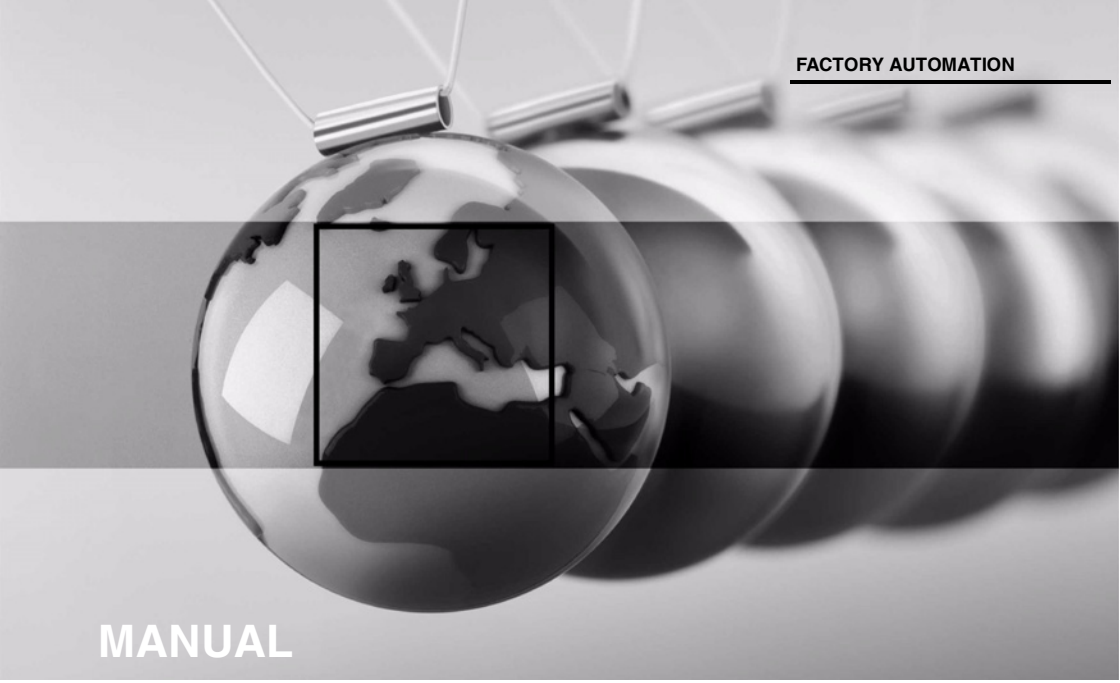
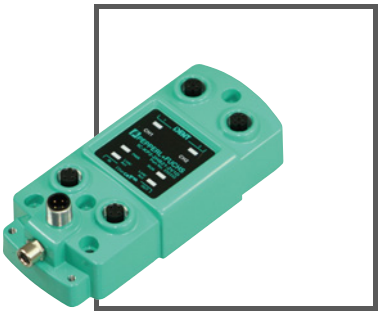


MANUAL

IC-KP2-2HB21-2V1D

IDENTControl Compact control interface with interface for EtherCAT



CE

EtherCAT

PEPPERL+FUCHS
SENSING YOUR NEEDS

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

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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

1.1 EtherCAT

EtherCAT® is a registered trademark and patented technology, licensed by Beckhoff Automation GmbH, Germany.

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-KP2-2HB21-2V1 is a control interface designed for identification systems with an integral EtherCAT interface. The IDENTControl Compact can be used as a control cabinet module or for field applications. You can connect suitable inductive read/write heads, UHF 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.

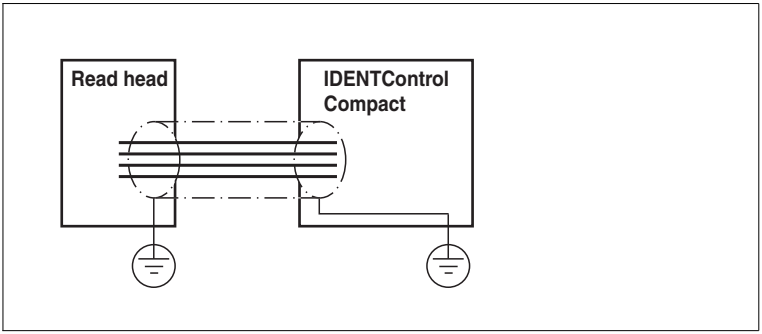
Note!

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 5.3.3

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).

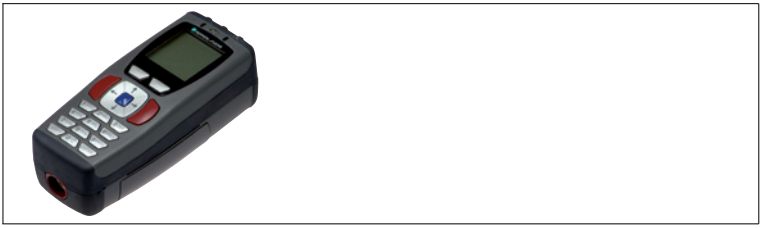


Figure 4.1

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.

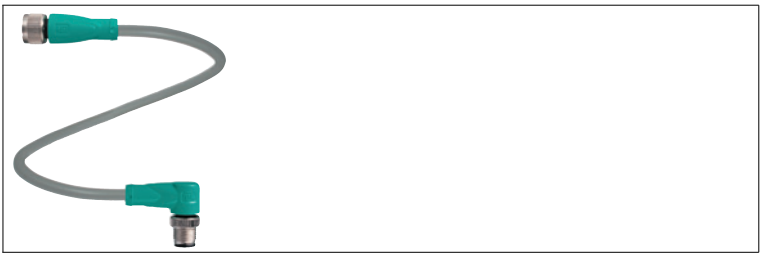


Figure 4.2

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.

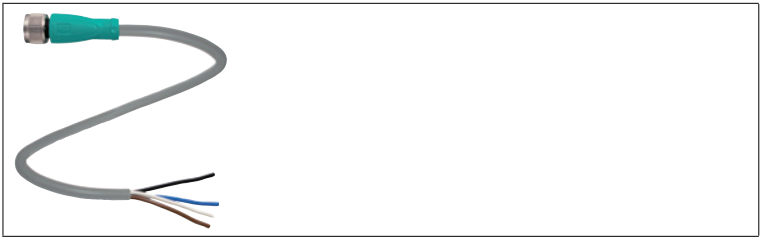


Figure 4.3

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 EtherCAT interface

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

Figure 4.4

Accessories	Model number
Connection cable 5 m	V1SD-G-5M-PUR-ABG-V45-G

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 for diagnosis.

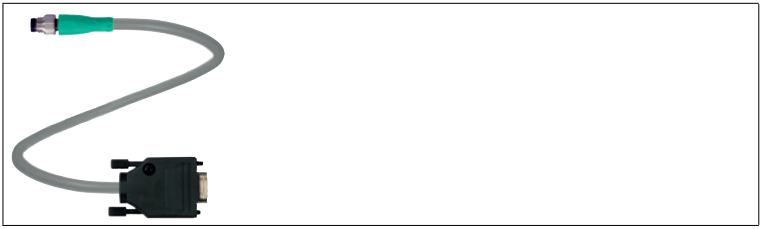


Figure 4.5

Accessories	Designation
M8 to SUBD adapter	V3S-GM-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 interface IC-KP2-2HB21-2V1 has the following interfaces and connections:

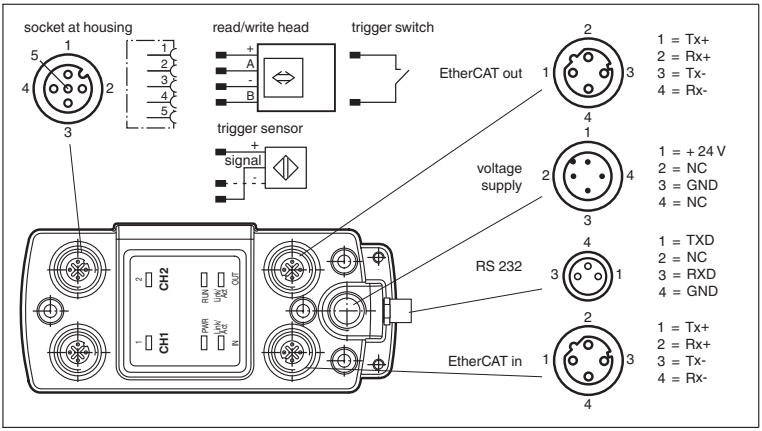


Figure 4.6

4.7 Displays and Controls

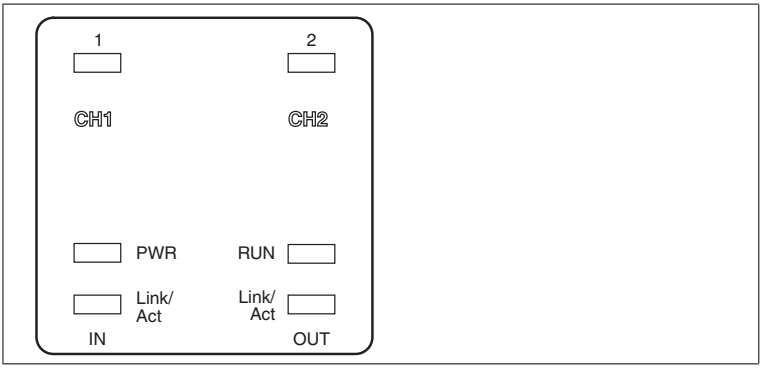


Figure 4.7

LEDs

Description	Function	Status description
1 2	Status display for read/write heads	LED lights up **green** when there is an active command on the read/write head. LED illuminates **yellow** for approx. 1 second when a command has been successfully executed.
CH1 CH2	Indicates that a read/write head is connected	LED lights up **green** when a read/write head is connected to channel 1 or channel 2. LED lights up **red** when a configuration error occurs.
PWR	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.
RUN	See table below	
Link/Act	Connection/network activity for the relevant channel (1/2)	LED is off until initial communication is made via the Ethernet. LED lights up **green** when a connection to the network is established. LED flashes **yellow** in the rhythm at which data is sent.

LED RUN	Status	Status description
Off	INITIALIZATION	The device is in the initialization phase.
Flashes **green**	PREOPERATIONAL	Communication on the service channel. No process data exchange.
Flashes **green** once	SAFE OPERATIONAL	Synchronization is taking place. Valid inputs are transferred. Outputs remain in a secure state.
Lights up **green**	OPERATIONAL	Normal communication. Synchronous data exchange with the master.

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.

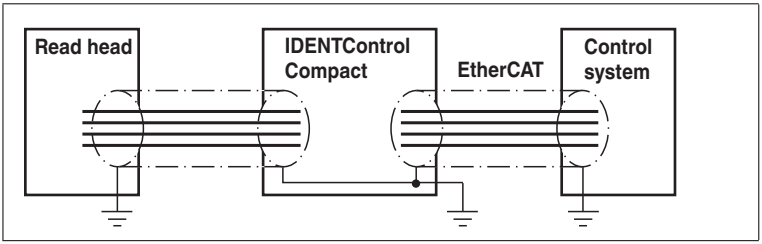


Figure 5.1

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.

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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 Device connection

Electrical connection using plug connectors makes installation simple.

5.3.1 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

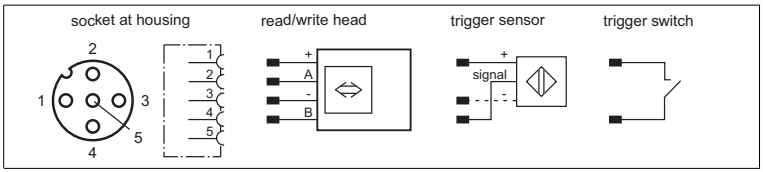
4 NC

Compatible connecting cable see chapter 4.2.2

5.3.2 R/W head and trigger sensors

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

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



Compatible R/W heads see chapter 4.1.1 and compatible connecting cables see chapter 4.2.1.

Connecting R/W heads

Connect the R/W heads or the trigger sensor with compatible cable to the top of the enclosure via the M12 connector.

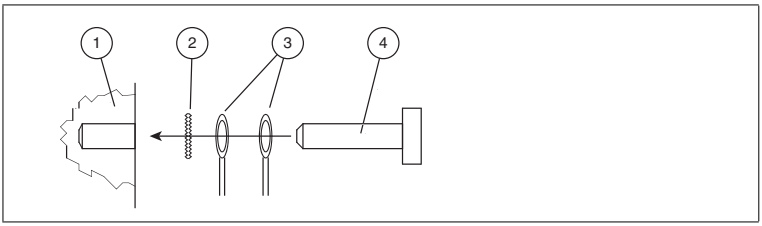
5.3.3 Ground connection

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 mm^2.



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.

5.3.4 Connecting the RS 232 diagnostic interface

The maximum length of the cable between the control unit and the higher level computer or the controller depends on the transfer rate and the noise level. We recommend the guide value of a 15 m maximum cable length on the **RS 232** diagnostic interface.

The transfer rate (baud rate) has a preset configuration at 38400 bit/s.

The device operates with the following parameters (permanent):

- 8 data bits
- 1 start bit
- 1 stop bit
- No parity

Connect the **RS 232** interface with the M8 socket. You must place the cable shield on the thread in the connector plug.

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Connector assignment	Pin	Signal
	1	TXD
	3	RXD
	4	GND

Use the adapter V3S-GM-0.15M-PUR-SUBD to connect the IDENTControl Compact to the **RS 232** diagnostic interface.

Pin assignment of the adapter for the RS 232 diagnostic interface

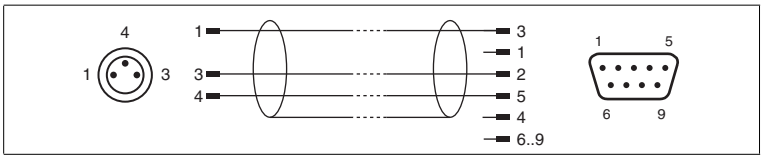
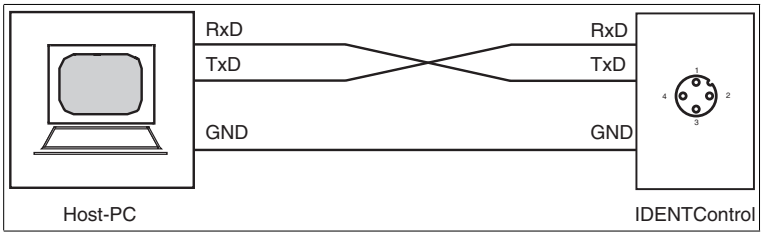


Figure 5.2

Connection example RS 232



5.3.5 EtherCAT connection guide

Use the D-coded M12 socket and the V1SD-G-5M-PUR-ABG-V45-G cable to connect the IDENT*Control* Compact control interface to an EtherCAT network.

1 Tx+

2 Rx+

3 Tx-

4 Rx-

Caution!

Electromagnetic interference

Device malfunction caused by EMC effects.

The M12 socket is connected galvanically to the grounded housing. To avoid interference, use cables with a continuous shield.

6 Commissioning

6.1 Connection

Warning!
Incorrect electrical connection

Incorrect connections may damage the system.

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.

6.2 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.

6.2.1 Address setting

EtherCAT slaves receive their address via the controller. No manual address assignment is necessary.

6.2.2 Non-volatile parameters

There 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
Read/write head		
Trigger mode	Off	On/off
Tag type	99	00 ... FF

Configure the non-volatile parameters of the R/W system with the system commands described (see chapter 7.2.4). The "multiplex mode" and "tag type" parameters can also be set via initial settings. "99" is preset as the tag type.

7 Commands

7.1 General Information about EtherCAT

EtherCAT (Ethernet for **C**ontrol **A**utomation **T**echnology) is a standardized field bus that enables data exchange between PLCs, PCs, operating and observation devices and also sensors and actuators.

Note!

The EtherCAT Technology Group (ETG) publishes various information brochures and an EtherCAT product catalog (http://www.ethercat.org).

7.2 Communication via EtherCAT

In order to integrate the IC-KP2-2HB21-2V1D device in a PLC project, you need the EtherCAT slave information file (ESI file). You can find this ESI file at http://www.pepperl-fuchs.com.

1. Simply enter the product name or model number in the **product/keyword search** box. Click on **Search**.

2. If there is more than one compatible product, a product list appears. Select your product from the list.
3. Switch to the **product information** list. Select "Technical Documents".

   ↳ A list of all available documents is displayed.

4. Select the ESI file or the sample project by clicking the relevant ZIP file name.

The ESI file contains four devices:

- 16 byte IN/OUT
- 64 byte IN/OUT
- 128 byte IN/OUT
- 256 byte IN/OUT

The devices are differentiated by the number of transferable bytes:

Device	**Channel 0** Control interface	**Channel 1** Reader 1	**Channel 2** Reader 2
16 byte IN/OUT	8 byte	16 byte	16 byte
64 byte IN/OUT	8 byte	64 byte	64 byte
128 byte IN/OUT	8 byte	128 byte	128 byte
256 byte IN/OUT	8 byte	256 byte	256 byte

Note!

The device is delivered with the 64-byte IN/OUT version

Channel setup

Each channel is set up according to the following plan

OUTPUT telegram:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved								
Byte 2	Command code								
Byte 3	Reserved								
Byte 4	Parameter								
Byte 5	Parameter								
Byte 6	Parameter								
Byte 7	Parameter								
Byte 8	Data								
...	Data								
Byte N	Data								

Table 7.1 Master -> Slave

INPUT telegram:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved								
Byte 2	Command code								
Byte 3	Reserved								
Byte 4	Status								
Byte 5	Reply counter								
Byte 6	Parameter								
Byte 7	Parameter								
Byte 8	Data								
...	Data								
Byte N	Data								

Table 7.2 Slave -> master

D_S: Delete bit. When the bit is inverted, all expired data in the FIFO memory bank is deleted in the slave

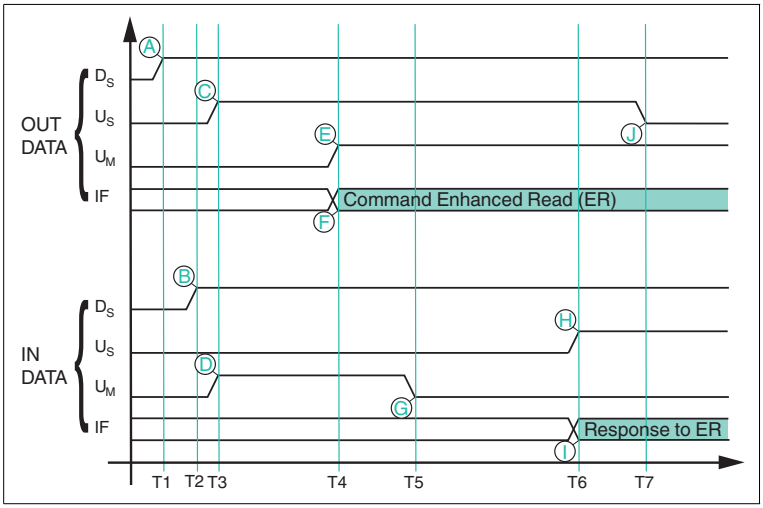
U_M: Update bit – master. If the master inverts this bit, it indicates the validity of a new telegram in the OUTPUT telegram. The slave reflects this bit back inverted, thus confirming receipt. Only then can the master (PLC) send new data.

U_S: Update bit – slave. If the slave inverts this bit, it indicates the validity of a new telegram in the INPUT telegram. The master reflects this bit back inverted, thus confirming receipt. Only then can the slave send new data.

7.2.1 Data Flow Control

The data flow between a programmable logic controller (PLC) and the control interface must be synchronized to guarantee continuous data transfer with no losses. The input and output data is transferred in cycles. The control of the data flow via the software is referred to as handshaking. The control bits required for this are contained in the control byte. (see table "INPUT telegram:" on page 24 and see table "OUTPUT telegram:" on page 23)

The following handshaking is used to transfer telegrams quickly and securely between the PLC and the control interface:



T1 The PLC will change the delete bit to high (**A**) and leads to the deletion of the FIFO memory in the control interface.

T2 The control interface will change the delete bit in the input field (**B**) in response to the event T1 and clears the entire contents of the FIFO memory.

T3 The PLC reflects the inverted state of U_S-INPUT from the input field in the output field (**C**). Similarly, the control interface reflects the inverted state of U_M-OUTPUT in the input field (**D**). This signals, that both communication partners are ready to receive a telegram.

T4 The PLC transmits an enhanced read command (ER) to IF-OUT (**I**dent **F**rame) (F). At the same time the PLC takes over U_M-INPUT to U_M-OUTPUT (**E**), thus indicating the validity of a new telegram.

T5 The control interface mirrors the inverted state of U_M-OUTPUT to U_M-INTPUT (**G**). This informs the PLC over the reception of the telegram.

T6 The control interface dealt with the ER and transmits the response to the command into the input field (**I**). In the same telegram U_S-OUTPUT is mirrored into U_S-INTPUT (**H**).

T7 The PLC has received the changed U_S-INPUT and mirrors the inverted state into U_S-OUTPUT (**J**). Only now, the control interface can send another telegram.

Example implementation in the controller

Slave delete bit:

This instruction is executed once when the controller starts up:

```
D_OUTPUT := NOT D_INPUT
```

Slave update bit:

The following instruction must be executed once in each PLC cycle:

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

Master update bit:

As soon as a new command is to be sent to the slave, the following instruction must be executed:

Write command to the OUTPUT data field:

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

IF (UM_OUTPUT <> UM_INPUT) then (* check whether the slave can receive new data *)

UM_OUTPUT := UM_INPUT (* slave is ready to receive, transfer of update bit *)

End_IF
```

On our website www.pepperl-fuchs.com, you will find an example program in structured text for a Beckhoff controller.

7.2.2 Command Information

Commands and data are exchanged between the PLC and the control interface using the control byte. For a description of the transfer procedure see chapter 7.2.1.

A **command** consists of the command code, a specified number of parameters, 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 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 data fields not used.

Once commands have been processed by the identification system, the "Status" is output in accordance with the Status/fault signal table. (see chapter 7.2.9)

As a response to a read command, the read/write tag sends the status 0 and the number of (useful) data of the response telegram in the "word count" response parameter. The word count in a response to a write command is 0 because the response only contains the status and no (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 0.

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

Enhanced commands are executed repeatedly until a new command is sent on the same channel.

When the system is switched on, the value on the reply counter is also 0. This value is incremented every time the response data field is modified.

In the event of an overrun, the counter skips from FF_h to 01_h.

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7.2.3 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.

7.2.4 Command overview

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

System commands

Command code		Command description	Abbreviation
4_d	04_h	See "change tag (CT)" on page 30	**CT**
2_d	02_h	See "quit (QU)" on page 33	**QU**
23_d	17_h	See "configuration store (CS)" on page 34	**CS**
22_d	16_h	See "reset (RS)" on page 35	**RS**
155_d	$9B_h$	See "set multiplexed mode (MM):" on page 36	**MM**
156_d	$9C_h$	See "set triggermode (TM):" on page 37	**TM**

Standard read/write commands

Read only code

Command code		Command description	Abbreviation
1_d	01_h	See "single read read only code (SF)" on page 39	**SF**
29_d	$1D_h$	See "enhanced buffered read read only code (EF)" on page 40	**EF**

Read data

Command code		Command description	Abbreviation
16_d	10_h	See "single read words (SR)" on page 41	**SR**
25_d	19_h	See "enhanced buffered read words (ER)" on page 42	**ER**

Write data

Command code		Command description	Abbreviation
64_d	40_h	See "single write words (SW)" on page 43	**SW**
26_d	$1A_h$	See "enhanced buffered write words (EW)" on page 44	**EW**

Special command modes

Password mode with IPC03

Command code		Command description	Abbreviation
24_d	18_h	See "set password mode (PM)" on page 47	**PM**
65_d	41_h	See "change password (PC)" on page 48	**PC**
66_d	42_h	See "set password (PS)" on page 49	**PS**

IPC03 configuration

Command code		Command description	Abbreviation
97_d	61_h	See "single get configuration (SG)" on page 51	**SG**
104_d	68_h	See "enhanced buffered get configuration (EG)" on page 52	**EG**
18_d	12_h	See "single write configuration (SC)" on page 53	**SC**
102_d	66_h	See "enhanced buffered write configuration (EC)" on page 55	**EC**

Extended commands for type IPC11 and IDC-...-1K read/write tags

Command code		Command description	Abbreviation
31_d	$1F_h$	See "single write read only code (SX)" on page 57	**SX**
36_d	24_h	See "enhanced buffered write read only code (EX)" on page 59	**EX**
188_d	BC_h	See "set tag ID code (TI)" on page 61	**TI**
170_d	AA_h	See "fill read/write tag (S#)" on page 63	**S#**

Extended commands for type IDC-...-1K and IUC… tags

Command code		Command description	Abbreviation
10_d	$0A_h$	See "single read special read only code (SS)" on page 65	**SS**
113_d	71_h	See "enhanced read special read only code (ES)" on page 66	**ES**
13_d	$0D_h$	See "single program special read only code (SP)" on page 67	**SP**
117_d	75_h	See "enhanced program special read only code (EP)" on page 68	**EP**
107_d	$6B_h$	See "initialize read/write tag (SI)" on page 70	**SI**

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Extended commands for type IDC-...-1K and IQC… tags

Command code		Command description	Abbreviation
71_d	47_h	See "single write words with lock (SL)" on page 71	**SL**
72_d	48_h	See "enhanced write words with lock (EL)" on page 72	**EL**

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

With the commands **WriteParam WP** and **ReadParam RD** you can configure the IUH-F117-V1 read/write head using different parameters. The parameters are described in the manual for the read/write head.

Command code		Command description	Abbreviation
190_d	BE_h	See "read param (RP)" on page 74	**RP**
191_d	BF_h	See "write param (WP)" on page 75	**WP**

7.2.5 System commands

change tag (CT)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 04_h**	0	0	0	0	0	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Tag type in ASCII	<TagType> (high byte)							
Byte 5	Tag type in ASCII	<TagType> (low byte)							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 04_h**	0	0	0	0	0	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
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
'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 (Infinion)	Read/write read only code	224	8	13.56 MHz
'2'	'4'	IQC24	my-D SRF55V10P (Infinion)	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
'7'	'3'	IUC73[4)]	Higgs-2 (Alien)	Read only code	-	96	868 MHz

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'7'	'4'	IUC74 4)	UCode-EPC-G2 (NXP)	Read/write read only code	28	96	868 MHz
'7'	'5'	IUC75 4)	Monza 2.0 (Impinj)	Read only code	-	96	868 MHz
'7'	'6'	IUC76 4)	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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 02_h**	0	0	0	0	0	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 02_h**	0	0	0	0	0	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

The command running on this channel is interrupted.

configuration store (CS)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 17_h**	0	0	0	1	0	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Mode	<Mode>							
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 17_h**	0	0	0	1	0	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 16_h**	0	0	0	1	0	1	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
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.

There is no response to the **reset** command. The handshake bits of the control byte are operated until the device performs a hardware reset and restarts.

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $9B_h$**	1	0	0	1	1	0	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Multiplex mode	<MultiplexMode>							
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $9B_h$**	1	0	0	1	1	0	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

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 triggermode (TM):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $9C_h$**	1	0	0	1	1	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Trigger mode	<Triggermode>							
Byte 5	Identity channel	<Identchannel>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $9C_h$**	1	0	0	1	1	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

Permitted parameters:

<Sensorchannel>	1 (1_h), 2 (2_h)
<Identchannel>	0 (0_h), 1 (1_h), 2 (2_h) (but not <Sensorchannel>)
<Triggermode>	0 (00000000_b): trigger mode off 1 (00000001_b): trigger mode on 2 (00000010_b): trigger mode inverted

The <Sensorchannel> is the channel to which the `set triggermode (TM)` command is sent.

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

If trigger mode is activated with <Triggermode>=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 <Sensorchannel>. Activating trigger mode generates a response that includes the current status of the sensor on <Sensorchannel>.

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

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

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

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

<Identchannel>=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.

7.2.6 Standard read/write commands

single read read only code (SF)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 01_h**	0	0	0	0	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 01_h**	0	0	0	0	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	ID code 00h ... FF_h	<ID code>							
...	ID code 00h ... FF_h	<ID code>							
Byte N[1)]	ID code 00h ... FF_h	<ID code>							

Table 7.3 1) N = <FixLen> + 7

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 31.

enhanced buffered read read only code (EF)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 1D$_h$**	0	0	0	1	1	1	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 1D$_h$**	0	0	0	1	1	1	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	ID code 00h ... FF$_h$	<ID code>							
...	ID code 00h ... FF$_h$	<ID code>							
Byte N[1)]	ID code 00h ... FF$_h$	<ID code>							

Table 7.4 1) N = <FixLen> + 7

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 31.

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single read words (SR)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 10_h**	0	0	0	1	0	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Word address	<WordAddr> (high byte)							
Byte 5	Word address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 10_h**	0	0	0	1	0	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							
Byte 8	Data 00h ... FF_h	<Data>							
...	Data 00h ... FF_h	<Data>							
Byte N[1)]	Data 00h ... FF_h	<Data>							

Table 7.5 1) N = 4 x <WordNum> + 7

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 19_h**	0	0	0	1	1	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Word address	<WordAddr> (high byte)							
Byte 5	Word address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 19_h**	0	0	0	1	1	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 5	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> high byte							
Byte 7	Word count	<WordNum> (low byte)							
Byte 8	Data 00h ... FF_h	<Data>							
...	Data 00h ... FF_h	<Data>							
Byte N[1)]	Data 00h ... FF_h	<Data>							

Table 7.6 1) N = 4 x <WordNum> + 7

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 40_h**	0	1	0	0	0	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Word address	<WordAddr> (high byte)							
Byte 5	Word address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							
Byte 8	Data 00h ... FF_h	<Data>							
...	Data 00h ... FF_h	<Data>							
Byte N[1)]	Data 00h ... FF_h	<Data>							

Table 7.7 1) N = 4 x <WordNum> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 40_h**	0	1	0	0	0	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $1A_h$**	0	0	0	1	1	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Word address	<WordAddr> (high byte)							
Byte 5	Word address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							
Byte 8	Data 00 ... FF_h	<Data>							
...	Data 00 ... FF_h	<Data>							
Byte N[1)]	Data 00 ... FF_h	<Data>							

Table 7.8 1) N = 4 x <WordNum> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $1A_h$**	0	0	0	1	1	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							

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.

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

7.2.7 Special command modes

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	
24 ... 31	Open	3

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 18_h**	0	0	0	1	1	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Password mode	<PasswordMode>							
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 18_h**	0	0	0	1	1	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 41$_h$**	0	1	0	0	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Old password 00 ... FF$_h$	<PSW> (byte 3)							
Byte 5	Old password 00 ... FF$_h$	<PSW> (byte 2)							
Byte 6	Old password 00 ... FF$_h$	<PSW> (byte 1)							
Byte 7	Old password 00 ... FF$_h$	<PSW> (byte 0)							
Byte 8	New password 00 ... FF$_h$	<PSW> (byte 3)							
Byte 9	New password 00 ... FF$_h$	<PSW> (byte 2)							
Byte 10	New password 00 ... FF$_h$	<PSW> (byte 1)							
Byte 11	New password 00 ... FF$_h$	<PSW> (byte 0)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 41$_h$**	0	1	0	0	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 42_h**	0	1	0	0	0	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Password 00h ... FF_h	<PSW> (byte 3)							
Byte 5	Password 00h ... FF_h	<PSW> (byte 2)							
Byte 6	Password 00h ... FF_h	<PSW> (byte 1)							
Byte 7	Password 00h ... FF_h	<PSW> (byte 0)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 42_h**	0	1	0	0	0	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 61_h**	0	1	1	0	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Address in the configuration range	<ConfAddr>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 61_h**	0	1	1	0	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	Data 00h ... FF_h	<Data>							
Byte 9	Data 00h ... FF_h	<Data>							
Byte 10	Data 00h ... FF_h	<Data>							
Byte 11	Data 00h ... FF_h	<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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 68_h**	0	1	1	0	1	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Address in the configuration range	<ConfAddr>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 68_h**	0	1	1	0	1	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	Data 00h ... FF_h	<Data>							
Byte 9	Data 00h ... FF_h	<Data>							
Byte 10	Data 00h ... FF_h	<Data>							
Byte 11	Data 00h ... FF_h	<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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 12_h**	0	0	0	1	0	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Address in the configuration range	<ConfAddr>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	Data 00 ... FF_h	<Data byte 3>							
Byte 9	Data 00 ... FF_h	<Data byte 2>							
Byte 10	Data 00 ... FF_h	<Data byte 1>							
Byte 11	Data 00 ... FF_h	<Data byte 0>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 12_h**	0	0	0	1	0	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
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.

Example:

With the read/write 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	0	0	D_S	U_M	U_S	Control byte (handshake)	-
Byte 1	0	0	0	0	0	0	0	0	Reserved	0_h
Byte 2	0	0	0	1	0	0	1	0	**single write configuration** command	12_h
Byte 3	0	0	0	0	0	0	0	0	Reserved	0_h
Byte 4	0	0	0	0	0	0	0	0	Reserved	0_h
Byte 5	0	0	0	0	0	0	1	0	Word address in the configuration range (= control word)	02_h
Byte 6	0	0	0	0	0	0	0	0	Reserved	0_h
Byte 7	0	0	0	0	0	0	0	0	Reserved	0_h
Byte 8	0	0	0	0	0	0	0	0	Bits 16 to 31 of the control word	00_h
Byte 9	0	0	0	0	0	0	0	0		00_h
Byte 10	0	0	0	0	0	0	1	1	Address of the last data word to be written	03_h
Byte 11	0	0	0	0	0	0	1	1	Address of the first data word to be written	03_h

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 66_h**	0	1	1	0	0	1	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Address in the configuration range	<ConfAddr>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	Data 00 ... FF_h	<Data byte 3>							
Byte 9	Data 00 ... FF_h	<Data byte 2>							
Byte 10	Data 00 ... FF_h	<Data byte 1>							
Byte 11	Data 00 ... FF_h	<Data byte 0>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 66_h**	0	1	1	0	0	1	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
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 read only code (SX)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $1F_h$**	0	0	0	1	1	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Read only code type	<FixType> (high byte)							
Byte 5	Read only code type	<FixType> (low byte)							
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							
Byte 8	Data 00 ... FF_h	<Data>							
...	Data 00 ... FF_h	<Data>							
Byte N[1)]	Data 00 ... FF_h	<Data>							

Table 7.9 1) N = <FixLen> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $1F_h$**	0	0	0	1	1	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							

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 read only code (EX)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 24_h**	0	0	1	0	0	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Read only code type	<FixType> (high byte)							
Byte 5	Read only code type	<FixType> (low byte)							
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							
Byte 8	Data 00 ... FF_h	<Data>							
...	Data 00 ... FF_h	<Data>							
Byte N[1)]	Data 00 ... FF_h	<Data>							

Table 7.10 1) N = <FixLen> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 24_h**	0	0	1	0	0	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							

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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- BC_h**	1	0	1	1	1	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Reserved	0	0	0	0	0	0	0	0
Byte 6	ID length	<ByteNum> (high byte)							
Byte 7	ID length	<ByteNum> (low byte)							
Byte 8	ID code 00 ... FF_h	<IDCode>							
Byte ...	ID code 00 ... FF_h	<IDCode>							
Byte N[1)]	ID code 00 ... FF_h	<IDCode>							

Table 7.11 1) N = <ByteNum> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- BC_h**	1	0	1	1	1	1	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

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 read/write tag (S#)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- AA_h**	1	0	1	0	1	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Start address	<WordAddr> (high byte)							
Byte 5	Start address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							
Byte 8	Character	<Fill Sign>							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- AA_h**	1	0	1	0	1	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

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 read only code (SS)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $0A_h$**	0	0	0	0	1	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Reserved	0	0	0	0	0	0	0	0
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $0A_h$**	0	0	0	0	1	0	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	ID code 00 ... FF_h	<IDCode>							
	ID code 00 ... FF_h	<IDCode>							
Byte N[1)]	ID code 00 ... FF_h	<IDCode>							

Table 7.12 1) N = <FixLen> + 7

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 read only code (ES)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 71$_h$**	0	1	1	1	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Reserved	0	0	0	0	0	0	0	0
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 71$_h$**	0	1	1	1	0	0	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Reserved	0	0	0	0	0	0	0	0
Byte 7	Reserved	0	0	0	0	0	0	0	0
Byte 8	ID code 00 ... FF_h	<IDCode>							
	ID code 00 ... FF_h	<IDCode>							
Byte N[1)]	ID code 00 ... FF_h	<IDCode>							

Table 7.13 1) N = <FixLen> + 7

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.

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single program special read only code (SP)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $0D_h$**	0	0	0	0	1	1	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Reserved	0	0	0	0	0	0	0	0
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							
Byte 8	ID code 00 ... FF_h	<IDCode>							
Byte ...	ID code 00 ... FF_h	<IDCode>							
Byte N[1)]	ID code 00 ... FF_h	<IDCode>							

Table 7.14 1) N = <FixLen> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $0D_h$**	0	0	0	0	1	1	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							

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 read only code (EP)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 75_h**	0	1	1	1	0	1	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	Reserved	0	0	0	0	0	0	0	0
Byte 6	Read only code length	<FixLen> (high byte)							
Byte 7	Read only code length	<FixLen> (low byte)							
Byte 8	ID code 00 ... FF_h	<IDCode>							
Byte ...	ID code 00 ... FF_h	<IDCode>							
Byte N[1)]	ID code 00 ... FF_h	<IDCode>							

Table 7.15 1) N = <FixLen> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 75_h**	0	1	1	1	0	1	0	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (low byte)							

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.

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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 read/write tag (SI)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $6B_h$**	0	1	1	0	1	0	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- $6B_h$**	0	1	1	0	1	0	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	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	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 47_h**	0	1	0	0	0	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Word address	<WordAddr> (high byte)							
Byte 5	Word address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (high byte)							
Byte 8	Data 00 ... FF_h	<Data>							
...	Data 00 ... FF_h	<Data>							
Byte N[1)]	Data 00 ... FF_h	<Data>							

Table 7.16 1) N = 4 x <WordNum> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 47_h**	0	1	0	0	0	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (high byte)							

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

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

enhanced write words with lock (EL)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 48_h**	0	1	0	0	1	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Word address	<WordAddr> (high byte)							
Byte 5	Word address	<WordAddr> (low byte)							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (high byte)							
Byte 8	Data 00 ... FF_h	<Data>							
...	Data 00 ... FF_h	<Data>							
Byte N[1)]	Data 00 ... FF_h	<Data>							

Table 7.17 1) N = 4 x <WordNum> + 7

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code **- 48_h**	0	1	0	0	1	0	0	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Word count	<WordNum> (high byte)							
Byte 7	Word count	<WordNum> (high byte)							

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

This applies to 13.56 MHz read/write tags of the type 21, 22, 24, and 33 as well as to LF read/write 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 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 reading. Then the read/write head reads the same read/write tag until it has left the measurement range or a new read/write tag appears within the measurement range. The command subsequently begins again with the write attempts.

The status '05h' is only output when a read/write tag leaves the measurement range or is not yet within the measurement range. If two read/write 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	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code - **BE_h**	1	0	1	1	1	1	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	System code	<SystemCode>							
Byte 6	Parameter type	<ParamTyp> (high byte)							
Byte 7	Parameter type	<ParamTyp> (low byte)							
Byte 8	Length [byte]	<DataLen> (high byte)							
Byte 9	Length [byte]	<DataLen> (low byte)							
Byte 10	Optional parameter	<Param>							
Byte ...	Optional parameter	<Param>							
Byte N 1)	Optional parameter	<Param>							

Table 7.18 1) N = <DataLen> + 9

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code - **BE_h**	1	0	1	1	1	1	1	0
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Length [byte]	<DataLen> (high byte)							
Byte 7	Length [byte]	<DataLen> (low byte)							
Byte 8	Data [byte] 00 ... FF_h	<Data>							
Byte ...	Data [byte] 00 ... FF_h	<Data>							
Byte N 1)	Data [byte] 00 ... FF_h	<Data>							

Table 7.19 1) N = <DataLen> + 7

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write param (WP)

Command:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code - **BF_h**	1	0	1	1	1	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Reserved	0	0	0	0	0	0	0	0
Byte 5	System code	<SystemCode>							
Byte 6	Parameter type	<ParamTyp> (high byte)							
Byte 7	Parameter type	<ParamTyp> (low byte)							
Byte 8	Length [byte]	<DataLen> (high byte)							
Byte 9	Length [byte]	<DataLen> (low byte)							
Byte 10	Data 00 ... FF_h	<Data>							
Byte ...	Data 00 ... FF_h	<Data>							
Byte N[1)]	Data 00 ... FF_h	<Data>							

Table 7.20 1) N = <DataLen> + 9

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Control byte	0	0	0	0	0	D_S	U_M	U_S
Byte 1	Reserved	0	0	0	0	0	0	0	0
Byte 2	Command code - **BF_h**	1	0	1	1	1	1	1	1
Byte 3	Reserved	0	0	0	0	0	0	0	0
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Not used	-	-	-	-	-	-	-	-
Byte 7	Not used	-	-	-	-	-	-	-	-

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

<ParamTyp> = 'K1' ASCII ($4B_h$ 31_h)
RP: liest den Schlüssel (12 Zeichen ASCII von 0 ... F) im Transponder und im Lesekopf
WP: schreibt den Schlüssel (12 Zeichen ASCII von 0 ... F) in den Lesekopf
Defaultschlussel = 'FF FF FF FF FF FF' ASCII ($46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h$)

IUH-...: Siehe Handbuch des Schreib-/Lesekopfes

7.2.8 Legend

<ByteNum> : 4 bits, length of <IDCode>; 8 characters (08_h)

<Channel> : 3 bits, channel of the read/write head
Channel 1 (001_b), channel 2 (010_b),
all channels (111_b)

<ConfAddr> : 1 ASCII character, word starting address in configuration range of the read/write tag. The following applies to IPC03:
01_h = protection word
02_h = 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 (0_b): operating mode off, 1 (1_b): operating 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 30

<FixType> : 2 ASCII characters, example: "02" for IPC02

<IDCode> : 4 bytes, 6 bytes, or 8 bytes (depending on the tag type)

<Identchannel> : 3 bits, channel of the read/write head
0(0000_b), 1 (001_b), 2 (010_b), all channels (111_b)
(but not <Sensorchannel> in trigger mode)

<Month> : 2 ASCII bytes, hexadecimal coding, 01_h ... $0C_h$ (01_h = January, $0C_h$ = December)

<P> : 1 bit, password mode, 0 (0_b): operating mode off, 1 (1_b): operating mode on

<ParamTyp> : Parameter type, 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).

<Sensorchannel> : Channel 1 or 2

<Status> : 1 byte (see chapter 7.2.9)

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<SystemCode> : = "U0" (high byte = 0x55, low byte = 0x30)

<T> : 1 bit, toggle bit

<TagType> : 2 ASCII characters, example: "02" for IPC02

<Triggermode> : 8 bits
0 (00000000_b): trigger mode off
1 (00000001_b): trigger mode on
2 (00000010_b): trigger mode inverted

<WordAddr> : 2 bytes, word start address in the read/write tag, range from 0000h to $FFFF_h$, depending on read/write tag type.

<WordNum> : 4 bits, number of words to be read or written, range from 0_h to F_h, depending on read/write tag type.
The following applies to IPC03: The word count 0h is used with the word address 0000_h to read the preset data range on the read/write tag ("Default Read").
The following applies to 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 coding, 00_h ... 63_h

7.2.9 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.

7.3 Communication via the RS 232 interface

The serial RS 232 interface enables the quick and easy connection of the IDENTControl Compact to a PC or PLC.

You can use the diagnostic function 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 tag 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 interface parameters are fixed:
Baud rate 38 400, 8 data bits, 1 stop bit, no parity.

7.3.1 Command examples

Note!

Enter all commands**without** spaces!

1. Example: Set tag type

Tag type “99” is preset on delivery. The tag type is used which is stored on the R/W head.

Send the command **Change tag** described in the **Command** table to select the tag type IPC03 for the R/W head connected to channel 1.

↳ You should receive one of the responses described in the **Response** table.

Command:

CT 1 03 # <CR>	
CT	**Change tag** command
1	Channel 1
03	Tag type IPC03
#	End character
<CR>	End character

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There is a read/write tag in the detection range.

Response:

0 0 04 1 000 # <CR>	
0	Status
0	Reserved
04	Command code
1	Channel 1
000	Response length in bytes
#	End character
<CR>	End character

The response indicates that the R/W head on channel 1 has received the command (status = '0').

Further possible responses:

4 0 04 1 000 # CR = wrong tag type

6 0 04 1 000 # CR = no R/W head is connected

Note!

The tag type is stored in the non-volatile memory for each channel of the control unit.

If you would like to apply the **Change tag** command to both channels, use <Identchannel> “x”.

Command:

CT x 03 # <CR>	
CT	**Change tag** command
x	All channels
03	Tag type IPC03
#	End character
<CR>	End character

You will receive the 2 responses for both channels:

Response 1:

0 0 04 1 000 # <CR>	
0	Status
0	Reserved
04	Command code
1	Channel 1
000	Response length in bytes
#	End character
<CR>	End character

Response 2:

0 0 04 2 000 # <CR>	
0	Status
0	Reserved
04	Command code
2	Channel 2
000	Response length in bytes
#	End character
<CR>	End character

2. Example: Writing two double words from address 7 with R/W head on channel 1

1. Position an IPC03 read/write tag in front of the R/W head on channel 1.
2. Send the command **single write words** as described in the **Command** table.

Command:

SW 1 0007 02 ABCDEFGH # <CR>	
SW	**Single write words** command
1	Channel 1
0007	Address (in hexadecimal format)
02	Number of double words (4-byte words)
ABCDEFGH	Data
#	End character
<CR>	End character

There is a read/write tag in the detection range.

Response:

0 0 40 1 000 # <CR>	
0	Status
0	Reserved
40	Command code
1	Channel 1
000	Response length in bytes
#	End character
<CR>	End character

If a read/write tag is not within the detection range, you will receive the response **5 0 40 1 000 #<CR>**. The two double words cannot be written (read/write tag is not within the detection range): Status = '5').

Response:

5 0 40 1 000 # <CR>	
5	Status
0	Reserved
40	Command code
1	Channel 1
000	Response length in bytes
#	End character
<CR>	End character

LED 1 on the IDENTControl Compact and the LED on the R/W head briefly light up green when the reading command is activated and then yellow if the command is executed successfully.

3. Example: Reading two double words from address 7 with R/W head on channel 1

1. Send the read command **Enhanced buffered read words** described in the **Command** table.
2. Move a read/write tag into the detection range. The R/W head reads the data on the read/write tag. You should receive the responses described in the **Response** table.

Command:

ER 1 0007 02 # <CR>	
ER	**Enhanced buffered read words** command
1	Channel 1
0007	Address (in hexadecimal format)
02	Number of double words
#	End character
<CR>	End character

Response:

0 0 19 1 008 ABCDEFGH # <CR	
0	Status
0	Reserved
19	Command code
1	Channel 1
008	Response length in bytes
ABCDEFGH	Data
#	End character
<CR>	End character

8 Technical specifications

8.1 Dimensions

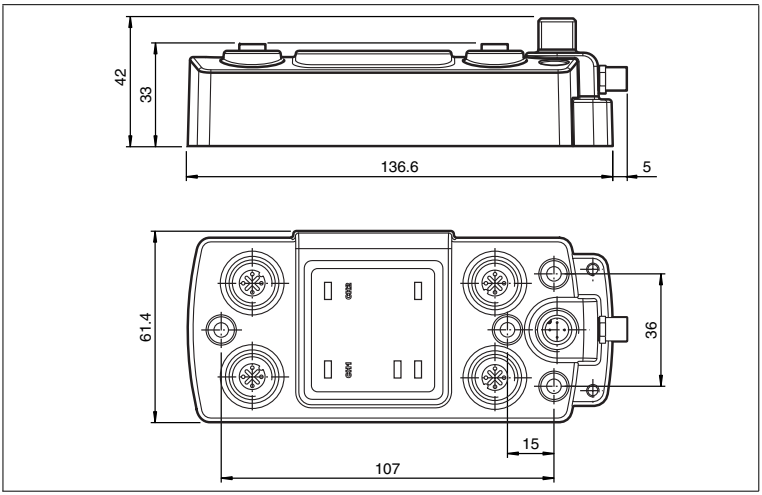

Figure 8.1

8.2 Technical data

General data

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

Display/controls

LEDs 1, 2	Status display for read/write heads Green: command to read/write head active Yellow: approx. 1 second if command is executed successfully
LEDs CH1, CH2	Green: read head identified Red: configuration error
LED PWR/ERR	Green: power on Red: hardware error
LED RUN	Off: Init flashing (green): preoperational Single flash (green): safe operational On (green): operational

Electrical data

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

Power consumption	3.5 W without read/write heads
Galvanic isolation	Basic insulation in accordance with DIN EN 50178, rated insulation voltage 50 V_{eff}

Interface 1

Interface type	EtherCAT IN & OUT
Physical	Ethernet
Protocol	EtherCAT
Transfer rate	100 Mbit/s

Interface 2

Interface type	Diagnostics interface
Physical	RS232
Protocol	ASCII
Transfer rate	38.4 kbit/s

Conformity with standards and directives

Directive conformity	
EMC Directive 2004/108/EC	EN 61000-6-2:2006, EN 61000-6-4:2007
Conformity with standards	
Degree of protection	IEC 60529:2001

Ambient conditions

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

Mechanical data

Degree of protection	IP67
Connection	Read/write heads: Shielded 4-pin M12 connector Power supply: M12 connector Protective ground: M4 grounding screw Diagnostic RS232: M8 connector EtherCAT: M12 connector, D-coded
Material	
Enclosure	Zinc, powdered-coated
Mounting	Screw mounting
Ground	Approx. 500 g

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9 Fault location

Fault source	Possible reason	Remedy
The operating voltage LED PWR does not light up.	Power supply is interrupted.	Ensure that the power supply is connected to a 24 VDC source.
The CH1 or CH2 indicator does not light up even though the read/write head is connected to port 1 or port 2.	The lead is defective or not connected correctly.	Check the lead and repair if necessary.
	The read/write head is defective.	Check the read/write 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 set for the relevant channel (e.g., IPC02). The read commands only function with read/write tags and not with read only tags.	Set the correct tag type (e.g., IPC03) or "Autodetect" using the **CT command**.
The LEDs in the read head are flashing and the CHx indicator on the IDENTControl is illuminated red.	The connected read head does not support the preset tag type.	Select a tag type that the read head supports.
The **SG** or **EG** (get configuration) command gives the status 4 even though the syntax is correct.	IPC03 is not set for the relevant channel. The configuration commands only function if the read/write tag IPC03 is selected and not in Autodetect mode.	Set tag type IPC03 using the **CT** command.
The green LED RUN does not light up.	There is no longer a connection to the master.	Check the lead, the connection, and the terminator and repair if necessary.

Table 9.1 This table will be updated and extended if necessary. For the latest manual, visit www.pepperl-fuchs.de.

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**	**I**
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**	**I**
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**

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