

MANUAL

IC-KP-B6-V15B
IDENTControl interface
with PROFIBUS DP interface



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

1	Introduction.....	5
2	Declaration of conformity	6
2.1	Declaration of conformity	6
3	Safety.....	7
3.1	Symbols relevant to safety	7
3.2	Intended use	7
3.3	General notes on safety.....	7
3.4	Contact protection.....	8
4	Product Description	9
4.1	Range of application	9
4.2	Device characteristics	9
4.3	Product family	9
4.3.1	R/W heads	9
4.3.2	Code / Data carrier	10
4.3.3	Handhelds	10
4.4	Displays and controls	11
4.5	Interfaces and connections	12
4.6	Delivery package	12
4.7	Connection accessories.....	13
4.7.1	Connection cable for R/W heads and trigger sensors	13
4.7.2	Cable connectors for the power supply	14
4.7.3	Connection cable to the PROFIBUS DP interface	14
5	Installation.....	16
5.1	Storage and transport	16
5.2	Unpacking.....	16
5.3	EMC concept	16
5.4	Device connection	17
5.4.1	Power supply	17
5.4.2	Read/Write Head and Trigger Sensors	17
5.4.3	Cable length between control interface and R/W heads	18
5.4.4	Ground connection	18
5.4.5	PROFIBUS connection guide	18
5.4.6	Cables	19
5.4.7	Transfer rates and line lengths	20
5.4.8	Terminator	20

6	Commissioning	23
6.1	Connection.....	23
6.2	Preliminary considerations	23
6.3	Device settings.....	24
6.3.1	Operating the device.....	25
6.4	Output of the contents of read data carriers on the display	25
6.4.1	Setting the device address	26
6.4.2	Setting the bus protocol	27
7	Commands.....	28
7.1	General information on PROFIBUS DP.....	28
7.1.1	PROFIBUS DP features	28
7.1.2	PROFIBUS DP communication parameters (GSD file)	28
7.1.3	PROFIBUS DP functions	29
7.2	General information on command structures	29
7.3	Communication in "IC-KP-B6" mode (IDENTControl).....	29
7.3.1	PROFIBUS DP communication parameters (GSD file)	29
7.3.2	Device identification/software version message for PROFIBUS DP.....	31
7.3.3	Software information	33
7.3.4	Command types	35
7.3.5	Command overview	35
7.3.6	System commands	38
7.3.7	Standard read/write commands	47
7.3.8	Special commands	53
7.3.9	Legend	78
7.3.10	Fault/Status messages.....	79
7.4	Communication in "IRI-B6" or "IVI-B6" mode.....	80
8	Technical specifications	81
8.1	Dimensions	81
8.2	General data	81
9	Troubleshooting	83
9.1	Fault location.....	83
10	ASCII table	84

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 installing this equipment and put into operation, read this manual carefully. This manual contains instructions and notes to help you through the installation and commissioning step by step. This makes sure bring such a trouble-free use of this product. This is for your benefit, since this:

- ensures the safe operation of the device
- helps you to exploit the full functionality of the device
- avoids errors and related malfunctions
- avoids costs by disruptions and any repairs
- increases the effectiveness and efficiency of your plant

Keep this manual at hand for subsequent operations on the device.

After opening the packaging please check the integrity of the device and the number of pieces of supplied.

Symbols used

The following symbols are used in this manual:



Note!

This symbol draws your attention to important information.



Handling instructions

You will find handling instructions beside this symbol

Contact

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

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

2 Declaration of conformity

2.1 Declaration of 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.

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



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 IC-KP-B6-V15B is a control interface including a PROFIBUS interface for identification systems. The device can be used as a control cabinet module or for field applications. Besides the PROFIBUS connection, suitable inductive R/W heads, microwave antennas or trigger sensors can be connected. Wiring suitable for the system design must be used.

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!

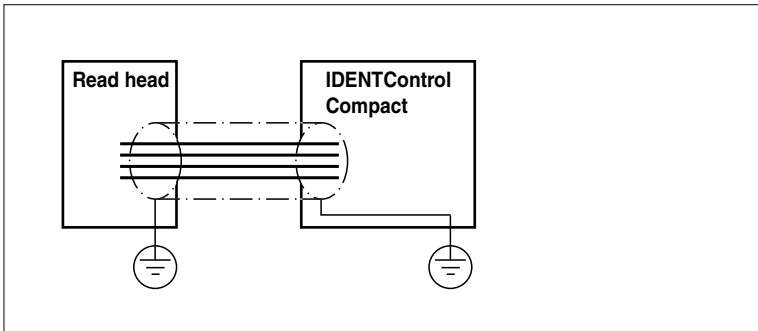
Disposal

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!

4 Product Description

4.1 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.

4.2 Device characteristics

- Up to 4 R/W heads can be connected
- Alternatively up to 2 R/W heads and 2 trigger sensors can be connected
- LCD indicator with background illumination
- Direct operation using 4 function keys
- LED status indicator for bus communication and R/W heads

4.3 Product family

The IDENTControl brand name represents a complete identification system. The system consists of an IDENTControl interface including bus interface, inductive R/W heads (125 kHz and 13.56 MHz) and accompanying code and data carriers in many different designs. The IDENTControl 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. Function buttons are available for parameterization and entering commands directly into the IDENTControl.

4.3.1 R/W heads

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

4.3.2 Code / Data carrier

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.

4.3.3 Handhelds

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

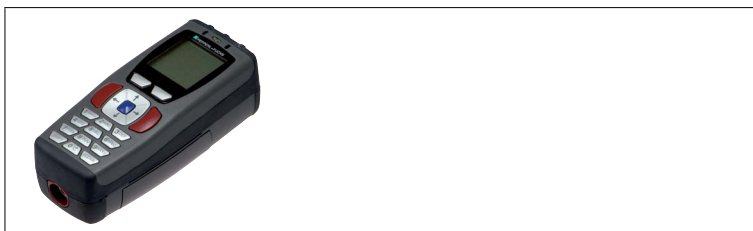
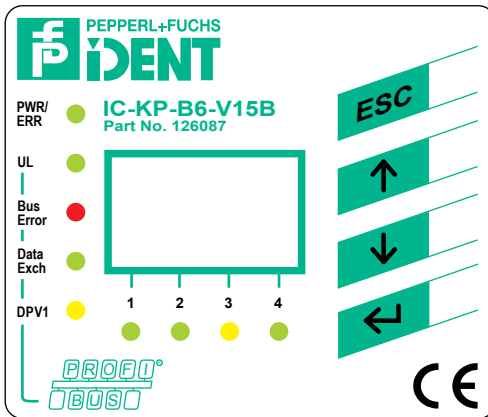


Figure 4.1

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

4.4 Displays and controls

The following displays and controls are located on the control interface.



LED indicators		
PWR/ERR	Power on Hardware error	green red
1, 2, 3, 4	Status display for R/W heads Command on R/W head is active Command executed successfully (approx. 1 second)	green yellow
UL	Interface ready for operation	green
Bus error	Bus error	red
Data Exch	Status of the slave is "Data Exchange"	green
DPV1	DPV1 operating mode (currently not available)	Yellow

Display
Two-line multifunction display with 12 characters per line for displaying different status and operating information and four pictograms for displaying connected reading heads.

Push buttons	
Push buttons are used for controlling the display and selecting commands when programming the control interface.	
	Return to higher level
	Up menu item
	Down menu item
	RETURN (confirm input)

4.5 Interfaces and connections

The following interfaces and connections are located on the IC-KP-B6-V15B control interface.



Connections

- 1 M12 connector for R/W heads (sockets) - V1
- 2 M12 connector for power supply (plug) - V1
- 3 M12 connector for PROFIBUS connection - V15B

Other accessories

- A Screw for ground
- B Metal latches for mounting the DIN rail

Accessories

Accessories see chapter 4.7.

4.6 Delivery package

The delivery package contains:

- 1 IDENTControl control interface
- 1 quick start guide
- 1 grounding screw (already fitted)
- 1 serrated lock washer (already fitted)
- 2 crimp connectors (already fitted)

4.7 Connection accessories

4.7.1 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

4.7.2 Cable connectors for the power supply

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



Figure 4.3

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

4.7.3 Connection cable to the PROFIBUS DP interface

The IDENT Control has a B-encoded M12 connector and is connected to the network using a suitable cable.

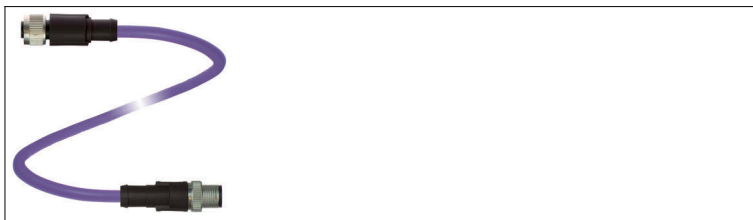


Figure 4.4

Accessories	Description
Terminator	ICZ-TR-V15B
T distributor	ICZ-3T-V15B
Y connection cable	ICZ-3T-0.2M-PUR ABG-V15B-G
Connection cable with terminator	ICZ-2T/TR-0.2M-PUR ABG-V15B-G
Connection cable 1 m ¹	V15B-G-1M-PUR ABG-V15B-G
Cable socket, screw terminal type	V15B-G
Cable plug, screw terminal type	V15SB-G

1. Connection cables are available in the following lengths: 1 m, 2 m, 5 m, 7 m, 12 m, 15 m.

2012-03



Note!

The T-distributor is designed for general applications in the PROFIBUS network only and is not compatible with the IDENT Control. The Y connection cable must always be used with the IDENT Control.

5 Installation

5.1 Storage and transport

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

5.2 Unpacking

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

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

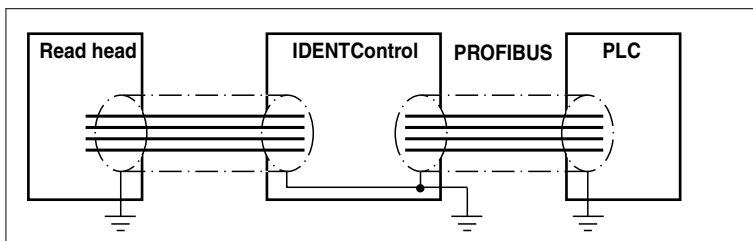
- Delivery quantity
- Device type and version in accordance with the type plate
- Accessories
- Quick start guide

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.

5.3 EMC concept

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



The screening of cables provides for the discharge of electromagnetic interference. When screening a cable, both sides of the screen must be connected to the earth with low resistance and low inductance.



Note!

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

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

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

The most important issue here is that the shields are connected to ground with low resistance and low inductance. The metal enclosure ensures that the shielding is not interrupted, i.e. the complete electronics system and all routed cables are located within a Faraday cage.

5.4 Device connection

Electrical connection using plug connectors makes installation simple.

5.4.1 Power supply

Connect the power supply via an M12 connector with integrated voltage and reverse polarity protection indicator (green: correct polarity, red: reverse polarity). A plug with the following pin assignment is located on the housing:



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

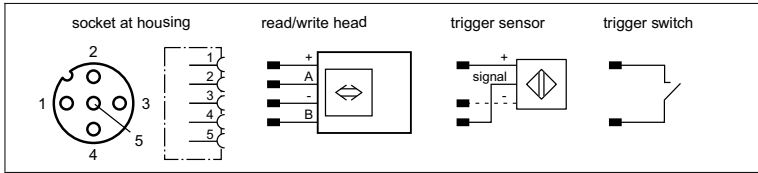
Compatible connecting cable see chapter 4.7.2.

5.4.2 Read/Write Head and Trigger Sensors

A maximum of 4 read/write heads can be connected to the IDENTControl.

Instead of the read/write heads, a maximum of 2 trigger sensors can be connected to sockets 3 and 4. A trigger sensor can be assigned to only one read/write head. The trigger sensors must be PNP.

Connect the read/write heads and trigger sensors to the sockets on the top of the enclosure using M12 connectors.



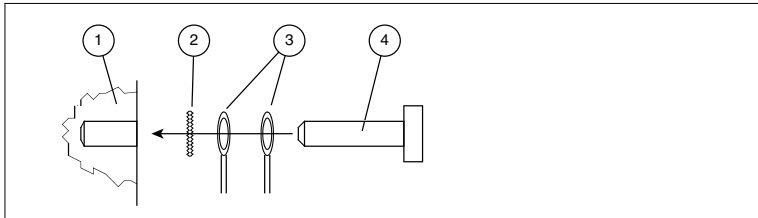
For details of compatible read/write heads see chapter 4.3.1. and of compatible connecting cables, see chapter 4.7.1.

5.4.3 Cable length between control interface and R/W heads

The maximum cable length between the control interface and a connected R/W head is 1000 meters. If you wish to attain the maximum possible cable length, select a suitably large cable cross-section. See chapter 4.7.1

5.4.4 Ground connection

The ground connection of the IDENTControl is located at the lower right of the connector array. The ground conductor is screwed to the housing with a crimp connector. In order to guarantee safe grounding, the serrated washer must be mounted between the crimp connector and the housing.



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

A cross-section of at least 4 mm² is recommended for the ground conductor lead.

5.4.5 PROFIBUS connection guide

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

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

The PROFIBUS DP is connected via a B-encoded M12 socket. This socket is connected to the Y line ICZ-3T-0.2M-PUR ABG-V15B-G so that it can be connected to the bus. Other Y lines can also be connected. Several IDENTControls can be connected directly to the PROFIBUS via several Y lines. The last node on the bus must be connected to the cable from the previous model with a ICZ-2T/TR-0.2M-PUR cable with integrated terminator.

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



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

5.4.6

Cables

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

The line parameters are as follows:

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

*No longer use line type B if possible.



Note!

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

5.4.7 Transfer rates and line lengths

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

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

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

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



Note!

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

5.4.8 Terminator

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

An external terminator must be attached for the last node. Pluggable terminators (ICZ-TR-V15B, for example) are available from Pepperl+Fuchs and is easy to connect using a ICZ-3T-V15B T-piece.



Note!

We recommend using a Y-splitter cordset because the fixed connection to the T-piece allows greater leverage on the connector insert.



Note!

The ICZ-TR-V15B terminator cannot be used together with the Y-splitter cordset ICZ-3T-0.2M-PUR ABG-V15B-G because the voltage required by the terminator cannot be supplied.

Cable ICZ-2T/TR-0.2M-PUR ABG-V15B-G should be used as a terminator for the Y-splitter cordset.



Note!

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

The brochure can be obtained from:

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

6 Commissioning

6.1 Connection



Warning!

Incorrect electrical connection

Incorrect connections may damage the system.

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

After the supply voltage is connected, the green LED in the voltage connector and the PWR and UL LEDs on the display panel must light up. If the LED in the connector lights up red, the polarity of the power supply is reversed.

6.2 Preliminary considerations



Caution!

Uncontrollable triggered processes

The plant where the device is installed may be damaged.

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

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

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

The most important factors that determine the time response are:

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

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



Note!

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

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

6.3 Device settings



Caution!

Device not configured or configured incorrectly

System failure caused by incorrectly configured device

Configure the device prior to commissioning.

You must set the various parameters prior to commissioning.

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

Non-volatile parameters

Parameter	Default setting	Value range
General		
LCD contrast	50	36 ... 71
LCD light	On	On / off
Language	English	English / German
Multiplex mode	off	On / off
R/W head		
Trigger mode	off	On / off
Tag type	99	00 ... FF
PROFIBUS interface		
Slave address	03	00 ... 7E
Bus protocol	IC-KP-B6	IC-KP-B6 / IRI-B6 / IVI-B6

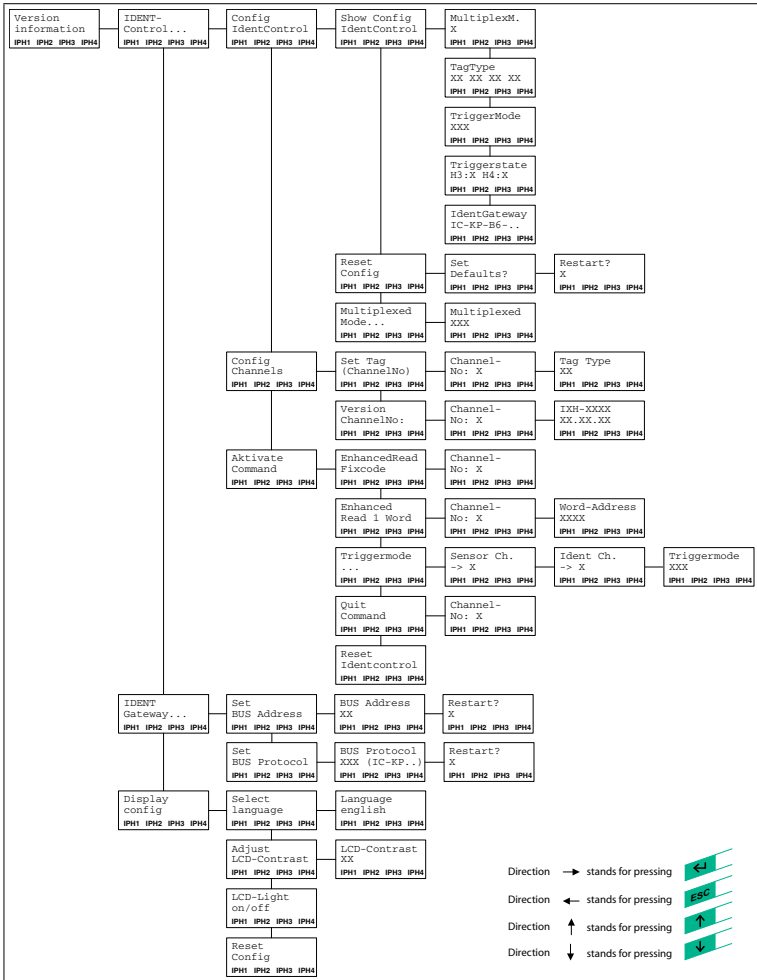
Volatile parameters

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

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

6.3.1 Operating the device

The following illustration shows how the device is operated directly:



6.4 Output of the contents of read data carriers on the display

In the first menu level, the IDENTControl shows the contents of read data carriers on the display. Information messages of this kind are marked with a bell icon (🔔) in the top right corner of the display to distinguish them from menu items.

A maximum of the first 12 characters of the read data set can be displayed. The following characters may be excluded.

The view on the display can be toggled by pressing the arrow buttons. The following display variants are available:

- HEX (hexadecimal with decimal delimiter)
- HEX2 (hexadecimal without decimal delimiter)
- ASCII (ASC)



Note!

Data carrier content from commands that are activated manually on the IDENTControl are always displayed, irrespective of the menu level that was just displayed.

6.4.1

Setting the device address



Setting the device address

Select a device address between 0 (00h) and 126 (7Eh) that is not occupied by another node and configure the device address on the display using the function buttons:

1. Select **IDENT gateway ...** (PROFIBUS settings).
2. Select **Set BUS address**.
3. Select the address 00h ... 7Eh using the arrow buttons.
4. Press return to adopt the settings and complete the process.
5. Switch the device off and back on again or restart using the function buttons on the display so that the PROFIBUS component adopts the new bus protocol settings.

↳ After being turned on, the IDENTControl automatically adjusts itself to the transfer speed specified by the master. Observe the maximum permitted cable length for the transfer rate (see chapter 5.4.7).



Note!

The device address on the IDENTControl is set in hexadecimal format.

Note that the address 7Eh may only be diverted from its intended use for commissioning.

6.4.2 Setting the bus protocol



Setting the bus protocol

Set the bus protocol as follows:

1. Select **IDENT gateway ...** (PROFIBUS settings).
2. Select **Set bus protocol** using the arrow buttons.
3. Select the relevant mode using the arrow buttons.
4. Press return to adopt the settings and complete the process.
5. Switch the device off and back on again or restart using the function buttons on the display so that the PROFIBUS component adopts the new bus protocol settings.

↳ After being turned on, the IDENTControl automatically adjusts itself to the transfer speed specified by the master. Observe the maximum permitted cable length for the transfer rate (see chapter 5.4.7).



Note!

The mode setting is stored in the non-volatile memory.

7 Commands

7.1 General information on PROFIBUS DP

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

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



Note!

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

7.1.1 PROFIBUS DP features

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

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

7.1.2 PROFIBUS DP communication parameters (GSD file)

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

The GSD file name for IDENTControl Compact IC-KP2-*HB6-V15B is: P&F_07cd.gsd.



Configuring the bus master for PROFIBUS DP operations

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

↳ The bus master is configured.

7.1.3 PROFIBUS DP functions

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

7.2 General information on command structures

The standard setting for the structure of commands is "IC-KP-B6" (IDENTControl, see chapter 7.3). The device can also be operated in "IRI-..." or "IVI-KHD2-4HB6 compatible" mode. The mode is selected or changed via the display and the setting is stored in the non-volatile memory. The modified setting only becomes valid after the device is reset.

7.3 Communication in "IC-KP-B6" mode (IDENTControl)

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

The GSD file name for the IDENTControl interface with PROFIBUS DP interface is: P&F_07cd.gsd.

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

For read/write operation:

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

For read only operation:

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

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

One word has 32 bits in "IC-KP-B6" mode.



Note!

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

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

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

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

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

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

7.3.2 Device identification/software version message for PROFIBUS DP

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

Address	Length	Contents
Byte 0	1 byte	Header byte, length of external diagnostics
Byte 1	2 bytes	16 bits external diagnostics (see table "GSD file (device-related diagnostic bits)" on page 32)
Byte 3	1 byte	Identification byte of the IDENT Control
Byte 4	3 bytes	Software number of the identification system
Byte 7	6 bytes	Software creation date of the identification system
Byte 13	3 bytes	Software number of the bus system
Byte 16	6 bytes	Software creation date of the bus system
Byte 22	1 byte	Identification byte of R/W head 1
Byte 23	3 bytes	Software number of R/W head 1
Byte 26	6 bytes	Software creation date of R/W head 1
Byte 32	1 byte	Identification byte of R/W head 2
Byte 33	3 bytes	Software number of R/W head 2
Byte 36	6 bytes	Software creation date of R/W head 2
Byte 42	1 byte	Identification byte of R/W head 3
Byte 43	3 bytes	Software number of R/W head 3
Byte 46	6 bytes	Software creation date of R/W head 3
Byte 52	1 byte	Identification byte of R/W head 4
Byte 53	3 bytes	Software number of R/W head 4
Byte 56	6 bytes	Software creation date of R/W head 4
	62 bytes	Total length of external diagnostics



Note!

The IDENTControl always uses a 6-byte header and 62 bytes of device-related diagnostics.

Identification byte in ExtDiag:

IDENTControl: First character of the connector description
 IC-KP-B6-V15B => 'V'
 IC-KP-B6-SUBD => 'S'

Reading head: Second character of the housing design
 IPH-18GM-V1 => '8'
 IPH-30GM-V1 => '0'
 IPH-F15-V1 => '1'
 IPH-FP-V1 => 'P'
 IPH-F61-V1 => '6'
 IPH-L2-V1 => '2'

Software number of the R/W head:
 420 => Type IPH-...
 330 => Type MVH-...
 597 => Type ISH-...
 635 => Type IQH-...
 422 => Type IQH1-...

GSD file (device-related diagnostic bits)

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

Example:

One type IPH-L2 R/W head is connected to channel 2.

Address	Length	Contents
Byte 0	1 byte	3Eh
Byte 1	2 bytes	00h 00h
Byte 3	1 byte	V
Byte 4	3 bytes	373
Byte 7	6 bytes	200804
Byte 13	3 bytes	358
Byte 16	6 bytes	301104
Byte 22	1 byte	-
Byte 23	3 bytes	no_
Byte 26	6 bytes	head_1
Byte 32	1 byte	2
Byte 33	3 bytes	420
Byte 36	6 bytes	061004
Byte 42	1 byte	-
Byte 43	3 bytes	no_
Byte 46	6 bytes	head_3
Byte 52	1 byte	-
Byte 53	3 bytes	no_
Byte 56	6 bytes	head_4

Table 7.1 Underscores (_) used in the table represent a protected space.

7.3.3 Software information

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

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

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

Output data field (command):

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

Input data field (response):

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

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

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

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

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

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

If the status is FFh (command detected), the second byte of the response also corresponds to the second byte of the command call-up. In the actual response (status not FFh), the second byte contains the parameters for the response, i.e. the number of words in the response and the channel used to transmit the response. After a read command is issued, a response with the status 00 in the "Word count" response parameter then contains the number of words in the response telegram (which is also the command call-up). The number of words in a response to a write command is 0000b because the response only contains the status and not (useful) data. Here, the second byte of the response is not the same as the second byte of the command call-up. With read only code

commands, the word count in the response is always 0000b. 3 responses are issued for commands to all connected R/W heads (channel = 111b): The first response (status = FFh) is followed up by 2 other responses that contain the status of the individual channels. The "Channel" parameter in the response telegram contains the number of the relevant channel (001, 010).

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

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

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

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

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

7.3.4 Command types

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

Single mode

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

Enhanced mode

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

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

7.3.5 Command overview

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

System commands

Command code		Command description	Abbreviation
4d	04h	See "Change tag (CT)" on page 38	CT
2d	02h	See "Quit (QU)" on page 41	QU
23d	17h	See "Configuration store (CS)" on page 42	CS
22d	16h	See "Reset (RS)" on page 43	RS

Command code		Command description	Abbr viation
155d	9Bh	See "Set multiplexed mode (MM):" on page 44	MM
156d	9Ch	See "Set trigger mode (TM):" on page 45	TM

Standard read/write commands

Fixcode

Command code		Command description	Abbr viation
1d	01h	See "single read fixcode (SF)" on page 47	SF
29d	1Dh	See "Enhanced buffered fixcode (EF)" on page 48	EF

Read data

Command code		Command description	Abbr viation
16d	10h	See "single read words (SR)" on page 49	SR
25d	19h	See "enhanced buffered read words (ER)" on page 50	ER

Write data

Command code		Command description	Abbr viation
64d	40h	See "single write words (SW)" on page 51	SW
26d	1Ah	See "enhanced buffered write words (EW)" on page 52	EW

Special command modes

Password mode with IPC03

Command code		Command description	Abbr viation
24d	18h	See "Set password mode (PM)" on page 55	PM
65d	41h	See "Change password (PC)" on page 56	PC
66d	42h	See "Set password (PS)" on page 57	PS

IPC03 configuration

Command code		Command description	Abbr viation
97d	61h	See "Single get configuration (SG)" on page 59	SG
104d	68h	See "Enhanced buffered get configuration (EG)" on page 60	EG
18d	12h	See "Single write configuration (SC)" on page 61	SC
102d	66h	See "Enhanced buffered write configuration (EC)" on page 63	EC

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

Command code		Command description	Abbreviation
31d	1Fh	See "Single write fixcode (SX)" on page 64	SX
36d	24h	See "Enhanced buffered write fixcode (EX)" on page 66	EX
188d	BCh	See "Set tag ID code (TI)" on page 67	TI
170d	AAh	See "Fill data carrier (S#)" on page 68	S#

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

Command code		Command description	Abbreviation
10d	0Ah	See "Single read special fixcode (SS)" on page 69	SS
113d	71h	See "Enhanced read special fixcode (ES)" on page 70	ES
13d	0Dh	See "Single program special fixcode (SP)" on page 71	SP
117d	75h	See "Enhanced program special fixcode (EP)" on page 72	EP
107d	6Bh	See "Initialize data carrier (SI)" on page 73	SI

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

Command code		Command description	Abbreviation
71d	47h	See "Single Write Words with Lock (SL)" on page 74	SL
72d	48h	See "Enhanced write words with lock (EL)" on page 75	EL

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

Command code		Command description	Abbreviation
190d	BEh	See "read param (RP)" on page 76	RP
191d	BFh	See "write param (WP)" on page 77	WP

7.3.6 System commands

Change tag (CT)

Command:

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

Response:

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

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

Supported Tag Types

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

2012-03

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'1'	'2'	IPC12	P+F FRAM	Read/write read only code	8k	4	125 kHz
'2'	'0'	IQC20 ¹⁾	All ISO 15693 compliant read/write tags	Read/write read only code	8	8	13.56 MHz
'2'	'1'	IQC21	I-Code SLI (NXP)	Read/write read only code	112	8	13.56 MHz
'2'	'2'	IQC22	Tag-it HF-I Plus (Texas Instruments)	Read/write read only code	250	8	13.56 MHz
'2'	'3'	IQC23	my-D SRF55V02P (Infion)	Read/write read only code	224	8	13.56 MHz
'2'	'4'	IQC24	my-D SRF55V10P (Infion)	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
'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	Command code (02h)	0	0	0	0	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	not used	-	-	-	-	-	-	-	-
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

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

The command running on this channel is interrupted.

Configuration store (CS)

Command:

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

Response:

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

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

<Mode>='1' activates the mode.

<Mode>='0' deactivates the mode.

Configuration store is deactivated by default.

Reset (RS)

Command:

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

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

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

Set multiplexed mode (MM):

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

Response:

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

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

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

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

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

Set trigger mode (TM):

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

Response:

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

Permitted parameters:

- <Sensor channel> 3 (011b), 4 (100b)
- <Ident channel> 1 (0001b), 2 (0010b), 3 (0011b), 4 (0100b)
(but not <Sensor channel>)
- <Trigger mode> 0 (00000000b): Trigger mode off
1 (00000001b): Trigger mode on
2 (00000010b): Trigger mode inverted

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

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

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

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

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

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

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

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

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

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

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

7.3.7 Standard read/write commands

single read fixcode (SF)

Command:

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

Response:

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

Table 7.2 1) N = <FixLen> + 3

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

The length of the read only code that is output depends on the tag type. See table "Supported Tag Types" on page 38.

Enhanced buffered fixcode (EF)

Command:

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

Response:

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

Table 7.3 1) N = <FixLen> + 3

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

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

The length of the read only code that is output depends on the tag type. See table "Supported Tag Types" on page 38.

single read words (SR)

Command:

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

Response:

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

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

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

enhanced buffered read words (ER)

Command:

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

Response:

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

Table 7.5 1) $N = 4 \times \text{<WordNum>} + 3$

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

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

single write words (SW)

Command:

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

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

Response:

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

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

enhanced buffered write words (EW)

Command:

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

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

Response:

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

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

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

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

7.3.8 Special commands

Commands for the data carrier IPC03



Note!

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

IPC03 Configuration

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

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

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

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

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

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

The individual bits have the following meanings:

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

Control word		
Bit	Meaning	Byte
0 ... 7	Read range start	0
8 ... 15	Read range end	1
16	Password mode on/off	2
17	"Read after write" operating mode on/off	
18 ... 23	Open	
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	Command code (18h)	0	0	0	1	1	0	0	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	<Channel>			<T>
Byte 2	Password mode	0	0	0	0	0	0	0	<P>
Byte 3	not used	-	-	-	-	-	-	-	-
Byte 4	not used	-	-	-	-	-	-	-	-
Byte 5	not used	-	-	-	-	-	-	-	-
Byte 6	not used	-	-	-	-	-	-	-	-
Byte 7	not used	-	-	-	-	-	-	-	-

Response:

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

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

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

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

Change password (PC)

Command:

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

Response:

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

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

Set password (PS)

Command:

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

Response:

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

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

Operating mode "Default Read"

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

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

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



Note!

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

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



Setting "Default Read"

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

IPC03 configuration

Single get configuration (SG)

Command:

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

Response:

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

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

Enhanced buffered get configuration (EG)

Command:

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

Response:

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

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

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

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

Single write configuration (SC)

Command:

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

Response:

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

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

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

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

For example:

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

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

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

Enhanced buffered write configuration (EC)

Command:

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

Response:

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

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

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

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

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

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

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

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

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

Single write fixcode (SX)

Command:

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

Table 7.8 1) N = <FixLen> + 3

Response:

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

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

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

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

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

The value range contains 7 characters:

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

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

Enhanced buffered write fixcode (EX)

Command:

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

Table 7.9 1) N = <FixLen> + 3

Response:

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

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

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

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

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

The value range contains 7 characters:

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

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

Set tag ID code (TI)

Command:

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

Response:

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

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

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

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

<ByteNum> = 0h deletes this filter.



Note!

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

Fill data carrier (S#)

Command:

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

Response:

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

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

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

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

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

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

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

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

Single read special fixcode (SS)

Command:

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

Response:

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

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



Note!

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

Enhanced read special fixcode (ES)

Command:

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

Response:

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

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

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



Note!

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

Single program special fixcode (SP)

Command:

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

Response:

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

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



Note!

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

Enhanced program special fixcode (EP)

Command:

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

Response:

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

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

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

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

Note!

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



Initialize data carrier (SI)

Command:

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

Response:

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

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

Extended commands for type IQC-... read/write tags.

Single Write Words with Lock (SL)

Command:

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

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

Response:

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

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

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

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

Enhanced write words with lock (EL)

Command:

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

Table 7.11 1) 4 x <WordNum> + 6

Response:

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

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

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

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

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

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

read param (RP)

Command:

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

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

Response:

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

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

write param (WP)

Command:

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

1) N = <DataLength> + 7

Response:

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

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

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

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

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

Default key = 'FF FF FF FF FF FF' ASCII (46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h)

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



Note!

Toggle bit

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

7.3.9

Legend

- <Battery condition 1> : 1 byte, first digit of battery status (percentage, decimal, ASCII encoded). 30h, 31h
- <Battery condition 2> : 1 byte, second digit of battery status (percentage, decimal, ASCII encoded). 30h, 39h
- <Battery condition 3> : 1 byte, third digit of battery status (percentage, decimal, ASCII encoded). 30h, 39h
- <ByteNum> : 4 bits, length of <ID code>;
System MV: 4 characters (04h)
System IQ: 8 characters (08h)
- <Channel> : 3 bits, channel
Channel 1 (001b), channel 2 (010b),
channel 3 (011b), channel 4 (100b), all channels (111b)
- <ConfAddr> : 1 ASCII character, word starting address in configuration area of data carrier. The following applies for IPC03:
01h = Protection Word
02h = Control Word
- <Data> : <WordNum> times 4 bytes. When communicating a word, the highest value byte is transferred first and the lowest value byte last.
- <F> : 1 bit, multiplex mode, 0 (0b): Mode off, 1 (1b): Mode on
- <Fill Sign> : 1 ASCII character
- <FixLen> : 4 bits, length of the read only code in bytes, see "This command tells the read/write head on the relevant channel which tag type to communicate with. This setting is stored in the non-volatile memory on the unit." on page 38
- <FixType> : 2 ASCII characters, for example: '02' for IPC02
- <IDCode> : 4 bytes, 6 bytes or 8 bytes (depending on the tag type)
- <Ident channel> : 3 bits, channel
1 (001b), 2 (010b), 3 (011b), 4 (100b), all channels (111b)
(but not <Sensor channel> in trigger mode)
- <Month> : 2 bytes ASCII, hexadecimal encoding, 01 ... 0C (01=January, 0C=December)
- <P> : 1 bit, password mode, 0 (0b): Mode off, 1 (1b): Mode on
- <PSW> : 4 bytes HEX, password
- <ReplyCounter> : 1 byte, increases by 1 after each response and confirmation. The reply counter starts from 0 after the system is switched on.
When the maximum value is reached, the counter skips the value 0 (from 255 to 1).
- <Sensor channel> : 3 bits, channel
3 (011b) or 4 (100b)
- <Status> : 1 byte (see chapter 7.3.10)

- <SystemCode> : = "Q" (0x51) or "U" (0x55)
- <T> : 1 bit, toggle bit
- <TagType> : 2 ASCII characters, for example: '02' for IPC02
- <Trigger mode> : 8 bits
 0 (00000000b): Trigger mode off
 1 (00000001b): Trigger mode on
 2 (00000010b): Trigger mode inverted
- <WordAddr> : 2 bytes, word start address in the data carrier, range from 0000h to FFFFh, depending on tag type.
- <WordNum> : 4 bits, number of words to be read or written, range from 0h to Fh, depending on tag type.
 The following applies for IPC03: The word count 0h is used with the word address 0000h to read the preset data range on the read/write tag ("Default Read").
- <Year> : 2 bytes ASCII, hexadecimal encoding, 00h ... 63h

7.3.10 Fault/Status messages

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

Error messages which triggered the identification system

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

Error messages sent by the bus connection

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

7.4

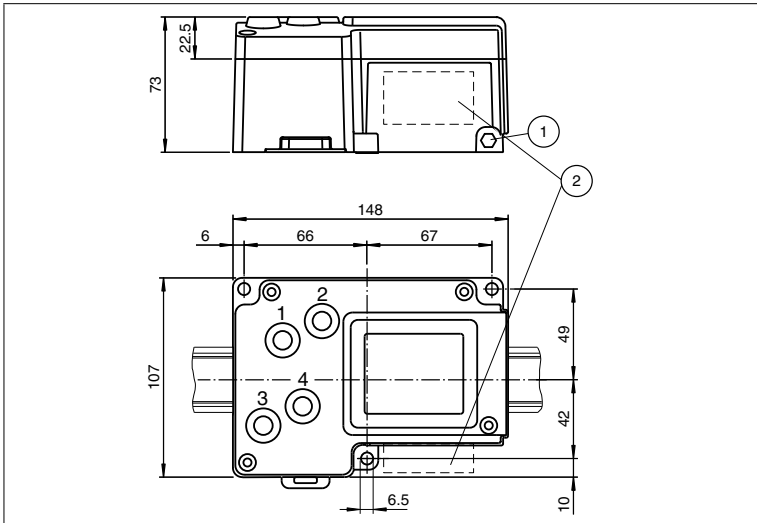
Communication in "IRI-B6" or "IVI-B6" mode

Only use "IRI-B6" and "IVI-B6" modes if you intend to operate the control interface as a replacement for a control interface with the designation "IRI-KH*-4HB6" or "IVI-KH*-4HB6".

See the manual "**IC-KP-B6-V15B / IC-KP-B6-2V15B / IC-KP-B6-SUBD - Communication in "IRI-B6" and "IVI-B6" mode.**

8 Technical specifications

8.1 Dimensions



- 1 Ground
- 2 Connector array

8.2 General data

General data

Number of R/W heads	max. 4 alternatively 2 R/W heads and 2 trigger sensors
---------------------	---

Display/controls

LEDs 1, 2, 3, 4	Status display for R/W heads green: Command to R/W head active yellow: Approx. 1 second if command executed successfully
LED PWR/ERR	green: Power on red: Hardware error
LED UL	green: Interface power ON/OK
Bus error LED	red: Bus error
Data Exch LED	green: Status of the slave is "Data Exchange"
LED DPV1	yellow: Not used

LC Display	Two-line multifunction display with 12 characters per line Configuration of the control interface and display of connected R/W heads as additional pictograms Simple, direct command input and addressing possible
Buttons	4 buttons: ESC, up, down and return

Electrical data

Rated operational voltage U_e	20 ... 30 V DC , PELV
Ripple	$\leq 10\%$ at 30 V DC
Current consumption	≤ 2 A incl. R/W heads
Power consumption P_0	3.5 W without R/W heads
Galvanic isolation	Basic insulation in accordance with DIN EN 50178, rated insulation voltage 50 V_{eff}

Interface

Physical	RS 485
Protocol	PROFIBUS DP accordant with DIN EN 50170
Transfer rate	9.6, 19.2, 93.75, 187.5, 500, 1500 kBit/s 3, 6, 12 MBit/s auto-synchronizing

Conformity

Electromagnetic compatibility	EN 61000-6-2, EN 61000-6-4,
Degree of protection	EN60529

Ambient conditions

Ambient temperature	-25 ... 70 °C (248 ... 343 K)
Storage temperature	-40 ... 80 °C (243 ... 353 K)
Climate conditions	Max. air humidity 96 % Salt spray resistant to EN 60068-2-52
Shock and impact resistance	Oscillation (sine): 5 g, 10 ... 1000 Hz to EN 60068-2-6 Shock (half-sine): 30 g, 11 ms to EN 60068-2-27

Mechanical data

Degree of protection	IP67 in accordance with EN 60529
Connection	R/W heads: Shielded, 4-pin, M12 connector Power supply: M12 connector Ground: M6 grounding screw PROFIBUS: Shielded, 5-pin, M12 connector
Housing material	Aluminum, powder-coated
Mounting	Snap on to 35 mm DIN mounting rail or screw mounting
Weight	Approx. 1000 g

9 Troubleshooting

9.1 Fault location

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

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

10 ASCII table

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

FACTORY AUTOMATION – SENSING YOUR NEEDS



Worldwide Headquarters

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

USA Headquarters

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

Asia Pacific Headquarters

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

www.pepperl-fuchs.com

 **PEPPERL+FUCHS**
SENSING YOUR NEEDS

Subject to modifications
Copyright PEPPERL+FUCHS • Printed in Germany

TDOCT-0078K_ENG
03/2012