Name Name Name Name Name FB_U FB_U FB_U FB_U FB_U FB_E FB_BusMode FB_FB_BusMode FB_Compact | Input Assistant Text Search Categories Variables Module Calls Instance Calls Function Blocks Conversion Operators A Name A Name Type D DED Library D DED Library FB_Compact FUNCTION_BLOCK FUNCTION_BLOCK FUNCTION_BLOCK |

Fig. 144: Calling the CODESYS function block

Example: Connecting the FB_Extended function block (Ch0, read or write 128 bytes)

- Create the required instances for the function block: Map inputs and outputs directly to the addresses of the corresponding module registers.
- Activate the function block.

In the following example 128 bytes can be read or written from or to Ch0 via the function block. The input and output data and the write and read data is assigned in the example as follows:

| Status bit | Meaning |
|------------|--|
| IB100 | Start address of the process input data |
| QB100 | Start address of the process output data |
| IB116 | Address of the read data as array |
| QB116 | Address of the write data as array |



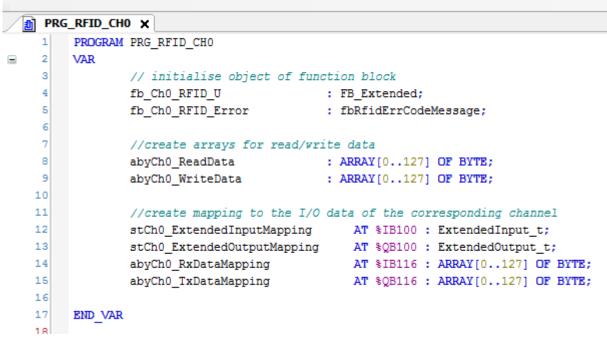


Fig. 145: Activate the FB_Extended function block (example: Ch0, read or write 128 bytes)

| | fb_Ch0 | _RFID_U |
|-----------------------------|-------------------|---------------------|
| | FB_E | xtended |
| | -xExecute | xDone- |
| | -xAbort | xBusy- |
| | -udiTimeOut | xError- |
| | eCommand | xAborted |
| stCh0_ExtendedInputMapping | rStatusMapping | eError |
| stCh0_ExtendedOutputMapping | rControlMapping | xTP- |
| | -udiStartAddress | xRWHeadNotConnected |
| | -usiUHFMemoryArea | uiTagCounter- |
| | uiDataLength | uiDataRxLength |
| | siLengthOfUidEpc | _ |
| abyCh0_RxDataMapping | pReadDataMapping | |
| abyCh0_TxDataMapping | pWriteDataMapping | |
| abyCh0_WriteData | pDataTx | |
| abyCh0_ReadData | pDataRx | |

Fig. 146: FB_Extended function block — overview of inputs and outputs



NOTE

When using function blocks, the UID is not automatically displayed in Idle mode. The device does not have to be reset to Idle mode between two identical commands.

The FB_BusMode and FB_Compact function blocks must be connected in the same way as the FB_Extended function block. Further information is provided in the documentation in the CODESYS package.



9.12 Using function blocks for Siemens TIA portal

Three function blocks are provided for the simple integration in (existing) programs in the TIA Portal:

- RFID_COMPACT_Mode
- RFID_EXTENDED_Mode
- RFID_HF_Busmode

| Function block | Operation mode |
|--------------------|-----------------------------|
| RFID_COMPACT_Mode | HF compact UHF compact |
| RFID_EXTENDED_Mode | HF extended UHF extended |
| RFID_HF_Busmode | HF bus mode |

The function blocks can be downloaded as elements of example programs free of charge at www.turck.com. The example programs are available for TIA V15 and TIA V16 and the Siemens S7-1200 and S7-1500 controllers.

The required command can be selected via the FC10 and FC20 functions. Further parameters can be set at the function blocks FB10 (Compact), FB11 (Extended) and FB12 (HF bus mode).

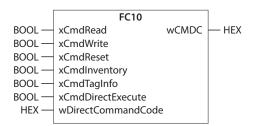


Fig. 147: FC10 function block

| | 5540 | | 1 |
|-----------|---------------------|------------|-----------|
| | FB10 | | |
| DEC — | HwID_HFcompact | RESC | - HEX |
| HEX — | CMDC | BUSY | — BOOL |
| DEC — | RCNT | ERROR | — BOOL |
| DEC — | DOM | RCNT_F | — DEC |
| DEC — | ADDR | TP1 | — BOOL |
| DEC — | LEN | XDx | — BOOL |
| DEC — | SOUID | PNSx | — BOOL |
| DEC — | HwID_Read016B | TREx | — BOOL |
| DEC — | HwID_Write016B | TNCx | — BOOL |
| POINTER — | WriteDataBuffer 16B | TONx | — BOOL |
| | | CMON | — BOOL |
| | | LEN_F | — DEC |
| | | ERRC | — HEX |
| | | TCNT | — DEC |
| | ReadDatal | Buffer 16B | - POINTER |

Fig. 148: FB10 function block



| | | | 1 |
|-----------|----------------------|------------|-----------|
| | FB11 | | |
| DEC — | HwID_HFextended | RESC | — HEX |
| HEX — | CMDC | BUSY | — BOOL |
| DEC — | RCNT | ERROR | — BOOL |
| DEC — | DOM | RCNT_F | — DEC |
| DEC — | ADDR | TP1 | — BOOL |
| DEC — | LEN | XDx | — BOOL |
| DEC — | SOUID | PNSx | — BOOL |
| DEC — | TOUT | TREx | — BOOL |
| DEC — | RFN | TNCx | — BOOL |
| DEC — | WFN | TONx | — BOOL |
| DEC — | HwID_Read128B | CMON | — BOOL |
| DEC — | HwID_Write128B | LEN_F | — DEC |
| POINTER — | WriteDataBuffer 128B | ERRC | — HEX |
| | | TCNT | — DEC |
| | | BYFI | — DEC |
| | | RFN_F | — DEC |
| | | WFN_F | — DEC |
| | ReadDataBu | uffer 128B | - POINTER |
| | | | 1 |

Fig. 149: FB11 function block

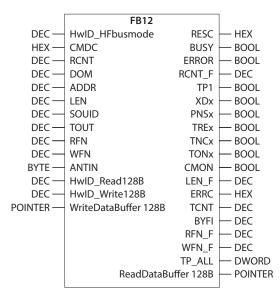


Fig. 150: FB12 function block

Input variables — FC10 and FC11

| Name | Data type | Meaning |
|--------------------|-----------|---|
| xCmdRead | BOOL | $0 \rightarrow 1 \rightarrow 0$: Executing a read command |
| xCmdWrite | BOOL | $0 \rightarrow 1 \rightarrow 0$: Execute write command |
| xCmdReset | BOOL | $0 \rightarrow 1 \rightarrow 0$: Reset command |
| xCmdInventory | BOOL | $0 \rightarrow 1 \rightarrow 0$: Executing the Inventory command |
| xCmdTagInfo | BOOL | $0 \rightarrow 1 \rightarrow 0$: Execute Tag info command |
| xCmdDirectExecute | BOOL | $0 \rightarrow 1 \rightarrow 0$: Execute direct command |
| wDirectCommandCode | HEX | Command code of the direct command |



Input variables — FB10, FB11 and FB12

| Name | Data type | Meaning |
|---|-----------|---|
| HwID_HFcompact HwID_HFextended HwID_HFbusmode | DEC | Hardware identifier of the module |
| CMDC | HEX | Command code, see the description of the output data, [> 105] |
| RCNT | DEC | Loop counter for fast processing, see descrip- tion of the output data, [▶ 105] |
| DOM | DEC | Memory area (can only be used with UHF ap- plications), see description of the output data, [▶ 105] |
| ADDR | DEC | Start address in bytes, see description of the output data, [▶ 105] |
| LEN | DEC | Length in bytes, see description of the output data, [▶ 105] |
| SOUID | DEC | Length of UID/EPC in bytes, see description of the output data, [105] |
| TOUT | DEC | Timeout, see description of the output data, [▶ 105] |
| RFN | DEC | Read fragment No., see description of the out- put data, [> 105] |
| WFN | DEC | Write fragment No., see description of the out- put data, [▶ 105] |
| ANTIN (RFID_HF_Busmode) | BYTE | Read/write head address of the head to be ad- dressed, [▶ 105] |
| HwID_Read016B (RFID_COMPACT_Mode) HwID_Read128B (RFID_EXTENDED_Mode) (RFID_HF_Busmode) | DEC | Hardware identifier for the read data |
| HwID_Write016B (RFID_COMPACT_Mode) HwID_Write128B (RFID_EXTENDED_Mode) (RFID_HF_Busmode) | DEC | Hardware identifier for the write data |
| WriteDataBuffer16B (RFID_COMPACT_Mode) WriteDataBuffer128B (RFID_EXTENDED_Mode) (RFID_HF_Busmode) | POINTER | Write data |



Output variables — FB10 and FB11

| Name | Data type | Meaning |
|---|---|---|
| RESC | HEX | Response code, see description of the input data, [▶ 100] |
| BUSY | BOOL | Status of the command execution, see descrip- tion of the input data, [> 100] |
| ERROR | BOOL | Error, see description of the input data, [> 100] |
| RCNT_F | DEC | Loop counter for fast processing, see descrip- tion of the input data, [▶ 100] |
| TP1 | BOOL | Tag present, see description of the input data, [▶ 100] |
| XDx | BOOL | HF read/write head at address x detuned, see description of the input data, [▶ 100] |
| PNSx | BOOL | Parameter of read/write head at address x not supported, see description of the input data, [▶ 100] |
| TREx | BOOL | Read/write head at address x reports error, see description of the input data, [> 100] |
| TNCx | BOOL | Expected read/write head with address x not connected, see description of the input data, [▶ 100] |
| TONx | BOOL HF read/write head switched on, see d tion of the input data, [> 100] | |
| CMON | BOOL | Continuous (Presence Sensing Mode) active, see description of the input data, [▶ 100] |
| LEN_F | DEC | Length, see description of the input data, [▶ 100] |
| ERRC | HEX | Error code, see description of the input data, [▶ 100] |
| TCNT | DEC | Tag counter, see description of the input data, [▶ 100] |
| BYFI (RFID_EXTENDED_Mode) | DEC | Data (bytes) available, see description of the input data, [> 100] |
| RFN_F (RFID_EXTENDED_Mode) | DEC | Read fragment No., see description of the in- put data, [▶ 100] |
| WFN_F (RFID_EXTENDED_Mode) | DEC | Write fragment No., see description of the in- put data, [▶ 100] |
| TP_ALL (RFID_HF_Busmode) | DWORD | Tag in the detection range of the connected read/write head, [▶ 100] |
| ReadDataBuffer 16B (RFID_COMPACT_Mode) ReadDataBuffer 128B (RFID_EXTENDED_Mode) (RFID_HF_Busmode) | DEC | Read data |



9.13 Using Inventory command and Continuous (Presence Sensing) Mode

The Inventory command and Continuous (Presence Sensing) Mode transfer data to the PLC in different ways. Continuous Mode is suitable for high-speed applications, in which a command (e.g. read or write) is to be performed repetitively. 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 | Continuous Presence Sensing Mode | | |
|---|--|---|--|--|
| Triggered reading of UIDs or EPCs | Repeated reading of UIDs or EPCs Automatic repetition of the same command (e.g. inventory, read, write) | UHF reader switches on as soon as a tag is detected Repeated reading of UIDs or EPCs Automatic repetition of the same command (e.g. inventory, read, write) | | |
| Data is displayed in the read data after the command has ended. | | Data must be read from the memory of the interface with a separate command. | | |
| Grouping of EPCs possible | Grouping of EPCs possible | Grouping of EPCs possible | | |
| No buffering on the read/write device | No buffering on the read/write device | No buffering on the read/write device | | |
| Terminate command: | Terminate command: | Terminate command: | | |
| 1. Timeout | 1. Timeout | 1. Timeout | | |
| 2. Automatically after command execution | 2. Stopping the Continuous (Presence Sensing) Mode command or Reset | 2. Stopping the Continuous (Presence Sensing) Mode command or Reset | | |



9.14 LEDs

The device is provided with the following LEDs:

- Power supply voltage
- Group and bus error
- Status
- Diagnostics

| PWR LED | Meaning |
|---------|----------------------------------|
| Off | No voltage or undervoltage at V1 |
| Green | Voltage at V1 and V2 ok |
| Red | No voltage or undervoltage at V2 |
| | |
| BUSIED | Meaning |

| BUS LED | Meaning |
|---------------------------|---|
| Off | No voltage present |
| Green | Connection to a master active |
| Flashing 3 × green in 2 s | ARGEE active |
| Green flashing (1 Hz) | Device is operational |
| Red | IP address conflict, Restore mode active, F_Reset active or Modbus connection timeout |
| Red flashing | Wink command active |
| Red/green (1 Hz) | Autonegotiation and/or wait for IP address allocation in DHCP or BootIP mode |
| | |
| ERR LED | Meaning |
| Off | No voltage present |
| Green | No diagnostics |
| Red | Diagnostics present |
| | |

| ETH1 and ETH2 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 | | |

| CMD0 and CMD1 LEDs | Meaning |
|--------------------|-----------------------------|
| Off | Read/write device off |
| Green | Read/write device on |
| Green flashing | BUSY (command active) |
| Red flashing | Interface memory full |
| Red | Error in the data interface |



| TP0 and TP1 LEDs | Meaning | | | |
|---------------------------------|--|----------------------------|--|--|
| Off | No tag within the detection range | | | |
| Green | Tag present at read/write head | | | |
| Green flashing | Tag present at read/write head, co | mmand is processed | | |
| Flashing (1 Hz) red/ green | Connection with DTM. No connection to controller active. | | | |
| Red | Diagnostics present | | | |
| | | | | |
| RFID channel LEDs | Meaning | | | |
| TP and CMD flash simultaneously | Auxiliary power overload | | | |
| TP and CMD flash alternately | Parameter error | | | |
| DXP channel LEDs | Manning (input) | Manning (autout) | | |
| | Meaning (input) | Meaning (output) | | |
| Off | No input signal | Output not active | | |
| Green | Input signal present | Output active (max. 0.5 A) | | |
| Red | - | Actuator overload | | |
| Flashing red (1 Hz) | Auxiliary power overload | | | |
| Flashing white (DXP7 only) | Wink command active | | | |

9.15 Software diagnostic messages

9.15.1 Diagnostic messages — gateway functions

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

Meaning of the diagnostic bits

| Designation | Meaning |
|-------------|------------------------------|
| V2 | Undervoltage V2 |
| ARGEE | ARGEE program active |
| DIAG | Module diagnostics available |
| FCE | DTM active in Force mode |
| COM | Internal error |
| V1 | Undervoltage V1 |

9.15.2 Diagnostic messages — RFID channels

| Byte no. | Bit | | | | | | | |
|----------|----------|----------|-------|------|---|---|-------|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | VAUX | PRMER | DTM | FIFO | | | | |
| 1 | Reserved | | | | | | L. L. | |
| 2 | Reserved | Reserved | | | | | | |
| 3 | Reserved | | | | | | | |
| 4 | TNC1 | TRE1 | PNS1 | XD1 | | | | |
| 5 | TNC2 | TRE2 | PNS2 | XD2 | | | | |
| 6 | TNC3 | TRE3 | PNS3 | XD3 | | | | |
| | | | | | | | | |
| 35 | TNC32 | TRE32 | PNS32 | XD32 | | | | |

Meaning of the diagnostic bits

| Designation | Meaning |
|-------------|---|
| VAUX | Overvoltage VAUX |
| PRMER | Parameterization error |
| DTM | Configuration via DTM active |
| FIFO | Buffer full |
| TNC | Expected read/write head not connected (only functions in bus mode or with activated parameter HF: Heartbeat read / write head) is activated |
| TRE | Read/write head reports error |
| PNS | Parameter not supported by read/write head |
| XD | Antenna detuned |

9.15.3 Diagnostic messages — digital channels

| Byte no. | Bit | | | | | | | |
|----------|------|------|------|------|------|------|---|---|
| | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | | | | | VAUX | VAUX | | |
| 1 | ERR7 | ERR6 | ERR5 | ERR4 | | | | |

Meaning of the diagnostic bits

| Designation | Meaning |
|-------------|----------------------------|
| VAUX | Overvoltage VAUX |
| ERR | Error message on channel x |

9.15.4 Diagnostic messages — module status

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

Meaning of the diagnostic bits

| Meaning |
|------------------------------|
| Undervoltage V2 |
| ARGEE program active |
| Module diagnostics available |
| DTM active in Force mode |
| Internal error |
| Undervoltage V1 |
| |



9.16 Example: Activating diagnostics via the PLC software

The following example describes the activation of diagnostic messages with CODESYS 3 in PROFINET.

- Include the device in an existing project and connect to the controller (example: Turck TX510-P3CV01 HMI).
- ▶ Right-click an empty slot.
- Click Insert device.

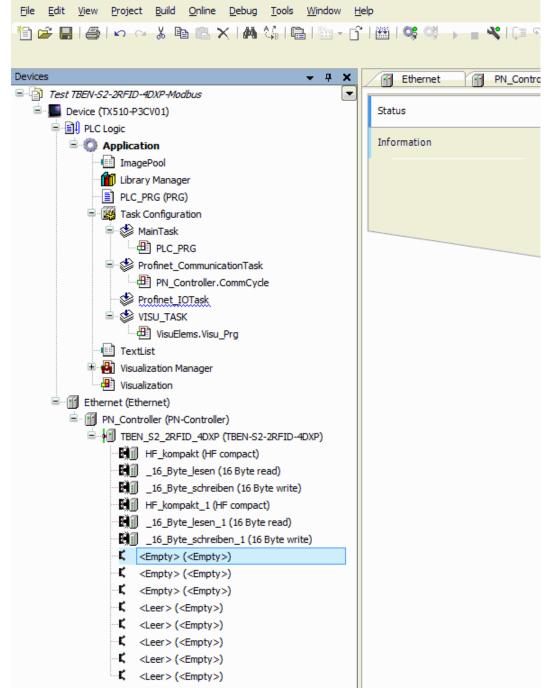


Fig. 151: Selecting an empty slot for diagnostics



Click **RFID diagnostics**.

Ele Edt Yew Broject Build Online Debug Iools Window Help 習論副目書|1~~※動職X|44は。1回目前・1日間|145 時)■ K (目目生生活な)々日常

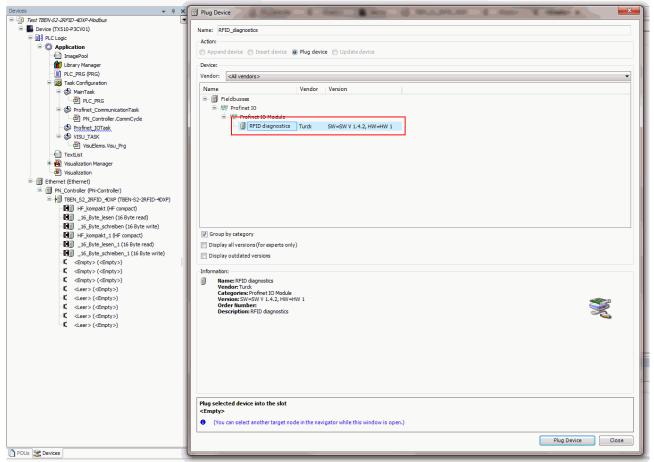


Fig. 152: Selecting RFID diagnostics

- Do not close the window.
- Select the next free slot.
- Select **DXP diagnostics** and confirm with **Insert device**.

| Edit <u>Vi</u> ew <u>P</u> roject <u>B</u> uild <u>O</u> nline <u>D</u> ebug <u>T</u> ools <u>W</u> indow 을 🔛 4월 40 ~~ ※ 🗈 🛍 🗮 🗙 444 4월 6월 1월 - | Buller (1) (1) (1) (1) (1) (1) (1) (1) (1) (1) |
|--|--|
| | |
| s 🗸 🕂 🕇 | 🗴 🗊 Plug Device 🔰 🖉 🖉 👘 👘 👘 👘 👘 👘 👘 👘 |
| Test TBEN-S2-2RFID-4DXP-Modbus | ¥ |
| Device (TX510-P3CV01) | Name: RFID_diagnostics |
| PLC Logic | Action: |
| 🖹 💮 Application | Append device Dissert device Dipdate device |
| ImagePool | |
| Library Manager | Device: |
| PLC_PRG (PRG) | Vendor: <ali vendors=""></ali> |
| 😑 🌃 Task Configuration | |
| 🗏 🍪 MainTask | Name Vendor Version |
| PLC PRG | E- I Fieldbusses |
| Profinet_CommunicationTask | 🚊 🛲 Profinet IO |
| PN Controller.CommCycle | B III Profinet IO Module |
| Profinet_IOTask | DXP Turck SW=SW V 1.4.2, HW=HW 1 |
| E SVISU_TASK | |
| VISU_TASK VISUElems.Visu_Prg | |
| | |
| TextList | |
| 🖲 🖶 Visualization Manager | |
| Uisualization | |
| Ethernet (Ethernet) | |
| PN_Controller (PN-Controller) | |
| 🖹 🗐 TBEN_S2_2RFID_4DXP (TBEN-S2-2RFID-4DXP) | |
| HF_kompakt (HF compact) | |
| | |
| 16_Byte_schreiben (16 Byte write) | |
| HF_kompakt_1 (HF compact) | Group by category |
| 16 Byte_lesen_1 (16 Byte read) | Display all versions (for experts only) |
| 16 Byte schreiben 1 (16 Byte write) | Display outdated versions |
| REID, diagnostics (REID diagnostics) | Display outdated versions |
| K <empty> (<empty>)</empty></empty> | Information: |
| <pre>cempty> (<empty>)</empty></pre> | Please select a device from the list above. |
| <pre><compty>(<compty>) </compty></compty></pre> < <leer> (<empty>)</empty></leer> | Please select a device from the list above. |
| | |
| <pre> <leer> (<empty>)</empty></leer></pre> | |
| <pre>-Leer>(<empty>)</empty></pre> | |
| <pre><k <leer=""> (<empty>)</empty></k></pre> | |
| <pre>Leer> (<empty>)</empty></pre> | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | |
| | (You can select another target node in the navigator while this window is open.) |
| | |
| | |
| | Plug Device Close |

Fig. 153: Selecting DXP diagnostics

The diagnostics can be read via the PLC program.



9.17 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 exceeds the size of the read fragment |
| 0x8005 | 32773 | Length larger than the size of the write fragment |
| 0x8006 | 37774 | Read/write head does not support HF bus mode |
| 0x8007 | 32775 | Only one read/write head should be connected for addressing. |
| 0x8008 | 32776 | Fragmentation must always start with write fragment No. 1 |
| 0x8009 | 32777 | Fragmentation incomplete. Write fragment No. > 0 expected |
| 0x8100 | 33024 | Parameter undefined |
| 0x8101 | 33025 | Operation mode parameter outside of the permissible range |
| 0x8102 | 33026 | Tag type parameter outside of the permissible range |
| 0x8103 | 33027 | Operation 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 |
| 0x8107 | 33031 | Bypass time parameter outside of the permissible range |
| 0x8108 | 33032 | Address in Continuous Mode parameter outside of permissible range |
| 0x8200 | 33280 | Command code unknown |
| 0x8201 | 33281 | The command is not implemented in this device |
| 0x8202 | 33282 | Command not supported in HF applications |
| 0x8203 | 33283 | Command not supported in UHF 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 detection |
| 0x8207 | 33287 | Command not supported for multitag application |
| 0x8208 | 33288 | Command not supported in HF bus mode |
| 0x8209 | 33289 | Length parameter 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 |



| Error code (hex.) | Error code (dec.) | Meaning |
|-------------------|-------------------|---|
| 0x8212 | 33298 | Length and address outside of the tag specification |
| 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 |
| 0x8216 | 33302 | Command only possible in HF bus mode |
| 0x8217 | 33303 | HF read/write head address invalid |
| | | |
| 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 violates the block limits |
| 0x8306 | 33542 | HF: Address in Continuous Mode violates the block limits |
| 0x8307 | 33543 | HF: Length in Continuous Mode outside of the permissible range |
| | | |
| 0x0801 | 2049 | Verify after write operation failed |
| | | |
| 0x2000 | 8192 | Kill command not successful |
| 0x2200 | 8704 | Autotuning active |
| 0x2201 | 8705 | Autotuning failed |
| 0x2202 | 8706 | Antenna detuned at HF read/write head |
| | | |
| 0x2500 | 9472 | Password function of the tag not supported |
| 0x2501 | 9473 | Password function not supported by read/write head |
| 0x2502 | 9474 | Tag protection bit pattern not supported |
| 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 command |
| 0xB069 | 45161 | Read/write head error when executing a write multiple block command |
| 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 |



| Error code (hex.) | Error code (dec.) | Meaning |
|-------------------|-------------------|--|
| 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 |
| 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 |
| 0xD0 | 53 | UHF read/write head reports error |
| 0xD001 | 53249 | Error when resetting the UHF read/write head |
| 0xD002 | 53250 | Error when reading the read/write head version |
| 0xD003 | 53251 | Error when reading the read/write head version when a tag is in the detec- tion range |
| 0xD004 | 53252 | Error when setting the read/write head address |
| 0xD009 | 53257 | Error with the parameter setting of the UHF read/write head |
| 0xD00A | 53258 | Error setting the transfer speed and the operating mode of the UHF read/ write head |
| 0xD00B | 53259 | Error when polling |
| 0xD00D | 53261 | Error when reading the device status |
| 0xD00E | 53262 | Error when resetting the internal status bit |
| 0xD00F | 53263 | Error when setting the read/write head outputs and/or LEDs |
| 0xD011 | 53265 | Error when reading the internal malfunctions |
| 0xD014 | 53268 | Diagnostics error |
| 0xD016 | 53270 | Error with the heartbeat message |
| 0xD017 | 53271 | Error when outputting the user settings |
| 0xD01B | 53275 | Error when emptying the message memory in Polling mode |
| 0xD081 | 53377 | Error when switching turning on/off UHF-carrier |
| 0xD083 | 53379 | Error when reading from a tag |
| 0xD084 | 53380 | Error when writing to a tag |
| 0xD085 | 53381 | Software trigger error |
| 0xD088 | 53384 | Error when outputting a command according to EPC Class1 Gen2 |
| 0xD100 | 53504 | Error with the Backup function |
| 0xD101 | 53505 | Error with the Backup function (required memory not available) |
| 0xD102 | 53506 | Error when restoring a backup |
| 0xD103 | 53507 | Error when restoring a backup (no backup present) |
| 0xD104 | 53508 | Error when restoring a backup (backup data damaged) |
| 0xD105 | 53509 | Error when restoring the default settings |



| Error code (hex.) | Error code (dec.) | Meaning |
|-------------------|-------------------|--|
| 0xD106 | 53510 | Error with the tag function |
| | | |
| 0xF0 | 61 | ISO -15693 error |
| 0xF001 | 61441 | ISO -15693 error: The command is not implemented in this device |
| 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 |
| 0xF104 | 61699 | Air interface error: HF tag error |
| 0xF108 | 61704 | Air interface error: HF tag outside of the detection range, before all com- mands could be executed |
| 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 window, check syntax |
| 0xF208 | 61960 | Power supply of the HF read/write head too low |
| 0xF20A | 61962 | HF read/write head: Command code unknown |
| | | |
| 0xF8 | 63 | UHF read/write head error |
| 0xF820 | 63520 | UHF read/write head: The command is not implemented in this device |
| 0xF821 | 63521 | UHF read/write head: unspecified error |
| 0xF822 | 63522 | UHF read/write head: A valid password is expected before the command is accepted. |
| 0xF824 | 63524 | UHF read/write head: Read operation not possible (e.g. invalid tag) |
| 0xF825 | 63525 | UHF read/write head: Write operation not possible (e.g. tag can only be read) |
| 0xF826 | 63526 | UHF read/write head: Verify after write operation failed |
| 0xF827 | 63527 | UHF read/write head: Access to unknown address (e.g. memory area out- side of range) |
| 0xF828 | 63528 | UHF read/write head: The data to be sent is not valid. |
| 0xF82A | 63530 | UHF read/write head: The command requires a long time for execution. |
| 0xF82C | 63532 | UHF read/write head: The requested object is not in the persistent memory. |
| 0xF82D | 63533 | UHF read/write head: The requested object is not in the volatile memory. |
| 0xF835 | 63541 | UHF read/write head: The command is temporarily not permissible. |
| | | . , , |



| Error code (hex.) | Error code (dec.) | Meaning |
|-------------------|-------------------|--|
| 0xF836 | 63542 | UHF read/write head: The opcode is not valid for this type of configuration memory. |
| 0xF880 | 63616 | UHF read/write head: No tag in the field |
| 0xF881 | 63617 | UHF read/write head: The EPC of the command does not match the EPC in the detection range. |
| 0xF882 | 63618 | UHF read/write head: No tag type specified in the command |
| 0xF883 | 63619 | Write command to a block failed |
| 0xFFFE | 65534 | Timeout on the RS485 interface |
| 0xFFFF | 65535 | Command aborted |



9.18 Using extended diagnostics — RFID channels

The extended diagnostics in the web server are used for specific troubleshooting for Turck Service technicians.

Displaying extended diagnostics in the web server:

- Open the web server and log in on the device.
- Select LOCAL I/O \rightarrow Diagnosis \rightarrow Select RFID channel (here: RFID channel 0).

| TBEN-S2-2RFID-4DXP | TBEN-S2-2R | FID-4DXP - Local I/O - Diagnosis | | |
|-------------------------------------|-------------------|---|----------|---|
| j Info | | Ē | | |
| {ွိ} Parameter | Write Channel v | | | |
| [ऐᢖ Diagnosis 샹 Event log | DXP channel | Diagnostics Overcurrent supply VAUX1 | - | ? |
| ✓ Ex- / Import © Change Password | RFID channel 0 | Parameterization error Configuration via DTM active | - | ? |
| Firmware | RFID channel 1 | Buffer full Diagnostics head 1 Antenna detuned at HF read/write head x | - | ? |
| LOCAL I/O {승} Parameter [| DXP 4 | Parameter not supported by read/write head x Error reported by read/write head x | - | ? |
| ູ∿ະ Input | DXP 5 | Not connected to read/write head x | - | ? |
| ్రి Output | DXP 6 | Protocol Device type | HF | |
| | DXP 7 | Configuration ID FW version | 0 791 | |
| | | HW version Status | 500 | |
| | | Tag Air | 0 | |
| | | XCVR | 0 | |
| | | Error General status | 2 | |
| | | RF status | 0 | |
| | | Device status | 0 | |

Fig. 154: Example: extended diagnostics of RFID channel 0

| Info | Description |
|------------------|--|
| Protocol | Technology of the connected read/write device (HF or UHF) |
| Device type | ID number for the device type of the connected read/write device |
| Configuration ID | ID number for the configuration of the connected read/write device |
| FW version | Firmware version of the connected read/write device |
| HW version | Hardware version of the connected read/write device |



| Status | Description | Values | |
|----------------|---------------------------------------|---|--|
| Tag | Error code of HF tag | The command is not implemented in this device Command not detected, e.g. incorrect input format Command option not supported Undefined error Addressed memory area not available Addressed memory area locked Addressed memory area locked and not writable Write operation not successful Addressed memory area could not be locked User-specific error code | |
| Air | Error code of HF air interface | 1: CRC error 2: Timeout 4: HF tag error 8: HF tag outside of the detection range, before all commands could be executed 16: Tag does not have the expected UID. | |
| XCVR | Error code of HF read/write head | 1: HF read/write head faulty 2: Error in command execution 4: Transmission window, check syntax 8: Power supply of the HF read/write head too low 16: Command code unknown | |
| Error | Error code of UHF reader | 32: The command is not implemented in this device 33: Unspecified error 34: A valid password is expected before the command is accepted. 36: Read operation not possible (e.g. invalid tag) 37: Write operation not possible (e.g. tag can only be read) 38: Verify after write operation failed 39: Access to unknown address (e.g. memory area outside of range) 40: The data to be sent is not valid. 42: The command requires a long time for execution. 44: The requested object is not in the persistent memory. 45: The requested object is not in the volatile memory. 53: The command is temporarily not permissible. 54: The opcode is not valid for this type of configuration memory. 128: No tag in the field 129: The EPC of the command does not match the EPC in the detection range. 130: Incorrect tag type specified in the command 131: Write command to a block failed | |
| General status | General status of UHF reader | The displayed values are based on the following bit structure: Bit 1: Tag present Bit 5: Test mode active Bit 6: Read/write head configuration damaged, default settings are used. Bit 7: Read/write head was reset (after reset). | |
| RF status | Status of the RF module UHF reader | | |



| Status | Description | Values |
|---------------|-----------------------------|--|
| Device status | Device specific information | The displayed values are based on the following bit structure: Bit 0: Configuration invalid. Command execution not possible. Bit 1: Communication error Bit 2: Temperature too high Bit 3: Temperature warning Bit 4: Error in message generation (in Polling mode outside of memory area) |



9.18.1 Using extended diagnostics — time measurement for commissioning an application

The time of the transmission from the tag to the interface is taken as the time measurement. The transmission of data to a controller is not taken into account.

If a particular tag is selected in the **HF: Select tag type** parameter, the time measurement for the write command is already started when it is activated. The time measurement is carried out irrespective of whether a tag is present in the detection range. The time measurement function is available for read/write heads from firmware version Vx.91.

The following values can be displayed for advanced diagnostics and system tests. Actual as well as minimum and maximum values are available.

- Time in which the Tag present bit is set
- Duration of an inventory command
- Duration of a read command
- Duration of a write command
- Cycle time of HF bus mode
- Cycle time of HF Continuous bus mode

Example: Opening extended diagnostics with the PACTware FDT/DTM frame application

- Open diagnostics in PACTware.
- Select the RFID channel (here: **Channel 0**).
- ⇒ The **Expert mode on/off** button is displayed in the menu bar.
- Activate expert mode.
- The time measurement is shown.

File Edit View Project Device Extras Window Help

i 🗋 😂 🛃 - 🔛 🖓 i 🖬 🕸 🖄 🐝 🗱 🔤

| Project 🛛 🕈 🗙 | ■ 01/Intern-S2-2RF | TD-4DXP # Diagnosis | |
|-----------------------------|----------------------|---|---------------|
| Device tag | | | |
| 📕 HOST PC | Your Global Auto | mation Partner | |
| 🖃 💳 TCP:192.168.1.10 | Device type Intern-S | | |
| | Description Interne | electronic module 2 RFID comm. and 4 digita | il in-/output |
| Modulbus | 🗖 🖌 🛅 🥵 🤹 | 👰 😫 📐 🔠 | |
| 🖂 💳 01/Intern-S2-2RFID-4DXP | DXP channel | Name | Value |
| w UHF Ident 0 | RFID channel 0 | - Current values | |
| UHF Ident 1 | RFID channel I | Tag present | 0 ms |
| φ offitident I | DXP 4 | Inventory Command | 0 ms |
| | DXP 5 | Read command | 0 ms |
| | DXP 6 | Write command | 0 ms |
| | DXP 7 | Bus cycle in normal mode | 0 ms |
| | | Bus cycle in continuous mode | 0 ms |
| | | 🖳 🖂 Min. values | |
| | | Tag present | 0 ms |
| | | Inventory Command | 0 ms |
| | | Read command | 0 ms |
| | | Write command | 0 ms |
| | | Bus cycle in normal mode | 0 ms |
| | | Bus cycle in continuous mode | 0 ms |
| | | Max. values | |
| | | Tag present | 0 ms |
| | | Inventory Command | 0 ms |
| | | Read command | 0 ms |
| | | Write command | 0 ms |
| | | Bus cycle in normal mode | 0 ms |
| | | Bus cycle in continuous mode | 0 ms |

Fig. 155: Time measurement in the DTM



Example: Opening extended diagnostics in the web server

- Open the web server.
- Log into the device.
- ▶ Select LOCAL I/O \rightarrow Diagnosis \rightarrow Select RFID channel (here: RFID channel 0).
- \Rightarrow The time measurement is shown.

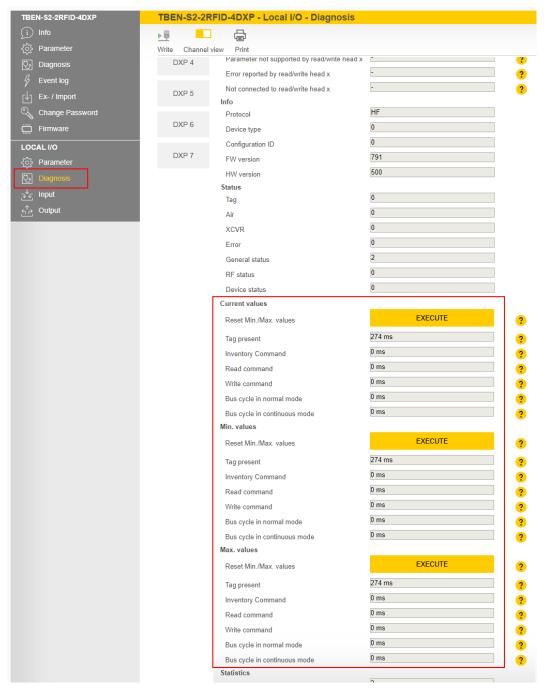


Fig. 156: Time measurement in the web server



- HF Applications firmware update of connected HF read/write heads via the 9.19 web server
- Prepare the firmware update 9.19.1



NOTE

In order to perform the firmware update via the PC and the web server, the device and the PC must be on the same IP network and the location of the new firmware file must be known.

Opening a web server 9.19.2

The web server can either be opened via a web browser or via the Turck Service Tool. The call of the web server via the Turck Service Tool is described in the section "Adjusting network settings".

The device is factory set to IP address 192.168.1.254. To open the web server via a web browser, enter http://129.168.1.254 in the address bar of the web browser.

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

| | | | | | URCK |
|--------------------|------------------------|---|--|-------|------|
| MAIN | UHF RFID CONFIG & DEMO | DOCUMENTATION | | LOGIN | |
| | | | | | |
| TBEN | I-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Gatewa | ıy - Info | | |
| (i) | Info | | | | |
| ႏွ်း ၊ | Parameter | | | | |
| ୍ ତିକ (| Diagnosis | 0 | | | |
| <i>4</i> 6 | Event log | S | A CON | | |
| F↓ ∎ | Ex- / Import | | TUN | | |
| (| Change Password | | | | |
| | Firmware | | | | |
| LOCA | AL 1/0 | | | | |
| | Parameter | | | | |
| | Diagnosis | | | | |
| | Input | Multiprotocol, 2 RFID comm. and 4 digital in-/c | output | | |
| | • Output | Device | | | |
| | | Station information | | | |
| | | Туре | TBEN-S2-2RFID-4DXP | | |
| | | ldent. no. | 6814029 | | |
| | | Firmware revision | 3.7.0.0 10.0.1.0 | | |
| | | Bootloader revision | 2.7.53.0 | | |
| | | EtherNet/IP revision | 1.7.22.0 | | |
| | | PROFINET revision Modbus/TCP revision | 2.4.5.0 | | |
| | | WEB revision | 1.0.29.0 | | |
| | | Software build number | 1051 | | |
| | | Addressing mode | PGM-DHCP | ? | |
| | | Special device properties | | • | |
| | | Production data | 01 3d 00 03 00 00 47 4f 51 53 44 59 00 0 | ? | |

Fig. 157: Example: Web server — home page



9.19.3 Performing a firmware update



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.

To perform the firmware update, proceed as follows:

Call up the web server

| MAIN RFID READER | DOCUMENTATION | |
|---------------------------|---|--|
| | | |
| TBEN-S2-2RFID-4DXP | TBEN-S2-2RFID-4DXP - Ga | teway - Info |
| (i) Info | | |
| {ွ်} Parameter | | |
| Cy Diagnosis | Q H I | |
| Event log | South Barris | |
| [↓] Ex- / Import | TI I | |
| 🔍 Change Password | Compact Multiprotocol RFID Module for | |
| | and 4 Universal Digital Channels, Confi | gurable as PNP Inputs or 0.5-A Outputs |
| LOCAL I/O | Device | |
| දිරිදි Parameter | Station information Type | TBEN-S2-2RFID-4DXP |
| 🖓 Diagnosis | Ident. no. | 6814029 |
| √vr Input | IP address | 192.168.1.20 |
| പ്പ പ്പറ്റ്റ്റ് Output | Addressing mode | PGM-DHCP ? |
| | MAC address | 00:07:46:11:30:37 |
| | Revisions | |
| | Firmware revision | 3.8.0.9 |
| | Bootloader revision | 10.0.1.0 |
| | EtherNet/IP revision | 2.7.53.0 |
| | PROFINET revision | 1.7.27.0 |
| | Modbus/TCP revision | 2.4.7.0 |
| | WEB revision | .1.5.7.0 |
| | Software build number | 1538 |
| | ARGEE revision | 3.7.7.0 |
| | Special device properties | |

Fig. 158: Web server home page



Select the RFID reader area and then, in the left column, select the Firmware point of the device on which you want to perform the firmware update

| MAIN RFID READER DOC | UMENTATION |
|------------------------------|--------------------------------|
| | |
| RFID IDENT 0 - HF DEVICE | Login |
| Firmware | Look to conduct from double |
| RFID IDENT 1 - TN865-Q120L13 | Login to read data from device |
| (i) Info | |
| ද်္ဂ်ိုး Parameter | |
| Cr Diagnostics | |
| ع ^ل ي Input | |
| [↓] Import-/Export | |
| දි Application | |
| Firmware | |
| | |
| | |
| | |

Fig. 159: RFID reader

Log into the device if you have not already done so

| | MAIN RFID READER DOCU | IMENTATION |
|---------|------------------------------|--|
| | RFID IDENT 0 - HF DEVICE | Login |
| | Firmware | |
| | RFID IDENT 1 - TN865-Q120L13 | Read data from device? Process data is not transferred while reading from device |
| | (i) Info | GO ONLINE |
| | {ွိ} Parameter | |
| | Cy Diagnostics | |
| | ച്⊊ Input | |
| | └── Import-/Export | |
| | ຼິງ Application | |
| | 🛄 Firmware | |
| | | |
| | | |
| | | |
| Fig. 16 | 0: Login | |



Select the appropriate firmware file using the Select firmware file button

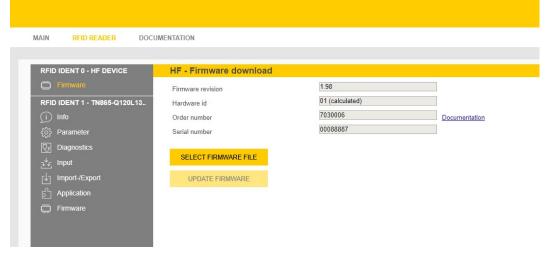


Fig. 161: Select firmware

⇒ Firmware file is loaded

| IAIN RFID READER DOCU | MENTATION | | |
|----------------------------------|-----------------------------|----------|---------------|
| RFID IDENT 0 - HF DEVICE | HF - Firmware download | | |
| 🛱 Firmware | Firmware revision | 1.99 | |
| RFID IDENT 1 - TN865-Q120L13 | Hardware id | 01 | |
| j Info | Order number | 7030004 | Documentation |
| ို္င်္နဲ Parameter | Serial number | 00294653 | |
| ତ୍ରୁ Diagnostics ଅନ୍ଦ୍ର Input | SELECT FIRMWARE FILE | | |
| [↓] Import-/Export | Firmware Download succeeded | | |
| ຼຼີ ລົງ Application | UPDATE FIRMWARE | | |

Fig. 162: Download the firmware



Start the update via the **Update firmware** button

| MAIN RFID READER DOCU | MENTATION | | |
|--|---|--|---------------|
| RFID IDENT 0 - HF DEVICE □ Firmware RFID IDENT 1 - TN865-Q120L13 (j) Info (\$\$) Parameter [\$] Diagnostics \$ | HF - Firmware download Firmware revision Hardware id Order number Serial number SELECT FIRMWARE FILE | 1.98 01 (calculated) 7030006 00088887 | Documentation |
| ් Import-/Export දු Application _ Firmware | File HF_RFID_xv99.dat4 selected | | |

Fig. 163: Firmware file selected

► Confirm with **OK**

| (i) Firmw | are successfully rea device | d. Press OK to update el |
|-----------|--------------------------------|-----------------------------|
| ОК | Cancel | |

Fig. 164: Start the update

⇒ Firmware update starts







⇒ After a successful update, you will receive a corresponding message.

| MAIN RFID READER DOCI | UMENTATION | |
|------------------------------|-----------------------------|-----------------------|
| | | |
| RFID IDENT 0 - HF DEVICE | HF - Firmware download | |
| 🛱 Firmware | Firmware revision | 1.99 |
| RFID IDENT 1 - TN865-Q120L13 | Hardware id | 01 (calculated) |
| j Info | Order number | 7030006 Documentation |
| ္ {္က်} Parameter | Serial number | 00088887 |
| Diagnostics | | |
| v Input | SELECT FIRMWARE FILE | |
| Import-/Export | Firmware Download succeeded | |
| പ് ട്രി Application | UPDATE FIRMWARE | |
| 📛 Firmware | | Firmware successfully |
| | | update. |
| | | |
| | | ок |
| | | |
| | | |
| | | |

Fig. 166: Update successful



10 Troubleshooting

Proceed as follows if the device does not operate as expected:

- Exclude environmental interference.
- Check the terminals of the device for faults.
- Check the device for parameter errors.

A device fault is present if the malfunction continues. In this case, decommission the device and replace it with a new device of the same type.

10.1 Rectify parameter errors

DXP channels

| Error | Possible causes | Mea | sure |
|--------------------------|---|-----|---|
| DXP output not switching | The output is deactivated in the default setting of the device. | • | Activate the output function via the Activate output parameter (DXP_EN_DO = 1). |



11 Maintenance

Ensure regularly that the plug connections and cables are in good condition.

The devices are maintenance-free, clean dry if required.

11.1 Performing a firmware update

The firmware of the device can be updated via FDT/DTM. The PACTware FDT frame application, the DTM for the device and the latest firmware can be downloaded free of charge from www.turck.com.

| 1 | NC |
|---|-----|
| | Int |

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.



NOTE

Before updating firmware version \leq 3.6.1.0 to version \geq 3.7.0.0 the bootloader must be updated to version \geq 10.0.1.0.

Example: Updating the firmware with the PACTware FDT frame application

- Launch PACTware.
- Right-click HOST PC \rightarrow Add device.

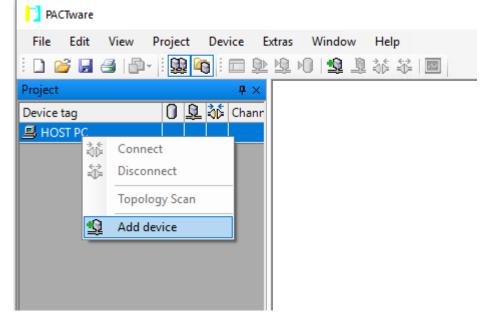


Fig. 167: Adding a device in PACTware



| PACTware | - 🗆 × |
|---|----------------|
| File Edit View Project Device Extras Window Help | |
| | |
| Project a × | |
| Device tag 0 | D. |
| B HOST PC | vice |
| Device for | Cevice catalog |
| | <u>°</u> |
| All Devices (2/2 DTMs) | |
| Enter text to search Find Clear | |
| Device Protocol Vendor Group Device Version DTM version | |
| ▼ BL Service Ethernet BL Servic Turck DTM spe 1.0.0 / 2007 1.2.0.0 1.00.260 | |
| ■ BL Service RS232 BL Service Turck DTM spe 1.0.0 / 2007 1.2.0.0 1.00.260 | |
| BL Service Ethernet Com DTM | ancel |
| < >> | |
| Image: Weight of the second | ,di, |

• Select **BL Service Ethernet** and confirm with **OK**.

Fig. 168: Selecting the Ethernet interface

- Double-click the connected device.
- ⇒ PACTware opens the Bus Address Management function.

| PACTware | | - | | × |
|-------------------------------|--|----------------|--------------|----------------|
| Eile Edit View Project Device | E <u>x</u> tras <u>W</u> indow <u>H</u> elp 』 望 遼 恭 豪 國 | | | |
| Project 🕂 🛨 TCP | :192.168.1.130 Busaddress management | | ⊲ ⊳ × | |
| Device tag 0 | Your Global Automation Partner | TUR | ск | Device |
| TCP:192.168.1.130 | Device type BL Service Ethernet Description BL Service over ethernet communication DTM | | | Device catalog |
| | 劉偉 ●※ 叫町 増 準 業車罩 | Busaddress man | agement | |
| Online a | available devices Add devices manually | | | |
| Industria | l Ethernet_192.168.1.130 (192.168.1.130/255.255.255.0) | | \sim | |
| De | vice type Online ID IP address Netmask Gateway Ethernet address | Version Mode | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| Planner | d devices | | | |
| | vice type Online ID Busaddress Designation ('Tag') Device short na | me | | |
| | | | | |
| | | | | |
| < > | | | | |
| | ministrator | | | |

Fig. 169: Opening Bus Address Management



- Search for connected Ethernet devices: Click the **Search** icon.
- Selecting the required device.

| 🔫 то | P:192.168.1 | .130 Busadd | ress managem | ent | | | < | 4 Þ × |
|---------|----------------------------|------------------------------|--------------------------------|---------------|-----------------|-------------------|--------------------|--------|
| | Your Glob | oal Automati | on Partner | | | | TURC | ĸ |
| - | Device type Description | BL Service E BL Service o | Ethernet over ethernet co | ommunication | DTM | | | |
| - | ያ 🕼 | ن 🕲 | 😻 IP↓ IP† +🚺 | 1 💷 ă 🧕 | | E | Busaddress managem | ent |
| Online | e available devic | es Add devices | manually | | | | | |
| Indust | rial Ethernet_192 | 2.168.1.130 (192.1 | 168.1.130/255.255.2 | 55.0) | | | | \sim |
| | evice type | Online ID | | Netmask | Gateway | Ethernet address | Version Mode | |
| T | BEN-S2-2RFI | D-4DX 1500029 | /C9 <u>192.168.1.51</u> | 255.255.255.0 | 0.0.0 | 00:07:46:0D:77:2A | V3.0.0.0 PGM_DH(| |
| Plann | ed devices | | | | | | | |
| | evice type | On | line ID Busaddre | ss Desi | gnation ('Tag') | Device short nam | ne | - |
| | | | | | | | | |
| 🕼 Disc | connected | | | / | | OK (| Cancel Apply | |
| -ig. 17 | 0: Selecting | g the device | | | | | | |
| | | ! | NOTICE Faulty firmwa | re update | | | | |

Restricted device functions due to missing web server

• Upload bootloader to version \geq 10.0.1.0.



Checking the bootloader version

- Open the web server via a web browser or via the Turck Service Tool.
- Check the bootloader version in the status information on the home page.

| STATION Station Information | > Station Information | |
|---|-----------------------|--------------------|
| Station Diagnostics | Station Information | |
| Event Log Ethernet Statistics | Туре | TBEN-S2-2RFID-4DXP |
| EtherNet/IP Memory Map | Identification Number | 6814029 |
| Modbus TCP Memory Map Links RFID measurements | Firmware Revision | V3.6.0.0 |
| | Bootloader Revision | V9.0.2.0 |
| RFID CONTROL/STATUS 0 | EtherNet/IP Revision | V2.7.39.0 |
| Parameters | PROFINET Revision | V1.6.6.0 |
| Inputs Outputs | Modbus TCP Revision | V2.4.1.0 |

Fig. 171: Checking the bootloader version

- The bootloader must be updated before the firmware update if the bootloader version is < 10.0.1.0.</p>
- ▶ If the bootloader version is \ge 10.0.1.0, continue with the firmware update (see [▶ 272]).



Updating the bootloader

- Click the Firmware Download button.
- Select the displayed bootloader and click **Open**.

| TCP:192.168.1.30 |) Busaddress management | |
|---|--|--|
| 🕱 Your Global | Automation Partner | |
| | L Service Ethernet L Service over ethernet co | mmunication DTM |
| | 🏽 🖗 🄅 IP↓ IP† +(| 3 冲 高速磁 |
| 🔁 Open | | |
| ← → • ↑ <mark> </mark> | > See Readme first | |
| Organize 💌 | New folder | |
| This PC 3D objects Pictures Desktop Documents Downloads Music | "BEN_S2_2RFID_4)XP_01500029_V 1.7.0.0_b1051.dat | TBEN_S2_2RFID_4 DXP_01500029_V 10.0.1.0_bootload er.dat |
| | File name: | V Firmware (.dat) |
| | | Open Cancel |

Fig. 172: Selecting the bootloader

⇒ PACTware displays a green bar at the bottom of the screen to indicate the progress of the bootloader update.



Updating the firmware

- Click the **Firmware Download** button.
- Select firmware and click **Open**.

| TCP:192.168.1.30 Busaddress manager | nent |
|---|-----------------------|
| Your Global Automation Partne | r |
| 4 | net communication DTM |
| | PT +0 보 👗 🕹 🕮 |
| 🚺 Open | |
| \leftarrow \rightarrow \checkmark \uparrow \square \rightarrow See Readme first | |
| Organize 🔻 New folder | |
| This PC 3D objects Pictures Desktop Documents Downloads Music | 29_V DXP_01500029_V |
| File name: | Firmware (.dat) |
| | Open Cancel |

Fig. 173: Starting the firmware update



ACTware displays a green bar at the bottom of the screen to indicate the progress of the bootloader update.

| PACTware | |
|---|--|
| File Edit View Project Device Extras Window Help | |
| i 🗅 🧉 🖉 🚭 👘 - 🔛 📬 i 🗖 🕸 🕸 🖄 🚳 🔤 | |
| Project 🕂 | ▼ TCP:192.168.2.108 Busaddress management |
| Device tag 🚺 🖳 🎲 Channel Addres | |
| B HOST PC ▼ TCP:192.168.2.108 ▼ TCP:192.168.2.108 | |
| | BL Service Ethemet BL Service over ethemet communication DTM |
| | 📄 🕫 🕼 🛈 🐙 IPI IPT 🔒 🎍 🦉 🛛 Busaddress management |
| | Online available devices Madd devices manually |
| | Ethernet (192.168.2.108/255.255.255.0) |
| | Device type Online ID IP address Netmask Gateway Ethemet address Version Mode |
| | TBEN \$2:28FID-40X 1500023/C <u>132:188.1.254</u> 255 255.0 0.0.0 00.07.46 0C.CB 64 V0.1.10 PGM_DHC |
| | |
| | |
| | |
| | |
| | Planned devices |
| | Device type Online ID Buraddress Designation (Tag) Device thost name |
| | Device type Online ID Busaddress Designation (Tag) Device short name |
| | |
| | |
| | |
| | |
| | |
| | OK Cancel Apply |
| | 40 Disconnected |
| | PACT <i>ware</i> [™] |
| | |
| | supported by PACTware 5.0.5.31 |
| | PACTware 5.0.5.31 |
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| < | |
| √I> ★ ○ <noname> Administrator</noname> | |
| | |

Fig. 174: Firmware update in progress



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 http://www.turck.de/de/produkt-retoure-6079.php and must be completely filled in, and affixed securely and weather-proof to the outside of the packaging.

13 Disposal



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



14 Technical Data

| Technical Data | |
|---------------------------------|---|
| Power supply | |
| Power supply voltage | 24 VDC |
| Permissible range | 1830 VDC Total current max. 4 A per voltage group Total current V1 + V2 max. 5.5 A at 70 °C per module |
| Voltage supply connection | 2 × M8, 4-pin |
| Operating current | V1: max. 120 mA V2: max. 30 mA |
| RFID power supply | Sockets C0…C1 from V1 short-circuit proof, 1.2 A ≤ 55 °C, 55 °C < 0.5 A ≤ 70 °C per channel |
| Sensor/actuator supply | Sockets C2C3 from V2 short-circuit proof, 0.14 A < 55 °C, 55 °C < 0.05 A < 70 °C |
| Potential isolation | Potential isolation of V1 and V2 voltage group Voltage proof up to 500 VDC |
| System data | |
| Ethernet transfer rate | 10 Mbit/s / 100 Mbit/s |
| Ethernet connection technology | 2 × M8, 4-pin, D-coded |
| Protocol detection | automatic |
| Web server | Default: 192.168.1.254 |
| Service interface | Ethernet via P1 or P2 |
| Field Logic Controller (FLC) | |
| ARGEE firmware version | 3.3.5.0 |
| ARGEE engineering version | 2.0.26.0 |
| Modbus TCP | |
| Addressing | Static IP, BOOTP, DHCP |
| Supported function codes | FC1, FC2, FC3, FC4, FC5, FC6, FC15, FC16, FC23 |
| Number of TCP connections | 8 |
| Input register start address | 0 (0x0000) |
| Output register start address | 2048 (0x0800) |
| EtherNet/IP | |
| Addressing | As per EtherNet/IP specification |
| Quick Connect (QC) | < 500 ms |
| Device Level Ring (DLR) | Supported |
| Class 3 connections (TCP) | 3 |
| Class 1 connections (CIP) | 10 |
| Input assembly instance | 103 |
| Output assembly instance | 104 |
| Configuration assembly instance | 106 |
| | |



| Technical Data | | |
|----------------------------------|---|--|
| PROFINET | | |
| Addressing | DCP | |
| Conformity class | B (RT) | |
| MinCycleTime | 1 ms | |
| Fast startup (FSU) | < 500 ms | |
| Diagnostics | According to PROFINET Alarm Handling | |
| Topology detection | Supported | |
| Automatic addressing | Supported | |
| Media redundancy protocol (MRP) | Supported | |
| System redundancy | S2 | |
| BFID | | |
| No. of channels | 2 | |
| Connection technology | M12 | |
| Power supply | 1.2 A ≤ 55 °C, 55 °C < 0.5 A ≤ 70 °C per channel, | |
| | short-circuit proof | |
| Operation per channel | $1 \times HF$ or read/write head or UHF reader, up to | |
| | 32 bus-capable HF read/write heads with | |
| | suffix / C53 (if necessary, additional power feed | |
| RFID data interface | required) HF and UHF | |
| | | |
| Cable length | Max. 50 m | |
| Digital inputs | | |
| No. of channels | 4 | |
| Connection technology of inputs | M12, 5-pin | |
| Input type | PNP | |
| Type of input diagnostics | Channel diagnostics | |
| Switch threshold | EN 61131-2 Type 3, PNP | |
| Signal voltage Low signal | < 5 V | |
| Signal voltage High signal | > 11V | |
| Signal current Low signal | < 1.5 mA | |
| Signal current High signal | > 2 mA | |
| Input delay | 0.05 ms | |
| Potential isolation | Galvanic isolation from the fieldbus, voltage proof up to 500 VDC | |
| Digital outputs | | |
| No. of channels | 4 | |
| Connection technology of outputs | M12, 5-pin | |
| Output type | PNP | |
| Type of input diagnostics | Channel diagnostics | |
| Output voltage | 24 VDC from potential group V2 | |
| Output current per channel | 0.5 A, short-circuit resistance | |
| Utilization factor | 1 (0.03 > 55 °C) | |
| Load type | EN 60947-5-1: DC-13 | |
| Short-circuit protection | yes | |
| | | |



| Technical Data | |
|--------------------------------------|---|
| Potential isolation | Galvanic isolation from the fieldbus, voltage proof up to 500 VDC |
| Conformity with standard/directive | |
| Vibration test | According to EN 60068-2-6, acceleration up to 20 g |
| Shock testing | Acc. to EN 60068-2-27 |
| Drop and topple | Acc. to IEC 60068-2-31/IEC 60068-2-32 |
| EMC (electromagnetic compatibility) | Acc. to EN 61131-2 |
| Approvals and certificates | CE FCC UV resistant acc. to DIN EN ISO 4892-2A (2013) |
| UL certificate | cULus LISTED 21 W2, Encl.type 1 IND.Cont.EQ. |
| General information | |
| Dimensions (W \times L \times H) | 32 × 144 × 31 mm |
| Operating temperature | -40+70 °C |
| Storage temperature | -40+70 °C |
| Operating height | Max. 5000 m |
| Protection class | IP65/IP67/IP69K |
| MTTF | 179 years acc. to SN 29500 (Ed. 99) 20 °C |
| Housing material | PA6-GF30 |
| Housing color | Black |
| Material of label | Polycarbonate |
| Halogen-free | yes |
| Mounting | 2 fixing holes, Ø 4.6 mm |

Note on FCC



NOTE

This device complies with the limit values for a Class A digital device in accordance with Part 15 of the FCC regulations. Operation of this device in a residential area may cause harmful interference. In this case users must rectify the interference at their own cost.



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

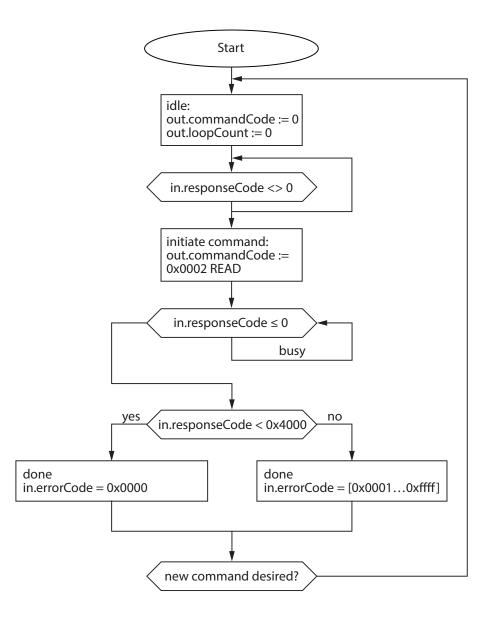


Fig. 175: Flow chart for command processing



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

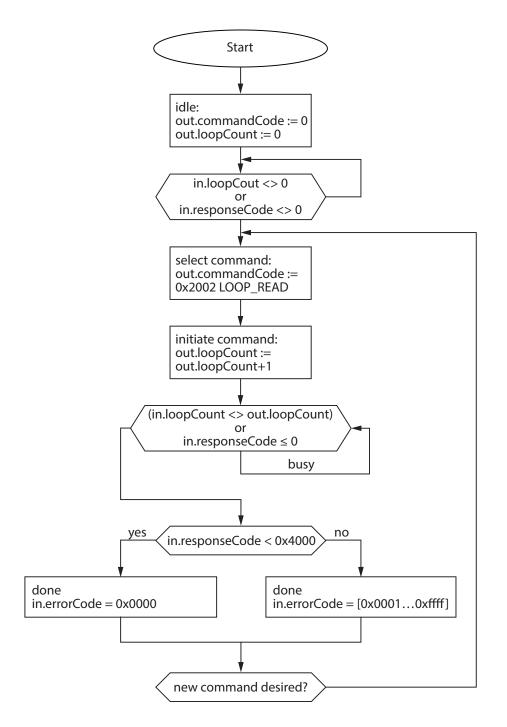


Fig. 176: Flow chart for fast command processing with loop counter



15.3 Flow chart: command processing with fragmentation

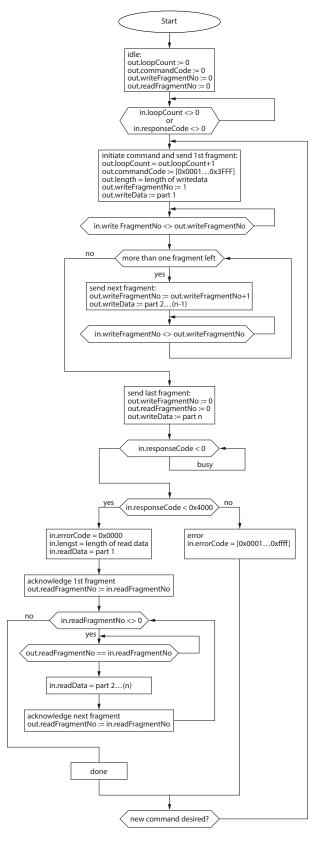


Fig. 177: Flow chart for command processing with fragmentation



15.4 Flow chart: Continuous Mode with interruption before reading data

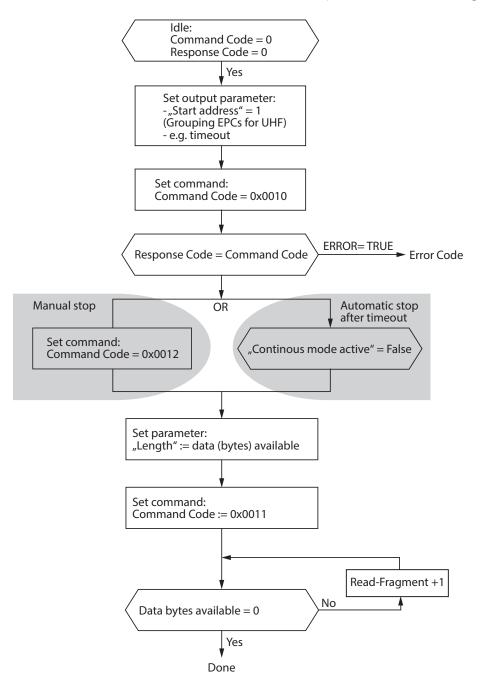
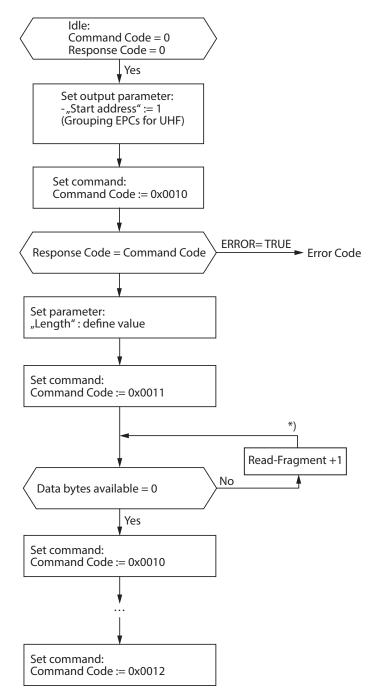


Fig. 178: Flow chart for Continuous Mode with interruption before reading data



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



15.6 Flow chart: programming tags with a password

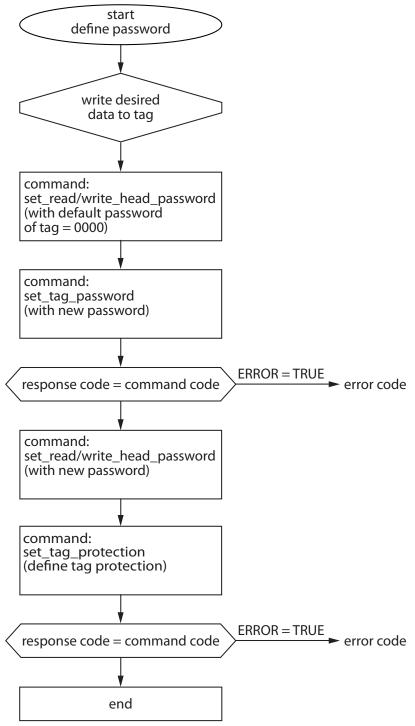


Fig. 180: programming tags with a password



16 Appendix: approvals and markings

Output current I_{max}

| Approvals | | |
|--|--|--|
| TÜV 20 ATEX 264795 X CE 을 | €x II 3 G Ex ec IIC T4 Gc | |
| TURCK Ex-20002HX UK ଞ୍ଚ CA % | € II 3 D Ex tc IIIC T115 °C Dc | |
| IECEx TUN 20.0010X | Ex ec IIC T4 Gc Ex tc IIIC T115 °C Dc | |
| Ambient temperature T _{amb} .: -25 °C+60 °C | | |
| Type code | TBEN-S2-2RFID-4DXP | |
| Power supply voltage | 24 VDC ±10 % | |
| Input current I _{max} | 5.5 A (total current per module) | |

0.5 A (per output)



17 Turck branches — contact data

| Germany | Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr www.turck.de |
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