PSSu WB S IDN

Programmable control systems PSS®

Contents

Contents

1 Introduction

1.1 Validity of documentation

This documentation is valid for the product **PSSu WB S IDN**. It is valid until new documentation is published.

This operating manual explains the function and operation of the programmable safety system, describes the installation and provides guidelines on how to connect the product **PSSu WB S IDN**.

Using the product **PSSu WB S IDN**:

Base station to connect the PSSuniversal system to **InduraNET p** for standard data

1.1.1 Retaining the documentation

This documentation is intended for instruction and should be retained for future reference.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

1-1

1.2 Overview of documentation

1 Introduction

The introduction is designed to familiarise you with the contents, structure and specific order of this manual.

2 Overview

This chapter provides information on the module's most important features.

3 Safety

This chapter must be read as it contains important information on intended use.

4 Function Description

This chapter describes the module's individual components.

5 Installation

This chapter explains how to install the module.

6 Wiring

This chapter describes the module's wiring.

7 Operation

This chapter explains the display elements and advises on what to do if a fault occurs.

8 Technical Details

1.3 Definition of symbols

Information in this manual that is of particular importance can be identified as follows:

DANGER!
This warning must be heeded! It warns of a hazardous situation that poses an immediate threat of serious injury and death and indicates preventive measures that can be taken.

WARNING!
This warning must be heeded! It warns of a hazardous situation that could lead to serious injury and death and indicates preventive measures that can be taken.

CAUTION!
This refers to a hazard that can lead to a less serious or minor injury plus material damage, and also provides information on preventive measures that can be taken.

NOTICE
This describes a situation in which the unit(s) could be damaged and also provides information on preventive measures that can be taken.

INFORMATION
This gives advice on applications and provides information on special features, as well as highlighting areas within the text that are of particular importance.

1 Introduction

2 Overview

2.1 Module structure

A module consists of
▶ Electronic module and
▶ Base module with
  – Screw terminals or
  – Cage clamp terminals

The base modules are the carrier units for the electronic modules and are used to connect the field wiring. The electronic modules are inserted on to the base modules and determine the module's function.

Details of the base modules that can be used are available in the "Wiring" chapter.

The **PSSu WB S IDN** module is supplied with a chip card for storing the configuration data. Additional chip cards are available as an accessory.

An antenna is required in order to operate the module. Two antenna types are available:
▶ For remote and base stations:
  PSS ANT 1 IDN
▶ For base stations only:
  PSS ANT 2 IDN

⚠ **CAUTION!**
The radio approval will be rendered invalid if a third-party antenna is used.
  ▶ InduraNET p devices should only be used with the antennas PSS ANT 1 IDN and PSS ANT 2 IDN.

The antenna is supplied with an SMA antenna cable which is 2 m long and has an impedance level of 50 Ohm. A suitable 2 m long extension cable is available as an accessory.

The chip card reader SCR 335 USB with USB cable is available as an accessory.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

2-1

2.1   Module structure

2.1.1   Module features

The module has the following features:

▸ The module terminates a PSSu system and extends the ST data bus across an **InduraNET p** radio link.

▸ As a base station the module supports up to four remote stations PSSu WR S IDN

▸ Antenna connection for **InduraNET p**

▸ The module provides connections for external supplies. The external supplies are galvanically isolated from the module bus supplies.

▸ LEDs for:
  – **InduraNET p** status per remote station
  – Module error

2.1.2   Features of InduraNET p

InduraNET p enables wireless communication on the PSSuniversal. Data from the standard section is transmitted via radio instead of the module bus. Wireless communication via InduraNET p does not need to be considered in the user program.

The module bus cycle is recreated in the remote system. This will increase the input/output reaction times of a remote system.

Each InduraNET p device is given an ID, which ensures that all subscribers are uniquely identified. Up to ten InduraNET p networks can coexist within one environment. All the settings for wireless communication are stored within the module on a chip card, which is written via a chip card reader.

2-2

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

2.1   Module structure

Schematic representation of **InduraNET p**

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

2-3
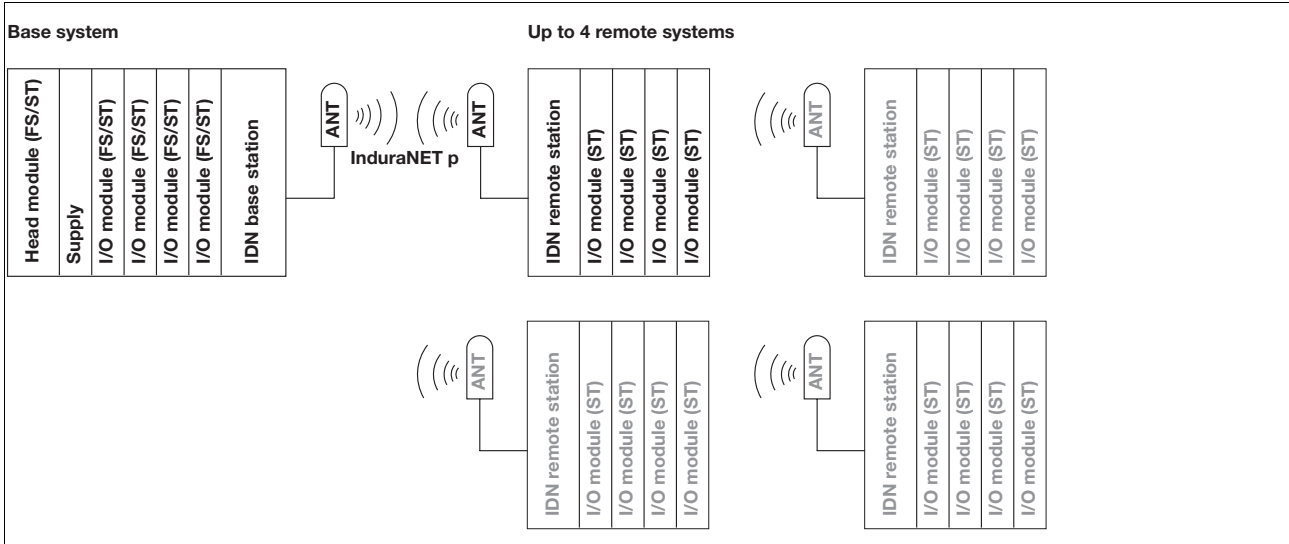
2.2   Front view
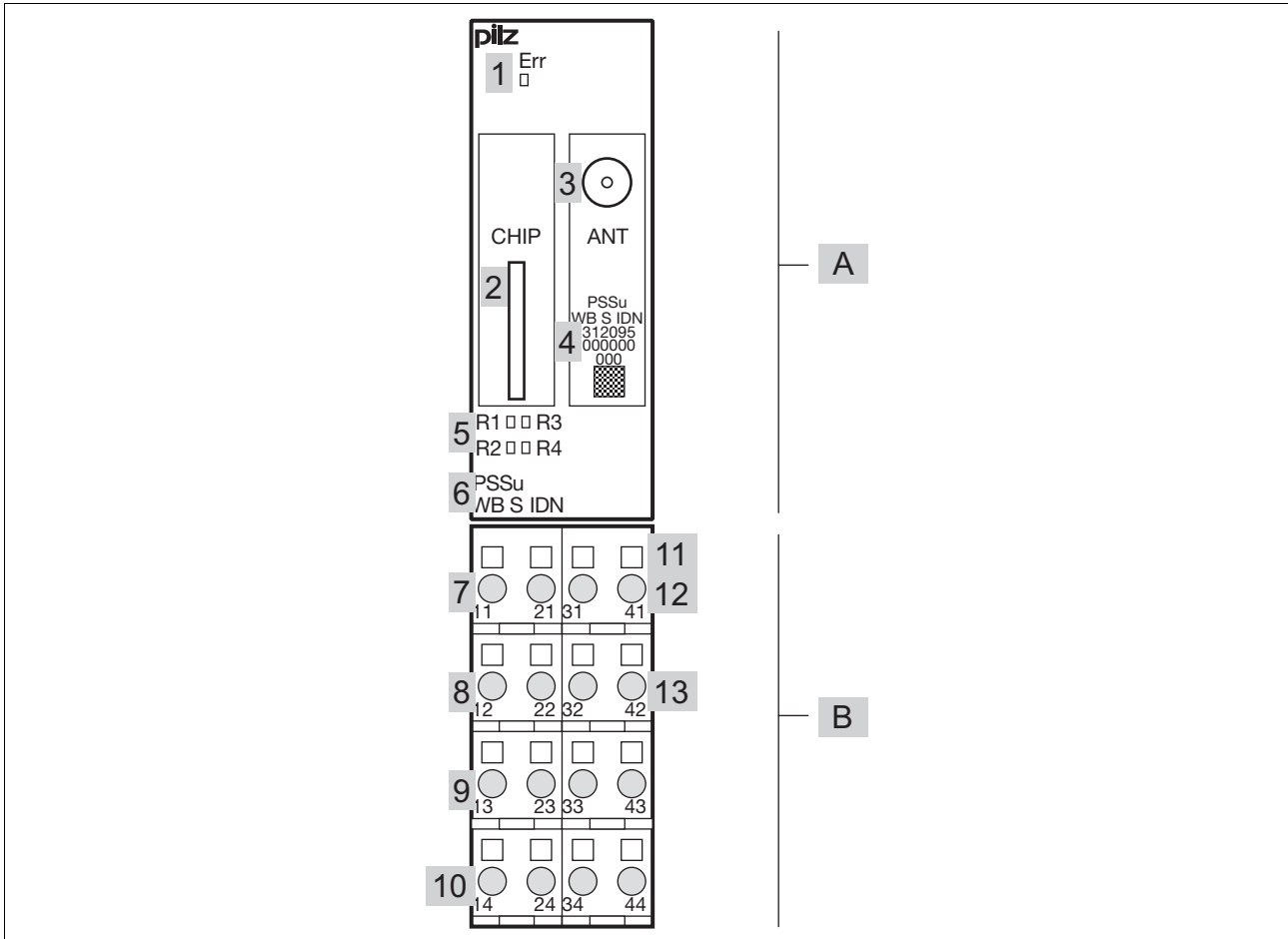
Key:

▸ A: Electronic module **PSSu WB S IDN**

▸ B: Base module

▸ 1: LED for module diagnostics

▸ 2: Chip card slot

▸ 3: Antenna connection (SMA)

▸ 4: Labelling strip with:

– Name of electronic module

– Order number

– Serial number

– Hardware version number

– 2D code

▸ 5: LEDs for the status of the remote stations

▸ 6: Name of electronic module

▸ 7: Connection level 1

▸ 8: Connection level 2

▸ 9: Connection level 3

▸ 10: Connection level 4

2.2   Front view

‣ 11: Square mounting holes (connection levels 1, 2, 3 and 4)
  – With screw to loosen/tighten the screw terminal on base modules
    with screw terminals
  – With mechanism to operate the cage clamp on base modules with
    cage clamp terminals
‣ 12: Round connection holes (connection levels 1, 2, 3 and 4) for con-
  necting the cables
‣ 13: Mounting slot for colour marker to label the connection level (con-
  nection levels 1, 2, 3 and 4)

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

2-5

3.1   Intended use

The module may be used as a base station in **InduraNET p**, for the wireless communication of ST data. It can be operated with up to four remote stations of type PSSu WR S IDN.

The module may be used to feed and extract external supplies to and from the connection terminals.

Intended use includes making the electrical installation EMC-compliant. Please refer to the guidelines stated in the "PSSuniversal Installation Manual". The module is designed for use in an industrial environment. It is not suitable for use in a domestic environment, as this can lead to interference.

The following is deemed improper use in particular:
‣ Any component, technical or electrical modification to the module
‣ Use of the module outside the areas described in this manual
‣ Use of the module outside the technical details (see chapter entitled "Technical Details")

> **INFORMATION**
> The module is supported by the PSSuniversal Configurator and the PSSuniversal Assistant from Version 1.5.
> The module is supported by PSSuniversal head modules from ST Firmware Version 12.

The **PSSu WB S IDN** module may be used in conjunction with the following base modules:
‣ PSSu BP 2/16S
‣ PSSu BP 2/16C
‣ PSSu BP-C 2/16S
‣ PSSu BP-C 2/16C

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

3-1

3.2 Safety regulations

3.2.1 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decomissioned by qualified personnel. Qualified personnel are people who, because they are:

▸ Qualified electrical engineers or
▸ Have received training from qualified electrical engineers

are suitably experienced to operate devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

It is the company's responsibility only to employ personnel who:

▸ Are familiar with the basic regulations concerning health and safety / accident prevention
▸ Have read and understood the safety guidelines given in this description
▸ Have a good knowledge of the generic and specialist standards applicable to the specific application.

3.2.2 Warranty and liability

All claims to warranty and liability will be rendered invalid if, among other things:

▸ The product was used contrary to the purpose for which it is intended
▸ Damage can be attributed to not having followed the guidelines in the manual
▸ Operating personnel are not suitably qualified
▸ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering work etc.).

3.2.3 Disposal

The product must be disposed of properly when it reaches the end of its service life.

3.3   Approvals for wireless operation

InduraNET p devices meet the requirements and specifications of the EU directive 1999/5/EU and may be operated in all European Union countries with the exception of:
▸ Hungary, Latvia, Lithuania, Poland, Romania, Slovakia, Slovenia

InduraNET p devices may also be operated in the following countries:
▸ Norway, Switzerland, Liechtenstein, Iceland
▸ Japan
▸ Canada, USA

Other countries: On request

In France, InduraNET p devices may only be operated inside.

Please comply with the provisions of ERC/REC 70-03 Appendix 3 - National Restrictions (Annex 3 Band A).

Radio approval for the antenna PSS ANT 2 IDN is in progress.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

3-3

3.3   Approvals for wireless operation

3.3.1   European approval

CETECOM ICT Services GmbH

EC Identification Number 0682

authorized by the German Government

Bundesnetzagentur

BNetzA-bS-02/51-52

to act as Notified Body in accordance with the R&TTE Directive 1999/5/EC of 9. March 1999.

EXPERT OPINION

Registration-No.:	**E815229V-EO**
Certificate Holder:	**Pilz GmbH & Co. KG**
	Felix-Wankel-Straße 2 **73760 Ostfildern** **Germany**
Product Designation:	**PSSu WB S IDN** **PSSu WR S IDN**
Product Description:	**Short Range Device - Industrial Wireless Communication System**
Product Manufacturer:	**Pilz GmbH & Co. KG**
	Felix-Wankel-Straße 2 **73760 Ostfildern** **Germany**

Essential requirements	Specifications / Standards	Submitted documents	Result
Safety (R&TTE, Article 3.1a)	EN 60950-1:2001, First Edition+A11 :2004	Test Report	conform
EMC (R&TTE, Article 3.1b)	EN 301 489-1 V1.6.1 (2005-09) EN 301 489-3 V1.4.1 (2002-08)	Test Report	conform
Radio spectrum (R&TTE, Article 3.2)	EN 300 328 V1.7.1 (2006-05)	Test Reports	conform

Marking: **The product shall be marked with CE, our notified body number and the Class II identifier (Alert sign) as shown right hand.**   **C E 0682 ⊙**

The scope of this evaluation relates to the submitted documents only.
The certificate is only valid in conjunction with the following **number** of annexes.

Number of annexes: **1**

Saarbrücken, 2008-01-29
Place, Date of Issue

Signed by Franz Machitsch
Notified Body

CETECOM ICT Services GmbH, Untertürkheimer Straße 6-10, 66117 Saarbrücken, Germany
http://www.cetecom-ict.de

3.3 Approvals for wireless operation

Product Characteristics:

Frequency range	:	2400 – 2483.5 MHz
Output power (EIRP)	:	≤ 20 dBm
Type of modulation	:	GFSK
Number of Channels	:	75 (one channel selected and allocated during boot process)
Antenna	:	External Antenna with SMA connector and 2 m of coax-cable InduraNET p
Temperature range	:	-20°C to +55°C
Power supply	:	24 VDC

Conformity Details:

Evaluated test reports

Requirement	Standard, test report number, date & laboratory
Safety	**EN 60950-1:2001, First Edition+A11 :2004** No. : 2 4790 01 08/07 dated 2008 01 29 and issued by CETECOM ICT Services GmbH
EMC	**EN 301 489-1 V1.6.1 (2005-09)** **EN 301 489-3 V1.4.1 (2002-08)** -No. : 2-4790-01-09/07 dated 2007-11-19 and issued by CETECOM ICT Services GmbH
Radio spectrum	**EN 300 328 V1.7.1 (2006-05)** -No : 2-4790-01-02/07 dated 2007-12-18 and issued by CETECOM ICT Services GmbH -No. : 2-4790-01-03/07 dated 2007-12-18 and issued by CETECOM ICT Services GmbH

******

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

3-5

3.3   Approvals for wireless operation

3.3.2   FCC approval

FCC ID: VT8-IDN01
IC: 7482A-IDN01

Please note the following when operating the device in the USA and Canada:

Installation by professionals only!

This device complies with Part 15 of the FCC Rules and with RSS-210 of Industry Canada. Operation is subject to the following two conditions:
▸ (1) This device may not cause harmful interference, and
▸ (2) This device must accept any interference received, including interference that may cause undesired operations.

This Class B digital apparatus complies with Canadian ICES-003.

Changes or modifications made to this equipment not expressly approved by Pilz may void the FCC authorisation to operate this equipment.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.

This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications.

However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
▸ Reorient or relocate the receiving antenna.
▸ Increase the separation between the equipment and receiver.
▸ Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
▸ Consult the dealer or an experienced radio/TV technician for help.

3.3   Approvals for wireless operation

⚠ **CAUTION!**
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 20 cm between the radiator and your body. The transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

3-7

4.1   Module features

4.1.1   Integrated protection mechanisms

When the PSSu E F PS1(-T) is used to supply the system, the module supply is buffered for 20 ms if the supply voltage is interrupted.

The module provides the following diagnostic data:
▸ Module status
▸ Module error

4.1.2   Base station in InduraNET p

The module is a base station in **InduraNET p** and extends the PSSu module bus across a radio link. The base station is always the termination module in a base system. The base station can communicate with up to four remote stations.

The module provides connections for external supplies.
▸ The module does not switch the external supplies.
▸ The external supplies are galvanically isolated from the module bus supplies and from each other.
▸ The module has no current limitation on the external supplies.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

4-1

4.2   InduraNET p

Properties of wireless communication
- ▸ Frequency range 2.4 GHz ISM band
- ▸ Strong immunity to signals from other wireless services
- ▸ CFM (Coexistence Frequency Management) guarantees that InduraNET p devices coexist without problem with other radio-based systems.
  - InduraNET p devices do not use non-overlapping WLAN channels.
  - InduraNET p devices do not transmit until they have scanned their frequency range (Listen before Talk).
  - InduraNET p devices switch to free channels in order to avoid collisions.

Properties of the antenna
- ▸ The antenna is designed to IP54. It can be installed on a flat surface using one hole mounting.
- ▸ The SMA antenna cable is 2 m long and has an impedance level of 50 Ohm.
- ▸ The max. operating range depends heavily on surface reflection and on the transmissivity of surrounding materials. Approximate guidelines are:
  - 10 m ... 100 m indoors
  - 100 m ... 1000 m outdoors
- ▸ Two antenna types are available:
  - For remote and base station:
    PSS ANT 1 IDN is optimised for typical indoor applications.
  - For base station only:
    PSS ANT 2 IDN with two redundant antennas in one housing is optimised for high availability in difficult environmental conditions, e.g. for mobile applications.

4.3   Chip card

The user configures the data for all the InduraNET p modules in the PSSuniversal Assistant and then downloads this configuration data to the chip card via the USB port. The chip card reader SCR 335 USB with USB cable is available as an accessory for this purpose.

ℹ️ **INFORMATION**
The module will not start up if the chip card is missing or is written incorrectly.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

4-3

5   Installation

5.1   General installation guidelines

Please also refer to the PSSuniversal Installation Manual.

The description below assumes that the head module and supply voltage module are already installed.

⚠ **CAUTION!**
Damage due to electrostatic discharge!
Electrostatic discharge can damage components. Ensure against discharge before touching the product, e.g. by touching an earthed, conductive surface or by wearing an earthed armband.

5.1.1   Dimensions
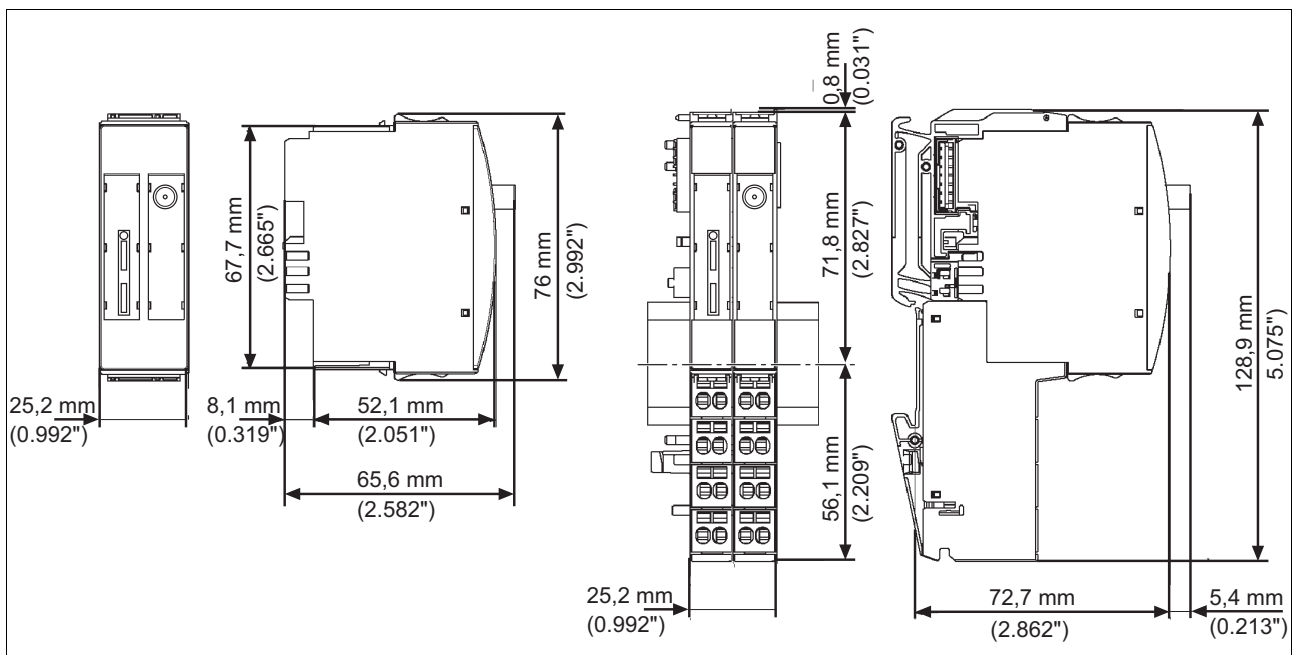
A min. 15 cm clearance is required above the mounting rail in the control cabinet to connect the antenna cable on the module.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

5-1

5.1 General installation guidelines

Dimensions of the antenna ANT1/ANT2 (ANT 2 for base station only):
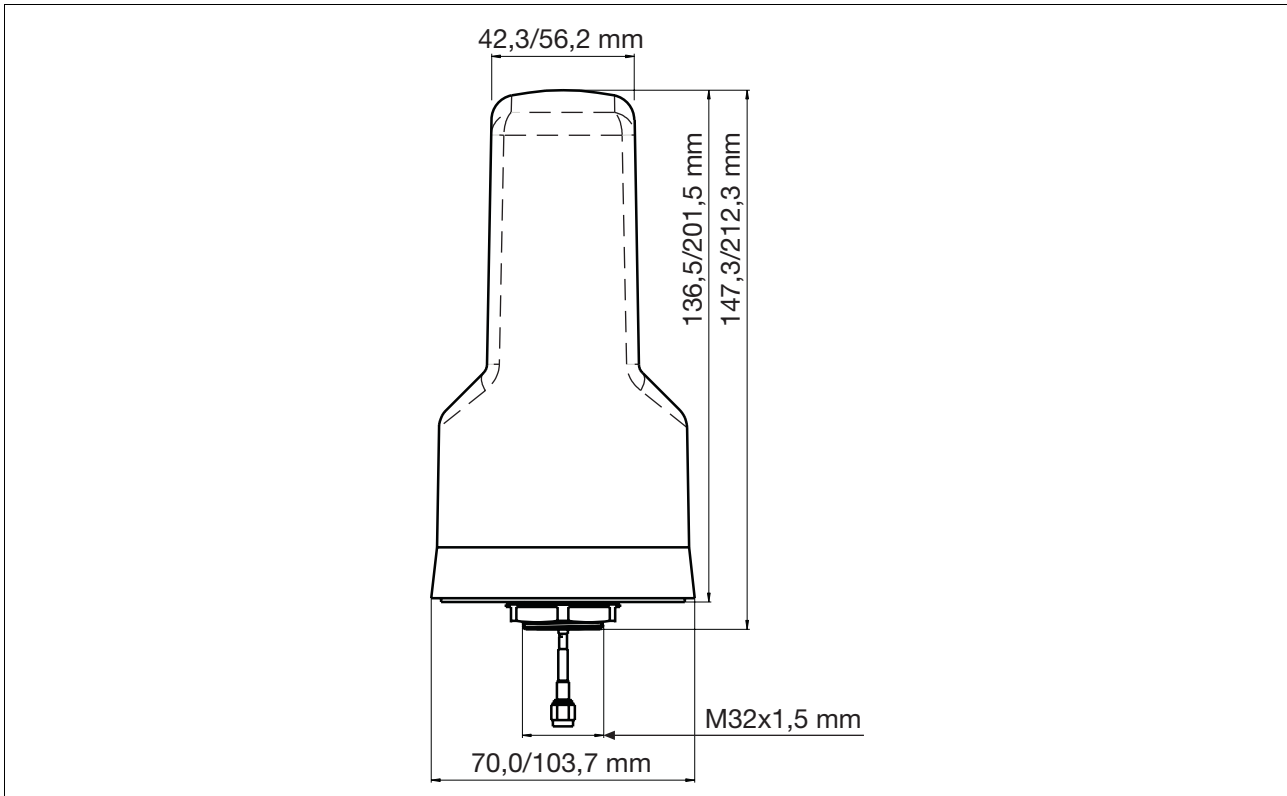
5.2 Install base station

The base station always provides the termination for a PSSuniversal system. No further modules may be positioned to the right of the base station.

Prerequisite:
▸ The head module must be installed.
▸ A base module for a supply voltage module is always connected to the right of the head module.
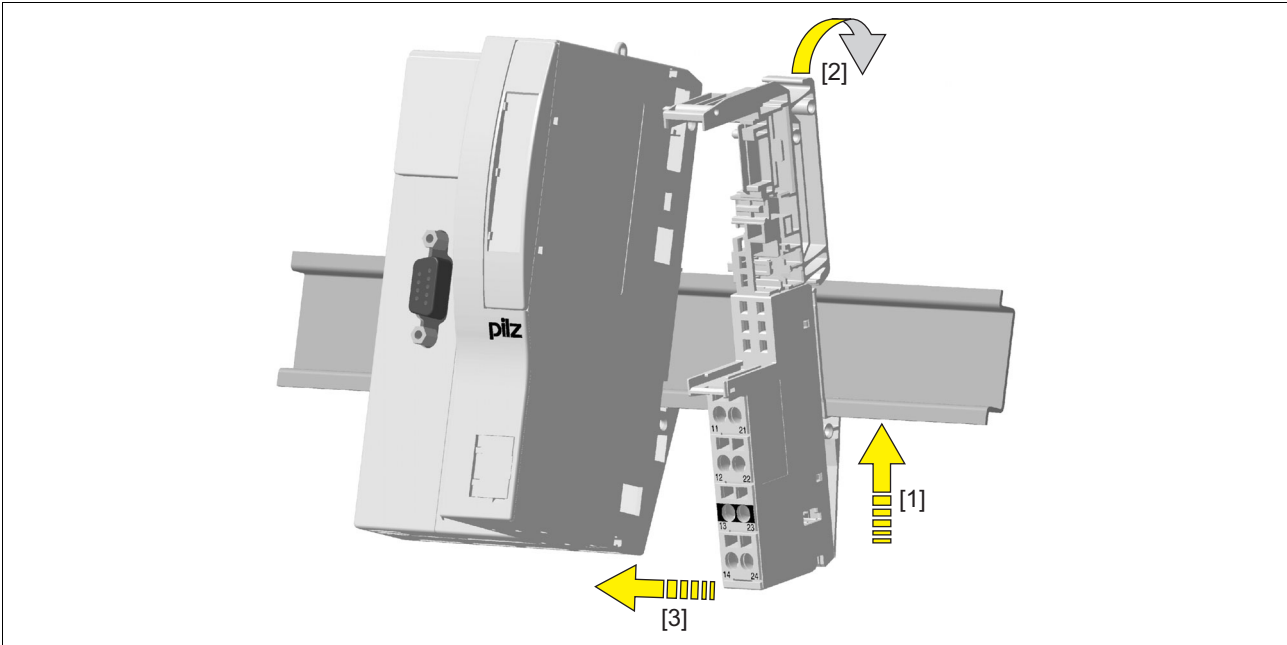
Please note:
▸ For mechanical reasons it is not possible to mix base modules with screw terminals and base modules with cage clamp terminals.
▸ All contacts should be protected from contamination.
▸ The mechanics of the base modules are designed for 50 plug in/out cycles.

Procedure:
▸ We recommend that you wire up the base modules before inserting the electronic modules.
▸ Slot the groove on the base module on to the mounting rail from below [1].
▸ Push the base module back [2] until you hear it lock into position.
▸ On the mounting rail, slide the base module to the left until you hear the two lateral mounting hooks on the adjacent module lock into position [3].

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

5-3

5.2 Install base station

Schematic representation:

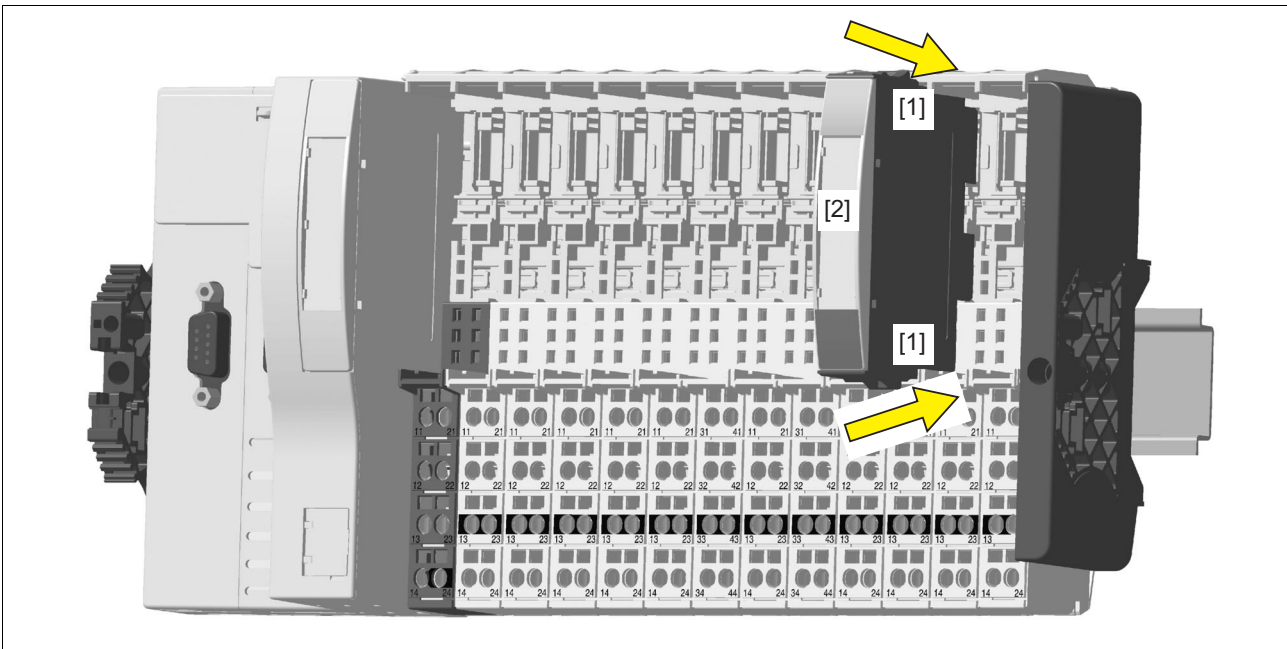## 5.3   Inserting and removing an electronic module

Please note:
- ▸ Only insert on to base modules that are already installed.
- ▸ Preferably these base modules should be ready wired.
- ▸ Electronic modules with outputs may only be inserted and removed when the load is switched off. Unforeseeable error reactions may be triggered if modules are inserted and removed under load.
- ▸ When an electronic module is plugged into a base module for the first time, one part of the coding element remains on the electronic module, while its counterpart is fixed on to the base module. This is how the base module is coded.
- ▸ The mechanics of the electronic modules are designed for 50 plug in/ out cycles.

5.3.1   Inserting an electronic module

Procedure:
- ▸ The electronic module must audibly lock into position [1].
- ▸ Mark the electronic module using the labelling strips [2].

Schematic representation:

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

5-5

5.3   Inserting and removing an electronic module

5.3.2   Removing an electronic module

Procedure:
▸ Press the locking mechanisms [1] together simultaneously.
▸ Pull out the electronic module [2].

Schematic representation:
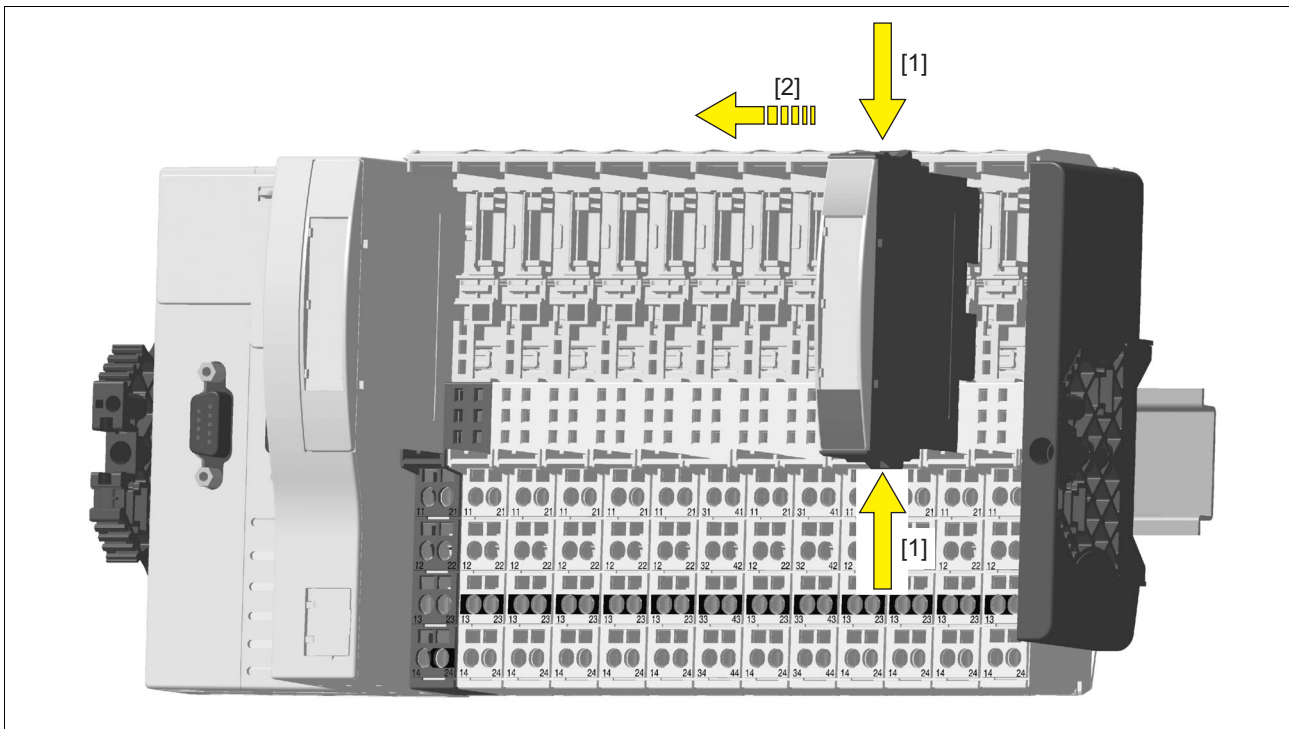
### 5.3.3   Changing an electronic module during operation

INFORMATION
After a module has been changed during operation, in some circumstances the remote stations may no longer be detected correctly.
Only change the module in the off state!

5.4 Antenna assembly

As with all radio signals, the InduraNET p signals will mainly propagate in the first Fresnel zone. The Fresnel zone is a spheroid, in whose focus the antennas are located.

Schematic representation:
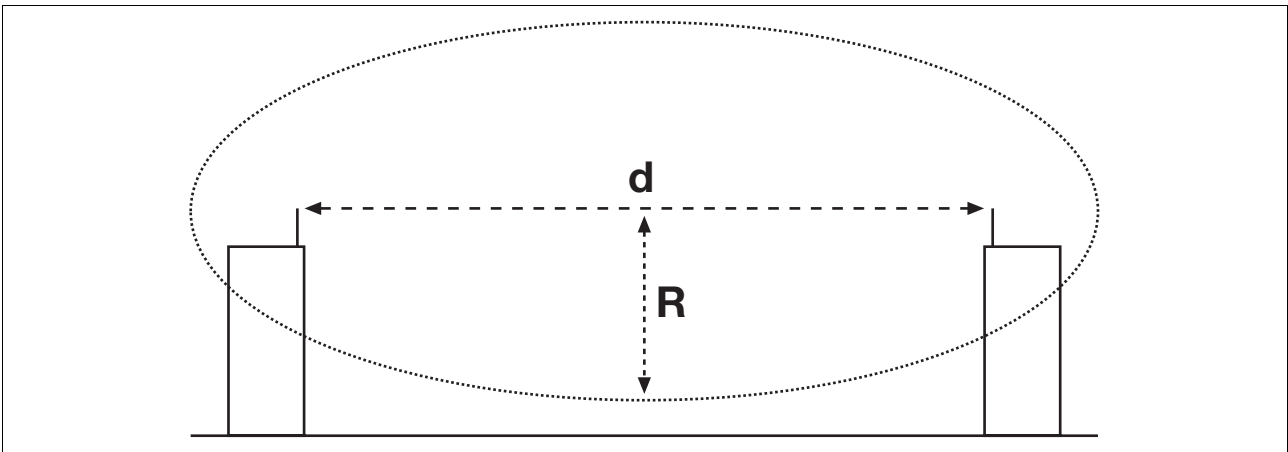
The size of the Fresnel zone depends on the wavelength of the radio signal and the distance of the antennas.

At 2.4 GHz, approximate values for the Fresnel zone's radius R in relation to antenna distance d:

d [m]	5	8	12	16	20	30	50	75	100
R [m]	0,4	0,5	0,6	0,7	0,8	0,9	1,3	1,5	1,8

5.4 Antenna assembly

Reception will deteriorate if any objects or parts of the building lie within the Fresnel zone. When positioning the antennas it is possible to distinguish between three scenarios:
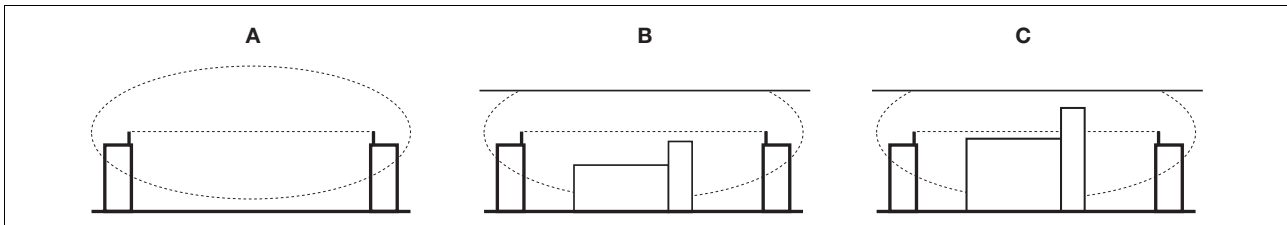
▸ A: The Fresnel zone is not adversely affected.
– Optimum conditions
▸ B: The Fresnel zone is adversely affected by the low ceiling and by an object between the antennas. There is visual contact between the antennas (straight, dotted line).
– These Fresnel zone encroachments will reduce the reception quality. The signals' operating range will be shorter.
▸ C: There is no visual contact between the antennas.
– Unfavourable conditions. The signals are only transmitted indirectly and via reflections.

Please note also:
▸ The antenna are designed for use inside buildings, particularly on factory floors.
▸ The optimum installation height of the antennas is 1.80 m – 2.00 m, e.g. on top of a control cabinet.
▸ The optimum orientation of the installed antenna is vertical on a horizontal surface.
▸ People standing within the Fresnel zone have a particularly adverse effect on reception quality.
▸ Reflections from walls (concrete, metal) lead to local signal quenching.
– A diverse antenna (PSS ANT 2 IDN, available as an accessory) can help to improve reception quality on mobile, remote stations.

5.5   Install antenna

The antenna is positioned on the control cabinet or on a flat surface, using one hole mounting. The InduraNET p antenna cable is a 2 m long coaxial cable for high frequency applications with an impedance level of 50 Ohms.

NOTICE
InduraNET p devices may be damaged if they are operated without an antenna.
▸ Always operate the **PSSu WB S IDN** device with the antenna connected.

CAUTION!
The radio approval will be rendered invalid if a third-party antenna is used.
▸ InduraNET p devices should only be used with the antennas PSS ANT 1 IDN and PSS ANT 2 IDN.

Please refer to the section entitled "Antenna assembly" for information on providing sufficient reception.

Procedure:
▸ In the control cabinet ceiling, punch or drill a hole suitable to take an M32 thread fitting (> 32 mm diameter).
▸ Feed the antenna cable through the punched hole and assemble the antenna.
▸ Screw on the antenna using the nut on the M32 thread.
▸ Install the antenna cable from the antenna to the InduraNET p station.
  – The minimum bending radius is 15 mm.
  – The antenna cable must not be bent or trapped.
  – The antenna cable must not be split and then rejoined.
  – Excess cable must not be wound like a coil. Excess cable should be looped.
▸ Screw the antenna cable on to the socket labelled "ANT" on the InduraNET p station.
  – The torque on the SMA screw connection is 0.7 – 1.1 Nm. You can achieve the appropriate torque by tightening the screw firmly by hand.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

5-9

5.5   Install antenna

The 2 m extension cable attenuates the signal by approx. 3 dB. Attenuation of 3 dB halves the transmitted output. For this reason, only use the extension cable where reception conditions are good and operating ranges are short.

▸ For reasons of electromagnetic compatibility, the extension cable may only be laid with group 1 cables (see PSSuniversal Installation Manual)
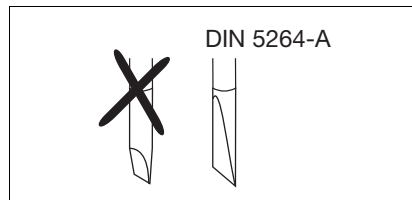
6.1   General wiring guidelines

Please note:

▸ The maximum current load for the periphery supply on the module bus is 10 A.
▸ The external power supplies must comply with the current applicable standard EN 60950-1, EN 61140, EN 50178 or EN 61558-1.
▸ Use copper wiring.

6.1.1   Mechanical connection of the base modules

Procedure:

▸ Use a flat blade screwdriver (DIN 5264-A)!

DIN 5264-A

▸ Strip the wire back 8 mm.
▸ If necessary, label the connection level with a colour marker [3].
▸ Base module with screw terminals:
 – Use a screwdriver to loosen the screw on the screw terminal [1]
 – Insert the stripped cable into the round fixing hole [2], as far as it will go.
 – Tighten up the screw on the screw terminal.
 – Check that the cable is firmly seated.
▸ Base module with cage clamp terminals:
 – Insert the screwdriver [4] into the square hole [1].
 – Insert the stripped cable into the round fixing hole [2], as far as it will go [5].
 – Pull out the screwdriver [6].
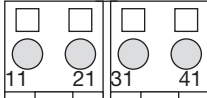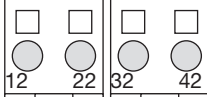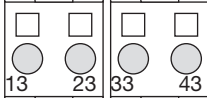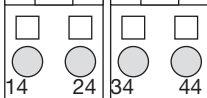 – Check that the cable is firmly seated.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
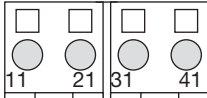Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de
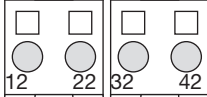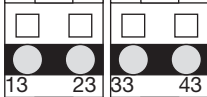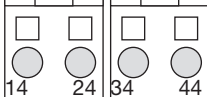
6-1
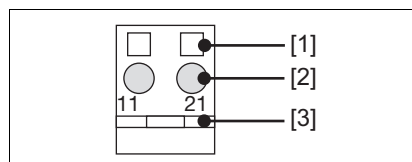
6.1 General wiring guidelines
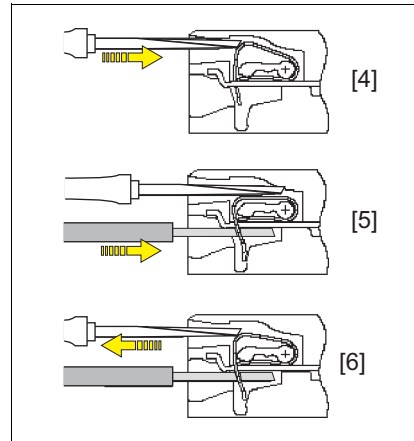
Please note:

▸ The minimum cable cross section for field connection terminals on the base modules is 0.14 mm^2 (AWG26)

▸ The maximum cable cross section for field connection terminals is:
  – Digital inputs: 1.5 mm^2 (AWG16)
  – Digital outputs: 2.0 mm^2 (AWG14)
  – Inputs/outputs on the counter modules: 1.5 mm^2 (AWG16)
  – Analogue inputs/outputs: 1.5 mm^2 (AWG16)
  – Communication cables: 1.5 mm^2 (AWG16)
  – Test pulse outputs: 1.5 mm^2 (AWG16)
  – Power supply: 2.5 mm^2 (AWG12)
  – Functional earth: 2.5 mm^2 (AWG12)

▸ On base modules with screw terminals:
  – If you use a multi-strand cable to connect the I/Os, it is recommended that you use ferrules conforming to Parts 1 and 2 of DIN 46228, 0.14 ... 1.5 mm^2, Form A or C, although this is not essential. To crimp the ferrules you can use crimp pliers (crimp form A or C) conforming to EN 60947-1, such as the PZ 1.5 or PZ 6.5 from Weidmüller, for example.

▸ Use copper wiring.

6.2 Terminal configuration

Base module	Terminal configuration
Screw terminals: PSSu BP 2/16S Cage clamp terminals: PSSu BP 2/16C	Without C-rail: 11- 21: Potential P1 (11-21 linked internally) 12-22: Potential P2 (12-22 linked within the base module) 13-23: Potential P3 (13-23 linked within the base module) 14-24: Potential P4 (14-24 linked internally) 31-44: Not connected 32-42: Not connected 33-43: Not connected 34-44: Not connected
Screw terminals: PSSu BP-C 2/16S Cage clamp terminals: PSSu BP-C 2/16C	With C-rail: 11- 21: Potential P1 (11-21 linked internally) 12-22: Potential P2 (12-22 linked within the base module) 13-23-33-43: C-rail supply (13-23-33-43 linked within the base module) 14-24: Potential P4 (14-24 linked internally) 31-44: Not connected 32-42: Not connected 34-44: Not connected

7 Operation

7.1 Messages

A module error is displayed via the "Err" LED (see section entitled "Display elements"), signalled to the head module and then entered in the head module's error stack.

The module can detect the following errors:

Module error	Explanation	Remedy
Start-up error	Error as the PSSu system starts up.	Change faulty module.
Configuration Error	Incorrect module type configured.	The configured hardware registry does not match the actual hardware registry.
ST communication error	Error in ST communication with the head module.	Change faulty module.
Bus termination error	There is no end bracket.	Install a terminating plate with integrated end angle.

Pilz GmbH & Co. KG, Sichere Automation, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, Telefax: +49 711 3409-133, E-Mail: pilz.gmbh@pilz.de

7-1
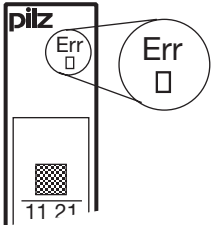
7.2 Display elements

Key:

☼	LED on
◐	LED flashes
●	LED off

7.2.1 Display elements for InduraNET p diagnostics

The module has an LED for displaying errors ("Err" LED).

	LED			Key
	Name	Colour	Status	
	Err	- - -	●	No error
		Red	◐	Chip card error
		Red	☼	Error when comparing the actual/registered hardware on the remote systems

7.2   Display elements

Each remote station is assigned an LED to display the connection status (LEDs "R1", "R2", "R3" and "R4").

	Name	Colour	Status	Signal	Target
	R1	- - -	●	No data transfer	Remote station 1
		Green		Establishing a connection or connection disrupted.	
		Green		Data is being transmitted	
	R2	- - -	●	No data is being transmitted/no remote system is configured	Remote station 2
		Green		Establishing a connection or connection disrupted.	
		Green		Data is being transmitted	
	R3	- - -	●	No data is being transmitted/no remote system is configured	Remote station 3
		Green		Establishing a connection or connection disrupted.	
		Green		Data is being transmitted	
	R4	- - -	●	No data is being transmitted/no remote system is configured	Remote station 4
		Green		Establishing a connection or connection disrupted.	
		Green		Data is being transmitted	

Device panel labels:

pilz
Err

CHIP   ANT

000000 000

R1 ☐ ☐ R3
R2 ☐ ☐ R4

ℹ INFORMATION

After a restart the InduraNET p configuration data is loaded from the chip card. This process lasts approximately 5 s. During this time the LEDs will flash in quick succession.

8.1   Technical details

Technical details	PSSu WB S IDN
Application range	**Standard**
Module's device code	**0005h**
Electrical data	
Internal supply voltage	
Supply voltage range of module supply	**4.8 - 5.4 V**
Current and power consumption from module supply	
Module's current consumption	**107 mA**
Module's power consumption	**0.55 W**
InduraNET p interface	
Scope	**Standard applications**
Application in accordance with	**ARIB STO-T 66 (19,2)**, **EN 300328 V1,7,1**, **EN 301489-1 V1,6,1**, **EN 301489-3 V1,4,1**, **FCC Part 15-249**, **IEC 60950**
Working frequency range	**2,405 - 2,479 MHz**
Channel spacing	**1 MHz**
Number of channels	**75**
Modulation	**GFSK**
Frequency deviation	**-160 - 160 kHz**
Typ. transmitter output EIRP	**18 dBm/64 mW**
Max. transmitter output EIRP	**20 dBm/100 mW**
Receiver type	**Superhet**
Max. receiver sensitivity when PER=0.1%	**-90 dBm**
Frequency stability	**-2.5 - 2.5 ppm**
Intermediate frequency	**$f_{ZF}=f_{LO}-f_{RX}=(8/7*f_{RX}+2MHz)-f_{RX}$**
Environmental data	
Climatic suitability	**EN 60068-2-14**, **EN 60068-2-1**, **EN 60068-2-2**, **EN 60068-2-30**, **EN 60068-2-78**
Ambient temperature	**0 - 60 °C**
Storage temperature	**-25 - 70 °C**
Climatic suitability in accordance with **EN 60068-2-30**, **EN 60068-2-78**	**93 % r. h. at 40 °C**
Condensation	**no**
EMC	**EN 55011: class A**, **EN 61000-4-2**, **EN 61000-4-3**, **EN 61000-4-4**, **EN 61000-4-5**, **EN 61000-4-6**, **EN 61131-2**
Vibration to **EN 60068-2-6**	
Frequency	**10 - 60 Hz**
Max. acceleration	**1g**
Shock stress **EN 60068-2-27**	**15g**
	11 ms
Protection type	
Mounting (e.g. cabinet)	**IP54**
Housing	**IP20**
Terminals	**IP20**
Airgap creepage in accordance with **EN 60664-1**	
Overvoltage	**II**
Pollution degree	**2**
Mechanical data	
Housing material	
Front	**PC**
Bottom	**PC**

8.1   Technical details

Mechanical data	
Dimensions	
Height	**76.0 mm**
Width	**25.4 mm**
Depth	**60.2 mm**
Colour of front plate	**dark grey**
Weight	**57 g**

60
1948-2008
AUTOMATION

ÖKOPROFIT

Deutscher
Akkreditierungs
Rat
DAR
DAT - I - 010/05
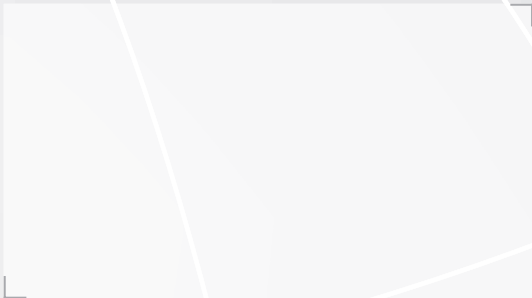
DIN EN ISO 9001
LQP
CERTIFIED QUALITY SYSTEM
REG. NO. 2462

▶ ...
In many countries we are
represented by sales partners.

Please refer to our homepage
for further details or contact our
headquarters.

Pilz GmbH & Co. KG
Sichere Automation
Felix-Wankel-Straße 2
73760 Ostfildern, Germany
Telephone: +49 711 3409-0
Telefax: +49 711 3409-133
E-Mail: pilz.gmbh@pilz.de

▶ www
www.pilz.com

▶ Technical support
+49 711 3409-444

pilz