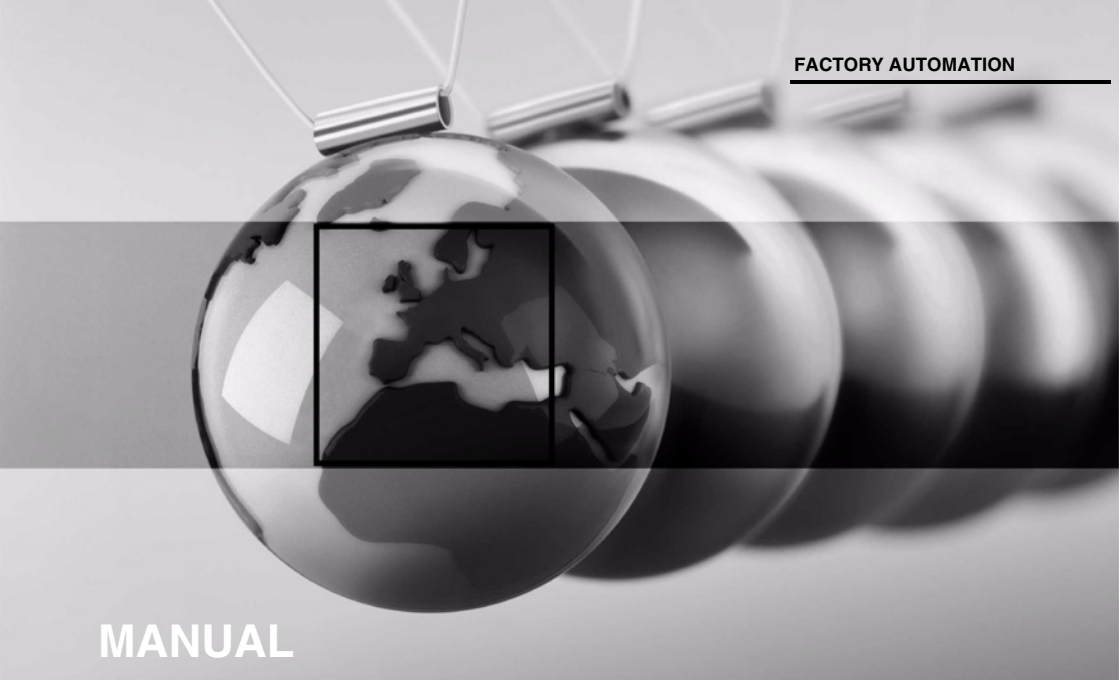
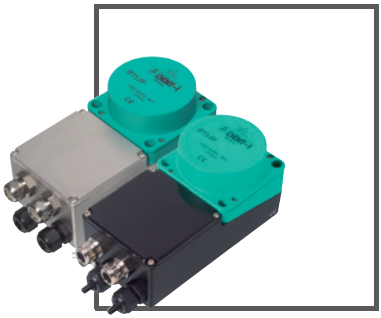


MANUAL

IPT*-FP WITH U-P6*-B6*

Read/write station with PROFIBUS DP interface



CE

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"

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 to ensure the trouble-free usage of this product. This is useful to you, because with this you:

- support the safe operation of the device
- can utilize the device's entire range of functions
- reduce 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.

Directly 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

098408 2009-03

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.

098408 2009-03

3 Safety

3.1 Verwendete Symbole

Sicherheitsrelevante Symbole

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

In the event the warning is ignored, the consequences may range from personal injury to death

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

In the event the warning is ignored, the consequences may course personal injury or heaviest property damage.

Caution!
Dieses Zeichen warnt vor einer möglichen Störung.

Bei Nichtbeachten können Geräte oder daran angeschlossene Systeme und Anlagen bis hin zur völligen Fehlfunktion gestört werden.

Informative Symbole

Note!
This symbol brings important information to your attention.

Handlungsanweisung

Dieses Symbol markiert eine Handlungsanweisung.

098408 2009-03

3.2 Intended use

Together, the devices IPT*-FP and U-P6*-B6* of the inductive identification system IDENT-I system P comprise a read/write station.. The read/write head IPT*-FP with integrated control communicates via amplitude modulation with code and data carriers using 125 kHz technology. The lower section U-P6*-B6* forms a PROFIBUS DP communication interface with the higher-level control system.

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 safety instructions

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

Independent interventions and separate modifications 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, send the device to Pepperl+Fuchs.

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.

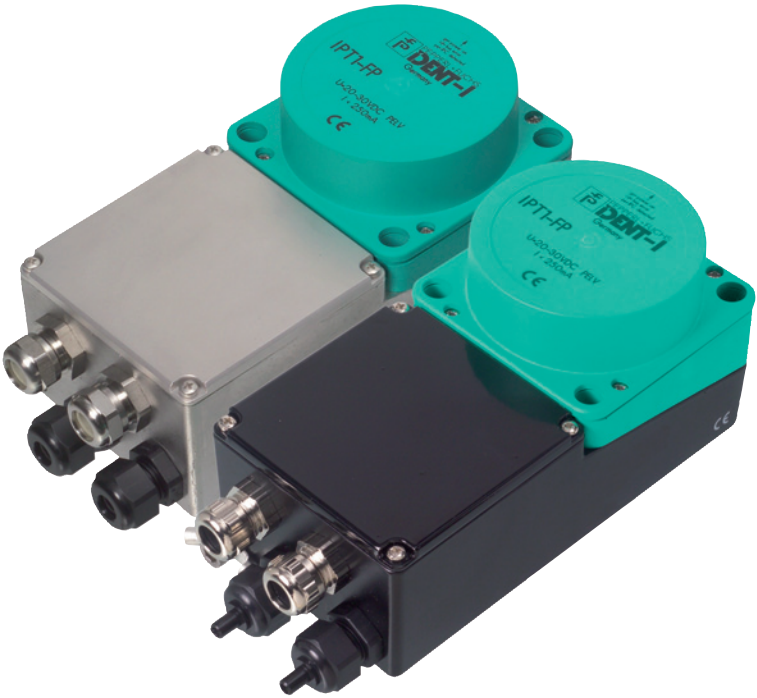
Note!

Electronic waste is hazardous waste. Observe local disposal regulations.

098408 2009-03

4 Product description

The brand name IDENT-I System P represents a complete identification system. The read/write station consists of the read/write head IPT*-FP (standard version: IPT1-FP) and the lower section U-P6*-B6* with bus interface. With the use of 125 kHz technology, the system is extensively open for the implementation of other components.



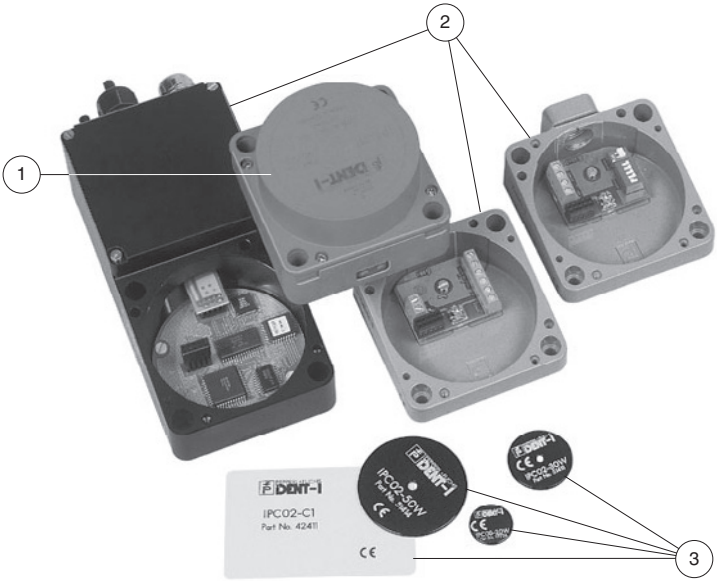
U-P6*-B6* stands for:

U-P6-B6	=	Standard device
U-P6V4A-B6	=	Variant with V4A stainless steel housing
U-P6-B6-V15B	=	Variant with plug-in connections

098408 2009-03

4.1 Product family

The inductive identification system IDENT-I system P from Pepperl+Fuchs offers various possible combinations of individual components.



1 Read/write station

2 Lower sections

3 Code/data carrier

Note!

Detailed information on the components of the identification system IDENT-I system P can be found in the sensor systems 1 catalog.

4.1.1 Code/data carrier

A wide assortment of designs is available for the inductive 125 kHz code and data carriers. Data carriers are available for temperatures up to 300 °C (max. 5 min) in chemical-resistant housings for installation in metal and in protection class IP68/IP69K. IPC02-... code carriers offer 40-bit fixcode. IPC03-... data carriers have 928 bits of freely programmable memory and a non-variable fixcode of 32 bits. The storage area of the IPC03-… can be protected against unauthorized read and write. 40-bit fixcodes that can be freely determined can be generated with IPC11-... code carriers. These fixcodes can be generated one time permanently or they can be modifiable.

098408 2009-03

4.2 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 e.g. storage vessels, pallets, work piece carriers, refuse containers, tanks, containers, etc.

4.3 Delivery package

IPT*-FP contains:

- 1 Read/write head
- CD with documentation (incl. this manual)

U-P6*-B6*[1] contains:

- Lower section
- CD with GDS file
- Pack with
  Cover with seal and 4 screws M3 x8
  Earthing screw M6 x 12 with serrated lock washer and with 2 cable terminals
  Sticker for bus address

[1] The lower section must be ordered separately.

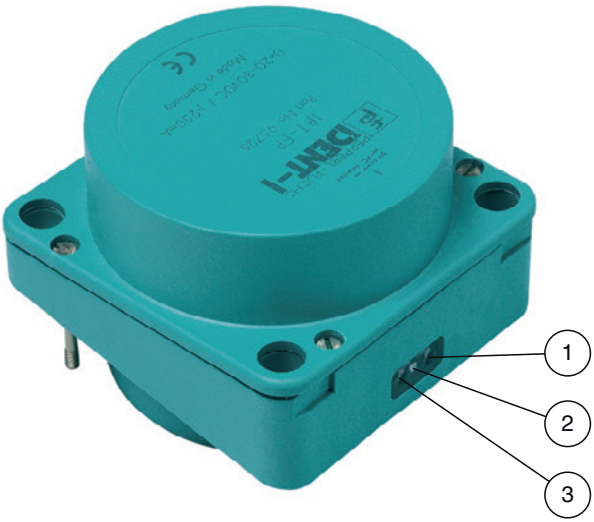
4.4 Device characteristics

- Supply voltage with galvanic isolation
- Bus interface with galvanic isolation from the supply voltage
- Connection to the field bus
- Address setting for PROFIBUS DP via 7-pin DIP switch in the lower section
- Display LEDs (on the front of the read/write station)

098408 2009-03

4.5 Display and controls

The following displays and controls are located on the read/write head.



LED display

1 Bus error - red

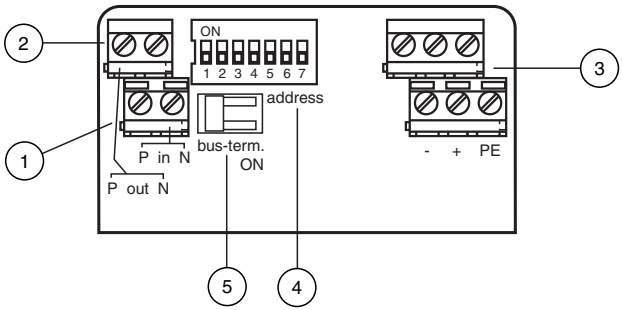
2 IPC recognized - yellow,
command executed successfully (approx. 1 second)

3 Power on - green

098408 2009-03

4.6 Interfaces and connections

The following interfaces and connections are located on the lower section U-P6*-B6*:



Connections

1 PROFIBUS input (P and N)

2 PROFIBUS output (P and N)

3 Voltage supply

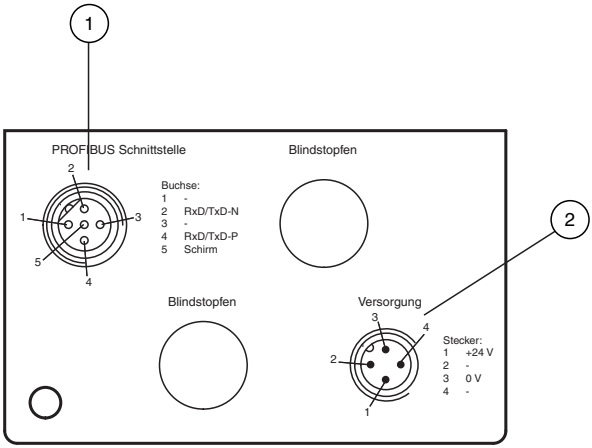
Configuration Options

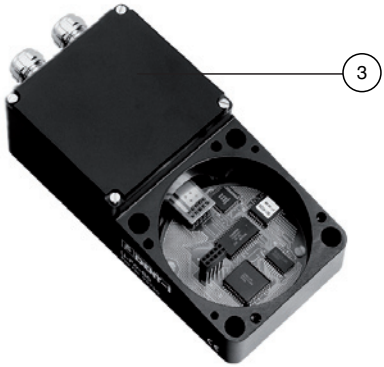
4 DIP switch for bus address

5 Internal bus terminating resistor
ON: The bus is terminated.
The stations that are connected to the terminal OUT (2) are removed from the bus.
OFF: The bus is not terminated.

098408 2009-03

The following interfaces and connections are located on the lower section U-P6-B6-V15B.





Connections

1 M12 socket, B-coded, PROFIBUS connection - V15B

2 M12 connector for power supply - V1

Configuration Options

3 Internal bus terminating resistor (under cover)
ON: The bus is terminated.
OFF: The bus is not terminated.

098408 2009-03

4.7 Connection accessories

4.7.1 Connection cable to the PROFIBUS DP interface

Accessories	Description
Terminating resistor	ICZ-TR-V15B
PROFIBUS connection cable in the lengths 0.6 m, 5 m and 10 m	V15B-G-0,6M-PUR ABG-V15B-G V15B-G-5M-PUR ABG-V15B-G V15B-G-10M-PUR ABG-V15B-G
Y connection cable	ICZ-3T-0.2M-PUR ABG-V15B-G
Cable socket, screw terminal type	V15B-G
Cable plug, screw terminal type	V15BS-G
PROFIBUS T distributor	ICZ-3T-V15B

098408 2009-03

5 Installation

5.1 Storage and transport

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

5.2 Unpacking

Check the product for damages 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
- Manual/manuals

Retain the original packaging in case the device must be stored or shipped again at a later date.

Should you have any questions, please direct them to Pepperl+Fuchs.

098408 2009-03

5.3 EMC concept

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!

Power supply cables are the source of much interference, e.g. the starting current 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.

5.3.1 Lower section with plug-in connection

When using the lower section U-P6-B6-V15B it should be noted that the screening of the cable is connected with pin 5 of the PROFIBUS plug (view image on page 14).

5.3.2 Lower section with terminal box

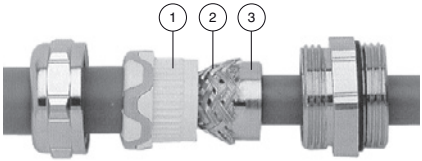
Note!

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

Connect screening with the lower section U-P6*-B6

In order to connect the screening with the cable gland on the lower section U-P6*-B6 and in so doing satisfy the EMC requirements in accordance with DIN VDE 0871/6.78, the following steps must be carried out:

1. Strip the outer sheathing of the cable end over a length of approx. 10 mm.
2. Carefully expand the screen and slide it over the cone.
3. Pull the seal insert over the screen and cone.
4. Screw on the PG cable gland.



1 Seal insert

2 Screen

3 Cone

To establish conductive contact with the housing, the cable gland is affixed with a self-tapping nut on the lower section U-P6*-B6.

Self-tapping nuts cannot be reused after the initial use!

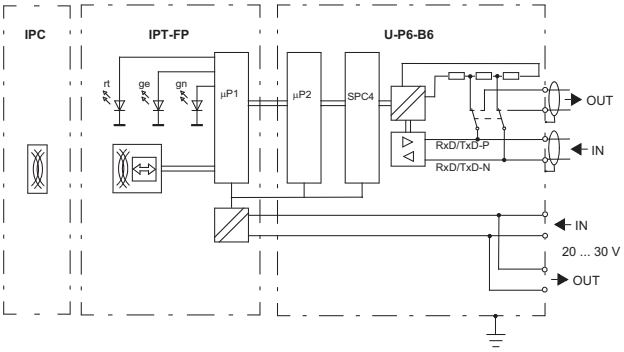
098408 2009-03

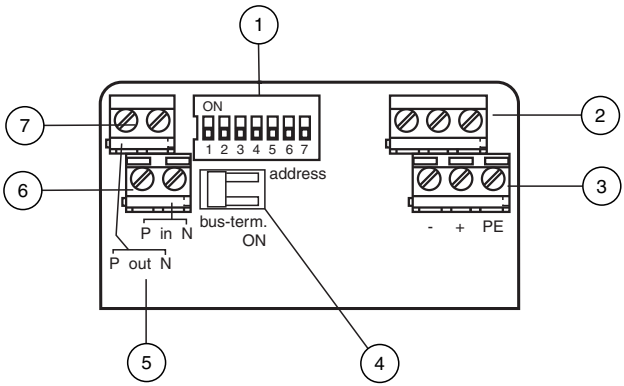
5.4 Device connection

5.4.1 Voltage supply

The electrical connection of the lower section is made via screw terminals. The maximum core cross-section of the cable is 1.5 mm^2.

Connect the PROFIBUS DP and the supply voltage as described in the connection diagram and in the terminal assignment list.





1 DIP switch for addressing (see chapter 6.3.1)

2 Supply voltage OUT (optional)

3 Supply voltage IN

4 Bus terminator (see chapter 5.4.6)

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

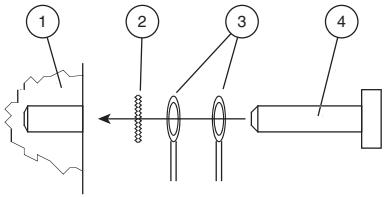
6 PROFIBUS IN

7 PROFIBUS OUT or terminating resistor

098408 2009-03

5.4.2 Earth connection

The earth connection of the lower section U-P6*-B6* is located lower left, adjacent to the cable entrances. The PE conductor is screwed to the housing with a crimp connector. In order to guarantee safe earthing, the serrated washer must be mounted between the crimp connector and the housing.



1 Housing

2 Serrated lock washer

3 Crimp connector

4 Lock screw

A cross-section of at least 4 mm^2 is recommended for the PE conductor lead.

The internal PE connection is conductively connected with the housing. However, from the point of view of screening, connection to the outside of the housing is preferable.

Note!

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

The brochure can be obtained from:

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

098408 2009-03

5.4.3 PROFIBUS connection guide

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

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

5.4.4 Cable

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

The line parameters are as follows:

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

*No longer use line type B if possible.

Note!

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

098408 2009-03

5.4.5 Transfer rates and line lengths

The setting of the possible transfer rates is auto-synchronizing. That means that the lower section U-P6*-B6* recognizes the baud rate of the PROFIBUS MASTER automatically and configures itself accordingly.

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

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

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

Baud rate in kbit/s	9,6	19,2	93,75	187,5	500	1500	3000, 6000, 12000
Line type A (in m)	1200	1200	1200	1000	400	200	100
Line type B (in m)	1200	1200	1200	600	200	---	---

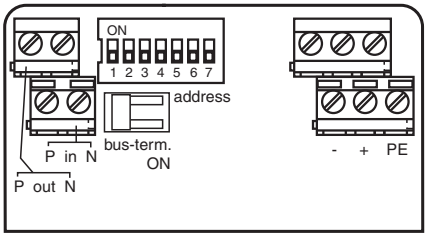
Note!

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

5.4.6 Bus terminator

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

The lower sections U-P6*-B6 and U-P6-B6-V15B have an internal bus terminator that can be switched on. The corresponding DIP switch is located at the terminals.



If the sliding switch is in the **ON** position, then the bus terminator is turned on. At the same time, **PB OUT** is removed from the PROFIBUS.

098408 2009-03

098408 2009-03

6 Commissioning

Warning!
Before commissioning, ensure that the plant is not in danger relating to device malfunction, e.g. from uncontrollable triggered processes.

6.1 Connection

Warning!
Incorrect electrical connection

Incorrect connections may damage the system.

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

When the supply voltage is looping through to the next device, the power may only reach a maximum of 2.5 A. I.e. a maximum of 8 read/write stations may be supplied by one supply system.

After connecting the supply voltage the green LED on the read station and the green "US" LED on the lower section must light. Configure the read/write station with the described system commands (see chapter 7). “Autodetect” is set as the data carrier type.

Note!
In the **autodetect** mode, mixed operation of different code/data carriers is possible. Since the read/write heads for the autodetect require a significantly longer time, only static read and write is possible in this mode.

098408 2009-03

6.2 Preliminary considerations

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

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

The most important factors that determine the time response are:

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

The most important factors that determine the time response are:

- Nature of the higher-level host system, e.g. SPS or PC.
- Nature of the PROFIBUS DP master, e.g. assigned transfer rate.
- Communication between the PROFIBUS master and the host system.
- Number of PROFIBUS DP stations.
- Number and nature of connected read/write stations.
- Type of code/data carrier used.
- Nature of access to the communication objects of the read/write station.
- Nature of the commands to the read/write station.
- Construction of the user program.

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

Warning!
There is a series of configuration tools that help PROFIBUS DP users plan a network and put it in operation, even if they do not have extensive experience with the underlying communication sequences.

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

098408 2009-03

6.3 Device settings

Warning!
Do not connect any devices to your network until you have configured them.

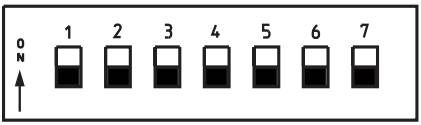
In preparation of commissioning, the device address and the bus terminator, if applicable, must be set on the lower section at the terminal with the sliding switch.

6.3.1 Setting the device address

Set device address

In order to set the device address, proceed as follows:

1. Select a device address between 0 and 126 that is not assigned to another node (view table "Set device address" on page 25).
2. Set this using the DIP switch at the terminals.



3. Note that the address 126 may only be diverted from its intended use for commissioning!

Set device address

Device address	S1	S2	S3	S4	S5	S6	S7
0	OFF	OFF	OFF	OFF	OFF	OFF	OFF
1	ON	OFF	OFF	OFF	OFF	OFF	OFF
2	OFF	ON	OFF	OFF	OFF	OFF	OFF
...	...	...	...	...	...	...	...
126	OFF	ON	ON	ON	ON	ON	ON

After being turned on, the lower section automatically adjusts itself to the transfer speed specified by the master.

The following are supported:

- 9.6 kbit/s
- 19.2 kbit/s
- 93.75 kbit/s
- 187.5 kbit/s
- 500 kbit/s
- 1.5 kbit/s
- 3 Mbit/s
- 6 Mbit/s
- 12 Mbit/s

098408 2009-03

7 Operation on the PROFIBUS DP

7.1 General information on PROFIBUS DP

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

An extensive introduction to PROFIBUS would go well beyond the limits of these operating instructions. For detailed information, reference should be made to the PROFIBUS standard EN 50170 and to the current literature on the subject (e.g. M. Popp, “The New Rapid Way to PROFIBUS DP” available (in German) from the PROFIBUS user's organization).

Note!

The PROFIBUS Users' Organization e.V. Haid- and Neu-Str. (PNO), Karlsruhe publishes informational brochures and a PROFIBUS product catalogue.

7.1.1 PROFIBUS DP features

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

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

098408 2009-03

7.1.2 PROFIBUS DP communication parameters (GSD file)

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

The GSD file name for the lower section U-P6*-B6* is:
P&F_04AD.gsd or 1830686.zip

Configuring the bus master for DP operations

The accompanying GSD file contains the communication parameters for the IDENTControl Compact. You can use the GSD file to configure the bus master currently in use. If you have a configuration tool, read in the GSD file with the configuration tool. You must also provide information for the device address and the size of the input and output data fields. The bus master is configured accordingly.

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

For read/write operation:

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

For only read operation:

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

One of the predefined modules is selected. In doing so, the data field size for the read/write commands used (depending on the parameter word count) must be sufficient.

Note!

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

098408 2009-0

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

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

7.1.3 PROFIBUS DP functions

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

098408 2009-03

7.1.4 Device identification/software version message for PROFIBUS DP

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

Address	Length	Content
Byte 0	1 byte	Header byte, length of external diagnostics
Byte 1 ... 2	2 bytes	16 bits external diagnostics Meaning of the device-related diagnostic bits Unit_Diag_Bit (00) = "Software error" Unit_Diag_Bit (01) = "Hardware error" Unit_Diag_Bit (02) = "User error" Unit_Diag_Bit (03) = "Head error" Unit_Diag_Bit (04) = "reserved" Unit_Diag_Bit (05) = "reserved" Unit_Diag_Bit (06) = "reserved" Unit_Diag_Bit (07) = "reserved" Unit_Diag_Bit (08) = "reserved" Unit_Diag_Bit (09) = "reserved" Unit_Diag_Bit (10) = "reserved" Unit_Diag_Bit (11) = "reserved" Unit_Diag_Bit (12) = "reserved" Unit_Diag_Bit (13) = "Ident Reset" Unit_Diag_Bit (14) = "Watchdog Reset" Unit_Diag_Bit (15) = "Power on Reset"
Byte 3 ... 8	6 bytes	Identification string of the IDENT system
Byte 9	1 byte	<CR>
Byte 10 ... 15	6 bytes	Part number of the IDENT system
Byte 16	1 byte	<CR>
Byte 17 ... 24	8 bytes	Software number of the IDENT system
Byte 25	1 byte	<CR>
Byte 26 ... 31	6 bytes	Software creation date of the IDENT system
Byte 32	1 byte	<CR>
Byte 33 ... 39	7 bytes	Identification string of the BUS system
Byte 40	1 byte	<CR>
Byte 41 ... 46	6 bytes	Part number of the BUS system
Byte 47	1 byte	<CR>
Byte 48 ... 55	8 bytes	Software number of the BUS system
Byte 56	1 byte	<CR>
Byte 57 ... 62	6 bytes	Software creation date of the BUS system
	63 bytes	**Total length of external diagnostics**

Note!

PROFIBUS DP always has a 6-byte header and up to 64-bytes of device-related diagnostics.

The above table explains only the 63-byte device-related diagnostics.

360

7.2 General command information

7.2.1 Software information

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

A response is read from the input data field of the master and consists of the echo of the command code, a parameter, the toggle flag, the status, an execution counter and the read data.

A number of commands do not use all the parameter and data fields. These unused data fields are then ignored by the device. The input and output fields are constructed as follows:

Output data field:

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

Input data field:

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

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

Upon detection of a new command “Status” is set to FFh. In addition, the execution counter is set to 00h and on every further execution of this command it counts up. If the execution counter overruns, it starts again at 00h. An overrun exists when the execution counter reading is equal to 00h and the status is not equal to FFh.

After the processing of commands by the identification system, the “Status” is output in accordance with the Status/Fault signal table.

098408 2009-03

The first two bytes of the response correspond to the first two bytes of the command call-up. The toggle bit of the response is the same as the toggle bit of the command.

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

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

The commands **buffered ...** and **enhanced buffered ...** are executed repeatedly as long as the commands remain in the output data field. The execution is terminated when a new command is written in the data.

The **reset** command was removed starting with firmware version 180K029 from August 2000 (see sticker on device). A "life" function was built in for this, which generates an error message "Hardware Error 60h" with a fault in the IDENT system.

098408 2009-03

7.2.2 Command overview

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

System commands

Command code		Command description	Abbreviation
2d	02h	quit	**QU**
4d	04h	change tag	**CT**
22d	16h	reset	**RS**

Standard read/write commands

Fixcode

Command code		Command description	Abbreviation
1d	1h	single read fixcode	**SF**
8d	8h	auto read fixcode	**AF**
9d	9h	buffered read fixcode	**BF**
29d	1Dh	enhanced buffered read fixcode	**EF**

Read data

Command code		Command description	Abbreviation
16d	10h	single read words	**SR**
32d	20h	auto read words	**AR**
48d	30h	buffered read words	**BR**
25d	19h	enhanced buffered read words	**ER**

Write data

Command code		Command description	Abbreviation
64d	40h	single write words	**SW**
80d	50h	auto write words	**AW**
96d	60h	buffered write words	**BW**
26d	1Ah	enhanced buffered write words	**EW**

098408 2009-03

Special command modes

Password mode with IPC03

Command code		Command description	Abbreviation
24d	18h	Password mode	**PM**
65d	41h	Password change	**PC**
66d	42h	Password set	**PS**

IPC03 configuration

Command code		Command description	Abbreviation
18d	12h	single write configure	**SC**
19d	13h	auto write configure	**AC**
20d	14h	buffered write configure	**BC**
102d	66h	enhanced buffered write configure	**EC**
97d	61h	single get configuration	**SG**
98d	62h	auto get configuration	**AG**
99d	63h	buffered get configuration	**BG**
104d	68h	enhanced buffered get configuration	**EG**

Write fixcode

Commands for the IPC10 and IPC11

Command code		Command description	Abbreviation
31d	1Fh	single write fixcode	**SX**
100d	64h	auto write fixcode	**AX**
101d	65h	buffered write fixcode	**BX**
36d	24h	enhanced buffered write fixcode	**EX**

098408 2009-03

7.2.3 System commands

quit (QU):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code (02)h	0	0	0	0	0	0	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	unused	-	-	-	-	-	-	-	-
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	0	0	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

With this command, an active read or write process is interrupted.

098408 2009-03

change tag (CT):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	0	1	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Data carrier type in ASCII	<TagType> (High Byte)							
Byte 3	Data carrier type in ASCII	<TagType> (Low Byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	0	1	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

This command tells the read/write station, which tag to communicate with. The read head status on delivery is Type ‘00’.

098408 2009-03

The following data carrier types are currently supported:

Data carrier-type		Descrip-tion P+F	Chip type	Access	Bits	<WordAddr>	Fixcode length [Byte]	Frequency range
High Byte	Low Byte							
'0'	'0'	Autodetect						
'0'	'2'	IPC02	Unique, EM4102 (EM microelectronic)	Fixcode	40		5	125 kHz
'0'	'3'	IPC03	EM4450 (EM microelectronic), Titan	R/W fixcode	928 32	00h ... 1Dh	4	125 kHz
'1'	'0'	IPC10	Nova (Sokymat)	R/W	40	00	-	125 kHz
'1'	'1'	IPC11	Q5 (Sokymat)	R/W	40		-	125 kHz
'1'	'2'	IPC12	FRAM	R/W fixcode	64k 32		4	125 kHz

Note!

In a plant where only one data carrier type is used, it is advantageous to configure that data carrier type so that the R/W head detects the data carrier quicker.

With <TagType> (“High Byte”)= ‘0’ and <TagType> (Low Byte) = ‘0’ a mixed operation of different code/data carriers is possible. Since the read/write head for the autodetect requires a significantly longer time, only static read and write is possible in this mode.

In the operating mode “Autodetect”, the parameters word start address and word count are only first checked when a data carrier is read or written, because the memory ranges differ for the various data carrier types. The error message “Status 4” can therefore only occur when a data carrier is located before the read/write head.

The setting of the data carrier type is stored in the IPT*-FP in a non-volatile manner.

098408 2009-03

reset (RS):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	1	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	unused	-	-	-	-	-	-	-	-
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	1	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status> = 2							
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

With this, the system settings of the IPT*-FP are newly loaded from the non-volatile memory.

098408 2009-03

7.2.4 Standard read/write commands

single read fixcode (SF):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	0	0	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	unused	-	-	-	-	-	-	-	-
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	0	0	0	1
Byte 1	Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	ID code 00h ... FFh	<ID-Code 4>[1]/<ID-Code 3>							
Byte 5	ID code 00h ... FFh	<ID-Code 3>[1]/<ID-Code 2>							
Byte 6	ID code 00h ... FFh	<ID-Code 2>[1]/<ID-Code 1>							
Byte 7	ID code 00h ... FFh	<ID-Code 1>[1]/<ID-Code 0>							
Byte 8[1)]	ID code 00h ... FFh	<ID-Code 0>[1]							

1. only IPC02 and IPC11

One attempt is made to read a **fixcode**.

098408 2009-03

auto read fixcode (AF):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	1	0	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	unused	-	-	-	-	-	-	-	-
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	1	0	0	0
Byte 1	Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	ID code 00h ... FFh	<ID-Code 4>[1]/<ID-Code 3>							
Byte 5	ID code 00h ... FFh	<ID-Code 3>[1]/<ID-Code 2>							
Byte 6	ID code 00h ... FFh	<ID-Code 2>[1]/<ID-Code 1>							
Byte 7	ID code 00h ... FFh	<ID-Code 1>[1]/<ID-Code 0>							
Byte 8[1)]	ID code 00h ... FFh	<ID-Code 0>[1]							

1. only IPC02 and IPC11

An attempt is made to read a **fixcode** until successful.

buffered read fixcode (BF):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	1	0	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Reserved	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	0	1	0	0	1
Byte 1	Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	ID code 00h ... FFh	<ID-Code 4>[1]/<ID-Code 3>							
Byte 5	ID code 00h ... FFh	<ID-Code 3>[1]/<ID-Code 2>							
Byte 6	ID code 00h ... FFh	<ID-Code 2>[1]/<ID-Code 1>							
Byte 7	ID code 00h ... FFh	<ID-Code 1>[1]/<ID-Code 0>							
Byte 8[1)]	ID code 00h ... FFh	<ID-Code 0>[1]							

1. only IPC02 and IPC11

The **fixcode** continues to be read. Only changing data is transferred via the interface, i.e. when a new data carrier is read or when a data carrier is read where there was previously none in the read range.

098408 2009-03

enhanced buffered read fixcode (EF):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	1	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Reserved	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	1	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	ID code 00h ... FFh	<ID-Code 4>[1]/<ID-Code 3>							
Byte 5	ID code 00h ... FFh	<ID-Code 3>[1]/<ID-Code 2>							
Byte 6	ID code 00h ... FFh	<ID-Code 2>[1]/<ID-Code 1>							
Byte 7	ID code 00h ... FFh	<ID-Code 1>[1]/<ID-Code 0>							
Byte 8[1)]	ID code 00h ... FFh	<ID-Code 0>[1]							

1. only IPC02 and IPC11

This command behaves like the **buffered read fixcode** command. The status ‘05h’ (read command) is output if the code or data carrier leaves the read range.

098408 2009-03

single read words (SR):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

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

098408 2009-03

enhanced buffered read words (ER):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	0	1
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	0	1
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

An attempt is made until successful, to read <WordNum> 32-bit words from the address <WordAddr>. Only changing data is transferred via the interface.

When a data carrier leaves the read range, the status ‘5’ (read command) is output.

098408 2009-03

auto read words (AR):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	0	1
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	0	1
Byte 1	Word count/Toggle bit	<WordNum>				<Channel>			<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

Repeated attempts are made until <WordNum> 32-bit words are read from the address <WordAddr>.

098408 2009-03

buffered read words (BR):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	1	1	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	1	1	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

An attempt is made until successful, to read <WordNum> 32-bit words from the address <WordAddr>. Only changing data is transferred via the interface, i.e. when a new data carrier is read or when a data carrier is read where there was previously none in the read range.

098408 2009-03

enhanced buffered write words (EW):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	1	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	1	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

This command behaves like the **buffered write** command, the status ‘5’ is only output when a data carrier leaves the read range.

098408 2009-03

single write words (SW):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	0	0	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	0	0	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

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

098408 2009-03

auto write words (AW):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	0	1	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	0	1	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Repeated attempts are made until <WordNum> 32-bit words are written from the address <WordAddr>.

098408 2009-03

buffered write words (BW):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Word address	<WordAddr> (High Byte)							
Byte 3	Word address	<WordAddr> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = 4 x <WordNum> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	0	0
Byte 1	Word count/Toggle bit	<WordNum>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Repeated attempts are made until <WordNum> 32-bit words are written from the address <WordAddr>. After every successful write, the response is sent and then continuous reading ensues. Then the same data carrier is read, until it has left the read/write range or a new data carrier appears in front of the read/write head. The command then starts again with write attempts.

098408 2009-03

7.2.5 Special command modes

Note!

These commands can only be used when data carrier type 03 (IPC03) is set. They cannot be used in the autodetect mode (mixed operation, data carrier type 00)!

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

098408 2009-03

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

098408 2009-03

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

To set the password, proceed as follows:

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

The password in the read/write head and on the data carrier can be changed with the command **PC**.

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

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

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

098408 2009-03

set password mode (PM):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	on=1 or off=0	0	0	0	0	0	0	0	<P>
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	0	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

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

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

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

098408 2009-03

password change (PC):

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

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	0	0	0	0	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

This command changes the password in a data carrier. Enter the old and then the new password <PSW> here. If the password has been successfully written, then the password in the read/write station is also changed. The command **set password** is no longer necessary. The password of the IPC03 (password on delivery: 0000) can also be change with password mode inactive.

098408 2009-03

password set (PS):

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

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	0	0	0	0	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Sets the password <PSW>, which the read/write station communicates to the data carrier in the password mode.

098408 2009-03

Operating mode “Default Read”

In the “default read” operating mode 1 or 2, words can be read very quickly, because the memory to be read is already defined on the data carrier and does not need to be communicated to the data carrier from the read/write head first.

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

The advantages of the “default read” operating mode lie in the readout speed. The readout of one data word (4 bytes) is twice as fast in this mode. The readout of 2 words takes approx. 1/3 less time. Starting at 3 data words there is no more time advantage since this mode is only intended for the reading of a maximum of 2 words (=8 bytes). Reading larger data ranges can lead to error messages when the read head does not respond within the planned reaction time.

Setting "Default Read"

In order to set the operating mode "Default Read", proceed as follows:

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

098408 2009-03

IPC03 configuration

single write configure (SC):

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

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	0	1	0
Byte 1	Reserved/Ident channel/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

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.

098408 2009-03

auto write configure (AC):

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

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	0	1	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

An attempt is made to read a word in the configuration range from the address until successful <ConfAddr>.

098408 2009-03

buffered write configure (BC):

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

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	0	1	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

One attempt is made to write a word in the configuration range to the address <ConfAddr>. After each successful write, the response is sent 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.

098408 2009-03

single get configuration (SG):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	0	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							

One attempt is made to read a word in the configuration range (“protection word” or “control word”) from the address <ConfAddr>.

098408 2009-03

auto get configuration (AG):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							

An attempt is made, to write a word in the configuration range from the address <ConfAddr>.

098408 2009-03

buffered get configuration (BG):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	1	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	Address in the configuration range	<ConfAddr>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	0	1	1
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							

An attempt is made until successful, to write a word in the configuration range from the address <ConfAddr>. Only changing data is transferred via the interface, i.e. when a new data carrier is read or when a data carrier is read where there was previously none in the read range.

098408 2009-03

enhanced buffered write configure (EC):

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

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	1	1	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

This command behaves like the **buffered configure** command, the status ‘05h’ (read/write commands) is only output when a data carrier leaves the read range.

098408 2009-03

enhanced buffered get configuration (EG):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	1	0	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Reserved	-	-	-	-	-	-	-	-
Byte 3	unused	-	-	-	-	-	-	-	-
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	1	0	0	0
Byte 1	Reserved/Toggle bit	-	-	-	-	-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	Data 00h ... FFh	<Data>							
Byte 5	Data 00h ... FFh	<Data>							
Byte 6	Data 00h ... FFh	<Data>							
Byte 7	Data 00h ... FFh	<Data>							

This command behaves like the **buffered get configuration** command, the status ‘5’ (read/write commands) is only output when a data carrier leaves the read range.

098408 2009-03

7.2.6 Write fixcode

Commands for the IPC10

The data carrier IPC10 is formatted during the first write process. It can therefore only be read when it has already been written.

The word start address is set to '0' for the read and write commands. The word count can be 1 or 3. For read commands, the word count is set to '0' since exactly the same amount of words are read as were previously written.

An IPC10 can also be programmed such that it behaves like an IPC02. To do this, the commands **SX**, **AX**, **BX** and **EX** are used. This programming takes place once, i.e. it can not be reversed (once the code is written it cannot be overwritten). The code is read when data carrier type 02 or 10 is set with the commands **SF**, **AF**, **BF** and **EF**.

Here, <FixType> is always "02" and <FixLen> is always "05", since 5 bytes must always be written.

single write fixcode (SX):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	1	1	1
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	FixType	<FixType> (High Byte)							
Byte 3	FixType	<FixType> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = <FixLen>

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	1	1	1
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

One attempt is made to write a **fixcode**. For IPC10, <FixType> is always '02' and <FixLen> is always '05h', since 5 bytes must always be written.

098408 2009-03

enhanced buffered write fixcode (EX):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	1	0	0	1	0	0
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	FixType	<FixType> (High Byte)							
Byte 3	FixType	<FixType> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							
1. N = <FixLen>									

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	1	0	0	1	0	0
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

This command behaves like the **buffered write fixcode** command. <FixType> is always ‘02’ on the IPC10 and <FixLen> is always ‘05h’ (read/write commands), since 5 bytes must always be written.

098408 2009-03

auto write fixcode (AX):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	1	0	0
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	FixType	<FixType> (High Byte)							
Byte 3	FixType	<FixType> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = <FixLen>

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	1	0	0
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

An attempt is made until successful, to write a **fixcode**. <FixType> is always ’02’ on the IPC10 and <FixLen> is always ‘05h’ since 5 bytes must always be written.

098408 2009-03

buffered write fixcode (BX):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	1	0	1
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	FixType	<FixType> (High Byte)							
Byte 3	FixType	<FixType> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = <FixLen> + 3

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	1	1	0	0	1	0	1
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

One attempt is made to write a **fixcode**. After each successful write, the response is sent and the system waits until a new data carrier is within the detection range. Then, the command starts from the beginning. <FixType> is always ‘02’ on the IPC10 and <FixLen> is always ‘05h’, since 5 bytes must always be written.

098408 2009-03

Commands for the IPC11

An IPC11 can be programmed such that it behaves like an IPC02. To do this, the commands **SX** and **EX** are used. The code is read when data carrier type '02' or '11' is set with the commands **SF** and **EF**.

Note!

Only IPT-FP with the part number 118028 or its successor IPT1-FP can describe IPC11.

single write fixcode (SX):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	1	1	1
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	FixType	<FixType> (High Byte)							
Byte 3	FixType	<FixType> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							

1. N = <FixLen>

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	0	1	1	1	1	1
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

Exactly one attempt is made to write a **fixcode**.

<FixType> is '02' ASCII (30h 32h) on the IPC11, when the **fixcode** should be unchangeable, or '11' ASCII (31h 31h), when the **fixcode** should be overwritable.

<FixLen> is always 1001b = 5d.

098408 2009-03

enhanced buffered write fixcode (EX):

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	1	0	0	1	0	0
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	FixType	<FixType> (High Byte)							
Byte 3	FixType	<FixType> (Low Byte)							
Byte 4	Data 00h ... FFh	<Data>							
...	Data 00h ... FFh	<Data>							
Byte N[1)]	Data 00h ... FFh	<Data>							
1. N = <FixLen>									

Response:

Byte	Content	Bit no.							
		7	6	5	4	3	2	1	0
Byte 0	Command code	0	0	1	0	0	1	0	0
Byte 1	FixLen/Toggle bit	<FixLen>				-	-	-	<T>
Byte 2	Status	<Status>							
Byte 3	Execution counter	<ExecCounter>							
Byte 4	unused	-	-	-	-	-	-	-	-
Byte 5	unused	-	-	-	-	-	-	-	-
Byte 6	unused	-	-	-	-	-	-	-	-
Byte 7	unused	-	-	-	-	-	-	-	-

An attempt is made until successful, to write a **fixcode**. After each successful write, the response is sent and the system waits until a new data carrier is within the detection range. The command then starts again from the beginning.

<FixType> is '02' ASCII (30h 32h) on the IPC11, when the **fixcode** should be unchangeable, or '11' ASCII (31h 31h), when the **fixcode** should be overwritable.

<FixLen> is always 1001b = 5d.

098408 2009-03

7.2.7 Legend

<ConfAddr>	:	1 byte, word start address in the configuration range of the data carrier. The following applies for IPC03: "1" = Protection Word "2" = Control Word
<Data>	:	<WordNum> times 4 Bytes. When communicating a word, the highest value byte is transferred first and the lowest value byte last.
<ExecCounter>	:	1 byte , the execution counter increments for each event while a command is active. Set to 0 for a new command.
<FixLen>	:	4 bits, length of the fixcode
<FixType>	:	2 ASCII characters, for example: '02' or '11' for IPC02 or IPC11
<IDCode>	:	4 bytes for IPC03 5 bytes for IPC02 and IPC11
<P>	:	1 bit 0 (0b); 1 (1b)
<PSW>	:	4 bytes, password
<Status>	:	1 byte
<T>	:	1 Bit 0 (0b); 1(1b)
<TagType>	:	2 ASCII characters, for example: '02' for IPC02
<WordAddr>	:	2 times 2 bytes (High Byte and Low Byte) Word start address in the data carrier, range from ‘0000h’ to ‘FFFFh’, depending on data carrier type.
<WordNum>	:	4 bits, number of words to be read or written, range from 0h to Fh, depending on data carrier type. The following applies for IPC03: The word count 0h is used with the word address ‘0000’ to read the preset data range on the data carrier.

098408 2009-03

7.2.8 Error/Status messages

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

Error messages, which triggered the identification system

Status	Meaning
02h	Switch-on message. Reset has been executed.
03h	Reserved
04h	Incorrect or incomplete command or parameter not in the valid range.
05h	Read/write error. No data carrier in the detection range.
06h	Hardware error, e.g. error on self test or read head defect.
07h	Internal device error.
08h	Reserved
09h	Reserved
0Ah	Reserved
0Bh	Reserved
0Ch	Reserved
0Dh	Reserved
0Eh	Reserved
0Fh	Reserved

Error messages, which triggered the lower section U-P6*-B6*

Status	Meaning
10h	Reserved
20h	Reset has been executed.
40h	Incorrect or incomplete command or parameter not in the valid range.
60h	Hardware error, e.g. no communication with the identification system.
70h	Internal device error.

098408 2009-03

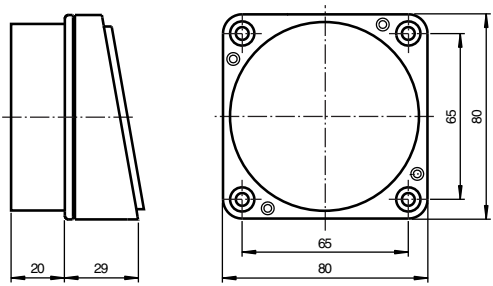
8 Technical specifications

8.1 Read/write station IPT*-FP

IPT*-FP	
General data	
Operating frequency	125 kHz
Transfer rate	2 kBit/s
Operating distance	max. 100 mm
Display/controls	
LED green	Power on
LED yellow	IPC recognized
LED red	Bus error (with the use of field bus interfaces)
Electrical data	
Rated operating voltage U_e	20 ... 30 V DC, ripple 10 $\%_{SS}$, PELV
Power consumption P_0	max. 5 W, in connection with lower section
Galvanic isolation	
Operating voltage/Interface	Functional isolation in accordance with DIN EN 50178, rated isolation voltage 50 V_{eff}
Interface	
Physical	Interface type depends on the lower section used
Ambient conditions	
Ambient temperature	-25 ... 70 °C (248 ... 343 K)
Storage temperature	-40 ... 85 °C (233 ... 358 K)
Mechanical data	
Degree of protection	IP67 in accordance with IN 60529, in connection with lower section
Housing material	PBT (Polybutylene terephthalate)

098408 2009-03

Dimensions of the read/write station



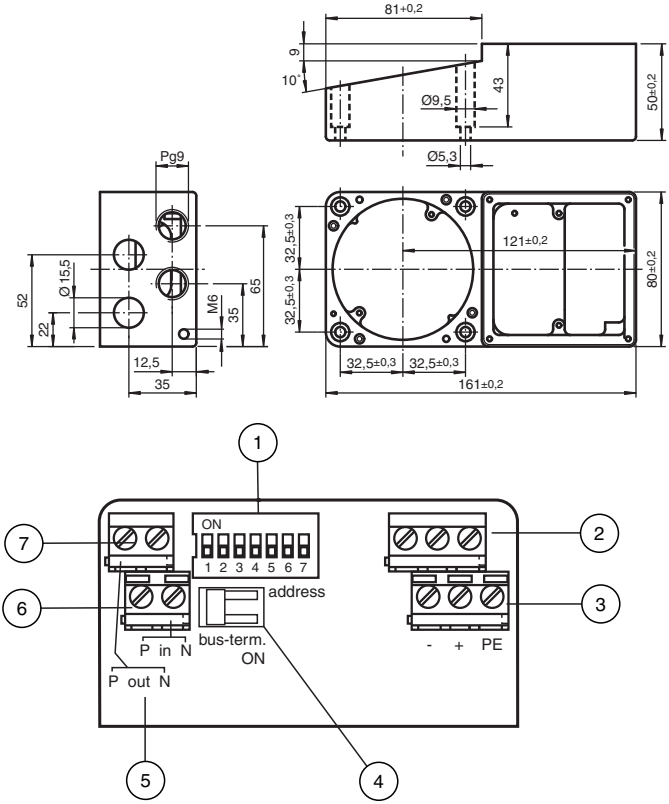
098408 2009-03

8.2 Lower sections

	U-P6-B6-V15B	U-P6-B6	U-P6V4A-B6
Display/controls			
DIP switch	Set the station address bus terminator ON = active Off = inactive		
Electrical data			
Rated operating voltage U_e	20 ... 30 V DC, ripple 10 $\%_{SS}$, PELV		
Power consumption P_0	max. 5 W with read/write head IPT-FP		
Galvanic isolation			
Operating voltage/Interface	Functional isolation in accordance with DIN EN 50178, rated isolation voltage 50 V_{eff}		
Interface			
Physical	RS 485		
Protocol	PROFIBUS DP accordant with DIN EN 50170		
Transfer rate	9.6; 19.2; 93.75; 187.5; 500; 1500 kbit/s		
	-	3; 6; 12 Mbit/s	Auto-synchronizing
Ambient conditions			
Ambient temperature	-25 ... 70 °C (248 ... 343 K)		
Storage temperature	-40 ... 85 °C (233 ... 358 K)		
Climate conditions	Max. relative humidity 95%	-	
Mechanical data			
Degree of protection	IP67 accordant with EN 60529		
Connection	Device plug M12 x 1, 4-pin to power supply;	Screw terminals	
	Device socket M12 x 1, 5-pin, B-coded for PROFIBUS		
Interface cable	-	2 x 0.64 mm^2, double-shielded, corresponding to PROFIBUS standard EN 50170	
Power supply	-	up to 3 x 1.5 mm^2	
Material	Aluminum, black anodized		Stainless steel

098408 2009-03

8.3 U-P6-B6 Lower section



1 DIP switch for addressing (see chapter 6.3.1)

2 Supply voltage OUT (optional)

3 Supply voltage IN

4 Bus terminator (see chapter 5.4.6)

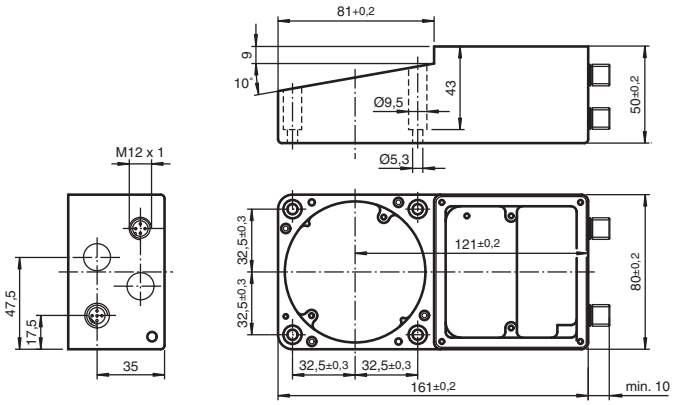
5 RxD/TxD-N (A line) green
RxD/TxD-P (B line) red

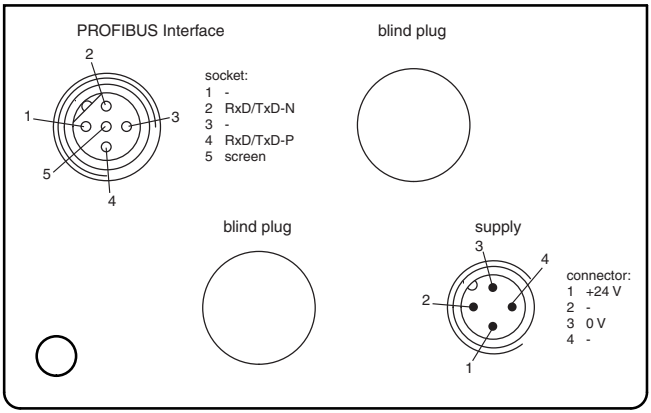
6 PROFIBUS IN

7 PROFIBUS OUT or terminating resistor

098408 2009-03

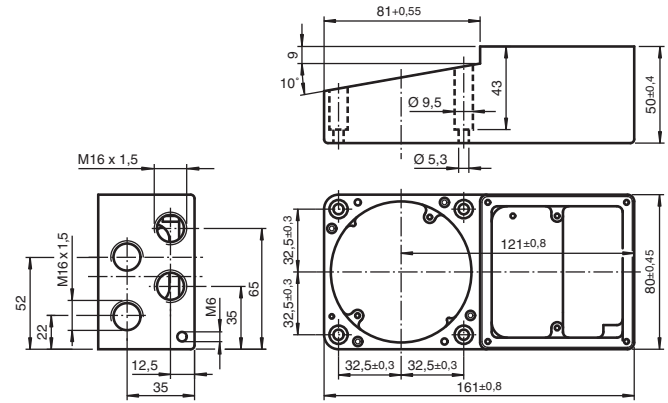
8.4 U-P6-B6-V15B

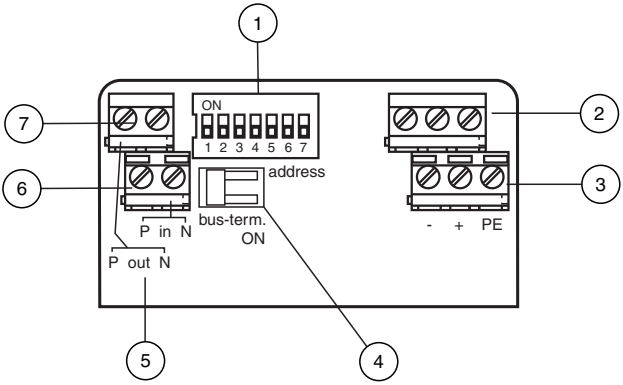




098408 2009-03

8.5 U-P6V4A-B6 Lower section





1 DIP switch for addressing (see chapter 6.3.1)

2 Supply voltage OUT (optional)

3 Supply voltage IN

4 Bus terminator (see chapter 5.4.6)

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

6 PROFIBUS IN

7 PROFIBUS OUT or terminating resistor

098408 2009-03

098408 2009-03

FACTORY AUTOMATION – SENSING YOUR NEEDS

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

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

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

www.pepperl-fuchs.com

PEPPERL+FUCHS
SENSING YOUR NEEDS

Subject to modifications
Copyright PEPPERL+FUCHS • Printed in Germany

TDOCT0234A__ENG 098408
03/2009