# IQT3 / IQT4 Series

# RFID Read/Write Devices for IO-Link, 13.56 MHz, ISO 15693

Manual


IO-Link

Your automation, our passion.

PEPPERL+FUCHS

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# 1 Introduction

## 1.1 Content of this Document

This document contains information required to use the product in the relevant phases of the product life cycle. This may include information on the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal

**Note**

For full information on the product, refer to the further documentation on the Internet at www.pepperl-fuchs.com.

**Note**

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at www.pepperl-fuchs.com/device-information.

The documentation comprises the following parts:

- This document
- Datasheet
- IO-Link parameter datasheet

The documentation may comprise the following parts, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Instruction manual
- Functional safety manual
- Cybersecurity documentation
- Other documents

## 1.2 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismounting lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

## 1.3 Intended Use

Always operate the device as described in these instructions. Only in this way, the safe function of the device and the connected systems is guaranteed.

The protection of operating personnel and plant is only given if the device is used in accordance with its intended use.

## 1.4 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

### Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:

**Danger!**

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.

**Warning!**

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.

**Caution!**

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

### Informative Symbols

**Note**

This symbol brings important information to your attention.

**Tip**

This symbol brings an useful tip to your attention.

**Example**

This symbol provides an example of the issue described.

**Action**

This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

## 1.5 Definitions

The data representation format varies in the following documentation. The following formats are used:

### ASCII

Example: "A"; "B"; "1"; "2"

An ASCII character corresponds to one byte. $2^8$= 256 different characters can be represented.

### Binary

Example: $1001_{bin}$

Binary numbers are indicated by the suffix $_{bin}$.

### DECIMAL

Example: 1234

Decimal numbers are shown without any additional notation.

### HEX

Example: 16#41; 16#42; 16#31; 16#32

The hexadecimal representation of a byte consists of two digits (e.g., 16#41). The left portion is the high-order nibble (16#4x). The right portion is the low-order nibble (16#x1). The value range extends from 16#00 to 16#FF.

**Note**

In the TIA Portal from Siemens, hexadecimal numbers are displayed as follows:

**Example:**

16#00 (equivalent to 0x00)

## 1.6 Terms and Abbreviations

### Terms

| | |
|---|---|
| COM Mode | The IO-Link data transfer rate |
| Tag | Mobile data carrier containing user data and a unique number |
| Device ID | Identification number of the device |
| Easy Mode | Communication protocol for simple data access of a read/write device; no function block required |
| Expert Mode | Communication protocol for high-performance data access of the RFID read/write device; the use of a function block is required |
| Fixed code | Unique and unchangeable number of a read/write tag; Unique Identifier UID |
| IODD | IO Device Description; file with information about IO-Link parameters of an IO-Link-enabled device |
| IO-Link | Communication system for the connection of intelligent sensors and actuators via point-to-point communication |
| IO-Link master | Interface to higher-level control; controls the communication to connected IO-Link devices |
| IO-Link device | Intelligent sensor or actuator for connecting to an IO-Link master; has device-specific IO-Link parameters |
| IO-Link parameters | Device-specific information about an IO-Link device; parameters are stored in an IODD; acyclic change of the parameters |
| IO-Link protocol | Version of the supported IO-Link communication; V1.0 or V1.1 |
| IQC | Pepperl+Fuchs-specific designation of a 13.56 MHz read/write tag |
| ISO/IEC 15693 | Standard for data tranmsission for a 13.56 MHz RFID system |
| ISDU | Indexed Service Data Unit |
| PACTware | Parameterization software for access to IO-Link parameters |
| Port type | Type of IO-Link port |
| RSSI | Indicator for the receive field strength |
| SIO Mode | Standard IO mode; mode for conventional signal transmission without IO-Link data[1] |
| PLC | Programmable logic controller; device for controlling a machine or plant |
| UID | See "Fixed code" |
| Vendor ID | Identification number of the device manufacturer, Pepperl+Fuchs: 0x01 |

1. Not supported

### Abbreviations

| | |
|---|---|
| **FCC** | **F**ederal **C**ommunications **C**ommission |
| **HF** | **H**igh **F**requency |
| **IC** | **I**ndustry **C**anada |
| **ISO** | **I**nternational **S**tandardisation **O**rganisation |
| **RFID** | **R**adio **F**requency **Id**entification |
| **RSSI** | **R**eceived **S**ignal **S**trength **I**ndicator |
| **PLC** | **P**rogrammable **L**ogic **C**ontroller |
| **Tag** | Read/write tag; tag |
| **UID** | **U**nique **I**dentifier |

# 2 Cybersecurity

The device is secure developed according to IEC 62443-4-1 for the application area defined here.

To ensure cybersecure operation and to protect the device, implement the following measures.

## Security Context

The RFID read/write device is designed for operation with an IO-Link master from Pepperl+Fuchs.

The Communication is realized via a point-to-point connection.

Physically protect the device and the application against unauthorized access.

Firmware updates are signed by Pepperl+Fuchs. This ensures protection against tampered firmware.

For manufacturing purposes, the device features a proprietary manufacturer's service interface that uses the existing connection lines.

After the device is switched on, the service interface is disabled after a defined time.

The service interface is deactivated after 50 ms.

## Maintenance and Management

Operate the device using the latest firmware. The latest firmware can be found at https://www.pepperl-fuchs.com/cybersecurity.

Check the website regularly for security advisories publications: https://www.pepperl-fuchs.com/cybersecurity.

Report incidents to the manufacturer.

## Decommissioning

The device stores adjustable parameters and operating data.

All parameters, operating data, and reset options are specified in the IO-Link parameter documentation.

To delete data, you have to physically destroy the device.

# 3 Certificates and Approvals

## 3.1 General

This manual applies to several types and variants of the device. The applicable approvals can be found in the relevant data sheet for your device. Further approvals are available on request.

## 3.2 CE Marking

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

**Note**

A Declaration of Conformity can be requested from the manufacturer or downloaded from www.pepperl-fuchs.com.

## 3.3 FCC Compliance Statement

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

**Attention:**

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Note**

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

To comply with FCC Part 15 rules in the United States, the system must be professionally installed to ensure compliance with the Part 15 certification. It is the responsibility of the operator and professional installer to ensure that only certified systems are deployed in the United States. The use of the system in any other combination (such as co-located antennas transmitting the same information) is expressly forbidden.

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a minimum separation distance from all persons as specified in the table below and must not be co-located or operated in conjunction with any other antenna or transmitter.

| Type/Design | Minimum separation distance |
|---|---|
| IQT3-FP-IO-V1 | 20 cm |
| IQT4-*-IO-V1 | 20 cm |

## 3.4 IC Compliance Statement

This device contains license-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's license-exempt RSS(s). Operation is subject to the following two conditions:

1. This device may not cause interference.
2. This device must accept any interference, including interference that may cause undesired operation of the device.

L’émetteur/récepteur exempt de licence contenu dans le présent appareil est conforme aux CNR d’Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes:

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

To comply with IC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a minimum separation distance from all persons as specified in the table below and must not be co-located or operated in conjunction with any other antenna or transmitter.

| Type/Design | Minimum separation distance |
|---|---|
| IQT3-FP-IO-V1 | 20 cm |
| IQT4-*-IO-V1 | 20 cm |

## 3.5 UL Information

### IQT3 Series

This device is for indoor use only.

This device may be operated at altitudes of up to 5000 m.

The ambient temperature range is from -20 °C … +70 °C for operation with non-transmission periods, or -25 °C … +55 °C for continuous operation. The pollution degree is 2.

The maximum relative humidity is 80 % at temperatures up to 31 °C, decreasing linearly to 50 % relative humidity at 40 °C.

The nominal supply voltage is 24 $V_{DC}$; the voltage range is 18 V ... 30 $V_{DC}$. The supply must be an LEC (Limited Energy Circuit), LPS (Limited Power Source), or Class 2. Overvoltage Category II applies.

The enclosure type is 1.
The products are intended for use in or with industrial machinery applications as defined in the Electrical Standard for Industrial Machinery, NFPA 79.

Degree of protection (IP67) is not included in the UL approval. The degree of protection is tested by Pepperl+Fuchs SE.

External circuits intended to be connected to this unit must be galvanically isolated from the mains supply or hazardous live voltages by reinforced or double insulation and must meet the limits of Clauses 6.3 and 9.4 of UL 61010-1.

**Caution!**

Connection cable Specifications

The maximum permissible temperature of the connection cable must be at least +70 °C. The minimum diameter of the connection cable must be 22 AWG or 0.34 $mm^2$.

## IQT4 Series

The ambient temperature range is from -25 °C … +70 °C for operation with non-transmission periods.

The nominal supply voltage is 24 $V_{DC}$; the voltage range is 18 V ... 30 $V_{DC}$. Supply must be CLASS 2.

Degree of protection (IP67) is not included in the UL approval. The degree of protection is tested by Pepperl+Fuchs SE.

**Caution!**

Connection cable Specifications

The device must be connected exclusively using any R/C cord (type CYJV/7 or CYJV2/8) with appropriate ratings.

# 4 Product Description

## 4.1 Product Description

### Function

The IQT3/IQT4-series read/write devices are designed for writing and reading passive tags in the 13.56 Mhz frequency range.

The read/write devices feature an IO-Link communication interface and are connected to an IO-Link master via an integrated M12 plug.

### Use and Application

The IQT3-series read/write devices have an extended sensing range of up to 30 cm and are therefore especially suitable for applications in which tags need to be reliably identified at a greater distance or at a higher passing speed.

The IQT4-series read/write devices are available in various housing designs and have a sensing range of up to 20 cm, depending on the design. This makes them suitable for applications with limited installation space.


Figure 4.1 IQT3-FP-IO-V1


Figure 4.2 IQT4-FP-IO-V1


Figure 4.3 IQT4-F61-IO-V1


Figure 4.4 IQT4-18GM-IO-V1

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## 4.2 Dimensions

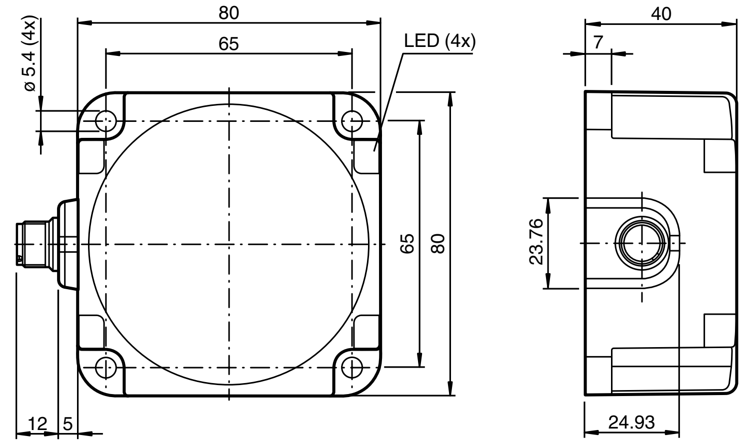


Figure 4.5 IQT3-FP-IO-V1 / IQT4-FP-IO-V1

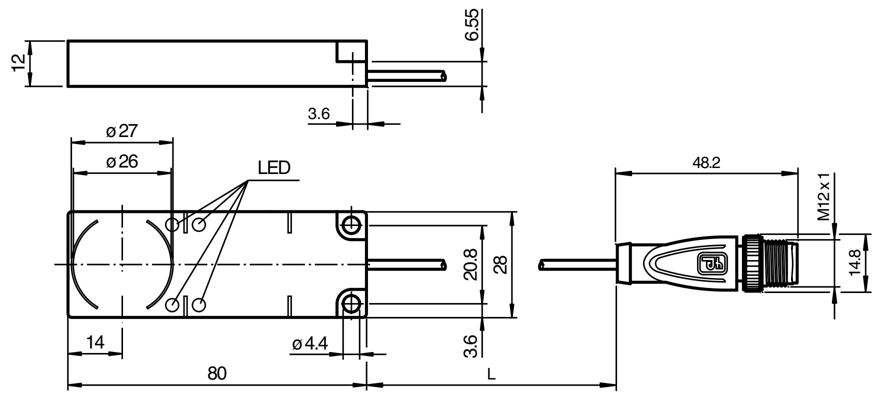


Figure 4.6 IQT4-F61-IO-V1

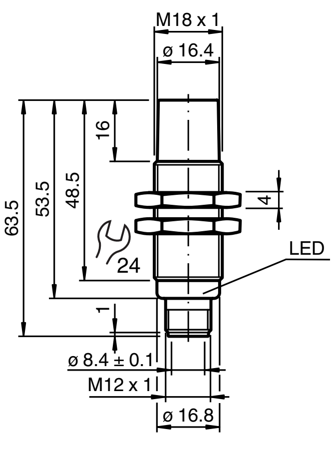


Figure 4.7 IQT4-18GM-IO-V1

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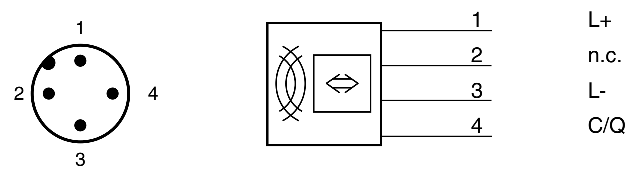
## 4.3 Indicators

The RFID read/write devices have four LEDs to indicate the operating state. The various indicators denote:

| LED | Description |
|---|---|
| Green | On: Device is ready for operation, no IO-Link communication<br>Flashing: IO-Link communication active |
| Blue | On: Write/read attempt is being performed |
| Orange | On: Write/read attempt was successful |
| Red | On: Interference from external signals in the sensing range, range may be limited.<br>Slow flashing (1 Hz): Metal interference<br>Fast flashing (10 Hz): Excess temperature |

## 4.4 Electrical Connection




| | | |
|---|---|---|
| Pin 1 | L+ | +24 V |
| Pin 2 | n.c. | Not connected |
| Pin 3 | L- | 0 V/GND |
| Pin 4 | C/Q | C/Q |

The RFID read/write device is connected to an IO-Link master via a point-to-point connection. According to the IO-Link installation instructions, the length of the connection line should not exceed 20 meters. The RFID read/write device is powered via the IO-Link master. For technical details, refer to the product datasheet.

## 4.5 IO-Link Interface Properties

| | |
|---|---|
| IO-Link version: | 1.1 |
| Data transmission rate | COM3 (230.4 kbits/s) |
| Min. cycle time | 4 ms |
| Process data | Input 32 bytes<br>Output 32 bytes |
| SIO mode support | No |
| Compatible master port type | Class A<br>Class B |
| Device ID | See product datasheet |
| Vendor ID | 1 (0x0001) |

## 4.6 Accessories

### 4.6.1 IO-Link Master

You can connect the RFID read/write devices to any IO-Link master, as long as it supports the IO-Link standard V1.1 and has a sufficient power supply. A selection of available IO-Link masters from Pepperl+Fuchs can be found online at www.pepperl-fuchs.com on the product page of the respective read/write device.

**Note**

Check the performance of the power supply at the connector of the master and the cable cross-section of the connecting cable to ensure stable communication.

### 4.6.2 RFID Tag

The RFID read/write device can access any tag that complies with the ISO15693 standard. A selection of available RFID tags from Pepperl+Fuchs can be found online at www.pepperl-fuchs.com on the product page for the respective read/write device.

### 4.6.3 Connection Cable

To connect the RFID read/write devices to an IO-Link master, you can use unshielded, 3- or 4-wire cables with an M12 plug and a maximum length of 20 m. You can find a selection of available connection cables from Pepperl+Fuchs online at www.pepperl-fuchs.com on the product page for the respective read/write device.

# 5 Installation

## 5.1 Storage and Transportation

Keep the original packaging. Always store and transport the device in the original packaging.

Store the device in a clean and dry environment. The permitted ambient conditions must be considered, see datasheet.

## 5.2 Unpacking

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

Check the package contents against your purchase order and the shipping documents for:

- Delivery quantity
- Device type and version in accordance with the type label
- Any accessories ordered

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

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

## 5.3 Mounting and Connection

**Note**

The RFID read/write devices are designed for wall mounting and mounting on brackets indoors.

Mount the read/write device on a flat surface and secure it using only the holes provided on the housing.

**Warning!**

Processes started in an uncontrolled manner jeopardize the plant

Before commissioning, ensure that there is no risk to the system into which the device is integrated.

**Caution!**

Hot surfaces

Risk of burns when handling the read/write device! After switching off the device, allow it to cool down for at least half an hour before touching it.

Use 4 screws (4 mm diameter) to secure the IQT3-FP-IO-V1 and IQT4-FP-IO-V1 read/write devices.

Use 2 screws (4 mm diameter) to secure the IQT4-F61-IO-V1 read/write device.

When securing the read/write devices, use suitable flat washers and fixtures that are appropriate for the type of surface.

The tightening torque of the screws depends on the type of fixture. We recommend using a tightening torque of 1.8 Nm. Use a maximum tightening torque of 2.4 Nm to prevent damage to the plastic housing.

Use suitable mounting material, such as nuts and mounting aids, to secure the IQT4-18GM-IO-V1 read/write device.

**Note**

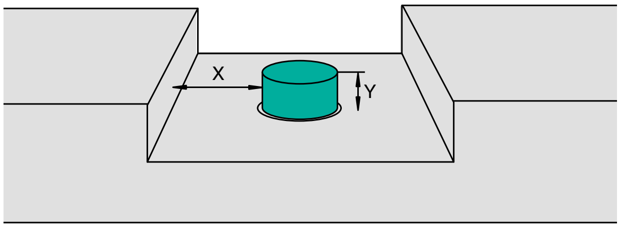
Do not route the connection cable for the read/write device and the IO-Link master within the operating range of the tag. Keep a distance of at least 10 cm.

If the distance is too small, in rare cases this may lead to incorrect detection of tags due to inductive coupling via the connection cable.

## 5.4 Minimum Distances

For flush mounting in metal surfaces, a lateral minimum distance X to metal must be observed.

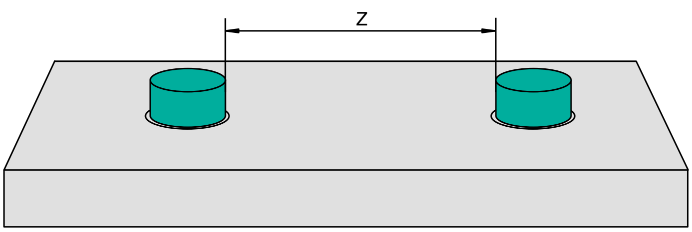
For flush mounting in metal, a protrusion Y above the mounting surface must be observed.




| Read/write device | X | Y |
|---|---|---|
| IQT3-FP-IO-V1 | XX | XX |
| IQT4-FP-IO-V1 | XX | XX |
| IQT4-F61-IO-V1 | XX | XX |
| IQT4-18GM-IO-V1 | XX | XX |

When mounting multiple RFID read/write devices next to one another, a minimum distance Z must be maintained. This distance prevents the read/write devices from interfering with one another.

When mounting multiple read/write devices, maintain the following minimum distances:




| Read/write device | Z |
|---|---|
| IQT3-FP-IO-V1 | 750 mm |
| IQT4-FP-IO-V1 | XX |
| IQT4-F61-IO-V1 | XX |
| IQT4-18GM-IO-V1 | XX |

## 5.5 Main and Auxiliary Fields

The RFID read/write devices have a main field and auxiliary fields. However, the auxiliary fields should only be used in exceptional cases during project planning, because the read/write distances are very limited. It is not possible to provide precise details regarding the geometries of the auxiliary fields, because the values depend heavily on the operating distance and the application.

In dynamic mode, it must be considered that the tag may be temporarily lost during the transition from the main field to the auxiliary field due to field gaps.

The typical main and auxiliary fields of the three device versions are shown schematically below.

| Legend | Designation |
|---|---|
| 1 | Main field |
| 2 | Auxiliary field |
| 3 | Field gap |

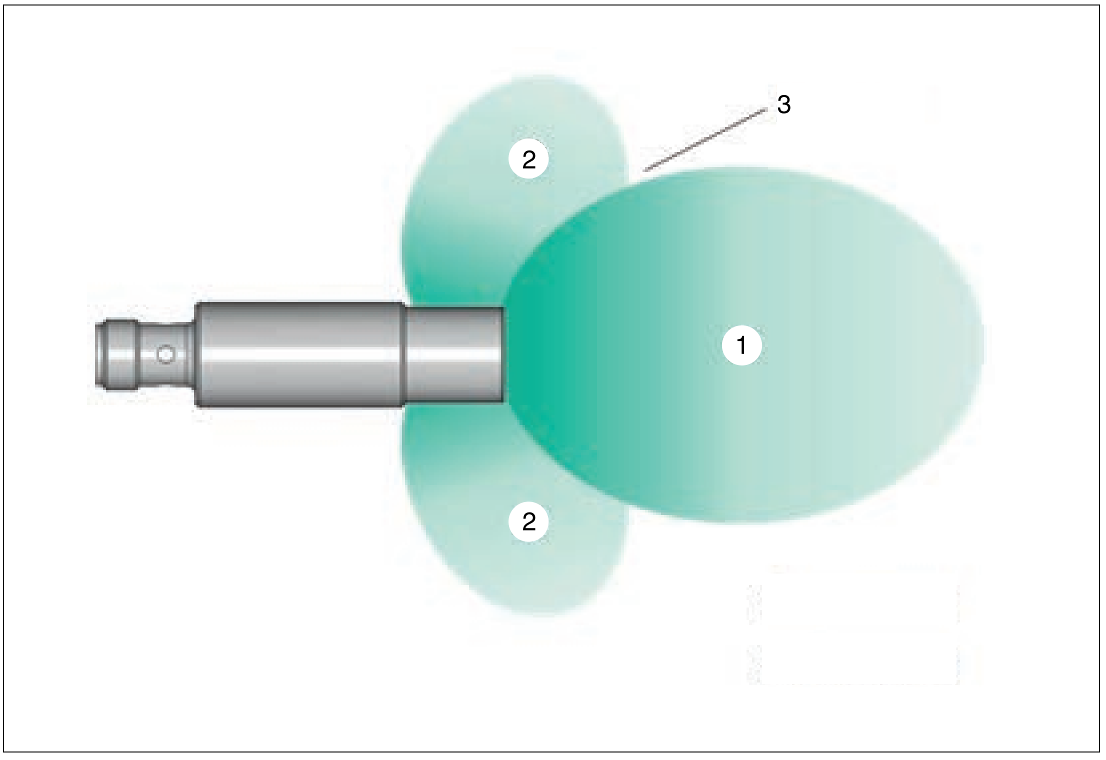



Figure 5.1 Schematic representation of the main and auxiliary fields IQT4-18GM-IO-V1

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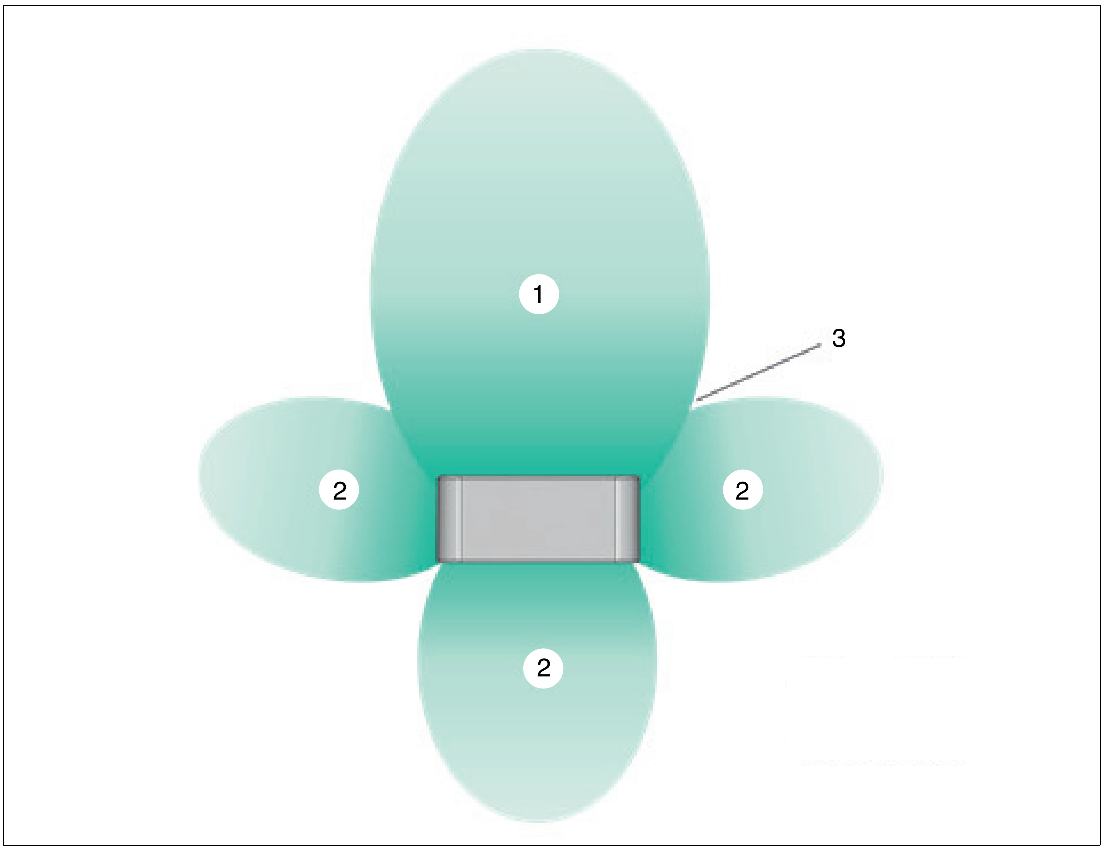


Figure 5.2 Schematic representation of the main and auxiliary fields IQT4-F61-IO-V1

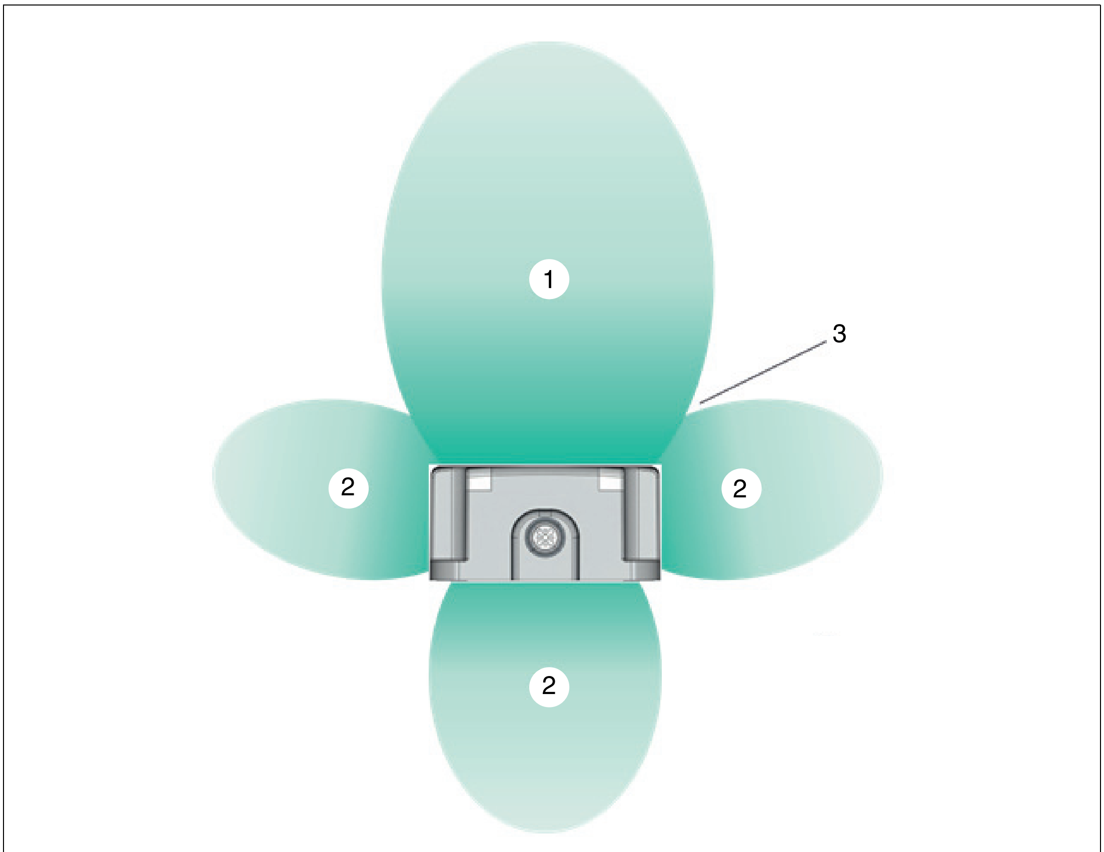


Figure 5.3 Schematic representation of the main and auxiliary fields IQT3-FP-IO-V1 / IQT4-FP-IO-V1

If no shielding measures are in place, the RFID read/write device can detect tags via one of the auxiliary fields.

| Legend | Designation |
|---|---|
| 1 | Main field |
| 2 | Auxiliary field |
| 3 | Conveying direction |
| 4 | Tag |
| 5 | Metal shielding |

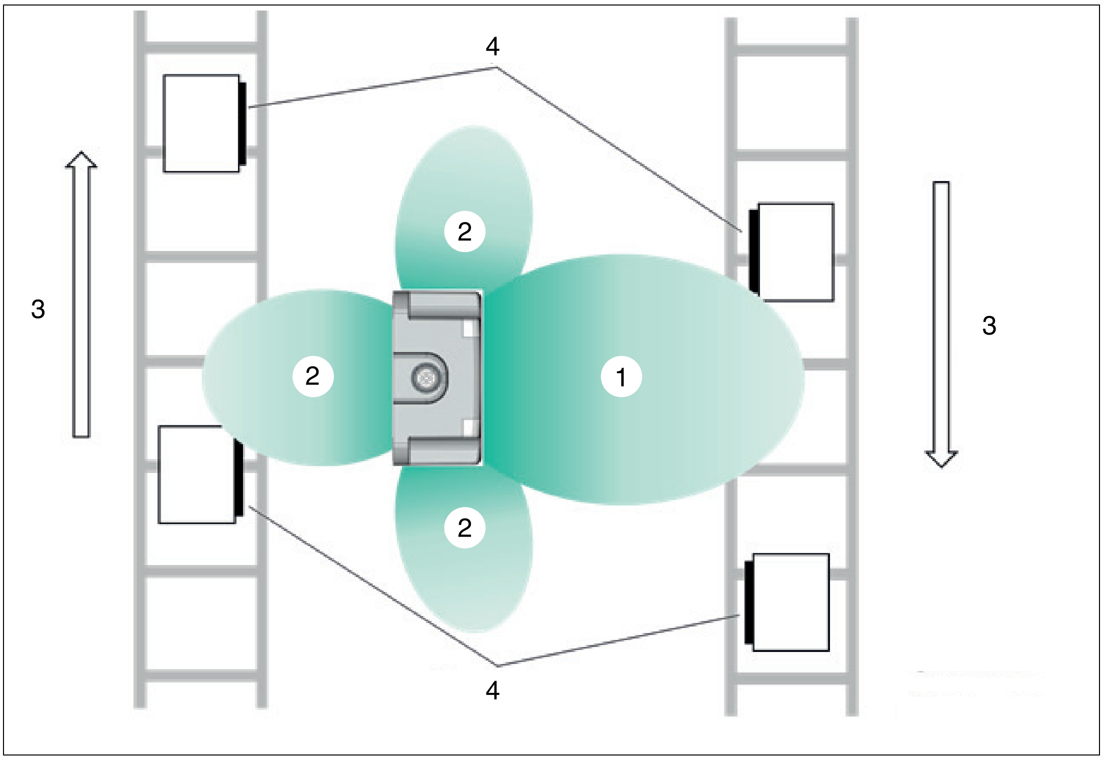


Figure 5.4 Schematic representation of auxiliary fields without shielding

Metal shielding is required to prevent unwanted detection of tags via the auxiliary field.

Typical main and auxiliary fields are shown below, but with metal shielding. Metal shielding prevents tags from being detected via the auxiliary field of the RFID read/write device.

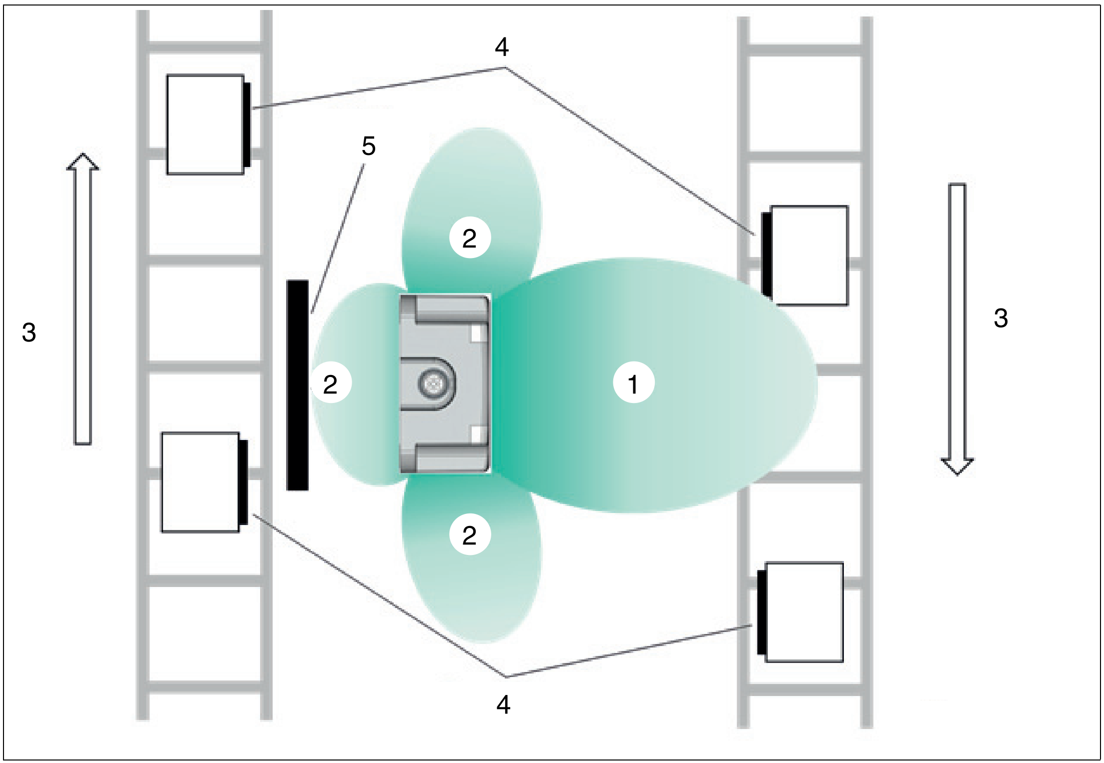


Figure 5.5 Schematic representation of auxiliary fields with shielding

## 5.6 Ambient Temperature Range

The ambient temperature at which the devices can be operated depends on various factors, such as the operating mode and the selected transmitter radiated power.

By adjusting the operating mode or the transmitter radiated power (parameter PT), the devices can operate permanently at higher ambient temperatures, because the self-heating of the devices is reduced.

### Operation with transmission pauses

| PT | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| IQT3-FP-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |
| IQT4-18GM-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |
| IQT4-F61-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |
| IQT4-FP-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |

### Continuous transmission operation

| PT | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| IQT3-FP-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 65 °C (-13 °F ... 149 °F) | -25 °C ... 55 °C (-13 °F ... 131 °F) |
| IQT4-18GM-IO-V1 | -25 °C ... 60 °C (-13 °F ... 140 °F) | -25 °C ... 60 °C (-13 °F ... 140 °F) | -25 °C ... 50 °C (-13 °F ... 122 °F) | -25 °C ... 50 °C (-13 °F ... 122 °F) |
| IQT4-F61-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 65 °C (-13 °F ... 149 °F) | -25 °C ... 65 °C (-13 °F ... 149 °F) |
| IQT4-FP-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |

### Continuous transmission operation, with forced convection

| PT | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| IQT3-FP-IO-V1 | -25 °C ... 70 °C (-13 °F ... 140 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |
| IQT4-18GM-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 65 °C (-13 °F ... 149 °F) | -25 °C ... 65 °C (-13 °F ... 149 °F) |
| IQT4-F61-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |
| IQT4-FP-IO-V1 | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) | -25 °C ... 70 °C (-13 °F ... 158 °F) |

# 6 Commissioning and Operation

## 6.1 Operating Modes

The device supports two operating modes:

- **Easy mode**
  Easy mode enables simplified commissioning with a limited range of functions. This is the preferred operating mode for standard applications.
- **Expert mode**
  The entire set of commands is available in Expert mode. To use Expert mode, a function block is required to integrate into the PLC.

## 6.2 Tag 13.56 MHz ISO15693

The tags of an RFID system with 13.56 MHz offer significantly quicker access to the data than a comparable RFID system based on a working frequency of 125 kHz. The 13.56 MHz system is standardized through ISO15693. A variety of tags from different manufacturers using different RFID chips is supported.

Parameterization of the associated tag type is recommended to set the RFID read/write device to the tag being used. On delivery of the RFID read/write device, tag type 20 is preset. This setting guarantees access to the fixed code of ISO15693-compliant tags.

The following table shows the tag types specified and recommended for the RFID read/write device.

**13.56 MHz/ISO 15693 tag types**

| Pepperl+Fuchs designation | Chip type | Manufacturer | Size of read/write memory [byte] | Size of memory block [byte] |
|---|---|---|---|---|
| IQC20 | All tags in accordance with ISO15693 | - | Depending on the tag | Depending on the tag |
| IQC21 | I-Code SLI(X) | NXP | 112 | 4 |
| IQC22 | Tag-it HF-I Plus | Texas Instruments | 256 | 4 |
| IQC23 | my-D SRF55V02P | Infineon | 224 | 4 |
| IQC24 | my-D SRF55V10P | Infineon | 992 | 4 |
| IQC27 | EM4135 | EM Microelectronic | 288 | 8 |
| IQC31 | Tag-it HFI standard | Texas Instruments | 32 | 4 |
| IQC32 | Tag-it HFI pro | Texas Instruments | 32 | 4 |
| IQC33 | FRAM MB89R118 | Fujitsu | 2000 | 8 |
| IQC34 | FRAM MB89R119 | Fujitsu | 232 | 4 |
| IQC35 | I-Code SLI-S | NXP | 160 | 4 |
| IQC36 | I-Code SLI-L | NXP | 32 | 4 |
| IQC37 | FRAM MB89R112 | Fujitsu | 8192 | 32 |

| Pepperl+Fuchs designation | Chip type | Manufacturer | Size of read/write memory [byte] | Size of memory block [byte] |
|---|---|---|---|---|
| IQC38 | EM4233 | EM Microelectronic | 208 | 4 |
| IQC50 | I-Code SLIX2 | NXP | 316 | 4 |
| IQC51 | I-Code 3 | NXP | 300 | 4 |

Table 6.1 13.56 MHz tag types in accordance with ISO 15693

All ISO15693-compliant tags have a unique 8-byte fixed code. The fixed code is determined by the chip manufacturer. The user can only read it and it cannot be changed. In addition, the tags have a memory area for user data. This can be written with application-specific data and read. The size of the memory for the user data differs according to the tag type.

The memory is divided into blocks with a length of 4 bytes. There are also exceptions with a block length of 8 bytes or 32 bytes. As a result of the block length of 32 bytes, Easy Mode does not support tag type IQC37.

The read and write commands use the "Number bytes" and "Start address" parameters. This defines how many bytes are accessed in the memory area of the user data and from which memory address this starts. If the tag type used has a block length of 4 bytes, the values of the "Number of bytes" and "Start address" parameters must be a multiple of 4. In the case of a block length of 8 or 32 bytes, they are multiples of 8 or 32.

## 6.3 Sensing Range

### IQT3 Series

The read/write device is classified with a sensing range of up to 30 cm. The range of the device depends on the tags to be identified and may therefore vary. You can change the transmitter radiated power (parameter PT) to enlarge or reduce the size of the sensing range.

**Note**

To comply with the limit value of the magnetic field strength of max. 10 A/m in accordance with ISO 15693-1, a minimum distance of 50 mm must be maintained between the tag and the read/write device at a transmitter radiated power PT > 1. Otherwise, there is a risk that a tag will be damaged in the near range. Reduce the transmitter radiated power of the read/write device to PT = 1 to meet the limit value at small minimum distances.

### IQT4 Series

The read/write devices are classified with a sensing range of up to 20 cm. The range of the devices varies depending on the design and is dependent on the tags to be identified. You can change the transmitter radiated power (parameter PT) to enlarge or reduce the size of the sensing range.

## 6.4 Multiple Tags in Sensing Range

The behavior when identifying tags in the sensing range depends on the operating mode selected.

### Easy Mode

All detected tags are transmitted. Filtering for individual tags is not possible.

### Expert Mode

Each read or write command can access one, several, or all tags in the sensing range. Filter masks that are managed with the **TI** parameter are used for control. These commands allow you to detect specific tags in the sensing range. See "Tag ID Filter (TI)" on page 136.

In addition, selective read/write commands can be used to execute specific commands for individual tags.

**Note**

For multi-tag applications, use the same tag types.

For multi-tag operation, the "Input Representation" IO-Link parameter must be set to "Long-Form."

# 7 Easy Mode

The RFID read/write device uses the "Easy Mode" communication protocol on the basis of IO-Link for data transfer to a higher-level system. If this protocol is used, the RFID read/write device can be commissioned without an additional function block on a control system. This makes it easier to commission the read/write device.

When "Easy Mode" is used, there is a distinction between parameter and process data. The parameter data is IO-Link parameters being transferred acyclically. This is data for the configuration of the read/write jobs, for parameterizing the device properties, e.g., transmit power and service data, e.g., operating hours meter. The process data is transmitted in cycles. The process data is divided into input and output data. It has a length of 32 bytes and contains the control values for the execution of the read and write commands and the associated values.

The IO-Link parameters for setting the RFID read/write device are defined by a device-specific IODD file. The IO-Link parameters are set using suitable configuration software. During this process, the IO-Link parameters are saved in a non-volatile memory in the RFID read/write device.

## 7.1 Command Overview

The Easy Mode supports the following read and write commands:

| Command | Description |
|---|---|
| Read the read-only code (UID) | Read-out of the 8 byte read-only code; no setting of the "Number of bytes" or "Start Address" parameters required |
| Read the user memory | Read-out of user data; setting of the "Number of bytes" and "Start Address" parameters is required |
| Write the user memory | Writing of user data; setting of the "Number of bytes" and "Start Address" parameters is required |
| Auto-start | Automatic execution of a read task for read-only code or user data after device start |

## 7.2 Basic Structure of the Process Data

The device process data is exchanged cyclically between a higher-level system (e.g., a PLC) and the device. A distinction is made between the output process data and the input process data. The process data for the outputs is transmitted from the PLC toward the device. The process data for the inputs is transmitted from the device toward the PLC.

A detailed description of the process data can be found in the IODD or on the IO-Link parameter datasheet of the device. You can find the IODD and the parameter datasheet on the product details page at www.pepperl-fuchs.com.

The input and output data of the process data have a fixed length of 32 bytes.

**Note**

Output process data is ignored by the device if the "valid" flag is not set. An unset "valid" flag indicates invalid process data.

## 7.2.1 Output Process Data (PLC -> Device)

| Byte | Content | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | Start write | Start read |
| 1 | 0x00 | | | | | | | |
| 2 | 0x00 | | | | | | | |
| 3 | 0x00 | | | | | | | |
| 4 | User data for write job or 16#00 for read job | | | | | | | |
| ... | User data for write job or 16#00 for read job | | | | | | | |
| 31 | User data for write job or 16#00 for read job | | | | | | | |

Table 7.1

**Byte 0** This byte contains the control bits for starting a read job or write job. If the auto-start function is enabled, the control bits have no effect.
**Start Read**: As soon as this bit is set (TRUE), a read job is started using the configuration set by the parameter "Read Task" in the IODD file. The read job is executed continuously. To cancel the read job, reset the bit (FALSE).
**Start Write**: As soon as this bit is set (TRUE), a write job is started. The write job transfers the user data, which must be stored starting from byte 4, according to the configuration set by the parameter "Write Task" in the IODD file. The write job is executed continuously. To cancel the write job, reset the bit (FALSE).
Note that both bits must not be set at the same time. The remaining bits have no function.

**Byte 1/2/3** These bytes are not used in Easy Mode. Set the value 0x00.

**Byte 4 … 31** When a read job is being executed, these bytes have no significance and are set with the value 0x00. When a write job is being executed, this area contains the user data to be written to the tag.

### For example: Writing user memory in TIA Portal

| Name | Address | Displa... | Monitor value |
|---|---|---|---|
| "ControlByte_Out" | %QB0 | Bin | 2#0000_0010 |
| "Unused_1" | %QB1 | Hex | 16#00 |
| "Unused_2" | %QB2 | Hex | 16#00 |
| "Unused_3" | %QB3 | Hex | 16#00 |
| "WriteData_1" | %QB4 | Hex | 16#01 |
| "WriteData_2" | %QB5 | Hex | 16#02 |
| "WriteData_3" | %QB6 | Hex | 16#03 |
| "WriteData_4" | %QB7 | Hex | 16#04 |
| "WriteData_5" | %QB8 | Hex | 16#05 |
| "WriteData_6" | %QB9 | Hex | 16#06 |
| "WriteData_7" | %QB10 | Hex | 16#07 |
| "WriteData_8" | %QB11 | Hex | 16#08 |

Output Process Data

Byte 0: 0000 $0010_{\text{bin}}$; the "Start write" bit is set to 1; a write job is executed.

Byte 1/2/3: 16#00; not used

Byte 4 … Byte 11: Write data

### 7.2.2 Input Process Data (Device -> PLC)

| Byte | Content | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | Tag present | Error | Job active | Write successful | Read successful |
| 1 | Length specification | | | | | | | |
| 2 | RSSI value | | | | | | | |
| 3 | Reserved | | | | | | | |
| 4 | Data for read/write job / error code | | | | | | | |
| 5 | Data for read/write job / error information | | | | | | | |
| ... | Data for read/write job / error information | | | | | | | |
| 31 | Data for read/write job / error information | | | | | | | |

Table 7.2

**Byte 0** This byte contains the control bits for signaling the execution status of the read or write job.
**Read successful**: This bit signals that data was read from a tag successfully. This bit is set if a tag enters the sensing range and the data has been read successfully. The bit remains set while the tag is within the sensing range. As soon as the tag leaves this area, the bit is reset. If multiple tags are within the sensing range at the same time, a positive edge change signals that another tag is[1] being transmitted.
**Write successful**: This bit signals that data was written to a tag successfully. This bit is set if a tag enters the sensing range and the data has been written successfully. The bit remains set while the tag is within the sensing range. As soon as the tag leaves this area, the bit is reset. If multiple tags are present simultaneously within the sensing range, a positive edge indicates that another tag was written to successfully.
**Job active**: This bit is set while the read or write job is being executed. As soon as the job is complete, the bit is reset.
**Error**: If an error occurs during execution of a read or write job, or if a parameter setting is incorrect, this is signaled by this bit. At the same time, additional error information in the form of an error code is located in the process data.
**Tag present**: Bit is set if one or more tags are in the sensing range. If there is no tag in the sensing range, this bit has the value FALSE.

**Byte 1** This byte contains the number of transferred bytes. If a tag enters the sensing range and the data has been read successfully (Read successful = TRUE), this byte indicates the length of the read data. If an error occurs during execution of a job (Error = TRUE), this byte contains a length specification for the error information.

**Byte 2** The RSSI value indicates the signal strength of the tag response as a percentage. The value range is between 0 and 100. 0 % = weak signal, 100 % = strong signal.

**Byte 3** Reserved.

| | |
|---|---|
| **Byte 4/5** | If a tag is successfully accessed, the length of the fixed code UID is located at this position.[2] |
| **Byte 6 … Byte 31** | Starting at byte 6, the UID of the tag from which the information was read or to which the information was written is transmitted. The UID is always included in the response to a read or write job. This information ensures unique assignment of the tag. When a user memory read job is performed, the length specification (2 bytes) of the read-in user memory and the read-in subarea of the user memory are connected. |

1. Positive edge change: Change from 0 to 1

2. Applies only to the long-form data format. In the short-form data format, the UID or the user memory of the tag is transferred directly from byte 4.

If an error occurs during execution of a read or write job ("Error" bit = TRUE), byte 4 contains an error code. In the fault state, an error message is transmitted in plain text (ASCII) starting at byte 5. This provides a possible cause of fault.

### For example: Read fixed code (UID), long-form data format

| Name | Address | Displ... | Monitor value |
|---|---|---|---|
| "ControlByte_In" | %IB0 | Bin | 2#0001_0101 |
| "Length" | %IB1 | DEC | 10 |
| "RSSI" | %IB2 | DEC | 97 |
| "Reserved" | %IB3 | DEC | 0 |
| "Length_UID_HighByte" | %IB4 | Hex | 16#00 |
| "Length_UID_LowByte" | %IB5 | Hex | 16#08 |
| "UID_1" | %IB6 | Hex | 16#E0 |
| "UID_2" | %IB7 | Hex | 16#04 |
| "UID_3" | %IB8 | Hex | 16#01 |
| "UID_4" | %IB9 | Hex | 16#50 |
| "UID_5" | %IB10 | Hex | 16#D3 |
| "UID_6" | %IB11 | Hex | 16#23 |
| "UID_7" | %IB12 | Hex | 16#74 |
| "UID_8" | %IB13 | Hex | 16#BA |

Byte 0: 0001 $0101_{bin}$; the "Job active" bit is set to 1, which indicates that a read job is activated. The "Read successful" bit is set to 1. A tag is therefore located in the sensing range and the data has been read. In addition, the "Tag present" bit is set because there is at least one tag in the sensing zone.

Byte 1: 10; the byte indicates the length of the transmitted information. This telegram is used to transmit information with a length of 10 bytes. The information starts at byte 4.

Byte 2: 97; RSSI value

Byte 3: 0; Reserved

Byte 4/5: 16#0008; length specification of the UID. The information has a length of 2 bytes. The length of the UID is always 8 bytes.

Byte 8 … Byte 13: UID of the tag that was read

### For example: Read fixed code (UID), short-form data format

| Name | Address | Displ... | Monitor value |
|---|---|---|---|
| "ControlByte_In" | %IB0 | Bin | 2#0001_0101 |
| "Length" | %IB1 | DEC | 8 |
| "RSSI" | %IB2 | DEC | 98 |
| "Reserved" | %IB3 | Hex | 16#00 |
| "ReadData_1" | %IB4 | Hex | 16#E0 |
| "ReadData_2" | %IB5 | Hex | 16#04 |
| "ReadData_3" | %IB6 | Hex | 16#01 |
| "ReadData_4" | %IB7 | Hex | 16#50 |
| "ReadData_5" | %IB8 | Hex | 16#D3 |
| "ReadData_6" | %IB9 | Hex | 16#23 |
| "ReadData_7" | %IB10 | Hex | 16#74 |
| "ReadData_8" | %IB11 | Hex | 16#BA |

Byte 0: 0001 $0101_{bin}$; the "Job active" bit is set to 1, which indicates that a read job is activated. The "Read successful" bit is set to 1. A tag is therefore located in the sensing range and the data has been read. In addition, the "Tag present" bit is set because there is at least one tag in the sensing zone.

Byte 1: 8; the byte indicates the length of the transmitted information. This telegram is used to transmit information with a length of 8 bytes. The information starts at byte 4.

Byte 2: 98; RSSI value

Byte 3: 16#00; reserved

Byte 4 … Byte 11: UID of the tag that was read.

### For example: Read user memory, long form data format

| Name | Address | Displ... | Monitor value |
|---|---|---|---|
| "ControlByte_In" | %IB0 | Bin | 2#0001_0101 |
| "Length" | %IB1 | DEC | 20 |
| "RSSI" | %IB2 | DEC | 97 |
| "Reserved" | %IB3 | DEC | 0 |
| "Length_UID_HighByte" | %IB4 | Hex | 16#00 |
| "Length_UID_LowByte" | %IB5 | Hex | 16#08 |
| "UID_1" | %IB6 | Hex | 16#E0 |
| "UID_2" | %IB7 | Hex | 16#04 |
| "UID_3" | %IB8 | Hex | 16#01 |
| "UID_4" | %IB9 | Hex | 16#50 |
| "UID_5" | %IB10 | Hex | 16#D3 |
| "UID_6" | %IB11 | Hex | 16#23 |
| "UID_7" | %IB12 | Hex | 16#74 |
| "UID_8" | %IB13 | Hex | 16#BA |
| "Length_Data_HighByte" | %IB14 | Hex | 16#00 |
| "Length_Data_LowByte" | %IB15 | Hex | 16#08 |
| "ReadData_1" | %IB16 | Hex | 16#01 |
| "ReadData_2" | %IB17 | Hex | 16#02 |
| "ReadData_3" | %IB18 | Hex | 16#03 |
| "ReadData_4" | %IB19 | Hex | 16#04 |
| "ReadData_5" | %IB20 | Hex | 16#05 |
| "ReadData_6" | %IB21 | Hex | 16#06 |
| "ReadData_7" | %IB22 | Hex | 16#07 |
| "ReadData_8" | %IB23 | Hex | 16#08 |

Byte 0: 0001 $0101_{bin}$; The "Job active" bit is set to 1 and signals an active read job. The "Read successful" bit is set to 1. A tag is located in the sensing range and the data has been read. In addition, the "Tag present" bit is set because there is at least one tag in the sensing zone.

Byte 1: 20; the byte indicates the length of the transmitted information. This telegram is used to transmit information with a length of 20 bytes. The information starts at byte 4.

Byte 2: 97; RSSI value

Byte 3: 0; Reserved

Byte 4/5: 16#0008; length specification of the UID. The information has a length of 2 bytes. The length of the UID is always 8 bytes.

Byte 6 … Byte 13: UID of the identified tag

Byte 14/15: 16#0008; length specification for the read-in user memory

Byte 16 … Byte 23: User memory section read

### For example: Read user memory, short-form data format

| Name | Address | Displ... | Monitor value |
|---|---|---|---|
| "ControlByte_In" | %IB0 | Bin | 2#0001_0101 |
| "Length" | %IB1 | DEC | 8 |
| "RSSI" | %IB2 | DEC | 97 |
| "Reserved" | %IB3 | Hex | 16#00 |
| "ReadData_1" | %IB4 | Hex | 16#01 |
| "ReadData_2" | %IB5 | Hex | 16#02 |
| "ReadData_3" | %IB6 | Hex | 16#03 |
| "ReadData_4" | %IB7 | Hex | 16#04 |
| "ReadData_5" | %IB8 | Hex | 16#05 |
| "ReadData_6" | %IB9 | Hex | 16#06 |
| "ReadData_7" | %IB10 | Hex | 16#07 |
| "ReadData_8" | %IB11 | Hex | 16#08 |

Byte 0: 0001 $0101_{bin}$; The "Job active" bit is set to 1 and signals an active read job. The "Read successful" bit is set to 1. A tag is located in the sensing range and the data has been read. In addition, the "Tag present" bit is set because there is at least one tag in the sensing zone.

Byte 1: 8; the byte indicates the length of the transmitted information. This telegram is used to transmit information with a length of 8 bytes. The information starts at byte 4.

Byte 2: 97; RSSI value

Byte 3: 16#00; reserved

Byte 4 … Byte 11: User memory section read

### For example: Write user memory, long form data format

| Name | Address | Displ... | Monitor value |
|---|---|---|---|
| "ControlByte_In" | %IB0 | Bin | 2#0001_0110 |
| "Length" | %IB1 | DEC | 10 |
| "RSSI" | %IB2 | DEC | 98 |
| "Reserved" | %IB3 | DEC | 0 |
| "Length_UID_HighByte" | %IB4 | Hex | 16#00 |
| "Length_UID_LowByte" | %IB5 | Hex | 16#08 |
| "UID_1" | %IB6 | Hex | 16#E0 |
| "UID_2" | %IB7 | Hex | 16#04 |
| "UID_3" | %IB8 | Hex | 16#01 |
| "UID_4" | %IB9 | Hex | 16#50 |
| "UID_5" | %IB10 | Hex | 16#D3 |
| "UID_6" | %IB11 | Hex | 16#23 |
| "UID_7" | %IB12 | Hex | 16#74 |
| "UID_8" | %IB13 | Hex | 16#BA |

Byte 0: 0001 $0110_{bin}$; The "Job active" bit is set to 1 and signals an active write job. The "Write successful" bit is set to 1. A tag is located in the sensing range and the data has been written successfully. In addition, the "Tag present" bit is set because there is at least one tag in the sensing range.

Byte 1: 10; the byte indicates the length of the transmitted information. This telegram is used to transmit information with a length of 10 bytes. The information starts at byte 4.

Byte 2: 98; RSSI value

Byte 3: 0; Reserved

Byte 4/5:16#0008; length specification of the UID. The information has a length of 2 bytes. The length of the UID is always 8 bytes.

Byte 6 … Byte 13: UID of the tag to which the data was written.

**For example: Write user memory, short-form data format**

| Name | Address | Displ... | Monitor value |
|---|---|---|---|
| "ControlByte_In" | %IB0 | Bin | 2#0001_0110 |
| "Length" | %IB1 | DEC | 08 |
| "RSSI" | %IB2 | DEC | 98 |
| "Reserved" | %IB3 | DEC | 0 |
| "UID_1" | %IB4 | Hex | 16#E0 |
| "UID_2" | %IB5 | Hex | 16#04 |
| "UID_3" | %IB6 | Hex | 16#01 |
| "UID_4" | %IB7 | Hex | 16#50 |
| "UID_5" | %IB8 | Hex | 16#D3 |
| "UID_6" | %IB9 | Hex | 16#23 |
| "UID_7" | %IB10 | Hex | 16#74 |
| "UID_8" | %IB11 | Hex | 16#BA |

Byte 0: 0001 $0110_{bin}$; The "Job active" bit is set to 1 and signals an active write job. The "Write successful" bit is set to 1. A tag is located in the sensing range and the data has been written successfully. In addition, the "Tag present" bit is set because there is at least one tag in the sensing zone.

Byte 1: 8; the byte indicates the length of the transmitted information. This telegram is used to transmit information with a length of 8 bytes. The information starts at byte 4.

Byte 2: 98; RSSI value

Byte 3: 0; Reserved

Byte 4 … Byte 11: UID of the tag to which the data was written.

## 7.2.3 Flowcharts

### Read Job Without Autostart Function

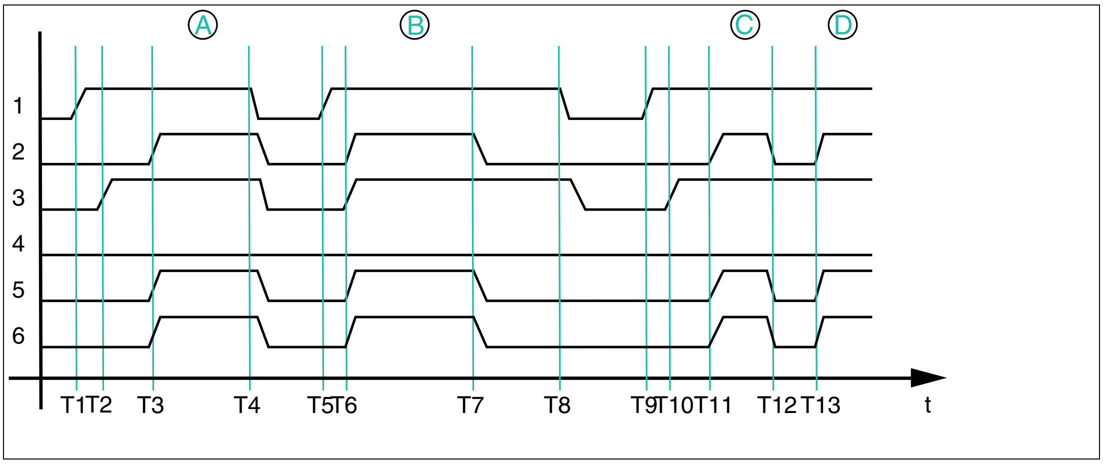


Figure 7.1 Timing sequence of bits in byte 0

**1** Start read

**2** Read successful

**3** Job active

**4** Error

**5** Tag present

**6** Data (input)

If the auto-start function is not used, the read job is started with the "Start read" bit. The read job is performed until the "Start read" bit is reset to FALSE.

T1: Start of the read job by setting the "Start read" bit to TRUE

T2: The read job is executed and indicated by the "Job active" bit ("Job active" = TRUE)

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T3: Tag A enters the sensing range; "Read successful" and "Tag present" are set to TRUE and the read data is located in the input field of the process data

T4: Read job is canceled by resetting the "Start read" bit to FALSE while the tag is located in the sensing range; the "Job active" bit, the "Read successful" bit and the "Tag present" are set to FALSE and the process data is filled with 0x00

T5: Start of the read job by setting the "Start read" bit to TRUE; at the time of the start, a tag B is already located in the sensing range

T6: Read job is being executed ("Job active" = TRUE) and the data is read successfully ("Read successful" and "Tag present" = TRUE); the read data is located in the input field of the process data

T7: Tag leaves the sensing range ("Read successful" and "Tag present" = FALSE); the area of the input field with the read process data is set to the value 0x00

T8: Cancellation of the read job ("Start read" = FALSE); the "Job active" bit is reset

T9: Start of the read job by setting the "Start read" bit to TRUE; at the time of the start, no tag is located in the sensing range; read job remains permanently active

T10: The read job is executed ("Job active" = TRUE).

T11: Tag C enters the sensing range and the data is read ("Read successful" and "Tag present" = TRUE); read data is located in the input field of the process data

T12: Tag C leaves the sensing range ("Read successful" and "Tag present" = FALSE)

T13: Tag D enters the sensing range

## Read Job With Autostart Function

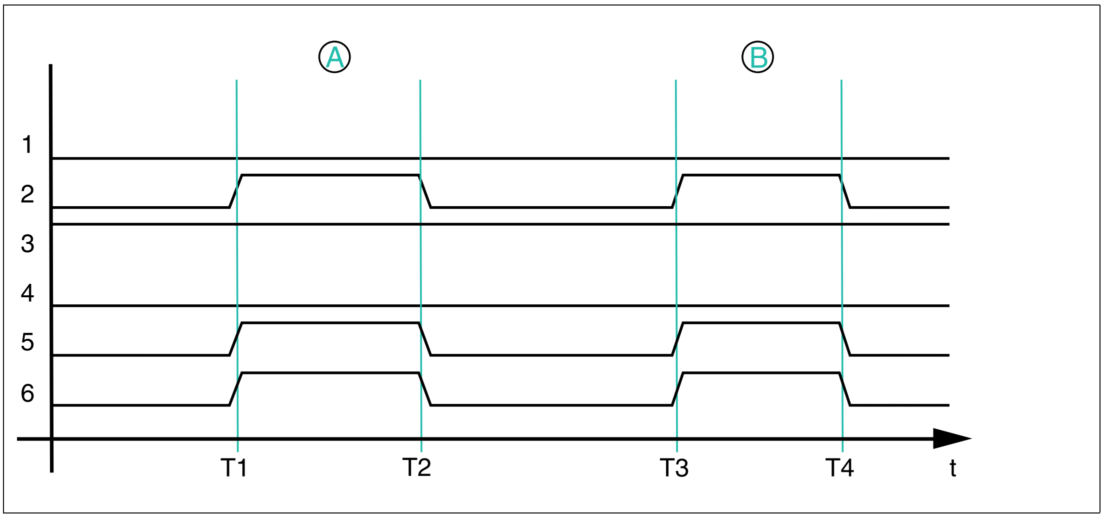



Figure 7.2 Timing sequence of bits in byte 0

**1** Start read
**2** Read successful
**3** Job active
**4** Error
**5** Tag present
**6** Data (input)

With the autostart function, read access is performed continuously, and the "Job active" bit of the input process data is set continuously.

T1: Tag A enters the sensing range; "Read successful" and "Tag present" are set to TRUE and the read data is located in the input field of the process data

T2: Tag A leaves the sensing range; "Read successful" and "Tag present" are reset to FALSE; the area with the previously read data is filled with 0x00

T3: Tag B enters the sensing range; behavior same as T1

T4: Tag B leaves the sensing range; behavior same as T2

## Write Job

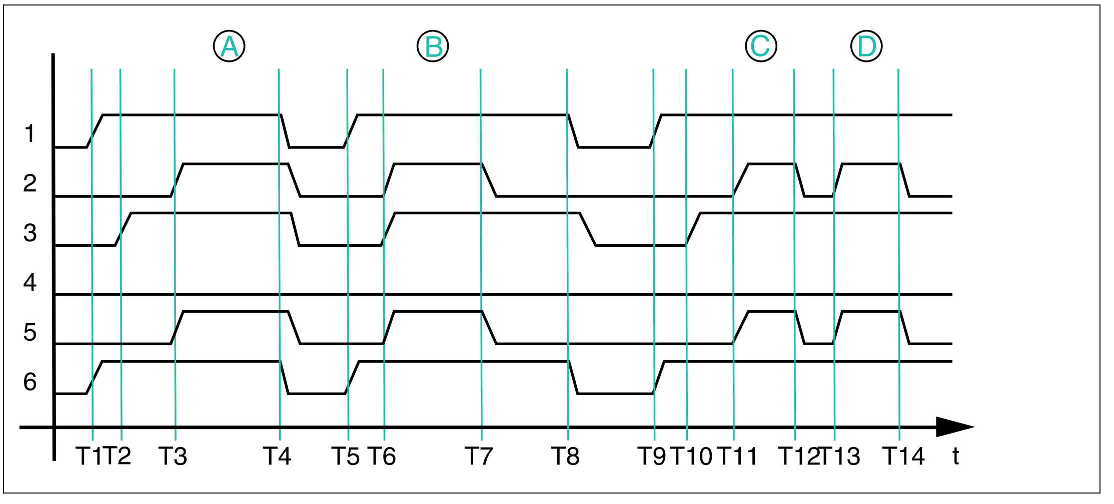



Figure 7.3 Timing sequence of bits in byte 0

**1** Start write

**2** Write successful

**3** Job active

**4** Error

**5** Tag present

**6** Data (input)

Execution of a write job cannot be performed via the autostart function. To start a write job, set the "Start write" bit to TRUE.

T1: Start of the write job by setting the "Start write" bit to TRUE; at the same time, the user data to be written to the tag must be transferred to the output field of the process data.

T2: Write job is active ("Job active" = TRUE), and no tag is located in the sensing range ("Write successful" = FALSE)

T3: Tag A enters the sensing range and the data is written successfully ("Write successful" and "Tag present" = TRUE)

T4: The write job is canceled by resetting the "Start write" bit to FALSE; the "Job active," "Write successful" and "Tag present" bits are reset to FALSE and the usable data is reset by the user to the value 0x00

T5: The write job is started by setting the "Start write" bit to TRUE and at the same time transferring the data to be written to the output field of the process data; at the time of the start, tag B is located in the sensing range

T6: The write job is active ("Job active" = TRUE) and tag B is described successfully ("Write successful" and "Tag present" = TRUE)

T7: Tag B leaves the sensing range ("Write successful" and "Tag present" = FALSE); the write job remains active ("Job active" = TRUE)

T8: The write job is canceled by resetting the "Start write" bit to FALSE; the "Job active," "Write successful" and "Tag present" bits are reset to FALSE and the usable data is reset by the user to the value 0x00

T9: Start of write job by setting the "Start write" bit to TRUE; at the same time, the user data to be written to the tag is transferred to the output field of the process data.

T10: Write job is active ("Job active" = TRUE), and no tag is located in the sensing range ("Write successful" = FALSE)

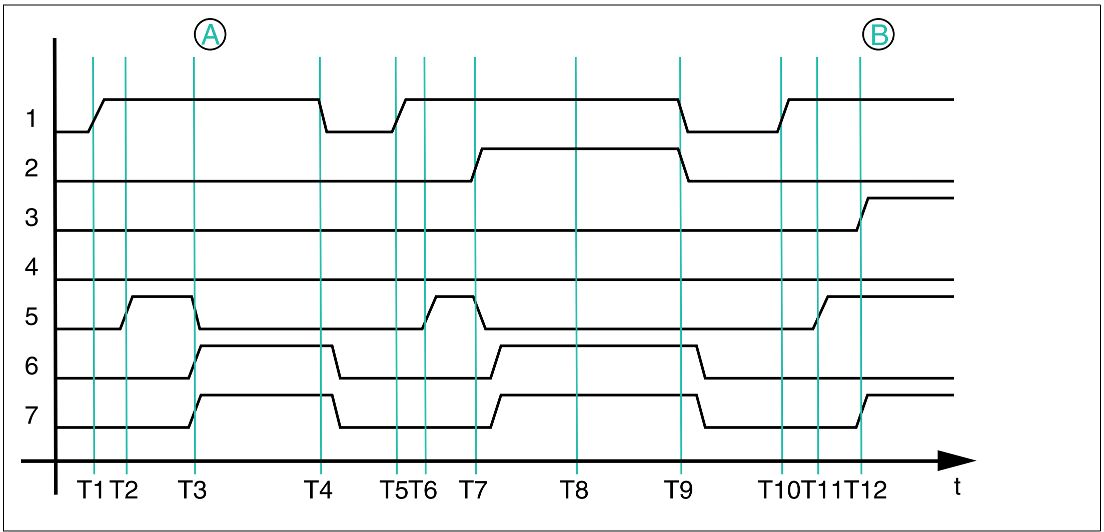
T11: Tag C enters the sensing range and the data is successfully written ("Write successful" and "Tag present" = TRUE); write job is still active ("Job active" = TRUE)

T12: Tag C leaves the sensing range ("Write successful" and "Tag present" = FALSE); write job is still active ("Job active" = TRUE)

T13: Tag D enters the sensing range and the data is successfully written ("Write successful" and "Tag present" = TRUE); write job is still active ("Job active" = TRUE)

T14: Tag D leaves the sensing zone ("Read successful" and "Tag present" = FALSE)

## Fault State




**1** Start read
**2** Start write
**3** Read successful
**4** Write successful
**5** Job active
**6** Error
**7** Data (input)

If an error occurs during execution of a read or write job, this condition is signaled by the "Error" bit. At the same time. an error message is transmitted in the input process data.

T1: Start of the read job by setting the "Start read" bit to TRUE

T2: The read job is active and is being executed ("Job active" = TRUE).

T3: Tag A with 4 bytes of memory enters the sensing range and the "Error" bit is set to TRUE. The "Job active" bit is reset to FALSE and at the same time the error code 0x04 and the text "invalid command" are entered in the input process data. This indicates that the read job set by the IODD file is not suitable for the properties of the tag. The cause is the number of bytes to be read. A maximum of 4 bytes can be read to access the tag. In this example, the value is set to 8. To rectify the error, correct the value in the IODD file.

T4: The read job is canceled by resetting the "Start read" bit to FALSE; at the same time, the "Error" bit is reset to FALSE and the error message in the input data is deleted

T5: Start of a new read job by setting the "Start read" bit to TRUE

T6: The read job is active and is being executed ("Job active" = TRUE).

T7: In addition, a write job is started by setting the "Start write" bit to TRUE. The "Error" bit is set and "Job active" is reset to FALSE. An error message with the error code 0x04 and the text "read AND write set" is transmitted to the input field of the process data. This indicates that a read and a write job were triggered simultaneously. This is not permitted for the device.

T8: The fault state remains active ("Error" = TRUE), because the "Start read" and "Start write" bits are set

T9: The "Start read" and "Start write" bits are reset to FALSE; at the same time, the "Error" bit is reset to FALSE and the error message is deleted in the input data

T10: Start of the read job by setting the "Start read" bit to TRUE

T11: The read job is active and is being executed ("Job active" = TRUE).

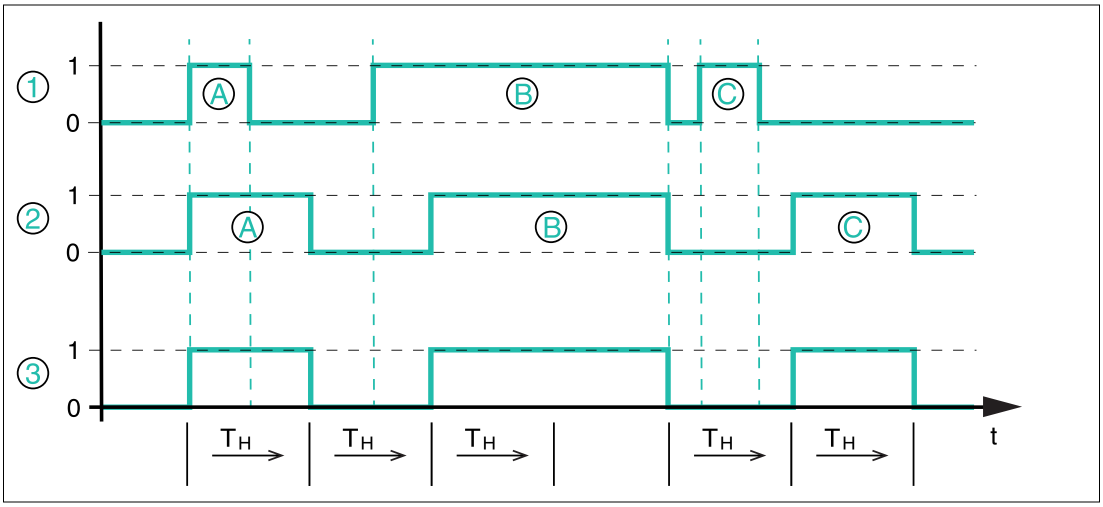
T12: A tag B enters the sensing range and is read successfully ("Read successful" = TRUE)

## 7.2.4 Timing

The device does not use the complex handshake procedure for data transmission in Easy Mode. The telegrams are set in the input process data and remain there for a defined hold time. The device cannot change the input process data within this hold time.

The hold time is ten times the set cycle time. The hold time is at least 40 ms long because the shortest possible cycle time is 4 ms.

The device can generate a new telegram within the hold time if a new tag is read or a tag leaves the sensing range. This telegram is only set in the input process data after the 40 ms have elapsed. If no new telegram occurs within the hold time, the input process data remains unchanged.




**1** Tag in the field

**2** Data

**3** Read successful

The diagram shows the fundamental chronological sequence of the data transmission depending on the presence of a tag within the device's sensing range.

"$T_H$" corresponds to the minimum hold time of the device of 40 ms.

The device is activated via the auto-start function or the "Start read" bit. The device executes a read job permanently.

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At the beginning, tag A enters the sensing range of the device and the "Read successful" bit in the input process data changes the signal state to "TRUE" (1). The dwell time of the tag in the sensing range is less than 40 ms, and it leaves shortly after entering. The input process data containing information about tag A is retained for the time "$T_H$" (= 40 ms). The input process data is only updated again once this time span has expired. It contains the information "Read successful" = FALSE (no tag) and indicates that the tag has left the sensing range. This telegram remains in the input process data for the hold time of "$T_H$."

Tag B enters the sensing range before the hold time of the previous telegram has elapsed. The input process data is only updated once the hold time of 40 ms has expired, and the "Read successful" bit then changes to "TRUE." The read-in data is simultaneously set in the input process data. Tag B has a dwell time of more than 40 ms (> "$T_H$") in the device's sensing range. During this time span, the input process data remains unchanged and the "Read successful" bit continues to have the signal state "TRUE."

Tag B leaves the sensing range and the signal state of the "Read successful" bit changes from 1 to 0 in the input process data. Before the hold time "$T_H$" has elapsed, tag C enters the sensing range. The input process data remains unchanged during the hold time span. It changes the signal state of "Read successful" to "TRUE" once "$T_H$" expires. This signals the presence of tag C, and the read data of this tag is transmitted.

Tag C leaves the sensing range before the hold time "$T_H$" has elapsed. Once the hold time of the previous information has expired (tag B has left the sensing range), the input process data is modified accordingly. The signal state of "Read successful" changes to "TRUE."

## 7.2.5 Interruption of IO-Link Communication

If IO-Link communication is interrupted, the device continues to operate normally. If a read job is active at the time of cancellation, the received data is stored in the device. When the device communicates via IO-Link again, this data is transferred to the IO-Link master.

**Note**

The device cache is designed for small amounts of data to compensate for short interruptions. Data may be lost if IO-Link communication is interrupted for a long time.

## 7.3 Easy Mode with PACTware

You can commission the RFID read/write device using the IO-Link master "IO-Link-Master02-USB."

### Commissioning with PACTware

**Note**

Use PACTware version 5.0 software to operate the system.

You can use the "IODD Interpreter DTM" software to integrate the IODD files into the PACTware on a PC.

You can find the software, the IODD file and the driver on the Pepperl+Fuchs homepage.

1. Connect the RFID read/write device to the IO-Link master.
2. Connect the IO-Link master to a power supply.
3. Connect the IO-Link master to a PC using a USB cable.
4. Install the two software packages on your PC.
5. Install the **IO-Link USB Master DTM 2.0** driver.
6. Import the IODD file for the RFID read/write device with the **IODD DTM Configurator** program.

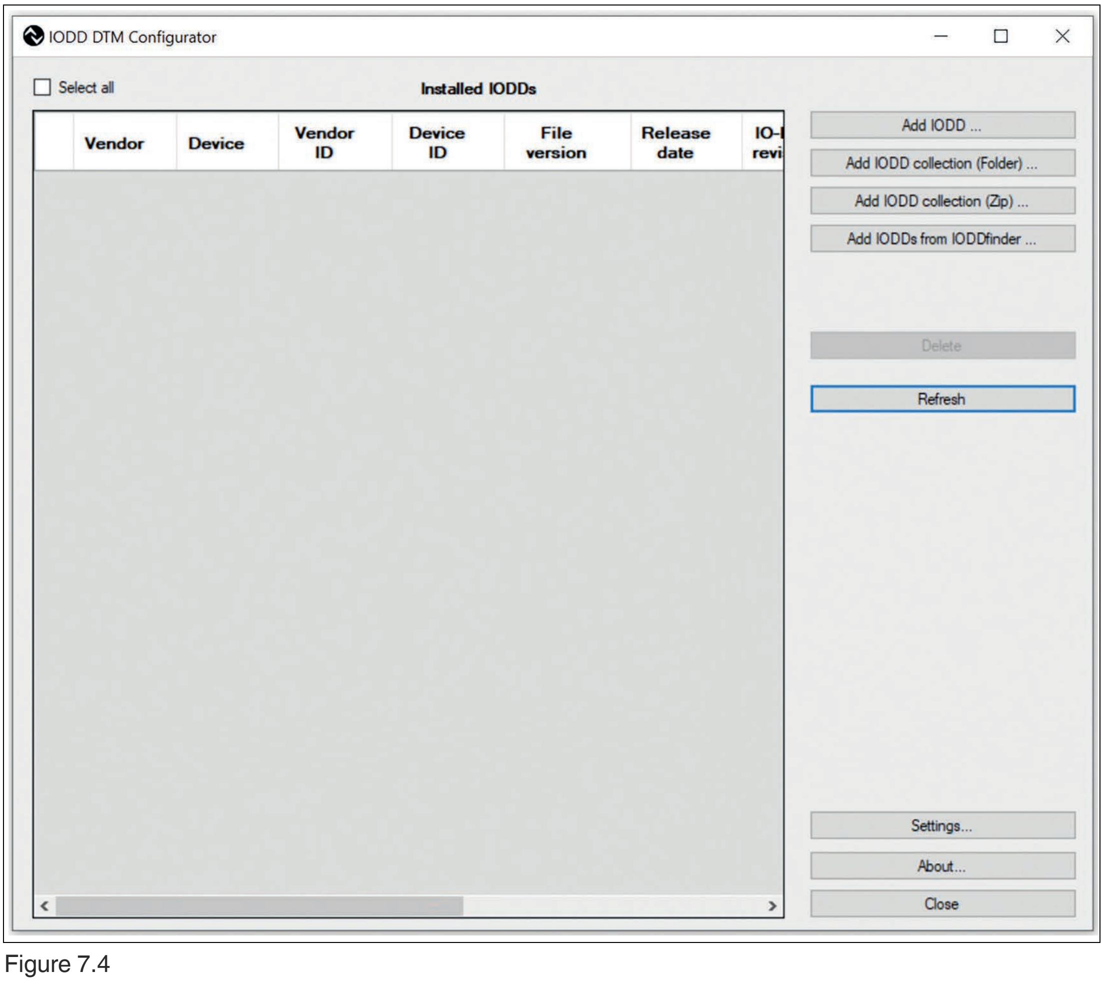


Figure 7.4

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7. You can add IODDs using the IODDfinder in several ways:
   - "Add IODD" adds a single IODD.
   - "Add IODD Collection (Folder)" adds an entire folder that can contain multiple IODDs.
   - "Add IODD Collection (*.zip)" adds an archived folder that can contain multiple IODDs.[1]
   - "Add IODD from IODDfinder" allows full access to the IODDfinder database ioddfinder.io-link.com.
8. You can use the filter mask to narrow down the manufacturer and device. Enter "Pepperl+Fuchs" as the manufacturer and "IQT3-FP-IO-V1" as the device.
9. Select the required IODD file version of the device (highlighted in blue)
10. Click "Add selected IODD."

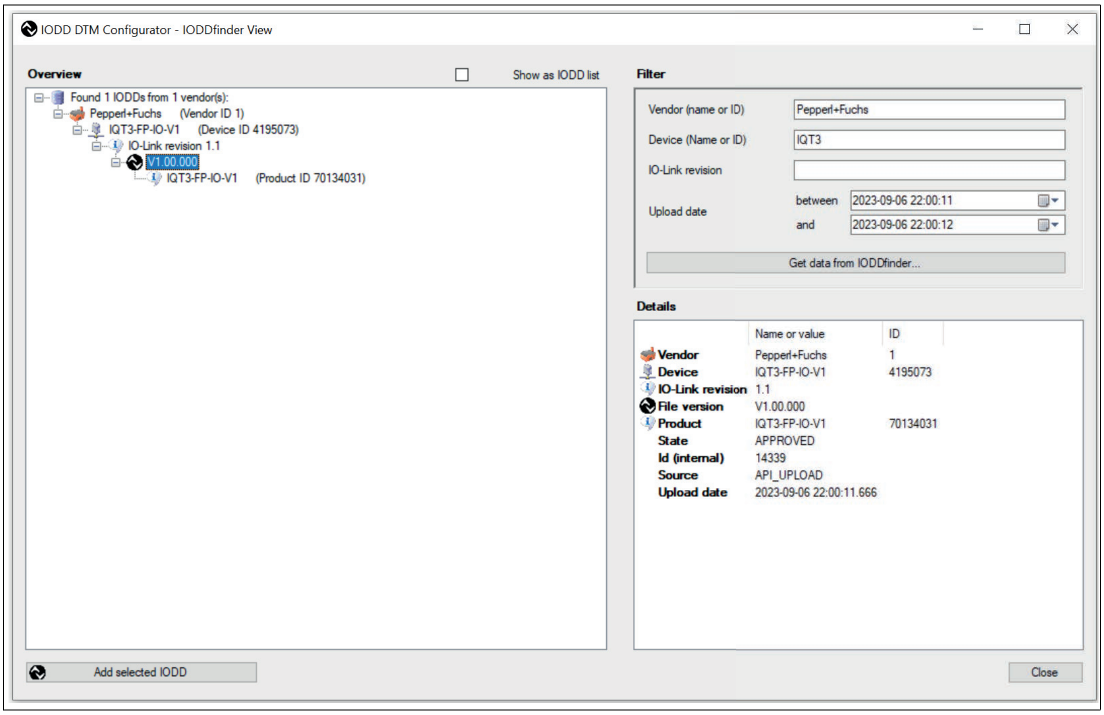



Figure 7.5

↳ Successfully added IODDs appear in "Installed IODDs."

1. For example IODD download from the Pepperl+Fuchs homepage

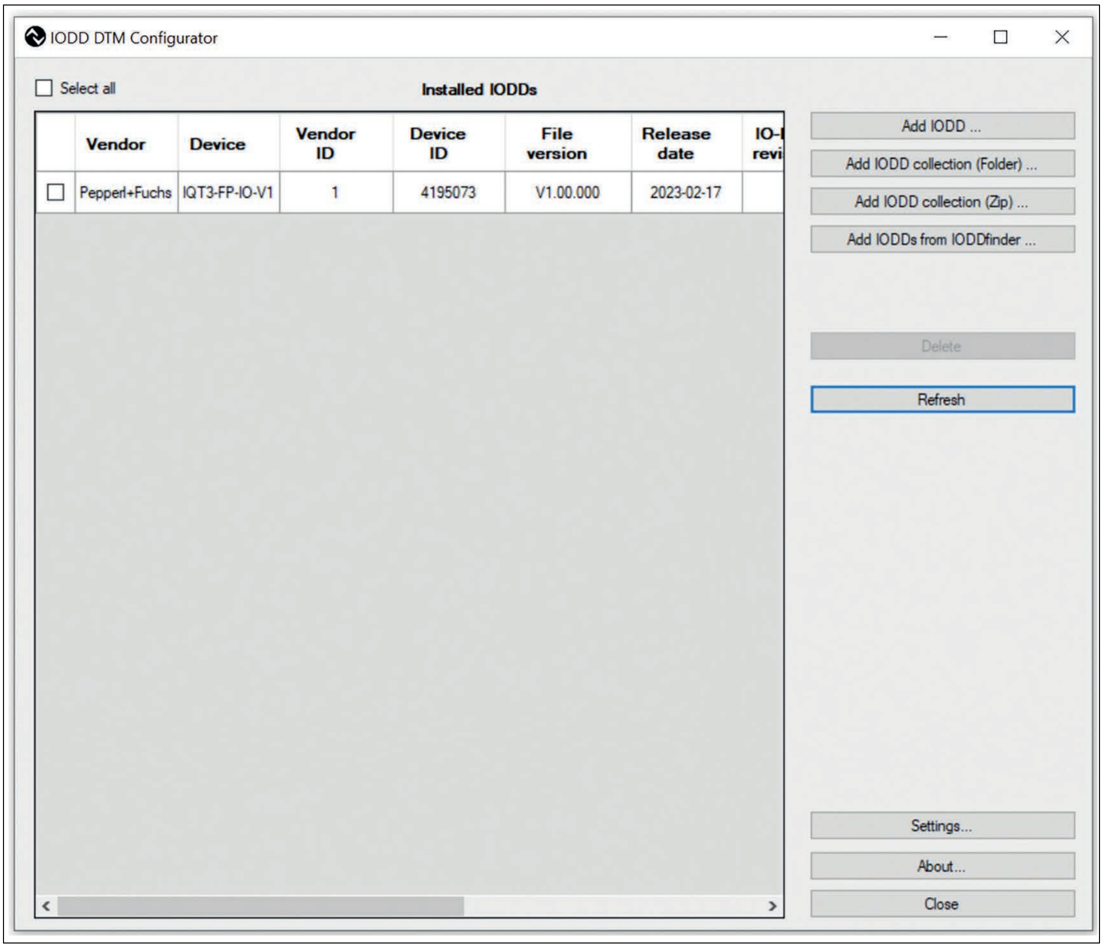



Figure 7.6

↳ Close the **IODD DTM Configurator** program.

11. Start PACTware.
12. Right-click on the "HOST PC."
13. Select the "Add device" menu item.

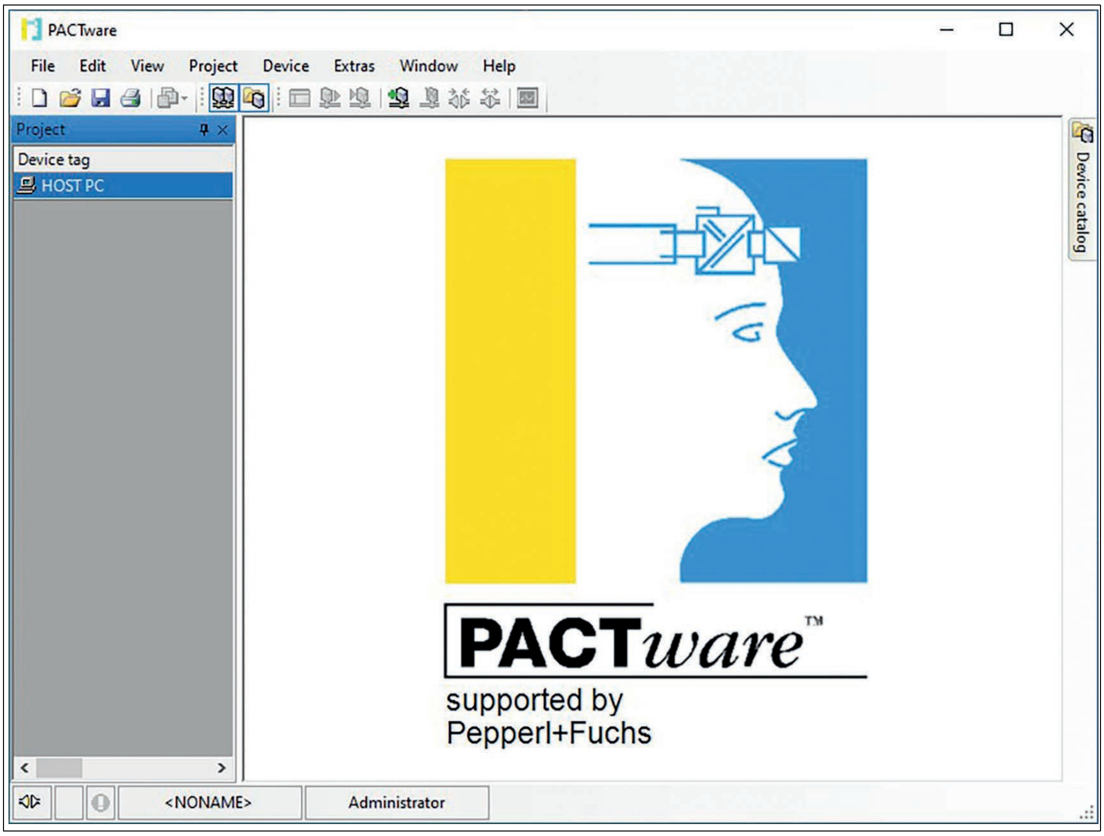



Figure 7.7

↳ The "Device for" window opens.

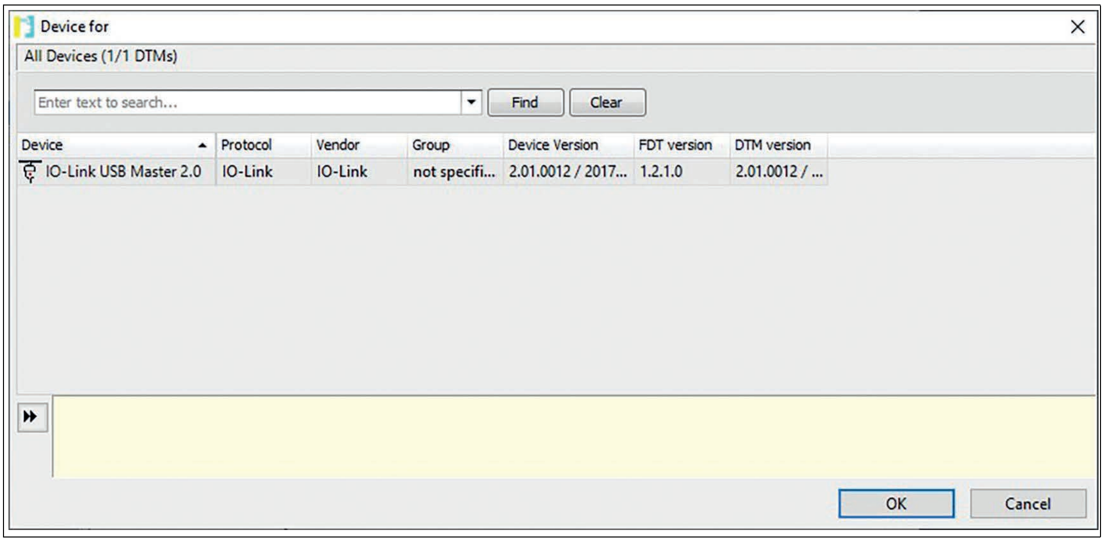



Figure 7.8

14. Select IO-Link USB Master 2.0.

**Note**

If you are using a different IO-Link master, select it.

15. Confirm with "OK."

↳ The IO-Link master appears in the menu on the left under your project.

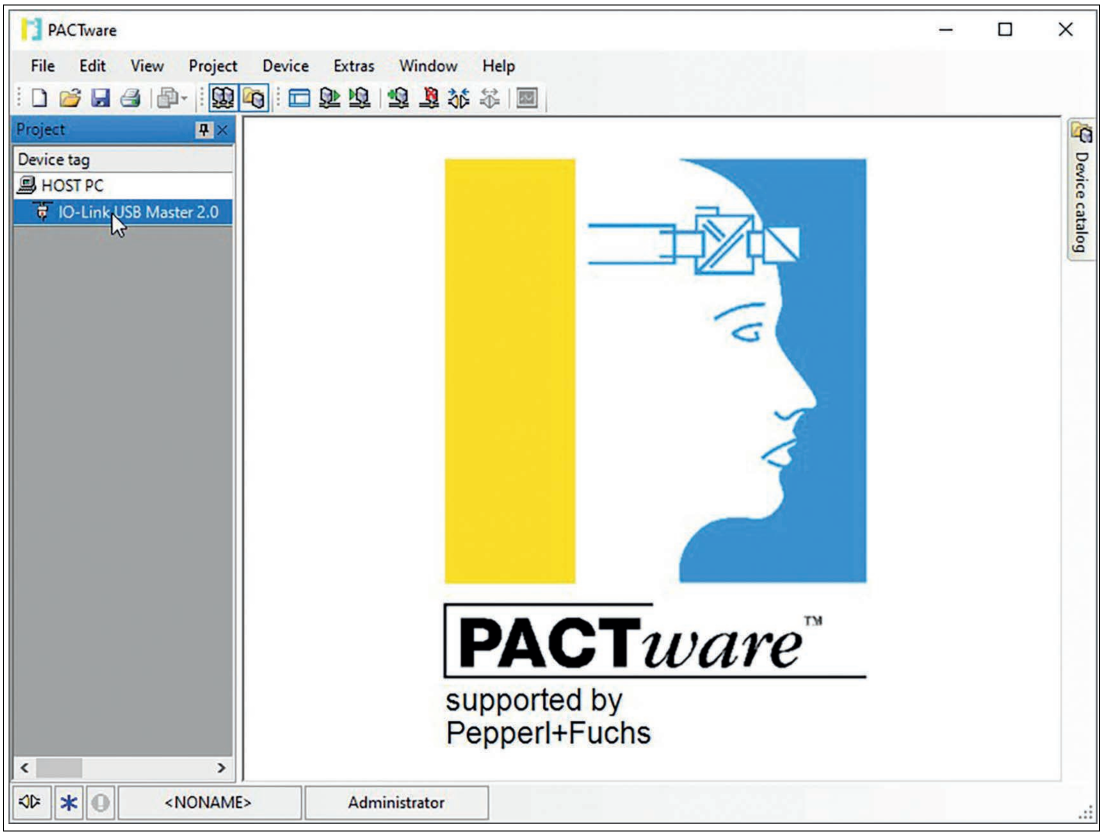



Figure 7.9

16. Right-click on the IO-Link master.

17. Select the "Add device" menu item.

↳ The "Device for" window opens.

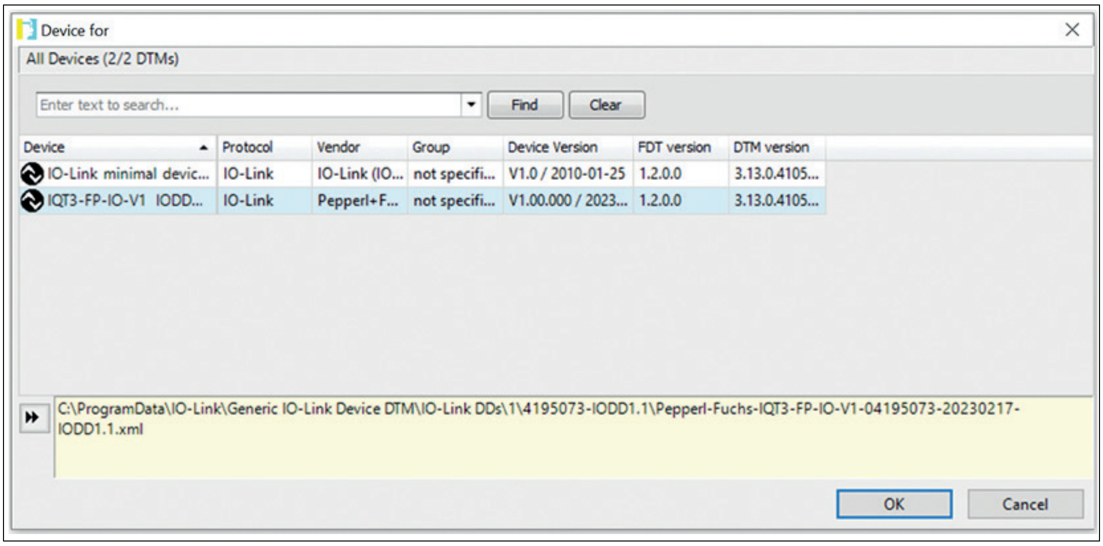



Figure 7.10

18. Select the required RFID read/write device.

19. Confirm with "OK."

20. Double-click the IO-Link device.

↳ The Parameters menu opens.

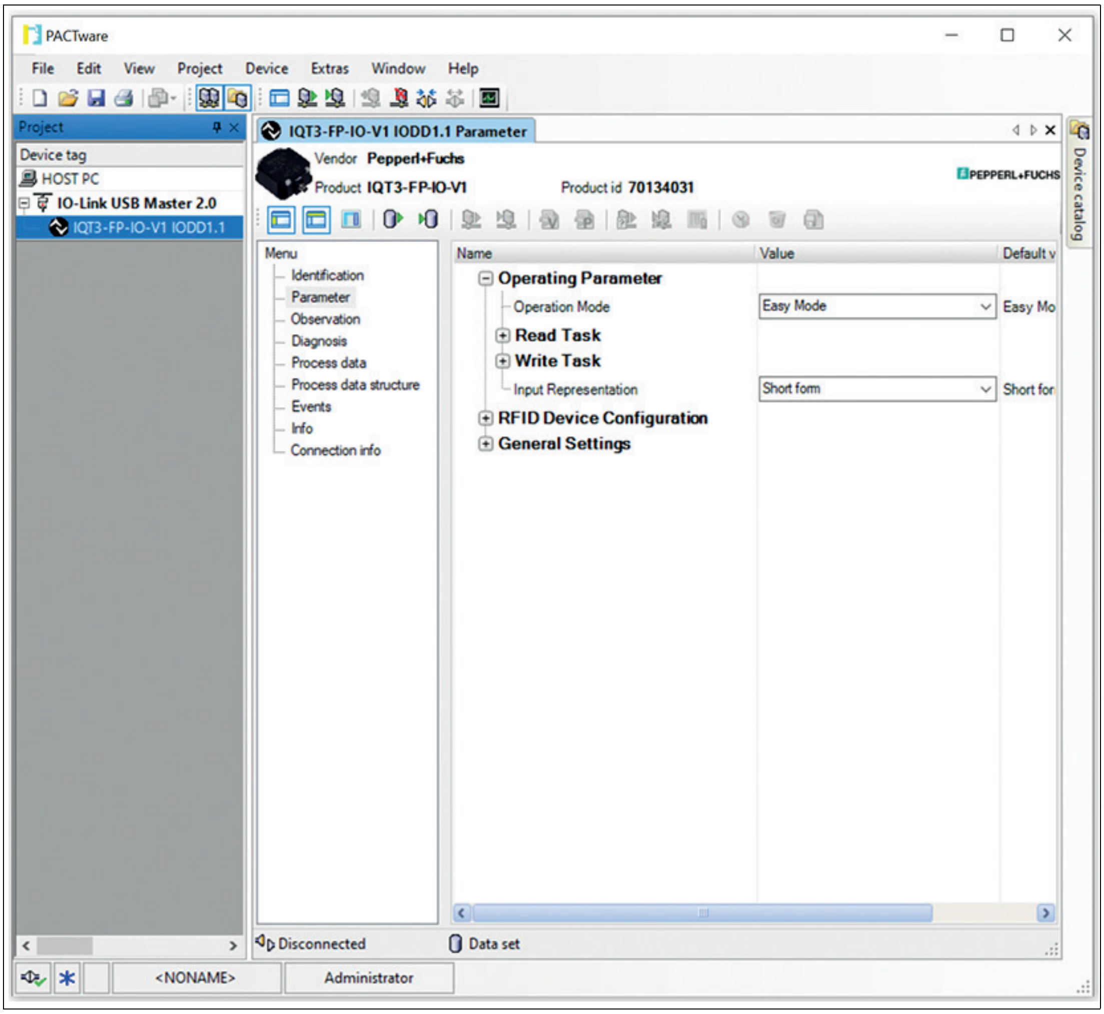



Figure 7.11

21. Right-click on the RFID read/write device and select the menu item "Connect."

22. Acknowledge the "Read from Device (Upload)?" dialog with "Yes."

↳ The parameter values displayed in PACTware are transferred to the device.

↳ A connection is established between the IO-Link master and the device.

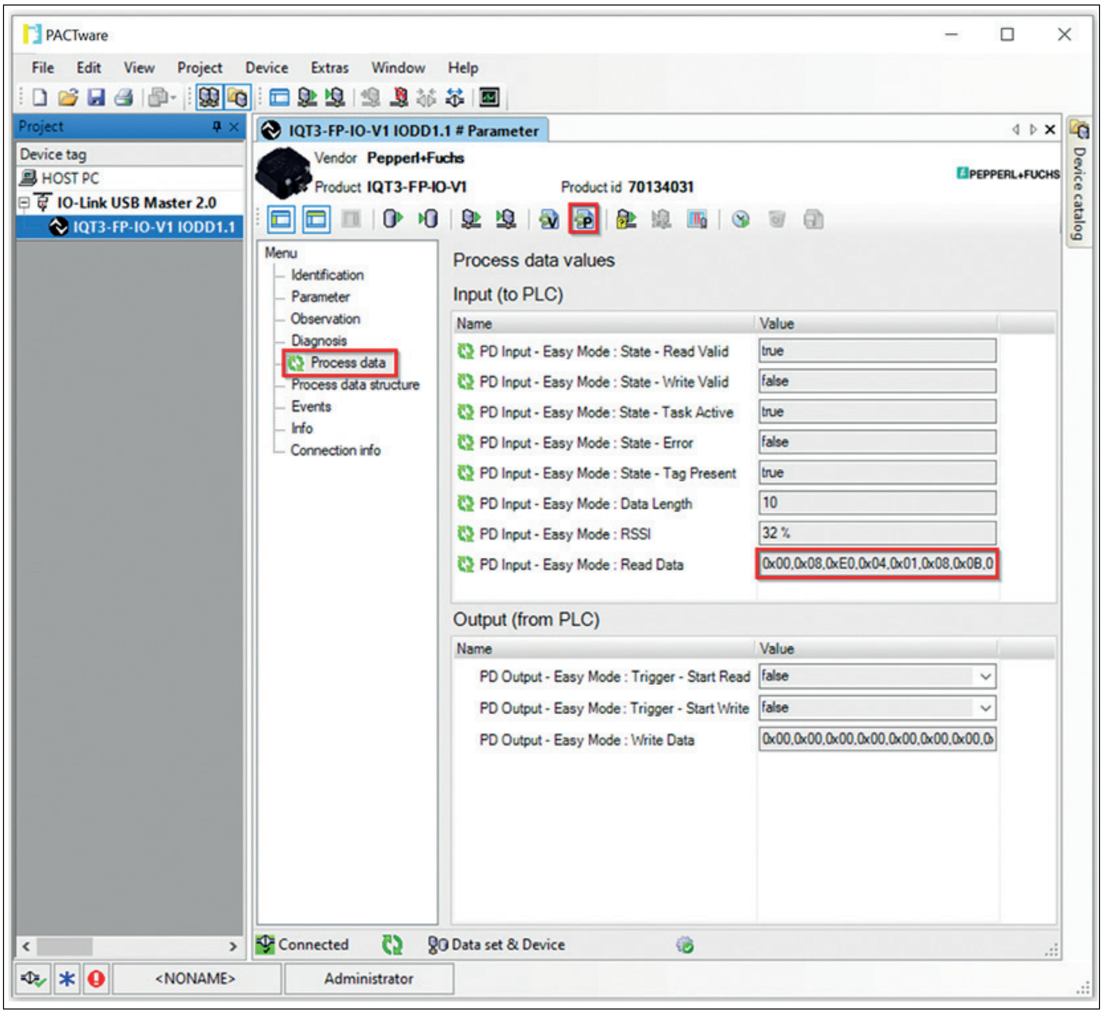



Figure 7.12

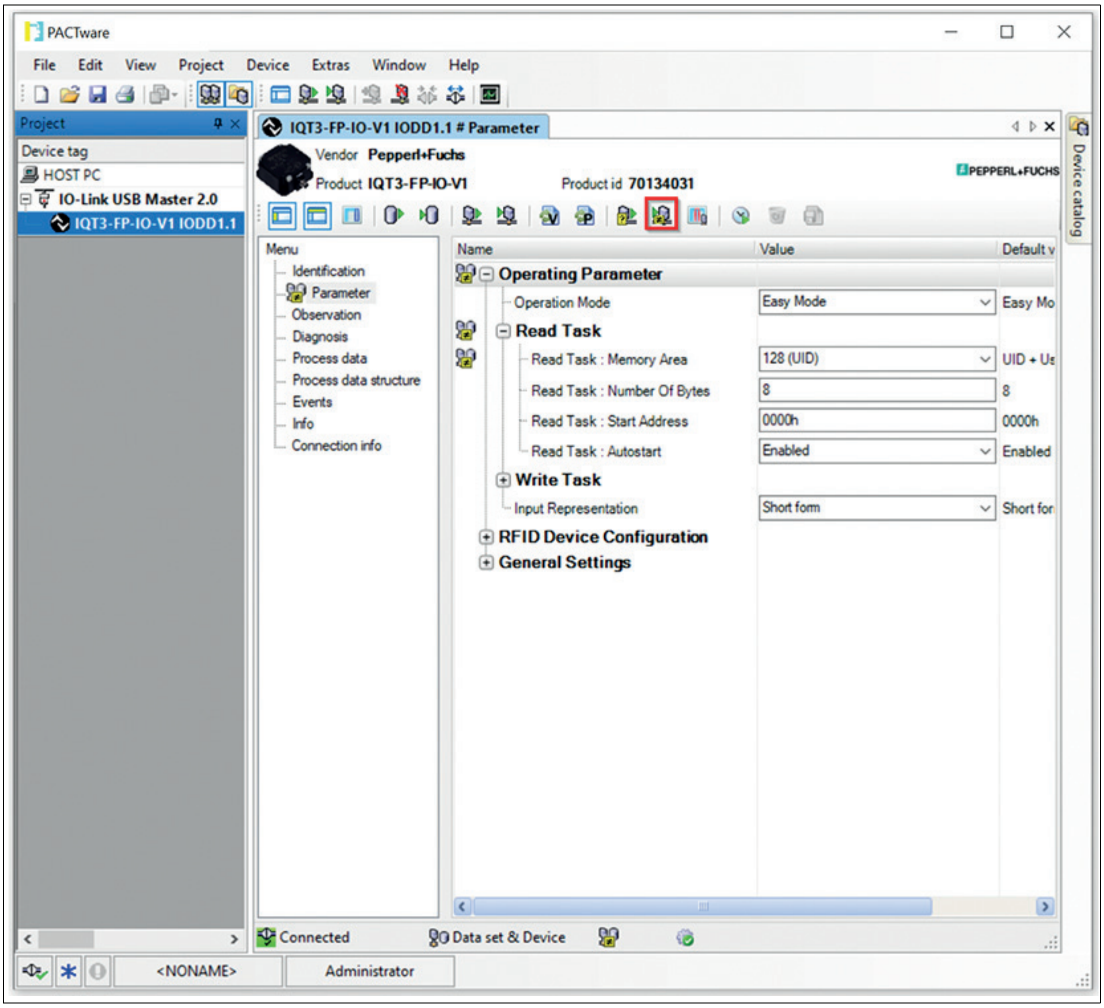
**Tip**

Activate the cyclic updating of the process data to display the data in PACTware.

As soon as a connection is established, the RFID read/write device automatically starts reading tags in the sensing range. The data is displayed in the input process data as per the set parameters under "Read Task."

1. Adjust the parameters of the device according to your application.
2. In the device selection menu, click on the Parameters entry.

   ↳ The Parameters menu opens.
3. Change the desired parameters and confirm the entry with the Enter key. Then click the "Write different values to device" icon.


PACTware
File Edit View Project Device Extras Window Help
Project
Device tag
HOST PC
IO-Link USB Master 2.0
IQT3-FP-IO-V1 IODD1.1
IQT3-FP-IO-V1 IODD1.1 # Parameter
Vendor Pepperl+Fuchs
Product IQT3-FP-IO-V1
Product id 70134031
Menu
Identification
Parameter
Observation
Diagnosis
Process data
Process data structure
Events
Info
Connection info
Name
Value
Default v
Operating Parameter
Operation Mode
Easy Mode
Read Task
Read Task : Memory Area
128 (UID)
Read Task : Number Of Bytes
8
Read Task : Start Address
0000h
Read Task : Autostart
Enabled
Write Task
Input Representation
Short form
RFID Device Configuration
General Settings
Connected
Data set & Device
<NONAME>
Administrator
Device catalog
Figure 7.13

# 8 ExpertMode

## 8.1 Basic Command Process

As in Easy Mode, the length of the input and output process data is 32 bytes, see chapter 7. The commands are first combined to form a telegram. This telegram can be significantly longer than the set in/out length. The telegram is transmitted one after another using individual fragments. The maximum size of a fragment is 32 bytes. A handshake procedure controls the data transfer.

## 8.2 Legend

| Name | Length | Meaning |
|---|---|---|
| <Number of Tags> | 4 bytes | The number of tags identified when a single read or write command is executed. The number of tags is encoded in ASCII format |
| <ByteAddress> | 2 bytes | Start address for read/write access to the user memory of the tag. The value must be a multiple of 4. |
| <Command> | 1 byte | Command code<br>Identifier of the command to be executed |
| <ControlByte> | 4 bits | Control bits for implementing the handshake procedure or deleting the device memory |
| <FragmentationCounter> | 1 byte | Fragmentation counter<br>Number of fragments still to be transmitted |
| <FrameLength> | 12 bits | Number of valid bytes within the telegram |
| <Length User Data> | 2 bytes | Length of user data<br>Specifies the length of the data read in from the user memory bank |
| <LengthParameter> | 2 bytes | Parameter length<br>Specifies the length of the parameter data set to be transmitted to the device. |
| <Number of Bytes> | 2 bytes | Number of bytes to be accessed during execution of a read or write command. The value must be a multiple of 4. |
| <ParameterData> | Variable length | Parameter data<br>Parameter data set that was read or transmitted. |
| <ParameterName> | 2 bytes | Device parameter name<br>The device parameter name determines the HF parameter to be accessed. |
| <Status> | 1 byte | Status byte<br>Status information about the execution state of the command. |
| <SystemCode> | 1 byte | System identifier<br>The system identifier for the HF system is "Q" (16#51). |
| <TelegramLength> | 2 bytes | Length of telegram including all fragments |
| <UID> | 8 bytes | Unique Identifier<br>Unique serial number of a tag |
| <User Data> | Variable length | Read-in data<br>Data read in during read access to the user memory bank |
| <Write Data> | Variable length | Write data<br>Data set to be transmitted to the tag. |

## 8.3 Structure of OUTPUT telegram

### OUTPUT Telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | <FrameLength> | | | |
| 1 | Frame length | <Frame Length> | | | | | | | |
| 2 | Fragmentation counter | <Fragmentation Counter> | | | | | | | |
| 3 | Telegram length (high byte)[1] | <Telegram Length (High Byte)> | | | | | | | |
| 4 | Telegram length (low byte)[1]<Default ¬[1] Font> | <Telegram Length (Low Byte)> | | | | | | | |
| 5 | Command[1]<Default ¬[1] Font> | <Command> | | | | | | | |
| 6 | Parameter/data | <Data Byte 1> | | | | | | | |
| 7 | Parameter/data | <Data Byte 2> | | | | | | | |
| 8 | Parameter/data | ... | | | | | | | |
| ... | Parameter/data | <Data Byte X> | | | | | | | |
| ... | Parameter/data | 16#00 | | | | | | | |
| ... | Parameter/data | ... | | | | | | | |
| 31 | Parameter/data | 16#00 | | | | | | | |

Table 8.1

1. As from the second fragment, parameters/data are transferred from byte 3 onwards.

The value of <Frame Length> depends on how many <Data Byte> data values must be transmitted to execute a command. It defines the length of the fragment up to and including <Data Byte X>. If no additional command parameters are required to execute the command, the length of the fragment extends up to <Command> and has the value 16#06.

The <Fragmentation Counter> has the value 16#00, since the command can be transmitted in a single fragment by the controller.

The <Telegram Length> specifies the length of the telegram starting from the <Telegram Length> field itself and including <Data Byte X>. If no additional command parameters are transmitted, the telegram ends at <Command>, and <Telegram Length> has the value 16#03.

The <Command> byte defines the command to be executed. Different commands are executed depending on the value of <Command>. The following classes of commands are available:

- **Read/write commands:** Access to one or more tags in the sensing zone
- **System commands:** Execution of device settings; no access to tags
- **HF configuration commands:** Setting of the device HF properties

The <Data Byte> fields are used to transmit the data required for execution of a command. This may include additional command parameters (e.g., start address) or user data to be written to a tag.

Unused areas within the telegram frame are set to the value 16#00.

## 8.4 Structure of INPUT telegram

**INPUT Telegram**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| 0 | Control Byte / Frame Length | $D_S$ | $U_M$ | $U_D$ | 0 | <FrameLength> | | | |
| 1 | Frame length | <Frame Length> | | | | | | | |
| 2 | Fragmentation counter | <Fragmentation Counter> | | | | | | | |
| 3 | Telegram length (high byte)[1] | <Telegram Length (High Byte)> | | | | | | | |
| 4 | Telegram length (low byte)[1]<Default ¬[1] Font> | <Telegram Length (Low Byte)> | | | | | | | |
| 5 | Command[1]<Default ¬[1] Font> | <Command> | | | | | | | |
| 6 | Status | <Status> | | | | | | | |
| 7 | Parameter/data | <Data Byte 1> | | | | | | | |
| 8 | Parameter/data | <Data Byte 2> | | | | | | | |
| ... | Parameter/data | ... | | | | | | | |
| ... | Parameter/data | <Data Byte X> | | | | | | | |
| ... | Parameter/data | 0x00 | | | | | | | |
| ... | Parameter/data | ... | | | | | | | |
| 31 | Parameter/data | 0x00 | | | | | | | |

Table 8.2

1. As from the second fragment, parameters/data are transferred from byte 3 onwards.

The value of <Frame Length> depends on how many <Data Byte> data values are returned by the device in the command response. It specifies the length of the fragment up to and including <Data Byte X>. If no additional data values are included in the command response, the fragment length extends up to <Status> and has the value 16#07.

Since the command response can be transmitted in a single fragment by the controller, the <Fragmentation Counter> has the value 16#00.

The <Telegram Length> specifies the length of the telegram starting from the <Telegram Length> field itself and including <Data Byte X>. If no additional response parameters are transmitted, the telegram ends at <Status>, and <Telegram Length> has the value 16#04.

The <Command> byte is a mirror of the command code from the command in the response.

The value of <Status> indicates the command execution status. Error states are indicated by corresponding status values. .

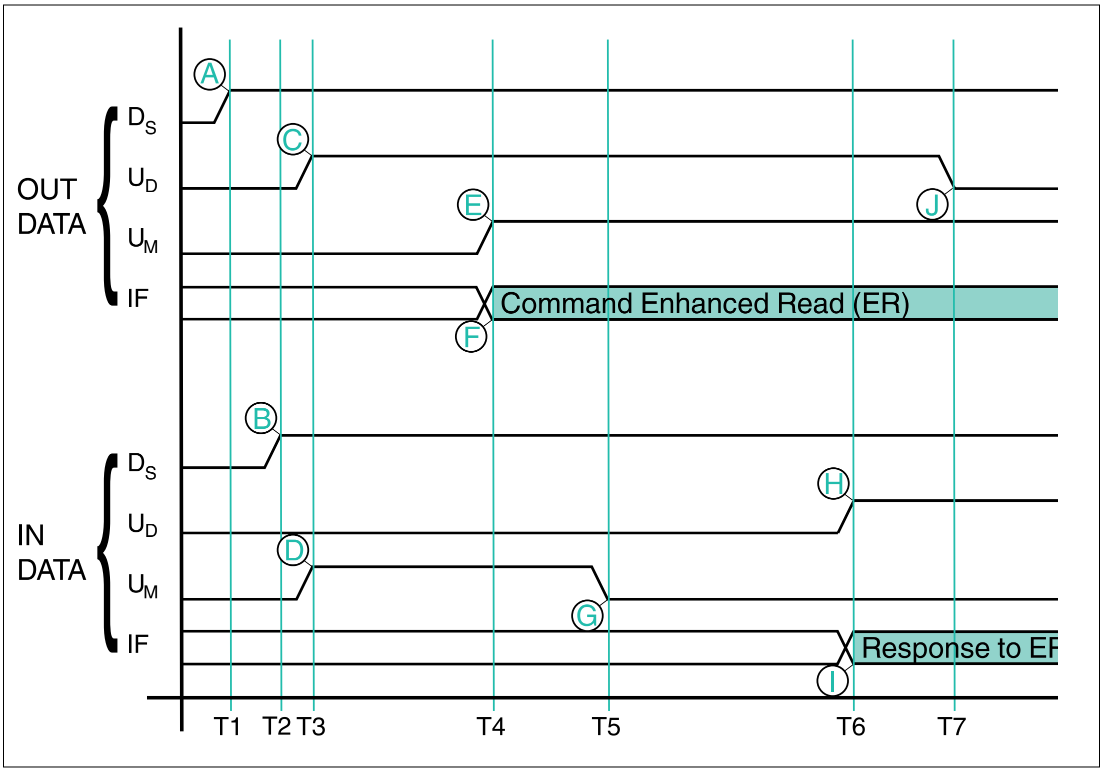
The <Data Byte> bytes contain the data returned by the device in response to the command. This could be data read from a tag or parameter values for the HF settings.

Unused areas within the response telegram are set to 16#00.

## 8.5 Handshake Procedure

Data flow between a PLC and the read/write device must be synchronized to ensure continuous data transfer with no losses. The input and output process data is transmitted in cycles. Control of the data flow via the software is referred to as "handshaking." The necessary control bits are contained in the control byte (see chapter 8.4 and see chapter 8.3).

The following handshake procedure is used to transmit telegrams safely and quickly between the PLC and the device:




**$D_S$** Delete bit; deletes internal memory of the device

**$U_M$** Update master bit

**$U_D$** Update device bit

**T1** The PLC changes the delete bit $D_S$ in the output process data to High (**A**), which deletes the FIFO memory in the device.

**T2** The read/write station changes the delete bit in the input process data (**B**) in response and deletes the entire contents of the FIFO memory

**T3** The PLC mirrors the inverted state of $U_S$-INPUT from the input field to the output field (**C**). Likewise, the device mirrors the inverted state of $U_M$-OUTPUT to the input field (**D**). Both communication partners are indicating that they are ready to receive a telegram.

**T4** The PLC enters an Enhanced Read command (ER) in IF-OUT (**I**dent **F**rame) (F). At the same time, the PLC applies $U_M$-INPUT in $U_M$-OUTPUT (**E**) and thus indicates the validity of a new telegram.

**T5** The device mirrors the inverted state of $U_M$-OUTPUT to $U_M$-INPUT (**G**). This informs the control panel that the telegram has been received.

**T6** The device has processed the ER and enters the response to the command in the input field (**I**). In the same telegram, $U_S$-OUTPUT is mirrored in $U_S$-INPUT (**H**).

**T7** The PLC has received the changed $U_S$-INPUT and mirrors the inverted state in $U_S$-OUTPUT (**J**). Only now can the device send another telegram.

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## Example implementation in the controller

**Device Delete Bit $D_S$:**

Once the device is ready for operation (IO-Link communication = OK), this instruction must be executed once. This deletes the internal telegram buffer. If an internal device fault has occurred, the internal telegram buffer should be deleted.

`D_S_OUTPUT := NOT D_S_INPUT`

**Device Update Bit $U_D$:**

New, valid data will be in the input process data if $U_D$ bits in the input and output process data have the same value. The device writes new read data to the input process data only once the PLC has read the input process data, i.e., the $U_D$ bit in the input and output process data has an inverted signal state.

To prevent transmission of the read data from being blocked, the inverted state of the $U_D$ bit must be transmitted from the input process data to the $U_D$ bit of the output process data in each cycle.

`U_D_OUTPUT := NOT U_D_INPUT` (* copy the inverted update bit from the INPUT telegram to the OUTPUT telegram *)

**Master Update Bit $U_M$:**

The device must be ready to receive new telegrams before a command is sent. This is the case if the $U_M$ bit in the input and output process data has an inverted signal state.

The command parameters must then be transmitted to the corresponding positions in the output process data.

The PLC transfers the new command to the device once the $U_M$ bit in the output process data is set to the same signal state as the $U_M$ bit in the input process data.

`OUTPUT[1..x]` := new telegram

`IF (U_M_OUTPUT <> U_M_INPUT) then` (* check whether the device can receive new data *)

`U_M_OUTPUT := U_M_INPUT` (* device is ready to receive, transfer of update bit *)

`End_IF`

## 8.6 Command Overview

The commands in the list are described in detail on the following pages.

### Read/Write Commands

| Command name | Command abbreviation | Command code | Command description | System |
|---|---|---|---|---|
| Single Read Fixcode | **SF** | 16#01 | Single read access to the fixed code (UID) | IQT3, IQT4 |
| Enhanced Read Fixcode | **EF** | 16#1D | Permanent read access to the fixed code (UID) | IQT3, IQT4 |
| Single Read 4 Byte Blocks | **SR** | 16#10 | Single read access to user memory | IQT3, IQT4 |
| Enhanced Read 4 Byte Blocks | **ER** | 16#19 | Permanent read access to user memory | IQT3, IQT4 |
| Single Write 4 Byte Blocks | **SW** | 16#40 | Single write access to user memory | IQT3, IQT4 |
| Enhanced Write 4 Byte Blocks | **EW** | 16#1A | Permanent write access to user memory | IQT3, IQT4 |
| Single Write 4 Byte Blocks with Lock | **SL** | 16#47 | Single write access to user memory with write protection | IQT3, IQT4 |
| Enhanced Write 4 Byte Blocks with Lock | **EL** | 16#48 | Permanent write access to user memory with write protection | IQT3, IQT4 |
| Single Read Configuration | **SG** | 16#61 | Single read access to the configuration area | IQT3, IQT4 |
| Enhanced Read Configuration | **EG** | 16#68 | Permanent read access to the configuration area | IQT3, IQT4 |
| Single Write Configuration | **SC** | 16#12 | Single write access to AFI/DSFID in the configuration area | IQT3, IQT4 |
| Enhanced Write Configuration | **EC** | 16#66 | Permanent write access to AFI/DSFID in the configuration area | IQT3, IQT4 |
| Fill Tag | **S#** | 16#AA | Write access to the user memory with fill sign | IQT3, IQT4 |
| Selective Single Read Fixcode | **XSF** | 16#E8 | Single read access to the fixed code (UID) of a selected tag | IQT3[1], IQT4 |
| Selective Enhanced Read Fixcode | **XEF** | 16#E9 | Permanent read access to the fixed code (UID) of a selected tag | IQT3[1<Default ¬1 Font>], IQT4 |
| Selective Single Read 4 Byte Blocks | **XSR** | 16#E0 | Single read access to the user memory of a selected tag | IQT3[1<Default ¬1 Font>], IQT4 |
| Selective Enhanced Read 4 Byte Blocks | **XER** | 16#D9 | Permanent read access to the user memory of a selected tag | IQT3[1<Default ¬1 Font>], IQT4 |

| Command name | Command abbreviation | Command code | Command description | System |
|---|---|---|---|---|
| Selective Single Write 4 Byte Blocks | **XSW** | 16#E3 | Single write access to the user memory of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Enhanced Write 4 Byte Blocks | **XEW** | 16#DC | Permanent write access to the user memory of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Single Write 4 Byte Blocks with Lock | **XSL** | 16#E4 | Single write access to the user memory with write protection of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Enhanced Write 4 Byte Blocks with Lock | **XEL** | 16#E5 | Permanent write access to the user memory with write protection of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Single Read Configuration | **XSG** | 16#DD | Single read access to AFI/DSFID of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Enhanced Read Configuration | **XEG** | 16#D6 | Permanent read access to AFI/DSFID of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Single Write Configuration | **XSC** | 16#E1 | Single write access to AFI/DSFID of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Enhanced Write Configuration | **XEC** | 16#DA | Permanent write access to AFI/DSFID of a selected tag | IQT3[1]<Default ¬[1] Font>, IQT4 |
| Selective Fill Tag | **XS#** | 16#E7 | Write access to the user memory with fill sign of a selected tag | IQT3, IQT4 |

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## System Commands

| Command name | Command abbreviation | Command code | Command description | System |
|---|---|---|---|---|
| Quit | **QU** | 16#02 | Cancels an active enhanced command | IQT3, IQT4 |
| Version | **VE** | 16#03 | Reads out the firmware version | IQT3, IQT4 |
| Change Tag | **CT** | 16#04 | Sets the tag type | IQT3, IQT4 |

## Configuration Commands

| Command name | Command abbreviation | Command code | Command description | System |
|---|---|---|---|---|
| Read Parameter | **RP** | 16#BE | Reads out device parameters | IQT3, IQT4 |
| Write Parameter | **WP** | 16#BF | Writes device parameters | IQT3, IQT4 |

## 8.6.1 Read/Write Commands

The following commands and responses are written using the long-form data format. The end of a single command is signaled back via a status 16#0F telegram. When using the short-form data format, the UID and the additional length information are omitted. The end of an enhanced command is not signaled back.

### Single Read Fixcode (SF)

The SF command has the command code 16#01 and performs a single read operation on the UID of a tag within the sensing zone.

For each tag read, the information read is transmitted in a separate data telegram with the status value 16#00. In addition, for each tag read, a further telegram with the status value 16#0B is transmitted, which contains the RSSI value for the signal strength of the tag response.

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags identified during execution of the command.

**Command telegram**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#06 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#03 | | | | | | | |
| Byte 5 | Command | 16#01 | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

**Response telegram 1 – status 16#00 (multiframe protocol)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#01 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#01 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#0F (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#01 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Enhanced Buffered Read Fixed code (EF)

The EF command has the command code 16#1D and performs a permanent read operation on the UID of a tag within the sensing zone.

For each tag read, the information read is transmitted in a separate data telegram with the status value 16#00. In addition, for each tag read, a further telegram with the status value 16#0B is transmitted, which contains the RSSI value for the signal strength of the tag response.

A tag leaving the sensing zone is indicated by a telegram containing the UID of the tag. This telegram has the status value 16#05.

A Quit command stops the command execution.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#06 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#03 | | | | | | | |
| Byte 5 | Command | 16#1D | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#1D | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#1D | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#05 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#1D | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Single Read 4-Byte Blocks (SR)

The SR command has the command code 16#10 and performs a single read access to the user data area of a tag within the sensing range.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be read. The number of bytes must be a multiple of the memory block size.

For each tag read, the information read is transmitted in a separate data telegram with the status value 16#00. In addition, for each tag read, a further telegram with the status value 16#0B is transmitted, which contains the RSSI value for the signal strength of the tag response.

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags that were identified during execution of the command.

### Command telegram

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0A | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#07 | | | | | | | |
| Byte 5 | Command | 16#10 | | | | | | | |
| Byte 6 | Command parameter | <Start Address (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | <Number of Bytes (Low Byte)> | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

**Response telegram 1 – status 16#00 (multiframe protocol)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#17 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#14 | | | | | | | |
| Byte 5 | Command | 16#10 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#04 | | | | | | | |
| Byte 19 | Data | <User Data Byte 1> | | | | | | | |
| Byte 20 | Data | <User Data Byte 2> | | | | | | | |
| Byte 21 | Data | <User Data Byte 3> | | | | | | | |
| Byte 22 | Data | <User Data Byte 4> | | | | | | | |
| ... | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#10 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (multiframe protocol)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#10 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Enhanced Read 4-Byte Blocks (ER)

The ER command has the command code 16#19 and performs a permanent read access to the user data area of a tag within the sensing zone.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be read. The number of bytes must be a multiple of the memory block size.

For each tag read, the information read is transmitted in a separate data telegram with the status value 16#00. In addition, for each tag read, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

A tag leaving the sensing zone is indicated by a telegram containing the UID of the tag. This telegram has the status value 16#05.

A Quit command stops the command execution.

### Command telegram

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0A | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#07 | | | | | | | |
| Byte 5 | Command | 16#19 | | | | | | | |
| Byte 6 | Command parameter | <Start Address (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | <Number of Bytes (Low Byte)> | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (multiframe protocol)

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#17 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#14 | | | | | | | |
| Byte 5 | Command | 16#19 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#04 | | | | | | | |
| Byte 19 | User data | <User Data Byte 1> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 20 | User data | <User Data Byte 2> | | | | | | | |
| Byte 21 | User data | <User Data Byte 3> | | | | | | | |
| Byte 22 | User data | <User Data Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#19 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#05 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#19 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |

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| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| ... | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Single Write 4-Byte Blocks (SW)

The SW command has the command code 16#40 and performs a single write operation to the user data area of a tag within the sensing range.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be written. The number of bytes must be a multiple of the memory block size.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags that were written during execution of the command.

### Command telegram (4 byte user data)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0E | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0B | | | | | | | |
| Byte 5 | Command | 16#40 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 10 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 11 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 12 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 13 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#40 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#40 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#0F (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#40 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Enhanced Write 4-Byte Blocks (EW)

The EW command has the command code 16#1A and performs a permanent write operation to the user data area of a tag within the sensing range.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be written. The number of bytes must be a multiple of the memory block size.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

A tag leaving the sensing zone is indicated by a telegram containing the UID of the tag. This telegram has the status value 16#05.

A Quit command stops the command execution.

### Command telegram (4 byte user data):

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0E | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0B | | | | | | | |
| Byte 5 | Command | 16#1A | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 7 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 10 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 11 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 12 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 13 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#1A | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#1A | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#05 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#1A | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Single Write 4-Byte Blocks with Lock (SL)

The SL command has the command code 16#47 and performs a single write operation to the user data area of a tag within the sensing zone. The data is write-protected at the end of the write process, provided the tag offers this function. This applies to type 21, 22, 24, 33, 50 and 51 tags. The write protection is permanent and cannot be undone. Write protection is only activated for memory blocks involved in the writing process. Data can continue to be written to all other memory blocks.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be written. The number of bytes must also be a multiple of the memory block size.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags that were written during execution of the command.

### Command telegram (4 byte user data)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0E | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0B | | | | | | | |
| Byte 5 | Command | 16#47 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 10 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 11 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 12 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 13 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

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### Response telegram 1 – status 16#00 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#47 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#47 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (multiframe protocol)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#47 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Enhanced Write 4-Byte Blocks with Lock (EL)

The EL command has the command code 16#48 and performs a permanent write operation to the user data area of a tag within the sensing zone. The data is write-protected at the end of the write process, provided the tag offers this function. This applies to type 21, 22, 24, 33, 50 and 51 tags. The write protection is permanent and cannot be undone. Write protection is only activated for memory blocks involved in the writing process. Data can continue to be written to all other memory blocks.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be written. The number of bytes must also be a multiple of the memory block size.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

A tag leaving the sensing zone is indicated by a telegram containing the fixed code of the tag. This telegram has the status value 16#05. A Quit command stops the command execution.

**Command telegram (4 byte user data)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0E | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0B | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 5 | Command | 16#48 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 10 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 11 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 12 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 13 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#48 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#48 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#05 (multiframe protocol)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#48 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Single Get Configuration (SG)

The SG command has the command code 16#61 and performs a single read operation on the configuration area of a tag within the sensing zone. This can be used to read the AFI or DSFID of the tag.

The <Config Address> parameter defines the access to the configuration area and has the value 16#00 or 16#30.

For each tag read, the information read is transmitted in a separate data telegram with the status value 16#00. In addition, for each tag read, a further telegram with the status value 16#0B is transmitted, which contains the RSSI value for the signal strength of the tag response.

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags that were identified during execution of the command.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#07 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#04 | | | | | | | |
| Byte 5 | Command | 16#61 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Config Address> | | | | | | | |
| Byte … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#20 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#01 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#1E | | | | | | | |
| Byte 5 | Command | 16#61 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#0E | | | | | | | |
| Byte 19 | Data | <Info Flags> | | | | | | | |
| Byte 20 | Data | <UID Byte 8> | | | | | | | |
| Byte 21 | Data | <UID Byte 7> | | | | | | | |
| Byte 22 | Data | <UID Byte 6> | | | | | | | |
| Byte 23 | Data | <UID Byte 5> | | | | | | | |
| Byte 24 | Data | <UID Byte 4> | | | | | | | |
| Byte 25 | Data | <UID Byte 3> | | | | | | | |
| Byte 26 | Data | <UID Byte 2> | | | | | | | |
| Byte 27 | Data | <UID Byte 1> | | | | | | | |
| Byte 28 | Data | <DSFID> | | | | | | | |
| Byte 29 | Data | <AFI> | | | | | | | |
| Byte 30 | Data | <VICC Memory Size (Number of Blocks -1)> | | | | | | | |
| Byte 31 | Data | <VICC Memory Size (Block Size -1)> | | | | | | | |

### Response telegram 2 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#04 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Data | <IC Reference> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#0B (information frame mode)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |

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| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 5 | Command | 16#61 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 4 – status 16#0F (long-form data format):**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#61 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Enhanced Get Configuration (EG)

The EG command has the command code 16#68 and performs a permanent read operation on the configuration area of a tag within the sensing zone. This can be used to read the AFI or DSFID of the tag.

The <Config Address> parameter defines the access to the configuration area and has the value 16#00 or 16#30.

For each tag read, the information read is transmitted in a separate data telegram with the status value 16#00. In addition, for each tag read, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

A tag leaving the sensing zone is indicated by a telegram containing the UID of the tag. This telegram has the status value 16#05.

A Quit command stops the command execution.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#07 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#04 | | | | | | | |
| Byte 5 | Command | 16#68 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Config Address> | | | | | | | |
| Byte … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#20 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#1E | | | | | | | |
| Byte 5 | Command | 16#68 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#0E | | | | | | | |
| Byte 19 | Data | <Info Flags> | | | | | | | |
| Byte 20 | Data | <UID Byte 8> | | | | | | | |
| Byte 21 | Data | <UID Byte 7> | | | | | | | |
| Byte 22 | Data | <UID Byte 6> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 23 | Data | <UID Byte 5> | | | | | | | |
| Byte 24 | Data | <UID Byte 4> | | | | | | | |
| Byte 25 | Data | <UID Byte 3> | | | | | | | |
| Byte 26 | Data | <UID Byte 2> | | | | | | | |
| Byte 27 | Data | <UID Byte 1> | | | | | | | |
| Byte 28 | Data | <DSFID> | | | | | | | |
| Byte 29 | Data | <AFI> | | | | | | | |
| Byte 30 | Data | <VICC Memory Size (Number of Blocks -1)> | | | | | | | |
| Byte 31 | Data | <VICC Memory Size (Block Size -1)> | | | | | | | |

**Response telegram 2 – status 16#00 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Data | <IC Reference> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0B (information frame mode)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#68 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 4 – status 16#05 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#68 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Single Set Configuration (SC)

The SC command has the command code 16#12 and performs a single write operation to the AFI or DSFID in the configuration area of a tag within the sensing zone.

The <Config Address> parameter specifies whether the AFI (16#00 or 16#30) or the DSFID (16#01 or 16#31) is to be written. The <Lock> parameter specifies whether the AFI or DSFID is to be written without (16#00 or 16#30) or with write protection (16#01 or 16#31).

If the AFI or DSFID is already read-only, a rewrite or write-protect operation has a response with status 5.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags that were written during execution of the command.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#12 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Config Address> | | | | | | | |
| Byte 7 | Command parameter | <Lock> | | | | | | | |
| Byte 8 | Command parameter | <DSFID / AFI> | | | | | | | |
| Byte 9 | Command parameter | 16#00 (always) | | | | | | | |
| Byte 10 | Command parameter | 16#00 (always) | | | | | | | |
| … | Command parameter | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#12 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#12 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#12 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Enhanced Set Configuration (EC)

The EC command has the command code 16#66 and performs a permanent write operation on the AFI or DSFID in the configuration area of a tag within the sensing zone.

The <Config Address> parameter specifies whether the AFI (16#00 or 16#30) or the DSFID (16#01 or 16#31) is to be written. The <Lock> parameter specifies whether the AFI or DSFID is to be written without (16#00 or 16#30) or with write protection (16#01 or 16#31). The read/write device constantly attempts to write the AFI or DSFID in the configuration area.

If the AFI or DSFID is already read-only, a rewrite or write-protect operation has a response with status 5.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

A tag leaving the sensing zone is indicated by a telegram containing the UID of the tag. This telegram has the status value 16#05.

A Quit command stops the command execution.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#66 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Config Address> | | | | | | | |
| Byte 7 | Command parameter | <Lock> | | | | | | | |
| Byte 8 | Command parameter | <DSFID / AFI> | | | | | | | |
| Byte 9 | Command parameter | 16#00 (always) | | | | | | | |
| Byte 10 | Command parameter | 16#00 (always) | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#66 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#66 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#05 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#66 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Fill Tag (S#)

The S# command has the command code 16#AA and performs a single write operation to the user data area of a tag within the sensing zone.

The <Start Address> parameter specifies the start address within the user data area. The value of <Start Address> is based on bytes. Only multiples of the memory block size can be parameterized. <Number of Bytes> defines the number of bytes to be written. The number of bytes must also be a multiple of the memory block size. The <Fill Sign> parameter specifies the fill sign to be written.

A separate data telegram with the status value 16#00 indicates a successful write operation for each tag written. The data telegram contains the UID of the tag to which the user data area was written. In addition, for each tag written, a further telegram with the status value 16#0B is transmitted, which contains information on the signal strength of the tag response (RSSI value).

The end of the command execution is indicated by an end telegram. The end telegram has the status value 16#0F and contains the number of tags that were written during execution of the command.

**Note**

If <Number of Bytes> is set to 16#0000, the tag is filled from <Start Address> up to the end of the tag.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#AA | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 9 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 10 | Command parameter | <Fill Sign> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

**Response telegram 1 – status 16#00 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#AA | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#AA | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#0F (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#AA | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Single Read Fixcode (XSF)

The XSF command has the command code 16#E8. In principle, the command functions in exactly the same way as the SF command (16#01), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#10 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0D | | | | | | | |
| Byte 5 | Command | 16#E8 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E8 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E8 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#E8 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Enhanced Read Fixcode (XEF)

The XEF command has the command code 16#E9. In principle, the command functions in exactly the same way as the EF command (16#1D), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#10 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0D | | | | | | | |
| Byte 5 | Command | 16#E9 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E9 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |

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| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E9 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#05 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E9 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Single Read 4-Byte Blocks (XSR)

The XSR command has the command code 16#E0. In principle, the command functions in exactly the same way as the SR command (16#10), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask, 4 byte user data)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#14 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#11 | | | | | | | |
| Byte 5 | Command | 16#E0 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | <Number of Bytes (Low Byte)> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#17 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#14 | | | | | | | |
| Byte 5 | Command | 16#E0 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#04 | | | | | | | |
| Byte 19 | Data | <User Data Byte 1> | | | | | | | |
| Byte 20 | Data | <User Data Byte 2> | | | | | | | |
| Byte 21 | Data | <User Data Byte 3> | | | | | | | |
| Byte 22 | Data | <User Data Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E0 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#0F (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#E0 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Enhanced Read 4-Byte Blocks (XER)

The XER command has the command code 16#D9. In principle, the command functions in exactly the same way as the ER command (16#19), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask, 4 byte user data)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#14 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#11 | | | | | | | |
| Byte 5 | Command | 16#D9 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | <Number of Bytes (Low Byte)> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#17 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#14 | | | | | | | |
| Byte 5 | Command | 16#D9 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#04 | | | | | | | |
| Byte 19 | Data | <User Data Byte 1> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 20 | Data | <User Data Byte 2> | | | | | | | |
| Byte 21 | Data | <User Data Byte 3> | | | | | | | |
| Byte 22 | Data | <User Data Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#D9 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 3 – status 16#05 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#D9 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |

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| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Single Write 4-Byte Blocks (XSW)

The XSW command has the command code 16#E3. In principle, the command functions in exactly the same way as the SW command (16#40), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask, 4 byte user data)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#18 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#15 | | | | | | | |
| Byte 5 | Command | 16#E3 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 20 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 21 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 22 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 23 | Command parameter | <Data Byte 4> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E3 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E3 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#E3 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Enhanced Write 4-Byte Blocks (XEW)

The XEW command has the command code 16#DC. In principle, the command functions in exactly the same way as the EW command (16#1A), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

**Command telegram (8 byte UID mask, 4 byte user data)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#18 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#15 | | | | | | | |
| Byte 5 | Command | 16#DC | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 20 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 21 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 22 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 23 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

**Response telegram 1 – status 16#00 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#DC | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#DC | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#05 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#DC | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Single Write 4-Byte Blocks with Lock (XSL)

The XSL command has the command code 16#E4. In principle, the command functions in exactly the same way as the SL command (16#47), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask, 4 byte user data)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#18 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#15 | | | | | | | |
| Byte 5 | Command | 16#E4 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 20 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 21 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 22 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 23 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E4 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E4 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#E4 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Enhanced Write 4-Byte Blocks with Lock (XEL)

The XEL command has the command code 16#E5. In principle, the command functions in exactly the same way as the SL command (16#48), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

**Command telegram (8 byte UID mask, 4 byte user data)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#18 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#15 | | | | | | | |
| Byte 5 | Command | 16#E5 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 20 | Command parameter | <Data Byte 1> | | | | | | | |
| Byte 21 | Command parameter | <Data Byte 2> | | | | | | | |
| Byte 22 | Command parameter | <Data Byte 3> | | | | | | | |
| Byte 23 | Command parameter | <Data Byte 4> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

**Response telegram 1 – status 16#00 (long-form data format):**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E5 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E5 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#05 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E5 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Single Get Configuration (XSG)

The XSG command has the command code 16#DD. In principle, the command functions in exactly the same way as the SG (16#61) command, but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#DD | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Config Address> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#20 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#01 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#1E | | | | | | | |
| Byte 5 | Command | 16#DD | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#0E | | | | | | | |
| Byte 19 | Data | <Info Flags> | | | | | | | |
| Byte 20 | Data | <UID Byte 8> | | | | | | | |
| Byte 21 | Data | <UID Byte 7> | | | | | | | |
| Byte 22 | Data | <UID Byte 6> | | | | | | | |
| Byte 23 | Data | <UID Byte 5> | | | | | | | |
| Byte 24 | Data | <UID Byte 4> | | | | | | | |
| Byte 25 | Data | <UID Byte 3> | | | | | | | |
| Byte 26 | Data | <UID Byte 2> | | | | | | | |
| Byte 27 | Data | <UID Byte 1> | | | | | | | |
| Byte 28 | Data | <DSFID> | | | | | | | |
| Byte 29 | Data | <AFI> | | | | | | | |
| Byte 30 | Data | <VICC Memory Size (Number of Blocks -1)> | | | | | | | |
| Byte 31 | Data | <VICC Memory Size (Block Size -1)> | | | | | | | |

**Response telegram 2 – status 16#00 (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#04 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Data | <IC Reference> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0B (information frame mode)**

| | | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte** | **Content** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#DD | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 4 – status 16#0F (long-form data format)**

| | | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte** | **Content** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#DD | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Enhanced Get Configuration (XEG)

The XEG command has the command code 16#D6. In principle, the command functions in exactly the same way as the EG command (16#68), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#D6 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Config Address> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#20 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#01 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#1E | | | | | | | |
| Byte 5 | Command | 16#D6 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| Byte 17 | Data | 16#00 | | | | | | | |
| Byte 18 | Data | 16#0E | | | | | | | |
| Byte 19 | Data | <Info Flags> | | | | | | | |
| Byte 20 | Data | <UID Byte 8> | | | | | | | |
| Byte 21 | Data | <UID Byte 7> | | | | | | | |
| Byte 22 | Data | <UID Byte 6> | | | | | | | |
| Byte 23 | Data | <UID Byte 5> | | | | | | | |
| Byte 24 | Data | <UID Byte 4> | | | | | | | |
| Byte 25 | Data | <UID Byte 3> | | | | | | | |
| Byte 26 | Data | <UID Byte 2> | | | | | | | |
| Byte 27 | Data | <UID Byte 1> | | | | | | | |
| Byte 28 | Data | <DSFID> | | | | | | | |
| Byte 29 | Data | <AFI> | | | | | | | |
| Byte 30 | Data | <VICC Memory Size (Number of Blocks -1)> | | | | | | | |
| Byte 31 | Data | <VICC Memory Size (Block Size -1)> | | | | | | | |

**Response telegram 2 – status 16#00 (long-form data format):**

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#04 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Data | <IC Reference> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0B (information frame mode)**

| Byte | Content | Bit number 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|---|---|---|---|---|---|---|---|---|---|
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 5 | Command | 16#D6 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 4 – status 16#05 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#D6 | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Single Set Configuration (XSC)

The XSC command has the command code 16#E1. In principle, the command functions in exactly the same way as the SC command (16#12), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#15 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#12 | | | | | | | |
| Byte 5 | Command | 16#E1 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Config Address> | | | | | | | |
| Byte 17 | Command parameter | <Lock> | | | | | | | |
| Byte 18 | Command parameter | <DSFID / AFI> | | | | | | | |
| Byte 19 | Command parameter | 16#00 (always) | | | | | | | |
| Byte 20 | Command parameter | 16#00 (always) | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E1 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode〉**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E1 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#E1 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Enhanced Set Configuration (XEC)

The XEC command has the command code 16#DA. In principle, the command functions in exactly the same way as the EC command (16#66), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

### Command telegram (8 byte UID mask)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#15 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#12 | | | | | | | |
| Byte 5 | Command | 16#DA | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Config Address> | | | | | | | |
| Byte 17 | Command parameter | <Lock> | | | | | | | |
| Byte 18 | Command parameter | <DSFID / AFI> | | | | | | | |
| Byte 19 | Command parameter | 16#00 (always) | | | | | | | |
| Byte 20 | Command parameter | 16#00 (always) | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

### Response telegram 1 – status 16#00 (long-form data format)

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#DA | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

### Response telegram 2 – status 16#0B (information frame mode〉

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#DA | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#05 (long-form data format):**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#DA | | | | | | | |
| Byte 6 | Status | 16#05 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## Selective Fill Tag (XS#)

The XS# command has the command code 16#E7. In principle, the command functions in exactly the same way as the S# command (16#AA), but is only executed for a selected tag.

The parameters <UID Mask Byte 1> to <UID Mask Byte 8> are used to specify the UID of the selected tag. <Length UID Mask in Bit> specifies the length of the UID in bits.

**Command telegram (8 byte UID mask)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#15 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#12 | | | | | | | |
| Byte 5 | Command | 16#E7 | | | | | | | |
| Byte 6 | Command parameter | 16#00 <Length UID Mask in Bit (High Byte)> | | | | | | | |
| Byte 7 | Command parameter | 16#40 <Length UID Mask in Bit (Low Byte)> | | | | | | | |

| | | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte** | **Content** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| Byte 8 | Command parameter | <UID Mask Byte 1> | | | | | | | |
| Byte 9 | Command parameter | <UID Mask Byte 2> | | | | | | | |
| Byte 10 | Command parameter | <UID Mask Byte 3> | | | | | | | |
| Byte 11 | Command parameter | <UID Mask Byte 4> | | | | | | | |
| Byte 12 | Command parameter | <UID Mask Byte 5> | | | | | | | |
| Byte 13 | Command parameter | <UID Mask Byte 6> | | | | | | | |
| Byte 14 | Command parameter | <UID Mask Byte 7> | | | | | | | |
| Byte 15 | Command parameter | <UID Mask Byte 8> | | | | | | | |
| Byte 16 | Command parameter | 16#00 <Start Address (High Byte)> | | | | | | | |
| Byte 17 | Command parameter | 16#00 <Start Address (Low Byte)> | | | | | | | |
| Byte 18 | Command parameter | 16#00 <Number of Bytes (High Byte)> | | | | | | | |
| Byte 19 | Command parameter | 16#04 <Number of Bytes (Low Byte)> | | | | | | | |
| Byte 20 | Command parameter | <FillSign> | | | | | | | |
| … | Command parameters | 16#00 | | | | | | | |
| Byte 31 | Command parameter | 16#00 | | | | | | | |

**Response telegram 1 – status 16#00 (long-form data format)**

| | | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **Byte** | **Content** | **7** | **6** | **5** | **4** | **3** | **2** | **1** | **0** |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#11 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#0E | | | | | | | |
| Byte 5 | Command | 16#E7 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Data | 16#00 <Length UID in Bytes (High Byte)> | | | | | | | |
| Byte 8 | Data | 16#08 <Length UID in Bytes (Low Byte)> | | | | | | | |
| Byte 9 | Data | <UID Byte 1> | | | | | | | |
| Byte 10 | Data | <UID Byte 2> | | | | | | | |
| Byte 11 | Data | <UID Byte 3> | | | | | | | |
| Byte 12 | Data | <UID Byte 4> | | | | | | | |
| Byte 13 | Data | <UID Byte 5> | | | | | | | |
| Byte 14 | Data | <UID Byte 6> | | | | | | | |
| Byte 15 | Data | <UID Byte 7> | | | | | | | |
| Byte 16 | Data | <UID Byte 8> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 2 – status 16#0B (information frame mode)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#09 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#06 | | | | | | | |
| Byte 5 | Command | 16#E7 | | | | | | | |
| Byte 6 | Status | 16#0B | | | | | | | |
| Byte 7 | Data | 16#01 <Info Type> | | | | | | | |
| Byte 8 | Data | <RSSI> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

**Response telegram 3 – status 16#0F (long-form data format)**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#0B | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#08 | | | | | | | |
| Byte 5 | Command | 16#E7 | | | | | | | |
| Byte 6 | Status | 16#0F | | | | | | | |
| Byte 7 | Data | <Number of Tags Byte 1> | | | | | | | |
| Byte 8 | Data | <Number of Tags Byte 2> | | | | | | | |
| Byte 9 | Data | <Number of Tags Byte 3> | | | | | | | |
| Byte 10 | Data | <Number of Tags Byte 4> | | | | | | | |
| … | Data | 16#00 | | | | | | | |
| Byte 31 | Data | 16#00 | | | | | | | |

## 8.6.2 System Commands

### Quit (QU)

The "Quit" command has the command code 16#02 and stops the execution of an active command on the device. This terminates the Enhanced Read or Enhanced Write commands. Successful execution of the command is indicated by a telegram with the status value 16#00.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#06 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#03 | | | | | | | |
| Byte 5 | Command | 16#02 | | | | | | | |
| Byte 6 | Not relevant | 16#00 | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.3

### Response telegram 1 – status 16#00

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#07 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#04 | | | | | | | |
| Byte 5 | Command | 16#02 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Not relevant | 16#00 | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.4

## Version (VE)

The "VE" command has the command code 16#03 and reads out the device firmware version.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#06 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#03 | | | | | | | |
| Byte 5 | Command | 16#03 | | | | | | | |
| Byte 6 | Not relevant | 16#00 | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |

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| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.5

### Response telegram 1 – status 16#00

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | <Frame Length> | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | <Telegram Length (High Byte)> | | | | | | | |
| Byte 4 | Telegram length (low byte) | <Telegram Length (Low Byte)> | | | | | | | |
| Byte 5 | Command | 16#03 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Version byte 1 | 16#XX | | | | | | | |
| ... | ... | 16#XX | | | | | | | |
| Byte X | Version byte X | 16#XX | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.6

## Change Tag (CT)

The "CT" command has the command code 16#04 and sets the tag type with which the read/write device communicates the read unit. The delivery status is type "20."

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#07 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#04 | | | | | | | |
| Byte 5 | Command | 16#04 | | | | | | | |
| Byte 6 | Tag type | 16#14 | | | | | | | |
| Byte 7 | Not relevant | 16#00 | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.7

**Response telegram 1 – status 16#00**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#07 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#04 | | | | | | | |
| Byte 5 | Command | 16#04 | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| Byte 7 | Not relevant | 16#00 | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.8

The tag type can be set via a parameter, see "Tag type (CT)" on page 128.

## 8.6.3 Configuration Commands

The "Read Parameter" and "Write Parameter" configuration commands can be used to read or change the parameters of the device.

All parameter values except parameter "TI" are stored in a non-volatile memory and remain unchanged after a power interruption. The response to a configuration command is a status message from the read/write device. During the read operation, a status message and the corresponding data are received as the response.

A system code is required to access the parameters on the device. This distinguishes between other systems in which parameters can be changed. This device uses the system code "Q" (16#51).

### 8.6.3.1 Basic Command Structure

### Read Parameter (RP)

The "Read Parameter" (RP) command has the command code 16#BE and reads a device parameter. The response to the configuration command is a status message from the RFID read/write device and the corresponding data.

**Command telegram**

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | <FrameLength> | | | |
| Byte 1 | Frame length | <FrameLength> | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | <TelegramLength (High Byte)> | | | | | | | |
| Byte 4 | Telegram length (low byte) | <TelegramLength (Low Byte)> | | | | | | | |
| Byte 5 | Command | 16#BE | | | | | | | |
| Byte 6 | System Code | 16#51 "Q" | | | | | | | |
| Byte 7 | Parameter name (high byte) | <ParameterName (High Byte)> | | | | | | | |
| Byte 8 | Parameter name (low byte) | <ParameterName (Low Byte)> | | | | | | | |

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| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 9 | Length Parameter (High Byte) | <ParameterLength (High Byte)> | | | | | | | |
| Byte 10 | Length Parameter (Low Byte) | <ParameterLength (Low Byte)> | | | | | | | |
| Byte 11 | Parameter Data Byte 1 | <Parameter Data Byte 1> | | | | | | | |
| Byte 12 | Parameter Data Byte 2 | <Parameter Data Byte 2> | | | | | | | |
| ... | ... | ... | | | | | | | |
| ... | Parameter Data Byte X | <Parameter Data Byte X> | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.9

### Response telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | <FrameLength> | | | |
| Byte 1 | Frame length | <FrameLength> | | | | | | | |
| Byte 2 | Fragmentation counter | <FragmentationCounter> | | | | | | | |
| Byte 3 | Telegram length (high byte) | <TelegramLength (High Byte)> | | | | | | | |
| Byte 4 | Telegram length (low byte) | <TelegramLength (Low Byte)> | | | | | | | |
| Byte 5 | Command | 16#BE | | | | | | | |
| Byte 6 | Status | <Status> | | | | | | | |
| Byte 7 | Parameter name (high byte) | <Parameter Data Byte 1> | | | | | | | |
| Byte 8 | Parameter name (low byte) | <Parameter Data Byte 2> | | | | | | | |
| ... | ... | ... | | | | | | | |
| ... | Parameter data byte X | <Parameter Data Byte X> | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.10

## Write Parameter (WP)

The "Write Parameter" (WP) command has the command code 16#BF. The command can be used to change device parameters. The response to the configuration command is a status message from the RFID read/write device.

### Command telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | <FrameLength> | | | |
| Byte 1 | Frame length | <FrameLength> | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | <TelegramLength (High Byte)> | | | | | | | |
| Byte 4 | Telegram length (low byte) | <TelegramLength (Low Byte)> | | | | | | | |
| Byte 5 | Command | 16#BF | | | | | | | |

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 6 | System code | 16#51 "Q" | | | | | | | |
| Byte 7 | Parameter name (high byte) | <ParameterName (High Byte)> | | | | | | | |
| Byte 8 | Parameter name (low byte) | <ParameterName (Low Byte)> | | | | | | | |
| Byte 9 | Length parameter (high byte) | <LengthParameter (High Byte)> | | | | | | | |
| Byte 10 | Length parameter (low byte) | <LengthParameter (Low Byte)> | | | | | | | |
| Byte 11 | Parameter data byte 1 | <Parameter Data Byte 1> | | | | | | | |
| Byte 12 | Parameter data byte 2 | <Parameter Data Byte 2> | | | | | | | |
| ... | ... | ... | | | | | | | |
| ... | Parameter data byte X | <Parameter Data Byte X> | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.11

### Response telegram

| Byte | Content | Bit number | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Byte 0 | Control byte / frame length | $D_S$ | $U_M$ | $U_D$ | 0 | 16#0 | | | |
| Byte 1 | Frame length | 16#07 | | | | | | | |
| Byte 2 | Fragmentation counter | 16#00 | | | | | | | |
| Byte 3 | Telegram length (high byte) | 16#00 | | | | | | | |
| Byte 4 | Telegram length (low byte) | 16#04 | | | | | | | |
| Byte 5 | Command | 16#BF | | | | | | | |
| Byte 6 | Status | 16#00 | | | | | | | |
| ... | Not relevant | 16#00 | | | | | | | |
| Byte 31 | Not relevant | 16#00 | | | | | | | |

Table 8.12

### 8.6.3.2 Parameter Overview

With the Read Parameter **RP** and Write Parameter **WP** configuration commands, you can read or write the following parameters:

| Abbreviation | Command code | Parameter description | Read/write | Default value | System |
|---|---|---|---|---|---|
| AF | 16#4146 | AFI<br>Filter on AFI for tag access | Read + write | 16#00 | IQT3, IQT4 |
| BB | 16#4242 | Back to Box<br>Reset all parameters to factory setting | Write | - | IQT3[1], IQT4 |
| CT | 16#4654 | Tag Type (Service)<br>Set tag type | Read + write | 16#14 | IQT3, IQT4 |
| DA | 16#4441 | Device Address<br>Set device address | Read + write | 16#FF | IQT3[1]<Default ¬[1] Font>, IQT4 |
| DD | 16#4444 | Diagnosis Data (Service)<br>Read the combined diagnostic data of parameters OH, ST, TE, and VO | Read | - | IQT3[1]<Default ¬[1] Font>, IQT4 |
| DN | 16#444E | Device Serial Number<br>Read the device serial number | Read | - | IQT3[1]<Default ¬[1] Font> , IQT4 |
| DR | 16#4452 | Data Rate<br>Set transmission rate | Read + write | 16#00 | IQT3, IQT4 |
| DS | 16#4453 | Data Swap<br>Rotate data blocks in blocks | Read + write | 16#01 | IQT3[1]<Default ¬[1] Font> , IQT4 |
| E5 | 16#4535 | Tag Lost Smoothing<br>Set the number of unsuccessful attempts to access a tag before a Status 5 message is issued | Read + write | 16#05 | IQT3, IQT4 |
| ED | 16#4544 | Standalone End Delimiter (Service)<br>Select the end delimiter | Read + write | 16#xx | IQT3[1]<Default ¬[1] Font> , IQT4 |
| FR | 16#4652 | Sequence Mode (Service)<br>Set the behavior for write accesses | Read + write | 16#01 | IQT3[1]<Default ¬[1] Font> , IQT4 |
| IF | 16#4946 | Information Frame Mode<br>Output additional information about access to the tag | Read | 16#01 | IQT3, IQT4 |
| LM | 16#4C4D | LED Masking<br>Setting for displaying the operating status via LEDs | Read + write | 16#0000 | IQT3[1]<Default ¬[1] Font> , IQT4 |
| MF | 16#4D46 | Reflected Power (Service)<br>Measurement of the reflected transmitter radiated power | Read | - | IQT3[1]<Default ¬[1] Font> , IQT4 |
| ND | 16#4E44 | Noise Detection Level<br>Setting for displaying the threshold for noise via LED | Read + write | 16#32 | IQT3[1]<Default ¬[1] Font> , IQT4 |

| Abbreviation | Command code | Parameter description | Read/write | Default value | System |
|---|---|---|---|---|---|
| NT | 16#4E54 | Number of Tags to Find<br>Setting for the abort criterion for read/write commands | Read + write | 16#FF | IQT3, IQT4 |
| OH | 16#4F48 | Operating Hours<br>Read the operating hours counter | Read | - | IQT3, IQT4 |
| PT | 16#5054 | Transmission Power<br>Setting for the device's transmitter radiated power | Read + write | 16#0004 / 16#0001 | IQT3, IQT4 |
| QV | 16#5156 | Reply Frame Mode<br>Protocol mode setting | Read | 16#4D | IQT3, IQT4 |
| QW | 16#5157 | Q-Value<br>Setting for the time slots for access to tags | Read + write | 16#00 | IQT3, IQT4 |
| RC | 16#5243 | Region Code (Service)<br>Reading the country code | Read | 16#01 | IQT3[1]<Default ¬[1] Font> , IQT4 |
| RD | 16#5244 | Reset to Default<br>Resetting certain parameters to factory setting | Write | - | IQT3, IQT4 |
| RL | 16#524C | RSSI Lower Limit<br>Setting the lower RSSI threshold value | Read + write | 16#00 | IQT3[1]<Default ¬[1] Font> , IQT4 |
| RU | 16#5255 | RSSI Upper Limit<br>Setting the upper RSSI threshold value | Read + write | 16#64 | IQT3[1]<Default ¬[1] Font> , IQT4 |
| RV | 16#5256 | SVN Revision (Service)<br>Reading the software revision number | Read | - | IQT3[1]<Default ¬[1] Font> , IQT4 |
| SN | 16#534E | Serial Number (Service)<br>Reading the serial number of the microcontroller | Read | - | IQT3[1]<Default ¬[1] Font> , IQT4 |
| ST | 16#5354 | Frontend State<br>Reading the front-end status | Read | 16#00 | IQT3, IQT4 |
| T2 | 16#5432 | Application Tag<br>Setting the application identifier | Read + write | Your automation, our passion. | IQT3[1]<Default ¬[1] Font> , IQT4 |
| T3 | 16#5433 | Function Tag<br>Setting the function identifier | Read + write | *** | IQT3[1]<Default ¬[1] Font> , IQT4 |
| T4 | 16#5434 | Location Tag<br>Setting the location identifier | Read + write | *** | IQT3[1]<Default ¬[1] Font> , IQT4 |
| T5 | 16#5435 | Installation Tag<br>Setting the installation identifier | Read + write | *** | IQT3[1]<Default ¬[1] Font> , IQT4 |
| TA | 16#5441 | Tries Allowed<br>Setting the number of attempts to access tags | Read + write | 16#02 | IQT3, IQT4 |
| TE | 16#5445 | Temperature<br>Reading the device temperature | Read | - | IQT3, IQT4 |

| Abbreviation | Command code | Parameter description | Read/write | Default value | System |
|---|---|---|---|---|---|
| TI | 16#5449 | Tag ID Filter<br>Setting the filter to the UID | Read + write | - | IQT3, IQT4 |
| TO | 16#544F | Overtemperature Handling<br>Setting the device behavior in the event of excess temperature | Read + write | 16#00 | IQT3, IQT4 |
| UB | 16#5542 | Host Uart Baudrate (Service)<br>Setting the baud rate | Read + write | 16#00009 600 | IQT3[1]<Default ¬[1] Font>, IQT4 |
| UT | 16#5554 | Host Uart Timeout (Service)<br>Setting the timeout | Read + write | 16#0064 | IQT3[1]<Default ¬[1] Font>, IQT4 |
| VO | 16#564F | Voltages<br>Reading internal voltage and current values | Read | - | IQT3[1]<Default ¬[1] Font>, IQT4 |

1. from SW Rev. 26

The parameters are saved in the read/write device as nonvolatile.

## 8.6.3.3 Parameters

### AFI (AF)

The AF parameter can be used to filter tags based on the AFI. Read/write commands are only executed for tags whose AFI matches the filter value.

| | |
|---|---|
| Parameter abbreviation: | AF |
| Parameter length: | 1 byte |
| Default: | 16#00 = all tags respond |
| Value range: | 16#00 … 16#FF |

### Back to Box (BB)

The BB parameter can be used to reset all read/write device settings to the factory setting.

| | |
|---|---|
| Parameter abbreviation: | BB |
| Factory setting: | See chapter 8.6.3.2 |

### Tag type (CT)

The CT parameter sets the type of tag with which the read/write device communicates.

| | |
|---|---|
| Parameter abbreviation: | CT (16#4354) |
| Parameter length: | 1 byte |
| Default: | 16#14 |
| Value range: | 16#14 ... 16#26; 16#32; 16#33 |

For supported read/write tags, please see see chapter 6.2.

**Note**

The tag type can be changed using the CT system command see "Change Tag (CT)" on page 121.

## Device Address (DA)

The DA parameter can be used to set the device address of the read/write device.

| | |
|---|---|
| Parameter abbreviation: | DA |
| Parameter length: | 1 byte |
| Default: | 16#FF |
| Value range: | 16#00 … 16#FF |

## P+F Serial Number (DN)

The DN parameter can be used to read the serial number of the read/write device.

| | |
|---|---|
| Parameter abbreviation: | DN |
| Parameter length: | 14 bytes |

## Data Rate (DR)

The DR parameter sets the data transmission rate between the read/write device and the tag.

| | |
|---|---|
| Parameter abbreviation: | DR (16#4452) |
| Parameter length: | 1 byte |
| Default: | 16#00 |
| Value range: | 0 (16#00) = normal [26 kilobit/s]<br>1 (16#01) = fast read mode in accordance with ISO/IEC 15693-2 X2 [53 kilobit/s] |

The "fast read mode" data transmission rate is supported by

- Pepperl+Fuchs tag types IQC21,-33, -37, and -50, see chapter 6.2.
- Tag with access to at least 2 memory blocks

## Data Swap (DS)

The DS parameter can be used to set the orientation of the data in a block of the user memory.

| | |
|---|---|
| Parameter abbreviation: | DS |
| Parameter length: | 1 byte |
| Default: | 16#01 |
| Value range: | 16#00 = No byte-by-byte exchange of data in the user memory<br>16#01 = Byte-by-byte exchange of blocks in the user memory (compatible with IQT1) |

For a tag with a block size of 4 bytes, the data can be oriented as follows.

**Normal orientation, DS = 16#00**

| Data block 0 | | | | Data block 1 | | | |
|---|---|---|---|---|---|---|---|
| Byte 0 | Byte 1 | Byte 2 | Byte 3 | Byte 0 | Byte 1 | Byte 2 | Byte 2 |

**Reverse orientation, DS = 16#01**

| Data block 0 | | | | Data block 1 | | | |
|---|---|---|---|---|---|---|---|
| Byte 3 | Byte 2 | Byte 1 | Byte 0 | Byte 3 | Byte 2 | Byte 1 | Byte 0 |

## Tag Lost Smoothing (E5)

The E5 parameter sets the number of unsuccessful write/read attempts when executing an Enhanced command before the device outputs the telegram with the status value 16#05. Via the telegram with the status 16#05 the device indicates that a tag has left the sensing range or could no longer be identified.

This parameter is only used when performing enhanced commands. When executing single commands, the parameter has no significance.

| | |
|---|---|
| Parameter abbreviation: | E5 (16#4535) |
| Parameter length: | 1 byte |
| Default: | 16#05<br>= 5 unsuccessful read/write attempts |
| Value range: | 16#00 ... 16#0A<br>= 0 ... 10 unsuccessful read/write attempts |

The value for the E5 parameter can be increased if communication between the tag and the device is unstable. This reduces the number of telegrams with status 16#05 received. In dynamic applications, this parameter can be used to bridge gaps in the sensing range without receiving a status 16#05 message if there are minor interruptions in the tag communication. The sensing zone appears more homogeneous.

If a large number of tags are detected at the same time during a dynamic application, receipt of the telegram with status 16#05 can be delayed by increasing the parameter value of E5. This allows the status 16#00 telegrams with the read-in information of the tags to be transmitted first. The status 16#05 telegrams are transmitted with a time delay.

Reducing the E5 parameter value shortens the reaction time of the system when a tag leaves the sensing range. The status 16#05 telegrams are sent quicker.

The transmission of the following telegrams is not affected by the E5 parameter setting and they are transmitted immediately:

- Status 16#00: Execution successful; data read or written

## Information Frame Mode (IF)

The IF parameter is set to 16#01 by default and cannot be changed. It signals that additional information about the RSSI value of the reading is output for each read access to a tag.

| | |
|---|---|
| Parameter abbre-viation: | IF |
| Parameter length: | 1 byte |
| Default: | 16#01 |
| Value range: | 16#01 |

## LED Masking (LM)

The LM parameter can be used to set which operating status should be displayed via the LEDs of the RFID read/write device.

| | |
|---|---|
| Parameter abbreviation: | LM |
| Parameter length: | 2 bytes |
| Default: | 16#0000 |
| Value range[1]: | 16#0000 = All operating statuses are output via LED<br>16#0001 = Operating status "Fault due to external signals in the useful spectrum" is suppressed<br>16#0002 = Operating status "Detuning due to surrounding metal" is suppressed<br>16#0004 = Operating status "Excess temperature warning" is suppressed |

1. Binary combinations are possible

**Note**

The operating statuses "Excess temperature error" (ST = 16#0008) and "Undervoltage/overvoltage error" (ST = 16#0010) cannot be suppressed.

The operating status of the RFID read/write device can still be read at any time via the ST parameter.

## Noise Detection Level (ND)

The ND parameter sets the threshold value (0–100 %) from which the status message LED is activated by reducing the read/write range (e.g., due to detuning).

For example, if the value is set to 50 dec, the LED lights up as soon as the read/write distance of the device drops by 50 % compared to the ideal value.

| | |
|---|---|
| Parameter abbreviation: | ND |
| Parameter length: | 1 byte |
| Default: | 16#32 ($50_{dec}$) |
| Value range: | 16#00 … 16#64 ($0_{de}$ ... $100_{dec}$) |

## Number of Tags to Find (NT)

The NT parameter specifies the number of tags that the device searches for within the sensing range. Each command is repeated according to the Number of Attempts (TA) parameter. If the number of tags found during the repeat operations reaches or exceeds the NT value, all further runs are canceled. The command is canceled, and the data is output.

If the number of tags is set to 255 (= 16#FF), the function is deactivated. This parameter only affects single commands. It does not affect enhanced commands.

| | |
|---|---|
| Parameter abbreviation: | NT (16#4E54) |
| Parameter length: | 1 byte |
| Default: | 16#FF |
| Value range: | 16#01 … 16#14; 16#FF |

## Operating Hours (OH)

The OH parameter outputs the information about how long the read/write device is in operation and how long a read/write command is running.

| | |
|---|---|
| Parameter abbreviation: | OH(16#4F48) |
| Parameter length: | 8 bytes<br>• Byte 1–4: Read/write device operating time in hours[1]<br>• Byte 5–8: Operating time read/write commands in hours[2] |

1. IO-Link communication active
2. Read/write command active

The operating time of the read/write device is $83_{dec}$ hours (16#00000053). The duration of the read/write commands is $3_{dec}$ hours (16#00000003).

## Transmission Power (PT)

The PT parameter can be used to set the transmitter radiated power of the read/write device. The transmitter radiated power affects the detection range of a tag's sensing zone. Increasing the transmitter radiated power extends the detection range for read and write access to a tag.

A transmitter radiated power level of PT1 is preset in the factory setting. It is possible to set up to 4 power levels (PT1 … PT4) in the device. This enables a ramp to be generated for a continuous increase in the transmitter radiated power. When used in conjunction with a "Single Read" or "Single Write" command and the definition of the cancellation criterion (NT parameter), the read or write operation is canceled as soon as the set number of tags is detected.

Setting multiple transmitter radiated power levels increases the execution time of a read or write operation. This is due to the inventory runs that are executed for each power level. The NT cancellation criterion can be set to reduce the execution time.

| | |
|---|---|
| Parameter abbreviation: | PT (16#5054) |
| Parameter length: | 1 byte |
| Default: | IQT3: 16#0004;<br>IQT4: 16#0001 |
| Value range: | 16#0001 (Min)<br>16#0002 (Eco)<br>16#0003 (Normal)<br>16#0004 (Maximum) |

**Note**

By reducing the transmitter radiated power, the RFID read/write device can be operated in continuous operation at a higher ambient temperature (for more information, see Chapter 5.6 Ambient temperature range).see "Overtemperature Handling (TO)" on page 136.

By reducing the transmitter radiated power, the device can be operated permanently at higher ambient temperatures. The self-heating of the device is reduced. If the device is operated in continuous operation with "enhanced" read/write commands with maximum transmitter radiated power, the ambient temperature must not exceed 55 °C. In Eco mode, the ambient temperature can be increased to a maximum of 70 °C. In addition to setting the transmitter radiated power, the read/write device has additional protection mechanisms that prevent the device from overheating.

## Reply Frame Mode (QV)

The QV parameter is set to 16#4D by default and cannot be changed. It signals that the multi-frame protocol is activated. This causes every tag that has responded to be output.

| | |
|---|---|
| Parameter abbreviation: | QV |
| Parameter length: | 1 byte |
| Default: | 16#4D |
| Value range: | 16#4D |

## Q-Value (QW)

The QW parameter defines the number of tags expected in the sensing range. This setting affects the time slot when communicating with a tag to avoid collisions due to simultaneous communication between multiple tags.

| | |
|---|---|
| Parameter abbreviation: | QW (16#5157) |
| Parameter length: | 1 byte |
| Default: | 16#00 |
| Value range: | 16#00 = one tag<br>16#01 = two tags<br>16#02 = multiple tags (approx. 4)<br>16#03 = many tags (approx. 8)<br>16#04 = very many tags (approx. 16) |

The Q value influences the execution time of write/read commands. Reducing the Q value shortens the execution time for accessing tags.

## Reset to Default (RD)

The RD parameter resets the device to the factory setting. The RD parameter is written in the process. Read access to this parameter is not possible.

| | |
|---|---|
| Parameter abbreviation: | RD (16#5244) |

Table 8.13

## RSSI Lower Limit (RL)

The RL parameter can be used to set the lower RSSI threshold value. As soon as the RSSI value of a read tag falls below the set threshold value, it is no longer output.

| | |
|---|---|
| Parameter abbreviation: | RL |
| Parameter length: | 1 byte |
| Default: | 16#00 |
| Value range: | 16#00 … 16#64 ($0_{de}$ ... $100_{dec}$) |

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| Legend | Designation |
|---|---|
| 1 | Zone A |
| 2 | RSSI threshold value |
| 3 | Zone B |
| 4 | Zone C |
| 5 | Tag |
| 6 | Read/write distance |

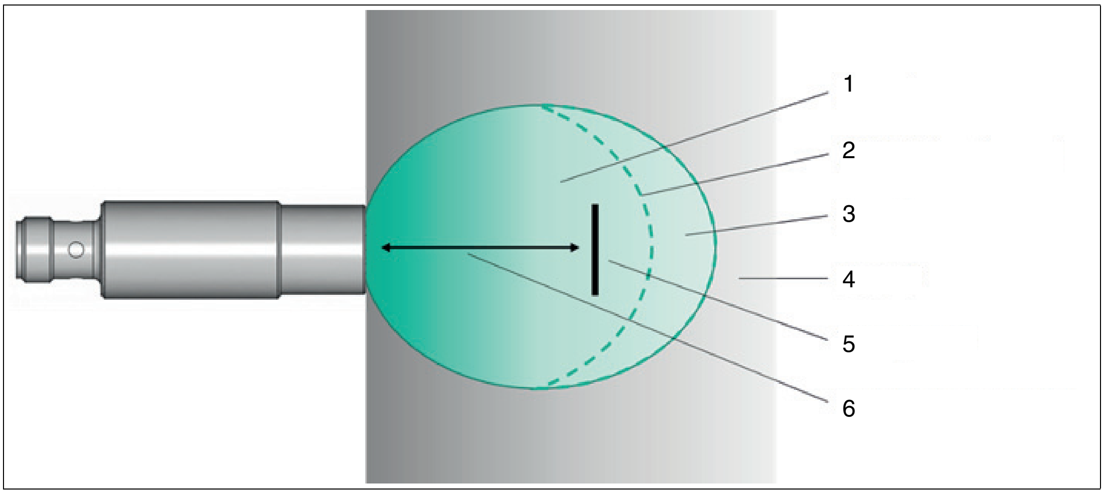


Figure 8.1 Schematic representation of the read range of the IQT4-18GM-IO-V1, based on RSSI

| Zone | RSSI | Note |
|---|---|---|
| A | RSSI tag ≥ RSSI threshold value | The tag is in the sensing range and is output. |
| B | RSSI tag < RSSI threshold value | The tag is within the maximum sensing range, but is not output. |
| C | - | The tag is outside the sensing range. |

## RSSI Upper Limit (RU)

The RL parameter can be used to set the upper RSSI threshold value. As soon as the RSSI value of a read tag exceeds the set threshold value, it is no longer output.

| | |
|---|---|
| Parameter abbreviation: | RU |
| Parameter length: | 1 byte |
| Default: | 16#64 |
| Value range: | 16#00 … 16#64 ($0_{de}$ ... $100_{dec}$) |

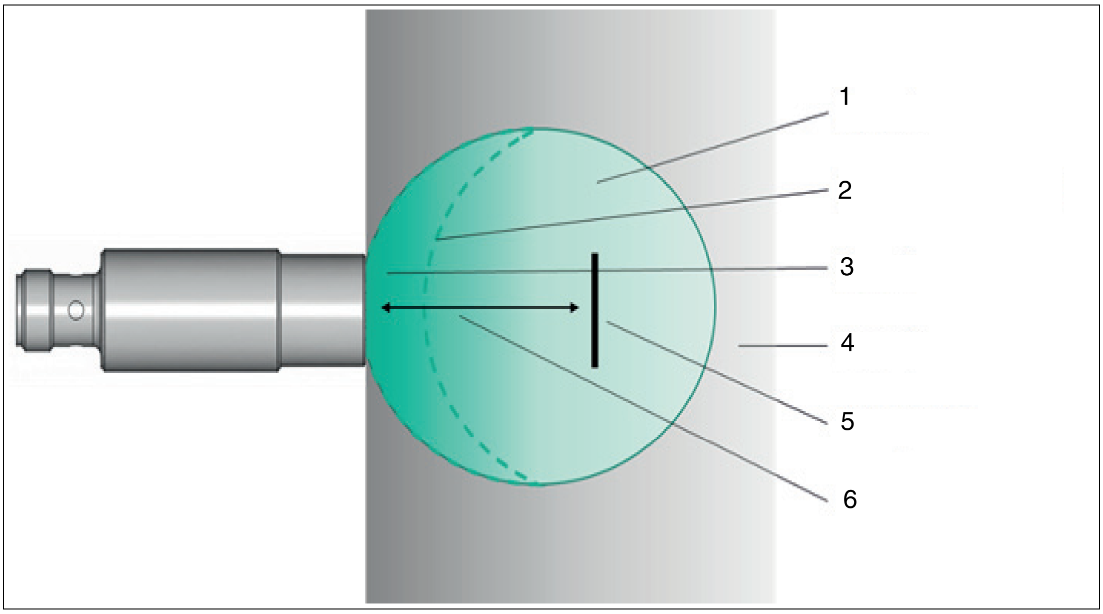


Figure 8.2 Schematic representation of the read range of the IQT4-18GM-IO-V1, based on RSSI

| Zone | RSSI | Note |
|---|---|---|
| A | RSSI tag ≤ RSSI threshold value | The tag is in the sensing range and is output. |
| B | RSSI tag > RSSI threshold value | The tag is in the sensing range but is not output. |
| C | - | The tag is outside the sensing range. |

## Frontend State (ST)

The ST parameter reads the operating status of the read/write device.

| | |
|---|---|
| Parameter abbreviation: | ST (16#5354) |
| Parameter length: | Byte 1: current status<br>Byte 2: status saved since the last read |
| Value range: | 16#01 = Fault<br>16#02 = Detuning due to surrounding metal<br>16#04 = Excess temperature warning, internal temperature between 80–85 °C.<br>16#08 = Excess temperature error, internal temperature > 85 °C.<br>16#10 = Under/overvoltage error, voltage < 17.5 V DC or > 30.5 V DC |

## Application Specific Tag (T2)

The T2 parameter can be used to mark the device with an application identifier to store application-specific information on the device.

| | |
|---|---|
| Parameter abbreviation: | T2 |
| Parameter length: | max. 32 bytes |
| Default: | Your automation, our passion. |

## Function Tag (T3)

The T3 parameter can be used to mark the device with a function tag to store function-specific information on the device.

| | |
|---|---|
| Parameter abbreviation: | T3 |
| Parameter length: | max. 32 bytes |
| Default: | *** |

## Location Tag (T4)

The T4 parameter can be used to mark the device with a location tag to store location-specific information on the device.

| | |
|---|---|
| Parameter abbreviation: | T4 |
| Parameter length: | max. 32 bytes |
| Default: | *** |

## Installation Tag (T5)

The T5 parameter can be used to mark the device with an installation identifier to store installation-specific information (e.g., date or data of the initial commissioning) on the device.

| | |
|---|---|
| Parameter abbreviation: | T5 |
| Parameter length: | max. 32 bytes |
| Default: | *** |

## Tries Allowed (TA)

The Tries Allowed (TA) parameter sets the number of access attempts during execution of a read/write operation on a tag.

| | |
|---|---|
| Parameter abbreviation: | TA (16#5441) |
| Parameter length: | 1 byte |
| Default: | 16#02 → 2 access attempts |
| Value range: | 16#01 … 16#0A |

This parameter affects the execution time of write and read commands. If the Tries Allowed parameter value is increased, the execution time for a command increases, because more access attempts are made.

By increasing the parameter value, the reliability for writing and reading tag data can be increased if communication between the device and the tag is unstable.

To limit the increase in execution time caused by increasing tries allowed, it is recommended to parameterize the NT cancellation criterion. This will stop the command execution as soon as the set number of tags has been identified.

## Temperature (TE)

The TE parameter indicates the internal temperature of the read/write device.

| | |
|---|---|
| Parameter abbreviation: | TE (16#5445) |
| Parameter length: | 2 bytes<br>• Byte 1: Temperature on the power amplifier<br>• Byte 2: Temperature on the microcontroller |

## Tag ID Filter (TI)

The TI parameter sets a filter to the UID of a tag. The read/write commands are therefore only executed for tags with the UID that corresponds to the set filter. The filter can be set to the entire UID (8 bytes) or the leading bytes.

| | |
|---|---|
| Parameter abbre-viation: | TI (16#5449) |
| Value range: | 0 ... 8-byte UID |

**Note**

The TI parameter is stored in the volatile memory.

## Overtemperature Handling (TO)

The TO parameter defines the behavior of the read/write device in the event of excess temperature. Setting the parameter can protect the device against overheating.

| | |
|---|---|
| Parameter abbreviation: | TO (16#544F) |
| Parameter length: | 1 byte |
| Default: | 16#00 |
| Value range: | 16#00 = Switch off<br>16#01 = Reduce power<br>16#02 = Reduce duty cycle |

| Value | Mode | Function |
|---|---|---|
| 0 | Switch off | The device switches off automatically if an internal temperature > 85 °C is measured.<br>If the internal temperature falls below 80 °C, the device switches on automatically. |
| 1 | Reduce power | The device automatically reduces the transmitter radiated power when an internal temperature is measured between 80–85 °C.<br>The device switches off automatically if an internal temperature > 85 °C is measured. |
| 2 | Reduce duty cycle | The device pauses for 0.5 ms–1 s after a transmission cycle when the internal temperature is measured between 80–85 °C.<br>The length of the pause time depends on the internal temperature and the duration of the last read/write command.<br>The device switches off automatically if an internal temperature > 85 °C is measured. |

**Note**

Note that in "Reduce duty cycle" mode, the read/write device does not identify any tags during the pause time.

Consider this pause for applications with tags that move dynamically through the sensing range. If necessary, use a different protection mechanism.

## Voltages (VO)

The VO parameter can be used to read the input voltage and other internal voltage and current values.

| | |
|---|---|
| Parameter abbreviation: | VO |
| Parameter length: | 14 bytes |

## 8.6.3.4 Parameter Examples

## Read Parameter

### Command telegram

| Byte | Content | Example parameter AF | Example parameter CT | Example parameter DN | Example parameter DR | Example parameter DS | Example parameter E5 | Example parameter IF | Example parameter LM | Example parameter ND | Example parameter NT | Example parameter OH | Example parameter PT | Example parameter QV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 |
| 1 | Frame length | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B |
| 2 | Fragmentation counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 |
| 5 | Command | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE |
| 6 | System Code | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" |
| 7 | Parameter name (high byte) | 16#41 "A" | 16#43 "C" | 16#44 "D" | 16#44 "D" | 16#44 "D" | 16#45 "E" | 16#49 "I" | 16#4C "L" | 16#4E "N" | 16#4E "N" | 16#4F "O" | 16#50 "P" | 16#51 "Q" |
| 8 | Parameter name (low byte) | 16#46 "F" | 16#54 "T" | 16#4E "N" | 16#52 "R" | 16#53 "S" | 16#35 "5" | 16#46 "F" | 16#4D "M" | 16#44 "D" | 16#54 "T" | 16#48 "H" | 16#54 "T" | 16#56 "V" |
| 9 | Length parameter (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 10 | Length parameter (low byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 11 | Command parameter | | | | | | | | | | | | | |
| 12 | Command parameter | | | | | | | | | | | | | |
| 13 | Command parameter | | | | | | | | | | | | | |
| ... | | | | | | | | | | | | | | |
| 31 | Command parameter | | | | | | | | | | | | | |

| Byte | Content | Example parameter QW | Example parameter RL | Example parameter RU | Example parameter ST | Example parameter T2 | Example parameter T3 | Example parameter T4 | Example parameter T5 | Example parameter TA | Example parameter TE | Example parameter TI | Example parameter TO | Example parameter VO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 |
| 1 | Frame length | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B | 16#0B |
| 2 | Fragmentation counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 | 16#08 |
| 5 | Command | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE |
| 6 | System code | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" |
| 7 | Parameter name (high byte) | 16#51 "Q" | 16#52 "R" | 16#52 "R" | 16#53 "S" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#56 "V" |

| Byte | Content | Example parameter QW | Example parameter RL | Example parameter RU | Example parameter ST | Example parameter T2 | Example parameter T3 | Example parameter T4 | Example parameter T5 | Example parameter TA | Example parameter TE | Example parameter TI | Example parameter TO | Example parameter VO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 8 | Parameter name (low byte) | 16#57 "W" | 16#4C "L" | 16#55 "U" | 16#54 "T" | 16#32 "2" | 16#33 "3" | 16#34 "4" | 16#35 "5" | 16#41 "A" | 16#45 "E" | 16#49 "I" | 16#4F "O" | 16#4F "O" |
| 9 | Length parameter (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 10 | Length parameter (low byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 11 | Command parameter | | | | | | | | | | | | | |
| 12 | Command parameter | | | | | | | | | | | | | |
| 13 | Command parameter | | | | | | | | | | | | | |
| ... | | | | | | | | | | | | | | |
| 31 | Command parameter | | | | | | | | | | | | | |

## Response telegram—status 16#00

| Byte | Content | Example parameter AF | Example parameter CT | Example parameter DN | Example parameter DR | Example parameter DS | Example parameter E5 | Example parameter IF | Example parameter LM | Example parameter ND | Example parameter NT | Example parameter OH | Example parameter PT | Example parameter QV |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#00 | 16#x0 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#x0 | 16#00 | 16#x0 | 16#x0 |
| 1 | Frame length | 16#08 | 16#08 | 16#15 | 16#08 | 16#08 | 16#08 | 16#08 | 16#09 | 16#08 | 16#08 | 16#0F | 16#09 | 16#08 |
| 2 | Fragmentation counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#05 | 16#05 | 16#12 | 16#05 | 16#05 | 16#05 | 16#05 | 16#06 | 16#05 | 16#05 | 16#0C | 16#06 | 16#05 |
| 5 | Command | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE |
| 6 | Status | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 7 | Data | 16#00 | 16#14 | 16#34 | 16#00 | 16#01 | 16#05 | 16#01 | 16#00 | 16#32 | 16#FF | 16#00 | 16#00 | 16#4D |
| 8 | Data | | | 16#30 | | | | | 16#03 | | | 16#00 | 16#04 | |
| 9 | Data | | | 16#30 | | | | | | | | 16#00 | | |
| 10 | Data | | | 16#30 | | | | | | | | 16#11 | | |
| 11 | Data | | | 16#30 | | | | | | | | 16#00 | | |
| 12 | Data | | | 16#31 | | | | | | | | 16#00 | | |
| 13 | Data | | | 16#38 | | | | | | | | 16#00 | | |
| 14 | Data | | | 16#30 | | | | | | | | 16#03 | | |
| 15 | Data | | | 16#36 | | | | | | | | | | |
| 16 | Data | | | 16#38 | | | | | | | | | | |
| 17 | Data | | | 16#34 | | | | | | | | | | |
| 18 | Data | | | 16#34 | | | | | | | | | | |
| 19 | Data | | | 16#37 | | | | | | | | | | |
| 20 | Data | | | 16#30 | | | | | | | | | | |
| ... | | | | | | | | | | | | | | |
| 31 | Data | | | | | | | | | | | | | |

| Byte | Content | Example parameter QW | Example parameter RL | Example parameter RU | Example parameter ST | Example parameter T2 | Example parameter T3 | Example parameter T4 | Example parameter T5 | Example parameter TA | Example parameter TE | Example parameter TI | Example parameter TO | Example parameter VO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#x0 | 16#x0 | # | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#00 |
| 1 | Frame length | 16#08 | 16#08 | 16#08 | 16#09 | 16#0a | 16#0a | 16#0a | 16#0a | 16#08 | 16#08 | 16#0B | 16#08 | 16#15 |
| 2 | Fragmentation counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#05 | 16#05 | 16#05 | 16#06 | 16#07 | 16#07 | 16#07 | 16#07 | 16#05 | 16#05 | 16#08 | 16#05 | 16#12 |
| 5 | Command | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE | 16#BE |
| 6 | Status | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 7 | Data | 16#00 | 16#00 | 16#50 | 16#00 | 16#2a | 16#2a | 16#2a | 16#2a | 16#02 | 16#20 | 16#E0 | 16#02 | 16#5D |
| 8 | Data | | | | 16#00 | 16#2a | 16#2a | 16#2a | 16#2a | | | 16#08 | | 16#15 |
| 9 | Data | | | | | 16#2a | 16#2a | 16#2a | 16#2a | | | 16#01 | | 16#14 |
| 10 | Data | | | | | | | | | | | 16#48 | | 16#71 |
| 11 | Data | | | | | | | | | | | | | 16#0C |
| 12 | Data | | | | | | | | | | | | | 16#DF |
| 13 | Data | | | | | | | | | | | | | 16#85 |
| 14 | Data | | | | | | | | | | | | | 16#E8 |
| 15 | Data | | | | | | | | | | | | | 16#0C |
| 16 | Data | | | | | | | | | | | | | 16#B9 |
| 17 | Data | | | | | | | | | | | | | 16#00 |
| 18 | Data | | | | | | | | | | | | | 16#00 |
| 19 | Data | | | | | | | | | | | | | 16#02 |
| 20 | Data | | | | | | | | | | | | | 16#96 |
| ... | | | | | | | | | | | | | | |
| 31 | Data | | | | | | | | | | | | | |

| Example | |
|---|---|
| Example parameter AF | (16#00 = all tags respond) |
| Example parameter CT | (16#14 = tag type 20) |
| Example parameter DN | (Serial number 40000180684470) |
| Example parameter DR | 16#00 = normal = 26 kilobit/s |
| Example parameter DS | (16#01 = byte-by-byte exchange of blocks) |
| Example parameter E5 | (16#05 = 5 unsuccessful read/write attempts |
| Example parameter IF | (16#01 = Information Frame Mode activated) |
| Example parameter LM | (16#0003 = "Fault due to external signals" and "Detuning due to surrounding metal" is suppressed) |
| Example parameter ND | (16#32 = status display from 50% range reduction) |
| Example parameter NT | (16#FF = Off) |
| Example parameter OH | (16#0000001100000003 = 17 hours operating time & 3 hours of active read/write commands) |
| Example parameter PT | (16#04 = Maximum) |
| Example parameter QV | (16#4D = multi-frame protocol) |
| Example parameter QW | (16#00 = one tag) |
| Example parameter RL | (16#00 = lower RSSI threshold of 0) |
| Example parameter RU | (16#50 = upper RSSI threshold value of $80_{dec}$ |

| Example | |
|---|---|
| Example parameter ST | (16#0000 = no fault) |
| Example parameter T2 | (***) |
| Example parameter T3 | (***) |
| Example parameter T4 | (***) |
| Example parameter T5 | (***) |
| Example parameter TA | (16#02 = 2 access attempts) |
| Example parameter TE | (IQT4: 16#20 = 32° at the microcontroller) |
| Example parameter TI | (Filter on UID, starting with 16#E0080148) |
| Example parameter TO | (16#02 = Duty Cycle) |
| Example parameter VO | (16#5D15 = 23829 mV input voltage; 16#14710CDF85E80CB900000296 = other internal voltage and current values) |

# Write Parameter

## Command telegram

| Byte | Content | Example parameter AF | Example parameter BB | Example parameter CT | Example parameter DR | Example parameter DS | Example parameter E5 | Example parameter LM | Example parameter ND | Example parameter NT | Example parameter PT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 |
| 1 | Frame length | 16#0C | 16#0B | 16#0C | 16#0C | 16#0C | 16#0C | 16#0D | 16#0C | 16#0C | 16#0D |
| 2 | Fragmenta-tion counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#09 | 16#08 | 16#09 | 16#09 | 16#09 | 16#09 | 16#0A | 16#09 | 16#09 | 16#0A |
| 5 | Command | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF |
| 6 | System code | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" |
| 7 | Parameter name (high byte) | 16#41 "A" | 16#42 "B" | 16#43 "C" | 16#44 "D" | 16#44 "D" | 16#45 "E" | 16#4C "L" | 16#4E "N" | 16#4E "N" | 16#50 "P" |
| 8 | Parameter name (low byte) | 16#46 "F" | 16#42 "B" | 16#54 "T" | 16#52 "R" | 16#53 "S" | 16#35 "5" | 16#4D "M" | 16#44 "D" | 16#54 "T" | 16#54 "T" |
| 9 | Length parameter (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 10 | Length parameter (low byte) | 16#01 | 16#00 | 16#01 | 16#01 | 16#01 | 16#01 | 16#02 | 16#01 | 16#01 | 16#02 |
| 11 | Command parameter | 16#39 | | 16#15 | 16#01 | 16#00 | 16#05 | 16#00 | 16#32 | 16#FF | 16#00 |
| 12 | Command parameter | | | | | | | 16#01 | | | 16#01 |
| 13 | Command parameter | | | | | | | | | | |
| 14 | Command parameter | | | | | | | | | | |
| 15 | Command parameter | | | | | | | | | | |
| 16 | Command parameter | | | | | | | | | | |
| 17 | Command parameter | | | | | | | | | | |
| 18 | Command parameter | | | | | | | | | | |
| 19 | Command parameter | | | | | | | | | | |
| 20 | Command parameter | | | | | | | | | | |
| 21 | Command parameter | | | | | | | | | | |
| 22 | Command parameter | | | | | | | | | | |
| ... | | | | | | | | | | | |
| 31 | Command parameter | | | | | | | | | | |

| Byte | Content | Example parameter QW | Example parameter RD | Example parameter RL | Example parameter RU | Example parameter T2 | Example parameter T3 | Example parameter T4 | Example parameter T5 | Example parameter TA | Example parameter TI | Example parameter TO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 | 16#x0 |
| 1 | Frame length | 16#0C | 16#0B | 16#0C | 16#0C | 16#16 | 16#13 | 16#13 | 16#14 | 16#0C | 16#0F | 16#0C |
| 2 | Fragmenta-tion counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#09 | 16#08 | 16#09 | 16#09 | 16#13 | 16#10 | 16#10 | 16#11 | 16#09 | 16#0C | 16#09 |
| 5 | Command | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF |

| Byte | Content | Example parameter QW | Example parameter RD | Example parameter RL | Example parameter RU | Example parameter T2 | Example parameter T3 | Example parameter T4 | Example parameter T5 | Example parameter TA | Example parameter TI | Example parameter TO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 6 | System code | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" | 16#51 "Q" |
| 7 | Parameter name (high byte) | 16#51 "Q" | 16#52 "R" | 16#52 "R" | 16#52 "R" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" | 16#54 "T" |
| 8 | Parameter name (low byte) | 16#57 "W" | 16#44 "D" | 16#55 "L" | 16#4C "U" | 16#32 "2" | 16#33 "3" | 16#34 "4" | 16#35 "5" | 16#41 "A" | 16#49 "I" | 16#4F "O" |
| 9 | Length parameter (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 10 | Length parameter (low byte) | 16#01 | 16#00 | 16#01 | 16#01 | 16#0B | 16#08 | 16#08 | 16#09 | 16#01 | 16#04 | 16#01 |
| 11 | Command parameter | 16#04 | | 16#14 | 16#50 | 16#41 | 16#46 | 16#4C | 16#49 | 16#02 | 16#E0 | 16#02 |
| 12 | Command parameter | | | | | 16#70 | 16#75 | 16#6F | 16#6E | | 16#08 | |
| 13 | Command parameter | | | | | 16#70 | 16#6E | 16#63 | 16#73 | | 16#01 | |
| 14 | Command parameter | | | | | 16#6C | 16#63 | 16#61 | 16#74 | | 16#48 | |
| 15 | Command parameter | | | | | 16#69 | 16#74 | 16#74 | 16#61 | | | |
| 16 | Command parameter | | | | | 16#63 | 16#69 | 16#69 | 16#6C | | | |
| 17 | Command parameter | | | | | 16#61 | 16#6F | 16#6F | 16#6C | | | |
| 18 | Command parameter | | | | | 16#74 | 16#6E | 16#6E | 16#61 | | | |
| 19 | Command parameter | | | | | 16#69 | | | 16#74 | | | |
| 20 | Command parameter | | | | | 16#6F | | | 16#69 | | | |
| 21 | Command parameter | | | | | 16#6E | | | 16#6F | | | |
| 22 | Command parameter | | | | | | | | 16#6E | | | |
| ... | | | | | | | | | | | | |
| 31 | Command parameter | | | | | | | | | | | |

| Example | |
|---|---|
| Example parameter AF | (16#39 = $57_{dec}$) |
| Example parameter BB | |
| Example parameter CT | (16#15 = tag type 21) |
| Example parameter DR | (16#01 = fast read mode) |
| Example parameter DS | (16#00 = no data exchange) |
| Example parameter E5 | (16#05 = 5 attempts up to status 5) |
| Example parameter LM | (16#0001 = operating status "Fault due to external signals in the useful spectrum" is suppressed) |
| Example parameter ND | (16#32 = threshold value 50%) |
| Example parameter NT | (16#FF = "Off") |
| Example parameter PT | (16#0001 = "Min") |
| Example parameter QW | (16#04 = "very many tags") |
| Example parameter RD | |
| Example parameter RL | (16#14 = lower RSSI threshold value $20_{dec}$) |
| Example parameter RU | (16#50 = upper RSSI threshold value $80_{dec}$) |
| Example parameter T2 | ("Application") |
| Example parameter T3 | ("Function") |

| Example | |
|---|---|
| Example parameter T4 | ("Location") |
| Example parameter T5 | ("Installation") |
| Example parameter TA | (16#02 = 2 attempts) |
| Example parameter TI | (16#E0080148 = UID starting with .E0.08.01.48 |
| Example parameter TO | (16#02 = "Reduce Duty Cycle") |

### Response telegram—status 16#00

| Byte | Content | Example parameter AF | Example parameter BB | Example parameter CT | Example parameter DR | Example parameter DS | Example parameter E5 | Example parameter LM | Example parameter ND | Example parameter NT | Example parameter PT |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 1 | Frame length | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 |
| 2 | Fragmentation counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 |
| 5 | Command | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF |
| 6 | Status | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 7 | Data | | | | | | | | | | |
| ... | | | | | | | | | | | |
| 31 | Data | | | | | | | | | | |

| Byte | Content | Example parameter QW | Example parameter RD | Example parameter RL | Example parameter RU | Example parameter T2 | Example parameter T3 | Example parameter T4 | Example parameter T5 | Example parameter TA | Example parameter TI | Example parameter TO |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | Control byte / frame length | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 1 | Frame length | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 | 16#07 |
| 2 | Fragmentation counter | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 3 | Telegram length (high byte) | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 4 | Telegram length (low byte) | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 | 16#04 |
| 5 | Command | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF | 16#BF |
| 6 | Status | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 | 16#00 |
| 7 | Data | | | | | | | | | | | |
| ... | | | | | | | | | | | | |
| 31 | Data | | | | | | | | | | | |

## 8.7 Error / Status Messages

| Status | Meaning |
|---|---|
| 16#00 | The command was executed successfully. |
| 16#01 | Excess temperature |
| 16#04 | Parameter error<br>If this status message is received immediately after the command is sent, a parameter within the command is outside the value range or the telegram structure is incorrect. |
| 16#05 | The tag has left the sensing zone. |
| 16#06 | Hardware error, e.g., error on self test or faulty device. |
| 16#07 | Internal device fault |
| 16#09 | The programmed tag type is not compatible with the connected read/write device. |
| 16#0A | Short-form data format: multiple tags in the sensing range.<br>Long-form data format: multiple tags in the sensing range with the same UID. |
| 16#0B | Telegram with additional information<br>This additional information (e.g., RSSI value) is transmitted in a telegram with this status. |
| 16#0E | Buffer overflow<br>The size of the internal telegram buffer has been exceeded. The device has generated telegrams faster than they could be transmitted to the controller. The telegram buffer is cleared by inverting the Delete bit. In addition, the function of the handshake procedure must be checked. |
| 16#0F | Indicates the end of an output in the long-form data format. |

# 9 Appendix

## 9.1 Troubleshooting

| Index | Description | Solution |
|---|---|---|
| 1 | No blue LED on; only the green LED flashes | Is the auto-start function active? |
| 2 | No orange LED if read/write tag is within the sensing range | Is the correct tag type set? Read the IO-Link parameter "Tag Type" (Index 106) and compare the result with the tag list.<br>Does the number of bytes fit with the block length of the tag? |
| 3 | No flashing green LED | Is the IO-Link configuration of the master correct? Is the IO-Link version V1.1 supported?<br>Is the connection cable connected correctly? |
| 4 | Byte 0 of the input data field contains 0x40 | This value indicates that the Expert Mode is enabled. In this case, the value of the "Operation Mode" IO-Link parameter is 0x00 (Expert Mode).<br>Change the "Operation Mode" IO-Link parameter to the value 0x80 (Easy Mode).<br>The higher nibble always has the value 0x00 in Easy Mode. |
| 5 | The tag IQC33 cannot be read or written | Is the number of bytes within the "Read job" or "Write job" IO-Link parameter a multiple of 8? |
| 6 | Tag IQC37 cannot be read or written | IQC37 is only supported when using the Expert Mode. |
| 7 | No change of the read data despite change of the start address | The address is counted by bytes.<br>Note the correct block length of the tag type: 4 or 8 bytes.<br>The data will be changed when the address is increased by the block length. |
| 8 | After setting the tag type IQC33, "invalid command" is displayed | Set the number of bytes to 8 or a multiple thereof. |
| 9 | An unknown tag cannot be read | Reset the RFID read/write device to the factory setting.<br>Switch the execution of the read job to the fixed code: Change the IO-Link parameter "Read job."<br>Can the fixed code be read? If the fixed code is readable, the tag can be accessed. You may need to change the tag type; if access is not possible, the tag is incompatible with ISO15693. |

## 9.2 ASCII Table

| hex | dec | ASCII | hex | dec | ASCII | hex | dec | ASCII | hex | dec | ASCII |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 00 | 0 | NUL | **20** | **32** | **Space** | 40 | 64 | @ | **60** | **96** | **'** |
| 01 | 1 | SOH | **21** | **33** | **!** | 41 | 65 | A | **61** | **97** | **a** |
| 02 | 2 | STX | **22** | **34** | **"** | 42 | 66 | B | **62** | **98** | **b** |
| 03 | 3 | ETX | **23** | **35** | **#** | 43 | 67 | C | **63** | **99** | **c** |
| 04 | 4 | EOT | **24** | **36** | **$** | 44 | 68 | D | **64** | **100** | **d** |
| 05 | 5 | ENQ | **25** | **37** | **%** | 45 | 69 | E | **65** | **101** | **e** |
| 06 | 6 | ACK | **26** | **38** | **&** | 46 | 70 | F | **66** | **102** | **f** |
| 07 | 7 | BEL | **27** | **39** | **'** | 47 | 71 | G | **67** | **103** | **g** |
| 08 | 8 | BS | **28** | **40** | **(** | 48 | 72 | H | **68** | **104** | **h** |
| 09 | 9 | HT | **29** | **41** | **)** | 49 | 73 | I | **69** | **105** | **I** |
| 0A | 10 | LF | **2A** | **42** | ***** | 4A | 74 | J | **6A** | **106** | **j** |
| 0B | 11 | VT | **2B** | **43** | **+** | 4B | 75 | K | **6B** | **107** | **k** |
| 0C | 12 | FF | **2C** | **44** | **,** | 4C | 76 | L | **6C** | **108** | **l** |
| 0D | 13 | CR | **2D** | **45** | **-** | 4D | 77 | M | **6D** | **109** | **m** |
| 0E | 14 | SO | **2E** | **46** | **.** | 4E | 78 | N | **6E** | **110** | **n** |
| 0F | 15 | SI | **2F** | **47** | **/** | 4F | 79 | O | **6F** | **111** | **o** |
| 10 | 16 | DLE | **30** | **48** | **0** | 50 | 80 | P | **70** | **112** | **p** |
| 11 | 17 | DC1 | **31** | **49** | **1** | 51 | 81 | Q | **71** | **113** | **q** |
| 12 | 18 | DC2 | **32** | **50** | **2** | 52 | 82 | R | **72** | **114** | **r** |
| 13 | 19 | DC3 | **33** | **51** | **3** | 53 | 83 | S | **73** | **115** | **s** |
| 14 | 20 | DC4 | **34** | **52** | **4** | 54 | 84 | T | **74** | **116** | **t** |
| 15 | 21 | NAK | **35** | **53** | **5** | 55 | 85 | U | **75** | **117** | **u** |
| 16 | 22 | SYN | **36** | **54** | **6** | 56 | 86 | V | **76** | **118** | **v** |
| 17 | 23 | ETB | **37** | **55** | **7** | 57 | 87 | W | **77** | **119** | **w** |
| 18 | 24 | CAN | **38** | **56** | **8** | 58 | 88 | X | **78** | **120** | **x** |
| 19 | 25 | EM | **39** | **57** | **9** | 59 | 89 | Y | **79** | **121** | **y** |
| 1A | 26 | SUB | **3A** | **58** | **:** | 5A | 90 | Z | **7A** | **122** | **z** |
| 1B | 27 | ESC | **3B** | **59** | **;** | 5B | 91 | [ | **7B** | **123** | **{** |
| 1C | 28 | FS | **3C** | **60** | **<** | 5C | 92 | \ | **7C** | **124** | **\|** |
| 1D | 29 | GS | **3D** | **61** | **=** | 5D | 93 | ] | **7D** | **125** | **}** |
| 1E | 30 | RS | **3E** | **62** | **>** | 5E | 94 | ^ | **7E** | **126** | **~** |
| 1F | 31 | US | **3F** | **63** | **?** | 5F | 95 | _ | **7F** | **127** | **DEL** |