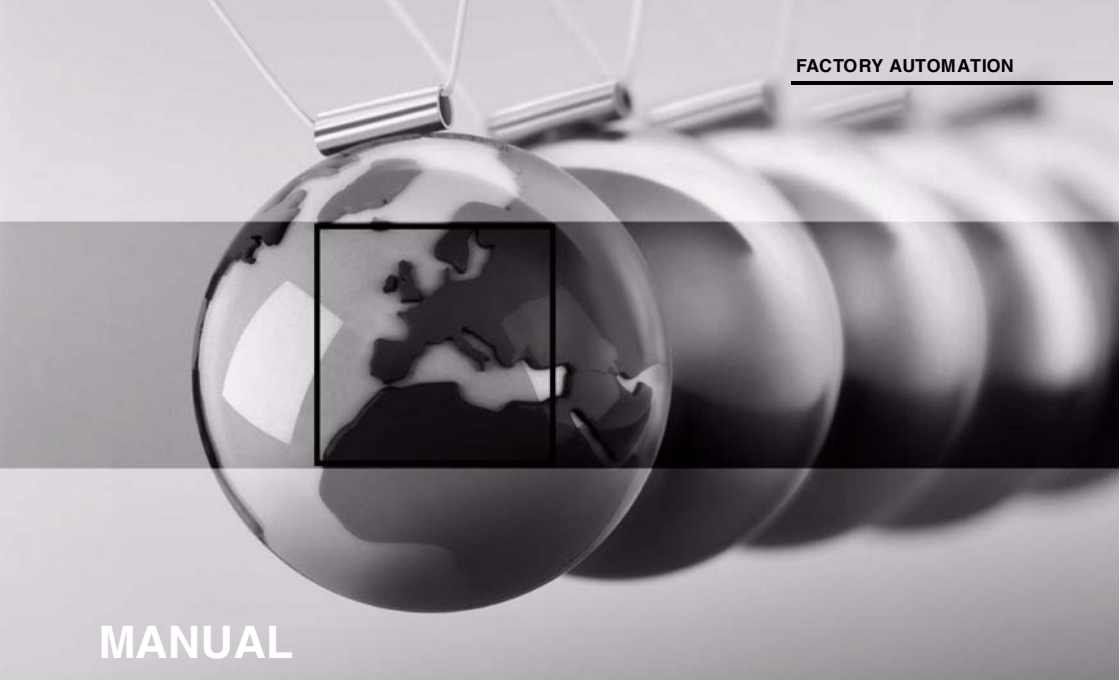
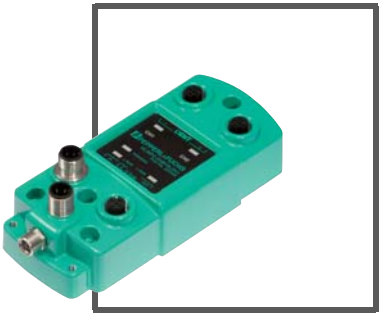


MANUAL

IC-KP2-2HB18-2V1

IDENTControl Compact control interface with interface for CC-Link V2



CE

CC-Link V2

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"

2012-12

2012-12

1 Introduction

Congratulations

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

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

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

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

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

Symbols used

The following symbols are used in this manual:

Note!

This symbol draws your attention to important information.

Handling instructions

You will find handling instructions beside this symbol

Contact

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

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

2012-12

2 Declaration of conformity

2.1 CE conformity

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

Note!

A declaration of conformity can be requested from the manufacturer.

3 Safety

3.1 Symbols relevant to safety

Danger!
This symbol indicates a warning about an immediate possible danger.

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

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

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

Caution!
This symbol indicates a warning about a possible fault.

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

3.2 Intended Use

The IDENTControl Compact IC-KP2-2HB18-2V1 is a control unit with integral CC-Link interface designed for identification systems. The IDENTControl Compact can be used as a control cabinet module or for field applications. You can connect suitable inductive R/W heads, UHF antennas, or trigger sensors to the IDENTControl Compact. However, wiring suitable for the system design must always be used.

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

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

3.3 General notes on safety

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

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

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

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

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

Ensure that the ambient conditions comply with regulations.

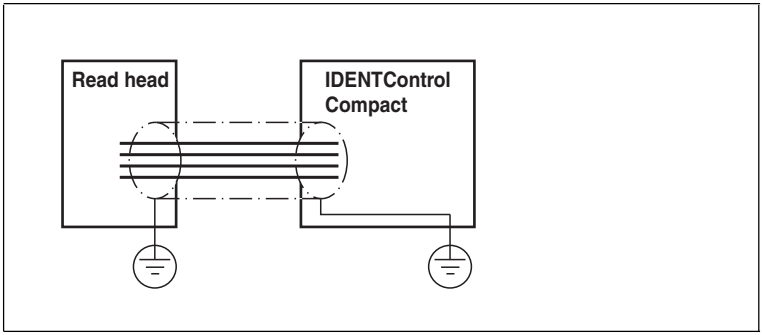
Note!

Disposal

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

3.4 Contact protection

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



Danger!

Electric shock

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

See chapter 5.4.3

4 Product Description

4.1 Product family

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

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

4.1.1 R/W heads

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

4.1.2 Code / Data carrier

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

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

Read/write tag 13.56 MHz (inductive)

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

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

4.1.3 Handhelds

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

Figure 4.1

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

4.2 Connection accessories

4.2.1 Connection cable for R/W heads and trigger sensors

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

Figure 4.2

Accessories	Description
2 m long (straight female, angled male)	V1-G-2M-PUR-ABG-V1-W
5 m long (straight female, angled male)	V1-G-5M-PUR-ABG-V1-W
10 m long (straight female, angled male)	V1-G-10M-PUR-ABG-V1-W

2012-12

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

4.2.2 Cable connectors for the power supply

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

Figure 4.3

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

4.2.3 Connection cable to the CC-Link interface

The IDENTControl Compact has two M12 connectors. It is connected to the bus via standard CC-Link cable with M12 connectors. If you want to exchange the control unit without affecting the bus during operation (hot-plug capability), connect the control unit via a Y-cable to **CC-Link IN**.

Figure 4.4

Accessories	Model number
Terminator	ICZ-TR-V1-110R ICZ-TR-V1-130R
Y-cable	ICZ-3T-0.2M-PVC-CCL-V1-G
Socket M12, field attachable	V1S-G-ABG-PG9
Cable connector M12, field attachable	V1-G-ABG-PG9

4.2.4 Adapter for RS 232 diagnostic interface

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

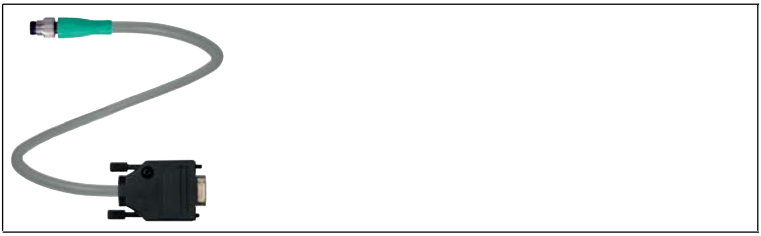


Figure 4.5

Accessories	Designation
M8 to SUBD adapter	V3S-GM-0.15M-PUR-ABG-SUBD

4.2.5 Mounting aid

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

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

4.3 Delivery package

The delivery package contains:

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

2012-12

4.4 Range of application

The system is suited for the following applications:

- Automation
- Material flow control in production
- Acquisition of operating data
- Access control
- Identification of storage vessels, pallets, work piece carriers, refuse containers, tanks, containers, etc.

4.5 Device characteristics

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

4.6 Interfaces and connections

The control unit IC-KP2-2HB18-2V1 has the following interfaces and connections:

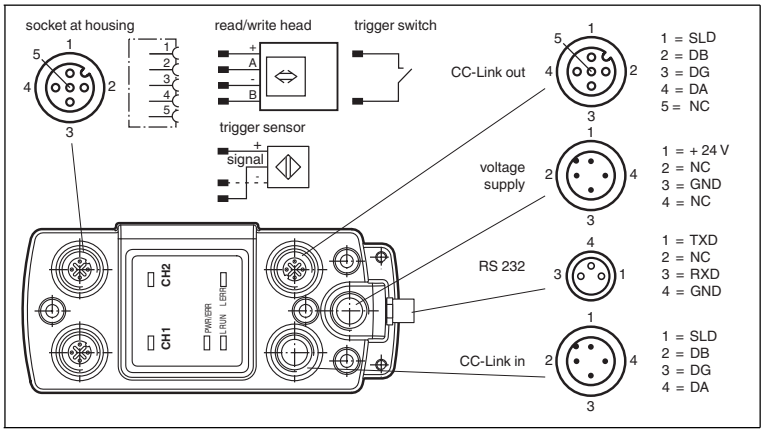


Figure 4.6

4.7 Displays and controls

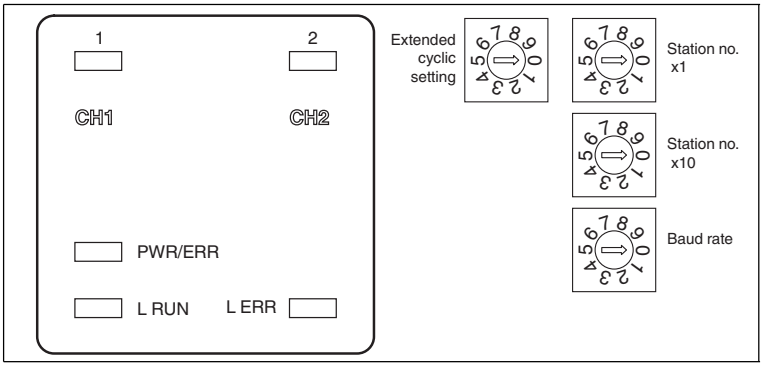


Figure 4.7

LEDs

Description	Function	Status description
1 2	Status display for R/W heads	LED lights up **green** when there is an active command on the R/W head. LED lights up **yellow** for approx. 1 second when a command is executed successfully.
CH1 CH2	Indicates that a R/W head is connected	LED lights up **green** when a R/W head is connected to channel 1 or channel 2. LED lights up **red** when a configuration error occurs.
PWR/ERR	Status display for IDENTControl Compact	LED lights up **green** when the IDENTControl Compact is connected to a power supply and the interface is ready for operation. LED lights up **red** if a hardware fault occurs.
L RUN	see table below	
L ERR		

L RUN	L ERR	Status description
Lights up **green**	Flashes **red**	■ Communication available, but some cyclic redundancy check errors[1)] due to noise. ■ No response, as the data received causes a cyclic redundancy check error[1)].
Lights up **green**	Flashes **red** with 0.4 s interval	The baud rate or station no. was changed since last start or restart.
Lights up **green**	Off	■ Normal communication. ■ No data for the controller.
Off	Flashes **red**	Data for the controller causes a cyclic redundancy check error[1)].

2012-12

L RUN	L ERR	Status description
Off	Off	■ Connection not started. ■ No data for the controller or reception error due to noise. ■ No reception due to line breakage, hardware switched off or hardware that has just been set.
Off	Lights up **red**	Error due to incorrect baud rate or station no.

1) CRC = Cyclic Redundancy Check = , checksum to detect errors during data transfer

Operating controls

Description	Status description
Rotary switch	Address setting 01 ... 64 (decimal) Station no.: 0 ... 6 (x10) Station no.: 0 ... 9 (x1) Baud rate setting: 0 ... 4 Extended cyclic setting: 0, 1, 2, 4, 8

5 Installation

5.1 Unpacking

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

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

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

Retain the original packaging in case you have to store or ship the device again at a later date.

Should you have any questions, please contact Pepperl+Fuchs.

5.2 EMC concept

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

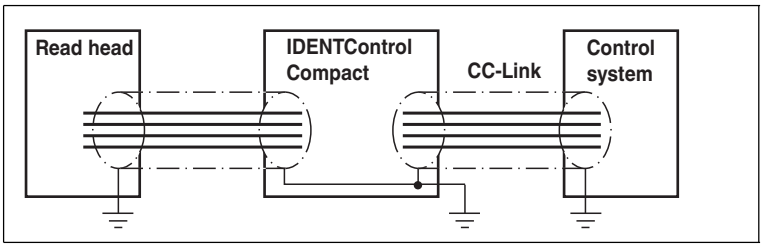


Figure 5.1

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

Note!

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

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

2012-12

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

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

5.3 Mounting

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

Note!

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

Set the rotary switches before mounting the IDENTControl Compact (see chapter 6.2.1).

5.4 Device connection

Electrical connection using plug connectors makes installation simple.

5.4.1 Power supply

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

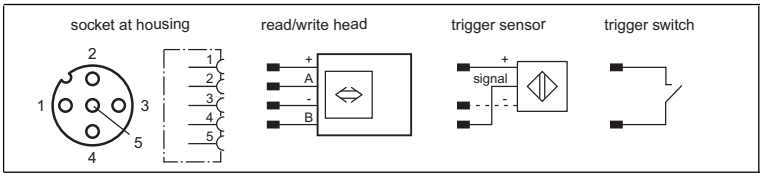
1 + 24 V
2 NC
3 GND
4 NC

Compatible connecting cable see chapter 4.2.2

5.4.2 Read/Write Head and Trigger Sensors

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

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



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

Connecting read/write heads

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

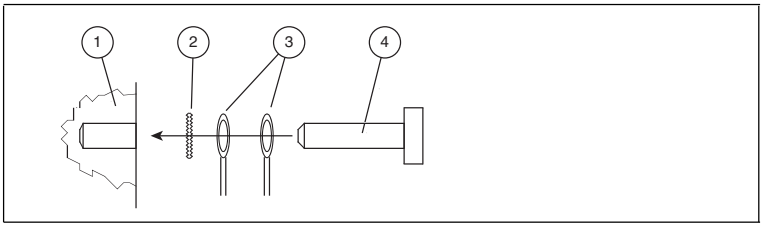
5.4.3 Ground connection

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

Note!

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

Use a ground conductor lead with a cross-section of at least 4 mm^2.



1 Housing

2 Serrated lock washer

3 Crimp connector

4 Lock screw

Connecting the IDENTControl Compact to ground

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

5.4.4 Connecting the RS 232 diagnostic interface

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

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

2012-12

The device operates with the following parameters (permanent):

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

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

Connector assignment	Pin	Signal
	1	TXD
	3	RXD
	4	GND

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

Pin assignment of the adapter for the RS 232 diagnostic interface

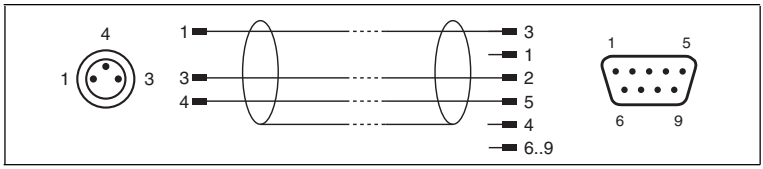
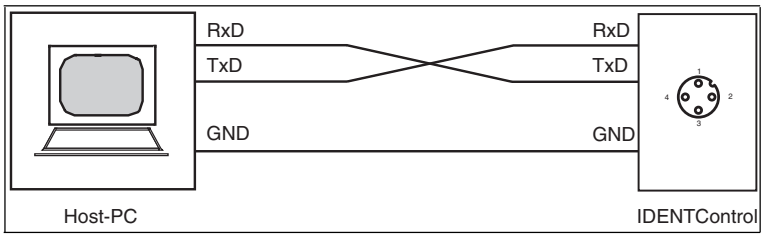


Figure 5.2

Connection example RS 232



5.4.5 CC-Link connection guide

The IC-KP2-2HB18-2V1 control interface is a device that assigns 4 stations to CC-Link.

The RWw and RWr areas of the bus protocol can be used to transfer the data of an individual channel or both channels in parallel. The RX and RY areas are always used to transfer the data of both channels in parallel.

CC-Link version	Maximum word count	Transmission
Version 1.1 and Version 2 - **single extension**	<WordNum> <= 3 (0000 0011b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 7 (0000 0111b)	per channel with transfer of channel 1
Version 2 - **dual extension**	<WordNum> <= 7 (0000 0111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 15 (0000 1111b)	per channel with transfer of channel 1
Version 2 - **quadruple extension**	<WordNum> <= 15 (0000 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 31 (0001 1111b)	per channel with transfer of channel 1
Version 2 - **octuple extension**	<WordNum> <= 31 (0001 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 63 (0011 1111b)	per channel with transfer of channel 1

<WordNum> = 8 bit, word count that can be read or written, the number is described in hexadecimal from 0h to FFh. The word count can be smaller if a transponder or R/W head only supports a small number of words.

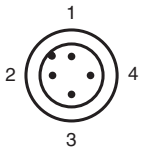
The following is valid for IPC03: Set the word count <WordNum> to 0h, if you want to read the preset data range of a read/write tag at address 0000h (“Default Read”).

The following is valid for IQC33: <WordNum> specifies the number of 8-byte blocks (max. 7 here) and must be an even number.

CC-Link

Physical interface:	RS-485
Protocol:	CC-Link
Transfer rate:	156 kbit/s 625 kbit/s 2.5 Mbit/s 5 Mbit/s 10 Mbit/s

CC-Link IN: M12 plug, A-coded

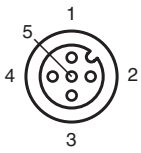
Connector assignment	Pin	Signal	Description
	1	SLD	Screen
	2	DB (white)	Data B
	3	DG (yellow)	Grounding
	4	DA (blue)	Data A

2012-12

Note!

To be able to use the hot-plug compatibility of the CC-Link bus, the**CC-Link IN** must be connected to the CC-Link bus via the Y-splitter cordset. The baud rate is not restricted by this.

CC-Link OUT: M12 socket, A-coded

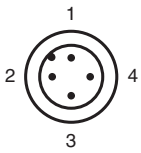
Connector assignment	Pin	Signal	Description
	1	SLD	Screen
	2	DB (white)	Data B
	3	DG (yellow)	Grounding
	4	DA (blue)	Data A
	5	NC	Not used

Caution!

Damage to the control interface and connected slaves

It is possible to swap the current and CC-Link IN socket as well as the channel and CC-Link OUT connection. If the current connection is connected to the CC-Link IN socket, the IC-KP2-2HB18-2V1 control unit and all further slaves that are linked to CC-Link OUT will be damaged.

Terminator

Connector assignment	Pin	Signal	Description
	1	NC	Not used
	2	DB	Data B
	3	NC	Not used
	4	DA	Data A

For Y-splitter cordset and terminator see chapter 4.2.3.

6 Commissioning

6.1 Connection

Warning!
Incorrect electrical connection

Incorrect connections may damage the system.

Before commissioning, familiarize yourself with the system of communication between your CC-Link master and the R/W system. Check all connections before commissioning.

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

6.2 Device settings

Caution!
Device not configured or configured incorrectly

System failure caused by incorrectly configured device

Configure the device prior to commissioning.

You must set the various parameters prior to commissioning.

6.2.1 Address setting

Assign the IDENTControl Compact an address between 01 and 64 that is not already assigned to another node. Set the device addresses with **station no.** rotary switches on the rear of the housing. The addressing via the device address is consistent with CC-Link. Select the next free device address in the CC-Link network as a device address.

Note!

The setting of the address is only read during the start process. An alteration of the switches during operation makes no alteration to the configuration of the IDENTControl control interface. If you change the address during operation, LED L ERR flashes red. To apply the changes, switch the device off and back on again.

6.2.2 Baud rate setting

The IDENTControl Compact supports five different baud rates:

Switch setting	Baud rate
0	156 kbit/s
1	625 kbit/s
2	2.5 Mbit/s
3	5 Mbit/s
4	10 Mbit/s
5-9	-

Set the desired baud rate via the**baud rate** rotary switch on the reverse of the device.

Note!

The setting of the baud rate is only read during the start process. An alteration of the switch during operation makes no alteration to the configuration of the IDENTControl control interface. If you change the baud rate during operation, LED L ERR flashes red. To apply the changes, switch the device off and back on again.

6.2.3 Extended cyclic setting

The IDENTControl Compact supports five different extended cycle settings:

Switch setting	CC-Link version	Extended cyclic setting
0	CC-Link V1.10	-
1	CC-Link V2	single = 1 telegram / response
2	CC-Link V2	2-way = 2 telegrams / response
4	CC-Link V2	4-way = 4 telegrams / response
8	CC-Link V2	8-way = 8 telegrams / response
3, 5-7, 9	CC-Link V1.10	no division

Set the desired number of cycles via the**extended cyclic setting** rotary switch on the reverse of the device.

Note!

The **extended cyclic setting** is only read during the start process. An alteration of the switch during operation makes no alteration to the configuration of the IDENTControl control interface. To apply the changes, switch the device off and back on again.

6.2.4 Non-volatile parameters

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

Non-volatile parameters

Parameter	Default setting	Value range
General		
Multiplex mode	Off	On / off
R/W head		
Trigger mode	Off	On / off
Tag type	99	00 ... FF

Configure the non-volatile parameters of the R/W system with the described system commands (see chapter 7.3.7). The “multiplex mode” and “tag type” parameters can also be set via initial settings. “99” is preset as the tag type.

7 Commands

7.1 Communication via the RS 232 interface

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

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

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

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

7.1.1 Command Overview, Diagnostics Interface

The serial commands executed in the list are described in the manuals for the IDENTControl Compact with serial interface. These manuals are available from www.pepperl-fuchs.com.

Command description	Abbreviation
'get address'	**GA**
'get log data'	**GE**
'get state info'	**GS**
'version'	**VE**
'configuration store'	**CS**
'change tag'	**CT**
'single read read only code/ID-code'	**SF**
'enhanced read read only code/ID-code'	**EF**
'enhanced read double words'	**SR**
'enhanced read double words'	**ER**
'quit command'	**QU**
'reset to default'	**RD**

7.1.2 Command examples

Note!

Enter all commands **without** spaces!

1. Example: Set tag type

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

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

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

Command:

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

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

Response:

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

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

Further possible responses:

4 0 04 1 000 # CR = wrong tag type

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

Note!

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

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

Command:

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

You will receive the 2 responses for both channels:

Response 1:

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

Response 2:

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

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

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

Command:

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

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

Response:

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

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

Response:

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

2012-12

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

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

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

Command:

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

Response:

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

7.2 General CC-Link information

CC-Link is a standardized field bus, which enables data exchange between PLCs, PCs, operating and observation devices and also sensors and actuators.

Note!

The CC-Link Partner Association (CLPA) publishes informational brochures and a CC-Link product catalog (http://www.clpa-europe.com/).

7.3 Communication via CC-Link

7.3.1 CC-Link profile

The following table describes input and output signals in the communication between master and slave:

RX and RY signals

Slave -> Master (RX)		Master -> Slave (RY)	
Address	Signal name	Address	Signal name
RXn0	unused	RYn0	Initial setting value
RXn1	unused	RYn1	unused
RXn2	CH1 in-zone contact	RYn2	1ch/2ch selection
RXn3	CH1 ID-BUSY	RYn3	CH1 data acknowledge
RXn4	CH1 ID command complete	RYn4	CH1 ID command execution request
RXn5	CH1 ID error occurrence	RYn5	unused
RXn6	CH1 ID connected	RYn6	CH1 mechanical flag execution request
RXn7	CH1 division data request	RYn7	CH1 division data complete
RXn8	unused	RYn8	unused
RXn9	unused	RYn9	unused
RXnA	CH2 in-zone contact	RYnA	unused
RXnB	CH2 ID-BUSY	RYnB	CH2 data acknowledge
RXnC	CH2 ID command complete	RYnC	CH2 ID command execution request
RXnD	CH2 error occurrence	RYnD	unused
RXnE	CH2 ID connected	RYnE	CH2 mechanical flag execution request
RXnF	CH2 division data request	RYnF	CH2 division data complete
RX(n+1)0-F	CH1 mechanical flag read data	RY(n+1)0-F	CH1 mechanical flag write data
RX(n+2)0-F		RY(n+2)0-F	
RX(n+3)0-F		RY(n+3)0-F	
RX(n+4)0-F	CH2 mechanical flag read data	RY(n+4)0-F	CH2 mechanical flag write data
RX(n+5)0-F		RY(n+5)0-F	
RX(n+6)0-F		RY(n+6)0-F	

2012-12

Slave -> Master (RX)		Master -> Slave (RY)	
Address	Signal name	Address	Signal name
RX(n+7)0	unavailable	RY(n+7)0	unavailable
RX(n+7)1		RY(n+7)1	
RX(n+7)2		RY(n+7)2	
RX(n+7)3		RY(n+7)3	
RX(n+7)4		RY(n+7)4	
RX(n+7)5		RY(n+7)5	
RX(n+7)6		RY(n+7)6	
RX(n+7)7		RY(n+7)7	
RX(n+7)8	Initial data processing request flag	RY(n+7)8	Initial data processing complete flag
RX(n+7)9	Initial data setting complete flag	RY(n+7)9	Initial data setting request flag
RX(n+7)A	Error status flag	RY(n+7)A	Error reset request flag
RX(n+7)B	Remote READY	RY(n+7)B	unavailable
RX(n+7)C	unavailable	RY(n+7)C	
RX(n+7)D		RY(n+7)D	
RX(n+7)E		RY(n+7)E	
RX(n+7)F		RY(n+7)F	

n: Address in master module, specified by the assignment of the stations

System area addresses

CC-Link version:	V 1.10	V 2	V 2	V 2	V 2
Cyclic setting:	-	single	2-way	4-way	8-way
Master address:	RX(n+7)0..F	RX(n+7)0..F	RX(n+D)0..F	RX(n+1B)0..F	RX(n+37)0..F
Slave address:	RY(n+7)0..F	RY(n+7)0..F	RY(n+D)0..F	RY(n+1B)0..F	RY(n+37)0..F

Description of the signals from master to the slave (RY)

Address	Signal name	Description
RYn0	**Initial setting value**	If this signal is ON, then the first data processing is skipped, the data in the RWw register is ignored and the setting that is stored in the non-volatile memory is used. Note: Even if the data in RWw is ignored, the **initial data processing complete** signal must be set and actuated so the **Remote Ready**signal is set.
RYn2	**1ch/2ch selection**	When this signal is set, the whole register area for data of one channel is used. The channel signals (CH1... or CH2 ...) which are set in RX and RY, select which channel the register area RWw or RWr uses for communication.
RYn3 / RYnB	**data acknowledge**	This signal is set after the master has read the data in the registers. It remains set until the slave sends **ID command complete**.
RYn4 / RYnC	**ID command execution request**	The master sets this signal after it has written a command and parameters in the register area to start an identification command.
RYn6 / RYnE	**mechanical flag execution request**	If this signal is set, the **mechanical flag read/write data** is used instead of the data in the registers to carry out an identification command.
RYn7 / RYnF	**division data complete**	If the data does not fit into the available register, the data can be split into smaller packets. Each packet is confirmed by setting this signal. The **division data complete** signal remains set until the **division data request** signal is reset.
RY(n+1)0-F / RY(n+4)0-F RY(n+2)0-F / RY(n+5)0-F RY(n+3)0-F / RY(n+6)0-F	**mechanical flag write data**	See chapter 7.3.2
RY(n+7)8	**Initial data processing complete flag**	The signal is set when the initialization process has ended.
RY(n+7)9	**Initial data setting request flag**	The signal is set after switching on or a hardware reset of the device to carry out initialization. The **initial data setting request flag** signal remains set until the **initial data setting complete** signal is set. It is used for parameterization of the slaves.
RY(n+7)A	**Error reset request flag**	The signal is set to delete the **error status** signal.

Description of the signals from the slave to the master (RX)

Address	Signal name	Description
RXn2 / RXnA	**in-zone contact**	The signal is set if a read/write tag is read or written (read/write command with status '0' is executed). The signal remains set until a single command or an enhanced read/write command with status '5' is executed or another fault occurs.
RXn3 / RXnB	**ID-BUSY**	The signal is set after an **ID command request** from the master is received. The signal remains set while the command is active.

2012-12

Address	Signal name	Description
RXn4 / RXnC	**ID command complete**	The signal is set if new data is available. The signal remains set until the master confirms the data with **ID data ack**. If split data is used, the signal is set when the last packet of the data is available.
RXn5 / RXnD	**ID error occurrence**	The signal is set, if the status is not '0' or '5' (e.g. hardware error status '6')
RXn6 / RXnE	**ID connected**	The signal is set if the R/W head is ready for operation and identification commands can be received.
RXn7 / RXnF	**division data request**	If the data does not fit into the available register, the data can be split into smaller packets. Each packet is sent by setting this signal. The signal remains set until the master confirms it with **ID data ack**.
RX(n+1)0-F / RX(n+4)0-F RX(n+2)0-F / RX(n+5)0-F RX(n+3)0-F / RX(n+6)0-F	**mechanical flag read data**	See chapter 7.3.2
RX(n+7)8	**Initial data processing request flag**	This signal is set after the device is switched on or hardware is reset, to start initialization. The **initial data processing request flag** signal remains set until the **initial data processing complete** signal is set. It is used for parameterization of the master.
RX(n+7)9	**Initial data setting complete flag**	The signal is set when initialization has been carried out and reset and if the **initial data setting complete** signal is no longer set.
RX(n+7)B	**Remote READY**	The signal is set after parameterization and reset if fatal errors occur.
RX(n+7)A	**Error status flag**	The signal is set if a fault occurs, e.g. internal buffer overflow, or if a code is read faster than the handshake.

7.3.2 Mechanical Flag Read/Write Data

With the **mechanical execution request** signal, you can switch the input of the read/write data. If the **mechanical execution request** signal is ON, then

- the write data in the RY flags on the **mechanical write data** addresses is entered.
- the read data is output in the RY flags on the **mechanical read data**-addresses instead of in the register area RWw and RWr.

The data is output in real time, i.e. the data can be overwritten without signaling retrieval of the data by setting **data acknowledge**.

This operating mode is suitable for applications where it is guaranteed that the read/write tag is in the detection area long enough for the data to be retrieved by the controller. With the transfer of the read/write data to the RX and RY flags you can access the data bit by bit.

Description of the mechanical write data signal from master to slave (RY)

Address	Signal name	Description
RY(n+1)0-F / RY(n+4)0-F RY(n+2)0-F / RY(n+5)0-F RY(n+3)0-F / RY(n+6)0-F	**mechanical flag write data**	The data of a write command is written to the address area RY of the read/write tag if the **mechanical flag execution**signal is set. The length of the words is dependent on the cyclic settings. See also the table below, "Addresses of the **mechanical write data** signal".

Description of the mechanical read data signal from slave to the master (RX)

Address	Signal name	Description
RX(n+1)0-F / RX(n+4)0-F RX(n+2)0-F / RX(n+5)0-F RX(n+3)0-F / RX(n+6)0-F	**mechanical flag read data**	If the master has set the **mechanical flag execution request** signal, the data of the read/write tag is formed on this signal.

Addresses of the mechanical read data signal

CC-Link version:	V 1.10	V 2	V 2	V 2	V 2
Cyclic setting:	-	single	2-way	4-way	8-way
Channel 1	RX(n+1)0..F . . . RX(n+3)0..F	RX(n+1)0..F . . . RX(n+3)0..F	RX(n+1)0..F . . . RX(n+6)0..F	RX(n+1)0..F . . . RX(n+C)0..F	RX(n+1)0..F . . . RX(n+1A)0..F
Channel 2	RX(n+4)0..F . . . RX(n+6)0..F	RX(n+4)0..F . . . RX(n+6)0..F	RX(n+7)0..F . . . RX(n+C)0..F	RX(n+D)0..F . . . RX(n+1A)0..F	RX(n+1B)0..F . . . RX(n+36)0..F

Addresses of the mechanical write data signal

CC-Link version:	V 1.10	V 2	V 2	V 2	V 2
Cyclic setting:	-	single	2-way	4-way	8-way
Channel 1	RY(n+1)0..F . . . RY(n+3)0..F	RY(n+1)0..F . . . RY(n+3)0..F	RY(n+1)0..F . . . RY(n+6)0..F	RY(n+1)0..F . . . RY(n+C)0..F	RY(n+1)0..F . . . RY(n+1A)0..F
Channel 2	RY(n+4)0..F . . . RY(n+6)0..F	RY(n+4)0..F . . . RY(n+6)0..F	RY(n+7)0..F . . . RY(n+C)0..F	RY(n+D)0..F . . . RY(n+1A)0..F	RY(n+1B)0..F . . . RY(n+36)0..F

2012-12

7.3.3 Data Structuring

Synchronous Data Exchange

Register RWw

Master -> slave																
Address		Bit no.														
CH1	CH2*	15							8	7						0
RWw n	RWw n+8	<Parameter> (primarily <WordNum>)								<CommandCode>						
RWw n+1	RWw n+9	<Parameter>														
RWw n+2	RWw n+A	<Write data>														
RWw n+3	RWw n+B	<Write data>														
RWw n+4	RWw n+C	<Write data>														
RWw n+5	RWw n+D	<Write data>														
RWw n+6	RWw n+E	<Write data>														
RWw n+7	RWw n+F	<Write data>														
RWw n+8		<Write data>														
RWw n+9		<Write data>														
RWw n+A		<Write data>														
RWw n+B		<Write data>														
RWw n+C		<Write data>														
RWw n+D		<Write data>														
RWw n+E		<Write data>														
RWw n+F		<Write data>														

Register RWr

Slave -> master																
Address		Bit no.														
CH1	CH2*	15							8	7						0
RWr n	RWr n+8	<WordNum>								<CommandCode>						
RWr n+1	RWr n+9	<ReplyCounter>								<Status>						
RWr n+2	RWr n+A	<Read data>														
RWr n+3	RWr n+B	<Read data>														
RWr n+4	RWr n+C	<Read data>														
RWr n+5	RWr n+D	<Read data>														
RWr n+6	RWr n+E	<Read data>														
RWr n+7	RWr n+F	<Read data>														
RWr n+8		<Read data>														

Slave -> master																	
Address		Bit no.															
CH1	CH2*	15						8	7								0
RWr n+9		<Read data>															
RWr n+A		<Read data>															
RWr n+B		<Read data>															
RWr n+C		<Read data>															
RWr n+D		<Read data>															
RWr n+E		<Read data>															
RWr n+F		<Read data>															

n: Address in master module, specified by the assignment of the stations

*: In dual-channel mode

7.3.4 Initialization

There are three ways of changing the settings of the IC-KP2-2HB18-2V1:

- The control interface triggers **initial data processing**, after which a data link is established.
- The higher-level bus triggers **initial data setting** during operation.
- A system command is sent during operation

Initial data processing can be skipped when the RYn0 signal **initial setting value** is set to 1. The IC-KP2-2HB18-2V1 then uses the parameter from the nonvolatile memory for initialization. If RYn0 is set to 1 while the **initial data complete**signal is set to 1, it is not necessary to send parameters to RWw, as the RWw memory is not used.

Changing the setup with a system command is described in the following sections, see chapter 7.3.8. Both **initial data processing** as well as **initial data setting** correspond to the definition in the CC-Link specification.

Note!

Error flags

The **error status flag** is set if an error status occurs when **setting** or **processing initial data** that does not equal 0 or 6.

Initial data processing

RX(m+n)8/RY(m+n)8: **initial data processing** signal request/termination

If the slave is switched on or after a hardware reset, **initial data processing** is requested on this signal.

Note: linked with (RX(m+n)B (Remote Monitor ready).

2012-12

Initial data processing

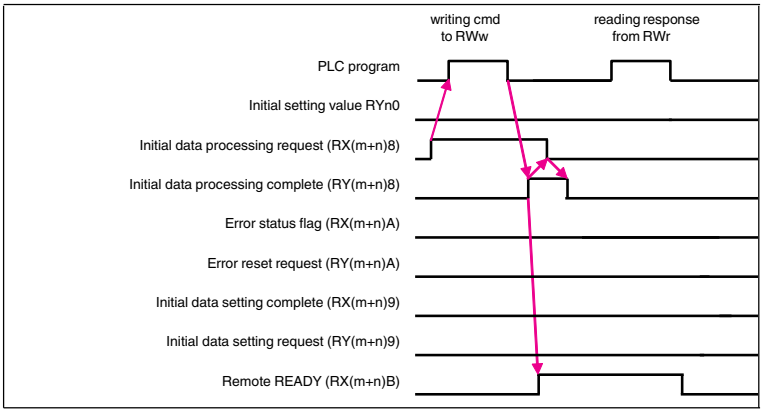


Figure 7.1

Initial data setting

RX(m+n)9/RY(m+n)9: **initial data setting** signal request/termination

With this signal, the user application program requests initialization of the slave.

Note: linked with RX(m+n)B (Remote Monitor ready).

Initial data setting

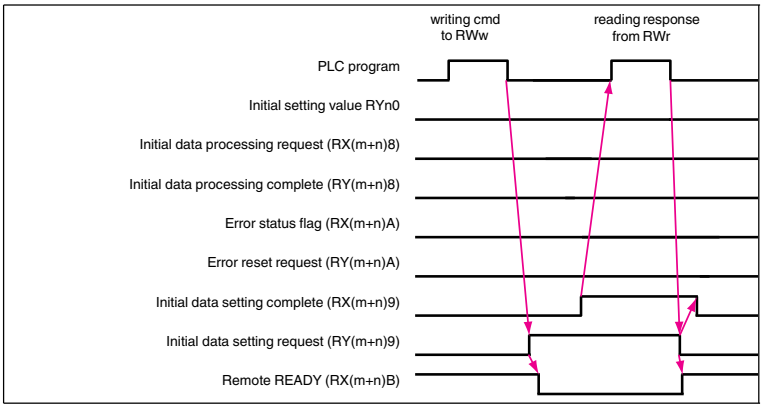


Figure 7.2

Error status flag

RX(m+n)A/RY(m+n)A: **error status flag** error status signal/error reset

Notification via/reset of an error, with exception of the watchdog timer of the slave.

Note: The **error status flag** deletes the error and removes the error value from the corresponding memory.

Error status flag

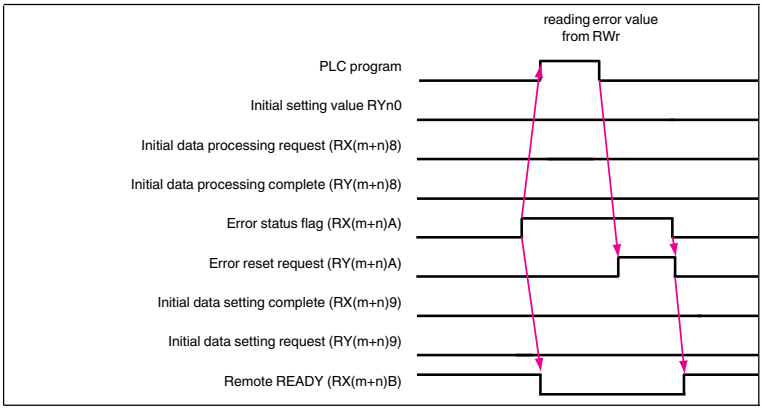


Figure 7.3

Register RWw and RWr Initial Setting

Slave -> master			Master -> slave		
Address	Description	Default	Address	Description	Default
RWrn	Cannot be used	0	RWwn	Cannot be used	
RWrn+1			RWwn+1	Cannot be used	
RWrn+2			RWwn+2	Cannot be used	
RWrn+3			RWwn+3	Cannot be used	
RWrn+4	<Status> for MM		RWwn+4	Multiplexed mode 0 = off, 1 = on	
RWrn+5	<Status> for CT1		RWwn+5	CH1 tag type <TagType> (low byte) <TagType> (high byte)	
RWrn+6			RWwn+6		
RWrn+7			RWwn+7		
RWrn+8			RWwn+8	Cannot be used	
RWrn+9			RWwn+9	Cannot be used	
RWrn+A			RWwn+A	Cannot be used	
RWrn+B			RWwn+B	Cannot be used	
RWrn+C			RWwn+C	Cannot be used	
RWrn+D	<Status> for CT2		RWwn+D	CH2 tag type <TagType> (low byte) <TagType> (high byte)	
RWrn+E			RWwn+E		
RWrn+F			RWwn+F		

n: Address in master module, specified by the assignment of the stations

<Status> Corresponds to <Status> in responses to commands **MM** and **CT**.

2012-12

Note!

Instead of setting the parameters "multiplexed mode" or "tag type" by command, these parameters can be set as part of the data initialization or initialization processes. For more information on the **MM** and **CT** commands, see chapter 7.3.8.

A trigger mode command must follow a command that is started on a trigger condition. As this command does not fit together with the other settings in the register, the trigger mode is not contained in the initialization data.

7.3.5 Command Types

When using commands, a distinction is always made between the two operating modes **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 transferred only 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.

If the control interface retrieves the responses from an enhanced command only a single time, the reader's working memory may become full.

7.3.6 Command sequence diagrams

Read command *single* without split data, RYn3 as confirmation

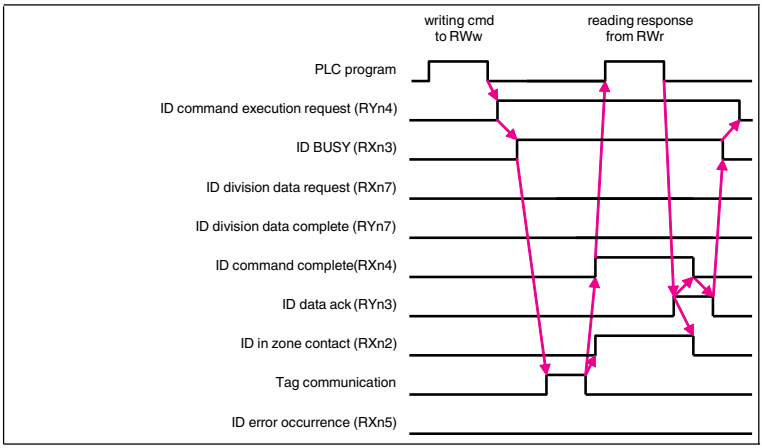


Figure 7.4

Read command *single* without split data, RYn4 as confirmation

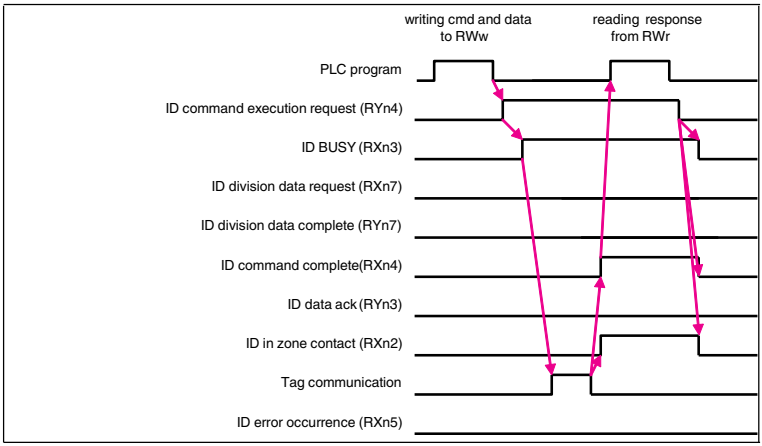


Figure 7.5

Read command *single* with split data

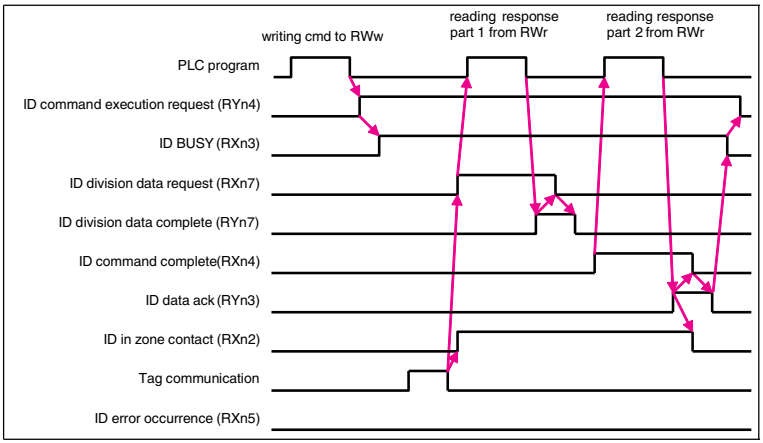


Figure 7.6

Read command *enhanced* without split data

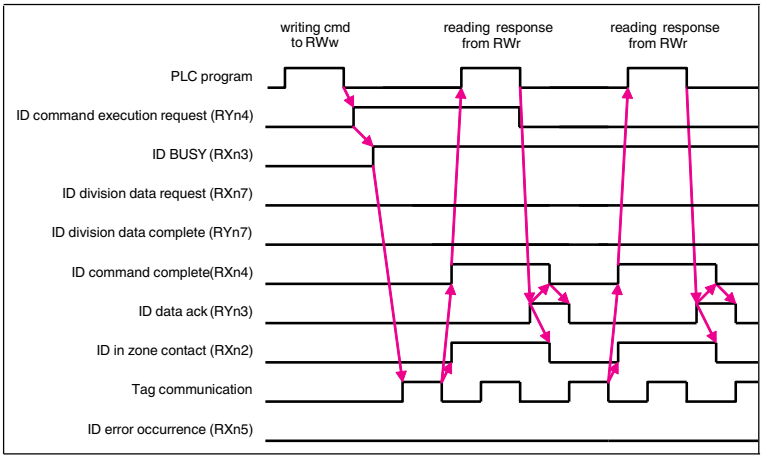


Figure 7.7

Read command *enhanced* with split data

behaves as a read command *single* with split data

Write command *single* without split data, RYn3 as confirmation

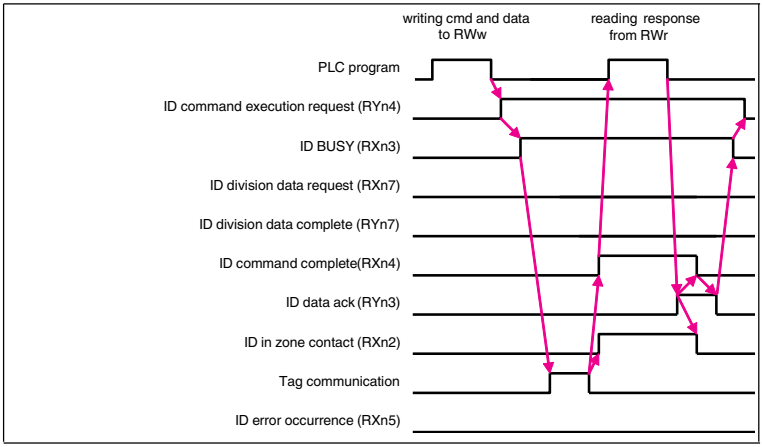


Figure 7.8

Write command *single* without split data, RYn4 as confirmation

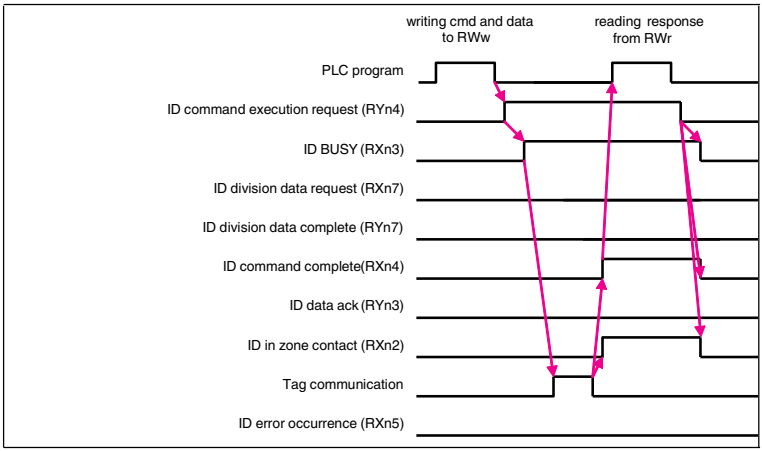


Figure 7.9

Write command *single* with split data

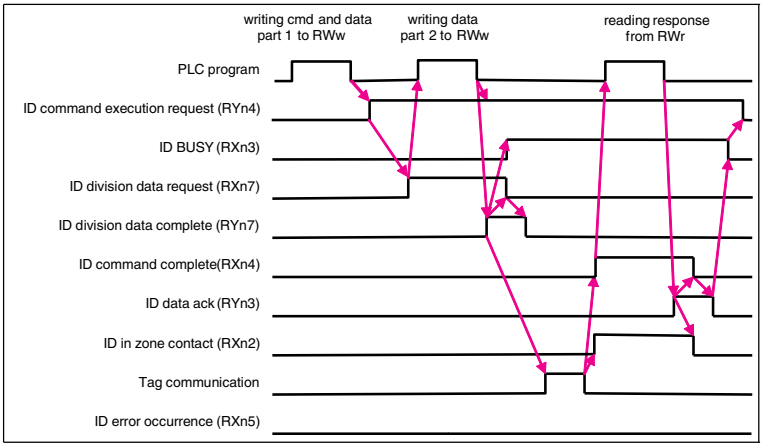


Figure 7.10

Write command *enhanced* without split data

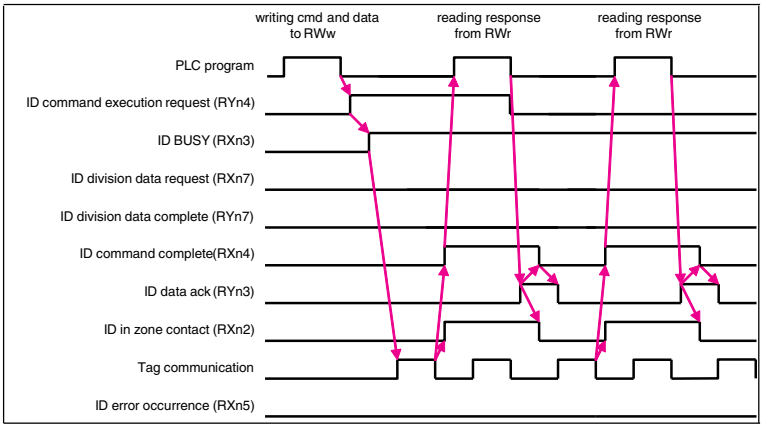


Figure 7.11

Write command *enhanced* with split data

behaves as a write command *single* with split data

Troubleshooting, RYn3 as confirmation

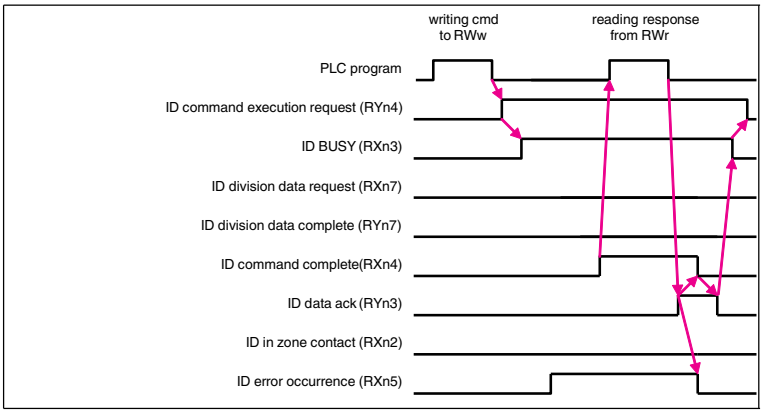


Figure 7.12

Troubleshooting, RYn4 as confirmation

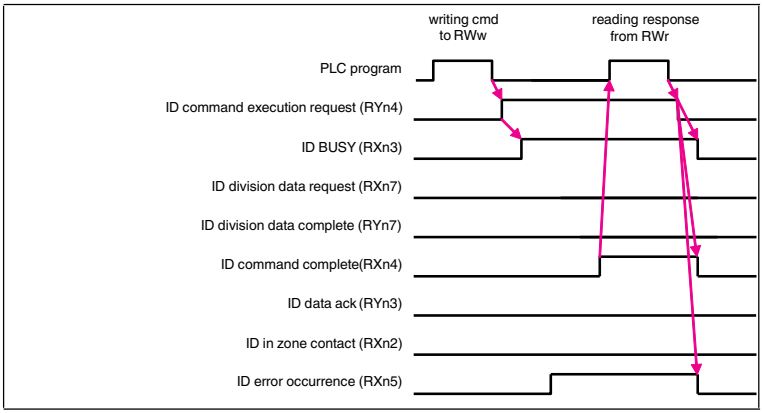


Figure 7.13

7.3.7 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 --> 04h)" on page 46	**CT**
2d	02h	See "Quit (QU --> 02h)" on page 49	**QU**
23d	17h	See "Configuration store (CS --> 17h)" on page 49	**CS**
22d	16h	See "Reset (RS --> 16h)" on page 50	**RS**
180d	B4h	See "Reset to default (RD --> B4h)" on page 50	**RD**
155d	9Bh	See "Set multiplex mode (MM --> 9Bh)" on page 50	**MM**
172d	ACh	See "Command List (CL --> ACh)" on page 51	**CL**
156d	9Ch	See "Set trigger mode (TM --> 9Ch)" on page 52	**TM**

Standard read/write commands

Read only code

Command code		Command description	Abbreviation
1d	01h	See "Single read read only code (SF --> 01h)" on page 54	**SF**
29d	1Dh	See "Enhanced read only code (EF --> 1Dh)" on page 54	**EF**

2012-12

Read data

Command code		Command description	Abbreviation
16d	10h	See "Single read words (SR --> 10h)" on page 56	**SR**
25d	19h	See "Enhanced read words (ER --> 19h)" on page 58	**ER**

Write data

Command code		Command description	Abbreviation
64d	40h	See "Single write words (SW --> 40h)" on page 60	**SW**
26d	1Ah	See "Enhanced write words (EW --> 1Ah)" on page 62	**EW**

Special command modes

Password mode with IPC03

Command code		Command description	Abbreviation
24d	18h	See "Set password mode (PM --> 18h)" on page 64	**PM**
65d	41h	See "Change password (PC --> 41h)" on page 65	**PC**
66d	42h	See "Set password (PS --> 42h)" on page 66	**PS**

IPC03 configuration

Command code		Command description	Abbreviation
97d	61h	See "Single get configuration (SG --> 61h)" on page 68	**SG**
104d	68h	See "Enhanced get configuration (EG --> 68h)" on page 69	**EG**
18d	12h	See "Single write configuration (SC --> 12h)" on page 70	**SC**
102d	66h	See "Enhanced buffered write configuration (EC --> 66h)" on page 70	**EC**

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

Command code		Command description	Abbreviation
31d	1Fh	See "Single write read only code (SX --> 1Fh)" on page 71	**SX**
36d	24h	See "Enhanced buffered write read only code (EX --> 24h)" on page 73	**EX**

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

Command code		Command description	Abbreviation
10d	0Ah	See "Single read special read only code (SS --> 0Ah)" on page 74	**SS**
113d	71h	See "Enhanced read special read only code (ES --> 71h)" on page 74	**ES**
13d	0Dh	See "Single program special read only code (SP --> 0Dh)" on page 76	**SP**

Command code		Command description	Abbreviation
117d	75h	See "Enhanced program special read only code (EP --> 75h)" on page 77	**EP**
107d	6Bh	See "Initialize data carrier (SI --> 6Bh)" on page 78	**SI**
170d	AAh	See "Fill datacarrier (S# --> AAh)" on page 78	**S#**

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

Command code		Command description	Abbreviation
71d	47h	See "Single write words with lock (SL -->47h)" on page 79	**SL**
72d	48h	See "Enhanced write words with lock (EL -->48h)" on page 80	**EL**

7.3.8 System commands

Change tag (CT --> 04h)

Master -> Slave																
Address		Bit no.														
CH1	CH2*	15							8	7						0
RWw n	RWw n+8									0	0	0	0	0	1	0	0
RWw n+1	RWw n+9	<TagType> (low byte)								<TagType> (high byte)							

Slave -> Master																
Address		Bit no.														
CH1	CH2*	15							8	7						0
RWr n	RWr n+8									0	0	0	0	0	1	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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

2012-12

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'1'	'1'	IPC11	Q5 (Sokymat)	Read/write	5	-	125 kHz
'1'	'2'	IPC12	P+F FRAM	Read/write read only code	8k	4	125 kHz
'2'	'0'	IQC20[1)]	All ISO 15693 compliant read/write tags	Read/write read only code	8	8	13.56 MHz
'2'	'1'	IQC21	I-Code SLI (NXP)	Read/write read only code	112	8	13.56 MHz
'2'	'2'	IQC22	Tag-it HF-I Plus (Texas Instruments)	Read/write read only code	250	8	13.56 MHz
'2'	'3'	IQC23	my-D SRF55V02P (Infinion)	Read/write read only code	224	8	13.56 MHz
'2'	'4'	IQC24	my-D SRF55V10P (Infinion)	Read/write read only code	928	8	13.56 MHz
'3'	'1'	IQC31	Tag-it HF-I Standard (Texas Instruments)	Read/write read only code	32	8	13.56 MHz
'3'	'3'	IQC33[2)]	FRAM MB89R118 (Fujitsu)	Read/write read only code	2k	8	13.56 MHz
'3'	'4'	IQC34	FRAM MB89R119 (Fujitsu)	Read/write read only code	29	8	13.56 MHz
'3'	'5'	IQC35	I-Code SLI-S (NXP)	Read/write read only code	160	8	13.56 MHz
'3'	'7'	IQC37[3)]	FRAM MB89R112 (Fujitsu)	Read/write read only code	8196	8	13.56 MHz
'4'	'0'	IQC40	All ISO 14443A compliant read/write tags	Read only code	-	4/7[7)]	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[4)]	Mifare Classic MF1 IC S50 (NXP)	Read/write read only code	752	4/7[7)]	13.56 MHz
'4'	'3'	IQC43[4)]	Mifare Classic MF1 IC S70 (NXP)	Read/write read only code	3440	4/7[7)]	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[5)]	UCode-EPC-G2XM (NXP)	Read/write read only code	64	8	868 MHz
'7'	'3'	IUC73[5)]	Higgs-2 (Alien)	Read only code	-	96	868 MHz
'7'	'4'	IUC74[5)]	UCode-EPC-G2 (NXP)	Read/write read only code	28	96	868 MHz
'7'	'5'	IUC75[5)]	Monza 2.0 (Impinj)	Read only code	-	96	868 MHz

2012-12

Tag type		P+F designation	Chip type	Access	Writable memory [bytes]	Read only code length [byte]	Frequency range
High byte	Low byte						
'7'	'6'	IUC76[5)]	Higgs-3 (Alien)	Read/write read only code	56	240	868 MHz
'8'	'0'	-	All Class 1 Gen 2 compliant read/write tags	-	-	Max. 96	868 MHz
'9'	'9'	Depends on the reader [6)]	-	-	-	-	-

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 4-byte blocks (here, max. 48) and must be an even number.

3) Read/write tag IQC37 can only be used in combination with a IQH1-... read/write head. The memory is divided into 32-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 4-byte blocks (here, max. 48) and must be divisible by 8.

4) 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.

5) IUC7* type read/write tags can only be used with read/write head IUH-F117-V1 in combination with certain control interfaces.

6) The tag type configured in the read/write head as the default is selected.

7) Read/write tags can have 4-byte (older versions) or 7-byte UIDs. IQC42 and IQC43 type read/write tags from Pepperl+Fuchs generally have 7-byte UIDs.

Note!

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

Default tag type:

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

Quit (QU --> 02h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	0	0	0	0	0	1	0
RWw n+1	RWw n+9	-															

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	0	0	0	0	0	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command running on this channel is interrupted.

Configuration store (CS --> 17h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	0	0	1	0	1	1	1
RWw n+1	RWw n+9	-								<Mode>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	0	0	1	0	1	1	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

<Mode> = 1 (00000001b) activates the mode for this channel.

<Mode> = 0 (00000000b) deactivates the mode for this channel.

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

<Mode>='1' activates the mode.
<Mode>='0' deactivates the mode.

Configuration store is deactivated by default.

Reset (RS --> 16h)

Master -> Slave																	
Address		Bit no.															
CH1		15							8	7							0
RWw n										0	0	0	1	0	1	1	0
RWw n+1		-															

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The device resets the hardware and then restarts.

Reset to default (RD --> B4h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									1	0	1	1	0	1	0	0
RWw n+1	RWw n+9	-															

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

This command stops all running commands. The conrol unit is reset to the factory settings. The changes take effect after a restart.

Set multiplex mode (MM --> 9Bh)

Master -> Slave																	
Adresse		Bit Nr.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									1	0	0	1	1	0	1	1
RWw n+1	RWw n+9	-								<Mode>							

2012-12

Slave -> Master																	
Adresse		Bit Nr.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									1	0	0	1	1	0	1	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

This command activates or deactivates multiplex mode. In multiplex mode, the transmitters of the R/W heads are controlled according to the time multiplex process, i.e. only one R/W head is active at any one time. In this way, mutual interference is minimized, allowing two R/W heads to be mounted side by side.

Each IDENT channel responds to an MM command so that two response telegrams are sent back.

<Mode> = 1 (00000001b) activates the multiplex operation for this channel.

<Mode> = 0 (00000000b) deactivates the multiplex operation for this channel

Command List (CL --> ACh)

Master -> slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									1	0	1	0	1	1	0	0
RWw n+1	RWw n+9	<ListModus>								<ListNo>							

Slave -> master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									1	0	1	0	1	1	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

With the **command list** command, read/write commands are no longer executed directly, but rather entered into a command list. While a command list is open, the device responds to each command executed using the **CL** response telegram. The low byte of register RWrn+2 shows the number of commands in the command list.

Opening a command list that has already been described deletes the list.

A command list can be activated in single mode or in enhanced mode. After activating the command list in single mode, the listed commands are executed in the order they are entered. Once the list has been worked through, the status 'F' is given.

After activating the command list in enhanced mode, the command list is worked through in the same way as in single mode. After processing the final command, the first command is activated again.

Each command executed is responded to as though the command had been executed directly. Closing a list, executing a quit command or a read/write command deactivates an activated list. If a list is deactivated, any enhanced command still active is interrupted.

Command lists are stored in a volatile state.

<ListModus> = 0 (00000000b) closes the command list

<ListModus> = 1 (00000001b) opens the command list

<ListModus> = 2 (00000010b) activates the command list in single mode

<ListModus> = 3 (00000011b) activates the command list in enhanced mode

<ListNo> = 0 (00000000b) selects command list no. 1

<ListNo> = 1 (00000001b) selects command list no. 2

Set trigger mode (TM --> 9Ch)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<IdentChannel>								1	0	0	1	1	1	0	0
RWw n+1	RWw n+9									<Mode>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<IdentChannel>								1	0	0	1	1	1	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

2012-12

<IdentChannel>	=	0 (00000000b) channel 0 of the R/W head[1)]
<IdentChannel>	=	1 (00000001b) channel 1 of the R/W head
<IdentChannel>	=	2 (00000010b) channel 2 of the R/W head

Table 7.1 [1)]: transmits the trigger signal to the control unit

<Mode>	=	0 (00000000b) trigger mode switched off
<Mode>	=	1 (00000001b) trigger mode switched on
<Mode>	=	2 (00000010b) trigger mode inverted

Activating trigger mode interrupts a command running on <IdentChannel>.

The channel to which the command telegram is transferred is automatically the <SensorChannel> channel. The trigger sensor is connected to the <SensorChannel>.

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

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

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

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

If you set <IdentChannel>=0, the sensor signal is transferred to <SensorChannel> without influencing a reader.

<IdentChannel>=0 allows you to assign the trigger signal to channel '0'. This means that the trigger signal is transmitted to the controller and not to a reader.

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

7.3.9 Standard read/write commands

Single read read only code (SF --> 01h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	0	0	0	0	0	0	1

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	0	0	0	0	0	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<ID-Code>								<ID-Code>							
...	...	<ID-Code>								<ID-Code>							
RWr n+1+N[1)]	RWr n+9+N[1)]	<ID-Code>								<ID-Code>							

n: Address in master module, specified by the assignment of the stations

*: If 2 channels are used

1): N =<FixLen>/2 rounded up

The length of the read only code (<FixLen>) depends on the transponder type.

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

Enhanced read only code (EF --> 1Dh)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	0	0	1	1	1	0	1

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	0	0	1	1	1	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<ID-Code>								<ID-Code>							

2012-12

Slave -> Master																
Address		Bit no.														
CH1	CH2*	15							8	7						0
...	...	<ID-Code>								<ID-Code>						
RWr n+1+N[1)]	RWr n+9+N[1)]	<ID-Code>								<ID-Code>						

n: Address in master module, specified by the assignment of the stations

*: If 2 channels are used

1): N =<FixLen>/2 rounded up

The length of the read only code (<FixLen>) depends on the transponder type.

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.

Single read words (SR --> 10h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<WordNum>								0	0	0	1	0	0	0	0
RWw n+1	RWw n+9	<WordAddress> low byte								<WordAddress> high byte							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	0	0	1	0	0	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<Read data> byte 2								<Read data> byte 3							
RWr n+3	RWr n+B	<Read data> byte 0								<Read data> byte 1							
RWr n+4	RWr n+C	<Read data> byte 2								<Read data> byte 3							
RWr n+5	RWr n+D	<Read data> byte 0								<Read data> byte 1							
RWr n+6	RWr n+E	<Read data> byte 2								<Read data> byte 3							
RWr n+7	RWr n+F	<Read data> byte 0								<Read data> byte 1							
RWr n+8		<Read data> byte 2								<Read data> byte 3							
RWr n+9		<Read data> byte 0								<Read data> byte 1							
RWr n+A		<Read data> byte 2								<Read data> byte 3							
RWr n+B		<Read data> byte 0								<Read data> byte 1							
RWr n+C		<Read data> byte 2								<Read data> byte 3							
RWr n+D		<Read data> byte 0								<Read data> byte 1							
RWr n+E		<Read data> byte 2								<Read data> byte 3							
RWr n+F		<Read data> byte 0								<Read data> byte 1							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command reads the number of words <WordNum> of the address <WordAddress> once.

CC-Link version	Maximum word count	Transmission
Version 1.1 and Version 2 - **single extension**	<WordNum> <= 3 (0000 0011b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 7 (0000 0111b)	per channel with transfer of channel 1
Version 2 - **dual extension**	<WordNum> <= 7 (0000 0111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 15 (0000 1111b)	per channel with transfer of channel 1
Version 2 - **quadruple extension**	<WordNum> <= 15 (0000 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 31 (0001 1111b)	per channel with transfer of channel 1
Version 2 - **octuple extension**	<WordNum> <= 31 (0001 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 63 (0011 1111b)	per channel with transfer of channel 1

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

Enhanced read words (ER --> 19h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<WordNum>								0	0	0	1	1	0	0	1
RWw n+1	RWw n+9	<WordAddr> low byte								<WordAddr> high byte							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	0	0	1	1	0	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<Read data> byte 2								<Read data> byte 3							
RWr n+3	RWr n+B	<Read data> byte 0								<Read data> byte 1							
RWr n+4	RWr n+C	<Read data> byte 2								<Read data> byte 3							
RWr n+5	RWr n+D	<Read data> byte 0								<Read data> byte 1							
RWr n+6	RWr n+E	<Read data> byte 2								<Read data> byte 3							
RWr n+7	RWr n+F	<Read data> byte 0								<Read data> byte 1							
RWr n+8		<Read data> byte 2								<Read data> byte 3							
RWr n+9		<Read data> byte 0								<Read data> byte 1							
RWr n+A		<Read data> byte 2								<Read data> byte 3							
RWr n+B		<Read data> byte 0								<Read data> byte 1							
RWr n+C		<Read data> byte 2								<Read data> byte 3							
RWr n+D		<Read data> byte 0								<Read data> byte 1							
RWr n+E		<Read data> byte 2								<Read data> byte 3							
RWr n+F		<Read data> byte 0								<Read data> byte 1							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command continuously reads the number of words <WordNum> of the address <WordAddr>.

CC-Link version	Maximum word count	Transmission
Version 1.1 and Version 2 - **single extension**	<WordNum> <= 3 (0000 0011b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 7 (0000 0111b)	per channel with transfer of channel 1
Version 2 - **dual extension**	<WordNum> <= 7 (0000 0111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 15 (0000 1111b)	per channel with transfer of channel 1
Version 2 - **quadruple extension**	<WordNum> <= 15 (0000 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 31 (0001 1111b)	per channel with transfer of channel 1
Version 2 - **octuple extension**	<WordNum> <= 31 (0001 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 63 (0011 1111b)	per channel with transfer of channel 1

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 --> 40h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<WordNum>								0	1	0	0	0	0	0	0
RWw n+1	RWw n+9	<WordAddr> low byte								<WordAddr> high byte							
RWw n+2	RWw n+A	<Write data> byte 2								<Write data> byte 3							
RWw n+3	RWw n+B	<Write data> byte 0								<Write data> byte 1							
RWw n+4	RWw n+C	<Write data> byte 2								<Write data> byte 3							
RWw n+5	RWw n+D	<Write data> byte 0								<Write data> byte 1							
RWw n+6	RWw n+E	<Write data> byte 2								<Write data> byte 3							
RWw n+7	RWw n+F	<Write data> byte 0								<Write data> byte 1							
RWw n+8		<Write data> byte 2								<Write data> byte 3							
RWw n+9		<Write data> byte 0								<Write data> byte 1							
RWw n+A		<Write data> byte 2								<Write data> byte 3							
RWw n+B		<Write data> byte 0								<Write data> byte 1							
RWw n+C		<Write data> byte 2								<Write data> byte 3							
RWw n+D		<Write data> byte 0								<Write data> byte 1							
RWw n+E		<Write data> byte 2								<Write data> byte 3							
RWw n+F		<Write data> byte 0								<Write data> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	1	0	0	0	0	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command writes the number of words <WordNum> at the address <WordAddr> once.

CC-Link version	Maximum word count	Transmission
Version 1.1 and Version 2 - **single extension**	<WordNum> <= 3 (0000 0011b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 7 (0000 0111b)	per channel with transfer of channel 1
Version 2 - **dual extension**	<WordNum> <= 7 (0000 0111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 15 (0000 1111b)	per channel with transfer of channel 1
Version 2 - **quadruple extension**	<WordNum> <= 15 (0000 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 31 (0001 1111b)	per channel with transfer of channel 1
Version 2 - **octuple extension**	<WordNum> <= 31 (0001 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 63 (0011 1111b)	per channel with transfer of channel 1

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

Enhanced write words (EW --> 1Ah)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<WordNum>								0	0	0	1	1	0	1	0
RWw n+1	RWw n+9	<WordAddr> low byte								<WordAddr> high byte							
RWw n+2	RWw n+A	<Write data> byte 2								<Write data> byte 3							
RWw n+3	RWw n+B	<Write data> byte 0								<Write data> byte 1							
RWw n+4	RWw n+C	<Write data> byte 2								<Write data> byte 3							
RWw n+5	RWw n+D	<Write data> byte 0								<Write data> byte 1							
RWw n+6	RWw n+E	<Write data> byte 2								<Write data> byte 3							
RWw n+7	RWw n+F	<Write data> byte 0								<Write data> byte 1							
RWw n+8		<Write data> byte 2								<Write data> byte 3							
RWw n+9		<Write data> byte 0								<Write data> byte 1							
RWw n+A		<Write data> byte 2								<Write data> byte 3							
RWw n+B		<Write data> byte 0								<Write data> byte 1							
RWw n+C		<Write data> byte 2								<Write data> byte 3							
RWw n+D		<Write data> byte 0								<Write data> byte 1							
RWw n+E		<Write data> byte 2								<Write data> byte 3							
RWw n+F		<Write data> byte 0								<Write data> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	0	0	1	1	0	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command continuously writes the number of words <WordNum> at the address <WordAddr>.

CC-Link version	Maximum word count	Transmission
Version 1.1 and Version 2 - **single extension**	<WordNum> <= 3 (0000 0011b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 7 (0000 0111b)	per channel with transfer of channel 1
Version 2 - **dual extension**	<WordNum> <= 7 (0000 0111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 15 (0000 1111b)	per channel with transfer of channel 1
Version 2 - **quadruple extension**	<WordNum> <= 15 (0000 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 31 (0001 1111b)	per channel with transfer of channel 1
Version 2 - **octuple extension**	<WordNum> <= 31 (0001 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 63 (0011 1111b)	per channel with transfer of channel 1

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

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

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

7.3.10 Special commands for the data carrier IPC03

Note!

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

IPC03 password mode

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

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

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

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

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

Setting the password

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

Changing the password

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

Set password mode (PM --> 18h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	0	0	1	1	0	0	0
RWw n+1	RWw n+9									<Mode>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	0	0	1	1	0	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command PM activates and deactivates the password mode of the corresponding channel. In password mode, the password is transferred to the read/write tag before each read/write access. If a read/write tag is addressed with a wrong password, the other data ranges of the read/write tag can no longer be accessed.

<Mode> = 0 (00000000b) Password mode switched off (deactivated)

<Mode> = 1 (00000001b) Password mode switched on (activated)

Change password (PC –> 41h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	1	0	0	0	0	0	1
RWw n+1	RWw n+9	<old PSW> byte 2								<old PSW> byte 3							
RWw n+2	RWw n+A	<old PSW> byte 0								<old PSW> byte 1							
RWw n+3	RWw n+B	<new PSW> byte 2								<new PSW> byte 3							
RWw n+4	RWw n+C	<new PSW> byte 0								<new PSW> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	1	0	0	0	0	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The command PC changes the password of a read/write tag. Enter the old and then the new password <PSW> here. If the password has been successfully written, then the password in the R/W head is also changed. You do not need to additionally send the "Set password" command.

The password of the IPC03 can also be changed with password mode inactive.

Set password (PS --> 42h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	1	0	0	0	0	1	0
RWw n+1	RWw n+9	-								-							
RWw n+2	RWw n+A	<PSW> byte 2								<PSW> byte 3							
RWw n+3	RWw n+B	<PSW> byte 0								<PSW> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	1	0	0	0	0	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

The PS command sets the password, which the R/W head transmits to the read/write tag in password mode.

Operating mode “Default Read”

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

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

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

Note!

The addresses for the start and end of the read range are based on the absolute word address of the read/write tag, not on <WordAddr>.
Example: With the setting read range start 03h and read range end 03h, the R/W head only reads the first data word in the read/write tag.

Setting "Default Read"

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

IPC03 Configuration

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

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

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

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

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

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

The individual bits have the following meanings:

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

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

Single get configuration (SG --> 61h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	1	1	0	0	0	0	1
RWw n+1	RWw n+9	<ConfAddr>								-							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	1	1	0	0	0	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<Data> byte 2								<Data> byte 3							
RWr n+3	RWr n+B	<Data> byte 0								<Data> byte 1							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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>.

2012-12

Enhanced get configuration (EG --> 68h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	1	1	0	1	0	0	0
RWw n+1	RWw n+9	<ConfAddr>								-							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	1	1	0	1	0	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<Data> byte 2								<Data> byte 3							
RWr n+3	RWr n+B	<Data> byte 0								<Data> byte 1							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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 --> 12h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	0	0	1	0	0	1	0
RWw n+1	RWw n+9	<ConfAddr>								-							
RWw n+2	RWw n+A	<Write data> byte 2								<Write data> byte 3							
RWw n+3	RWw n+B	<Write data> byte 0								<Write data> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	0	0	1	0	0	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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 --> 66h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	1	1	0	0	1	1	0
RWw n+1	RWw n+9	<ConfAddr>								-							
RWw n+2	RWw n+A	<Write data> byte 2								<Write data> byte 3							
RWw n+3	RWw n+B	<Write data> byte 0								<Write data> byte 1							

2012-12

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	1	1	0	0	1	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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.

7.3.11 Special commands for read/write tags IPC11, IDC-...-1K, IQC-... and IUC...

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 --> 1Fh)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<FixLen>								0	0	0	1	1	1	1	1
RWw n+1	RWw n+9	<FixType> (low byte)								<FixType> (high byte)							
RWw n+2	RWw n+A	<Data>								<Data> (high byte)							

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
...	...	<Data>								<Data>							
RWw n+1+N[1)]	RWw n+9+N[1)]	<Data> (low byte)								<Data>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								0	0	0	1	1	1	1	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: If 2 channels are used

1): N =<FixLen>/2 rounded up

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

IPC11: <FixLen> = 5

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

IDC-...-1K: <FixLen> = 7
The first 3 bytes are hexadecimal (0h ... Fh), the last 4 bytes are decimal (0d ... 9d).

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

<Data> = (Byte 1 to 3): 0x30 ... 0x39; 0x41...0x46
(Byte 4 to 7): 0x30...0x39

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

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

The value range contains 7 characters:

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

2012-12

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

Enhanced buffered write read only code (EX --> 24h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<FixLen>								0	0	1	0	0	1	0	0
RWw n+1	RWw n+9	<FixType> (low byte)								<FixType> (high byte)							
RWw n+2	RWw n+A	<Data>								<Data> (high byte)							
...	...	<Data>								<Data>							
RWw n+1+N[1)]	RWw n+9+N[1)]	<Data> (low byte)								<Data>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								0	0	1	0	0	1	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: If 2 channels are used

1): N =<FixLen>/2 rounded up

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.

For more information see chapter 7.3.11.

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

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

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

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

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

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

Single read special read only code (SS --> 0Ah)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<FixLen>								0	0	0	0	1	0	1	0

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								0	0	0	0	1	0	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							
RWr n+2	RWr n+A	<ID code>								<ID code> (high byte)							
RWr n+3	RWr n+B	<ID code>								<ID code>							
RWr n+4	RWr n+C	<ID code> (low byte)								<ID code>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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

Note!

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

Enhanced read special read only code (ES --> 71h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<FixLen>								0	1	1	1	0	0	0	1

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								0	1	1	1	0	0	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

2012-12

Slave -> Master																
Address		Bit no.														
CH1	CH2*	15							8	7						0
RWr n+2	RWr n+A	<ID code>								<ID code> (high byte)						
RWr n+3	RWr n+B	<ID code>								<ID code>						
RWr n+4	RWr n+C	<ID code> (low byte)								<ID code>						

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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 read only code (SP --> 0Dh)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<FixLen>								0	0	0	0	1	1	0	1
RWw n+1	RWw n+9	-								-							
RWw n+2	RWw n+A	<ID code>								<ID code> (high byte)							
RWw n+3	RWw n+B	<ID code>								<ID code>							
RWw n+4	RWw n+C	<ID code> (low byte)								<ID code>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								0	0	0	0	1	1	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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

Note!

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

Enhanced program special read only code (EP --> 75h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<FixLen>								0	1	1	1	0	1	0	1
RWw n+1	RWw n+9	-								-							
RWw n+2	RWw n+A	<ID code>								<ID code> (high byte)							
RWw n+3	RWw n+B	<ID code>								<ID code>							
RWw n+4	RWw n+C	<ID code> (low byte)								<ID code>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								0	1	1	1	0	1	0	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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 --> 6Bh)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									0	1	1	0	1	0	1	1

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8									0	1	1	0	1	0	1	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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

Fill datacarrier (S# --> AAh)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8									1	0	1	0	1	0	1	0
RWw n+1	RWw n+9	<WordAddr> low byte								<WordAddr> high byte							
RWw n+2	RWw n+A	<WordNum> low byte								<WordNum> high byte							
RWw n+3	RWw n+B									<Fill Sign>							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<FixLen>								1	0	1	0	1	0	1	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

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

2012-12

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

Single write words with lock (SL -->47h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<WordNum>								0	1	0	0	0	1	1	1
RWw n+1	RWw n+9	<WordAddr> low byte								<WordAddr> high byte							
RWw n+2	RWw n+A	<Write data> byte 2								<Write data> byte 3							
RWw n+3	RWw n+B	<Write data> byte 0								<Write data> byte 1							
RWw n+4	RWw n+C	<Write data> byte 2								<Write data> byte 3							
RWw n+5	RWw n+D	<Write data> byte 0								<Write data> byte 1							
RWw n+6	RWw n+E	<Write data> byte 2								<Write data> byte 3							
RWw n+7	RWw n+F	<Write data> byte 0								<Write data> byte 1							
RWw n+8		<Write data> byte 2								<Write data> byte 3							
RWw n+9		<Write data> byte 0								<Write data> byte 1							
RWw n+A		<Write data> byte 2								<Write data> byte 3							
RWw n+B		<Write data> byte 0								<Write data> byte 1							
RWw n+C		<Write data> byte 2								<Write data> byte 3							
RWw n+D		<Write data> byte 0								<Write data> byte 1							
RWw n+E		<Write data> byte 2								<Write data> byte 3							
RWw n+F		<Write data> byte 0								<Write data> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	1	0	0	0	1	1	1
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address in master module, specified by the assignment of the stations

*: 2 channel mode

CC-Link version	Maximum word count	Transmission
Version 1.1 and Version 2 - **single extension**	<WordNum> <= 3 (0000 0011b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 7 (0000 0111b)	per channel with transfer of channel 1
Version 2 - **dual extension**	<WordNum> <= 7 (0000 0111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 15 (0000 1111b)	per channel with transfer of channel 1
Version 2 - **quadruple extension**	<WordNum> <= 15 (0000 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 31 (0001 1111b)	per channel with transfer of channel 1
Version 2 - **octuple extension**	<WordNum> <= 31 (0001 1111b)	per channel with parallel transfer of channels 1 & 2
	<WordNum> <= 63 (0011 1111b)	per channel with transfer of channel 1

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

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

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

Enhanced write words with lock (EL -->48h)

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n	RWw n+8	<WordNum>								0	1	0	0	1	0	0	0
RWw n+1	RWw n+9	<WordAddr> low byte								<WordAddr> high byte							
RWw n+2	RWw n+A	<Write data> byte 2								<Write data> byte 3							
RWw n+3	RWw n+B	<Write data> byte 0								<Write data> byte 1							
RWw n+4	RWw n+C	<Write data> byte 2								<Write data> byte 3							
RWw n+5	RWw n+D	<Write data> byte 0								<Write data> byte 1							
RWw n+6	RWw n+E	<Write data> byte 2								<Write data> byte 3							
RWw n+7	RWw n+F	<Write data> byte 0								<Write data> byte 1							
RWw n+8		<Write data> byte 2								<Write data> byte 3							
RWw n+9		<Write data> byte 0								<Write data> byte 1							
RWw n+A		<Write data> byte 2								<Write data> byte 3							
RWw n+B		<Write data> byte 0								<Write data> byte 1							

2012-12

Master -> Slave																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWw n+C		<Write data> byte 2								<Write data> byte 3							
RWw n+D		<Write data> byte 0								<Write data> byte 1							
RWw n+E		<Write data> byte 2								<Write data> byte 3							
RWw n+F		<Write data> byte 0								<Write data> byte 1							

Slave -> Master																	
Address		Bit no.															
CH1	CH2*	15							8	7							0
RWr n	RWr n+8	<WordNum>								0	1	0	0	1	0	0	0
RWr n+1	RWr n+9	<ReplyCounter>								<Status>							

n: Address of the master module, specified by the assignment of the stations

*: If 2 channels are used

<WordNum> ≤ 3 (0011b) if 2 channels are used

<WordNum> ≤ 7 (0111b) if 1 channel is used

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

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

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

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

7.3.12 Legend

<ConfAddr>	:	1 ASCII character, word starting address in configuration range of the read/write tag. The following applies to 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.
<Fill Sign>	:	1 ASCII character
<FixLen>	:	4 bits, length of the read-only code in bytes (see "Change tag (CT --> 04h)" on page 46)
<FixType>	:	2 ASCII characters, example: "02" for IPC02
<IDCode>	:	4 bytes, 6 bytes, or 8 bytes (depending on the tag type)
<Identchannel>	:	3 bits, channel of the read/write head Channel 0 (0000b), channel 1 (001b), channel 2 (010b) (but not <Sensorchannel> in trigger mode)
<PSW>	:	4 bytes HEX, password
<ReplyCounter>	:	1 byte, increases by 1 after each response and confirmation. The reply counter starts from 0 after the system is switched on. When the maximum value is reached, the counter skips the value 0 (from 255 to 1).
<Sensorchannel>	:	3 bits, channel 1 (001b) or 2 (010b)
<Status>	:	1 byte (see chapter 7.3.13)
<TagType>	:	2 ASCII characters, example: "02" for IPC02
<Triggermode>	:	8 bits 0 (00000000b): trigger mode off 1 (00000001b): trigger mode on 2 (00000010b): trigger mode inverted
<WordAddr>	:	2 bytes, word starting address in the read/write tag, range from 0000h to FFFFh, depending on tag type.
<WordNum>	:	1 byte, number of words to be read or written, range from 0h to FFh, depending on tag type. The following applies to IPC03: The word count 0h is used with the word address 0000h to read the preset data range on the read/write tag ("Default Read"). The following applies to IQC33: The parameter must be even-numbered. The word address then indicates the offset in 8-byte increments. The following applies to IQC42 and IQC43: The parameter must be a multiple of 4. The word address then indicates the offset in 8-byte increments.

7.3.13 Fault/status messages

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

Error messages triggered by the identification system

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

8 Technical specifications

8.1 Dimensions

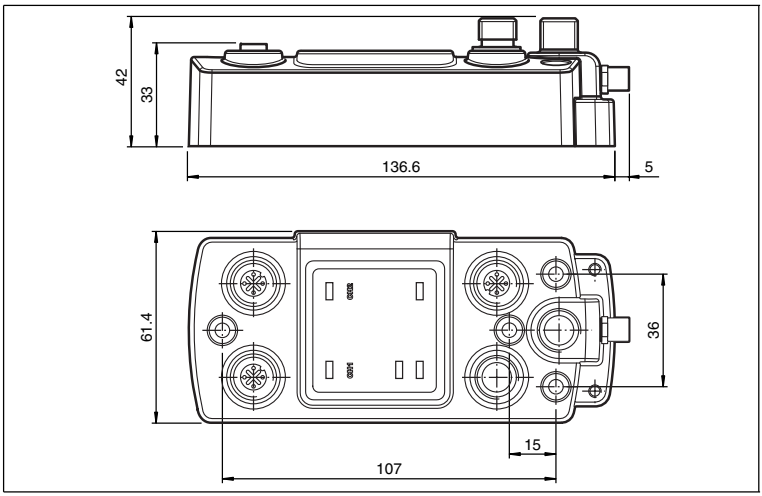


Figure 8.1

8.2 Technical Data

General specifications

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

Indicators/operating means

LEDs 1, 2	Status indicator for read/write heads green: command at read/write head active yellow: approx. 1 second long, if command was successfully executed
LEDs CH1, CH2	green: read head detected red: Configuration error
LED PWR/ERR	green: power on red: Hardware fault
LED L RUN	green: on, data communication active
LED L ERR	red: on, invalid rotary switch setting or data transfer failure red: flashing, rotary switch setting changed since last switched on
Rotary switch	Address setting 01 ... 64 (decimal) Station no.: 0 ... 6 (x10) Station no.: 0 ... 9 (x1) Baud rate setting: 0 ... 4

2012-12

Electrical specifications

Rated operational voltage	20 ... 30 V DC , PELV
Ripple	≤ 10 % at 30 V DC
Current consumption	≤ 4 A incl. read/write heads
Power consumption	3.5 W Without read/write heads
Electrical isolation	basic insulation acc. to DIN EN 50178, rated insulation voltage of 50 V_{eff}

Interface 1

Interface type	CC-Link
Physical	RS 485
Protocol	CC-Link
Transfer rate	156; 625 kBit/s 2,5;5;10 Mbit/s

Interface 2

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

Compliance with standards and directives

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

Ambient conditions

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

Mechanical specifications

Protection degree	IP67
Connection	Read/write heads: shielded, 4-pin, M12 connector Power supply: M12 connector Protective earth: M4 earthing screw Diagnostic RS 232: M8 connector CC-Link: M12 connector, A-coded
Material	
Housing	Powder coated zinc
Installation	screw fixing
Mass	approx. 500 g

9 Fault location

Fault source	Possible cause	Remedy
The operating voltage LED (PWR/ERR) does not light up.	Power supply is interrupted.	Ensure that the power supply is connected to a 24 V DC source.
The CH1 or CH2 indicator does not light up even though the R/W head is connected to port 1 or port 2.	The lead is defective or not connected correctly.	Check the lead and repair if necessary.
	The R/W head is defective.	Check the R/W head and replace if necessary.
A read command (e.g. **SR** ...) gives the status 4 even though the syntax is correct.	An incorrect tag type is selected for the relevant channel (e.g. IPC02). The read commands only function with tags and not with read only tags.	Preset the correct tag type (e.g. IPC03) or "Autodetect" using the **CT** command.
The LEDs in the read head and the CHx indicator on the IDENTControl are flashing.	The connected read head does not support the preset tag type.	Select a tag type that the read 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 tag IPC03 is selected and not in Autodetect mode.	Preset tag type IPC03 using the **CT** command.
The L ERR LED lights up red.	The switch setting of the **Station no.**, **Baud rate** or **Extended cyclic setting**switch is wrong.	Check the switch setting.
The L ERR LED flashes red.	The switch setting of the **Station no.**, **Baud rate** or **Extended cyclic setting**is adjusted during operation.	Carry out a device reset.
The red LRUN LED does not light up.	There is no longer a connection to the master.	Check the cable, the connection, and the terminator and repair if necessary.
	The **Station no**. is wrong.	Configure the device and the master with the same **Station no**.

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

10 ASCII table

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

2012-12

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