

TN-UHF-...-OPC-UA UHF-Reader

Instructions for Use



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1 About these Instructions

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

1.1 Target groups

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

1.2 Explanation of symbols

The following symbols are used in these instructions:

| | DANGER DANGER indicates a hazardous situation with a high level of risk, which, if not |
|---|--|
| | avolueu, win result in death of 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. |
| i | 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 |
| F | 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
- Approvals
- Configuration manual

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 UHF readers:



2.2 Scope of delivery

The delivery consists of the following:

- UHF reader
- Wall bracket (metal rail)
- 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 [> 74].



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 readers with an integrated RFID interface are used for contactless data exchange with the RFID tags in the Turck UHF RFID system. The following table shows the operating frequency of the devices:

| Type designation | Operating frequency | Region |
|------------------|---------------------|-----------------------------|
| TN-UHFAUS-OPC-UA | 920926 MHz | Australia, New Zealand |
| TN-UHFBRA-OPC-UA | 915928 MHz | Brazil |
| TN-UHFCHN-OPC-UA | 920.5924.5 MHz | China and Thailand |
| TN-UHFEU-OPC-UA | 865.6867.6 MHz | Europe, Turkey, India |
| TN-UHFJPN-OPC-UA | 916.7920.9 MHz | Japan |
| TN-UHFKOR-OPC-UA | 917920.8 MHz | Korea |
| TN-UHFMYS-OPC-UA | 919923 MHz | Malaysia |
| TN-UHFNA-OPC-UA | 902928 MHz | North America (USA, Canada, |
| | | Mexico) |
| TN-UHFSGP-OPC-UA | 920925 MHz | Singapore |

These devices may only be started up under the following conditions:

- The particular frequency range is permissible for the use of UHF-RFID.
- The operating frequency range of the devices is compliant with the permissible UHF RFID range of the region.
- A valid certification and/or approval is available for the region of use.

The module can communicate with third-party systems such as ERP systems via an integrated OPC UA server compliant with the AutoID Companion Specification.

Four configurable digital channels are also provided for connecting digital sensors and actuators.

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 notes

- The device meets the EMC requirements for the industrial areas. When used in residential areas, take measures to prevent radio frequency interference.
- 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.
- Any extended stay within the area of radiation of UHF readers may be harmful to health. Observe a minimum distance of > 0.35 m from the actively radiating surface of the UHF reader.
- The radiation of the UHF readers may have an adverse effect on the operation of electrically controlled medical equipment. Keep an additional distance from active radiation sources up to the maximum transmission distance.
- Change the default password of the integrated web server after the first login. Turck recommends the use of a secure password.



4 Product Description

The devices are designed with an aluminum housing and degree of protection IP67. The active face is made out of plastic. Devices are available with an integrated antenna (Q300) or for connecting external antennas (Q180). Both device variants are suitable for connecting up to four external passive UHF RFID antennas.

The terminals for the Ethernet and for digital I/Os are M12 sockets. The device has an M12 plug connector for connecting the power supply. Terminals are provided for up to four external antennas.

4.1 Device overview



Fig. 1: Dimensions – TN-UHF-Q180L300...



Fig. 2: Dimensions – TN-UHF-Q300...

4.1.1 Indication elements

The device is provided with the following LEDs:

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

An audible alarm can also be set using software tools.



4.2 Properties and features

- Integrated OPC UA server standardized in accordance with AutoID Companion Specification
- Calling of data via OPC UA clients
- Universal interface offers interoperability
- Supports security mechanisms and authentication
- Rectangular, height 180 or 300 mm
- Active front face, UV-resistant
- Four terminals for passive UHF RFID antennas
- Four configurable digital channels, which can be configured as PNP inputs and/or 0.5-A outputs
- 2 W (ERP) maximum output power
- Close-to-control integration in PLC systems without the use of a special function module
- Integrated web server
- LEDs and diagnostics

4.3 Operating principle

The readers are used for contactless data exchange with tags. For this the controller sends commands and data via the interface to the reader and receives the corresponding response data from the reader. The reading of the IDs of all RFID tags in the read area and the writing of an RFID tag with a specific production date are examples of typical commands. To communicate with the tag, the data of the reader is coded and transferred via an electromagnetic field, which at the same time supplies the tags with power.

A reader contains a transmitter and a receiver, an interface to the interface module and a coupling element (coil and dipole antenna) for communicating with the tag. Electromagnetic wave propagation is used for the transmission between reader and tag on devices for the UHF range.



Fig. 3: Operating principle of UHF-RFID

The antenna of the reader generates electromagnetic waves. This produces a transmission window as a so-called air interface in which the data exchange with the tag takes place. The size of the transmission window depends on the combination of readers and tags, as well as on the relevant environmental conditions.

Each reader can communicate with a number of tags. This requires the reader and the tag to operate in the same frequency range. Depending on their power and the frequency in use, the devices have a range of a few millimeters up to several meters. The specified maximum distance between the read/write heads represents values measured under laboratory conditions, free from any influences caused by surrounding materials. Attainable distances may vary due to component tolerances, mounting conditions, ambient conditions and influences caused by surrounding materials.



The OPC UA interface is used to connect the reader to the higher-level system via Ethernet. Up to four additional antennas can be connected via the RFID interfaces. During operation, the process data is exchanged between the higher-level system and RFID system. The OPC UA server integrated in the reader communicates with the OPC UA client of the higher-level system to do this.

4.4 Functions and operating modes

4.4.1 Operating frequency

The Turck UHF system operates at country-specific operating frequencies between the tags and the readers. These national operating frequencies for UHF are the frequency ranges that are individually specified by the national regulation bodies.

For example, the operating frequencies of the devices in the UHF band are 865.6...867.6 MHz for Europe and 902...928 MHZ for the USA. The UHF readers can only be used in the particular designated regions and must not be commissioned outside these regions. Since UHF tags do not emit their own radio waves, they may be used worldwide.

In order to achieve the biggest possible communication range, Turck offers tags which are optimally tuned to country-specific frequency bands. Alternatively, broadband multi-area tags are also available for international use.

The different Turck readers support the following operating frequencies:

- 920...926 MHz (e.g. Australia and New Zealand)
- 915...928 MHz (e.g. Brazil)
- 920.5...924.5 MHz (e.g. China and Thailand)
- 865.6...867.6 MHz (e.g. Europe, Turkey, India)
- 916.7...920.9 MHz (e.g. Japan)
- 917...920.8 MHz (e.g. Korea)
- 919...923 MHz (e.g. Malaysia)
- 902...928 MHz (e.g. USA, Canada, Mexico)
- 920...925 MHz (e.g. Singapore)

All the country-specific details concerning UHF, such as frequency band, power supply, and any national regulations are available at:

https://www.gs1.org/docs/epc/uhf_regulations.pdf

For more detailed information please contact the regulation authorities of the country where you wish to use the UHF RFID system.

HF RFID systems can be operated in parallel with UHF RFID systems in a single system.

4.4.2 Compatible OPC UA clients

The device is compatible with all OPC UA clients that support the method execution and data model according to the AutoID Companion Specification. For example, the following OPC UA clients can be used:

- UAExpert Unified Automation
- dataFeed OPC UA Client Softing
- OPC Router Inray

It is also possible to capture RFID data with any OPC UA client by setting variables (ScanStart and Read), without the client having to support a method execution.

A specific OPC UA client can be programmed with the OPC UA Stack of the OPC Foundation. It is also possible to use the OPC UA SDKs of other manufacturers. Turck recommends the use of the ".NET based OPC UA client/server SDK". The OPC Foundation provides an overview of the available clients.



4.4.3 Authentication and encryption

For secure communication, the OPC UA interface offers authentication by the signing of certificates and the encryption of messages on the transport level. The OPC UA server of the device makes it possible to perform authentication and authorization on the application level by means of user levels and passwords.

4.4.4 RFID commands (methods)

The RFID functionality is defined in accordance with the AutoID Companion Specification. A complete description of the methods is provided in the specification. The methods are also described in the "Setting" chapter.

The device can perform the following methods and functions:

- Scan
- ScanStart
- ScanStop
- ReadTag
- WriteTag
- KillTag
- LockTag
- SetTagPassword
- WriteTagID



5 Installing

The device is provided with a bracket in accordance with VESA 100×100 for mounting. The device is provided with four M4 threaded holes spaced 100 mm apart (horizontally and vertically). The maximum length of the screws is 8 mm plus the thickness of the VESA bracket. The devices can be mounted in any position.

▶ Fasten the device with four M4 screws to a bracket in accordance with VESA 100 × 100.





Fig. 4: Rear view – TN-UHF-Q180...

Fig. 5: Rear view – TN-UHF-Q300...



6 Connecting

6.1 Connecting devices to Ethernet

The device has a 4-pin M12 female connector for connection to an Ethernet system.



Fig. 6: M12 Ethernet connector

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

Fig. 7: Pin assignment for Ethernet connections



NOTE

With PoE, the supply voltage is transmitted via PoE Mode A with 4-wire cables. The use of PoE and 24 VDC simultaneously is not supported.



6.2 Connecting the power supply

The device is provided with a 5-pin M12 plug connectors for connecting the power supply.



Fig. 8: M12 plug connector for connecting the power supply

• Connect the device to the power supply as per the following pin assignment (max. tightening torque 0.8 Nm).



Fig. 9: Pin assignment of the power supply terminals



6.3 Connecting digital sensors and actuators

The device has two 5-pin M12 plug connectors for connecting digital sensors and actuators.



Fig. 10: M12 plug connectors for connecting digital sensors and actuators

NOTE When operating via PoE (Power over Ethernet) the digital channels cannot be used as outputs.

 Connect sensors and actuators to the device as per the following pin assignment (max. tightening torque 0.8 Nm).



Fig. 11: Connections for digital sensors and ac-
tuators – pin assignmentFig. 12: Connections for digital sensors and ac-
tuators – wiring diagram



6.4 Connecting external antennas

The device is provided with four RP-TNC sockets for connecting up to four external antennas. The input impedance is 50 Ω .



Fig. 13: RP-TNC sockets for connecting external antennas

 Connect external antennas with an RP-TNC antenna cable to the device (max. tightening torque 0.8 Nm).



7 Commissioning

7.1 Parameterizing the reader using the web server

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

7.1.1 Opening a web server

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

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



7.1.2 Editing settings in the web server

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



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

- Click Login.
- Enter the password.

NOTE

Click OK.

| | | TURCH |
|---|---|--|
| MAIN RFID READER DOO | UMENTATION | |
| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q180L300-EU-OPC | -UA - Gateway - Info |
| ₹ŷ; Parameter ♡j Diagnosis ↓' Status ∮ Event log ↓ Ex- / Import ♥ Change Password | Read/Write Head UHF RFID | |
| | Station information | |
| | lype | IN-UHF-Q180L300-EU-OPC-UA |
| No Parameter | Ident. no. | 100000933 |
| ি Diagnosis ⊋৺্ Input র্^∂ Output | Addressing mode Revisions Firmware revision Bootloader revision OPC/UA revision | 1.0.3.8 1.0.1.0 1.0.0 |
| | WEB revision | v1.6.3.6 |
| | Software build number | 35 |
| | Special device properties Production data | 00 00 00 00 00 00 00 00 00 00 00 00 00 |
| | Version code | ? |
| | Serial number | 0 |
| | Hardware version | 0.0 |
| | Rev. counter | 0 |
| | | |

Fig. 14: Web server — login



• Change the password after the first login.





- ⇒ The start page is displayed with the device information after the login.
- Click **RFID READER** to display and set the device parameters.



Fig. 16: Web server — home page





Click **Parameter** in the navigation bar on the left of the screen.



⇒ All parameters of the device are displayed.

| RFID IDENT 0 - TN-UHF-Q300-E | RFID Ident 0 |) - TN-UHF-Q300-EU-xxx - Parame | eter | | |
|---------------------------------|--------------------|--|---------------|---|---|
| j Info | | Hex 🗸 | | | |
| ද်္ဂြို့ Parameter | Read Write Tab | view Print Data format | | | |
| Cy Diagnostics | Basic setup | General Device mode | Trigger mode | ~ | ? |
| ু∿ু Input г√ন Import-/Export | Antenna | Carrier delay time | 65535 ms | | ? |
| ្នា . ភា Application | Antonna | Interface mode | Polling mode | ~ | ? |
| | configuration | Inventory mode | anticollision | ~ | ? |
| | Communi- | Single shot timeout | 65535 ms | | ? |
| | cation | Tag data delay time (presence sensing) | 100 ms | | ? |
| | EPC Class1 Gen2 | | | | |
| | Post read filter | | | | |
| | Signaling | | | | |

Fig. 18: Web server — RFID Reader — Parameter

The following setup windows can be called up:

- Basic setup
- Antenna
- Antenna configuration
- Communication
- EPC Class1 Gen2
- Post read filter
- Signaling
- Set the parameters: Click Write.



NOTE

While a parameter is being set, the ERR LED lights up red and automatically turns green.



7.2 Testing the reader using the web server

The **Application** function enables the devices to be tested with the web server.

► Click **RFID READER** → **Application**



Fig. 19: Web server — RFID 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 Diag: 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.







Fig. 20: Example of RFID test: Record of a tag with the received RSSI values over time and the number of read operations





Fig. 21: Example of UHF diagnostics: Received power level per channel

7.3 Adjusting network settings

7.3.1 Adjusting network settings via TAS (Turck Automation Suite)

The device is factory set to IP address 192.168.1.254. The IP address can be set via TAS (Turck Automation Suite). The TAS is available free of charge at www.turck.com.

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

| TAS – Turck Automation | n Suite | | | | TURCK |
|------------------------|---|---|------------------------------|---------------------------|-----------------|
| TAS - Turck Automation | IN Suite Network Scan network Add device Eat device Change PW FW Locate Export CS Actions C Device type / feature (| ◆〕 ● ? V Import CSV Print Help ● Device name IP address | Adapter address Address mode | MAC address Subnet mask / | Sateway Version |
| | | | | | |

Fig. 22: TAS — home screen

⇒ The TAS displays the connected devices.

| TAS – Turck Automation | 1 Suite | | | | | | TUR | СК |
|---------------------------|--|---------------------------|------------------------|-----------------|--------------|-------------------|-----------------------------|---------|
| DEVICE LIST DOCUMENTATION | | | | | | | | |
| VIEW / FEATURE | Network | | | | | | | |
| ලා Network ලා ARGEE | Scan network Add device Edit device Chai | /P 🔅 💽 🎝 🖶 | ? nt Help | | | | | |
| ලා BEEP | Actions ? | Device type / feature ? | Device name IP address | Adapter address | Address mode | MAC address | Subnet mask / Gateway | Version |
| © 10-Unk | □ ⊜∥≊೧୯⊙ | TN-UHF-O180.309-EU-OPC-UA | <u>192 168 1 20</u> | 192.168.1.25 | PGM_DHCP | 00 07 46 84 08 4F | 255 255 255 0 / 192 188 1.1 | 1.0.3.8 |

Fig. 23: TAS — found devices

- Select the required device (check the checkbox).
- Click Edit device.

| AS - Turck Automation Suite | | | | | | | | |
|--|-------------------------------------|--|------------------------|-----------------|--------------|-------------------|-----------------------------|---------|
| DEVICE LIST DOCUMENTATION | | | | | | | | |
| VIEW / FEATURE | Network | | | | | | | |
| ଡ଼ି Network ଡ଼ି ARGEE | Scan network Add device Edit device | n Change PW FW Update Export CSV Import CSV Print He | ? elp | | | | | |
| (e) BEEP | Actions ? | Device type / feature ? | Device name IP address | Adapter address | Address mode | MAC address | Subnet mask / Gateway | Version |
| ي الال الله الله الله الله الله الله الل | ₽⊜₽≚०७⊙ | TN-UHF-G188L380-EU-OPC-UA | <u>192 168 1 20</u> | 192.188,1.25 | PGM_DHCP | 00 07 46 84 08 4F | 255.255.255.0 / 192.186.1.1 | 1.0.3.8 |

Fig. 24: TAS -selecting a device



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



- Change the IP address and, if necessary, the network mask and gateway.
- Apply changes by clicking **SET NETWORK DATA**.

| Edit network setti | ngs |
|---------------------------|--|
| IP address | 192.168.1.20 |
| Default gateway | 192.168.1.1 |
| Subnet mask | 255.255.255.0 |
| Take care, that the IP ad | dress isn't used by any other devices or switches! |

Fig. 25: TAS — adjusting network settings



7.3.2 Adjusting network settings via the web server



NOTE

The device must be in PGM mode in order to set the IP address via the web server.

- Open the web server.
- Log into the device as administrator.
- Click Parameter \rightarrow Network.
- Change the IP address and if necessary also the subnet mask and default gateway.
- Write the new IP address, subnet mask and default gateway via SET NETWORK CONFIGURATION to the device.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q180L300-EU-OPC-UA - Gateway - Parameter | | | | | |
|---------------------------|---|---------------------------------|-----------------------------|--|--|--|
| í) Info | | Hex 🗸 | | | | |
| {ဂ္ဂ်ို Parameter | Read Write Tab | view Print Data format | | | | |
| Uiagnosis | Device | Global SNMP Public Community | | | | |
| ൂഴ്ഹ Status | Data and time | SNMP Private Community | | | | |
| 4 Event log | Date and time | MAC address | 00:07:46:84:08:4f | | | |
| Ex- / Import | Network | DNS-Mode | Automatic | | | |
| ିକ୍କୁ Change Password | | DNS Domain | | | | |
| Firmware | OPC UA | DNS Name Server 1 | 0.0.0.0 | | | |
| LOCAL I/O | DNS Name Server 2 | | 0.0.0.0 | | | |
| ႏွို Parameter | DNS Name Server 3 | | 0.0.0.0 | | | |
| ି ଅତି Diagnosis | | Ethernet port 1 | | | | |
| ⊃∜⊂ Input | | Addressing mode | PGM-DHCP ? | | | |
| ↑ output | | Connection mode | Autonegotiation 🗸 🥐 | | | |
| <u>م کے</u> Output | | IP address | 192.168.1.20 | | | |
| | | Netmask | 255.255.255.0 | | | |
| | | Default gateway | 192.168.1.1 | | | |
| | | Set network configuration | SET NETWORK CONFIGURATION ? | | | |

Fig. 26: Adjusting network settings via the web server



7.4 Preparing the device for commissioning via the web server



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

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

7.4.1 Opening the web server and editing the settings

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

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

MAIN RFID READER DOCUMENTATION

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q180L300-EU-OPC-UA - Gateway - Info | | | | |
|--|---|---|--|--|--|
| TN-UHF-Q180L300-EU-OPC-UA (i) Info ξ ³ / ₂ Parameter 🖓 Diagnosis 2 ⁴ / ₂ Status ⁶ / ₇ Event log L Ex- / Import | Read/Write Head UHF RFID | C-UA - Gateway - Info | | | |
| Change Password | Device Station information | | | | |
| LOCAL I/O | Туре | TN-UHF-Q180L300-EU-OPC-UA | | | |
| {္က်န် Parameter | ldent. no. | 100000933 | | | |
| 😳 Diagnosis | Addressing mode | PGM-DHCP ? | | | |
| ີູ່ ວູບ້⊊ Input ∱Output | Revisions Firmware revision Bootloader revision OPC/UA revision WEB revision Software build number Special device properties Production data Version code | 1.0.3.8 1.0.1.0 1.0.0.0 v1.6.3.6 35 00 00 00 00 00 00 00 00 00 00 00 00 00 | | | |
| | Serial number Hardware version Rev. counter | 0.0 0 0 7 7 7 7 7 7 7 7 7 | | | |

Fig. 27: Web server — home page



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

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

- Click Login.
- Enter the password.
- Click OK.

Write access to the parameter data of the module is possible after the login.

To access OPC UA-specific parameters, enter the OPC UA root password. The default password is "Turck."



NOTICE

Insufficiently secured devices Unauthorized access to sensitive data

- Change the password after the first login. Turck recommends the use of a secure password.
- Parameter \rightarrow OPC UA: Enter the password in the OPC UA root password field.

Click AUTHENTICATE.

MAIN RFID READER DOCUMENTATION

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q1 | 80L300-EU-OPC-UA - Gateway - Pa | arameter | |
|-----------------------------|----------------|--|--------------|---|
| (j) Info | | - 🖶 Hex 🗸 | | |
| နိုင္ပ်ိန္ Parameter | Read Write Tal | b view Print Data format | | |
| Cy Diagnosis | Device | Authentication OPC UA root password | ••••• | |
| ુ∿્ Status ઇટે Event log | Date and time | Root authentificated | no | |
| , Ex- / Import | Network | Check root | AUTHENTICATE | ? |
| ୍ଦ୍ଧି Change Password | OPC UA | | | |
| LOCAL I/O | | | | |
| ද ္ပ်ို Parameter | | | | |
| 🕑 Diagnosis | | | | |
| নু∿দু Input | | | | |
| 5 ^个 관 Output | | | | |

Fig. 28: Entering the OPC UA root password



⇒ The parameters for the OPC UA-specific configuration are shown.

| MAIN RFID READER DOCUN | IENTATION | | | |
|-------------------------------|-----------------------|--|-----------------------------|--|
| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q1 | 80L300-EU-OPC-UA - Gateway - P | arameter | |
| j Info | | - 🖶 Hex 🗸 | | |
| နိုင်္ဂို Parameter | Read <i>Write</i> Tab | view Print Data format | | |
| Co Diagnosis | Device | Authentication OPC UA root password | ۲ | |
| ⊋∿్త Status ఈ Event log | Date and time | Root authentificated | yes | |
| sla Ex-/import | | Check root | AUTHENTICATE ? | |
| Change Password | Network | Server configuration Port | 4840 | |
| Firmware | OPC UA | Host name | 192.168.1.20 | |
| LOCAL I/O | Trusted | Server name | | |
| ² رَبَّخ Parameter | Certificates | Device name | | |
| 😲 Diagnosis | Policies | Addressing mode | IP Address 🗸 | |
| ್ನ [⊥] ್ರ Input | | OPC UA Server Url | opc.tcp://192.168.1.20:4840 | |
| ूर् इत्ये Output | User roles | Single user client name | | |
| <u></u> | | Language of the OPC UA Server | English 🗸 | |
| | Access data | Reboot | EXECUTE REBOOT ? | |
| | Server certificate | | | |

Fig. 29: Parameters for the OPC UA-specific configuration

The root password can be changed via Access data.



Fig. 30: Changing the root password



7.4.2 Establishing the connection between the OPC UA server and OPC UA client The following example uses UAExpert as the OPC UA client.

- Add the OPC UA server in the OPC UA client used.
- Enter in the following window the OPC UA server URL and the required Security Settings.
- Confirm entries with OK.

| 🔛 Unified Autor | mation UaExpert - 1 | The OPC Uni | fied Arch | itec | ture Client - NewProject* | | |
|------------------|---------------------|-------------|-----------|------|--|-----------------------------|-----------|
| File View Ser | ver Document | Settings | Help | | | | |
| 0 🖉 📄 | 12 💽 🛉 | | × | 2 | SRXS | | |
| Project | | ₽× | Data Ac | | Add Server | | ? × |
| V 🗂 Project | | | # | | - | | |
| D Servers | S | | | Co | onfiguration Name TN-UHF | -Q180L300-EU-OPC-UA | |
| 🗸 🎵 Docun | nents | | | | Discovery Advanced | | |
| 📁 Da | ta Access View | | | | Server Information | | |
| | | | | | Endpoint Url | opc.tcp://192.168.1.20:4840 | |
| | | | | | Security Settings | | |
| | | | | | Security Policy | Basic256 | - |
| | | | | | Message Security Mode | Sign & Encrypt | - |
| Address Space | | 5 × | ٤ | | Authentication Settings Anonymous Username root Password •••••• Certificate Private Key Session Settings Session Name | |] 🗹 Store |
| Log | | | | | | | |
| 🗱 📔 | | | | | | | |
| Timestamp | Source | Server | P | | | | |
| 11.04.2023 11:39 | DiscoveryWidget | | C | | | | |
| 11.04.2023 11:39 | DiscoveryWidget | | | | | | |
| 11.04.2023 11:30 | DiscoveryWidget | | | | Connect Automatically | | 1 |
| 11.04.2023 11:36 | UaExpert | | | | | ОК | Cancel |
| 11.04.2023 11:36 | UaExpert | | , i | оло | EU VIZA EU DUD LA IAUC EU U | | |

Fig. 31: Enter the OPC UA server URL and choose the Security Settings

⇒ The OPC UA server is added to the project tree.



- ► Right-click the server in the project tree.
- Click Connect.



Fig. 32: Connecting the OPC UA server

- ⇒ The OPC UA client requests a connection and a security certificate from the server. If encryption is activated, the security certificate appears in the web server at **Parameter** → **Rejected certificates**.
- Click **TRUST** to add the security certificate to the list of trustworthy certificates.



Fig. 33: Trusting security certificates

▶ In the OPC UA client, right-click the server and click **Connect**.



➡ The connection between the OPC UA server and OPC UA client is established and the Address Space in the client is created.



Fig. 34: Connection established, address space created



7.4.3 Validating security certificates

Security certificates must be accepted by the server before communication. The OPC UA client sends its certificate when the client is connected to the server via a secured connection. A separate security certificate is sent for each security level. The security certificates can be validated via the web server.

If the OPC UA client sends its security certificate when it is establishing a connection, the security certificate appears in the web server at **Parameter** \rightarrow **Rejected certificates**.

- ► Trust security certificates: Click **TRUST**.
- ⇒ The security certificate is added to the list of trusted certificates.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q180 |)L300-EU-OPC-UA - Gateway - Parameter |
|-----------------------------------|--------------------------|--|
| j Info | | Hex 🗸 |
| နိုဂ္ဂ်ိန် Parameter | Read <i>Write</i> Tab vi | iew Print Data format |
| 🕑 Diagnosis | Device | Certifcate Name |
| ي [↓] ح Status | | Issuer |
| Event log | Date and time | valid to |
| [↓] Ex- / Import | Network | Certifcate file UaExpert@MH-HSchnabel [3A8EF7924AC959A158056A74AA1A19C6FDAAEBCF].der |
| 🔍 Change Password | Network | Action TRUST ? |
| 🛄 Firmware | OPC UA | DELETE |
| LOCAL I/O | Rejected | |
| {ွ်} Parameter | certificates | |
| Cy Diagnosis | Policies | |
| _ఎ √ _ఆ Input | | |
| ∱் Output | User roles | |
| | Access data | |
| | 100033 4414 | |
| | Server certificate | |

Fig. 35: Trusting security certificates

The **Trusted certificates** area lists the trusted certificates and can be rejected by clicking **REJECT**.





Creating a specific security certificate

The user can create a specific security certificate via **Update own server certificate**. The OPC UA clients must accept the new generated certificate. During the generation, the current IP address and host name are automatically added to the certificate. The certificate can also be edited via an OPC UA client if the highest security level is activated.

► Create a specific security certificate: Click Parameter → Server certificate → UPDATE CERTIFICATE.



Fig. 37: Creating a specific security certificate



7.4.4 Adapting settings for OPC UA communication – set endpoints



Changes to the settings are accepted after a voltage reset.

Changing the security settings

The device is provided with three security levels for OPC UA communication. The security levels Sign and Sign & Encrypt require the confirmation of the security certificate in the web server.

| Security level | Description |
|----------------|--|
| None | No protection |
| Sign | Communication with security certificate, no encryption |
| Sign & Encrypt | Communication with security certificate, encryption |

The security levels for the individual security policies can be set at **Parameter** \rightarrow **Policies**. The SecurityPolicy describes the algorithm type and the key length used for a SecureChannel between the client and the server application.

TN-UHF-Q180L300-EU-OPC-UA TN-UHF-Q180L300-EU-OPC-UA - Gateway - Parameter ÷ Hex 🗸 Read Write Tab view Print Data format 🖓 Diagnosis Device Policy name ? Enabled ? Anonymous ? Date and time None yes yes ר¢ך Ex- / Import Network Change Password Policy name ? Sign 🥐 Sign & Encrypt ? Anonymous ? 🔅 Firmware OPC UA Basic128Rsa15 yes yes yes LOCAL I/O Basic256 yes yes yes Trusted certificates Basic256Sha256 yes yes yes 😳 Diagnosis yes Aes128_Sha256_RsaOaep yes yes Policies ್ಷ√್ಯ Input User roles ¦പீ ∧ Output Access data Server certificate

If **Anonymous** is activated, a connection is allowed without a user login.

Fig. 38: Setting security levels for SecurityPolicies



Issuing authorizations

The users (Anonymous, root, singleUser, user1, user2) can be assigned different rights at Parameter \rightarrow User roles.

- Observer: authorized to search, read and receive events
- Operator: authorized to search, read, write and receive events and call up methods
- Engineer: authorized to search, read and configure safety-related parameters and methods (e.g. SetTagPassword, LockTag)
- Administrator: all authorizations
- Single user: authorized to use variables for limited clients (ScanActive, ScanSettings variables) (only singleUsers)

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q1 | TN-UHF-Q180L300-EU-OPC-UA - Gateway - Parameter | | | | | |
|---------------------------|--|---|------------|------------|------------|-----------------|---------------|
| j Info | | ₽► ► ₽ 🔂 Hex 🗸 | | | | | |
| ξ⊙} Parameter | Read <i>Write</i> Tab view Print Data format | | | | | | |
| 🕑 Diagnosis | Device | | | | | | |
| ુ⊸્ Status | | User name | Observer ? | Operater 🥐 | Engineer ? | Administrator 🥐 | Single user ? |
| Event log | Date and time | Anonymous | yes | yes | no | no | no |
| Ex- / Import | | root | yes | yes | yes | yes | no |
| Change Password | Network | singleUser | yes | no | no | no | yes |
| 🛱 Firmware | OPC UA | user1 | yes | yes | yes | no | no |
| | | user2 | yes | no | no | no | no |
| د کمک کے Parameter | Trusted certificates | | | | | | |
| 💱 Diagnosis | Policies | | | | | | |
| ా√్ Input | | | | | | | |
| പ്പ് Output | User roles | | | | | | |
| | Access data | | | | | | |
| | Server certificate | | | | | | |

Fig. 39: User roles



Configuring endpoints — server configuration

Settings including those listed below can be changed in the Parameter \rightarrow OPC UA \rightarrow Server configuration area:

- Port
- Host name
- Name of the OPC UA server

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q180L300-EU-OPC-UA - Gateway - Parameter | | | | | |
|-------------------------------|---|--|-----------------------------|--|--|--|
| j Info | | Hex 🗸 | | | | |
| ද်္လာနဲ့ Parameter | Read Write Taby | view Print Data format | | | | |
| Diagnosis | Device | Authentication OPC UA root password | • | | | |
| ુ≚્ડ Status ઇટ્ર Event log | Date and time | Root authentificated | yes | | | |
| , Ex- / Import | Network | Check root Server configuration | AUTHENTICATE ? | | | |
| 🔍 Change Password | | Port | 4840 | | | |
| 🛱 Firmware | OPC UA | Host name | 192.168.1.20 | | | |
| LOCAL I/O | Trusted | Server name | | | | |
| {ွ်} Parameter | certificates | Device name | | | | |
| 😲 Diagnosis | Policies | Addressing mode | IP Address 🗸 | | | |
| ್ನ್ Input | | OPC UA Server Url | opc.tcp://192.168.1.20:4840 | | | |
| പ്പ് Output | User roles | Single user client name | | | | |
| | | Language of the OPC UA Server | English 🗸 | | | |
| | Access data | Reboot | EXECUTE REBOOT ? | | | |
| | Server certificate | | | | | |

Fig. 40: Server configuration


Changing the name resolution on the OPC UA server endpoint — Choose NodeName for Endpoint Resolution

In order to identify the endpoint uniquely, the OPC UA client checks the host name for the specified IP address. Identification problems can occur if DHCP and DNS are not available in a network. In order to avoid identification problems, a fixed IP address can be assigned for the name resolution or the host name can be set statically.

In networks with a DHCP server, the host name can be set via the NodeName variable.

In local networks without DHCP, the server can provide the DNS name via mDNS. In this case, Avahi (Linux network service) adds the ".local" suffix to the host name. In Windows systems, the Bonjour service can be used for the name resolution.



Fig. 41: Changing the name resolution for server endpoints



Changing the language setting of the OPC UA server — Language of the OPC UA Server

OPC UA provides the opportunity to create a description (Description) for each object. The language of the description can be set at **Parameter** \rightarrow **OPC UA** \rightarrow **Language of the OPC UA Server**. German and English are the available languages.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | 30L300-EU-OPC-UA - Gateway - | Parameter |
|----------------------------|--------------------|--|-----------------------------|
| (i) Info | | - E Hex 🗸 | |
| နိုင္ငံ} Parameter | Read Write Tab | view Print Data format | |
| Cy Diagnosis | Device | Authentication OPC UA root password | ۲ |
| ాళ్త Status ఈ Event log | Date and time | Root authentificated | yes |
| / - rla Ex./Import | | Check root | AUTHENTICATE |
| Change Password | Network | Server configuration Port | 4840 |
| 🛄 Firmware | OPC UA | Host name | 192.168.1.20 |
| LOCAL I/O | Trusted | Server name | |
| {ဂ်ို} Parameter | certificates | Device name | |
| 🕑 Diagnosis | Policies | Addressing mode | IP Address 🗸 |
| ຈ∜∉ Input | | OPC UA Server Url | opc.tcp://192.168.1.20:4840 |
| ામ્ટ્ર ક∱∂ Output | User roles | Single user client name | |
| | | Language of the OPC UA Server | English 🗸 |
| | Access data | Reboot | English ? |
| | Server certificate | | |

Fig. 42: Changing language settings of the OPC UA server



7.4.5 Setting the OPC UA password

To access OPC UA-specific parameters, enter the OPC UA root password. The default password is "Turck."

| • | |
|---|--|

NOTICE

Insufficiently secured devices

Unauthorized access to sensitive data

- Change the password after the first login. Turck recommends the use of a secure password.
- Parameter \rightarrow OPC UA: Enter the password in the OPC UA root password field.

Click **AUTHENTICATE**.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | 0L300-EU-OPC-UA - Gateway - Par | ameter | |
|---------------------------|--------------------|---------------------------------|-----------------------------|---|
| j Info | | Hex 🗸 | | |
| ႏွိုင်နဲ့ Parameter | Read Write Tab | view Print Data format | | |
| Cy Diagnosis | Device | Authentication | ۵ | 1 |
| ુ∜્ Status | | | | |
| G Event log | Date and time | Root authentificated | yes | |
| , c , Ex / Import | | Check root | AUTHENTICATE | ? |
| | Network | Server configuration | | |
| Change Password | | Port | 4840 | |
| 🛱 Firmware | OPC UA | Host name | 192.168.1.20 |] |
| LOCAL I/O | Trusted | Server name | |] |
| {္က်ိန် Parameter | certificates | Device name | |] |
| 🗐 Diagnosis | Policies | Addressing mode | IP Address 🗸 |] |
| a∜c Input | 1 0110100 | OPC UA Server Url | opc.tcp://192.168.1.20:4840 | |
| t output | User roles | Single user client name | |] |
| | | Language of the OPC UA Server | English 🗸 |] |
| | Access data | Reboot | EXECUTE REBOOT | ? |
| | Server certificate | | | |

Fig. 43: Entering the OPC UA root password



A separate OPC UA password can be assigned and changed for each user. The default passwords for the different users are shown in the following table:

| User | Default password |
|------------|------------------|
| root | Turck |
| user1 | password |
| user2 | password |
| singleUser | singlepassword |

- Parameter \rightarrow Access data
- Enter the old password in the line of the required user.
- Enter the new password.
- Repeat the new password.
- Write the new password to the device via **SET PASSWORD**.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | BOL300-EU-OPC-U | <mark>A - Gateway - Para</mark> | ameter | | |
|---------------------------|--------------------|------------------------|---------------------------------|-----------------------|-----------------|--------------|
| j Info | P ▶ □ Hex ▼ | | | | | |
| ද်္ဂိုန် Parameter | Read Write Tab | view Print Data format | | | | |
| 🕑 Diagnosis | Device | | | | | |
| √⊈ Status | | User name | Old password | New password <i>?</i> | Repeat password | Action ? |
| 🖗 Event log | Date and time | root | ٩ | ٩ | ۲ | SET PASSWORD |
| Ex- / Import | Network | singleUser | ۲ | ۲ | ۲ | SET PASSWORD |
| 🔍 Change Password | Hetholik | user1 | ۲ | ۲ | ۲ | SET PASSWORD |
| Firmware | OPC UA | user2 | ۲ | ۲ | ۲ | SET PASSWORD |
| LOCAL I/O | Trusted | | | | | |
| දိ္ပ်} Parameter | certificates | | | | | |
| 😳 Diagnosis | Policies | | | | | |
| ್ತ್ Input | | | | | | |
| தீ⊉ Output | User roles | | | | | |
| | Access data | | | | | |
| | Server certificate | | | | | |

Fig. 44: Web server — changing OPC UA passwords

Web server — resetting a password for the OPC UA server

The device can be reset to the factory settings via the F_Reset function (rotary coding switch at switch position 90, DIP switch [MODE] at position 1) without entering a password. All other possibilities to fully reset to the default settings, including the OPC UA passwords, are blocked.



7.4.6 Setting up an OPC UA client via an SDK

The OPC UA client must be set up in order to connect the OPC UA server of the device to an OPC UA client. The following software is required for the setup:

- Client SDK, e.g. from www.unified-automation.com (for C++, .net, ANSI C or Java)
- UaModeler, e.g. from www.unified-automation.com

The client SDK requires a chargeable license from www.unified-automation.com. The license supplied with the software always only lasts for an hour.

Creating application frames

- ▶ Install the client SDK and UaModeler.
- Launch the development environment and create a new project.



NOTE

An example of how to create a new application and the first steps required are provided in the documentation supplied with the client SDK.

- Download the license applied for and incorporate it in the project.
- Create the structured data types with the UaModeler.



NOTE

Examples and further information on handling structured data types are provided in the documentation supplied with the UaModeler.

• Incorporate the data generated in the UaModeler in the project of the client SDK.



8 Setting

8.1 Information model – mapping

The AutoID information model is structured in nodes which may also contain subnodes:

| Node class | Description |
|------------|---|
| Folder | General collection |
| Object | Mapping of a technical object |
| Property | Description of an object |
| Variable | Process data or status information |
| Method | Functional scan with status feedback (e.g. RFID commands) |



In the information model, the devices are defined as objects and structured as follows:



Fig. 45: Information model of the RFID channel Ident 0 — example: UA Expert



8.1.1 RFID channels – mapping in the information model

Each connected read/write device is assigned an Ident channel. The Ident 0 object contains properties, variables and methods.

Properties

| Property | Description | Example |
|--------------------|--|------------------------|
| AutoldModelVersion | Version of the AutoID specification | 1.01 |
| DeviceInfo | RFID frequency range (HF/UHF) of the connected device | UHF |
| DeviceLocationName | _ | — |
| DeviceManual | Link to operating instructions of the connected device | www.turck.de |
| DeviceName | Device name of the connected device | RFID read/write device |
| DeviceRevision | _ | — |
| HardwareRevision | Hardware version of the connected device | V1.2 |
| Manufacturer | Manufacturer of the connected device | Turck |
| Model | Type designation of the connected device | 0x018F |
| RevisionCounter | Firmware version of the connected device | V1.69.82 |
| SerialNumber | Serial number of the connected device | 197601056 |
| SoftwareRevision | Firmware version of the connected device | V1.69.82 |

Variables — properties



NOTE The variables in the LastAccess (Diagnostics) folder are not supported by the Scan-Start method or the ScanActive variable.

| Variable | Description | Folder |
|-------------------|---|-----------------------------|
| DeviceStatus | Device status: Idle: Device is in Idle mode, command execution possible Error: Error Scanning: Inventory command active (asynchronous) Busy: Read or write operation active (synchronous) | |
| AntennaNames | Address of the read/write device | LastAccess (Diagnostics) |
| Client | Client executing the last command | LastAccess (Diagnostics) |
| Command | Last executed command | LastAccess (Diagnostics) |
| CurrentPowerLevel | Set output power of the UHF reader at the last command execution | LastAccess (Diagnostics) |
| Identifier | EPC of the last detected UHF tag | LastAccess (Diagnostics) |
| PC | PC of the last detected UHF tag | LastAccess (Diagnostics) |
| RWData | Read or write data of the last command execution | LastAccess (Diagnostics) |
| Strength | RSSI value of the last tag read | LastAccess (Diagnostics) |



| Variable | Description | Folder |
|-------------------|--|-------------------------------------|
| Timestamp | Time stamp of the last UID or EPC read | LastAccess (Diagnostics) |
| LastLogEntry | Last log book entry for diagnostic messages | Logbook (Diagnostics) |
| LogColumns | Number of log book entries | Logbook (Diagnostics) |
| Presence | Indicates whether a tag was detected or not in front of the read/write device (true/false). | |
| LastScanAntenna | Address of the read/write device detecting the last read tag | |
| LastScanData | Last UID or EPC read | |
| LastScanTimestamp | Time stamp of the last UID or EPC read | |
| LastScanRSSI | RSSI value of the last tag read | |
| CodeTypes | Defines the EPC or UID format. | RuntimeParameters |
| CodeTypesRWData | Defines the format of the data to be read/written. | RuntimeParameters |
| MinRSSI | Minimum value of the RSSI to execute the action | RuntimeParameters |
| RfPower | Adaption of the output power of the UHF reader | RuntimeParameters |
| ScanSettings | Settings for the continuous scanning and reading of the UIDs or EPCs | RuntimeParameters |
| Cycles | Number of retries If a total run time of cycles × duration > 6000 ms is exceeded, the device outputs the error message INVALID_CONFIGURATION. | ScanSettings (RuntimeParameters) |
| Duration | Duration in ms If a total run time of cycles × duration > 6000 ms is exceeded, the device outputs the error message INVALID_CONFIGURATION. | ScanSettings (RuntimeParameters) |
| DataAvailable | Execute the action until a tag is in the detection range | ScanSettings (RuntimeParameters) |
| ScanActive | The read/write head searches for tags in the detection range and reads the UID or EPC continuously. The read UIDs or EPCs are presented as events in the LastScanData variable. The write permissions of the variable are restricted to one client or user. The variable cannot be used in Multitag mode. | |

Methods — properties

The methods also contain arguments. The arguments enable the methods to be configured and status messages read out.



NOTE The reading of USER data can be set via the web server parameters.

| Method | Argument (type) | Description |
|--------|--|--|
| Scan | | The read/write device searches for tags in the detection range and reads the UID or EPC once. If the Multitag parameter is activated, several tags are read and output. |
| | Setting (ScanSettings) | Settings for reading the UIDs or EPCs |
| | Results (RfidScanResults) | UID or EPC of the read tags |
| | Status (AutoldOperationStatusEnumeration) | Status of scan operation |



| Method | Argument (type) | Description |
|-----------|--|---|
| ScanStart | | The read/write device searches for tags in the detection range and reads the UID or EPC continuously. The read- ing of USER data of HF tags can also be set via the web server parameters. The read UIDs, EPCs or USER data are presented as events in the LastScanData variable. The method cannot be used in multitag mode. |
| | Setting (ScanSettings) | Settings for continuous reading of UIDs or EPCs |
| | Status (AutoldOperationStatusEnumeration) | Status of the continuous scan operation |
| ScanStop | | Terminates the continuous reading of data initiated by ScanStart . |
| KillTag | | The memory of a UHF tag is made unusable. The tag can neither be read nor written after a KillTag command. A KillTag command cannot be reversed. |
| | AutoID identifier (ScanData) | EPC of the tag for which the Kill command is to be executed |
| | KillPassword (ByteString) | Kill password of the tag for which the Kill command is to be executed |
| | CodeType (String) | Defines the EPC or UID format. |
| | Status (AutoldOperationStatusEnumeration) | Status of command execution |
| LockTag | | Activates or deactivates the password protection for a tag or protects the selected memory area permanently and irrevocably. |
| | AutoID identifier (ScanData) | EPC of the tag to be locked |
| | CodeType (String) | Defines the EPC or UID format. |
| | Password (ByteString) | Access password of the tag (if required) |
| | Region (RfidLockRegionEnumeration) | Only in UHF applications: Defines the memory area of the UHF tag to be locked. The following memory areas can be locked: 0: Reserved (kill and access password) 1: EPC 3: USER |
| | Lock (RfidLockOperationEnumeration) | Sets the type of lock: 0: Lock (the entire memory area selected is write protected with a password.) 1: Unlock (not supported) 2: Permanent Lock (the entire memory area selected is permanently locked from write access. Kill password and access password are also locked irrevocably from read access.) 3: Permanent Unlock (not supported) |
| | | Memory areas lock: EPC and PC, USER Memory areas permanent lock: EPC and PC, USER, Ac- cess password, Kill password |
| | Status (AutoldOperationStatusEnumeration) | Status of command execution |



| Method | Argument (type) | Description |
|----------------|---|--|
| SetTagPassword | | Sets a password in the UHF tag. The method is only available for UHF applications. |
| | AutoID identifier (ScanData) | EPC of the UHF tag to be protected |
| | PasswordType (RfidPasswordTypeEnumeration) | Password type (e.g. Access password) |
| | AccessPassword (ByteString) | Access password of the tag (if required) |
| | NewPassword (ByteString) | New password to be written to the tag |
| | CodeType (String) | Defines the EPC or UID format. |
| | Status (AutoldOperationStatusEnumeration) | Status of command execution |
| ReadTag | | The read/write device reads the data of the tags in the detection range. |
| | AutoID identifier (ScanData) | UID or EPC of the tag that is to be read |
| | Offset (UInt32) | Start address of the memory area to be read on the tag |
| | Length (UInt32) | Number of bytes to be read |
| | Password (ByteString) | Access password of the tag (if required) |
| | Region (RfidLockRegionEnumeration) | Only in UHF applications: Defines the memory area of the UHF tag to be read. The following memory areas can be read: 0: Reserved 1: EPC 2: TID 3: User |
| | CodeType (String) | Defines the EPC or UID format. |
| | Status (AutoldOperationStatusEnumeration) | Status of command execution |
| | ResultData (ByteString) | Read data |
| WriteTag | | The read/write device writes the data to tags in the de- tection range. |
| | AutolD identifier (ScanData) | UID or EPC of the tag that is to be written to |
| | Offset (UInt32) | Start address of the memory area on the tag |
| | Password (ByteString) | Access password of the tag (if required) |
| | Region (RfidLockRegionEnumeration) | Only in UHF applications: Defines the memory area of the UHF tag to be written. The following memory areas can be written: 0: Reserved 1: EPC 3: User |
| | CodeType (String) | Defines the EPC or UID format. |
| | Status (AutoldOperationStatusEnumeration) | Status of command execution |
| | Data (ByteString) | Write data |



| Method | Argument (type) | Description |
|------------|--|---|
| WriteTagID | | Writing of a new UID or EPC (only for UHF applications) |
| | AutolD identifier (ScanData) | UID or EPC of the tag that is to be written to |
| | CodeType (String) | Defines the EPC or UID format. |
| | NewUid (ByteString) | UID or EPC to be written to the tag |
| | AFI (Byte) | (not supported) |
| | Toggle (Boolean) | (not supported) |
| | Password (ByteString) | Access password of the tag (if required) |
| | Status (AutoldOperationStatusEnumeration) | Status of command execution |

8.1.2 Digital channels (DXP) – mapping in the information model

A DXP channel is assigned to every connected digital sensor or actuator.



Fig. 46: Information model of DXP channels 8 and 9 — example: UAExpert



| Name | Description |
|-----------|---|
| IO_Config | 0: Configure channel as a digital input 1: Configure channel as a digital output |
| IO_Diag | 0: No error present 1: Error present |
| IO_Value | 0: No signal present 1: Signal present |



8.2 Setting RFID interface parameters via the web server

The parameters for the RFID channels and the digital channels can also be set via the integrated web server in addition to the OPC UA configuration. The switchable VAUX power supply can also be set in the web server.

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



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

- Click Login.
- Enter the password.
- Click OK.

8.2.1 Setting digital channels (DXP) parameters via the web server

- Open the web server.
- Click Local I/O \rightarrow Parameter in the navigation bar on the left of the screen.
- Select the DXP channel (here: **Digital In/Out 8**).
- Set the required parameters via the appropriate drop-down menu.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | 80L300-EU-OPC-UA - Local I/O - Pa | arameter | |
|---------------------------|----------------|---------------------------------------|----------|----------|
| j Info | | | | |
| ද⊖္ခ်} Parameter | Read Write Tab | view Print | | |
| 🕑 Diagnosis | DXP | DXP channel 0 | | |
| | | Manual output reset after overcurrent | no | × ? |
| | VAUX control | Activate output | yes | <u> </u> |
| γ Event log | | DXP channel 1 | | |
| Ex- / Import | | Manual output reset after overcurrent | no | × ? |
| 🔍 Change Password | | Activate output | yes | × ? |
| 🗂 Firmware | | DXP channel 2 | | |
| | | Manual output reset after overcurrent | no | × ? |
| | | Activate output | yes | × ? |
| کې Parameter | | DXP channel 3 | | |
| 🕑 Diagnosis | | Manual output reset after overcurrent | no | × ? |
| ⊋ [↓] ⊊ Input | | Activate output | yes | × ? |
| പ്പ_ Output | | | | |



DXP channels — meaning of the parameters

Default values are shown in **bold**.

| Designation | Meaning |
|---------------------------------------|--|
| Activate output | Yes: Output activated. No: Output deactivated. |
| Manual output reset after overcurrent | Yes: The output only switches back on after the overcurrent is re- moved and the switch signal is reset No: The output switches on automatically again after overcur- rent. |



8.2.2 Digital channels – setting switchable VAUX power supply

- Open the web server.
- Click Local I/O \rightarrow Parameter in the navigation bar on the left of the screen.
- Select switchable VAUX control power supply.
- Set the required parameters via the appropriate drop-down menu.

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | 80L300-EU-OPC-UA - Local I | I/O - Parameter | |
|---------------------------|----------------|----------------------------|-----------------|-----|
| j Info | | | | |
| {ွ်} Parameter | Read Write Tab | view Print | | |
| 😳 Diagnosis | DXP | VAUX1 Pin1 C0 (Ch0/1) | 24 VDC | × ? |
| ູ √ະ Status | | VAUX1 Pin1 C1 (Ch2/3) | 24 VDC | × ? |
| Event log | VAUX control | | | |
| Ex- / Import | | | | |
| ିକ୍କୁ Change Password | | | | |
| 🚊 Firmware | | | | |
| LOCAL I/O | | | | |
| နိုဂ္ဂ်ိန် Parameter | | | | |
| Cy Diagnosis | | | | |
| ⊋৺⊊ Input | | | | |
| த்∱∂ Output | | | | |

Fig. 48: Web server — VAUX control parameter

| Switchable power supply — meaning of the parameters |
|---|
|---|

| Designation | Meaning |
|-----------------------|---|
| VAUX2 Pin1 C4 (Ch0/1) | Activates or deactivates the VAUX2 24-VDC power supply at pin 1 of channel 0 and channel 1. Default setting: On |
| VAUX2 Pin1 C5 (Ch2/3) | Activates or deactivates the VAUX2 24-VDC power supply at pin 1 of channel 2 and channel 3. Default setting: On |



8.3 Testing the device with demo programs

Two demo programs can be downloaded free of charge for test purposes at www.turck.com:

| Program | Description |
|--|-----------------------------------|
| OPC UA Client Demo V1.2.0 – Complete RFID functionality | Testing RFID methods |
| OPC UA Client Demo V1.2.0 – Notifications about scan events | Testing the reading of UID or EPC |



NOTE

The demo programs can be used for one hour from the time when they were connected.

The source code of the demo programs is also available for download free of charge. The demo programs were created with the followings software:

- Visual Studio IDE V 17
- Unified Automation .NET-SDK V 2.5.8.410

8.3.1 Testing RFID methods

The program contains the following methods and functions:

- Scan
- ScanStart
- ScanStop
- ReadTag
- WriteTag
- Info (properties of the connected read/write device)



NOTE With UHF, the user area is read or written automatically.

A description of the methods is provided in the chapter "RFID channels – mapping in the information model"



| POPC UA Client Demo V1.2.0 - Complete RFID functionality | |
|--|---------------|
| | TURCK |
| Server: 192.168.1.77 Port: 48010 Connect Disconnect | |
| Reader: Ident 0 HF Name: RFID-Reader 🔻 Info Edit name Refresh | |
| Scan October Scan Scan start Scan | Clear Tags |
| | |
| | |
| Read Tag Write Tag Offset: 0 Length: 30 Write Data: | Clear Outputs |
| Outputs: | |
| | |
| | |
| | |
| Events (Please select an item to show RFID tag): | |
| Ident Time Severity Message | |
| | |
| | |
| | |

Fig. 49: OPC UA Client Demo V1.2.0 - complete RFID functionality

Example: Running the scan method

- ✓ The device must be connected to a PC.
- Enter the IP address of the server and port.
- Establish a connection to the OPC UA server via **Connect**.
- Select the read/write device. The properties of the connected read/write device can be displayed via Info. The name of the selected read/write device can be changed via Edit.
- Set the number of cycles and duration of command execution in seconds or select Data available. With Data available, the command is executed until a tag is found.
- Search for tags via **Scan**.
- ⇒ The found tags are displayed in the **Result** area.
- Select tags for further processing.
- Adjust the offset and length if required.
- Read data from the tag: Click **Read Tag**.
- Writing data to the tag: Enter the required data and click **Write Tag**.



8.3.2 Testing reading of the EPC

The program contains the following methods and functions:

- ScanStart
- ScanStop

A description of the methods is provided in the chapter "RFID channels — mapping in the information model"

| ➡ Demo2 | | |
|----------------------|-------------|----------------------|
| | | TURCK |
| Server: 192.168.1.97 | Port: 48010 | Connect Disconnect |
| Reader: | ▼ Refresh | Scan start Scan stop |
| DeviceStatus: | | |
| Last found tag: | | |

Fig. 50: OPC UA Client Demo V1.2.0 - Notifications about read events

Example: executing the ScanStart method

- $\checkmark\,$ The device must be connected to a PC.
- Enter the IP address of the server and port.
- Establish a connection to the OPC UA server via **Connect**.
- Select the reader. The properties of the connected reader can be displayed via Info. The name of the selected reader can be changed via Edit.
- Click ScanStart.
- ⇒ The last tag found tag and the device status of the interface are displayed.



9 Operation



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

9.1 Executing a method and calling data

The data can either be called by the OPC UA client or forwarded as event messages to the higher-level system by the OPC UA server.

- Execute the **Scan** method.
- ⇒ The data is returned as a result and can be queried by the client.
- ⇒ The last tag read can be read in the **LastScanData** variable.
- ⇒ The **Status** variable shows if a method is active and if the reader is operational.
- Execute a command via the ScanStart method.
- ⇒ The readers are set to report mode. The read data is provided via event messages for all clients that have subscribed to this service. A separate scan by the OPC UA client is not required.
- ⇒ The last tag read can be read in the **LastScanData** variable.
- ⇒ The **Status** variable shows if a method is active and if the read/write device is operational.



9.1.1 Example: Reading or writing tags with a specific UID

- Call the **Scan** method in the OPC UA client (here: UAExpert).
- ► At Input Arguments → Setting click the [...] button.

⇒ The Edit Value window opens.

- Change the value in the DataAvailable line from false to true (double-click, tick check-box).
- Confirm operation with **Write** and read the tag by clicking **Call**.

| Call S | can on Ident 0 | | | | ? | × |
|-------------------------|--|--|-------------------------------------|---------------------------|--------------|------------------|
| The read/ ?Multitag? | write head searches parameter is activa | for tags in the detec ted, several tags are | ction range and r read and outpu | eads the UID or EPC t. | once. If the | |
| Input A | rguments | | | | | |
| Name V | alue | | DataType | | Description | |
| Setting | Click '' to display v | alue | ScanSettings | | | |
| Output / | Arguments | | | | | |
| R Ed | it Value | | | | × | ⁻ the |
| Name | | Value | | | | |
| s ~ | | ScanSettings | | | | scan |
| | Duration | 0 | | | | |
| | Cycles | 0 | | | | |
| U U | DataAvailable | true | | | | |
| | Location Type | 0 (NMEA) | | | | |
| | | | | | | |
| | | | | | | |
| | | | | Write | Cancel | |
| | | | | | | |
| | | | | Call | Close | |

Fig. 51: Scan method - settings (example: UAExpert)



- At **Output Arguments** \rightarrow **Results** click the [...] button.
- Copy the read UID by right-clicking in the Value window in the ByteString line (here: E0040150588039B1).

| Input | Argume | ents | | | | | |
|---------|---------|---------------------|----------------|----------|-----------------|-----------------------|-----|
| Name | Value | | DataType | | | Description | |
| Setting | Click ' | .' to display value | ScanSetting | IS | | | |
| Outpu | t Argun | nents | | | | | |
| Name | Value | | DataType | | | Description | |
| Results | Click ' | .' to display value | RfidScanRe | sult | | UID or EPC of tags | th |
| Status | 0 (SUC | CESS) | - AutoIdOper | ationSt | atusEnumeration | Status of the | scr |
| Re | Value | | | | | × | 1 |
| Suc Na | me | | Value | | | | |
| ~ | | | RfidScanResul | lt Array | [1] | | 1 |
| | × [0] | | RfidScanResul | lt | | | |
| | | CodeType | RAW:BYTES | | | | Т |
| | ~ | ScanData | ScanData | | | | |
| | | Switch Field | 1 (ByteString) | | | | Т |
| | | ByteString | E00401505880 | 29R1 | | | |
| | | Timestamp | 2021-10-07T | E | xpand All | | ٦ |
| | ~ | Location | Location | c | ollanse All | | |
| | | Switch Field | 0 (Null) | | onapse van | | Т |
| | ~ | Sighting | RfidSighting | 0 | opy Value | | ł |
| | | ✓ [0] | RfidSighting | | | | 1 |
| - | | Antenna | 0 | | | | |
| | | Strength | 0 | | | | 1 |
| | | Timestamp | 2021-10-07T1 | 5:47:03 | .046Z | | |
| | | | - | | | | 1 |

Fig. 52: Copying the read UID



- Call the **ReadTag** method.
- At Input Arguments \rightarrow Identifier click the [...] button.
- In the Edit Value window in the Switch Field line select 1 (ByteString) in the drop-down menu.

| Call ReadTag on Ider | nt O | | | ? | × |
|----------------------------|------------------------------|--------------------|-------|---|-----|
| The read/write device read | ls the data of the tags in t | ne detection range | 2. | | ^ |
| Input Arguments | | | | | |
| Name Value | | DataType | | Descriptio | |
| Identifier Click '' to di | splay value | ScanData | | UID or EPC of the tag to be read. | |
| CodeType | Load file | CodeTypeDataTy | pe | Defines the EPC or UID format. | |
| | | | | Defines the memory are | |
| Edit Value | | | | × | |
| Reg Name | Value | | | | |
| ~ | ScanData | | | | |
| Switch Field | 0 (Null) | | | • | |
| | 0 (Null) | | | | |
| | 1 (ByteString) | | | | |
| | 2 (String) 3 (Enc) | | | | |
| | 4 (Custom) | | | | |
| Off | | | | | 1 |
| | | | | | × . |
| < | | | | a 1 | |
| | | | Write | Cancel | |

Fig. 53: ReadTag method – selecting ByteString



- Insert the copied UID in the **ByteString** line.
- Confirm the operation with **Write**.

| Call Re | eadTag on Ide | nt 0 | | | ? | \times |
|------------|------------------|----------------------------|--------------------|-------|------------------------------------|------------|
| The read/v | vrite device rea | ds the data of the tags ir | the detection rang | ge. | | ^ |
| Input Ar | guments | | | | | |
| Name | Value | | DataType | | Descrip | tio |
| Identifier | Click '' to d | isplay value | . ScanData | | UID or EF of the ta be read. | PC g ti |
| CodeType | | Load file | . CodeTypeData | Гуре | Defines t EPC or U format. | he ID |
| _ | | | | | Defines t memory a | he are |
| E 1 | dit Value | | | | > | × |
| Reg Name | e | Value | | | | |
| ~ | | ScanData | | | | |
| | Switch Field | 1 (ByteString) | | | | |
| | ByteString | E0040150588039B1 | | | | |
| | | | | | | |
| | | | | | | |
| Off | | | | | | |
| | | | | | | ~ |
| < | | | | | | |
| | | | | Write | Cancel | |

Fig. 54: Identifier – entering a copied UID



- ► Enter under Input Arguments → Offset the start address of the register to be read (here:
 0).
- Enter the number of bytes to be read in Length (here: 30).
- At **CodeType** click the [...] button.
- In the Edit Value window enter the term UID.
- Confirm the operation with **Write** and click **Call**.
- ⇒ The tag is read.

| 📕 Call Re | adTag on Ident 0 | | | | | | ? | \times |
|------------|----------------------------|------------------------|---------------|-------------|--------------------------------|--|------------------------------------|----------------------|
| The read/w | rite device reads the data | of the tags in the det | ection range. | | | | | |
| Input Arg | juments | | | | | | | |
| Name | Value | | | |)ataType | Description | | |
| Identifier | Click '' to display value | | | S | canData | UID or EPC of the tag to be | read. | |
| CodeType | | | | Load file C | CodeTypeDataType | Defines the EPC or UID for | nat. | |
| Region | | Edit Value | | × | nt16 | Defines the memory area o to be read. The following m can be read: 0: Reserved 1 3: User. | f the UHF emory ar L: EPC 2: | F tag reas TID |
| Offset | 0 | | | | nt32 | Start address of the memor read on the tag | y area to | o be |
| Length | 30 |] | | | nt32 | Number of bytes to be read | ł | |
| Password | | | | | teString | Access password of the tag |) (if requi | ired) |
| Output A | rguments | | | | | | | |
| Name | Value | | | | ıtaType | Description | | |
| ResultData | | | | | teString | Read data | | |
| Status | 0 (SUCCESS) | | | | toIdOperationStatusEnumeration | Status of command executi | on | |
| Result | | | Write | Cancel | | | | |
| | | - | | | | | | |
| | | | | | | Call | Close | |

Fig. 55: ReadTag method settings



- At **Output Arguments** \rightarrow **ResultsData** click the [...] button.
- ⇒ The information stored on the tag is displayed in the **Value** window.

| Call Re | adTag on Ident 0 | | | ? X |
|------------------|---|------------------|----------------------------------|--|
| The read/w | rite device reads the data of the tags in the de | etection range. | | |
| Input Arg | juments | | | |
| Name | Value | | DataType | Description |
| Identifier | Click '' to display value | | ScanData | UID or EPC of the tag to be read. |
| CodeType | UID | Load file | CodeTypeDataType | Defines the EPC or UID format. |
| Region | | | UInt16 | Defines the memory area of the UHF tag to be read. The following memory areas can be read: 0: Reserved 1: EPC 2: TID 3: User. |
| Offset | 0 | | UInt32 | Start address of the memory area to be read on the tag |
| Length | 30 | | UInt32 | Number of bytes to be read |
| Password | | Load file | ByteString | Access password of the tag (if required) |
| Output A | rguments | | | |
| Name | Value | | DataType | Description |
| ResultData | Length=30, Content=0d7b0d02011616025a | 646e7882 Save as | ByteString | Read data |
| Status Result | 0 (SUCCCCC) Value 0d7b0d02011616025a646e78828c96a | × | AutoIdOperationStatusEnumeration | Status of command execution |
| | 000000000000000000000000000000000000000 | | | Call Close |
| | | Close | | |

Fig. 56: Information stored on the tag



9.2 Linking sensor signals and RFID methods

Sensor signals can be linked with the execution of an RFID method by programming in the client application. Alternatively, the Report mode of the read/write head can be used (see Scan-Start method). The read/write head is automatically triggered in Report mode as soon as a tag is located in the detection range.

9.3 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 ok |
| Red | No voltage or undervoltage at V2 |
| | |
| | |
| RUN LED | Meaning |
| RUN LED Off | Meaning OPC UA server not active |
| RUN LED Off Green | Meaning OPC UA server not active OPC UA server active |



9.4 Reading status and diagnostic messages

9.4.1 Read out OPC UA diagnostic messages

The OPC UA diagnostic messages are output via the Status argument when methods are executed.



NOTE Additional specific fault signals relating to the readers are output in the web server.

| Message | Description | Possible causes |
|------------------------|--|--|
| SUCCESS | No error, command success- fully executed | _ |
| MISC_ERROR_TOTAL | Command not fully executed | Unknown error |
| PERMISSON_ERROR | Password required | A valid password is expected before the command is accepted. |
| PASSWORD_ERROR | Password incorrect | |
| REGION_NOT_FOUND_ERROR | Addressed memory area not available for current tag | Memory area of the tag outside of the permiss- ible range |
| OUT_OF_RANGE_ERROR | Specified memory area not available for current tag | Block size of the tag not supported Tag type parameter outside of the permissible range Address outside of the permissible range Length and address outside of the permissible range Length of the UID outside of the permissible range Length outside of the tag specification Address outside of the tag specification Length and address outside of the tag specification Length and address outside of the tag specification |
| NO_IDENTIFIER | Command not fully executed — no tag in the detection range | No tag found Timeout Air interface error: Timeout Air interface error: UHF tag outside of the detection range before all commands could be executed UHF reader: no tag in the field Air interface error: Tag does not have the expected UID |
| MULTIPLE_IDENTIFIERS | Multiple tags were selected, command only usable for one tag. | |
| READ_ERROR | Tag could not be read. | Error when reading from a tag Read process not possible (e.g. invalid tag) The UHF reader failed to execute an inventory command |
| WRITE_ERROR | Tag could not be written. | Write process not possible (e.g. tag readable only)Error when writing to a tag |



| Message | Description | Possible causes |
|-------------------------|--|--|
| NOT_SUPPORTED_BY DEVICE | Command or parameter are not supported by the device. | Command not supported Command for applications with automatic tag detection not supported Command only supported for applications with automatic tag detection Password function not supported by the UHF reader Command not supported by the UHF reader version |
| NOT_SUPPORTED_BY_TAG | Command or parameter are not supported by the tag. | Password function of the tag not supported Command for multitag application with automatic tag detection not supported Command not supported for multitag application |
| DEVICE_NOT_READY | Device is not operational | UHF reader is encountering an issue |
| INVALID_CONFIGURATION | Device configuration invalid | Parameter undefined Bypass time parameter outside of the permissible range Value for timeout outside of the permissible range Error in parameterization of UHF reader |
| RF_COMMUNICATION_ERROR | Error during communication between the read/write device and tag | Air interface error Air interface error: CRC error Air interface error: Timeout Air interface error: UHF tag error |
| DEVICE_FAULT | Hardware error in the connec- ted device | UHF reader not connected |



9.4.2 Calling channel and module diagnostic messages in the web server

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | TN-UHF-Q180L300-EU-OPC-UA - Gateway - Diagnosis | | | | |
|---------------------------|----------------|--|---|---|--|--|
| j Info | | | | | | |
| ႏွိုး Parameter | Tab view Print | | | | | |
| | Device | Current diagnosis I/O-ASSISTANT Force Mode active | - | ? | | |
| ع بر Status | | Undervoltage V1 | - | ? | | |
| 4/2 Event log | | Module diagnostics available | - | ? | | |
| Ex- / Import | | Internal error | - | ? | | |
| ୍ଦ୍ତ୍ତି Change Password | | | | | | |
| Firmware | | | | | | |
| LOCAL I/O | | | | | | |
| ႏွိုး Parameter | | | | | | |
| 🕑 Diagnosis | | | | | | |
| പ്⊷_ Input | | | | | | |
| ∱் Output | | | | | | |

Diagnostic Messages — Module Status

Fig. 57: Web server — module status diagnostics

| Status message | Description |
|---------------------------------|------------------------------|
| I/O-ASSISTANT Force Mode active | DTM active in force mode |
| Undervoltage V1 | Undervoltage V1 |
| Module diagnostics available | Module diagnostics available |
| Internal error | Internal error |



Diagnostic Messages — RFID Channels

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q18 | 0L300-EU-OPC-UA - Local I | I/O - Diagnosis | |
|---------------------------|----------------|------------------------------|-----------------|---|
| j Info | | | | |
| {္က်} Parameter | Tab view Print | | | |
| 🕑 Diagnosis | RFID channel | Overcurrent supply VAUX1 | - | ? |
| ູ√∽ Status | 0 | Parameterization error | - | ? |
| Event log | DXP | Configuration via DTM active | - | ? |
| , ↓ Ex- / Import | | Buffer full | - | ? |
| 🔍 Change Password | | | | |
| 🛄 Firmware | | | | |
| LOCAL I/O | | | | |
| {္က်} Parameter | | | | |
| 😳 Diagnosis | | | | |
| ي ^ل ح Input | | | | |
| ∱் Output | | | | |

Fig. 58: Web server — RFID channel diagnostics

| Diagnostics | Description |
|------------------------------|------------------------------|
| Overcurrent supply VAUX1 | Overcurrent VAUX 1 |
| Parameterization error | Parameterization error |
| Configuration via DTM active | Configuration via DTM active |
| Buffer full | Buffer full |

Diagnostic messages — DXP channels

| TN-UHF-Q180L300-EU-OPC-UA | TN-UHF-Q180L300-EU-OPC-UA - Local I/O - Diagnosis | |
|-------------------------------|--|---|
| ၂်) Info ႏိုင္ပဲ Parameter | Tab view Print | |
| িু Diagnosis নু√ু Status | RFID channel Overcurrent VAUX1 Pin1 C0 (Ch0/1) - 0 Overcurrent VAUX1 Pin1 C1 (Ch2/3) - | |
| ₽ Event log ↓ Ex- / Import | DXP channel 0 Overcurrent output - | ? |
| Change Password | Overcurrent output - DXP channel 2 Overcurrent output - | ? |
| LOCAL I/O နလ္မွ် Parameter | DXP channel 3 Overcurrent output - | ? |
| చ్∡ Input షీ∠ Output | | |

Fig. 59: Web server — DXP channel diagnostics

| Diagnostics | Description |
|--------------------|-----------------------|
| Overcurrent output | Overcurrent at output |



9.5 Reset device (Reset)



Resetting the device without resetting the OPC UA server

- ✓ No preparation required.
- Perform a reset directly via the TAS or the web server.

Restarting the device by performing a power reset, including resetting the OPS UA server

- Restart the device by performing a power reset.
 - \Rightarrow This ensures that the user has physical access to the device.
- Perform a reset via the TAS or the web server within 60 seconds.



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 Rectifying errors

Errors are displayed by an ERR LED lit red on the device.

Calling error messages in the web server and rectifying them



Contact Turck if the error persists after the reader is reset.

- Log into the web server (see page Editing settings in the web server).
- Click **Diagnostics** in the navigation bar on the left of the screen.
- ⇒ The error messages are displayed in the device status.

| MAIN | UHF RFID CONFIG & DEMO | DOCUMENTATIO | N CLOUD | | |
|--------|------------------------|--------------------|---|--------|---|
| | | | | | |
| INTER | N Q300 GENERIC | TN-UHF-Q300 | -EU-CDS | | |
| UHF ID | ENT 0 - UHF DEVICE | | | | |
| (i) | Info | Write Channel view | | | |
| က် | Parameter | Participation (| Device status | | |
| ତ | Diagnostics | Device status | Configuration invalid; operation impossible | - | ? |
| | Input | | Message generation error - out of memory in polling mode | - | ? |
| r√n | Import-/Export | | RF Transceiver communication error | - | ? |
| | Application | | Temperature too high | - | ? |
| | | | Temperature warning | - | ? |
| | | | General status | | |
| | | | Device configuration invalid, using defaults | - | ? |
| | | | Device had a reset | active | ? |
| | | | Test mode | - | ? |
| | | | Transponder present | - | ? |
| | | | RF status | | |
| | | | Antenna resistance too high or too low | - | ? |
| | | | PLL is not locked | - | ? |
| | | | Regulation execution failed; no free RF channel | - | ? |
| | | | Reverse power too high | - | ? |
| | | | Transmit power exceeded limit | - | ? |
| | | | | | |

Fig. 60: Web server — diagnostics



Rectifying error messages:

- Click Local I/O \rightarrow Output in the navigation bar on the left of the screen.
- Select **RFID control/status ch0**.
- Choose the reset command via the **Command code** drop-down menu: **0x8000 Reset**
- \Rightarrow The reader is reset.

| MAIN | UHF RFID CONFIG & DEMO | DOCUMENTATIO | N CLOUD | |
|--------------------------------------|---|---|--|---|
| | | | | |
| TN-UHF | -Q300-EU-CDS | TN-UHF-Q30 | 0-EU-CDS - Local I/O - Output | |
| (i) II | nfo | | | |
| 양 대 양 대 상 도 상 도 신 CAL | Diagnosis Status Event log Ex- / Import Change Password | RFID control/status ch0 RFID read data ch0 RFID write data ch0 | Input values Response code Tag present at read/write head Continuous (Presence sensing) mode active Loop counter for fast processing Length Error code | 0x0000 Idle no ? 1 no ? 0 ? 0 ? ? 0 ? ? ? ? ? ? ? ? ? ? ? ? |
| န့်္ခာ့ F | Parameter | DXP | Tag counter | 0 |
| □ © ↓ ↓ ↓ | Diagnosis nput Dutnut | VAUX control | Output values Command code Loop counter for fast processing | 0x0000 Idle 0x0001 Inventory 0x0002 Read |
| | | | UHF: Memory area | 0x0004 Write 0x0008 Write and Verify |
| | | | Start address | 0x0010 Continuous Mode 0x0011 Get data from buffer (Continuous Mode) |
| | | | Length | 0x0012 Stop Continuous (Presence Sensing) Mode 0x0020 UHF Continuous Presence Sensing Mode |
| | | | Length of UID/EPC | 0x0041 Read/write head identification 0x0042 Get UHF read/write head status/error 0x0060 Direct read/write head password 0x0100 Set read/write head password 0x0101 Reset read/write head password 0x0102 Set tag password 0x0103 Set tag protection 0x0105 Set perma lock |
| For comme | ents or questions please find your loc | al contact on www.tu | rck.com | 0x0200 Kill UHF tag 0x1000 Restore settings UHF read/write head 0x1001 Backup settings UHF read/write head |

Fig. 61: Web server — resetting the reader



11 Maintenance

11.1 Updating the firmware via the Web server

- Open the web server and log in on the device.
- ► Click Firmware → SELECT FIRMWARE FILE.

| í) Info | Firmware revision | 2.0.2.0 |
|-----------------------|----------------------|---------|
| දိ္ပ်ိန် Parameter | | |
| 😳 Diagnosis | SELECT FIRMWARE FILE | |
| ુ∜⊾ Status | UPDATE FIRMWARE | |
| 🖗 Event log | | |
| └ Ex- / Import | | |
| ିକ୍କୁ Change Password | | |
| Firmware | | |
| LOCAL I/O | | |
| දိ္ပ်ိန် Parameter | | |
| 😳 Diagnosis | | |
| ુ∜∡ Input | | |
| ∱் Output | | |

Fig. 62: Selecting the new firmware file

- Select the storage location of the file and select the file.
- Start the firmware update via the **UPDATE FIRMWARE** button.
 - \Rightarrow The progress of the firmware update is displayed.
- After a firmware update has been successfully completed, start the device by clicking **OK**.



12 Repair

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

12.1 Returning devices

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

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

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



13 Disposal

X

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



14 Technical data

| Technical data | |
|--|---|
| Electrical data | |
| Operating voltage | 1830 VDC |
| DC rated operational current | ≤ 3500 mA |
| Data transfer | Electromagnetic AC field |
| Technology | UHF RFID |
| Radio communication and protocol standards | ISO 18000-63 EPCglobal Gen 2 |
| Antenna polarization | Circular/linear, adjustable |
| Antenna HPBW | 65° |
| Output function | Read/write |
| Mechanical data | |
| Mounting condition | Non-flush |
| Ambient temperature | -20+50 °C |
| Design | Rectangular |
| Dimensions | 300 × 300 × 61.7 mm |
| Housing material | Aluminum, AL, silver |
| Material of active face | Fiber glass reinforced polyamide, PA6-GF30, black |
| Vibration resistance | 55 Hz (1 mm) |
| Shock resistance | 30 g (11 ms) |
| Protection class | IP67 |
| Electrical connection | RP-TNC |
| Input impedance | 50 ohm |
| MTTF | 49 years acc. to SN 29500 (Ed. 99) 20 °C |
| System description | |
| Processor | ARM Cortex A8, 32-bit, 800 MHz |
| Memory | MB Flash |
| RAM | 512 MB DDR3 |
| System data | |
| Ethernet transfer rate | 10/100 Mbps |
| Connection technology Ethernet | 1 × M12, 4-pin, D-coded |
| Web server | Default: 192.168.1.100 |
| Digital inputs | |
| Number of channels | 4 |
| Connection technology | M12, 5-pin |
| Input type | PNP |
| Switching threshold | EN 61131-2 Type 3, PNP |
| Low-level signal voltage | < 5 V |
| High-level signal voltage | >11 V |
| Low-level signal current | < 1.5 mA |
| High-level signal current | > 2 mA |


| Technical data | | |
|----------------------------|---------------------|--|
| Type of input diagnostics | Channel diagnostics | |
| Digital outputs | | |
| Number of channels | 4 | |
| Connection technology | M12, 5-pin | |
| Output type | PNP | |
| Type of output diagnostics | Channel diagnostics | |



15 Turck branches — contact data

| Germany | Hans Turck GmbH & Co. KG Witzlebenstraße 7, 45472 Mülheim an der Ruhr www.turck.de |
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| Austria | Turck GmbH Graumanngasse 7/A5-1, A-1150 Vienna www.turck.at |
| Belgium | TURCK MULTIPROX Lion d'Orweg 12, B-9300 Aalst www.multiprox.be |
| Brazil | Turck do Brasil Automação Ltda. Rua Anjo Custódio Nr. 42, Jardim Anália Franco, CEP 03358-040 São Paulo www.turck.com.br |
| Canada | Turck Canada Inc. 140 Duffield Drive, CDN-Markham, Ontario L6G 1B5 www.turck.ca |
| China | Turck (Tianjin) Sensor Co. Ltd. 18,4th Xinghuazhi Road, Xiqing Economic Development Area, 300381 Tianjin www.turck.com.cn |
| Czech Republic | TURCK s.r.o. Na Brne 2065, CZ-500 06 Hradec Králové www.turck.cz |
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