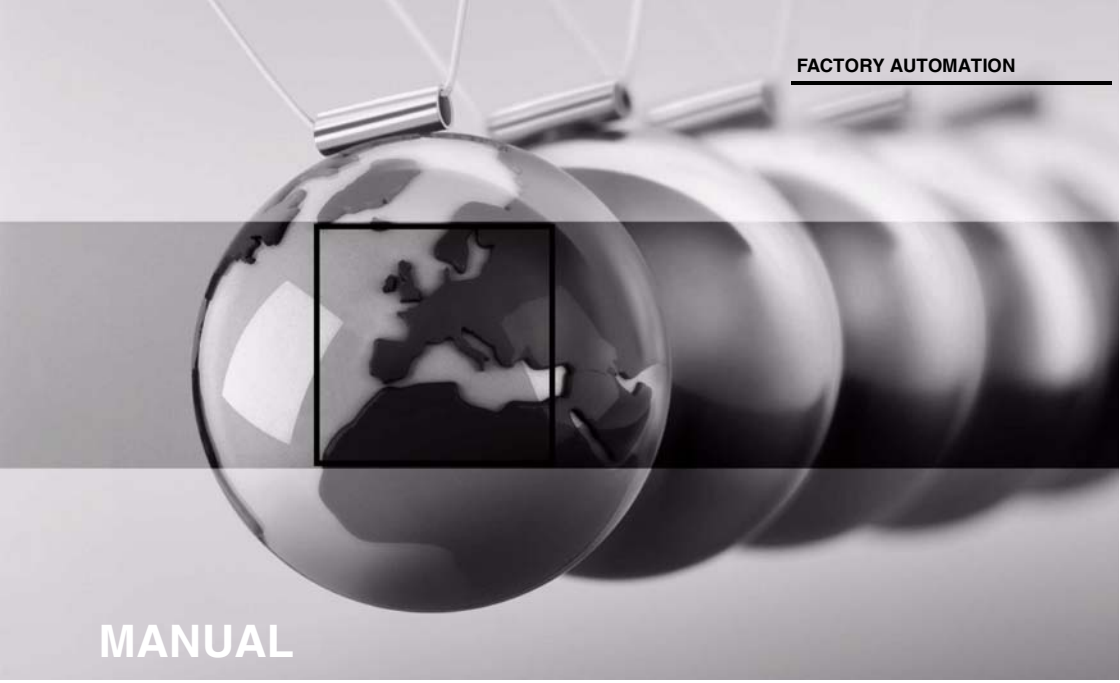
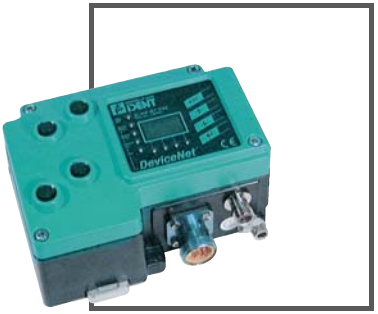


MANUAL

IC-KP-B7-V95

IDENT*Control* interface with DeviceNet interface



PEPPERL+FUCHS
SENSING YOUR NEEDS

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

2013-04

2013-04

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 containes 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

2013-04

PEPPERL+FUCHS

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.

ISO**9001**

3 Safety

3.1 Symbols relevant to safety

Danger!
This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.

Warning!
This symbol indicates a possible fault or danger.

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

Caution!
This symbol indicates a possible fault.

Non-observance could interrupt devices and any connected facilities or systems, or result in their complete failure.

3.2 Intended use

The IDENTControl IC-KP-B7-V95 is a control interface including a DeviceNet interface for identification systems. The device can be used as a control cabinet module or for field applications. Besides the DeviceNet 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.

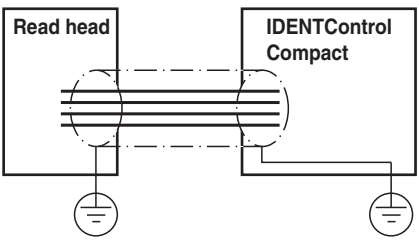
Note!

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!

See chapter 5.4.4

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.

2013-04

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

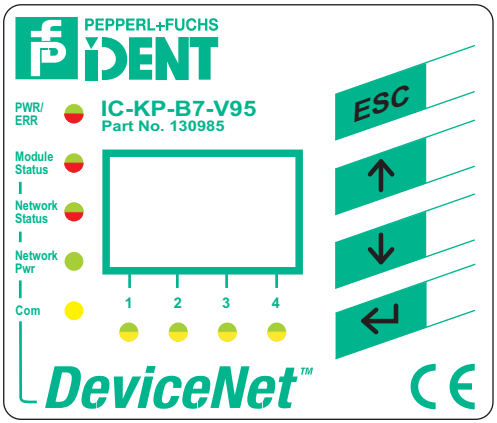
There are various handheld read/write devices available for controlling processes (write/read functions, initialization of data carriers).

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
Module status	Device is operating in normal state Repairable errors (see chapter 9.1) Irreparable errors – device must be replaced Configuration requires modification (see chapter 9.1) LED function test	green red flashing red green flashing red/green flashing
Network status	Online, not connected Online, connected Connection timeout Critical connection error (duplicate MAC ID, bus error)	green flashing green red flashing red
Network Pwr	Network power supply available	green
Com	Data transfer (approx. 250 ms)	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.

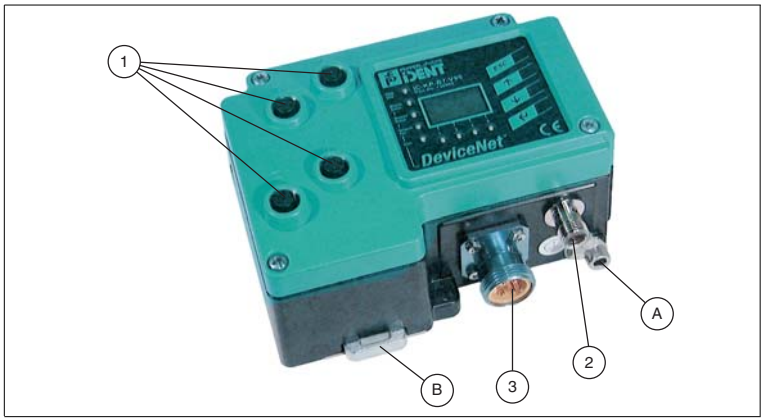
Push buttons	
Push buttons are used for controlling the display and selecting commands when programming the control interface.	
ESC	Return to higher level
↑	Up menu item

2013-04

Push buttons	
	Down menu item
	RETURN (confirm input)

4.5 Interfaces and connections

The following interfaces and connections are located on the control interface IC-KP-B7-V95.



Connections

1 M12 connector for R/W heads (sockets) - V1

2 M12 connector for power supply (plug) - V1

3 5-pin DeviceNet Ministyle connector

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.

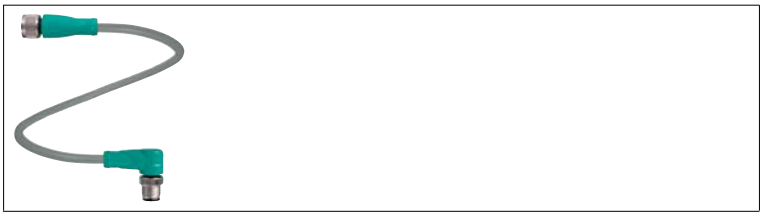


Figure 4.2

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-B3

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

2013-04

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:

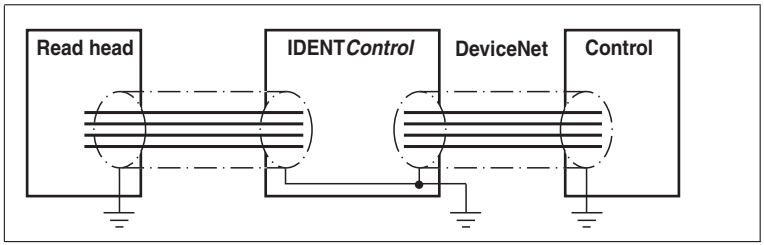
- Delivery quantity
- Device type and version in accordance with the type plate
- Accessories
- Quick start guide

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

Note!

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

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

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.

Caution!

Due to the requirements in the DeviceNet specification, the shield on the bus cable is connected to the device housing via an RC link.

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

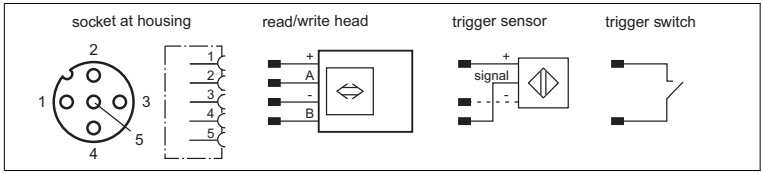
Compatible connecting cable see chapter 4.7.2.

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.



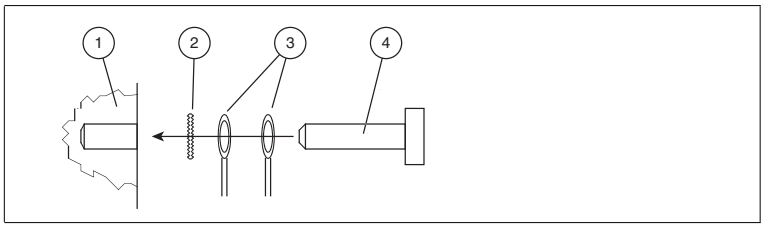
For details of compatible read/write heads, and of compatible connecting cables, see chapter 4.7.1.

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 mm^2 is recommended for the ground conductor lead.

5.4.5 DeviceNet connection guide

Network connection

The network connection is established using a DeviceNet MiniStyle connector. The pin assignment is taken from the drawing below.

1 Ground / uncoated

2 V+ / RD

3 V- / BK

4 CAN_H / WH

5 CAN_L / BU

Connecting cable

The device must always be connected using the "Thick" and "Thin" extension cables described in the DeviceNet specification. Refer to the "Thick cable profile" and "Thin cable profile" sections in the DeviceNet specification for more detailed information.

Transfer rates and cable lengths

Baud rate	Max. length of the transfer cable
125 kBits/s	500 m
250 kBits/s	250 m
500 kBits/s	100 m

2013-04

6 Commissioning

6.1 Connection

Warning!
Before commissioning, check once again that the connections are correct.

Before commissioning, familiarize yourself with the system of communication between your DeviceNet control and the read/write station (see chapter 7). Commissioning requires accurate knowledge of DeviceNet communication.

After the supply voltage is connected, the green LED in the voltage connector and the PWR LED 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

A very important aspect of the operation of an extended identification system on the DeviceNet is the time response of the overall system. 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?" cannot be answered universally.

The most important factors that determine the response time 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 read/write stations
- Type of code/data carrier used
- Nature of access to the communication objects of the read/write station
- Nature of the commands to the read/write station
- Structure of the user program

6.3 Device settings

Warning!
Device not configured or configured incorrectly

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

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
DeviceNet interface		
Network address	63d	00d ... 63d
Baud rate	125 kBit/s	125 kBit/s, 250 kBit/s, 500 kBit/s
Instance Out	100d	100d ... 112d
Instance In	150d	150d ... 162d
Data hold time	10 x 10 ms	000 x 10 ms ... 255d x 10 ms

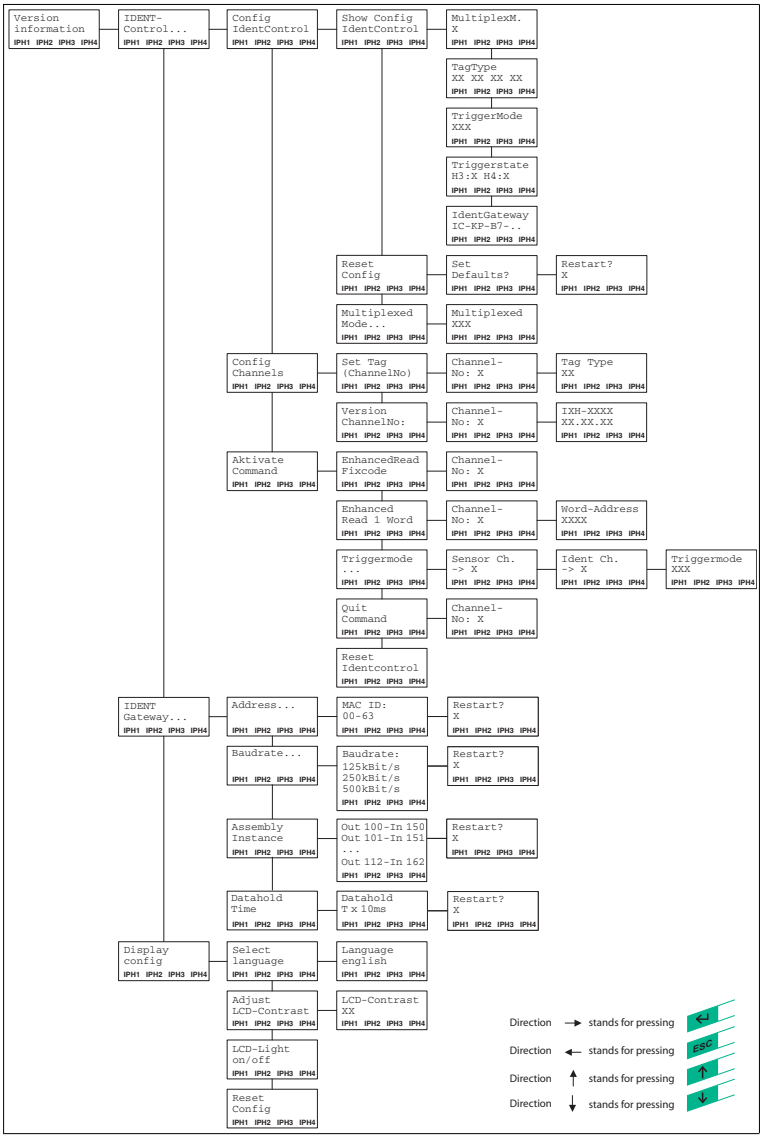
Volatile parameters

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.

6.5 Setting the network parameters

The following parameters must be set manually via the display:

- Bus address
- Baud rate
- Assembly instance
- Data hold time

Caution!

Always use parameters that you know are compatible with your network.

Setting parameters

To set the parameters using the function buttons, proceed as follows:

1. Press return (confirm input).
2. Select IDENT gateway (down arrow button, return).
3. Press return to confirm the option Address ...
4. Enter the bus address using the arrow buttons.
5. Press return to save and exit the menu item.
6. Proceed with the options Baud rate, Assembly instance and Data hold time in the same way.
7. Initiate a reset (menu) or disconnect the power supply to restart the device.

   ↳ The settings only take effect after the reset.

7 Commands

7.1 Communication via DeviceNet

7.1.1 General information on communication via DeviceNet

DeviceNet is an open fieldbus standard that enables data exchange between programmable logic controllers (PLCs), personal computers (PCs), control and monitoring systems as well as sensors and actuators. Please visit the ODVA website at www.odva.org for more information about DeviceNet.

7.1.2 Performance spectrum

The DeviceNet has the following characteristics:

- Group 2 only server
- Data transfer via Poll I/O, change of state, cyclic I/O, explicit message
- Supported transfer rates: 125 kBit/s, 250 kBit/s, 500 kBit/s

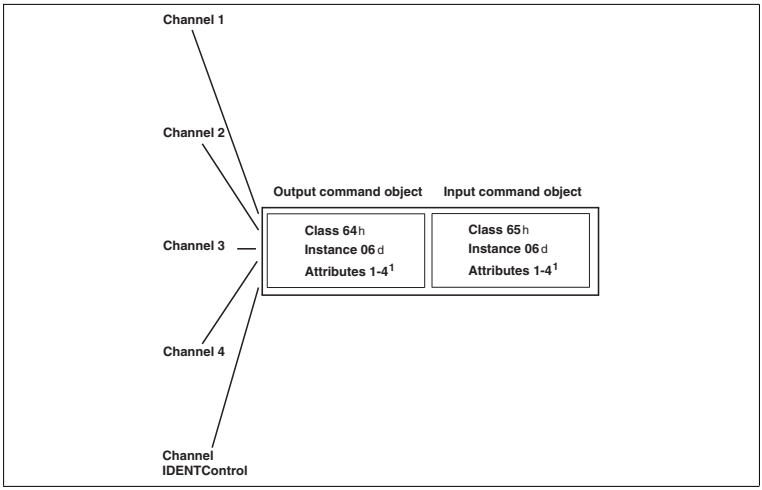
7.1.3 Electronic data sheet (EDS)

The device is supplied with an EDS file.

7.1.4 Data/Command transfer

The commands are transferred via DeviceNet/IP objects, i.e. objects from classes 04h, 64h, and 65h. There are always two different modes available, which may not be confused: "Mixed mode" and "Separated mode".

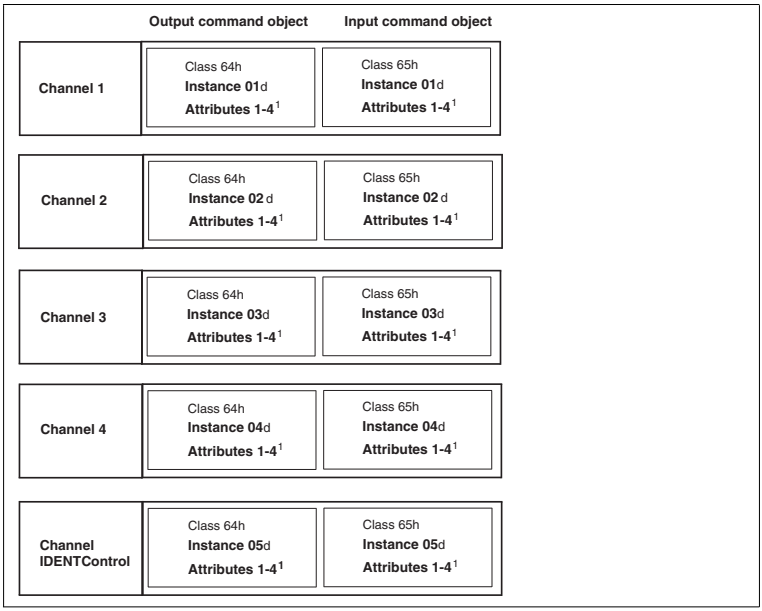
7.1.5 Mixed mode



The five IDENT channels (four R/W heads, one configuration channel) are addressed using an input and an output instance, with the advantage that the controller requires less memory.

The different parameters of the IDENT telegram distinguish the channels.

7.1.6 Separated mode



Each IDENT channel is addressed using a separate input and separate output instance. The advantage here is that data processing is simplified because different IDENT channels do not have to process the data in the same memory area.

7.1.7 Data length

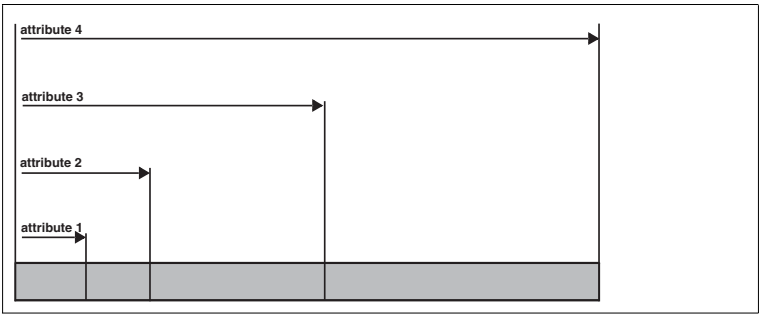
Depending on the data length required, four different attributes with different lengths are available for each input/output instance.

Class 64h and 65h, instance 1-6

Attribute ID	Data length	Maximum number of double words (4 bytes) that can be read/written at any one time
1	8	1
2	12	2
3	32	7
4	60	14

Attributes 1-3 require fewer data bytes than attribute 4.

2013-04



7.1.8 Assembly attributes

The attributes of the output object (class 64h) and the input objects (class 65h) appear in different combinations in the assembly object. 26 assembly instances can be used in pairs for implicit communication and so there are 13 possible combinations. These combinations can be selected either via the device display, the attribute 100 from instance 0 of the assembly object or by specifying the combination on the PLC (Forward Open).

	Output instance	Input instance	Channel size					Required/Generated size Output/Input byte
			1	2	3	4	5 (conf.)	
Mixed mode	100d	150d	8*					8 / 8
	101d	151d	12*					12 / 12
	102d	152d	32*					32 / 32
	103d	153d	60*					60 / 60
Sepa-rated mode	104d	154d	8	8	8	8		32 / 32
	105d	155d	12	12	12	12		48 / 48
	106d	156d	32	32	32	32		128 / 128
	107d	157d	60	60	60	60		240 / 240
	108d	158d	8	8	8	8	8	40 / 40
	109d	159d	12	12	12	12	8	56 / 56
	110d	160d	32	32	32	32	8	136 / 136
	111d	161d	60	60	60	60	8	248 / 248
	112d	162d	0 / 10					0 / 10

* access to mixed mode instance for input/output command object

The following comparison shows the relationship between input and output instances: Input instance = output instance + 50d.

A combination of the "heartbeat" and the ident status forms the output instance 112 and input instance 162. Refer to appendix B for a more detailed view of the object model.

7.1.9 Access administration

The assembly object is a collection of attributes from classes 64h and 65h (input and output). Both implicit and explicit access to these objects is possible (via the assembly object). Simultaneous access is regulated as follows to prevent the attributes from overwriting one another.

	Implicit data exchange		Explicit access Instances from input/output commands					
	Output instance	Input instance	1	2	3	4	5 (conf.)	6
Mixed mode	100d	150d	x	x	x	x	x	x
	101d	151d	x	x	x	x	x	x
	102d	152d	x	x	x	x	x	x
	103d	153d	x	x	x	x	x	x
Sepa-rated mode	104d	154d	x	x	x	x	✓	x
	105d	155d	x	x	x	x	✓	x
	106d	156d	x	x	x	x	✓	x
	107d	157d	x	x	x	x	✓	x
	108d	158d	x	x	x	x	x	x
	109d	159d	x	x	x	x	x	x
	110d	160d	x	x	x	x	x	x
	111d	161d	x	x	x	x	x	x
	112d	162d	✓	✓	✓	✓	✓	x

7.1.10 Heartbeat and ident status

If instance 112d and 162d of the assembly object are selected, the size of the output field is 0 bytes and the size of the input that contains the status and reply counter is 10 bytes.

Byte status	Description
00	Status of the IDENTControl
01	Reply counter of the IDENTControl
02	Status of channel 1
03	Reply counter from channel 1
04	Status of channel 2
05	Reply counter from channel 2
06	Status of channel 3
07	Reply counter from channel 3
08	Status of channel 4
09	Reply counter from channel 4

2013-04

The advantage of this procedure is that only a few data bytes are transferred via the bus. Ident commands are transferred as the ident system as explicit commands. A new ident response can be read as soon as the value on the reply counter changes.

7.1.11 Data hold time

All responses from the device are present in the input field for a specific time. Make sure that the controller reads all responses before they are overwritten by a new response. The data hold time indicates how long an IDENT telegram of this kind remains in the input field. The data hold time can be adjusted via the display or the boot-up object (see chapter 12.1). Values between 0 and 2.55 seconds can be preset in 10 ms increments. The default value is 100 ms. Make sure that the data hold time is greater than the maximum cycle time of the whole system (including data storage to the PLC). However, the data hold time should not be much longer than necessary for the following reasons:

1. The reaction time of the device will increase if several responses arrive in quick succession.
2. The maximum possible number of response telegrams per time unit decreases when the data hold time is increased. A memory overflow may occur. The State LED then flashes green.

7.2 Command Execution

The controller initiates an identification command. If the data has changed since the last read-out, the control interface executes the new command If the control interface is scheduled to execute a command a number of times, the toggle bit must be inverted. Only then does the device detect that the command has to be executed again.

If the control interface detects a new command, it sets the status in the input field to FFh. The reply counter value increases by 1. The status is displayed () after the control interface has executed the commands.

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

When new data becomes available, the previous data is overwritten. The reply counter value increases by 1. In the event of an overflow, the reply counter is reset to its start value (01h).

New commands may only be sent to an output field after the response from the previous command is read.

For an overview of supported commands, .

Command:

Byte 0*	Telegram length, high byte
Byte 1*	Telegram length, low byte
Byte 2	Command code
Byte 3	Channel/toggle bit = 0
Byte 4	Parameters
Byte 5	Parameters
Byte 6	Data to be written
...	...
Byte N	Data to be written

Table 7.1 * This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

Confirmation (with MODBUS/TCP, no confirmation is sent)

Byte 0*	Telegram length, high byte
Byte 1*	Telegram length, low byte
Byte 2	Command code (echo)
Byte 3	Channel/toggle bit (echo) = 0
Byte 4	Status FFh
Byte 5	Reply counter
...	00h
Byte N	00h

Table 7.2 * This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

Response:

Byte 0*	Telegram length, high byte
Byte 1*	Telegram length, low byte
Byte 2	Command code (echo)
Byte 3	Channel/toggle bit (echo) = 0
Byte 4	Status
Byte 5	Reply counter
Byte 6	Read data
...	...
Byte N	Read data

Table 7.3 * This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

2013-04

7.2.1 Command examples

Example: Define tag type

Command: Change tag type on channel 1 to IPC03

04:02:30:33 (hexadecimal format)	
04	Command code **CT** (change tag)
02	Reserved/Channel (1), toggle bit 0b
30:33	tag type (IPC03)

Confirmation

04:02:FF:01	
04	Repeat command code **CT** (change tag)
02	Reserved/Channel (1), toggle bit 0b
FF	Status FFh (processing command)
01	Reply counter

Response: Type IPH-... read/write head on channel 1

04:02:00:02	
04	Repeat command code **CT** (change tag)
02	Reserved/Channel (1), toggle bit 0b
00	Status 0 (command executed without error)
02	Reply counter

Alternative response: No read/write head on channel 1

04:02:06:02	
04	Repeat command code **CT** (change tag)
02	Reserved/Channel (1), toggle bit 0b
06	Status 6 (hardware error)
02	Reply counter

Example: Read tag

Prerequisites:

- The tag type IPC03 is set.
- One type IPH-... read/write head is connected to channel 1.

Command: Read two double words starting from address 0 on channel 1

10:22:00:00	
10	Command code **SR** (single read words)
22	Number of double words (2) / channel (1), toggle bit
00:00	Address of double words (0000)

Confirmation

10:22:FF:01	
10	Repeat command code **SR** (single read words)
22	Number of double words (2) / channel (1), toggle bit
FF	Status FFh (processing command)
01	Reply counter

Response: Type IPC03 tag is located in front of the read/write head, the highlighted part depends on the content of the tag

10:22:00:02:**31:32:33:34:35:36:37:38**	
10	Repeat command code **SR** (single read words)
22	Number of double words (2) / channel (1), toggle bit
00	Status 0 (command executed without error)
02	Reply counter
31:32:33:34:35:36:37:38	**Data**

Alternative response: No tag in front of read/write head

10:02:05:02	
10	Repeat command code **SR** (single read words)
02	Number of double words (0) / channel (1), toggle bit
05	Status 5 (no tag in the detection range)
02	Reply counter

7.3 Command types

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

Single mode

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

Enhanced mode

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

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

7.4 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 33	**CT**
2d	02h	See "Quit (QU):" on page 36	**QU**
22d	16h	See "Reset (RS):" on page 36	**RS**
155d	9Bh	See "Set multiplexed mode (MM):" on page 37	**MM**
156d	9Ch	See "Set trigger mode (TM):" on page 38	**TM**

Standard read/write commands

Fixcode

Command code		Command description	Abbreviation
1d	01h	See "Single read read only code (SF):" on page 39	**SF**
29d	1Dh	See "Enhanced buffered read read only code (EF):" on page 40	**EF**

Read data

Command code		Command description	Abbreviation
16d	10h	See "Single read words (SR):" on page 41	**SR**
25d	19h	See "Enhanced buffered read words (ER):" on page 42	**ER**

Write data

Command code		Command description	Abbreviation
64d	40h	See "Single write words (SW):" on page 43	**SW**
26d	1Ah	See "Enhanced buffered write words (EW):" on page 44	**EW**

Special command modes

Password mode with IPC03

Command code		Command description	Abbreviation
24d	18h	See "Set password mode (PM):" on page 47	**PM**
65d	41h	See "Change password (PC):" on page 48	**PC**
66d	42h	See "Set password (PS):" on page 49	**PS**

IPC03 configuration

Command code		Command description	Abbreviation
97d	61h	See "Single get configuration (SG):" on page 50	**SG**
104d	68h	See "Enhanced buffered get configuration (EG):" on page 51	**EG**
18d	12h	See "Single write configuration (SC):" on page 52	**SC**
102d	66h	See "Enhanced buffered write configuration (EC):" on page 53	**EC**

Extended commands for tag type IPC11 and IDC-...-1K

Command code		Command description	Abbreviation
31d	1Fh	See "Single write read only code (SX):" on page 54	**SX**
36d	24h	See "Enhanced buffered write read only code (EX):" on page 55	**EX**
188d	BCh	See "Set tag ID code (TI)" on page 56	**TI**
170d	AAh	See "Fill data carrier (S#)" on page 57	**S#**

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

Command code		Command description	Abbreviation
10d	0Ah	See "Single read special fixcode (SS)" on page 58	**SS**
113d	71h	See "Enhanced read special fixcode (ES)" on page 59	**ES**
13d	0Dh	See "Single program special fixcode (SP)" on page 60	**SP**
117d	75h	See "Enhanced program special fixcode (EP)" on page 61	**EP**
107d	6Bh	See "Initialize data carrier (SI):" on page 62	**SI**

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

Command code		Command description	Abbreviation
190d	BEh	See "read param (RP)" on page 63	**RP**
191d	BFh	See "write param (WP)" on page 64	**WP**

7.4.1 System commands

Change tag (CT):

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Tag type in ASCII	<TagType> (high byte)							
Byte 3	Tag type in ASCII	<TagType> (low byte)							

Response:

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

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

Supported Tag Types

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'0'	'2'	IPC02	Unique, EM4102 (EM microelectronic)	Read only code	5	5	125 kHz
'0'	'3'	IPC03	EM4450 (EM microelectronic), Titan	Read/write read only code	116	4	125 kHz
'1'	'1'	IPC11	Q5 (Sokymat)	Read/write	5	-	125 kHz
'1'	'2'	IPC12	P+F FRAM	Read/write read only code	8k	4	125 kHz
'2'	'0'	IQC20[1)]	All ISO 15693 compliant read/write tags	Read/write read only code	8	8	13.56 MHz
'2'	'1'	IQC21	I-Code SLI (NXP)	Read/write read only code	112	8	13.56 MHz
'2'	'2'	IQC22	Tag-it HF-I Plus (Texas Instruments)	Read/write read only code	250	8	13.56 MHz

2013-04

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'2'	'3'	IQC23	my-D SRF55V02P (Infinion)	Read/write read only code	224	8	13.56 MHz
'2'	'4'	IQC24	my-D SRF55V10P (Infinion)	Read/write read only code	928	8	13.56 MHz
'3'	'1'	IQC31	Tag-it HF-I Standard (Texas Instruments)	Read/write read only code	32	8	13.56 MHz
'3'	'3'	IQC33[2)]	FRAM MB89R118 (Fujitsu)	Read/write read only code	2k	8	13.56 MHz
'3'	'4'	IQC34	FRAM MB89R119 (Fujitsu)	Read/write read only code	29	8	13.56 MHz
'3'	'5'	IQC35	I-Code SLI-S (NXP)	Read/write read only code	160	8	13.56 MHz
'4'	'0'	IQC40	All ISO 14443A compliant read/write tags	Read only code	-	4/7[6)]	13.56 MHz
'4'	'1'	IQC41	Mifare UltraLight MF0 IC U1 (NXP)	Read/write read only code	48	7	13.56 MHz
'4'	'2'	IQC42[3)]	Mifare Classic MF1 IC S50 (NXP)	Read/write read only code	752	4/7[6)]	13.56 MHz
'4'	'3'	IQC43[3)]	Mifare Classic MF1 IC S70 (NXP)	Read/write read only code	3440	4/7[6)]	13.56 MHz
'5'	'0'	IDC-...-1K	P+F	Read/write read only code	125	4	250 kHz
'5'	'2'	ICC-...	P+F	Read only code	28	7	250 kHz
'7'	'2'	IUC72[4)]	UCode-EPC-G2XM (NXP)	Read/write read only code	64	8	868 MHz
'7'	'3'	IUC73[4)]	Higgs-2 (Alien)	Read only code	-	96	868 MHz
'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

2013-04

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'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.

Recommendation:

For operation in an automated plant, permanently preset the data carrier type in use via a command.

Quit (QU):

Byte	Contents	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	0	0	0	0	<Channel>			<T>

Response:

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

The command running on this channel is interrupted.

Reset (RS):

Byte	Contents	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	0	0	0	0	0	0	0	<T>

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	Contents	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	0	0	0	0	0	0	0	<T>
Byte 2	Multiplex mode	0	0	0	0	0	0	0	<F>

Response:

Byte	Contents	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	0	0	0	0	0	0	0	<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

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>							

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	0	0	0	<Sensor channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

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

2013-04

7.4.2 Standard read/write commands

Single read read only code (SF):

Byte	Contents	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	0	0	0	0	<Channel>			<T>

Response:

Byte	Contents	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	0	0	0	0	<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>							

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 33.

Enhanced buffered read read only code (EF):

Byte	Contents	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/Ichannel/Toggle bit	0	0	0	0	<Channel>			<T>

Response:

Byte	Contents	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	0	0	0	0	<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>							

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 33.

Single read words (SR):

Byte	Contents	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/Channel/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Word address	<WordAddr>(high byte)							
Byte 3	Word address	<WordAddr> (low byte)							

Response:

Byte	Contents	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>							

1. N = 4 x <WordNum> + 5; Ethernet/IP: 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):

Byte	Contents	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)							

Response:

Byte	Contents	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>							

1. N = 4 x <WordNum> + 5; Ethernet/IP: N = 4 x <WordNum> + 3

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

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

Single write words (SW):

Byte	Contents	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>							

1. N = 4 x <WordNum> + 5; Ethernet/IP: N = 4 x <WordNum> + 3

Response:

Byte	Contents	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>							

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

Enhanced buffered write words (EW):

Byte	Contents	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>							

1. N = 4 x <WordNum> + 5; Ethernet/IP: N = 4 x <WordNum> + 3

Response:

Byte	Contents	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>							

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.

7.4.3 Special command modes

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.

2013-04

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).

The password in the R/W head and on the read/write tag can be changed with the command **PC**.

If the password mode is deactivated, every data word on the read/write tag can be read and written as necessary.

To read and write the words 1 “Protection Word” and 2 “Control Word”, the correct password is always required and therefore the password mode must be active (see the commands **SC** or **EC**).

In addition, the access to the read/write tag can be limited via read- and write-protected ranges. To achieve this, each mutually independent start and end of a read-protected and a write-protected range can be defined in the "Protection Word".

In the factory default condition of the reading heads and the read/write tag IPC03, the password is 00000000h. In the reading head, the password is stored in a volatile manner and in the read/write tag IPC03 in a non-volatile manner.

Set password mode (PM):

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Password mode	0	0	0	0	0	0	0	<P>

Response:

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							

Activates and deactivates the password mode of the relevant channel. In the password mode, the password is transferred to the read/write tag before each read/write access. If a data carrier is addressed with the wrong password, then even the other data ranges can no longer be accessed.

Change password (PC):

Byte	Contents	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	0	0	0	0	<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	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							

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.

2013-04

Set password (PS):

Byte	Contents	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	0	0	0	0	<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	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	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							

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.

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):

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Reserved	0	0	0	0	0	0	0	0
Byte 3	Address in the configuration range	<ConfAddr>							

Response:

Byte	Contents	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	0	0	0	0	<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):

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Reserved	0	0	0	0	0	0	0	0
Byte 3	Address in the configuration range	<ConfAddr>							

Response:

Byte	Contents	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	0	0	0	0	<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):

Byte	Contents	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	Reserved	0	0	0	0	0	0	0	0
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	Contents	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>							

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.

Enhanced buffered write configuration (EC):

Byte	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Reserved	0	0	0	0	0	0	0	0
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	Contents	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	0	0	0	0	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

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

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

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

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

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

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

Tags IDC-...- 1K can be programmed to behave like the ICC read only tag. This programming occupies the first 8 bytes in the tag and occurs when the tag type '50' is set with the commands **SX** or **EX**.
This code is read when tag type '52' is set with the commands **SF** or **EF**. If you use the command **SF** or **EF** when tag type '50' is selected, the 4-byte read only code of the tag is issued.

Single write read only code (SX):

Byte	Contents	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/Channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	FixType	<FixType> (high byte)							
Byte 3	FixType	<FixType> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
Byte 8	Data 00h ... FFh	<Data>							

Response:

Byte	Contents	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/Channel/Toggle bit	0	1	0	1	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

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[1]

<FixType> = '52' ASCII (35h 32h), the read only code can be overwritten

1. The first 3 bytes are hexadecimal (0h ... Fh), the last 4 bytes are decimal (0d ... 9d).

2013-04

Enhanced buffered write read only code (EX):

Byte	Contents	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/Channel/Toggle bit	<FixLen>				<Channel>			<T>
Byte 2	FixType	<FixType> (high byte)							
Byte 3	FixType	<FixType> (low byte)							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
Byte 8	Data 00h ... FFh	<Data>							

Response:

Byte	Contents	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/Channel/Toggle bit	0	1	0	1	<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Reply counter	<ReplyCounter>							

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[1]

<FixType> = '52' ASCII (35h 32h), the read only code can be overwritten

1. The first 3 bytes are hexadecimal (0h ... Fh), the last 4 bytes are decimal (0d ... 9d).

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):

Byte	Contents	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/Channel/Toggle bit	0	0	0	0	<Channel>			<T>

Response:

Byte	Contents	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/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	-	-	-	-	-	-	-	-
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 IQH2-... read/write heads

read param (RP)

Command:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0[1)]	Telegram length, high byte	0	0	0	0	0	0	0	0
Byte 1[1)]	Telegram length, low byte	0	0	0	0	0	1	0	0
Byte 2	Command code (BEh)	1	0	1	1	1	1	1	0
Byte 3	Reserved/Ident channel/Toggle bit	-				<Channel>			<T>
Byte 4	System code	<SystemCode> (high byte)							
Byte 5	System code	<SystemCode> (low byte)							
Byte 6	Parameter type	<ParamTyp> (high byte)							
Byte 7	Parameter type	<ParamTyp> (low byte)							

1) This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0[1)]	Telegram length, high byte	0	0	0	0	0	0	0	0
Byte 1[1)]	Telegram length, low byte	0	0	0	0	1	0	1	1
Byte 2	Command code (BEh)	1	0	1	1	1	1	1	0
Byte 3	Reserved/Ident channel/Toggle bit	0				<Channel>			<T>
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							
Byte 6	Data 00 ... FFh	<Data>							
...	Data 00 ... FFh	<Data>							
Byte N[2)]	Data 00 ... FFh	<Data>							

1) This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

2) N = <DataLength> + 6

write param (WP)

Command:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0[1)]	Telegram length, high byte	0	0	0	0	0	0	0	0
Byte 1[1)]	Telegram length, low byte	0	0	0	0	0	1	0	0
Byte 2	Command code (BFh)	1	0	1	1	1	1	1	1
Byte 3	Reserved/Ident channel/Toggle bit	-				<Channel>			<T>
Byte 4	System code	<SystemCode> (high byte)							
Byte 5	System code	<SystemCode> (low byte)							
Byte 6	Parameter type	<ParamTyp> (high byte)							
Byte 7	Parameter type	<ParamTyp> (low byte)							
Byte 8	Length 00 … FFh	<DataLength (Byte)>							
Byte 9	Data 00 ... FFh	<Data>							
...	Data 00 ... FFh	<Data>							
Byte N[2)]	Data 00 ... FFh	<Data>							

1) This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

2) N = <DataLength> + 6

Response:

Byte	Contents	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0[1)]	Telegram length, high byte	0	0	0	0	0	0	0	0
Byte 1[1)]	Telegram length, low byte	0	0	0	0	1	0	1	1
Byte 2	Command code (BFh)	1	0	1	1	1	1	1	1
Byte 3	Reserved/Ident channel/Toggle bit	0				<Channel>			<T>
Byte 4	Status	<Status>							
Byte 5	Reply counter	<ReplyCounter>							

1) This byte is only used with the TCP/IP and MODBUS TCP/IP protocol.

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 ($46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h46_h$)

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.

7.5 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 33

<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

<PW> : 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 (011b) or 4 (100b)

<Status> : 1 byte ()

<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 data carrier ("Default Read").

<Year> : 2 bytes ASCII, hexadecimal encoding, 00h ... 63h

7.6 Fault/Status messages

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

Error messages triggered by the identification system

Status	Meaning
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	Reserved
0Bh	Reserved
0Ch	Reserved

2013-04

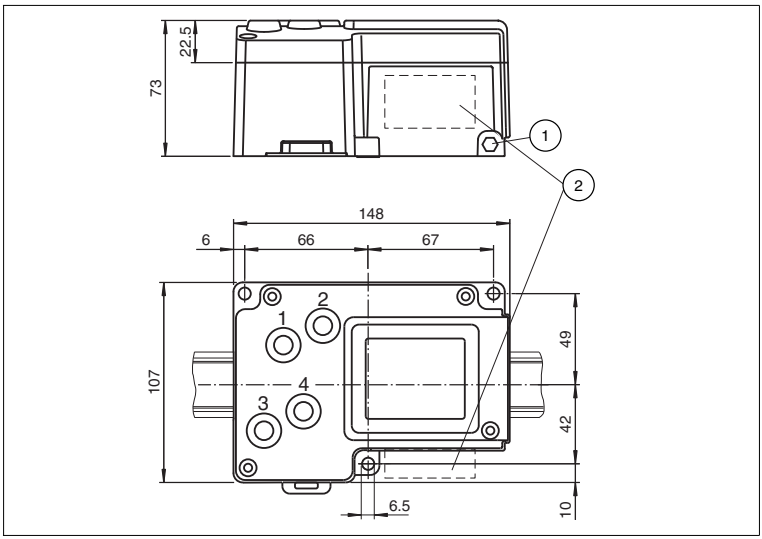
Status	Meaning
0Dh	Reserved
0Eh	Reserved
0Fh	Reserved

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.
60h	Hardware error, e.g. no communication with the identification system.
70h	Internal device error.

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

Displays/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 module status	green: Normal operation red: Irreparable error red flashing: Repairable error red/green flashing: LED test
LED network status	green: Online, connected red: Critical connection error green flashing: Online, not connected red flashing: Off-delay time red/green flashing: LED test

2013-04

LED network PWR	green: Network voltage available green flashing: LED test
LED COM	Yellow: Data exchange yellow flashing: LED test
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	≤ 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	DeviceNet
Protocol	CIP
Transfer rate	125, 250, 500 kBit/s

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 DeviceNet: DeviceNet MiniStyle 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 LED on the M12 plug lights up red.	The polarity of the screw terminal type M12 socket is reversed.	Ensure that the connection layout is correct.
The icon in the display (e.g. IPH1) does not appear even though the R/W head is connected to port 1.	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 repair 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 IPHx icon on the IDENT Control display 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 module status LED lights up red.	The device is faulty.	Replace the device.
The module status LED flashes red.	The buffer is full.	Increase the interscan delay or decrease the reduce/consume size
The module status LED lights up red/green.	The device performs a self test.	Wait until the device has completed the self test.
The module status LED flashes green.	The memory is full.	Reduce the data hold time.

This table will be updated and extended if necessary. Visit 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**	**I**
1D	29	GS	**3D**	**61**	**=**	5D	93	]	**7D**	**125**	**}**
1E	30	RS	**3E**	**62**	**>**	5E	94	^	**7E**	**126**	**~**
1F	31	US	**3F**	**63**	**?**	5F	95	_	**7F**	**127**	**DEL**

2013-04

11 Appendix A

11.1 Example 1

The following example uses assembly objects 101d/151d (mixed mode) and results in the following:

- Setting the data carrier IPC02 on channel 1 and channel 3.
- Reading the read only code from an IPC02 data carrier.
- Implicit communication.

The following prerequisites must be fulfilled:

- One type IPH-XX R/W head is connected to channel 1 and channel 3 on the IDENT Control.
- One type IPC02 data carrier is located in front of each R/W head.
- The MAC address on the IDENTControl is set to '01' (see chapter 6.5).
- The device is connected to the network.

Setting connection parameters

These parameters are configured on the PLC:

Assembly instance	Size (32 bits)
Input: 151	3
Output: 101	3
Configuration: 112 (this value is used for all input/output instances)	0 (this value is used for all input/output instances)

Setting tag type IPC02 on channels 1 and 3

Send a Change tagcommand to channel 1 as an implicit command:

Byte no.	Use	Contents	Description
Byte 0	Command code	04h	Command **CT** (Change tag)
Byte 1	Channel/Toggle bit	02h	Channel = 1 Toggle bit = 0
Byte 2	Tag type (high byte)	30h	IPC 02
Byte 3	Tag type (low byte)	32h	IPC 02
Byte 4 ... Byte 11		00h	

A command confirmation appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	04h	Command **CT** (Change tag type)
Byte 1	Number of double words/ Channel/Toggle bit	02h	Channel = 1 Toggle bit = 0

2013-04

Byte no.	Use	Contents	Description
Byte 2	Status	FFh	Processing command.
Byte 3	Reply counter	01h	For every IDENT telegram, the value on the reply counter increases by 1.
Byte 4 ... Byte 11		00h	

A response appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	04h	Command **CT** (Change tag)
Byte 1	Number of double words/ Channel/Toggle bit	02h	Channel = 1 Toggle bit = 0
Byte 2	Status	00h	Command executed.
Byte 3	Reply counter	02h	For every IDENT telegram, the value on the reply counter increases by 1.
Byte 4 ... Byte 11		00h	

Send a Change tagcommand to channel 3 as an implicit command:

Byte no.	Use	Contents	Description
Byte 0	Command code	04h	Command **CT** (Change tag)
Byte 1	Channel/Toggle bit	06h	Channel = 3 Toggle bit = 0
Byte 2	Tag type (high byte)	30h	IPC 02
Byte 3	Tag type (low byte)	32h	IPC 02
Byte 4 ... Byte 11		00h	

A command confirmation appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	04h	Command **CT** (Change tag)
Byte 1	Number of double words/ Channel/Toggle bit	06h	Channel = 3 Toggle bit = 0
Byte 2	Status	FFh	Processing command.
Byte 3	Reply counter	03h	For every IDENT telegram, the value on the reply counter increases by 1.
Byte 4 ... Byte 11		00h	

A response appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	04h	Command **CT** (Change tag)
Byte 1	Number of double words/ Channel/Toggle bit	06h	Channel = 3 Toggle bit = 0
Byte 2	Status	00h	Command executed.
Byte 3	Reply counter	04h	For every IDENT telegram, the value on the reply counter increases by 1.
Byte 4 ... Byte 11		00h	

Note!

Alternatively select the tag type by configuring the relevant setting in the boot-up object.

Reading data carriers on the R/W heads on channels 1 and 3.

Send a Single readcommand to channel 1 as an implicit command:

Byte no.	Use	Contents	Description
Byte 0	Command code	01h	Command **SF** (Single read read only code)
Byte 1	Channel/Toggle bit	02h	Channel = 1 Toggle bit = 0
Byte 2		00h	
Byte 3		00h	
Byte 4		00h	
Byte 5		00h	
Byte 6		00h	
Byte 7		00h	
Byte 8		00h	
Byte 9		00h	
Byte 10		00h	
Byte 11		00h	

A command confirmation appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	01h	Command **SF** (Single read read only code)
Byte 1	Channel/Toggle bit	02h	Channel = 1 Toggle bit = 0
Byte 2	Status	FFh	Processing command.
Byte 3	Reply counter	05h	For every IDENT telegram, the value on the reply counter increases by 1.
Byte 4		00h	
Byte 5		00h	
Byte 6		00h	
Byte 7		00h	
Byte 8		00h	
Byte 9		00h	
Byte 10		00h	
Byte 11		00h	

A response appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	01h	Command **SF** (Single read read only code)
Byte 1	Channel/Toggle bit	02h	Channel = 1 Toggle bit = 0
Byte 2	Status	00h	Command executed.
Byte 3	Reply counter	06h	For every IDENT telegram, the value on the reply counter increases by 1.
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>[1]
Byte 9		00h	
Byte 10		00h	
Byte 11		00h	

1. only IPC02 and IPC11

Send a Single readcommand to channel 3 as an implicit command:

Byte no.	Use	Contents	Description
Byte 0	Command code	01h	Command **SF** (Single read read only code)
Byte 1	Channel/Toggle bit	06h	Channel = 3 Toggle bit = 0
Byte 2		00h	
Byte 3		00h	
Byte 4		00h	
Byte 5		00h	
Byte 6		00h	
Byte 7		00h	
Byte 8		00h	
Byte 9		00h	
Byte 10		00h	
Byte 11		00h	

A command confirmation appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	01h	Command **SF** (Single read read only code)
Byte 1	Channel/Toggle bit	06h	Channel = 3 Toggle bit = 0
Byte 2	Status	FFh	Processing command.
Byte 3	Reply counter	07h	For every IDENT telegram, the value on the reply counter increases by 1.
Byte 4		00h	
Byte 5		00h	
Byte 6		00h	
Byte 7		00h	
Byte 8		00h	
Byte 9		00h	
Byte 10		00h	
Byte 11		00h	

A response appears in the input field:

Byte no.	Use	Contents	Description
Byte 0	Command code	01h	Command **SF** (Single read read only code)
Byte 1	Channel/Toggle bit	06h	Channel = 3 Toggle bit = 0
Byte 2	Status	00h	Command executed.
Byte 3	Reply counter	08h	For every IDENT telegram, the value on the reply counter increases by 1.
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>[1]
Byte 9		00h	
Byte 10		00h	
Byte 11		00h	

1. only IPC02 and IPC11

11.2 Example 2

Assembly objects 104d/154d (separated mode) are used in the example. The following functions are activated:

- Set tag type IPC03 on channel 1 and channel 2.
- Write data to a IPC03 tag.
- Read data from a IPC03 tag.

The following prerequisites must be fulfilled:

- One type IPH-XX R/W head is connected to channel 1 and channel 2 on the IDENT Control.
- One type IPC03 data carrier is located in front of each R/W head.
- The MAC address on the IDENTControl is set to '01' (see chapter 6.5).
- The device is connected to the network.

Setting the connection parameters

Configure the parameters on the PLC as follows:

Assembly instance	Size (32 bits)
Input: 154	8
Output: 104	8
Configuration: 112 (this value is used for all input/output instances)	0 (this value is used for all input/output instances)

The selected input and output instances of the assembly object is divided as follows:

Output instance 104d - 32 bytes

Bytes	Class, instance, attribute	Description
0 - 7	64h, 01d, 01h	Channel 1 [8]
8 - 15	64h, 02d, 01h	Channel 2 [8]
16 - 23	64h, 03d, 01h	Channel 3 [8]
24 - 31	64h, 04d, 01h	Channel 4 [8]

Input instance 154d - 32 bytes

Bytes	Class, instance, attribute	Description
0 - 7	65h, 01d, 01h	Channel 1 [8]
8 - 15	65h, 02d, 01h	Channel 2 [8]
16 - 23	65h, 03d, 01h	Channel 3 [8]
24 - 31	65h, 04d, 01h	Channel 4 [8]

Additionally, the IDENTControl requires 32 bytes of input data and sends back 32 bytes of output data as a result.

Note!

The input and output instances can be configured via the display. However, setting should be performed via the program while the plant is operating to permit easier replacement or extension to the plant.

Setting tag type IPC03 on channels 1 and 2

Send a Change tagcommand as an implicit command:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	04h	Command **CT** (Change tag)
	Byte 1	Channel/Toggle bit	00h	The element defined the channel. Toggle bit = 0
	Byte 2	Tag type (high byte)	30h	IPC 03
	Byte 3	Tag type (low byte)	33h	IPC 03
	Byte 4		00h	Not used
	Byte 5		00h	Not used
	Byte 6		00h	Not used
	Byte 7		00h	Not used

2013-04

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	04h	Command **CT** (Change tag)
	Byte 9	Channel/Toggle bit	00h	The element defined the channel. Toggle bit = 0
	Byte 10	Tag type (high byte)	30h	IPC 03
	Byte 11	Tag type (low byte)	33h	IPC 03
	byte 12		00h	Not used
	Byte 13		00h	Not used
	Byte 14		00h	Not used
	Byte 15		00h	Not used
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

A command confirmation appears in the input field:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code (Echo)	04h	Command **CT** (Change tag)
	Byte 1	Channel/Toggle bit	02h	Channel = element = 1 Toggle bit = 0
	Byte 2	Status	FFh	Processing command.
	Byte 3	Reply counter	01h	For every IDENT telegram, the value on the reply counter increases by 1.
	Byte 4		00h	
	Byte 5		00h	
	Byte 6		00h	
	Byte 7		00h	

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code (Echo)	04h	Command **CT** (Change tag)
	Byte 9	Channel/Toggle bit	04h	Channel = element = 2 Toggle bit = 0
	Byte 10	Status	FFh	Processing command.
	Byte 11	Reply counter	01h	For every IDENT telegram, the value on the reply counter increases by 1.
	byte 12		00h	Not used
	Byte 13		00h	Not used
	Byte 14		00h	Not used
	Byte 15		00h	Not used
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

A response appears in the input field:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	04h	Command **CT** (Change tag)
	Byte 1	Number of double words/ Channel/Toggle bit	02h	Channel = element = 1 Toggle bit = 0
	Byte 2	Status	00h	Command executed.
	Byte 3	Reply counter	02h	For every IDENT telegram, the value on the reply counter increases by 1.
	Byte 4		00h	
	Byte 5		00h	
	Byte 6		00h	
	Byte 7		00h	

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	04h	Command **CT** (Change tag)
	Byte 9	Number of double words/ Channel/Toggle bit	04h	Channel = element = 2 Toggle bit = 0
	Byte 10	Status	00h	Processing command.
	Byte 11	Reply counter	02h	For every IDENT telegram, the value on the reply counter increases by 1.
	byte 12		00h	Not used
	Byte 13		00h	Not used
	Byte 14		00h	Not used
	Byte 15		00h	Not used
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

Note!

The input and output instances can be configured via the display. However, setting should be performed via the program while the plant is operating to permit easier replacement or extension to the plant.

Sending a write command as an implicit command

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	40h	Command **SW** (Single write double words)
	Byte 1	Number of double words/ Channel/Toggle bit	10h	1 double word = 4 bytes Element defines the channel. Toggle bit = 0
	Byte 2	Address of double word (high byte)	00h	Start address = 0
	Byte 3	Address of double word (low byte)	00h	Start address = 0
	Byte 4	Data	00h	1. Byte data
	Byte 5	Data	01h	2. Byte data
	Byte 6	Data	02h	3. Byte data
	Byte 7	Data	03h	4. Byte data

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	40h	Command **SW** (Single write double words)
	Byte 9	Number of double words/ Channel/Toggle bit	10h	1 double word = 4 bytes Element defines the channel. Toggle bit = 0
	Byte 10	Address of double word (high byte)	00h	Start address = 0
	Byte 11	Address of double word (low byte)	00h	Start address = 0
	byte 12	Data	10h	1. Byte data
	Byte 13	Data	11h	2. Byte data
	Byte 14	Data	12h	3. Byte data
	Byte 15	Data	13h	4. Byte data
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

A command confirmation appears in the input field:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	40h	Command **SW** (Single write double words)
	Byte 1	Number of double words/ Channel/Toggle bit	12h	1 double word = 4 bytes Channel = element = 1 Toggle bit = 0
	Byte 2	Status	FFh	Processing command.
	Byte 3	Reply counter	03h	For every IDENT telegram, the value on the reply counter increases by 1.
	Byte 4	-	00h	
	Byte 5	-	00h	
	Byte 6	-	00h	
	Byte 7	-	00h	

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	40h	Command **SW** (Single write double words)
	Byte 9	Number of double words/ Channel/Toggle bit	14h	1 double word = 4 bytes Channel = element = 1 Toggle bit = 0
	Byte 10	Status	FFh	Processing command.
	Byte 11	Reply counter	03h	For every IDENT telegram, the value on the reply counter increases by 1.
	byte 12	-	00h	
	Byte 13	-	00h	
	Byte 14	-	00h	
	Byte 15	-	00h	
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

A response appears in the input field:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	40h	Command **SW** (Single write double words)
	Byte 1	Number of double words/ Channel/Toggle bit	02h	Element defines channel. Toggle bit = 0
	Byte 2	Status	00h	Command executed.
	Byte 3	Reply counter	04h	For every IDENT telegram, the value on the reply counter increases by 1.
	Byte 4	-	00h	
	Byte 5	-	00h	
	Byte 6	-	00h	
	Byte 7	-	00h	

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	40h	Command **SW** (Single write double words)
	Byte 9	Number of double words/ Channel/Toggle bit	04h	Element defines channel. Toggle bit = 0
	Byte 10	Status	00h	Command executed.
	Byte 11	Reply counter	04h	For every IDENT telegram, the value on the reply counter increases by 1.
	byte 12	-	00h	
	Byte 13	-	00h	
	Byte 14	-	00h	
	Byte 15	-	00h	
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

Sending a read command as an implicit command

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	10h	Command **SR** (Single read double words)
	Byte 1	Number of double words/ Channel/Toggle bit	10h	1 double word = 4 bytes Element defines the channel. Toggle bit = 0
	Byte 2	Address of double word (high byte)	00h	Start address = 0
	Byte 3	Address of double word (low byte)	00h	Start address = 0
	Byte 4		00h	
	Byte 5		00h	
	Byte 6		00h	
	Byte 7		00h	

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	10h	Command **SR** (Single read double words)
	Byte 9	Number of double words/ Channel/Toggle bit	10h	1 double word = 4 bytes Element defines the channel. Toggle bit = 0
	Byte 10	Address of double word (high byte)	00h	Start address = 0
	Byte 11	Address of double word (low byte)	00h	Start address = 0
	byte 12		00h	
	Byte 13		00h	
	Byte 14		00h	
	Byte 15		00h	
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

A command confirmation appears in the input field:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	10h	Command **SR** (Single read words)
	Byte 1	Number of double words/ Channel/Toggle bit	12h	1 double word = 4 bytes Channel = element = 1 Toggle bit = 0
	Byte 2	Status	FFh	Processing command.
	Byte 3	Reply counter	05h	For every IDENT telegram, the value on the reply counter increases by 1.
	Byte 4	-	00h	
	Byte 5	-	00h	
	Byte 6	-	00h	
	Byte 7	-	00h	

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	10h	Command **SR** (Single read words)
	Byte 9	Number of double words/ Channel/Toggle bit	14h	1 double word = 4 bytes Channel = element = 1 Toggle bit = 0
	Byte 10	Status	FFh	Processing command.
	Byte 11	Reply counter	05h	For every IDENT telegram, the value on the reply counter increases by 1.
	byte 12	-	00h	
	Byte 13	-	00h	
	Byte 14	-	00h	
	Byte 15	-	00h	
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

A response appears in the input field:

Element	Implicit telegram	Use	Contents	Description
1	Byte 0	Command code	10h	Command **SR** (Single read words)
	Byte 1	Number of double words/ Channel/Toggle bit	12h	1 double word = 4 bytes Channel = element = 1 Toggle bit = 0
	Byte 2	Status	00h	Command executed.
	Byte 3	Reply counter	06h	For every IDENT telegram, the value on the reply counter increases by 1.
	Byte 4	Data	00h	1. Byte data
	Byte 5	Data	01h	2. Byte data
	Byte 6	Data	02h	3. Byte data
	Byte 7	Data	03h	4. Byte data

Element	Implicit telegram	Use	Contents	Description
2	Byte 8	Command code	10h	Command **SR** (Single read words)
	Byte 9	Number of double words/ Channel/Toggle bit	14h	1 double word = 4 bytes Channel = element = 2 Toggle bit = 0
	Byte 10	Status	00h	Command executed.
	Byte 11	Reply counter	06h	For every IDENT telegram, the value on the reply counter increases by 1.
	byte 12	Data	10h	1. Byte data
	Byte 13	Data	11h	2. Byte data
	Byte 14	Data	12h	3. Byte data
	Byte 15	Data	13h	4. Byte data
3	Byte 16 ... Byte 23		00h	No commands are transmitted to channel 3.
4	Byte 24 ... Byte 31		00h	No commands are transmitted to channel 4.

12 Appendix B

12.1 Object model

Class	Object name	Number of instances
01h	Identity	1
04h	Assembly	25
64h	Output command for channels 1-4, IDENTControl and mixed mode	13
65h	Input command for channels 1-4, IDENTControl and mixed mode	13
66h	Boot-up parameters	4
67h	Diagnostics	4

12.1.1 Identity object (01h)

Class attribute (instance 0)

Attribute ID	Name	Data type	Data content	Access authorization
1	Revision	UINT	1	Get

Instance attributes (instance 1)

Attribute ID	Name	Data type	Data content	Access authorization
1	Vendor number	UINT	57d	Get
2	Device type	UINT	00h	Get
3	Product code number	UINT	1	Get
4	Product major revision Product minor revision	USINT USINT	02 04	Get
5	Status	WORD	see below	Get
6	Serial number	UDINT	Unique 32-bit value	Get
7	Product number	String from USINT	IC-KP-B7-V95 #130985	Get

Shared services

Service code	integrated in		service designation
	Class level	Instance level	
0Eh	Yes	Yes	Get attribute single
05h	No	Yes	Reset

2013-04

12.1.2 Assembly object (04h)

These instances are taken from classes 64h and 65h.

Class attributes (instance 0)

Attribute ID	Name	Data type	Data content	Access authorization
1	Revision	UINT	2	Get
2	Max. instance	UINT	162	Get
100	I/O output instance	USINT	100	Get / Set
101	I/O output produce length	UINT	8	Get
102	I/O input instance[1]	USINT	150	Get
103	I/O input consume length	UINT	8	Get

1. I/O input instance = I/O output instance + 50d

Output instance attributes (instances 100d-112d)

Attribute ID	Name	Data type	Data content	Access authorization
3	Output data	USINT [0-248]	0	Get

Output instance 100d - 8 bytes

Bytes	Class, instance, attribute	Description
0 - 7	64h, 06d, 01h	Mixed mode [8]

Output instance 101d - 12 bytes

Bytes	Class, instance, attribute	Description
0 - 11	64h, 06d, 02h	Mixed mode [12]

Output instance 102d - 32 bytes

Bytes	Class, instance, attribute	Description
0 - 31	64h, 06d, 03h	Mixed mode [32]

Output instance 103d - 60 bytes

Bytes	Class, instance, attribute	Description
0 - 59	64h, 06d, 04h	Mixed mode [60]

Output instance 104d - 32 bytes

Bytes	Class, instance, attribute	Description
0 - 7	64h, 01d, 01h	Channel 1 [8]
8 - 15	64h, 02d, 01h	Channel 2 [8]
16 - 23	64h, 03d, 01h	Channel 3 [8]
24 - 31	64h, 04d, 01h	Channel 4 [8]

Output instance 105d - 48 bytes

Bytes	Class, instance, attribute	Description
0 - 11	64h, 01d, 02h	Channel 1 [12]
12 - 23	64h, 02d, 02h	Channel 2 [12]
24 - 35	64h, 03d, 02h	Channel 3 [12]
36 - 47	64h, 04d, 02h	Channel 4 [12]

Output instance 106d - 128 bytes

Bytes	Class, instance, attribute	Description
0 - 31	64h, 01d, 03h	Channel 1 [32]
32 - 63	64h, 02d, 03h	Channel 2 [32]
64 - 95	64h, 03d, 03h	Channel 3 [32]
96 - 127	64h, 04d, 03h	Channel 4 [32]

Output instance 107d - 240 bytes

Bytes	Class, instance, attribute	Description
0 - 59	64h, 01d, 04h	Channel 1 [60]
60 - 119	64h, 02d, 04h	Channel 2 [60]
120 - 179	64h, 03d, 04h	Channel 3 [60]
180 - 239	64h, 04d, 04h	Channel 4 [60]

Output instance 108d - 40 bytes

Bytes	Class, instance, attribute	Description
0 - 7	64h, 01d, 01h	Channel 1 [8]
8 - 15	64h, 02d, 01h	Channel 2 [8]
16 - 23	64h, 03d, 01h	Channel 3 [8]
24 - 31	64h, 04d, 01h	Channel 4 [8]
32 - 39	64h, 05d, 01h	IDENT Control

2013-04

Output instance 109d - 56 bytes

Bytes	Class, instance, attribute	Description
0 - 11	64h, 01d, 02h	Channel 1 [12]
12 - 23	64h, 02d, 02h	Channel 2 [12]
24 - 35	64h, 03d, 02h	Channel 3 [12]
36 - 47	64h, 04d, 02h	Channel 4 [12]
48 - 55	64h, 05d, 01h	IDENT Control

Output instance 110d - 136 bytes

Bytes	Class, instance, attribute	Description
0 - 31	64h, 01d, 03h	Channel 1 [32]
32 - 63	64h, 02d, 03h	Channel 2 [32]
64 - 95	64h, 03d, 03h	Channel 3 [32]
96 - 127	64h, 04d, 03h	Channel 4 [32]
128 - 135	64h, 05d, 01h	IDENT Control

Output instance 111d - 248 bytes

Bytes	Class, instance, attribute	Description
0 - 59	64h, 01d, 04h	Channel 1 [60]
60 - 119	64h, 02d, 04h	Channel 2 [60]
120 - 179	64h, 03d, 04h	Channel 3 [60]
180 - 239	64h, 04d, 04h	Channel 4 [60]
240 - 299	64h, 05d, 01h	IDENT Control

Output instance 112d - 0 bytes

Bytes	Class, instance, attribute	Description
NONE	N/A	Heartbeat

Input instance attributes (instances 150d-162d)

Attribute ID	Name	Data type	Data content	Access authorization
3	Input data	USINT [8-248]	0	Get

Input instance 150d - 8 bytes

Bytes	Class, instance, attribute	Description
0 - 7	65h, 06d, 01h	Mixed mode [8]

Input instance 151d - 12 bytes

Bytes	Class, instance, attribute	Description
0 - 11	65h, 06d, 02h	Mixed mode [12]

Input instance 152d - 32 bytes

Bytes	Class, instance, attribute	Description
0 - 31	65h, 06d, 03h	Mixed mode [32]

Input instance 153d - 60 bytes

Bytes	Class, instance, attribute	Description
0 - 59	65h, 06d, 04h	Mixed mode [60]

Input instance 154d - 32 bytes

Bytes	Class, instance, attribute	Description
0 - 7	65h, 01d, 01h	Channel 1 [8]
8 - 15	65h, 02d, 01h	Channel 2 [8]
16 - 23	65h, 03d, 01h	Channel 3 [8]
24 - 31	65h, 04d, 01h	Channel 4 [8]

Input instance 155d - 48 bytes

Bytes	Class, instance, attribute	Description
0 - 11	65h, 01d, 02h	Channel 1 [12]
12 - 23	65h, 02d, 02h	Channel 2 [12]
24 - 35	65h, 03d, 02h	Channel 3 [12]
36 - 47	65h, 04d, 02h	Channel 4 [12]

2013-04

Input instance 156d - 128 bytes

Bytes	Class, instance, attribute	Description
0 - 31	65h, 01d, 03h	Channel 1 [32]
32 - 63	65h, 02d, 03h	Channel 2 [32]
64 - 95	65h, 03d, 03h	Channel 3 [32]
96 - 127	65h, 04d, 03h	Channel 4 [32]

Input instance 157d - 240 bytes

Bytes	Class, instance, attribute	Description
0 - 63	65h, 01d, 04h	Channel 1 [60]
64 - 127	65h, 02d, 04h	Channel 2 [60]
128 - 191	65h, 03d, 04h	Channel 3 [60]
192 - 255	65h, 04d, 04h	Channel 4 [60]

Input instance 158d - 40 bytes

Bytes	Class, instance, attribute	Description
0 - 7	65h, 01d, 01h	Channel 1 [8]
8 - 15	65h, 02d, 01h	Channel 2 [8]
16 - 23	65h, 03d, 01h	Channel 3 [8]
24 - 31	65h, 04d, 01h	Channel 4 [8]
32 - 39	65h, 05d, 01h	IDENT Control

Input instance 159d - 56 bytes

Bytes	Class, instance, attribute	Description
0 - 11	65h, 01d, 02h	Channel 1 [12]
12 - 23	65h, 02d, 02h	Channel 2 [12]
24 - 35	65h, 03d, 02h	Channel 3 [12]
36 - 47	65h, 04d, 02h	Channel 4 [12]
48 - 55	65h, 05d, 01h	IDENT Control

Input instance 160d - 136 bytes

Bytes	Class, instance, attribute	Description
0 - 31	65h, 01d, 03h	Channel 1 [32]
32 - 63	65h, 02d, 03h	Channel 2 [32]
64 - 95	65h, 03d, 03h	Channel 3 [32]
96 - 127	65h, 04d, 03h	Channel 4 [32]
128 - 135	65h, 05d, 01h	IDENT Control

Input instance 161d - 248 bytes

Bytes	Class, instance, attribute	Description
0 - 59	65h, 01d, 04h	Channel 1 [60]
60 - 119	65h, 02d, 04h	Channel 2 [60]
120 - 179	65h, 03d, 04h	Channel 3 [60]
180 - 239	65h, 04d, 04h	Channel 4 [60]
240 - 299	65h, 05d, 01h	IDENT Control

Input instance 162d - 10 bytes

Bytes	Class, instance, attribute	Description
0 - 9	65h, 00d, 64h	Status

Shared services

Service code	integrated in		service designation
	Class level	Instance level	
0Eh	Yes	Yes	Get attribute single
10h	Yes	Yes	Set attribute single

12.1.3 Output command object (instances 64h - 6)

Class attributes (instance 0)

AttributeID	Name	Data type	Data content	Access authorization
1	Revision	UINT	1	Get

Instance attributes (instances 1-6)

- Instances 1-4: R/W heads 1-4
- Instance 5 - Ident Control
- Instance 6 - Mixed mode

AttributeID	Name	Data type	Data content	Access authorization
1	Output data image (first 8 bytes)	USINT[8]	0	Get / Set
2	Output data image (first 12 bytes)	USINT[12]	0	Get / Set
3	Output data image (first 32 bytes)	USINT[32]	0	Get / Set
4	Output data image (first 60 bytes)	USINT[60]	0	Get / Set

2013-04

Shared services

Service code	integrated in		service designation
	Class level	Instance level	
0Eh	Yes	Yes	Get attribute single
10h	No	Yes	Set attribute single

12.1.4 Input command object (instances 65h - 6)

Class attributes (instance 0)

AttributeID	Name	Data type	Data content	Access authorization
1	Revision	UINT	1	Get
100	Explicit status	USINT[10]	0	Get

Instance attributes (instances 1-6)

- Instances 1-4: R/W heads 1-4
- Instance 5 - Ident Control
- Instance 6 - Mixed mode

AttributeID	Name	Data type	Data content	Access authorization
1	Input data image (first 8 bytes)	USINT[8]	0	Get
2	Input data image (first 12 bytes)	USINT[12]	0	Get
3	Input data image (first 32 bytes)	USINT[32]	0	Get
4	Input data image (first 60 bytes)	USINT[60]	0	Get

Shared services

Service code	integrated in		service designation
	Class level	Instance level	
0Eh	Yes	Yes	Get attribute single

12.1.5 Boot-up parameter object (instances 66h - 4)

Class attributes (instance 0)

AttributeID	Name	Data type	Data content	Access authorization
1	Revision	UINT	1	Get
100	Multiplex mode	BOOL	0	Get / Set
101	Data retention time	USINT	0	Get / Set

Instance attributes (instances 1-4, channels 1-4)

AttributeID	Name	Data type	Data content	Access authorization
1	Tag type	USINT	3	Get / Set

Shared services

Service code	integrated in		service designation
	Class level	Instance level	
0Eh	Yes	Yes	Get attribute single
10h	Yes	Yes	Get attribute single

12.1.6 Diagnostics object (instances 67h - 5)

Class attributes (instance 0)

AttributeID	Name	Data type	Data content	Access authorization
1	Revision	UINT	1	Get
100	Refresh all	BOOL	0	Get / Set
101	Multiplex mode	BOOL	0	Get
102	Trigger condition 3	USINT	0	Get
103	Trigger condition 4	USINT	0	Get
104	Version gateway	Bytes [52]	0	Get

Instance attributes (instances 1-4, channels 1-4)

AttributeID	Name	Data type	Data content	Access authorization
1	Tag type	USINT	0	Get
2	Version	Bytes [52]	0	Get

2013-04

Instance attributes (instance 5, IDENTControl)

Attribute ID	Name	Data type	Data content	Access authorization
1	Unused			
2	Version	Bytes [52]	0	Get

Shared services

Service code	integrated in		service designation
	Class level	Instance level	
0Eh	Yes	Yes	Get attribute single
10h	Yes	No	Set attribute single

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

TDOCT0845D_ENG
04/2013