FACTORY AUTOMATION

QUICK START GUIDE

IUH-F192-V1-*

Read/Write Head for IDENT*Control*

IDENTControl

PEPPERL+FUCHS
SENSING YOUR NEEDS

With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

1 Introduction 4
1.1 Purpose of this quick start guide 4
1.2 Product documentation on the internet 4
1.3 Declaration of Conformity (R&TTE Directive 1995/5/EC) 4
1.4 FCC Information 4
1.5 IC Information 5
1.6 UL Information 5
1.7 Additional country-specific approvals 5
2 Product Description 6
2.1 General Functions and Features 6
2.2 Indicators and Operating Elements 6
2.3 Connection 6
2.4 Scope of Delivery 7
2.5 Accessories 7
2.5.1 IDENTControl 7
2.5.2 Read/Write Tags 8
2.5.3 Connection cable for R/W heads and trigger sensors 8
2.5.4 Cable connectors for the power supply 8
2.5.5 Installation accessories 8
3 Installation 9
3.1 Storage and transport 9
3.2 Unpacking 9
3.3 Mounting 9
3.3.1 Room Orientation 10
3.3.2 Minimum Distances 10
3.3.3 Polarization 10
3.4 Connection 11
3.5 EMC Concept 12
4 Commissioning 13
4.1 Initial Commissioning 13
4.2 Device Settings 14
4.3 Operation via the Command Interface 15

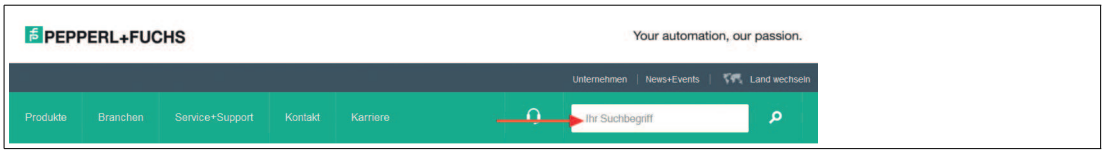
1 Introduction

1.1 Purpose of this quick start guide

This quick start guide contains basic instructions for operating the device. However, the manual takes priority over the quick start guide.

1.2 Product documentation on the internet

You can view all the relevant documentation and additional information on your product at http://www.pepperl-fuchs.com. Simply enter the product name or model number in the **Product/Key word search** box and click **Search**.



Select your product from the list of search results. Click on the information you require in the product information list, e.g., **Technical documents**.

A list of all available documents is displayed.

1.3 Declaration of Conformity (R&TTE Directive 1995/5/EC)

This product was developed and manufactured under observance of the applicable European standards and guidelines.

Note!

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

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

ISO**9001**

1.4 FCC Information

FCC ID: IREIUH-F192-V1
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 his own expense.

FCC Notice

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.

FCC Exposure Information

To comply with FCC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 30 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter.

1.5 IC Information

This device complies with Industry Canada licence-exempt RSS standard(s) and with part 15 of the FCC Rules. Operation is subject to the following two conditions:

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

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

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

IC Exposure Information

To comply with IC RF exposure compliance requirements, the antennas used for this transmitter must be installed to provide a separation distance of at least 30 cm from all persons and must not be co-located or operated in conjunction with any other antenna or transmitter.

1.6 UL Information

Technical Data and Environmental Conditions

This device is for indoor use only.

This device may be operated in altitudes up to 2000 m.

The ambient temperature range is from -25 °C to +50 °C for continuous transmission mode, or -25 °C to +70 °C for operation with non-transmission periods.

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

Nominal power supply voltage is 24 V_{DC}⎓. For the intended use this read/write head has to be connected to Pepperl+Fuchs IDENT*Control* control interfaces using a shielded connection cable. The IDENT*Control* supplies the read/write head with 20 ... 30 V_{DC}, Protective Extra Low Voltage (PELV).

Protection class IP67 is not included in the UL approval. The protection class is tested by Pepperl + Fuchs GmbH.

1.7 Additional country-specific approvals

For all current approvals see the data sheet of your read / write head under www.pepperl-fuchs.com.

2 Product Description

2.1 General Functions and Features

Functions

The read/write head was developed for reading and writing passive read/write tags with an ultra-high operating frequency.

Detection Range

The detection range is typically 4 meters. Tags that comply with EPC Gen 2 (ISO/IEC 18000-63) are supported.

Maximum Frequency Range

The IUH-F192-V1-FR1 read/write head can be operated in the frequency range from 865 MHz to 868 MHz. The IUH-F192-V1-FR2 read/write head can be operated in the frequency range from 902 MHz to 928 MHz.

Features

The read/write head has the following features:

- 2 x 3 function indicator LEDs
- Industrial housing
- Bulk detection
- Connects to the IDENT*Control* via connector V1 (M12 x 1)
- Protected against electrostatic discharge

Integrated antenna

The IUH-F192-V1-FR1 and IUH-F192-V1-FR2 read/write heads have a linear dual-polarized antenna. The read/write heads can transmit and receive waves with horizontal and vertical polarization.

2.2 Indicators and Operating Elements

The IUH-F192-V1-* read/write head has 2 x 3 LEDs, which are green/blue/yellow. The various indicators denote:

- Green LED:
  Continuously on - Power on
  Flashing - Region code must be set. See chapter 4.1.
- Yellow LED: Read/write operation successful
- Blue LED: Transmission mode

2.3 Connection

The read/write head is connected to the IDENTControl control interface via the M12 x 1 connector.

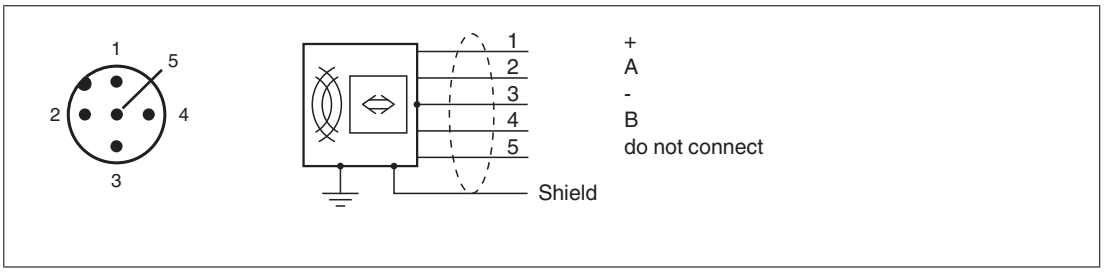


Figure 2.1

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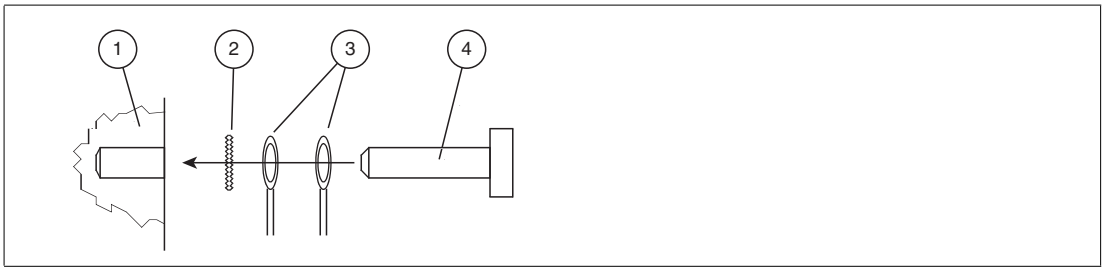
Ground connection

The ground connection of the read / write head is on the right side when the cable outlet faces downward. Connect the protective earth conductor to the casing the with a crimp connector. To ensure proper grounding, you must install the lock washer between the crimp and the housing.



1 Housing

2 Serrated lock washer

3 Crimp connector

4 Lock screw

Use a conductor cross section of at least 4 mm^2 for the protective earth conductor.

Tighten the lock screw with a torque of 1.6 Nm ±0,4 Nm

2.4 Scope of Delivery

- Read/write head
- Quick start guide

2.5 Accessories

2.5.1 IDENTControl

The read/write head can be connected to Pepperl+Fuchs IDENT*Control* control interfaces.

Interface	Designation
4 read/write heads:	
Ethernet	IC-KP-B17-AIDA1
2 read/write heads:	
PROFIBUS	IC-KP2-2HB6-V15B
Ethernet	IC-KP2-2HB17-2V1D
EtherCAT	IC-KP2-2HB21-2V1D
Serial	IC-KP2-2HRX-2V1
1 read/write head:	
PROFIBUS	IC-KP2-1HB6-V15B IC-KP2-1HB6-2V15B
Ethernet	IC-KP2-1HB17-2V1D
Serial	IC-KP2-1HRX-2V1

Table 2.1

2.5.2 Read/Write Tags

Type	Designation
EPC Gen 2 (ISO/IEC 18000-63)	IUC72-F152-M-FR1 IUC72-F152-M-FR2 IUC76-50-FR1 IUC76-50-FR2 IUC76-F157-M-FR1 IUC76-F157-M-FR2 IUC76-F203-M-FR1 IUC76-F203-M-FR2 IUC76-C8-T14-GBL IUC77-F151-M-GBL IUC77-25L100-GBL IUC77-25L110-GBL

Table 2.2

2.5.3 Connection cable for R/W heads and trigger sensors

Compatible connection cables with shielding are available for connecting the R/W heads and trigger sensors.

Accessories	Description
2 m long (straight female, angled male)	V1-G-2M-PUR-ABG-V1-W
5 m long (straight female, angled male)	V1-G-5M-PUR-ABG-V1-W
10 m long (straight female, angled male)	V1-G-10M-PUR-ABG-V1-W
20 m long (straight female, angled male)	V1-G-20M-PUR-ABG-V1-W
Field attachable female connector, straight, shielded	V1-G-ABG-PG9
Field attachable male connector, straight, shielded	V1S-G-ABG-PG9
Field attachable female connector, angled, shielded	V1-W-ABG-PG9
Field attachable male connector, angled, shielded	V1S-W-ABG-PG9
Dummy plug M12x1	VAZ-V1-B3

2.5.4 Cable connectors for the power supply

Compatible M12 sockets with an open cable end for connecting the IDENTControl to a power supply are available in different lengths.

Accessories	Designation
Length 2 m (straight socket)	V1-G-2M-PUR
Length 5 m (straight socket)	V1-G-5M-PUR
Length 10 m (straight socket)	V1-G-10M-PUR

2.5.5 Installation accessories

Two different mounting brackets are available to mount the read/write head on a wall or pole.

Accessories	Designation
Mounting bracket for wall attachment	IUZ-MH10
Mounting bracket for pipe installation (pipe with maximum diameter of 40 mm)	IUZ-MH11

3 Installation

3.1 Storage and transport

For storage and transport purposes, package the unit using shockproof packaging material and protect it against moisture. The best method of protection is to package the unit using the original packaging. Furthermore, ensure that the ambient conditions are within allowable range.

3.2 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.

3.3 Mounting

The read/write head is intended for wall mounting or mounting on brackets in internal areas. Please mount the read/write head using only the holes provided in the housing. The preferred mounting direction is with the cable connection facing vertically downwards.

Note!

Do not lay the connection cable in the main beam direction of the antenna.

To attach the read/write head, use four screws with a diameter of 6 mm, as well as mounting materials that are suitable for the type of mounting surface. The tightening torque of the screws depends on the type of mounting.

Caution!

Mounting the read/write head

Make sure that the read/write head is firmly attached to the mounting surface.

Mounting the Read/Write Head

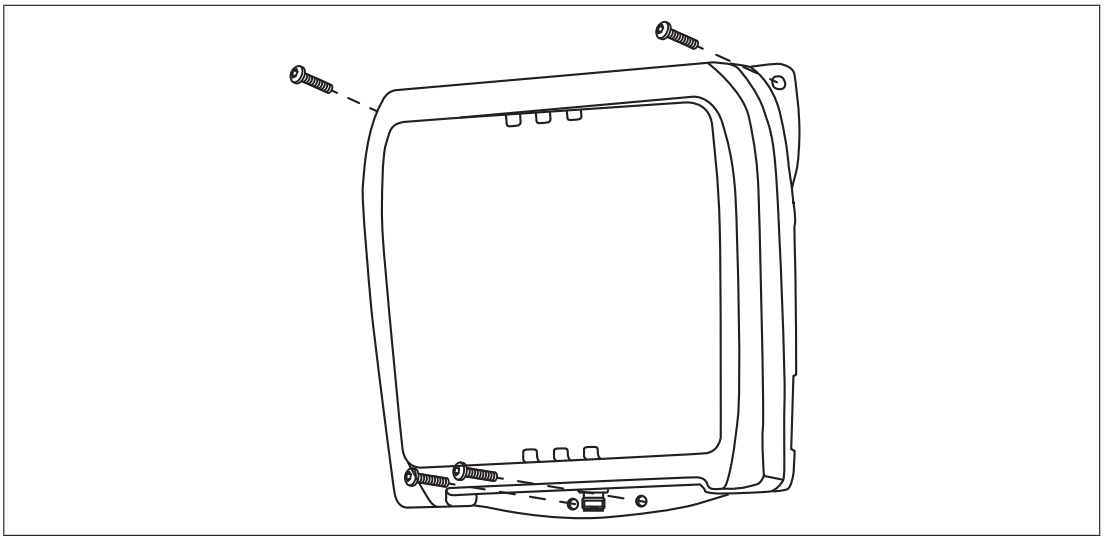
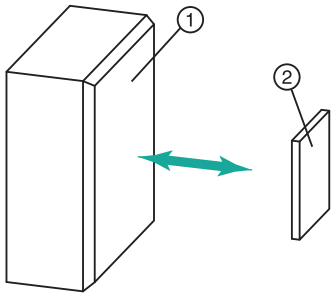


Figure 3.1

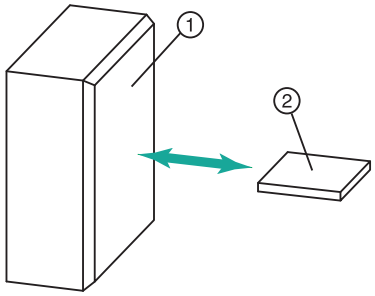
3.3.1 Room Orientation

The alignment of the read/write tag antennae in relation to the antennae of the read/write head influences the detection range of the system. Make sure the antennae are aligned parallel to each other.



Optimum alignment of the tag

- Good communication between the read/write head and tag



Poor alignment of the tag

- Insufficient communication between the read/write head and tag

(1) Read/write head
(2) Tag

3.3.2 Minimum Distances

When positioning the read/write head, please observe the minimum distances. The lateral distance between the read/write head and metals or liquids should be at least 50 cm. The distance between the read/write head and the ground should be at least 50 cm.

During simultaneous operation of several read/write heads, only one read/write head may ever communicate with a tag at any given time. When arranging the read/write heads, make sure that the measurement ranges do not overlap. You can enlarge or reduce the size of the measurement range by changing the transmitting power. Determine the measurement range of each read/write head at the mounting location.

Note!

During mounting, take into account how the read/write heads may cause interference with each other. The further the transmission channels of the read/write heads are from each other, the lower the risk of interference.

If you want to transmit with just one read/write head at any given time, use the multiplex mode of the IDENTControl control interface. Multiplex operating mode allows chronologically exclusive access to tags, and prevents mutual interference from read/write heads. For a precise description, see the manual for your control interface.

3.3.3 Polarization

The polarization of the electromagnetic wave emitted by an antenna depends on the electromagnetic field component and the position of the antenna. Polarization can be either linear or circular. To achieve the maximum detection range for a UHF system, the polarization of the read/write head must match the polarization of the tag. Refer to the relevant data sheet to find the polarization of the tag.

- Linear polarization: When an electromagnetic wave has linear polarization, the direction of the vector of the electromagnetic field component is constant. Linear polarization can be either vertical or horizontal. This characteristic depends on the position of the antenna.
- Circular polarization: When an electromagnetic wave has circular polarization, the vector of the electromagnetic field component rotates around an axis parallel to the direction of emission. The rotation of the antenna around the transmission axis has no effect.

The integrated antenna of the IUH-F192-V1-* read/write head has dual linear polarization. The read/write head operates in combined mode by default. In combined mode, both horizontal and vertical polarization are used for each read/write access. This increases the reading reliability of tags with an unknown location in the room.

If the orientation of the tags is known, you can optimize the access time by setting a fixed polarization. To do this, you can switch the polarization to horizontally linear polarization or vertically linear polarization via the IDENTControl control interface software. The linear polarization plane refers to the preferred mounting direction with the cable connection mounted vertically downwards.

Figure 3.2 (1) = Vertical polarization plane
(2) = Horizontal polarization plane

3.4 Connection

Connect the read/write head to the IDENTControl control interface using a shielded connection cable (see chapter 2.5.3). Ensure that the shield is end-to-end to avoid EMC interference. (see chapter 3.5)

Warning!

Incorrect electrical connection

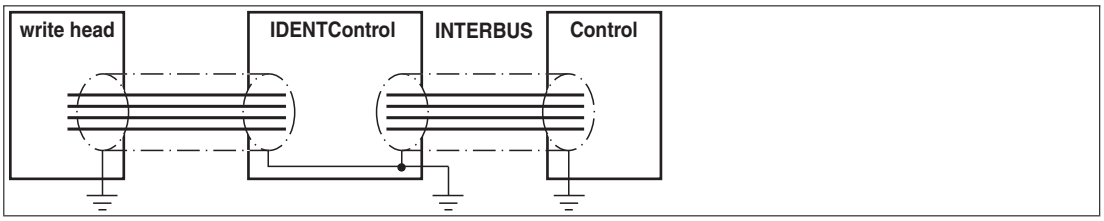
Damage to the device or plant caused by incorrect electrical connection.

Check all connections in the plant before commissioning the device.

After connecting the supply voltage to the control interface, the POWER LED lights up green on the device. If the LED does not light up on the device, the power supply is not connected correctly.

3.5 EMC Concept

The outstanding noise immunity of the IDENTControl against emission and immission is based on its consistent shielding design, which uses the principle of the Faraday cage. Interference is caught in the shield and safely diverted via the ground connections.



The cable shielding is used to discharge electromagnetic interference. When shielding a cable, you must connect both sides of the shield to ground with low resistance and low inductance.

Note!

If cables with double shields are used, e.g. wire mesh and metalized foil, the both shields must be connected together, with low resistance, at the ends when making up the cable.

Power supply cables are the source of much interference, e.g. from the supply lines of 3-phase electric motors. For this reason, the parallel laying of power supply cables with data and signal cables should be avoided, particularly in the same cable duct.

Note!

The circuit ground is conductively connected to the housing of the write/read head and to the protective ground. (Connection image → see Figure 2.1 on page 6)

4 Commissioning

4.1 Initial Commissioning

Note!

Transmission License

A country-specific transmission license is required to operate the read/write head. In the European Union and Turkey, the manufacturer's EU declaration of conformity constitutes an adequate license. A currently valid transmission license may not exist for all countries of use listed in this chapter, as transmission licenses are temporary in some countries. All currently valid transmission licenses can be found in the data sheet for the respective read/write head at www.pepperl-fuchs.com

All IUH-F192-V1-* read/write heads operate within their maximum frequency range from 865 MHz to 868 MHz, or from 902 MHz to 928 MHz, with the appropriate settings for the relevant country. This enables the following parameters to be set according to the applicable regulations for the relevant country:

- The maximum occupied bandwidth
- The channel bandwidth
- The channel plan used
- The frequency access method
- The maximum power setting

Note!

Country Identifier

The IUH-F192-V1-FR* read/write head has no valid country identifier by default. This status is indicated by the flashing green LED. In this state, the read/write head will accept only the command for setting the relevant country identifier. Once you have parameterized a valid country identifier, you can begin using the read/write head.

The IUH-F192-V1-FR2-02 is supplied ex-works with the country identifier "02" for the USA, Canada, and Mexico. Due to legal regulations, you cannot change this country identifier in the IUH-F192-V1-FR2-02.

Note!

The country identifier set is saved in the read/write head as non-volatile. The country identifier setting is not affected by a reset to the factory settings. It can be overwritten with another valid country identifier at any time.

Country identifiers for IUH-F192-V1-FR1
(The currently valid transmission licenses can be found in the data sheet at pepperl-fuchs.com)

Country Identifier	Occupied Frequency Bandwidth Frequency Access Method	Country or Region
01	865.6 MHz – 867.6 MHz Programmable frequency list	EU and other countries subject to EN 302208
04	865.0 MHz – 867.0 MHz Programmable frequency list	India
05	866.0 MHz – 868.0 MHz Programmable frequency list	Singapore, Vietnam
06	866.0 MHz – 867.6 MHz Programmable frequency list	Russia

Country identifiers for IUH-F192-V1-FR2
(The currently valid transmission licenses can be found in the data sheet at pepperl-fuchs.com)

Country Identifier	Occupied Frequency Bandwidth Frequency Access Method	Country or Region
02	902 MHz – 928 MHz Frequency hopping spread spectrum	USA Canada Mexico Argentina Colombia
03	920 MHz – 925 MHz Frequency hopping spread spectrum	China
07	915 MHz – 928 MHz Frequency hopping spread spectrum	Brazil
08	916.7 MHz – 920.5 MHz Programmable frequency list	Japan
09	917.2 MHz – 920.4 MHz Frequency hopping spread spectrum	South Korea
10	920 MHz – 926 MHz Frequency hopping spread spectrum	Australia
11	921.5 MHz – 928 MHz Frequency hopping spread spectrum	New Zealand
12	920 MHz – 925 MHz Frequency hopping spread spectrum	Hong Kong Thailand
13	919 MHz – 923 MHz Frequency hopping spread spectrum	Malaysia
14	920 MHz – 925 MHz Frequency hopping spread spectrum	Singapore Vietnam

The list of country identifiers is extended from time to time. For the most current list of country identifiers and the technical details of the regional settings, refer to the manual on www.pepperl-fuchs.com.

For an example of reading and writing the country identifier, see chapter 4.2.

4.2 Device Settings

Warning!

Device not configured or configured incorrectly

Configure the device prior to commissioning. A device that has not been configured or configured incorrectly may lead to faults in the plant.

Before commissioning the read/write head, you need to configure the control interface. To do so, read the "Commissioning" chapter of the manual for your control interface.

Configure the read/write heads with the described system commands. For a parameterization example, see see chapter 4.3.

Caution!

Uncontrolled triggered processes

Before commissioning the device, make sure that all processes are running smoothly; otherwise damage may occur in the plant.

4.3 Operation via the Command Interface

This section shows you how to operate the read/write head using an IDENTControl control interface with serial interface. The commissioning procedure described relates to the RS-232 interface and involves a PC. The examples include the syntax for coding the commands and parameters via the Ethernet TCP/IP and PROFIBUS/PROFINET interfaces. Further details about these codes and the factory settings for your IDENTControl control interface can be found in the manual.

Example:

In the examples below, the read/write head is connected to channel 1 of the control interface.

The outputs follow the multiframe protocol, .

Reading the Country Identifier

Read Parameter RC

Use the read parameter RC command to read out the read/write head's country identifier:

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	RP1URC.00.00	.00.0A.BE.03.00.55.52.43.00.00	.BE.03.00.55.52.43.00.00
Confirmation:	-	.00.06.BE.03.FF.3E	.BE.03.FF.3E
Response:	.30.31.00.01	.00.0A.BE.03.00.3F.00.02.00.01	.BE.03.00.3F.00.02.00.01

Table 4.1 Read Parameter RC

The country identifier set on the read/write head is 01, where 01 corresponds to the country identifier for the European Union.

Writing the Country Identifier

Write Parameter RC

Use the write parameter RC command to change the country identifier on the read/write head to 04 (= India).

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	WP1URC.00.02.00.04	.00.0C.BF.03.00.55.52.43.00.02.00.04	.BF.03.00.55.52.43.00.02.00.04
Confirmation:	-	.00.06.BF.03.FF.11	.BF.03.FF.11
Response:	.30.31	.00.06.BF.03.00.12	.BF.03.00.12

Table 4.2 Write Parameter RC

Reading Tags

Enhanced Read Read-Only Code

Send the enhanced read read-only code command to the read/write head. The "RF ON" LED on the read/write head lights up blue.

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	EF1	.00.04.1D.03	.1D.03
Confirmation:	-	.00.06.1D.03.FF.0B	.1D.03.FF.0B
Response:	.35.31	.00.06.1D.03.05.0C	.1D.03.05.0C

Table 4.3 Enhanced read read-only code, no tag in the measurement range

Move a tag into the read/write head's measurement range. When the tag has been detected and the read-only code has been read out, the "READ / WRITE" LED on the read/write head lights up yellow. The read-only code is displayed in the terminal program.

	Serial	Ethernet	PROFIBUS/PROFINET
Response:	.30.31.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.00.00.01.00.08.E2.00.60.03.14.42.D6.D1	.00.20.1D.03.00.0D.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.00.00.01.00.08.E2.00.60.03.14.42.D6.D1	.1D.03.00.0D.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.00.00.01.00.08.E2.00.60.03.14.42.D6.D1

Table 4.4 Enhanced read read-only code, tag is entering the measurement range

Describing Tags

Single Write Special Read-Only Code

Send the single write special read-only code command to the read/write head while a tag is in the measurement range.

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	SP1E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E	.00.14.0D.E3.00.00.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E	.0D.E3.00.00.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E
Confirmation:	-	.00.06.0D.E3.FF.2D	.0D.E3.FF.2D
Response:	.30.31.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E .46.31.30.30.30.31	.00.16.0D.03.00.2E.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E .00.0A.0D.03.0F.2F.30.30.30.31	0D.03.00.2E.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E .0D.03.0F.2F.30.30.30.31

Single Read Special Read-Only Code

As confirmation, read out the read-only code of the tag within the read/write head's measurement range via the single read special read-only code command.

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	SS10	.00.04.0A.02	.0A.02
Confirmation:	-	.00.06.0A.02.FF.30	.0A.02.FF.30
Response:	.30.31.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E .46.31.30.30.30.31	.00.16.0A.02.00.31.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E .00.0A.0A.02.0F.32.30.30.30.31	.0A.02.00.31.00.0E.30.00.30.14.F7.33.7C.00.1F.00.00.03.1C.6E .0A.02.0F.32.30.30.30.31

Parameterizing the Read/Write Head

Requesting and Setting the Transmission Power

Read out the read/write head's transmission power with the read parameter PT command:

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	RP1UPT.00.00	.00.0A.BE.03.00.55.50.54.00.00	.BE.03.00.55.50.54.00.00
Confirmation:	-	.00.06.BE.03.FF.33	.BE.03.FF.33
Response:	.30.31.00.32	.00.0A.BE.03.00.34.00.02.00.32	.BE.03.00.34.00.02.00.32

The read/write head's set transmitting power is 50 mW (32_{hex} corresponding to 50_{dec}).

Change the transmitting power of the read/write head to 100 mW (100_{dec} corresponding to 64_{hex}) via the write parameter PT command:

	Serial	Ethernet	PROFIBUS/PROFINET
Command:	WP1UPT.00.02.00.64	.00.0C.BF.03.00.55.50.54.00.02.00.64	.BF.03.00.55.50.54.04.00.02.00.64
Confirmation:	-	.00.06.BF.03.FF.35	.BF.03.FF.35
Response:	.30.31	.00.06.BF.03.00.36	.BF.03.00.36

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