

MANUAL

IC-KP2-2HB6-V15B
IDENTControl Compact unit
with interface for PROFIBUS DP



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.....	5
2	Declaration of conformity	6
2.1	CE conformity	6
3	Safety.....	7
3.1	Symbols relevant to safety	7
3.2	Intended use	7
3.3	General notes on safety.....	7
3.4	Contact protection.....	8
4	Product Description	9
4.1	Product family	9
4.1.1	R/W heads	9
4.1.2	Read Only Tags/Read/Write Tags.....	9
4.1.3	Handhelds	10
4.2	Connection accessories.....	11
4.2.1	Connection cable for R/W heads and trigger sensors	11
4.2.2	Cable connectors for the power supply	12
4.2.3	Connection cable to the PROFIBUS DP interface	12
4.2.4	Adapter for RS 232 diagnostic interface	13
4.2.5	Mounting aid.....	13
4.3	Delivery package	13
4.4	Range of application	13
4.5	Device characteristics	14
4.6	Interfaces and connections.....	14
4.7	Displays and controls.....	15
5	Installation.....	16
5.1	Unpacking.....	16
5.2	EMC concept	16
5.3	Mounting.....	17
5.4	Device connection	17
5.4.1	Power supply	17
5.4.2	Read/Write Head and Trigger Sensors	17
5.4.3	Ground connection.....	18
5.4.4	Connecting the RS 232 diagnostic interface.....	19
5.4.5	PROFIBUS connection guide	19
5.4.6	Cables	20
5.4.7	Transfer rates and line lengths	20
5.4.8	Terminator	21

6	Commissioning	23
6.1	Preliminary considerations	23
6.2	Connection.....	24
6.3	Device settings.....	24
6.4	Address setting	25
7	Commands.....	27
7.1	Communication via the RS 232 diagnostic interface	27
7.1.1	Commands for the RS 232 diagnostic interface.....	27
7.1.2	Legend	29
7.1.3	Fault/status messages	29
7.2	General information on PROFIBUS DP.....	30
7.2.1	PROFIBUS DP features.....	30
7.2.2	PROFIBUS DP communication parameters (GSD file).....	30
7.2.3	PROFIBUS DP functions	31
7.3	Communication via the PROFIBUS DP.....	31
7.3.1	PROFIBUS DP communication parameters (GSD file).....	31
7.3.2	Device identification/software version message for PROFIBUS DP.....	32
7.3.3	Software information.....	35
7.3.4	Command types	36
7.3.5	Command overview.....	37
7.3.6	System commands	39
7.3.7	Standard read/write commands	48
7.3.8	Special commands	54
7.3.9	Legend	80
7.3.10	Fault/Status messages.....	81
8	Technical specifications.....	83
8.1	Dimensions	83
8.2	Technical data	83
9	Fehlersuche.....	85
10	ASCII table	86

1 Introduction

Congratulations

You have chosen a device manufactured by Pepperl+Fuchs. Pepperl+Fuchs develops, produces and distributes electronic sensors and interface modules for the market of automation technology on a worldwide scale.

Before you install this device and put it into operation, please read the operating instructions thoroughly. The instructions and notes contained in this operating manual will guide you step-by-step through the installation and commissioning procedures to ensure trouble-free use of this product. By doing so, you:

- guarantee safe operation of the device
- can utilize the entire range of device functions
- avoid faulty operation and the associated errors
- reduce costs from downtime and incidental repairs
- increase the effectiveness and operating efficiency of your plant.

Store this operating manual somewhere safe in order to have it available for future work on the device.

After opening the packaging, please ensure that the device is intact and that the package is complete.

Symbols used

The following symbols are used in this manual:



Note!

This symbol draws your attention to important information.



Handling instructions

You will find handling instructions beside this symbol

Contact

If you have any questions about the device, its functions, or accessories, please contact us at:

Pepperl+Fuchs GmbH
Lilienthalstraße 200
68307 Mannheim
Telephone: +49 621 776-4411
Fax: +49 621 776-274411
E-Mail: fa-info@pepperl-fuchs.com

2 Declaration of conformity

2.1 CE conformity

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.

3 Safety

3.1 Symbols relevant to safety



Danger!

This symbol indicates a warning about an immediate possible danger.

In case of ignoring the consequences may range from personal injury to death.



Warning!

This symbol indicates a warning about a possible fault or danger.

In case of ignoring the consequences may cause personal injury or heaviest property damage.



Caution!

This symbol indicates a warning about a possible fault.

In case of ignoring the devices and any connected facilities or systems may be interrupted or fail completely.

3.2 Intended use

The IDENTControl Compact IC-KP2-2HB6-V15B is a control unit with integral PROFIBUS interface designed for identification systems. The IDENTControl Compact can be used as a control cabinet module or for field applications. You can connect suitable inductive R/W heads, microwave antennas, or trigger sensors to the IDENTControl Compact. However, wiring suitable for the system design must always be used.

Read through these instructions thoroughly. Familiarize yourself with the device before installing, mounting, or operating.

Always operate the device as described in these instructions to ensure that the device and connected systems function correctly. The protection of operating personnel and plant is only guaranteed if the device is operated in accordance with its intended use.

3.3 General notes on safety

Only instructed specialist staff may operate the device in accordance with the operating manual.

User modification and or repair are dangerous and will void the warranty and exclude the manufacturer from any liability. If serious faults occur, stop using the device. Secure the device against inadvertent operation. In the event of repairs, return the device to your local Pepperl+Fuchs representative or sales office.

The connection of the device and maintenance work when live may only be carried out by a qualified electrical specialist.

The operating company bears responsibility for observing locally applicable safety regulations.

Store the not used device in the original packaging. This offers the device optimal protection against impact and moisture.

Ensure that the ambient conditions comply with regulations.



Note!

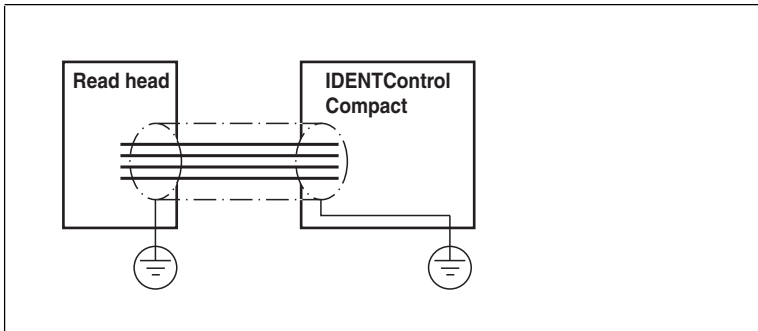
Disposal

Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.

3.4

Contact protection

Our housings are manufactured using components made partly or completely from metal to improve noise immunity.



Danger!

Electric shock

The metallic housing components are connected to ground to protect against dangerous voltages that may occur in the event of a fault in the SELV power supply!

See chapter 5.4.3

4 Product Description

4.1 Product family

The brand name, IDENTControl, represents a complete identification system. The system consists of an IDENTControl Compact unit with bus interface, inductive R/W heads (125 kHz and 13.56 MHz), R/W heads with electromagnetic coupling (UHF with 868 MHz) and accompanying code, and read/write tag in many different designs. The IDENTControl Compact can be connected to other identification systems.

The system is equally well suited for use in the switching cabinet and for field use in IP67. The interface to the controlling fieldbus is integrated into the enclosure and all connections are implemented as plugs. This enables simple installation and quick, correct replacement in case of device failure. The consistent EMC design (metal enclosure, grounding, shielded wires) offers a high degree of noise immunity.

4.1.1 R/W heads

There are different R/W heads available for the IDENTControl Compact in different designs. You can connect inductive R/W heads (125 kHz and 13.56 MHz) or R/W heads with electromagnetic coupling (UHF with 868 MHz) depending on your particular application.

4.1.2 Read Only Tags/Read/Write Tags

Read only / read/write tag 125 kHz (inductive)

A wide range of read only and read/write tag designs are available for this frequency range, from a 3 mm thin glass tube to a transponder 50 mm in diameter. Read/write tags are available for temperatures up to 300 °C (max. 5 min) in chemical-resistant housings for installation in metal and in degree of protection IP68/IP69K. IPC02-... read only tags offer 40-bit read only codes. IPC03-... read/write tags have a 928-bit freely programmable memory bank and an unmodifiable 32-bit read only code. You can define 40-bit read only codes with IPC11-... read only tags. You can use these as permanent read only codes or continually redefine them.

Read/write tag 13.56 MHz (inductive)

Read/write tags in this frequency range save larger quantities of data and offer a considerably higher reading speed than read/write tags of the 125 kHz system. IQH-* and IQH1-* read/write heads from Pepperl+Fuchs are compatible with most existing read/write tags that comply with standard ISO 15693. With the IQH2-* read/write heads you can use read/write tags that comply with standard ISO 14443A.

The 13.56 MHz technology even allows smart labels (read/write tags in the form of adhesive labels with printed barcode). Currently available read/write tags have a memory capacity of 64 bits of read only code and a maximum 2 KB of programmable memory.

Data carrier 868 MHz (UHF)

Data carriers in this frequency range can be passive as well as active (with battery) and use a specially-shaped rod antenna as the resonance element. The passive transponders can be produced very cheaply and have a range of several meters.

As material handling and the automotive sector requires ranges of 1 to 5 meters, this system represents a low-cost alternative to microwave systems, particularly because of its low transponder costs. The high carrier frequency supports large data volumes and extremely short read times.

4.1.3

Handhelds

There are various handheld read/write devices available for controlling processes (write/read functions, initialization of data carriers).



Figure 4.1

Handheld	Frequency range
IPT-HH20	125 kHz
IST-HH20	250 kHz
IQT1-HH20	13.56 MHz
IC-HH20-V1	depending on the read/write head

4.2 Connection accessories

4.2.1 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.

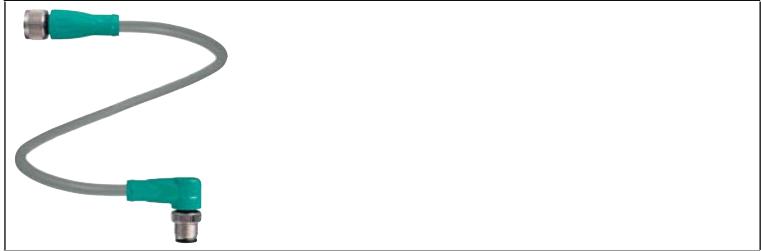


Figure 4.2

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-B

4.2.2 Cable connectors for the power supply

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



Figure 4.3

Accessories	Model number
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

4.2.3 Connection cable to the PROFIBUS DP interface

The IDENTControl Compact has a B-coded M12 socket and is connected to the network using a suitable cable.



Figure 4.4

Accessories	Model number
Terminator	ICZ-TR-V15B
T distributor	ICZ-3T-V15B
Y cable	ICZ-3T-0,3M-PUR ABG-V15B-G
Cable with terminator	ICZ-2T/TR-0,2M-PUR ABG-V15B-G
1 m cable ¹⁾	V15B-G-1M-PUR ABG-V15B-G
Socket, field attachable	V15B-G
Cable connector, field attachable	V15SB-G

Table 4.1 1) Cables are available in the following lengths: 1 m, 2 m, 5 m, 7 m, 12 m, 15 m.

2013-01



Note!

The T-distributor is designed for general applications in the PROFIBUS network and is not compatible with the IDENTControl Compact. Always use the Y cable with the IDENTControl Compact.

4.2.4 Adapter for RS 232 diagnostic interface

A compatible adapter is available for connecting the IDENTControl Compact to the RS 232 diagnostic interface.



Figure 4.5

Accessories	Model number
M12 to SUBD adapter	V1S-G-0,15M-PUR-ABG-SUBD

4.2.5 Mounting aid

An aid for mounting the IDENTControl Compact to a DIN mounting rail is available.

Accessories	Model number
Mounting aid	ICZ-MH05-SACB-8

4.3 Delivery package

The delivery package contains:

- 1 IDENTControl Compact unit
- 1 Quick Start Guide
- 2 grounding screws
- 2 serrated lock washers
- 2 crimp connectors

4.4 Range of application

The system is suited for the following applications:

- Automation
- Material flow control in production
- Acquisition of operating data

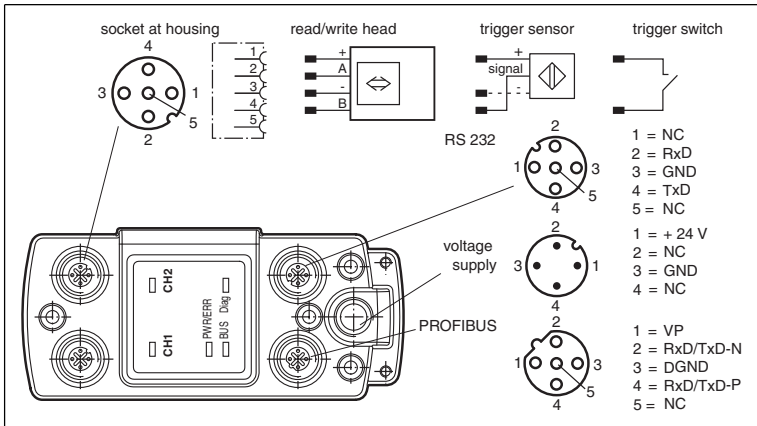
- Access control
- Identification of storage vessels, pallets, work piece carriers, refuse containers, tanks, containers, etc.

4.5 Device characteristics

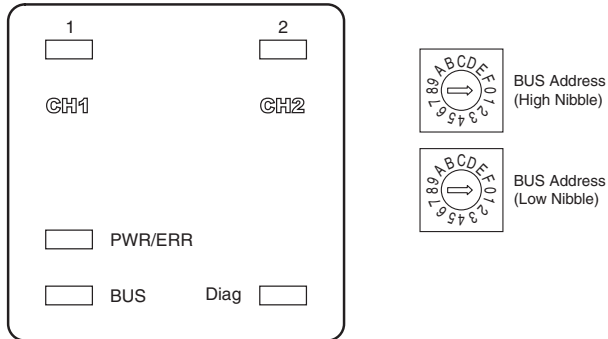
- Up to 2 R/W heads can be connected
- Alternatively, 1 R/W head and 1 trigger sensor can be connected
- LED status indicators for bus communication and R/W heads

4.6 Interfaces and connections

The control unit IC-KP2-2HB6-V15B has the following interfaces and connections:



4.7 Displays and controls



LEDs

Description	Function	Status description
1 2	Status display for R/W heads	LED lights up green when there is an active command on the R/W head. LED lights up yellow for approx. 1 second when a command is executed successfully.
CH1 CH2	Indicates that a R/W head is connected	LED lights up green when an R/W head is connected to channel 1 or channel 2. LED lights up red when a configuration error occurs.
PWR/ERR	Status display for IDENTControl Compact	LED lights up green when the IDENTControl Compact is connected to a power supply and the interface is ready for operation. LED lights up red if a hardware fault occurs.
BUS	Status display of the bus	LED is off until initial communication is made via the PROFIBUS. LED lights up green when the status of the slave is Data Exchange. LED lights up red when a bus fault occurs and Data Exchange is not possible.
Diag	No function	-

Operating elements

Rotary switch	Address setting 00 ... 7E, FF (hexadecimal) BUS address (high nibble): 0 ... 7, F BUS address (low nibble): 0 ... F
---------------	---

5 Installation

5.1 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 with your purchase order and the shipping documents for:

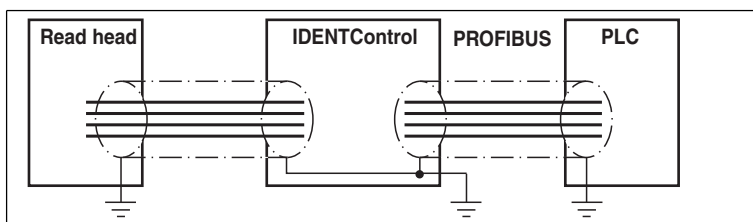
- Delivery quantity
- Device type and version in accordance with the type plate
- Accessories
- Quick start guide

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.

5.2 EMC concept

The outstanding noise immunity of the IDENTControl Compact 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 screening of cables provides for the discharge of electromagnetic interference. When screening a cable, both sides of the screen must be connected to the earth 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.

The metal enclosure of the IDENTControl Compact and the metal enclosure of the R/W heads complete the consistent shielding concept.

You must establish a low resistance and low inductance connection between the shields and ground so that the shielding is not interrupted through the metal enclosure. The complete electronics system and all routed cables are therefore located within a Faraday cage.

5.3 Mounting

If you would like to mount the IDENTControl Compact to a DIN mounting rail, we recommend using mounting aid ICZ-MH05-SACB-8.



Note!

The rotary switches used to select the device address are located on the underside of the IDENTControl Compact. These rotary switches are no longer accessible once the IDENTControl Compact is installed.

Set the rotary switches before mounting the IDENTControl Compact (see chapter 6.4).

5.4 Device connection

Electrical connection using plug connectors makes installation simple.

5.4.1 Power supply

Connect the power supply using an M12 connector. A plug with the following pin assignment is located on the housing:



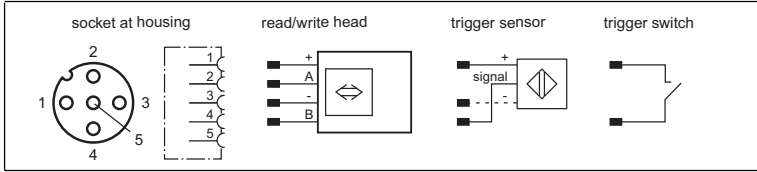
- 1 + 24 V
- 2 NC
- 3 GND
- 4 NC

Compatible connecting cable see chapter 4.2.2

5.4.2 Read/Write Head and Trigger Sensors

You can connect a maximum of two read/write heads (125 kHz or 13.56 MHz) or read/write heads with electromagnetic coupling (UHF with 868 MHz) to the IDENTControl Compact.

You can connect a trigger sensor, instead of a read/write head, to sockets 1 and 2. You can assign the trigger sensor to a read/write head. The trigger sensor must be PNP.



For details of compatible read/write heads, see chapter 4.1.1 and of compatible connecting cables, see chapter 4.2.1.



Connecting read/write heads

Connect the read/write heads or the trigger sensor with compatible connecting cable to the top of the housing via the M12 connector.

5.4.3

Ground connection

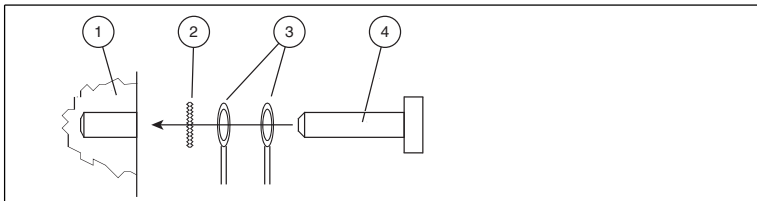
Connect the IDENTControl Compact unit to ground via a screw on the right under the housing.



Note!

In order to guarantee safe grounding, mount the serrated washer between the crimp connector and the housing.

Use a ground conductor lead with a cross-section of at least 4 mm².



- 1 Housing
- 2 Serrated lock washer
- 3 Crimp connector
- 4 Lock screw



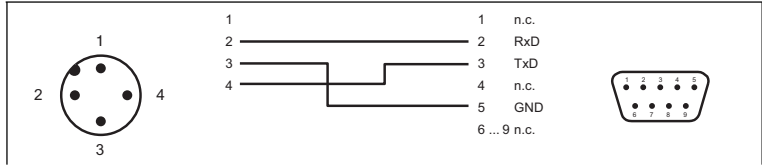
Connecting the IDENTControl Compact to ground

Screw the ground conductor to the housing with a crimp connector.

5.4.4 Connecting the RS 232 diagnostic interface

Use the adapter V1S-G-0.15M-PUR-SUBD to connect the IDENTControl Compact to the RS 232 diagnostic interface.

Connection diagram of the adapter for the RS 232 diagnostic interface



5.4.5 PROFIBUS connection guide

The data lines RxD/TxD-P and RxD/TxD-N are also referred to as A and B lines. There are no PROFIBUS specifications that indicate which color wire on the data cable should be attached to which terminal. The wire color must be unified within the entire plant. If you use a transfer cable with red and green wires, we recommend the following assignment:

RxD/TxD-N (A line):	green
RxD/TxD-P (B line):	red

Use the B-coded M12 socket and Y Cable ICZ-3T-0.2M-PUR ABG-V15B-G to connect the IDENTControl Compact unit to the PROFIBUS DP.

If you would like to connect several IDENTControl Compact units to the PROFIBUS DP, install more Y cables to connect the units to the PROFIBUS DP. You must connect the last node in the bus to the cable leading from the next to last device using an ICZ-2T/TR-0.2M-PUR cable with integrated terminator. See chapter 5.4.8 for a connection diagram.

The shield is connected to the IDENTControl Compact via the knurled nut on the connector.



- 1 VP
- 2 RxD/TxD-N
- 3 DGND
- 4 RxD/TxD-P
- 5 NC

5.4.6

Cables

The bus line is specified in EN 50170 as line type A. It can be used in accordance with the following table. The line parameters and lengths for line type B are also specified in the two following tables. When planning a new plant, only line type A should be used because of the higher total line length.

The line parameters are as follows:

Parameter	Line type A	Line type B*
Cable construction	two-wire, twisted, screened	
Distributed capacitance [pF/m]	< 30	< 60
Ripple resistance [Ω]	135 ... 165	100 ... 130
Loop resistance [Ω /km]	110	---
Wire cross-section [mm]	> 0,64	> 0,53
Line cross-section [mm ²]	> 0.34	> 0.22

*No longer use line type B if possible.

**Note!**

Use only screened, twisted-pair cables. The best possible EMC interference immunity can only be achieved by using screened cables.

5.4.7

Transfer rates and line lengths

The permitted length of the transfer line in a bus segment is largely determined by the following parameters:

- Type of bus cable used
- Transfer rate
- External interference
- Number of nodes

The maximum total line length of a bus segment, depending on the transfer rate with the maximum number of stations (32) totals:

Baud rate in kbit/s	9.6	19.2	93.75	187.5	500	1500	3000, 6000, 12000
Line type A (in m)	1200	1200	1200	1000	400	200	100
Line type B (in m)	1200	1200	1200	600	200	---	---

**Note!**

The transfer length can be increased with the distribution among multiple bus segments and the use of repeaters. A maximum of three repeaters can be used between two communicating nodes.

5.4.8 Terminator

With the PROFIBUS DP, every bus segment must be terminated on both line ends with terminating resistors.

For compatible connection accessories see chapter 4.2.

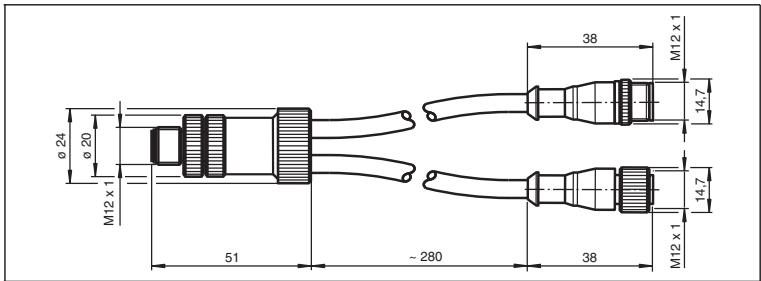


Note!

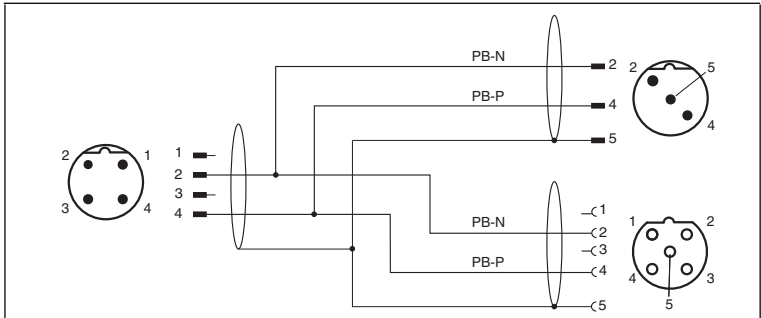
The ICZ-TR-V15B terminator cannot be used together with the Y cable ICZ-3T-0,3M-PUR ABG-V15B-G because the voltage required by the terminator cannot be supplied.

If you are using the Y cable, cable ICZ-2T/TR-0,2M-PUR ABG-V15B-G should be used as a terminator.

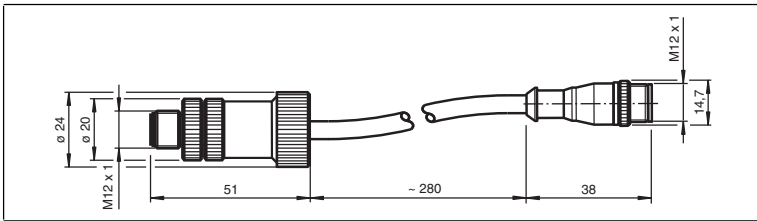
Dimensions of Y Extension Cable



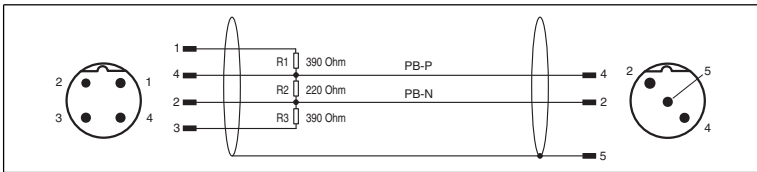
Connection diagram of the Y cable



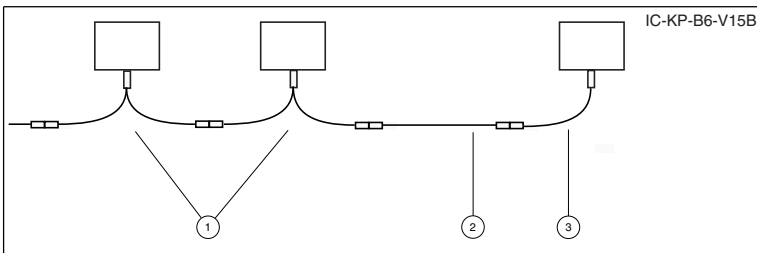
Dimensions of the ICZ-2T/TR-0,2M-PUR ABG-V15B-G



Connection layout of the ICZ-2T/TR-0,2M-PUR ABG-V15B-G



Example: connection of adjacent devices



- 1 Y connection cable
ICZ-3T-0.2M-PUR ABG-V15B-G
- 2 V15B-G-M-PUR ABG-V15B-G
- 3 For last node: ICZ-2T/TR-0.2M-PUR ABG-V15B-G with integrated terminator



Note!

More information on the installation of the PROFIBUS can be found in the brochure: "PROFIBUS Technical Guidelines, Construction Guidelines PROFIBUS DP/FMS!"

The brochure can be obtained from:

PROFIBUS Nutzerorganisation e.V.
 Haid- und Neu-Str. 7
 D-76131 Karlsruhe
 Tel: +49 721 96 58 590
 Fax: +49 721 96 58 589
 E-mail: PROFIBUS-International@compuserve.com
 http://www.PROFIBUS.com

6 Commissioning

6.1 Preliminary considerations



Caution!

Uncontrollable triggered processes

The plant where the device is installed may be damaged.

Before commissioning, make sure that all processes run in a controlled manner.

These instructions contain all important information required to operate the IDENTControl Compact unit with the PROFIBUS DP. Due to the wide variety of field bus programming options with the PROFIBUS, we are unable to make specific statements about commissioning.

One important aspect of the operation of an extended identification system on the PROFIBUS DP is the time response of the overall system. The answer to the question "How long after the positioning of a data carrier in front of a read/write station will the read data be available in the computer or PLC?" depends on many different factors.

The most important factors that determine the time response are:

- Nature of the higher-level host system, e.g. PLC or PC.
- Communication between the client and server.
- Network utilization.
- Number and nature of connected R/W heads.
- Code / data carrier types used.
- Nature of access to the communication objects of the R/W head.
- Nature of the commands to the R/W head.
- Structure of the user program.

If you are planning larger projects or gaining basic experience in programming a PROFIBUS DP system, we recommend constructing a laboratory set up of your application before installing the system in the plant. Use this laboratory set up to test the process of data transfer to the PROFIBUS DP master or the host system.



Note!

There are configuration tools available to help PROFIBUS DP users plan a network and put it in operation even if they do not have extensive experience with the underlying communication sequences.

The system software of PLCs with the PROFIBUS DP communication interface often offers suitable options for configuring and managing a bus.

6.2 Connection



Warning!

Incorrect electrical connection

Incorrect connections may damage the system.

Before commissioning, familiarize yourself with the system of communication between your PROFIBUS DP and the read/write station. Check all connections before commissioning.

When the supply voltage is connected and the device is initialized, the PWR/ERR LED lights up green. If the LED lights up red, either the initialization process has not yet finished or there is a device fault.

6.3 Device settings



Caution!

Device not configured or configured incorrectly

System failure caused by incorrectly configured device

Configure the device prior to commissioning.

You must set the various parameters prior to commissioning.

The parameters are volatile and non-volatile parameters. Volatile parameters are reset to their default setting when the system is switched off and on again.

Non-volatile parameters

Parameter	Default setting	Value range
General		
Multiplex mode	Off	On / off
R/W head		
Trigger mode	Off	On / off
Data carrier type	99	00 ... FF
PROFIBUS interface		
Slave address	7E	00 ... 7E

Volatile parameters

Parameter	Default setting	Value range
R/W head		
Password mode	Off	on / off
Password	00000000	00000000 ... FFFFFFFF

Configure the read/write station with the described system commands "99" is preset as the tag type.

6.4 Address setting

Assign the IDENTControl Compact an address between 0 (00h) and 125 (7Dh) that is not already assigned to another node. The device address is set in the hexadecimal system.

You have three options to set the device address:

1. using the rotary switches
2. via the PROFIBUS
3. via the RS 232 diagnostic interface



Note!

The rotary switches used to select the device address are located on the underside of the IDENTControl Compact. These rotary switches are no longer accessible once the IDENTControl Compact is installed.



Note!

If you would like to set the device address via the PROFIBUS or the RS 232 diagnostic interface, turn the rotary switch to position "7Eh" ... "FEh" or "FFh". The address "7Eh ... FEh" may only be used for commissioning purposes.

However, you can only configure the device address via the PROFIBUS if the device is the only node on the bus with the address 126. Otherwise, set the address using the rotary switches before connecting the device to the bus.

After switching on, the IDENTControl Compact automatically adopts the transfer rate specified by the master. Select the maximum cable length permitted for this transfer rate (see chapter 5.4.7).

Switch setting

Switch setting	Address after switching on	Address modification possible via "Set_Slave_Add"?	Address during operation	Meaning
00 ... 7D	0 ... 125	No	0 ... 125 (permanent)	Normal address
7E ... FE	126	Yes	126 or modified address	Commissioning address
FF	Stored address (default setting: 126)	Yes	Stored or modified address	Start with stored address



Setting the device address via the rotary switch

There are two rotary switches for setting the device address located on the underside of the device.

1. Select the relevant address ("00h" ... "7Dh") using the rotary switches.
2. Switch the device off and back on again or restart via the RS 232 diagnostic interface using the RS<CHK><ETX> command so that the PROFIBUS adopts the device address.

► Preparing the device address setting via the PROFIBUS or the RS 232 diagnostic interface

If you set the rotary switches to a value between "7Eh" and "FEh", the device is allocated the address "7Eh" (126), which you can modify during operation via the PROFIBUS or the RS 232 diagnostic interface. The new address is stored in the volatile memory.

If you set the rotary switches to "FFh", the factory preset address 126 is selected. You can modify the address during operation via the PROFIBUS or the RS 232 diagnostic interface. The new address is stored in the non-volatile memory, which means the modified address becomes valid when the device is switched off and back on again.

1. Set the rotary switches to "7Eh" ... "FEh" or "FFh".
2. Switch the device off and back on again or restart via the RS 232 diagnostic interface using the RS<CHK><ETX> command so that the PROFIBUS adopts the device address.

Setting the device address via the PROFIBUS

The device supports the PROFIBUS service "Set_Slave_Add" via the **Service Access Point** SAP55 of a DP slave. You will require a DPM2 master here.

You must set the address using a suitable projecting tool (e.g. Siemens "STEP7 / SIMATIC Manager" or VAZ-PB-SIM "PROFIBUS DP Master Simulator").

► Setting the device address using the Siemens "STEP7 / SIMATIC Manager"

1. To assign the PROFIBUS interface parameterization to the "S7ONLINE" access point, select "Options", "Set PG/PC interface ..." and "PC adapter (PROFIBUS)" from the SIMATIC Manager menu.
2. To allocate the address, select "Target system", "PROFIBUS" and "Allocate PROFIBUS address ..." from the HW Config menu and enter or select the PROFIBUS address. Press "OK" to change the address.

► Setting the device address using the VAZ-PB-SIM "PROFIBUS DP Master Simulator"

1. Select "Address" and "Modify address of PROFIBUS slave ..." from the menu.
2. Enter the old and new address.
3. Press "OK" to change the address.

► Setting the device address via the RS 232 diagnostic interface

1. Set the device address (<Addr> = "00" ... "7D") using the "Set device address" command SD<Addr><CHK><ETX>.
2. Use the "Get address" command GA<CHK><ETX> to view the current address setting.

7 Commands

7.1 Communication via the RS 232 diagnostic interface

You can use the RS 232 diagnostic interface to retrieve information via the IDENTControl Compact and the connected R/W heads. The information includes details such as the device version, software date, type and version of the connected R/W head, preset handheld parameters, and the data carrier type.

Any kind of terminal program can be used to control communication. We recommend RFIDControl software, which is available from Pepperl+Fuchs free of charge.

The following RS 232 diagnostic interface parameters are fixed:
Baud rate 38 400, 8 data bits, 1 stop bit, no parity.

7.1.1 Commands for the RS 232 diagnostic interface

You can request information using the following commands. Each command must end with the identifier #<CR> (23h 0Dh) or the check sum <CHCK><ETX>.

Check sums are generated by adding the ASCII values of all preceding characters, without overrun.

Version (VE)

The command **VE** requests the version of the unit and the connected R/W head. The IDENTControl Compact sends three responses. The first response contains information on the unit while the second and third responses contain information on the R/W heads. Each response starts with the status of the device.

Command:

VE#<CR>

Response:

```
<Status>0<Command code>0<Data length>(C) P+F Ident<CR><LF>
<Device designation><CR><LF>
#<Device part number><CR><LF>
<Device software number><CR><LF>
<Software date>#<CR>
<Status>0<Command code>1<Data length><Designation of R/W head
1><CR><LF>
#<Part number of R/W head 1><CR><LF>
<Software number of R/W head 1><CR><LF>
<Software date>#<CR>
<Status>0<Command code>2<Data length><Designation of R/W head
2><CR><LF>
#<Part number of R/W head 2><CR><LF>
<Software number of R/W head 2><CR><LF>
<Software date>#<CR>
```

Examples of a response:

```
00030035(C) P+F Ident
IC-KP2-1HB6-V15B
#200874
1831418
```

```
08.08.08#<CR>
0003102D IQH1-FP-V1
#204623
1831422
05.08.08#<CR>
0003202D IQH1-FP-V1
#204623
1831422
05.08.08#<CR>
```

If a R/W head is not connected, the following second response appears.

```
60031000#<CR>
```

Or the third response:

```
60032000#<CR>.
```

Get state (GS)

The command **GS** retrieves the settings.

Command:

```
GS#<CR>
```

Response:

```
<Status>0<Command code>0<Data length>TO:<Timeout> BD:<Baud rate>
HD1:<Status><Tag type>HD2:<Status><Tag type>MM:<Multiplex mode>
TM1:<Ident channel><Trigger mode>TM2:<Ident channel><Trigger
mode>#<CR>
```

Example of a response:

```
00950031 TO:0 BD:38400 HD1:022 HD2:033 MM:0 TM1:21 TM2:20#<CR>
(trigger sensor is connected to channel 1, R/W head is connected to channel 2.)
```

As well as these commands, you can use any commands that are defined for the IDENTControl with serial interface. A description of the commands is included in the manual for the IDENTControl with serial interface (e.g. IC-KP2-1HRX-2V1 manual).



Note!

The responses from the IDENTControl Compact with an interface for PROFIBUS DP are different from the responses of the IDENTControl with a serial interface.

PROFIBUS device: <Status>0<Command code><Channel><Data length> ...

Device with serial interface: <Status><Channel> ...

Example: Set data carrier type 33 for read head channel 1 using the "Change tag" (CT) command:

Command:

```
CT133#<CR>
```

Response:

```
00041000#<CR>
```

(status=0, command code=04, read head channel=1)

7.1.2 Legend

- <Command code> : Two-digit hexadecimal code, same as the command code transferred via the PROFIBUS
- <Data length> : Three-digit hexadecimal code, number of other digits included in the response (excluding end identifier)
- <Multiplex mode> : Multiplex mode, 0=off, 1=on
- <Trigger mode> : TM1: Trigger mode for channel 1,
TM2: Trigger mode for channel 2,
0=off, 1=on, 2=inverted
- <Ident channel> : Channel influenced by the trigger signal.
1= Read head on channel 1, 2=Read head on channel 2, 0=Trigger signal is detected and transmitted to the controller (trigger signal does not influence the read head)

7.1.3 Fault/status messages

Status	Meaning
0	The command has been executed without error.
1	The command is processing.

Error messages triggered by the identification system

Status	Meaning
1	Reserved
2	Switch-on message, reset has been executed.
3	Reserved
4	Incorrect or incomplete command or parameter not in the valid range.
5	No data carrier in the detection range.
6	Hardware error, e.g. error during self-test or read/write head defective.
7	Internal device error.
8	Reserved
9	The parameterized data carrier type is not compatible with the connected read head.
A	There are several transponders in the detection range (UHF).
B	Reserved
C	Reserved
D	Reserved
E	The internal cache is full.
F	Reserved

7.2 General information on PROFIBUS DP

The PROFIBUS DP is a standardized, open fieldbus, which enables data exchange between PLCs, PCs, operating and observation devices, and also sensors and actuators.

For more detailed information on the PROFIBUS DP, refer to the PROFIBUS standard EN 50170 and to the current literature on the subject (e.g. M. Popp, "The New Rapid Way to PROFIBUS DP" available (in German) from the PROFIBUS user organization).



Note!

The PROFIBUS User Organization e.V. Haid- and Neu-Str. (PNO) publishes informational brochures and a PROFIBUS product catalog (www.PROFIBUS.com).

7.2.1 PROFIBUS DP features

The following is a list of the most important performance features of PROFIBUS DP:

- DP slave functionality with functions Data_Exchange, RD_Inp, RD_Outp, Slave_Diag, Set_Prm, Chk_Cfg, Get_Cfg, Global_Control, Set_Slave_Address.
- Modular DP slave device with one module each for writing and reading data.
- Transfer rates of 9.6 kbit/s, 19.2 kbit/s, 93.75 kbit/s, 187.5 kbit/s, 500 kbit/s, 1.5 Mbit/s, 3 Mbit/s, 6 Mbit/s and 12 Mbit/s auto-synchronizing.
- Adjustable device address 00h ... 7Eh.

7.2.2 PROFIBUS DP communication parameters (GSD file)

The communication parameters for the IDENTControl Compact can be taken from the GSD file.

The GSD file name for IDENTControl Compact IC-KP2-*HB6-V15B is: P&F_0B65.gsd.



Configuring the bus master for PROFIBUS DP operations

If you have a configuration tool, read in the GSD file with the configuration tool. Provide information for the device address and the size of the input and output data fields at the same time.

↳ The bus master is configured.

7.2.3 PROFIBUS DP functions

Function	Description	Master
Set_Prm	Transfers parameter data to a DP slave	Class 1
Chk_Cfg	Transfers the configuration data for testing to a DP slave	Class 1
Get_Cfg	Reads out the configuration data of a DP slave	Class 2
Data_Exchange	Sends output data to a DP slave device and requests input data from a DP slave	Class 1
RD_Inp	Reads the input data of a DP slave	Class 2
RD_Outp	Reads the output data of a DP slave	Class 2
Global_Control	Sends special commands to one or more DP slaves	Class 1
Slave_Diag	Reads the diagnostic information of a DP slave	Class 1
Set_Slave_Address	Modifies the device address	Class 2

7.3 Communication via the PROFIBUS DP

7.3.1 PROFIBUS DP communication parameters (GSD file) for the IDENTControl Compact

The GSD file name for the IDENTControl Compact unit with PROFIBUS DP interface is: P&F_0B65.gsd.

The following data field sizes (modules) are predefined in the GSD file:

For read/write operation:

"In/Out 8 bytes"	Corresponds to	1 word (32 bits)	Input and output data
"In/Out 12 bytes"	"	2 words	"
"In/Out 16 bytes"	"	3 words	"
"In/Out 20 bytes"	"	4 words	"
"In/Out 24 bytes"	"	5 words	"
"In/Out 28 bytes"	"	6 words	"
"In/Out 32 bytes"	"	7 words	"
"In/Out 64 bytes"	"	15 words	"

For read only operation:

"8 In/4 Out bytes"	Corresponds to	1 word (32 bits)	Input data
"12 In/4 Out bytes"	"	2 words	"
"16 In/4 Out bytes"	"	3 words	"
"20 In/4 Out bytes"	"	4 words	"
"24 In/4 Out bytes"	"	5 words	"
"28 In/4 Out bytes"	"	6 words	"
"32 In/4 Out bytes"	"	7 words	"
"64 In/4 Out bytes"	"	15 words	"

Select one of the predefined modules. In doing so, make sure that the data field size for the read/write commands used is sufficient, depending on the parameter word count.

One word has 32 bits.



Note!

The "Data Hold Time" and the diagnostic interrupt are stored in the GSD file. These values can be changed via the properties of the PROFIBUS slave.

The data hold time is the time after which the identification system may overwrite the input data field. Select a time that is longer than the cycle time of the controller. If two data carriers are read directly after one other, the code of the data carrier read first remains in the input data field for the specified time. Then the code of the second data carrier is entered.

The basic setting of the data hold time is "0". The data hold time is set at 10 ms intervals. The value range is 0 ... 2550 ms. Certain values lead to the IDENTControl communication not starting, i.e. the communication does not change into the state Data Exchange. The bus error LED stays on and the IDENTControl is not found by the controller. All data hold time values ??corresponding to a binary code like `xxxx x1xx` lead to this error.

Valid values are 0, 1, 2, 3, 8, 9, 10, 11, 16, 17, 18, ...

Not allowed are 4, 5, 6, 7, 12, 13, 14, 15, 20, 21, 22, ...

The diagnostic interrupt defines whether an interrupt is triggered via the PROFIBUS when a new diagnostic message appears. You can switch the diagnostic interrupt on and off.

7.3.2

Device identification/software version message for PROFIBUS DP

The device identification and the software version are transferred via the DP function "Device-Related Diagnostics".

Address	Length	Content
Byte 0	1 byte	Header byte, length of external diagnostics
Byte 1	2 bytes	16 bits external diagnostics (see table "GSD file (device-related diagnostic bits)" on page 34)
Byte 3	1 byte	Identification byte of the IDENTControl Compact
Byte 4	3 bytes	Software number of the IDENTControl Compact
Byte 7	6 bytes	Software creation date of the IDENTControl Compact
Byte 13	9 bytes	Reserved
Byte 22	1 byte	Identification byte of R/W head 1
Byte 23	3 bytes	Software number of R/W head 1
Byte 26	6 bytes	Software creation date of R/W head 1

Address	Length	Content
Byte 32	1 byte	Identification byte of R/W head 2
Byte 33	3 bytes	Software number of R/W head 2
Byte 36	6 bytes	Software creation date of R/W head 2
	42 bytes	Total length of external diagnostics

**Note!**

The IDENTControl Compact always uses a 6-byte header and 42 bytes of device-related diagnostics.

Identification byte in ExtDiag:**Number of R/W heads that can be connected**

'1'	=>	IC-KP2-1HB6-V15B
'2'	=>	IC-KP2-2HB6-V15B

IDENTControl Compact:**Second character of the housing design**

'8'	=>	IPH-18GM-V1
'0'	=>	IPH-30GM-V1
'1'	=>	IPH-F15-V1
'P'	=>	IPH-FP-V1
'6'	=>	IPH-F61-V1
'2'	=>	IPH-L2-V1

Read head:**Software number of the R/W head:**

330	=>	Type MVH-...
420	=>	Type IPH-...
422	=>	Type IQH1
597	=>	Type ISH-...
635	=>	Type IQH-...

Read head:

Example:

One type IPH-L2 R/W head is connected.

Address	Length	Content
Byte 0	1 byte	2Ah
Byte 1	2 bytes	00h 00h
Byte 3	1 byte	2
Byte 4	3 bytes	418
Byte 7	6 bytes	071108
Byte 13	9 bytes	-----
Byte 22	1 byte	-
Byte 23	3 bytes	no_
Byte 26	6 bytes	head_1
Byte 32	1 byte	2
Byte 33	3 bytes	420
Byte 36	6 bytes	061004

Table 7.1 Underscores (_) represent a protected space.

GSD file (device-related diagnostic bits)

Bit	Meaning
Bit 00	Software error
Bit 01	Hardware error
Bit 02	User error
Bit 03	Reserved
Bit 04	R/W head disconnected
Bit 05	R/W head error
Bit 06	R/W head status changed
Bit 07	Reserved
Bit 08	Power on reset
Bit 09	Reserved
Bit 10	Reserved
Bit 11	Reserved
Bit 12	Reserved
Bit 13	Ident reset
Bit 14	Watchdog reset
Bit 15	Reserved

7.3.3

Software information

A **command** consists of the command code, a specified number of parameters, the toggle flag, and the data relating to the command. The command is entered in the output data field of the master.

A **response** consists of the echo of the command code, a parameter, the toggle flag, the status, a reply counter, and the read data. The response is entered in the input data field of the master.

Some commands do not use all parameter and data fields. The device ignores the not used data fields. The input and output data fields are structured as follows:

Output data field (command):

Byte 0	Command code
Byte 1	Parameter/Toggle flag
Byte 2	Parameter
Byte 3	Parameter
Byte 4	Write data
...	...
Byte N (N is defined by module selection)	Write data

Input data field (response):

Byte 0	Command code (Echo)
Byte 1	Parameter/Toggle flag
Byte 2	Status
Byte 3	Reply counter
Byte 4	Read data
...	...
Byte N (N is defined by module selection)	Read data

In order to send a new command to the device, the PROFIBUS DP master must write the command in the output data field. The new command is executed if the data has changed relative to the last read-in. If the same command is to be executed a number of times, the toggle flag must be inverted so that the device recognizes that it should process a new command.

Upon detection of a new command "Status" is set to FFh.

After the identification system processes commands, the "Status" is output in accordance with the status/fault message table (see chapter 7.3.10).

The first byte of the response corresponds to the first byte of the command call-up (command code).

The toggle bit of the response is the same as the toggle bit of the command.

If the status is FFh (command detected), the second byte of the response also corresponds to the second byte of the command call-up. In the actual response (status not FFh), the second byte contains the parameters for the response, i.e. the number of words in the response and the channel used to transmit the response. After a read command is issued, a response with the status 00 in the "Word count" response parameter then contains the number of words in the response telegram (which is also the command call-up). The number of words in a response to a write command is 0000b because the response only contains the status and not (useful) data. Here, the second byte of the response is not the same as the second byte of the command call-up. With read only code commands, the word count in the response is always 0000b. 3 responses are issued for commands to all connected R/W heads (channel = 111b): The first response (status = FFh) is followed up by 2 other responses that contain the status of the individual channels. The "Channel" parameter in the response telegram contains the number of the relevant channel (001, 010).

If new response data is available, the previous data is overwritten. The configurable data hold time value defines the minimum duration that old data is retained before it may be overwritten with new data. The default setting for the timer value is 0.

New commands may only be issued to the device once the answer was retrieved from the previously issued command.

Enhanced commands are executed repeatedly as long as the commands remain in the output data field. Execution stops only when a new command for the channel on which the **Enhanced** command was executed is written to the output data field.

When the system is switched on, the value on the reply counter is also 00h. This value increases every time the response data field is modified. This also applies if the status changes to FFh or from 00h to 05h (with **enhanced** commands: data carrier leaves the detection range).

In the event of an overrun, the counter skips from FFh to 01h.

7.3.4

Command types

When using commands, a distinction is always made between the two command types **single mode** and **enhanced mode**.

Single mode

The command is executed once. A response is issued immediately.

Enhanced mode

The command remains permanently active until it is interrupted by the user or by an error message. A response is issued immediately.

The command remains active after the response is issued. Data is only transferred if read/write tags change. Read/write tags are not read twice. If a read/write tag leaves the read range, the status '5' is output.

7.3.5

Command overview

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

System commands

Command code		Command description	Abbreviation
4d	04h	See "Change tag (CT)" on page 39	CT
2d	02h	See "Quit (QU)" on page 42	QU
23d	17h	See "Configuration store (CS)" on page 43	CS
22d	16h	See "Reset (RS)" on page 44	RS
155d	9Bh	See "Set multiplexed mode (MM):" on page 45	MM
156d	9Ch	See "Set trigger mode (TM):" on page 46	TM

Standard read/write commands**Fixcode**

Command code		Command description	Abbreviation
1d	01h	See "single read fixcode (SF)" on page 48	SF
29d	1Dh	See "Enhanced buffered fixcode (EF)" on page 49	EF

Read data

Command code		Command description	Abbreviation
16d	10h	See "single read words (SR)" on page 50	SR
25d	19h	See "enhanced buffered read words (ER)" on page 51	ER

Write data

Command code		Command description	Abbreviation
64d	40h	See "single write words (SW)" on page 52	SW
26d	1Ah	See "enhanced buffered write words (EW)" on page 53	EW

Special command modes**Password mode with IPC03**

Command code		Command description	Abbreviation
24d	18h	See "Set password mode (PM)" on page 56	PM
65d	41h	See "Change password (PC)" on page 57	PC
66d	42h	See "Set password (PS)" on page 58	PS

IPC03 configuration

Command code		Command description	Abbreviation
97d	61h	See "Single get configuration (SG)" on page 60	SG
104d	68h	See "Enhanced buffered get configuration (EG)" on page 61	EG
18d	12h	See "Single write configuration (SC)" on page 62	SC
102d	66h	See "Enhanced buffered write configuration (EC)" on page 64	EC

Extended Commands for Type IPC11 and IDC-...-1K Read/Write Tags

Command code		Command description	Abbreviation
31d	1Fh	See "Single write fixcode (SX)" on page 65	SX
36d	24h	See "Enhanced buffered write fixcode (EX)" on page 67	EX
188d	BCh	See "Set tag ID code (TI)" on page 69	TI
170d	AAh	See "Fill data carrier (S#)" on page 70	S#

Extended commands for tag type IDC-...-1K and IUC...

Command code		Command description	Abbreviation
10d	0Ah	See "Single read special fixcode (SS)" on page 71	SS
113d	71h	See "Enhanced read special fixcode (ES)" on page 72	ES
13d	0Dh	See "Single program special fixcode (SP)" on page 73	SP
117d	75h	See "Enhanced program special fixcode (EP)" on page 74	EP
107d	6Bh	See "Initialize data carrier (SI)" on page 75	SI

Extended commands for tag type IDC-...-1K and IQC...

Command code		Command description	Abbreviation
71d	47h	See "Single Write Words with Lock (SL)" on page 76	SL
72d	48h	See "Enhanced write words with lock (EL)" on page 77	EL

Extended commands for IQH2-... and IUH-... read/write heads

Command code		Command description	Abbreviation
190d	BEh	See "read param (RP)" on page 78	RP
191d	BFh	See "write param (WP)" on page 79	WP

7.3.6 System commands

Change tag (CT)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (04h)	0	0	0	0	0	1	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>		<T>	
Byte 2	Data carrier type in ASCII	<TagType> (high byte)							
Byte 3	Data carrier type in ASCII	<TagType> (low byte)							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (04h)	0	0	0	0	0	1	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

This command tells the read/write head on the relevant channel which tag type to communicate with. This setting is stored in the non-volatile memory on the unit.

Supported Tag Types

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'0'	'2'	IPC02	Unique, EM4102 (EM microelectronic)	Read only code	5	5	125 kHz
'0'	'3'	IPC03	EM4450 (EM microelectronic), Titan	Read/write read only code	116	4	125 kHz
'1'	'1'	IPC11	Q5 (Sokymat)	Read/write	5	-	125 kHz

Tag type		P+F design- ation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'1'	'2'	IPC12	P+F FRAM	Read/write read only code	8k	4	125 kHz
'2'	'0'	IQC20 ¹⁾	All ISO 15693 compliant read/write tags	Read/write read only code	8	8	13.56 MHz
'2'	'1'	IQC21	I-Code SLI (NXP)	Read/write read only code	112	8	13.56 MHz
'2'	'2'	IQC22	Tag-it HF-I Plus (Texas Instruments)	Read/write read only code	250	8	13.56 MHz
'2'	'3'	IQC23	my-D SRF55V02P (Infinition)	Read/write read only code	224	8	13.56 MHz
'2'	'4'	IQC24	my-D SRF55V10P (Infinition)	Read/write read only code	928	8	13.56 MHz
'3'	'1'	IQC31	Tag-it HF-I Standard (Texas Instruments)	Read/write read only code	32	8	13.56 MHz
'3'	'3'	IQC33 ²⁾	FRAM MB89R118 (Fujitsu)	Read/write read only code	2k	8	13.56 MHz
'3'	'4'	IQC34	FRAM MB89R119 (Fujitsu)	Read/write read only code	29	8	13.56 MHz
'3'	'5'	IQC35	I-Code SLI-S (NXP)	Read/write read only code	160	8	13.56 MHz
'4'	'0'	IQC40	All ISO 14443A compliant read/write tags	Read only code	-	4/7 ⁶⁾	13.56 MHz
'4'	'1'	IQC41	Mifare UltraLight MF0 IC U1 (NXP)	Read/write read only code	48	7	13.56 MHz
'4'	'2'	IQC42 ³⁾	Mifare Classic MF1 IC S50 (NXP)	Read/write read only code	752	4/7 ⁶⁾	13.56 MHz
'4'	'3'	IQC43 ³⁾	Mifare Classic MF1 IC S70 (NXP)	Read/write read only code	3440	4/7 ⁶⁾	13.56 MHz
'5'	'0'	IDC-...-1K	P+F	Read/write read only code	125	4	250 kHz
'5'	'2'	ICC-...	P+F	Read only code	28	7	250 kHz
'7'	'2'	IUC72 ⁴⁾	UCode-EPC-G2XM (NXP)	Read/write read only code	64	8	868 MHz

Tag type		P+F design- ation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'7'	'3'	IUC7 ₃₄)	Higgs-2 (Alien)	Read only code	-	96	868 MHz
'7'	'4'	IUC7 ₄₄)	UCODE-EPC-G2 (NXP)	Read/write read only code	28	96	868 MHz
'7'	'5'	IUC7 ₅₄)	Monza 2.0 (Impinj)	Read only code	-	96	868 MHz
'7'	'6'	IUC7 ₆₄)	Higgs-3 (Alien)	Read/write read only code	56	240	868 MHz
'8'	'0'	All Class 1 Gen 2 compliant read/write tags		-	-	Max. 96	868 MHz
'9'	'9'	Depends on the reader ⁵⁾		-	-	-	-

- 1) IQC20 is not an actual tag type as such, but is used to read the UID (read only code) of all ISO 15693 compliant read/write tags.
- 2) Read/write tag IQC33 can only be used in combination with a IQH1-... read/write head. The memory is divided into 8-byte blocks (instead of 4-byte blocks). You must enter a continuous initial address for write commands SR, ER, SW and EW.
<WordNum> specifies the number of 8-byte blocks (here, max. 7) and must be an even number.
- 3) Read/write tags IQC40–IQC43 can only be used in combination with a IQH2-... read/write head.
<WordNum> specifies the number of 16-byte blocks and must be a multiple of 4.
The memory can be encrypted for each sector (1 sector = 4 blocks of 16 bytes).
The default key in the tag and reader is FF FF FF FF FF FF_{ASCII}. The key in the reader can be read using the `Read param` command and written using the `Write param` command (see System Commands). The key is only changed in the reader during this process and not in the tag!
The key in the reader is stored in the non-volatile memory.
- 4) IUC7* type read/write tags can only be used with read/write head IUH-F117-V1 in combination with certain control interfaces.
- 5) The tag type configured in the read/write head as the default is selected.
- 6) Read/write tags can have 4-byte (older versions) or 7-byte UIDs. IQC42 and IQC43 type read/write tags from Pepperl+Fuchs generally have 7-byte UIDs.



Note!

In a plant where only one tag type is used, it is advantageous to permanently configure that tag type so that the read/write head detects the tag quicker.

Default tag type:

In the factory default condition, the tag type 99 is preset in the IDENTControl (depending on the reading head type), thus the tag type preset on the reading head is used.

Quit (QU)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (02h)	0	0	0	0	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	not used	-	-	-	-	-	-	-	-
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (02h)	0	0	0	0	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The command running on this channel is interrupted.

Configuration store (CS)**Command:**

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 2	Command code (17h)	0	0	0	1	0	1	1	1
Byte 3	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 4	Mode	0	0	0	0	0	0	0	<Mode>
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-
Byte 8	not used	-	-	-	-	-	-	-	-
Byte 9	not used	-	-	-	-	-	-	-	-

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 2	Command code (17h)	0	0	0	1	0	1	1	1
Byte 3	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-
Byte 8	not used	-	-	-	-	-	-	-	-
Byte 9	not used	-	-	-	-	-	-	-	-

The configuration store (CS) command allows you to store the last command sent to the R/W head in the non-volatile memory of the IDENTControl Compact. The R/W head executes the command automatically again if the power supply is interrupted or the IDENTControl Compact is reset.

<Mode>='1' activates the mode.

<Mode>='0' deactivates the mode.

Configuration store is deactivated by default.

Reset (RS)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (16h)	0	0	0	1	0	1	1	0
Byte 1	Reserved/Channel/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	not used	-	-	-	-	-	-	-	-
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

This command terminates all active commands. The device settings are reloaded from the non-volatile memory.

This confirmation is issued for this command (status FFh) instead of a response. The device resets the hardware and then restarts.

Set multiplexed mode (MM):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (9Bh)	1	0	0	1	1	0	1	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Multiplex mode	0	0	0	0	0	0	0	<F>
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (9Bh)	1	0	0	1	1	0	1	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

This command switches multiplex mode on and off. In multiplex mode, the R/W heads are controlled according to the time multiplex process, i.e. only one R/W head is active. The procedure minimizes mutual interference between R/W heads, allowing two R/W heads to be mounted side by side.

Each IDENT channel sends a response in reply to an MM command.

Multiplex mode <F>='0': Mode off
 <F>='1': Mode on

If a R/W head is not connected to a channel, the response telegram receives the status "06h" (hardware fault) from this channel.

Set trigger mode (TM):

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (9Ch)	1	0	0	1	1	1	0	0
Byte 1	Ident channel/sensor channel/toggle bit	0	<Ident channel>			<Sensor channel>		<T>	
Byte 2	Trigger mode	<Trigger mode>							
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (9Ch)	1	0	0	1	1	1	0	0
Byte 1	Reserved/sensor channel/toggle bit	0	<Ident channel>			<Sensor channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Permitted parameters:

- <Sensor channel> 1 (001b), 2 (010b)
- <Ident channel> 1 (001b), 2 (010b)
(but not <Sensor channel>)
- <Trigger mode> 0 (00000000b): Trigger mode off
1 (00000001b): Trigger mode on
2 (00000010b): Trigger mode inverted

Activating trigger mode interrupts a command running on the <Ident channel>.

If trigger mode is activated with <Trigger mode>=1 (=2), dampening the trigger sensor generates the status 0 (5) and after changing to undamped state, generates the status 5 (0) as a response to the <Sensor channel>. Activating trigger mode generates a response that includes the current status of the sensor on the <Sensor channel>.

If a read/write command is sent to the triggered channel <Ident channel> when trigger mode is active, this command is always activated if the <Sensor channel> transmits status 0. <Ident channel> transmits status 0 to confirm receipt of this command.

If you set <Ident channel> 0, the signal is transferred without influencing a reading head.

The command activated by the <Sensor channel> initiates execution as if it had just been restarted by the host.

The command is deactivated again if the status of the <Sensor channel> changes to 5 or trigger mode is deactivated.

If the <Sensor channel> requests a version message, the response contains the status 0 and no other information.

<Ident channel>=0 allows you to assign the trigger signal to channel '0' so that the trigger signal is transmitted to the controller and not to a read head.

This function can be used to monitor functions via the PLC if trigger signals and reading of data cannot occur simultaneously for application related reasons. Correlation must take place in the PLC.

If a trigger command has assigned channel '0' (000b) for <Identchannel>, this change in the status of the trigger sensor (status 0x00 and 0x05) is transmitted to the controller via the sensor channel

This function can be used to monitor functions via the controller if trigger signals and reading of data cannot occur simultaneously for application related reasons. Correlation must take place in the controller.

7.3.7

Standard read/write commands

single read fixcode (SF)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (01h)	0	0	0	0	0	0	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>		<T>	

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (01h)	0	0	0	0	0	0	0	1
Byte 1	Reserved/Channel/Toggle bit	-	-	-	-	<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	ID code 00h ... FFh	<ID-Code>							
Byte 5	ID code 00h ... FFh	<ID-Code>							
...	ID code 00h ... FFh	<ID-Code>							
Byte N ¹⁾	ID code 00h ... FFh	<ID-Code>							

Table 7.2 1) N = <FixLen> + 3

The R/W head makes only one attempt to read a read only code.

The length of the read only code that is output depends on the tag type. See table "Supported Tag Types" on page 39.

Enhanced buffered fixcode (EF)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (1Dh)	0	0	0	1	1	1	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	not used	-	-	-	-	-	-	-	-
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (1Dh)	0	0	0	1	1	1	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	ID code 00h ... FFh	<ID code>							
Byte 5	ID code 00h ... FFh	<ID code>							
...	ID code 00h ... FFh	<ID code>							
Byte N ¹⁾	ID code 00h ... FFh	<ID code>							

Table 7.3 1) N = <FixLen> + 3

The R/W head makes attempts until successful to read a read only code. Only data that changes is transferred via the interface, i.e. the R/W head transfers data whenever it reads a new read/write tag or whenever it reads a read/write tag where there was previously no read/write head within the detection range.

The status '05h' (read command) is output whenever a read/write tag leaves the detection range.

The length of the read only code that is output depends on the tag type. See table "Supported Tag Types" on page 39.

single read words (SR)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (10h)	0	0	0	1	0	0	0	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Word address	<WordAddr> (high byte)							
Byte 3	Word address	<WordAddr> (low byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (10h)	0	0	0	1	0	0	0	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.4 1) N = 4 x <WordNum> + 3

The R/W head makes one attempt to read <WordNum> 32-bit words from the address<WordAddr>.

enhanced buffered read words (ER)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (19h)	0	0	0	1	1	0	0	1
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Word address	<WordAddr> (high byte)							
Byte 3	Word address	<WordAddr> (low byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (19h)	0	0	0	1	1	0	0	1
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.5 1) N = 4 x <WordNum> + 3

The R/W head makes attempts until successful, to read <WordNum> 32-bit words from the address <WordAddr>. Only modified data is transferred via the interface.

When a read/write tag leaves the detection range, the status '05h' (read command) is output.

single write words (SW)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (40h)	0	1	0	0	0	0	0	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Word address	<WordAddr> (high byte)							
Byte 3	Word address	<WordAddr> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.6 1) N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (40h)	0	1	0	0	0	0	0	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

The R/W head makes one attempt to write <WordNum> 32-bit words from the address<WordAddr>.

enhanced buffered write words (EW)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (1Ah)	0	0	0	1	1	0	1	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Word address	<WordAddr> (high byte)							
Byte 3	Word address	<WordAddr> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.7 1) N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (1Ah)	0	0	0	1	1	0	1	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

The read/write head repeatedly attempts to write <WordNum> 32-bit words from the address <WordAddr> until successful. After each successful write, the head sends the response and then switches to continuous read. The read/write head then reads the same tag until the tag has left the detection range or a new tag appears within the detection range. At this point, the read/write head again starts write attempts.

The status '05h' is only output when a tag leaves the detection range or is not yet within the detection range.

If two tags enter the read range one immediately after the other, the status '05h' is not issued between the two readings.

7.3.8 Special commands

Commands for the data carrier IPC03**Note!**

You can only use the commands in this section for the data carrier type '03' (IPC03).

IPC03 Configuration

The storage of a data carrier IPC03 is organized by word. A data word is defined with a length of 32 bits. For the normal data range, 29 words from addresses 3 through 31 (<WordAddr> = 00h ... 1Ch) are available.

Address	Meaning	<WordAddr>	<ConfAddr>	Note
Word 0	Password	-	-	Write only
Word 1	Protection word	-	1	Read/write
Word 2	Control word	-	2	Read/write
Word 3 ...31	Data range	00h ... 1Ch	-	Read/write
Word 32	Device Serial Number	1Dh	-	Read only
Word 33	Device identification	1Eh	-	Read only

Word 0 contains the password. The password can only be written.

With word 1, the "Protection Word", you can define a read-protected and a write-protected range. The "Protection Word" can only be read and written with the correct password.

With word 2, the "Control Word", you can set various operating modes and the read range for the operating mode "Default Read". The "Control Word" can only be read and written with the correct password.

If you would like to use the "Protection Word" and the "Control Word", you must first activate the password mode.

The individual bits have the following meanings:

Protection word		
Bit	Meaning	Byte
0 ... 7	First read-protected word	0
8 ... 15	Last read-protected word	1
16 ... 23	First write-protected word	2
24 ... 31	Last write-protected word	3

Control word		
Bit	Meaning	Byte
0 ... 7	Read range start	0
8 ... 15	Read range end	1
16	Password mode on/off	2
17	"Read after write" operating mode on/off	
18 ... 23	Open	3
24 ... 31	Open	

IPC03 password mode

If the password mode in the data carrier is activated, the data range of the data carrier is read and write-protected and can only be read or written if the R/W head sends the correct password to the data carrier.

If the password mode in the data carrier is deactivated, every data word on the data carrier can be read or written.

The default password of the R/W heads and the data carrier is 00000000h. In the R/W head, the password is stored in the volatile memory and in the data carrier, the password is stored in the non-volatile memory.

To read or write the "Protection Word" and the "Control Word", you must first enter the password in the password mode (see the commands **SC** or **EC**).

You can also limit access to the data carriers by defining the start and end of a read-protected and a write-protected range in the Protection Word.

Setting the password

1. Enter the correct password once with the command **PS** (set password).
2. Activate the password mode with the command **PM** (set password mode).

Changing the password

To change the password in the R/W head and on the read/write tag, use the command **PC**.

Set password mode (PM)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (18h)	0	0	0	1	1	0	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Password mode	0	0	0	0	0	0	0	<P>
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (18h)	0	0	0	1	1	0	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The command **PM** activates and deactivates the password mode of the relevant channel. In the password mode, the password is transferred to the data carrier before each read/write access. If a data carrier is addressed with the wrong password, then even the other data areas on the data carrier can no longer be accessed.

Password mode "off": <P>=0 (0b) (deactivated)

Password mode "on": <P>=1 (1b) (activated)

Change password (PC)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (41h)	0	1	0	0	0	0	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Old password 00h ... FFh	<PSW> (byte 3)							
Byte 3	Old password 00h ... FFh	<PSW> (byte 2)							
Byte 4	Old password 00h ... FFh	<PSW> (byte 1)							
Byte 5	Old password 00h ... FFh	<PSW> (byte 0)							
Byte 6	New password 00h ... FFh	<PSW> (byte 3)							
Byte 7	New password 00h ... FFh	<PSW> (byte 2)							
Byte 8	New password 00h ... FFh	<PSW> (byte 1)							
Byte 9	New password 00h ... FFh	<PSW> (byte 0)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (41h)	0	1	0	0	0	0	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The command **PC** changes the password in a tag. Enter the old and then the new password <PSW> here. If the password has been successfully written, the password in the read/write head also changes and the **set password** command is no longer required. The password of the IPC03 can also be changed if the password mode is deactivated.

Set password (PS)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (42h)	0	1	0	0	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Reserved	-	-	-	-	-	-	-	-
Byte 4	Password 00h ... FFh	<PSW> (byte 3)							
Byte 5	Password 00h ... FFh	<PSW> (byte 2)							
Byte 6	Password 00h ... FFh	<PSW> (byte 1)							
Byte 7	Password 00h ... FFh	<PSW> (byte 0)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (42h)	0	1	0	0	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The command **PS** sets the password, which the R/W head communicates to the data carrier in password mode.

Operating mode "Default Read"

In "default read" operating mode, 1 or 2 words are read extremely quickly. The area of memory earmarked for reading is already specified on the tag. The R/W head does not have to identify the memory area for the tag.

The start and end of the read range are stored in the bytes 0 and 1 of the control word. As soon as power is supplied to the tag, it sends data from the data range defined by the start and end of the read range. The data range between read range start and end is read with the read commands **SR** (Single read words) and **ER** (enhanced buffered read words) when <WordAddr> is set to 0000h and <WordNum> to 00h.

The advantage of "default read" operating mode is the readout speed. The readout of one data word (4 bytes) is twice as fast in this mode as the other modes. The readout of two words takes approx. 1/3 less time. No more time advantages can be gained after three data words because "default read" mode is designed to read a maximum of two words (= 8 bytes). Reading larger data ranges can lead to error messages if the reading head does not respond within the planned reaction time.

**Note!**

The addresses for the start and end of the read range are based on the absolute word address of the read/write tag, not on <WordAddr>.

Example: With the setting read range start 03h and read range end 03h, the R/W head only reads the first data word in the read/write tag.

**Setting "Default Read"**

1. Activate the password mode.
2. Write the read range start and end into the "Control Word".
3. Deactivate the password mode.
4. Read the data range with address designation 0000h and word count 0h.

IPC03 configuration**Single get configuration (SG)****Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (61h)	0	1	1	0	0	0	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (61h)	0	1	1	0	0	0	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							

The R/W head makes exactly one attempt to read a word in the configuration range ("Protection Word" or "Control Word") from the address <ConfAddr>.

Enhanced buffered get configuration (EG)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (68h)	0	1	1	0	1	0	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (68h)	0	1	1	0	1	0	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							

The R/W head attempts to read a word in the configuration range from the address <ConfAddr> until successful. Only data that changes is transferred via the interface, i.e. the R/W head transfers data whenever it reads a new data carrier or whenever it reads a data carrier where there was previously no R/W head within the detection range.

The status '05h' (read/write command) is output when the data carrier leaves the detection range or if the data carrier is not yet within the detection range when the command is executed.

If two data carriers enter the read range one immediately after the other, the status '05h' is not issued between the two readings.

Single write configuration (SC)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (12h)	0	0	0	1	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	Data 00h ... FFh	<Data byte 3>							
Byte 5	Data 00h ... FFh	<Data byte 2>							
Byte 6	Data 00h ... FFh	<Data byte 1>							
Byte 7	Data 00h ... FFh	<Data byte 0>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (12h)	0	0	0	1	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The R/W head makes exactly one attempt to write a word to the configuration range ("Protection Word" or "Control Word") from the address <ConfAddr>.

The password mode must be active so that the R/W head can write to the configuration range.

If the password mode is deactivated, every data word outside of the write-protected range can be written to. If you would like to modify the write-protected range, you must modify the "Protection Word" accordingly.

For example:

With the R/W head on channel 1, one data word (4 bytes) that does not contain details of the address and data length should be transferred during each read command (accessed with 00 byte and address 0000). Password mode must be activated beforehand by transmitting the command **Set password mode**.

Byte	Bit no.									
	7	6	5	4	3	2	1	0		
Byte 0	0	0	0	1	0	0	1	0	Single write configuration	12h
Byte 1	-	-	-	-	0	0	1	<T>	Channel (=1)	02h/03h
Byte 2	-	-	-	-	-	-	-	-	-	-
Byte 3	0	0	0	0	0	0	1	0	Word address in the configuration range (=control word)	02h
Byte 4	0	0	0	0	0	0	0	0	Bits 16 to 31 of the control word	00h
Byte 5	0	0	0	0	0	0	0	0		00h
Byte 6	0	0	0	0	0	0	1	1	Address of the last data word to write	03h
Byte 7	0	0	0	0	0	0	1	1	Address of the first data word to write	03h

The address of the first and last data word to be written is based on the absolute address of the read/write tag (not the <WordAddr>). The address 03h is therefore the first available word in the data range.

Enhanced buffered write configuration (EC)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (66h)	0	1	1	0	0	1	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	Data 00h ... FFh	<Data byte 3>							
Byte 5	Data 00h ... FFh	<Data byte 2>							
Byte 6	Data 00h ... FFh	<Data byte 1>							
Byte 7	Data 00h ... FFh	<Data byte 0>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (66h)	0	1	1	0	0	1	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The R/W head attempts to write a word in the configuration range to the address <ConfAddr> until successful. After each write, the status is evaluated and the system waits until a new data carrier is within the detection range. The command then starts again from the beginning. In order to write in the configuration range, the password mode must be active.

The status '05h' (read/write command) is only output when a data carrier leaves the detection range or is not yet within the detection range when the command is executed.

If two data carriers enter the read range one immediately after the other, the status '05h' is not issued between the two readings.

Write read only code IPC11 and IDC-...-1K

"Read-after-write" operating mode is not used.

Tags IPC11 can be programmed to behave like the IPC02 read only tag. To do this, use the commands **SX** and **EX**. The code is read when tag type '02' or '11' is set with the commands **SF** and **EF**.

Tags IDC-...-1K can be programmed to behave like the ICC read only tag. This programming occupies the first 8 bytes in the tag and occurs when the tag type '50' is set with the commands **SX** or **EX**.

This code is read when tag type '52' is set with the commands **SF** or **EF**. If you use the command **SF** or **EF** when tag type '50' is selected, the 4-byte read only code of the tag is issued.

Single write fixcode (SX)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (1Fh)	0	0	0	1	1	1	1	1
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	FixType	<FixType> (high byte)							
Byte 3	FixType	<FixType> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.8 1) N = <FixLen> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (1Fh)	0	0	0	1	1	1	1	1
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The R/W head makes only one attempt to write a read only code.

IPC11:	<FixLen>	=	5
	<FixType>	=	'02' ASCII (30h 32h), the read only code cannot be changed '11' ASCII (31h 31h), the read only code can be overwritten
IDC-...-1K:	<FixLen>	=	7 The first 3 bytes are hexadecimal (0h ... Fh), the last 4 bytes are decimal (0d ... 9d).
	<FixType>	=	'52' ASCII (35h 32h), the read only code can be overwritten
	<Data>	=	(Byte 1 to 3): 0x30 ... 0x39; 0x41...0x46 (Byte 4 to 7): 0x30...0x39

Type IDC-...-1K tags can be programmed in such a way that they are compatible with the type ICC-... read only carriers. This programming occupies the first 8 bytes in the tag. The read/write commands can be used to access the remaining memory.

You must set the tag type '50' in order to program type IDC-...-1K tags. To do this, transmit the command **SX** or **EX**.

The value range contains 7 characters:

- the first 3 characters contain the values 0 ... F (hexadecimal code)
- the last 4 characters contain the values 0 ... 9 (decimal code)

You must select the tag type '50' (ICC-...) beforehand in order to read out this code. If a "read only code" command is executed when the tag type '50' (IDC-...-1K) is set, the 4-byte read only code for this tag is issued.

Enhanced buffered write fixcode (EX)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (24h)	0	0	1	0	0	1	0	0
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>		<T>	
Byte 2	FixType	<FixType> (high byte)							
Byte 3	FixType	<FixType> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.9 1) N = <FixLen> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (24h)	0	0	1	0	0	1	0	0
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The R/W head constantly attempts to write a read only code. After each successful write, the response is sent and the system waits until a new tag is within the detection range. The command then starts again from the beginning.

IPC11: <FixLen> = 5
 <FixType> = '02' ASCII (30h 32h), the read only code cannot be changed
 '11' ASCII (31h 31h), the read only code can be overwritten

IDC-...-1K: <FixLen> = 7
 The first 3 bytes are hexadecimal (0h ... Fh), the last 4 bytes are decimal (0d ... 9d).
 <FixType> = '52' ASCII (35h 32h), the read only code can be overwritten
 <Data> = (Byte 1 to 3): 0x30 ... 0x39; 0x41...0x46
 (Byte 4 to 7): 0x30...0x39

Type IDC-...-1K tags can be programmed in such a way that they are compatible with the type ICC-... read only carriers. This programming occupies the first 8 bytes in the tag. The read/write commands can be used to access the remaining memory.

You must set the tag type '50' in order to program type IDC-...-1K tags. To do this, transmit the command **SX** or **EX**.

The value range contains 7 characters:

- the first 3 characters contain the values 0 ... F (hexadecimal code)
- the last 4 characters contain the values 0 ... 9 (decimal code)

You must select the tag type '50' (ICC-...) beforehand in order to read out this code. If a "read only code" command is executed when the tag type '50' (IDC-...-1K) is set, the 4-byte read only code for this tag is issued.

Set tag ID code (TI)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (BCh)	1	0	1	1	1	1	0	0
Byte 1	ID length/Channel/Toggle bit	<ByteNum>				<Channel>		<T>	
Byte 2	Data	<ID code>							
Byte 3	Data	<ID code>							
Byte 4	Data	<ID code>							
Byte 5	Data	<ID code>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (BCh)	1	0	1	1	1	1	0	0
Byte 1	Reserved/Channel/Toggle bit	<ByteNum>				<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

This command restricts the execution of all other read/write commands to the read/write tag with the specified ID code. This also applies if another read/write tag is located within the detection range. A targeted response is achieved from the read/write tag as a result.

<ByteNum> = 0h: Do not make a selection. An ID code is not specified in the telegram.

<ByteNum> = 8h (System IQ): Make a selection. An ID code must be specified in the telegram.

<ByteNum> = 0h deletes this filter.

**Note!**

The TI command only adjusts a setting in the reading head. There is no HF communication with the read/write tags.

Fill data carrier (S#)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (AAh)	1	0	1	0	1	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	<Reserved>				<Channel>		<T>	
Byte 2	Start address	<WordAddr> (high byte)							
Byte 3	Start address	<WordAddr> (low byte)							
Byte 4	Word count	<WordNum> (high byte)							
Byte 5	Word count	<WordNum> (low byte)							
Byte 6	Character	<Fill sign>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (AAh)	1	0	1	0	1	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	<Reserved>				<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

The word number <WordNum> of fill signs <Fill Sign> is written to the read/write tag from the specified start address <WordAddr>.

Extended commands for type IDC-... and IUC... tags

Type IDC-...-1K tags can be programmed to read 24-bit information (so-called **special read only code**) very quickly. This is useful for detecting containers in automated warehouses.

Length of the **special read only code**:

- Tag of the type IDC-...-1K: 48 bit
- Tag of the type IUC: 96 ... 240 bit

To write the **special read only code** use the commands **SP** and **EP**; to read it out, use the commands **SS** and **ES**.

If **SP** or **EP** is used to write to an IDC-...-1K tag, the tag is then locked. If you wish to write to the tag again using standard commands, unlock it using the command **SI**.

Single read special fixcode (SS)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (0Ah)	0	0	0	0	1	0	1	0
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	not used	-	-	-	-	-	-	-	-
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (0Ah)	0	0	0	0	1	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	ID code 00h ... FFh	<ID code>							
Byte 5	ID code 00h ... FFh	<ID code>							
Byte 6	ID code 00h ... FFh	<ID code>							
Byte 7	ID code 00h ... FFh	<ID code>							
Byte 8	ID code 00h ... FFh	<ID code>							
Byte 9	ID code 00h ... FFh	<ID code>							

The R/W head makes only one attempt to read a **special read only code**.

**Note!**

The <FixLen> of IDC-...-1K read/write tags is always 6 bytes.

Enhanced read special fixcode (ES)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (71h)	0	1	1	1	0	0	0	1
Byte 1	Word number/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	not used	-	-	-	-	-	-	-	-
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (71h)	0	1	1	1	0	0	0	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	ID code 00h ... FFh	<ID code>							
Byte 5	ID code 00h ... FFh	<ID code>							
Byte 6	ID code 00h ... FFh	<ID code>							
Byte 7	ID code 00h ... FFh	<ID code>							
Byte 8	ID code 00h ... FFh	<ID code>							
Byte 9	ID code 00h ... FFh	<ID code>							

The R/W head attempts to read a **special read only code** until successful. Only data that changes is transferred via the interface, i.e. the R/W head transfers data whenever it reads a new data carrier or whenever it reads a data carrier where there was previously no R/W head within the detection range.

The status '05h' (read command) is output whenever a data carrier leaves the detection range.

**Note!**

The <FixLen> of IDC-...-1K read/write tags is always 6 bytes.

Single program special fixcode (SP)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (0Dh)	0	0	0	0	1	1	0	1
Byte 1	Word number/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	Reserved	0	0	0	0	0	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	ID code 00h ... FFh	<ID code>							
Byte 5	ID code 00h ... FFh	<ID code>							
Byte 6	ID code 00h ... FFh	<ID code>							
Byte 7	ID code 00h ... FFh	<ID code>							
Byte 8	ID code 00h ... FFh	<ID code>							
Byte 9	ID code 00h ... FFh	<ID code>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (0Dh)	0	0	0	0	1	1	0	1
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The R/W head makes only one attempt to write a **special read only code**.

**Note!**

The <FixLen> of IDC-...-1K read/write tags is always 6 bytes.

Enhanced program special fixcode (EP)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (75h)	0	1	1	1	0	1	0	1
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	Reserved	0	0	0	0	0	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	ID code 00h ... FFh	<ID code>							
Byte 5	ID code 00h ... FFh	<ID code>							
Byte 6	ID code 00h ... FFh	<ID code>							
Byte 7	ID code 00h ... FFh	<ID code>							
Byte 8	ID code 00h ... FFh	<ID code>							
Byte 9	ID code 00h ... FFh	<ID code>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (75h)	0	1	1	1	0	1	0	1
Byte 1	FixLen/Ident channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

The R/W head attempts to write a **special read only code** until successful. After each successful write, the head sends the response and then switches to continuous reading. Then the R/W head reads the same data carrier until it has left the detection range or a new data carrier appears within the detection range. The command then starts again with write attempts.

The status '05h' (read/write command) is output when the data carrier leaves the detection range or if the data carrier is not yet within the detection range when the command is executed.

If two data carriers enter the read range one immediately after the other, the status '05h' is not issued between the two readings.

Note!

The <FixLen> of IDC-...-1K read/write tags is always 6 bytes.



Initialize data carrier (SI)**Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (6Bh)	0	1	1	0	1	0	1	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>		<T>	

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (6Bh)	0	1	1	0	1	0	1	1
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-
Byte 8	not used	-	-	-	-	-	-	-	-

This command allows conventional reading and writing of IDC-...-1K read/write tags that were configured using the **EP** or **SP** commands.

Extended commands for type IQC-... read/write tags.**Single Write Words with Lock (SL)****Command:**

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (47h)	0	1	0	0	0	1	1	1
Byte 1	Word number/ident channel/toggle bit	<WordNum>				<Channel>		<T>	
Byte 2	Word address	<WordAddr> (high byte)							
Byte 3	Word address	<WordAddr> (low byte)							
Byte 4	Data for 00h to FFh	<Data>							
Byte 5	Data for 00h to FFh	<Data>							
...	Data for 00h to FFh	<Data>							
Byte N ¹⁾	Data for 00h to FFh	<Data>							

Table 7.10 1) N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (47h)	0	1	0	0	0	1	1	1
Byte 1	Word number/ident channel/toggle bit	<WordNum>				<Channel>		<T>	
Byte 2	State	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	Not used	-	-	-	-	-	-	-	-
Byte 5	Not used	-	-	-	-	-	-	-	-
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

This command works in the same way as a normal write command. Once writing is completed, the data from before the overwriting process is protected, providing that the read/write tags offer this function.

This applies for 21, 22, 24 and 33 type 13.56 MHz read/write tags as well as for IDC-...-1K LF read/write tags. 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 read/write head makes one attempt to write <WordNum> 32-bit words from the address <WordAddr>.

Enhanced write words with lock (EL)**Command:**

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (48h)	0	1	0	0	1	0	0	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>		<T>	
Byte 2	Word address	<WordAddr>(high byte)							
Byte 3	Word address	<WordAddr> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N ¹⁾	Data 00h ... FFh	<Data>							

Table 7.11 1) 4 x <WordNum> + 6

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (48h)	0	1	0	0	1	0	0	0
Byte 1	Word number/Ident channel/Toggle bit	<WordNum>				<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

This command is the same as a normal write command. The data is write-protected at the end of the write process, provided the tags offer this function.

This applies for 13.56 MHz tags of the type 21, 22, 24, and 33 as well as for LF tags IDC-...-1K. Write protection is only activated for memory blocks involved in the write process. Data can continue to be written to all other memory blocks.

The R/W head repeatedly attempts to write <WordNum> 32-bit words from the address <WordAddr> until successful. After each successful write, the head sends the response and then switches to continuous reading. Then the R/W head reads the same tag until it has left the detection range or a new tag appears within the detection range. The command then starts again with write attempts.

The status '05h' is only output when a tag leaves the detection range or is not yet within the detection range. If two tags enter the read range one immediately after the other, the status '05' is not issued between the two readings.

Extended commands for IQH2-... and IUH-... read/write heads**read param (RP)****Command:**

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (BEh)	1	0	1	1	1	1	1	0
Byte 1	reserved/Ident channel/Toggle bit	0				<Channel>		<T>	
Byte 2	reserved	0							
Byte 3	System code	<SystemCode>							
Byte 4	Parameter type	<ParamTyp> (High Byte)							
Byte 5	Parameter type	<ParamTyp> (Low Byte)							
Byte 6	Parameter length	<ParamLen> (High Byte)							
Byte 7	Parameter length	<ParamLen> (Low Byte)							
Byte 8	Parameter (optional)	<Param> (opt.)							
...	Parameter (optional)	<Param> (opt.)							
Byte N ¹⁾	Parameter (optional)	<Param> (opt.)							

1) $N = \text{<DataLength>} + 7$

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (BEh)	1	0	1	1	1	1	1	0
Byte 1	reserved/Ident channel/Toggle bit	0				<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	Data length in bytes	<DataLen> (High Byte)							
Byte 5	Data length in bytes	<DataLen> (Low Byte)							
Byte 6	Data 00 ... FFh	<Data>							
...	Data 00 ... FFh	<Data>							
Byte N ²⁾	Data 00 ... FFh	<Data>							

2) $N = \text{<DataLength>} + 5$

write param (WP)**Command:**

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (BFh)	1	0	1	1	1	1	1	1
Byte 1	reserved/Ident channel/Toggle bit	0				<Channel>		<T>	
Byte 2	reserved	0							
Byte 3	System code	<SystemCode>							
Byte 4	Parameter type	<ParamTyp> (High Byte)							
Byte 5	Parameter type	<ParamTyp> (Low Byte)							
Byte 6	Data length in bytes	<DataLen> (High Byte)							
Byte 7	Data length in bytes	<DataLen> (Low Byte)							
Byte 8	Data 00 ... FFh	<Data>							
...	Data 00 ... FFh	<Data>							
Byte N ¹⁾	Data 00 ... FFh	<Data>							

1) $N = \text{<DataLength>} + 7$

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (BFh)	1	0	1	1	1	1	1	1
Byte 1	reserved/Ident channel/Toggle bit	0				<Channel>		<T>	
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-

IQH2-...: <SystemCode> = 'Q' ASCII (51_h)

<ParamTyp> = 'K1' ASCII (4B_h 31_h)

RP: reads the key (12 characters ASCII from 0 ... F) from the transponder and the read head

WP: writes the key (12 characters ASCII from 0 ... F) into the read head

Default key = 'FF FF FF FF FF FF' ASCII

(46_n46_n46_n46_n46_n46_n46_n46_n46_n46_n46_n46_n)

IUH-...: See handbook of the read / write head



Note!

Toggle bit

If you send two commands with the same SystemCode and same ParamTyp in succession on the bus interface, you must change the toggle bit in the second command in order for the node to detect the command.

7.3.9

Legend

- <Battery condition 1> : 1 byte, first digit of battery condition (percentage, decimal, ASCII encoded). 30h, 31h
- <Battery condition 2> : 1 byte, second digit of battery condition (percentage, decimal, ASCII encoded). 30h, 39h
- <Battery condition 3> : 1 byte, third digit of battery condition (percentage, decimal, ASCII encoded). 30h, 39h
- <ByteNum> : 4 bits, length of <ID code>;
System MV: 4 characters (04h)
System IQ: 8 characters (08h)
- <Channel> : 3 bits, channel of the R/W head
Channel 1 (001b), channel 2 (010b),
all channels (111b)
- <ConfAddr> : 1 ASCII character, word starting address in configuration
area of data carrier. The following applies for IPC03:
"1" = Protection Word
"2" = Control Word
- <Data> : <WordNum> times 4 bytes. When communicating a word,
the highest value byte is transferred first and the lowest
value byte last.
- <F> : 1 bit, multiplex mode, 0 (0b): Mode off, 1 (1b): Mode on
- <Fill sign> : 1 ASCII character
- <FixLen> : 4 bits, length of the read only code in bytes, see "This command tells
the read/write head on the relevant channel which tag type to
communicate with. This setting is stored in the non-volatile memory
on the unit." on page 39
- <FixType> : 2 ASCII characters, for example: '02' for IPC02
- <ID code> : 4 bytes, 6 bytes or 8 bytes (depending on the data carrier type)
- <Ident channel> : 3 bits, channel of the R/W head
0 (000b), 1 (001b), 2 (010b), all channels (111b)
(but not <Sensor channel> in trigger mode)
- <Month> : 2 bytes ASCII, hexadecimal encoding, 01 ... 0C (01=January,
0C=December)
- <P> : 1 bit, password mode, 0 (0b): Mode off, 1 (1b): Mode on
- <ParamTyp> : Type of parameter, 2 ASCII characters
- <PSW> : 4 bytes HEX, password
- <ReplyCounter> : 1 byte, increases by 1 after each response and confirmation. The
reply counter starts from 0 after the system is switched on. When the
maximum value is reached, the counter skips the value 0 (from 255 to
1).
- <Sensor channel> : 3 bits, channel 1 (001b) or 2 (010b)

<Status>	: 1 byte (see chapter 7.3.10)
<SystemCode>	: = "Q" (0x51) or "U" (0x55)
<T>	: 1 bit, toggle bit
<TagType>	: 2 ASCII characters, for example: '02' for IPC02
<Trigger mode>	: 8 bits 0 (0000000b): Trigger mode off 1 (0000001b): Trigger mode on 2 (0000010b): Trigger mode inverted
<WordAddr>	: 2 bytes, word start address in the data carrier, range from 0000h to FFFh, depending on data carrier type.
<WordNum>	: 4 bits, number of words to be read or written, range from 0h to Fh, depending on data carrier type. The following applies for IPC03: The word count 0h is used with the word address 0000h to read the preset data range on the data carrier ("Default Read"). The following applies for IQC33: The word count parameter must be even-numbered because of the block size of 8 bytes. The word address then indicates the offset in 8-byte increments.
<Year>	: 2 bytes ASCII, hexadecimal encoding, 00h ... 63h

7.3.10

Fault/Status messages

Status	Meaning
00h	The command has been executed without error.
FFh	The command is processing.

Error messages which triggered the identification system

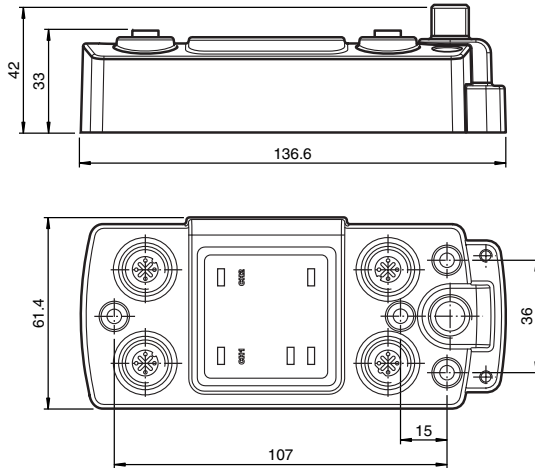
Status	Meaning
01h	The battery of the read/write tag is weak.
02h	Reserved
03h	Reserved
04h	Incorrect or incomplete command or parameter not in the valid range.
05h	No data carrier in the detection range.
06h	Hardware error, e.g. error during self-test or R/W head defect.
07h	Internal device error.
08h	Reserved
09h	The parameterized tag type is not compatible with the connected reading head.
0Ah	Several tags in the detection range (UHF).
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Internal buffer overflow.
0Fh	Reserved

Error messages sent by the bus connection

Status	Meaning
10h	Reserved
20h	Reserved
40h	Incorrect or incomplete command or parameter not in the valid range. TCP/IP: The specified length of the message does not match the actual length.

8 Technical specifications

8.1 Dimensions



8.2 Technical data

General specifications

Number of read/write heads	max. 2 alternatively 1 read/write head and 1 trigger sensor
----------------------------	--

Indicators/operating means

LED BUS	green: Slave is at state Data Exchange red: Bus error
LED Diag	No function
LEDs 1, 2	Status indicator for read/write heads green: command at read/write head active yellow: approx. 1 second long, if command was successfully executed
LEDs CH1, CH2	green: read head detected red: Configuration error
LED PWR/ERR	green: power on red: Hardware fault
Rotary switch	Address setting 00 ... 7E, FF (hexadecimal) BUS Address (high nibble): 0 ... 7, F BUS Address (low nibble): 0 ... F

Electrical specifications

Rated operating voltage	20 ... 30 V DC , PELV
Ripple	≤ 10 % at 30 V DC
Current consumption	≤ 4 A incl. read/write heads

Power consumption	2 W Without read/write heads
Electrical isolation	basic insulation acc. to DIN EN 50178, rated insulation voltage of 50 V _{eff}

Interface 1

Interface type	PROFIBUS
Physical	RS 485
Protocol	PROFIBUS DP acc. to EN 50170
Transfer rate	9.6; 19.2; 93.75; 187.5; 500; 1500 kBit/s 3; 6; 12 Mbit/s self-synchronizing

Interface 2

Interface type	Diagnostic Interface
Physical	RS 232
Protocol	ASCII
Transfer rate	38.4 kBit/s

Compliance with standards and directives

Directive conformity	
EMC Directive 2004/108/EC	EN 61000-6-2:2006, EN 61000-6-4:2007
Standard conformity	
Protection degree	IEC 60529:2001

Ambient conditions

Ambient temperature	-25 ... 70 °C (-13 ... 158 °F)
Storage temperature	-40 ... 85 °C (-40 ... 185 °F)
Climatic conditions	air humidity max. 96 % Salt spray resistant to EN 60068-2-52
Shock and impact resistance	Oscillation (Sine): 5 g, 10 - 1000 Hz to EN 60068-2-6 Shock (Half-sine): 30 g, 11 ms in accordance with EN 60068-2-27

Mechanical specifications

Protection degree	IP67
Connection	Read/write heads: shielded, 4-pin, M12 connector Power supply: M12 connector Protective earth: M4 earthing screw Diagnostic RS 232: M12 connector PROFIBUS: M12 connector, B-coded
Material	
Housing	Powder coated zinc
Installation	screw fixing
Mass	approx. 500 g

9

Fehlersuche

Fault source	Possible cause	Remedy
The operating voltage LED (PWR/ERR) does not light up.	Power supply is interrupted.	Ensure that the power supply is connected to a 24 V DC source.
The CH1 or CH2 indicator does not light up even though the R/W head is connected to port 1 or port 2.	The cable is defective or not connected correctly.	Check the cable and repair if necessary.
	The R/W head is defective.	Check the R/W head and replace if necessary.
A read command (e.g. SR ...) gives the status 4 even though the syntax is correct.	An incorrect tag type is selected for the relevant channel (e.g. IPC02). The read commands only function with data carriers and not with code carriers.	Preset the correct tag type (e.g. IPC03) or "Autodetect" using the CT ... command.
The LEDs in the reading head and the CHx indicator on the IDENTControl are flashing.	The connected reading head does not support the preset tag type.	Select a tag type that the reading head supports.
The SG or EG command (Get configuration) gives the status 4 even though the syntax is correct.	IPC03 is not selected for the relevant channel. The configuration commands only function if the data carrier IPC03 is selected and not in Autodetect mode.	Preset the tag type IPC03 using the CT ... command.
The red "BusError" LED lights up (slave is not in "DataExchange" state).	There is no longer a connection to the master.	Check the cable, the connection, and the terminator and repair if necessary.
	The slave address is incorrect.	Configure the device and the master with the same slave address (on the slave in the hexadecimal display).

Table 9.1 This table will be updated and extended if necessary. See www.pepperl-fuchs.de to download the latest version of the manual

10 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



FACTORY AUTOMATION – SENSING YOUR NEEDS



Worldwide Headquarters

Pepperl+Fuchs GmbH
68307 Mannheim · Germany
Tel. +49 621 776-0
E-mail: info@de.pepperl-fuchs.com

USA Headquarters

Pepperl+Fuchs Inc.
Twinsburg, Ohio 44087 · USA
Tel. +1 330 4253555
E-mail: sales@us.pepperl-fuchs.com

Asia Pacific Headquarters

Pepperl+Fuchs Pte Ltd.
Company Registration No. 199003130E
Singapore 139942
Tel. +65 67799091
E-mail: sales@sg.pepperl-fuchs.com

www.pepperl-fuchs.com

 **PEPPERL+FUCHS**
SENSING YOUR NEEDS

Subject to modifications
Copyright PEPPERL+FUCHS • Printed in Germany

TDOCT-1530E_ENG
01/2013