

MANUFACTURER DOCUMENT PACKAGE

Manufacturer's Manual

Amikon cover with applicable official manufacturer pages

PEPPERL+FUCHS

IC-KP2-1HB17-2V1D

RFID EVALUATION UNIT

The following Pepperl+Fuchs pages cover safety, product description, installation, connections, dimensions, specifications and troubleshooting for the exact model.

MANUAL

IC-KP2-1HB17-2V1D IDENTControl Compact unit with Ethernet interface





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



1	Introduction.....	7
2	Declaration of conformity	8
2.1	CE conformity	8
3	Safety	9
3.1	Symbols relevant to safety	9
3.2	Intended use	9
3.3	General notes on safety	9
3.4	Contact protection	10
4	Product Description	11
4.1	Product family	11
4.1.1	R/W heads	11
4.1.2	Read Only Tags/Read/Write Tags	11
4.1.3	Handhelds	12
4.2	Connection accessories.....	12
4.2.1	Connecting Cable to the Read/Write Head	12
4.2.2	Cable connectors for the power supply	13
4.2.3	Connection cable to the Ethernet interface	13
4.2.4	Mounting aid	13
4.3	Delivery package.....	13
4.4	Range of application	14
4.5	Device characteristics	14
4.6	Interfaces and connections	14
4.7	Displays and Controls	15
5	Installation.....	16
5.1	Unpacking.....	16
5.2	EMC concept	16
5.3	Installation	17



5.4	Device connection	17
5.4.1	Power Supply	17
5.4.2	R/W head	17
5.4.3	Ground connection	18
5.4.4	Ethernet connection guide	18
6	Commissioning	19
6.1	Preliminary considerations	19
6.2	Connection	19
6.3	Device Settings	20
6.4	Setting the IP address	20
7	Commands	22
7.1	Communication of the IDENTControl Compact	22
7.2	Data exchange	22
7.3	Command execution	22
7.4	Command types	24
7.5	Web function	24
7.5.1	Website of the IDENTControl Compact	24
7.5.2	Network settings	25
7.5.3	Email function	26
7.5.4	Sending commands via the website	27
7.5.5	Data logging	27
7.6	Communication via TCP/IP	28
7.6.1	Data exchange via TCP/IP	28
7.6.2	Command examples TCP/IP	29
7.7	Communication via MODBUS TCP/IP	31
7.7.1	Data exchange via MODBUS TCP/IP	31
7.7.2	Register	31
7.7.3	MODBUS commands	34
7.7.4	Notes for creating the control program	38
7.7.5	MODBUS exception codes	39



7.8	Communication via Ethernet/IP	39
7.8.1	Data exchange via EtherNet/IP	39
7.8.2	Mixed mode	40
7.8.3	Separated mode	40
7.8.4	Data length.....	41
7.8.5	Assembly attributes.....	41
7.8.6	Access administration.....	42
7.8.7	Heartbeat and ident status	43
7.8.8	Data hold time	43
7.8.9	PCCC	43
7.9	Communication via PROFINET	45
7.9.1	What is PROFINET?	45
7.9.2	Project planning using device description (GSD)	46
7.9.3	Start-up: Assignment of device name, LED flashes.....	47
7.9.4	Data Transfer Statistics.....	47
7.9.5	Topology detection.....	48
7.9.6	Identification & Maintenance Data.....	52
7.9.7	Command examples.....	53
7.10	Command overview	55
7.11	System Commands	57
7.12	Standard read/write commands	61
7.13	Special commands for type IPC03 tags.....	67
7.14	"Write Read Only Code" for IPC11 & IDC-...-1K Read/Write Tags..	76
7.15	Extended Command Modes.....	78
7.16	Legend	88
7.17	Fault/Status messages	89
8	Technical Specifications	90
8.1	Dimensions.....	90
8.2	Technical Data	90
9	Troubleshooting.....	92
10	ASCII table.....	93



11	Appendix A.....	94
11.1	Example 1	94
11.2	Example 2	96
12	Appendix B.....	102
12.1	Object model in the EtherNet/IP protocol	102
12.2	Identity object (01h)	102
12.3	Assembly object (04h)	103
12.4	Output command object (instances 64h - 6)	107
12.5	Input command object (instances 65h - 6)	108
12.6	Boot-up parameter object (instances 66h - 4)	108
12.7	Diagnostics object (instances 67h - 5).....	109



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



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 an imminent danger.

Non-observance will result in personal injury or death.



Warning!

This symbol indicates a possible fault or danger.

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



Caution!

This symbol indicates a possible fault.

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

3.2 Intended use

The IDENTControl Compact IC-KP2-1HB17-2V1D is a control unit with integral Ethernet interface designed for identification systems. The IDENTControl Compact can be used as a control cabinet module or for field applications. You can connect a suitable inductive R/W head or a microwave antenna 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

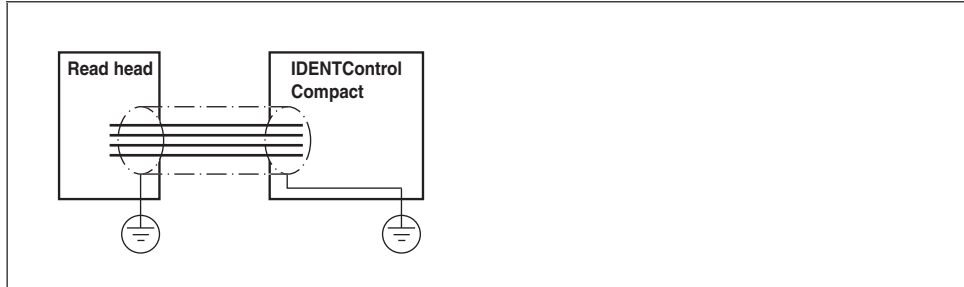
Electronic waste is hazardous waste. When disposing of the equipment, observe the current statutory requirements in the respective country of use, as well as local regulations.



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 an inductive R/W head (125 kHz and 13.56 MHz) or a R/W head with electromagnetic coupling (UHF with 868 MHz).

4.1.2 Read Only Tags/Read/Write Tags

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

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

Read/write tag 13.56 MHz (inductive)

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

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

Data carrier 868 MHz (UHF)

Data carriers in this frequency range can be passive as well as active (with battery) and use a specially-shaped rod antenna as the resonance element. The passive transponders can be produced very cheaply and have a range of several meters.

As material handling and the automotive sector requires ranges of 1 to 5 meters, this system represents a low-cost alternative to microwave systems, particularly because of its low transponder costs. The high carrier frequency supports large data volumes and extremely short read times.



4.1.3

Handhelds

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



Figure 4.1

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

4.2

Connection accessories

4.2.1

Connecting Cable to the Read/Write Head

Compatible connecting cables with shielding are available for connecting the read/write head.

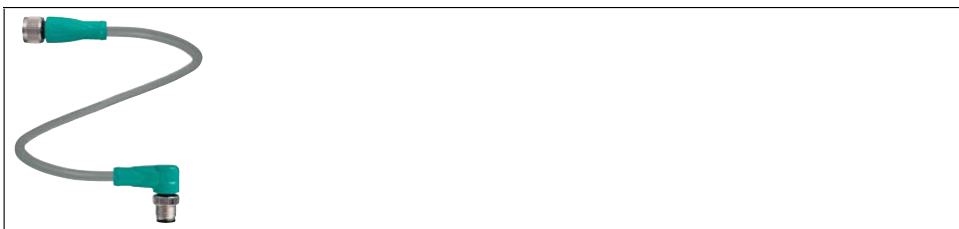


Figure 4.2

Accessories	Description
2 m long (straight female, angled male)	V1-G-2M-PUR-ABG-V1-W
5 m long (straight female, angled male)	V1-G-5M-PUR-ABG-V1-W
10 m long (straight female, angled male)	V1-G-10M-PUR-ABG-V1-W
20 m long (straight female, angled male)	V1-G-20M-PUR-ABG-V1-W
Field attachable female connector, straight, shielded	V1-G-ABG-PG9
Field attachable male connector, straight, shielded	V1S-G-ABG-PG9
Field attachable female connector, angled, shielded	V1-W-ABG-PG9
Field attachable male connector, angled, shielded	V1S-W-ABG-PG9
Dummy plug M12x1	VAZ-V1-B3

2014-02



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 Ethernet interface

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



Figure 4.4

Accessories	Designation
5 m connection cable	V1SD-G-5M-PUR-ABG-V45-G

4.2.4 Mounting aid

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

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

4.3 Delivery package

The delivery package contains:

- 1 IDENTControl Compact unit
- 1 Quick start guide
- 2 grounding screws
- 2 serrated lock washers
- 2 crimp connectors



4.4 Range of application

The system is suited for the following applications:

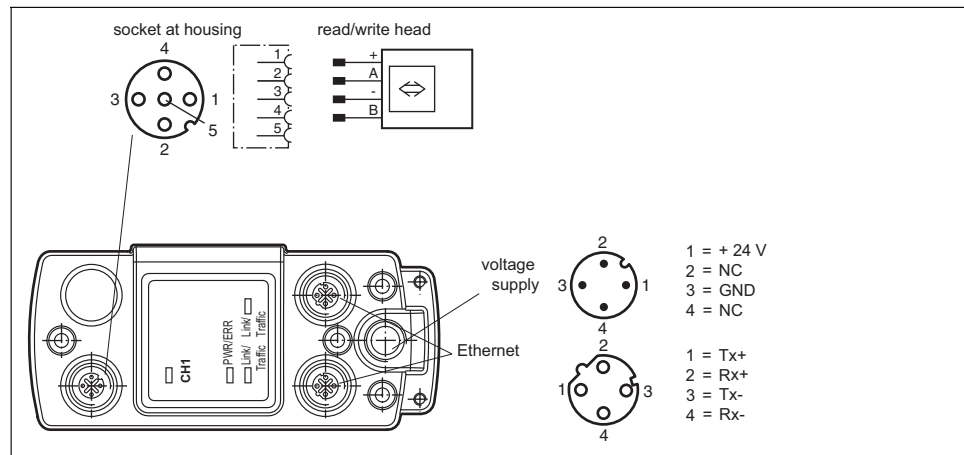
- Automation
- Material flow control in production
- Acquisition of operating data
- Access control
- Identification of storage vessels, pallets, work piece carriers, refuse containers, tanks, containers, etc.

4.5 Device characteristics

- 1 R/W head can be connected
- LED status indicators for bus communication and R/W head

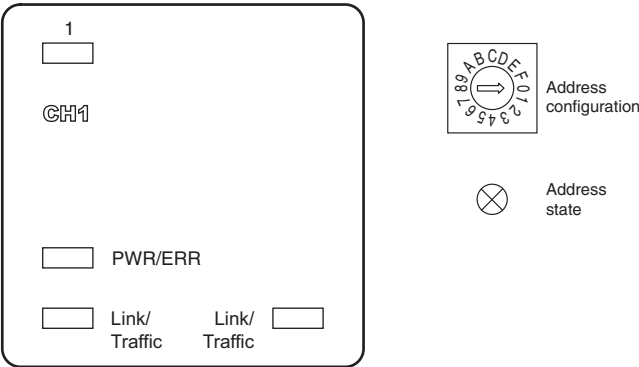
4.6 Interfaces and connections

The control unit IC-KP2-1HB17-2V1D has the following interfaces and connections:





4.7 Displays and Controls



LEDs

Description	Function	Status description
1	Status display of the read/write head	LED illuminates green when there is an active command on the read/write head. LED illuminates yellow for approx. 1 second when a command is executed successfully.
CH1	Displays the read/write head connected (channel)	LED illuminates green when a read/write head is connected to channel 1. LED illuminates red if a configuration error occurs.
PWR/ERR	Status display for the IDENTControl Compact	LED illuminates green when the IDENTControl Compact is connected to a power supply and the interface is ready for operation. LED illuminates red if there is a hardware error or a PROFINET name has been assigned and no PROFINET connection has been established. LED illuminates yellow while the IDENTControl Compact starts up. The start-up process lasts approximately 20 seconds LED flashes green if a signal is sent to the IDENTControl Compact via the "Flashing" PROFINET function or if there is an internal data overflow.
Link/Traffic	Connection/network activity for the channel	LED is off until initial communication is made via Ethernet. LED illuminates green when a connection to the network is established. LED flashes yellow at the same speed as the data being sent.
ADDR STATE	Status display for address setting	LED flashes green when the IDENTControl Compact is ready for the address to be entered using the rotary switch. LED illuminates green when one digit of the address is entered successfully using the rotary switch.

Operating controls

Description	Function	Configuration option
Rotary switch	Device address setting	0 ... F



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:

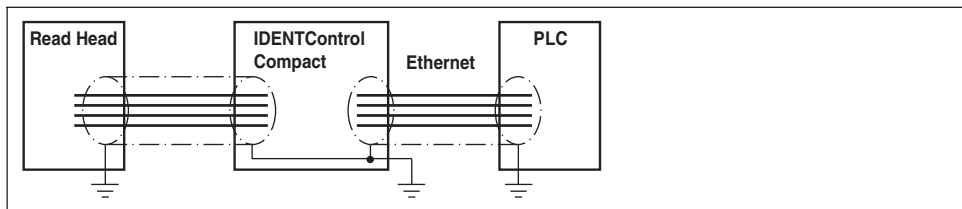
- Delivery quantity
- Device type and version in accordance with the type plate
- Accessories
- Quick start guide

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.



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



Note!

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

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

The metal enclosure of the IDENTControl Compact and the metal enclosure of the R/W heads complete the continuous 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 located within a Faraday cage.



Caution!

Electromagnetic interference

Device malfunction caused by EMC effects.

Use cables with continuous shield.



5.3 Installation

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



Note!

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

Set the rotary switch before mounting the IDENTControl Compact (see chapter 6.4).

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 enclosure:

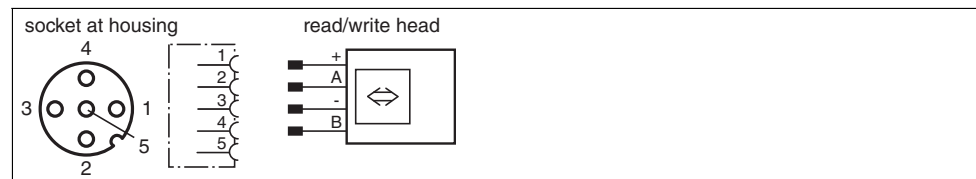


- 1 + 24 V
- 2 NC
- 3 GND
- 4 NC

Compatible connecting cable see chapter 4.2.2.

5.4.2 R/W head

You can connect either an inductive R/W head (125 kHz or 13.56 MHz) or an inductive R/W head with electromagnetic coupling (UHF with 868 MHz) to the IDENTControl Compact.



Compatible R/W head see chapter 4.1.1.



Connecting the R/W head

Connect the R/W head with compatible connecting cable to the socket on the top of the enclosure via the M12 connector.

Compatible connecting cables see chapter 4.2.1.



5.4.3 Ground connection

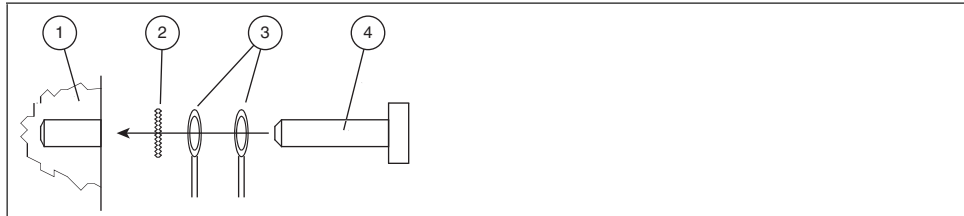
Connect the IDENTControl Compact unit to ground via a screw on the right under the housing.



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 mm².



- 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 Ethernet connection guide

Use the D-coded M12 socket and the V1SD-G-5M-PUR-ABG-V45-G cable to connect the IDENTControl Compact unit to an Ethernet network.



- 1 Tx+
- 2 Rx+
- 3 Tx-
- 4 Rx-



Caution!

Electromagnetic interference

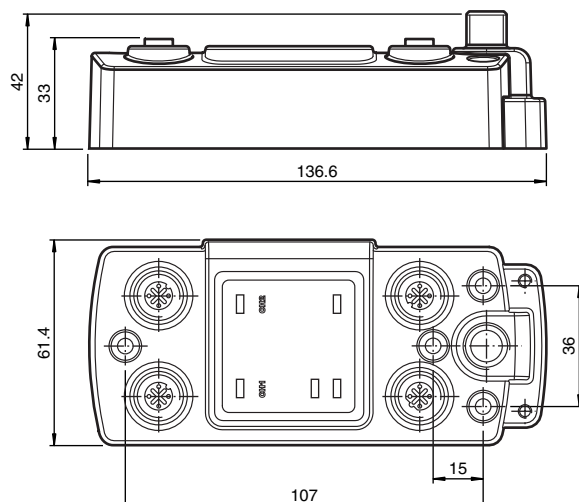
Device malfunction caused by EMC effects.

The M12 socket is connected galvanically to the grounded housing. The EtherNet/IP specification recommends not using cables with a shield connected to the plug at both ends. However, we recommend using cables with a continuous shield to avoid malfunctions.



8 Technical Specifications

8.1 Dimensions



8.2 Technical Data

General Data

Number of read/write heads	Max. 1
UL file number	E87056

Displays/Controls

Link/Traffic LED	Green: connection to the network Yellow: flashes at the same speed as the data being sent
LED 1	Status display for read/write heads Green: command to read/write head active Yellow: approx. 1 second if command is executed successfully
CH1 LED	Green: reader identified Red: configuration error
PWR/ERR LED	Green: power on Yellow: system starting Red: PROFINET bus error
Rotary switch	Address setting

Electrical Data

Rated operational voltage	20–30 V DC, PELV
Ripple	≤ 10 % at 30 V DC
Current consumption	≤ 2 A incl. read/write head
Power consumption	3.5 W without read/write heads
Galvanic isolation	Basic insulation in accordance with DIN EN 50178, rated insulation voltage 50 V _{eff}



Interface 1

Physical	Ethernet
Protocol	SMTP HTTP TCP/IP (port 10000) MODBUS/TCP EtherNet/IP PROFINET IO
Transmission rate	10 Mbit/s or 100 Mbit/s

Interface 2

Physical	Ethernet
Protocol	SMTP HTTP TCP/IP (port 10000) MODBUS/TCP EtherNet/IP PROFINET IO
Transmission rate	10 Mbit/s or 100 Mbit/s

Conformity with Standards and Directives

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

Ambient Conditions

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

Mechanical Data

Degree of protection	IP67
Connection	Read/write heads: Shielded, 4-pin, M12 connector Power supply: M12 connector Protective ground: M4 grounding screw Ethernet: M12 connector
Enclosure material	Zinc, powder-coated
Mounting	Screw mounting
Weight	Approx. 500 g



9

Troubleshooting

Source of fault	Possible cause	Remedy
The PWR/ERR LED does not illuminate.	Power supply not guaranteed.	Ensure the power supply using a 24 V DC source.
The PWR/ERR LED illuminates yellow.	The device is still booting up.	Wait until the booting process is complete.
The PWR/ERR LED flashes green. (For Ethernet/IP communication only)	Memory overflow.	Reduce the data hold time (see chapter 7.8.8).
The PWR/ERR LED illuminates red. (For PROFINET communication only)	No physical connection to the master, e.g. due to lead breakage.	Check the lead and repair if necessary.
	The assigned device name is incorrect	Configure the same device names in the master and in the device.
The Link/Act LED does not illuminate.	No physical network connection, e.g. due to lead breakage.	Check the lead and repair if necessary.
The CHx display does not appear even though the read/write head is connected to port 1.	The lead is faulty or not connected correctly.	Check the lead and repair if necessary.
	The read/write head is faulty.	Check the read/write head and repair if necessary.
The LEDs in the reader and the CHx display on the IDENTControl display are flashing.	The reader connected does not support the tag type set.	Select a tag type that is supported by the reader.
A read command (e.g. SR ...) gives the status 4 even though the syntax is correct.	An incorrect tag type (e.g. IPC02) is set for the relevant channel. The read commands only function with read/write tags and not with read only tags.	Set the correct tag type (e.g. IPC03) or "Autodetect" using the CT... command.
The SG or EG (get configuration) command gives the status 4 even though the syntax is correct.	IPC03 is not set for the relevant channel. The configuration commands only function if the read/write tag IPC03 is set and not in Autodetect mode.	Set the tag type IPC03 using the CT... command.
The website cannot be displayed.	The IP address is incorrect.	With the DHCP server: Make sure that the IP address entered in the browser corresponds with the address assigned to the device. Without DHCP server: Check the IP address entered in the browser to see whether it corresponds with the fixed IP address set in the device. Check the subnet mask in both cases.

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