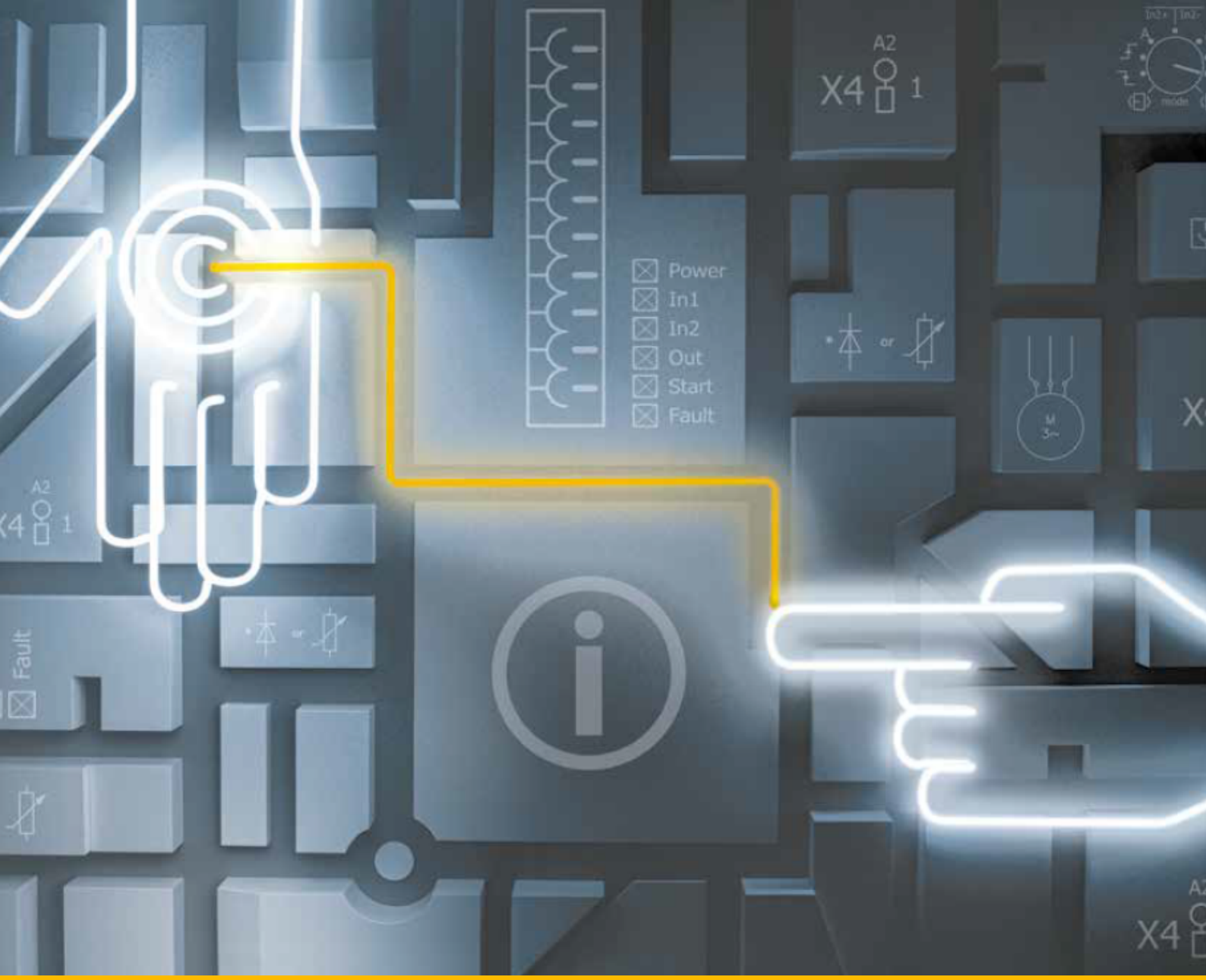


PSS u2 P12 F/S -R

PILZ
THE SPIRIT OF SAFETY

Operating Manual-1007182-EN-01

- PSS u2 in the automation system PSS 4000

This document is the original document.

Where unavoidable, for reasons of readability, the masculine form has been selected when formulating this document. We do assure you that all persons are regarded without discrimination and on an equal basis.

1 Introduction

1.1 Validity of documentation

This documentation is valid for the product PSS u2 P12 F/S -R from Version HW 1.2, FW 1.28.0.

This operating manual explains the function and operation, describes the installation and provides guidelines on how to connect the product.

1.2 Using the documentation

This document is intended for instruction. Only install and commission the product if you have read and understood this document. The document should be retained for future reference.

1.3 Terminology

PSS u2 system

A PSS u2 system consists of a PSS u2 head module, main voltage supply module and optional PSS u2 electronic modules with backplanes.

PSS u2 in the automation system PSS 4000

A PSS u2 system can be used in the automation system PSS 4000. A PSS u2 system is a 2nd generation device in the automation system PSS 4000.

The configuration is performed in the tool PAS4000.

1.4 Definition of symbols

Information that is particularly important is 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 product or devices could be damaged and also provides information on preventive measures that can be taken. It also highlights areas within the text that are of particular importance.

INFORMATION

This gives advice on applications and provides information on special features.

2 Overview

2.1 Module features

The head module is part of the automation system PSS 4000 and belongs to the performance class "PSS 4000 I/O+". It can be used to connect a PSS u2 system to SafetyNET p.

The head module has the following features:

- Enables the PSS u2 system to be used as a modular, decentralised I/O module
- Preprocessing of I/O signals
- 2 free switch ports for connection to SafetyNET p
- One FS resource
- microSD card used to store the device project and the naming data
- Reset button
  - For warm reset
  - To transfer the naming data and/or device project from the microSD card to the device memory
  - Perform recovery mode
- Status LEDs
- Supports FS and ST modules in the PSS u2 system
- **R-type**:
  For railway applications (increased environmental requirements)

2.2 Front view

Front view of head modules with an RJ45 female connector

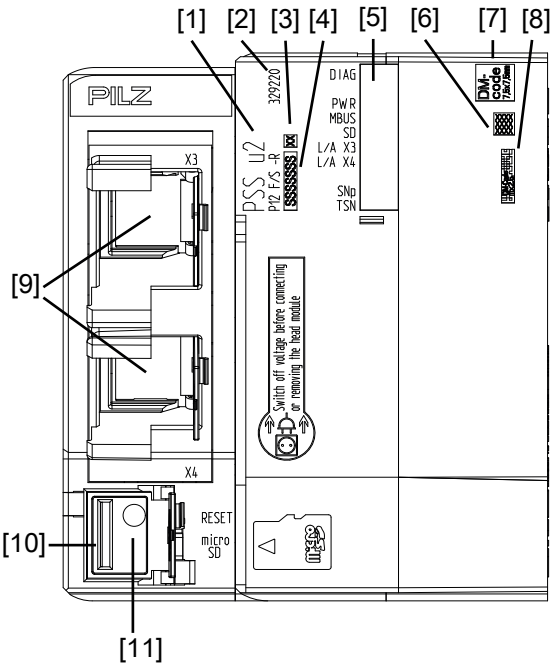


Fig.: Front view PSS u2 P12 F/S -R

Legend

[1] Product name

[2] Order number

[3] Hardware version

[4] Serial number

[5] LEDs for status display

[6] Devices MAC address

[7] 2D code product information

[8] 2D code MAC address

[9] RJ45 female connector

[10] Slot for micro SD card (microSD card not included in the scope of delivery of the unit)

[11] Reset button

2.3 Side view right-hand

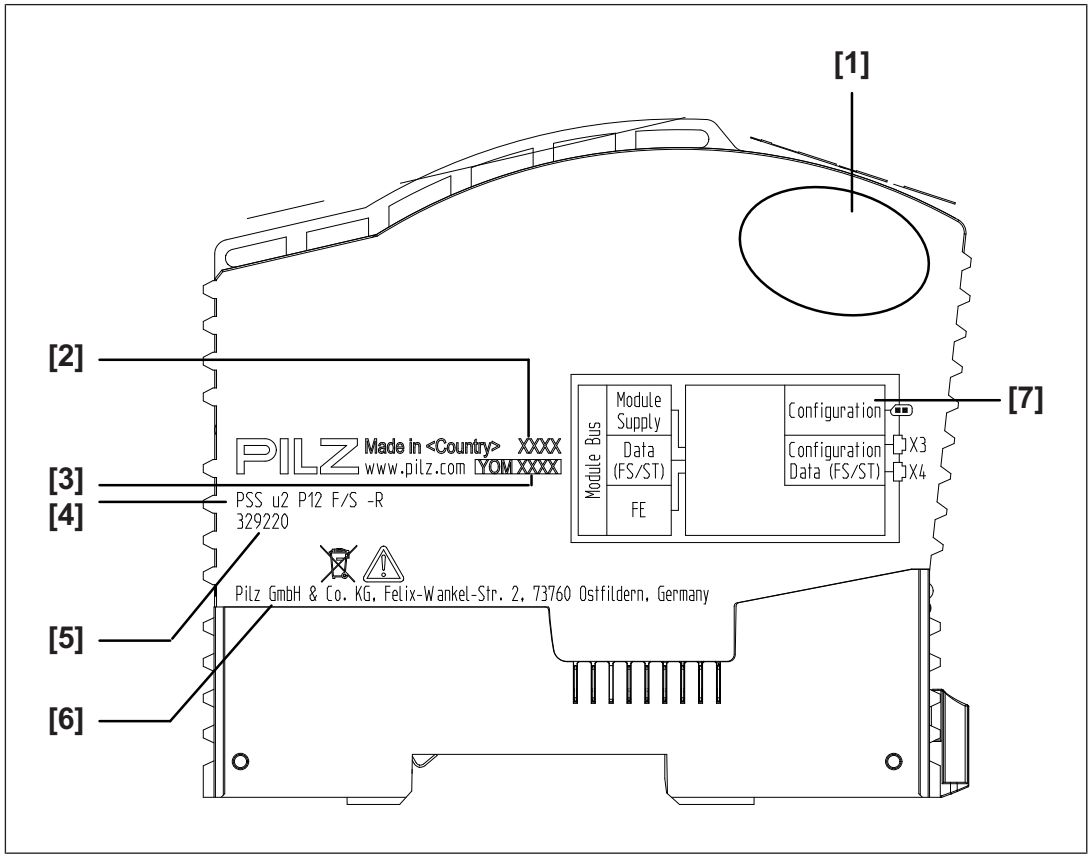


Fig.: Side view right-hand head module PSS u2 P12 F/S -R

Legend

[1] Placeholder for approval marking

[2] Production site

[3] "YOM" year of manufacture

[4] Product name

[5] Order number

[6] Manufacturer and address

[7] Block diagram

3 Safety

3.1 Intended use

Use in a PSS u2 system

The module is suitable for use in safety and non-safety-related applications with **SafetyNET p**.

The head module may only be used in a project in which there is at least one PSS u2 system of performance class PSS 4000 PLC, i.e. a PSS u2 system with a head module PSS u2 P42 F/S -R.

Install the head module in a protected environment. Example: Protected inside space or control cabinet with protection class see Technical details [📖 32]. Make sure that only authorised personnel have access to the PSS u2 system.

The module PSS u2 P12 F/S -R may only be used in the PSS u2.

Module's function

- Enables the PSS u2 system to be used as a modular, decentralised I/O module
- Preprocessing of I/O signals

Application areas

- The module is suitable for use where there are increased environmental requirements and railway applications (see Technical Details).
- Condensing humidity is permitted in operation.
- Depending on the selected railway architecture (see system description Safety architectures for railway applications (1006614)) the requirements of EN 50129 up to SIL 3 or SIL 4.

The modules have the UL fire class UL94-V2.

The module is intended for use in railway applications. Interference may occur if used in other areas.

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 operating manual,
- Any use of the module that is not in accordance with the technical details.

Firmware

- The module can be used with any firmware version when the specified conditions are met (see Display elements). The user must ensure that these conditions are met:
  - The firmware has been officially released by Pilz.
  - The firmware has not been withdrawn by Pilz in the meantime.
  - The firmware has been checked by a notified body for the standard applicable for the intended use and the successful check has been confirmed.

Operating height

The maximum permitted operating height depends on the respective application area (see Technical Details).

With reference to the standard IEC 61131-2 the values stated in the technical details for ambient temperature are reduced at heights >2000 m operating height above sea level (see Supplementary data [📖 35]).

EMC-compliant installation

Intended use includes making the electrical installation EMC-compliant. Follow the instructions in the "Installation Manual PSS u2 in the Automation System PSS 4000".

Software tools

The module is supported by:

- PAS4000, from Version 1.28.0

INFORMATION

We recommend that you always use the latest version of the software tool (download from www.pilz.com).

3.1.1 Third-party manufacturer licence information

The product contains open source software, whose terms of use could further limit the product's application area. It is essential that you observe the third-party manufacturer licence information.

Further information is available in the document „Third-party manufacturer licence information PSS 4000-exclusive devices“ (document number 1003883) at www.pilz.com.

3.2 Safety regulations

3.2.1 Additional documents that apply

Please read and take note of the following documents:

- Installation Manual PSS u2 in the automation system PSS 4000 (1006253)
- System Description PSS 4000 (1001467)
- Product Changes PSS 4000 (1001740)

With railway applications you should also refer to:

- Safety Manual, Safety Architectures for Railway Applications (1006614)

You will need to be conversant with the information in these documents in order to fully understand this operating manual.

3.2.2 Safety assessment in railway applications (PSS u2 in the automation system PSS 4000)

Before using a device, a safety assessment with risk assessment and risk analysis is required.

Using the architectures defined in the system description "Safety architectures for railway applications", the product fulfils the functional safety requirements in accordance with EN 50126/EN 50129. However, this does not guarantee the functional safety of the overall railway application/plant. To achieve the relevant safety level of the overall railway application's/plant's required safety function, each safety function needs to be considered separately.

3.2.3 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, decommissioned and maintained by persons who are competent to do so.

A competent person is a qualified and knowledgeable person who, because of their training, experience and current professional activity, has the specialist knowledge required. In order to inspect, assess and handle products, devices, systems, plant and machinery, this person must be familiar with the state of the art and the applicable national, European and international laws, directives and standards.

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 information provided in the section entitled Safety
- Have a good knowledge of the generic and specialist standards applicable to the specific application.

3.2.4 Warranty and liability

All claims to warranty and liability will be rendered invalid if

- 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.).

3.2.5 Disposal

- In safety-related applications, please comply with the mission time T_M stated in the safety-related characteristic data.
- When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

4 Security

To secure plants, systems, machines and networks against cyberthreats it is necessary to implement (and continuously maintain) an overall industrial security concept that is state of the art.
Perform a risk assessment in accordance with VDI/VDE 2182 or IEC 62443-3-2 and plan the security measures with care. If necessary, seek advice from Pilz Customer Support.

Further information on Security can be found in the System description PSS 4000 (1001467).

- Note the network data [📖 36] for risk analysis and the security measures.

5 Function description

5.1 Block diagram

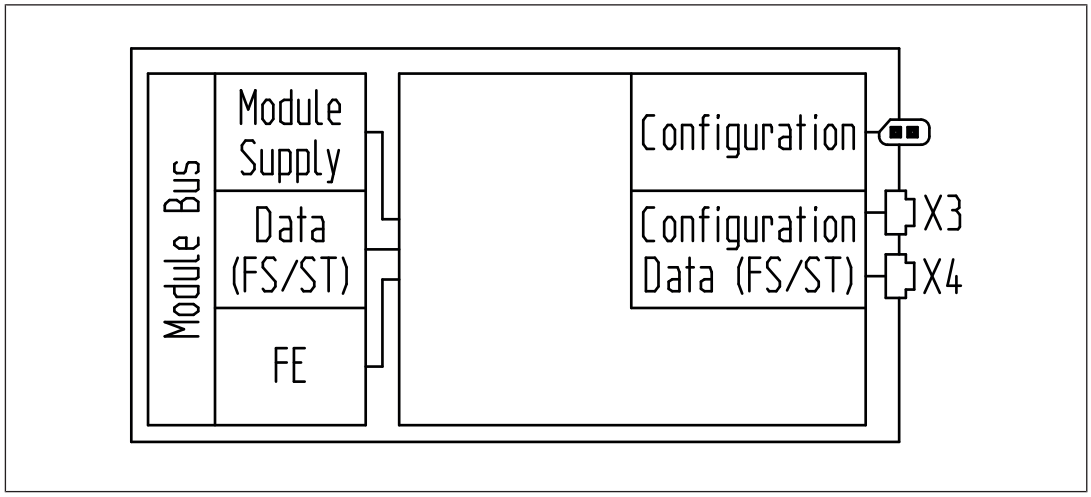


Fig.: Block diagram PSS u2 P12 F/S -R

5.2 Decentralised inputs and outputs

The head module belongs to the performance class "PSS 4000 I/O+". It enables the PSS u2 system to be used as a modular, decentralised I/O module:

- PSS u2 system without control functionality
- Preprocessing of I/O signals
- Necessary to expand the head module with electronic modules
- Control of I/Os via SafetyNET p through a control system (e.g. PSS u2 P42 F/S -R)

5.3 Preprocessing of I/O signals

A user program can be created in Multi programming to pre-process the I/O signals.
The Multi programming function range is limited to the following blocks:

- AND - AND operation
- OR - OR operation
- XOR - EXCLUSIVE OR operation
- NOT - Negation
- SEL - Binary selection
- SR - Flip-Flop with overriding set
- RS - Flip-Flop with overriding reset
- R_TRIG - Detects a rising edge
- F_TRIG - Detects a falling edge
- TP - Pulse generator
- TON - Switch-on delay
- TOF - Switch-off delay
- VALID - Evaluation of the valid bit

5.4 Supply voltage

The module PSS u2 P12 F/S -R is provided with the module supply via the main voltage supply module PSS u2 PS1 -R.

The main voltage supply module is arranged directly, to the right of the head module, and it forms a recognisable unit with the head module. The main voltage supply module can only be connected to a head module of the PSS u2 system in the automation system PSS 4000. The head module cannot be connected inadvertently to a backplane.

Further information is available in the following operating manuals:

- PSS u2 PS1 -R
- Installation Manual, PSS u2 in the automation system PSS 4000

5.5 Integrated protection mechanisms

The module has the following protection mechanisms:

- multi-channel diverse processor section
- Cyclical self tests
- potentially isolated **SafetyNET p**interface
- Temperature monitoring
  When exceeding the permitted ambient temperature (see Technical details [📖 32]) the PSS u2 system switches to a safe state.

5.6 microSD card

The microSD card has the following functions:

- The microSD card is used to store the naming data and the device project; see PSS 4000 System Description (1001467).
- The microSD card is part of the PSS 4000 safety concept. If the microSD card is missing or has been swapped, the next time the PSS u2 system is booted it will be unable to achieve the operating status "PSS u2 System in RUN condition without fault". The microSD card has a push-push-mechanism, which protects it from being removed from the card holder unintentionally. The cover flap of the microSD card can also be sealed to protect it from manipulation, whether accidental or intentional.

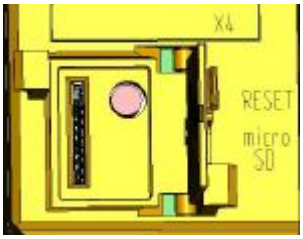
Push-push-mechanism of the microSD card

Inserting the microSD card

- Slide the microSD card into the slot until you hear it lock into position.

Removing the microSD card

- Put the PSS u2 system into recovery mode.
- Press lightly on the microSD card until it releases.
- Use your fingers to pull the microSD card out of the slot.

	
Slot for microSD card Cover flap opened	Cover flap of the microSD card closed and sealed

NOTICE

Damage to files on the microSD card

Files may be damaged if the microSD card is removed from the device or the power to the device is switched off as the SD card is being written. Remove the microSD card only in recovery mode or in switched off mode.

When a device is changed, the stored data can be copied over using the Reset button (see Reset button).

The following microSD card is available, see order reference accessories.

5.7 Reset button

The "Reset" pushbutton on the head module has various functions:

- Perform a warm reset for the PSS u2 system.

  The reset pushbutton can be used to perform a warm reset for the PSS u2 system.
- Transfer the naming data and/or device project from the microSD card (deliberate operator action to transfer the naming data and/or device project from the microSD card to the device memory).
- Perform recovery mode.

INFORMATION

The warm reset and the recovery mode and transfer of the naming data and/or device project are described in the "PSS 4000 System Description". This is also where the general effects on the PSS u2 system are described in detail.

5.8 SafetyNET p

5.8.1 Connection to SafetyNET p

Functions

- The SafetyNET p interface enables safety-related and non-safety-related data transfer between the PSS u2 system and other network subscribers.

- The head module receives signals from other network subscribers; it processes these signals in the user program and passes them on to the connected input/output modules.
- The head module receives signals from the connected input/output modules; it processes these signals in the user program and passes them on to the other network subscribers.
- If a fault occurs, the head module switches the connected failsafe outputs to a safe condition.

MAC address

- The MAC address is a factory-set default. It can be found on the labelling strip on the front of the head module.

INFORMATION

Further information on SafetyNET p can be found in the "PSS 4000 System Description".

6 I/O-data of module bus PSS u2 of the head module

(The I/O data of the electronic modules are described in the operating manuals of the electronic modules. Other I/O data are described in the system description PSS 4000.)

The data described below are available on the head module.

6.1 I/O data available in the I/O mapping.

Data access is via pre-defined I/O data types:

I/O data name	I/O data type	Data element: Data type	Meaning
OutputValid (*)	FS_I_DI	Data: SAFEBOOL	Bit *OutputValid*
ReadyForReintegration (*)	FS_I_DI	Data: SAFEBOOL	Bit *ReadyForReintegration*
Reintegrate (*)	ST_O_DO	Data: BOOL	Bit *Reintegrate*

(*) Available only when the FS shutdown behaviour "Shutdown of all FS outputs on the PSS u2 system” is configured.

6.2 Other I/O data

In addition to the I/O data available via I/O mapping, it is possible to access further I/O data in the user program:

- Valid bit of the *OutputValid* bit (*)
- Valid bit of the *ReadyForReintegration* bit (*)

(*) Available only when the FS shutdown behaviour "Shutdown of all FS outputs on the PSS u2 system” is configured.

In the Multi programming, access is via the PSS 4000 system control block "Valid".

In IEC 61131 programming, access is via the variable extension "WITH VALID".

7 Installation

7.1 General installation guidelines

Refer to the Installation Manual PSS u2 in the automation system PSS 4000 (1006253).

The description below assumes that the mounting rail is already installed.

CAUTION!

Risk of material damage

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.

CAUTION!

Risk of material damage

The incorrect ambient temperature during assembly/dismantling can lead to material damage.

– Comply with the permitted ambient temperature for assembly/dismantling: -20°C … +45°C

7.2 Dimensions in mm

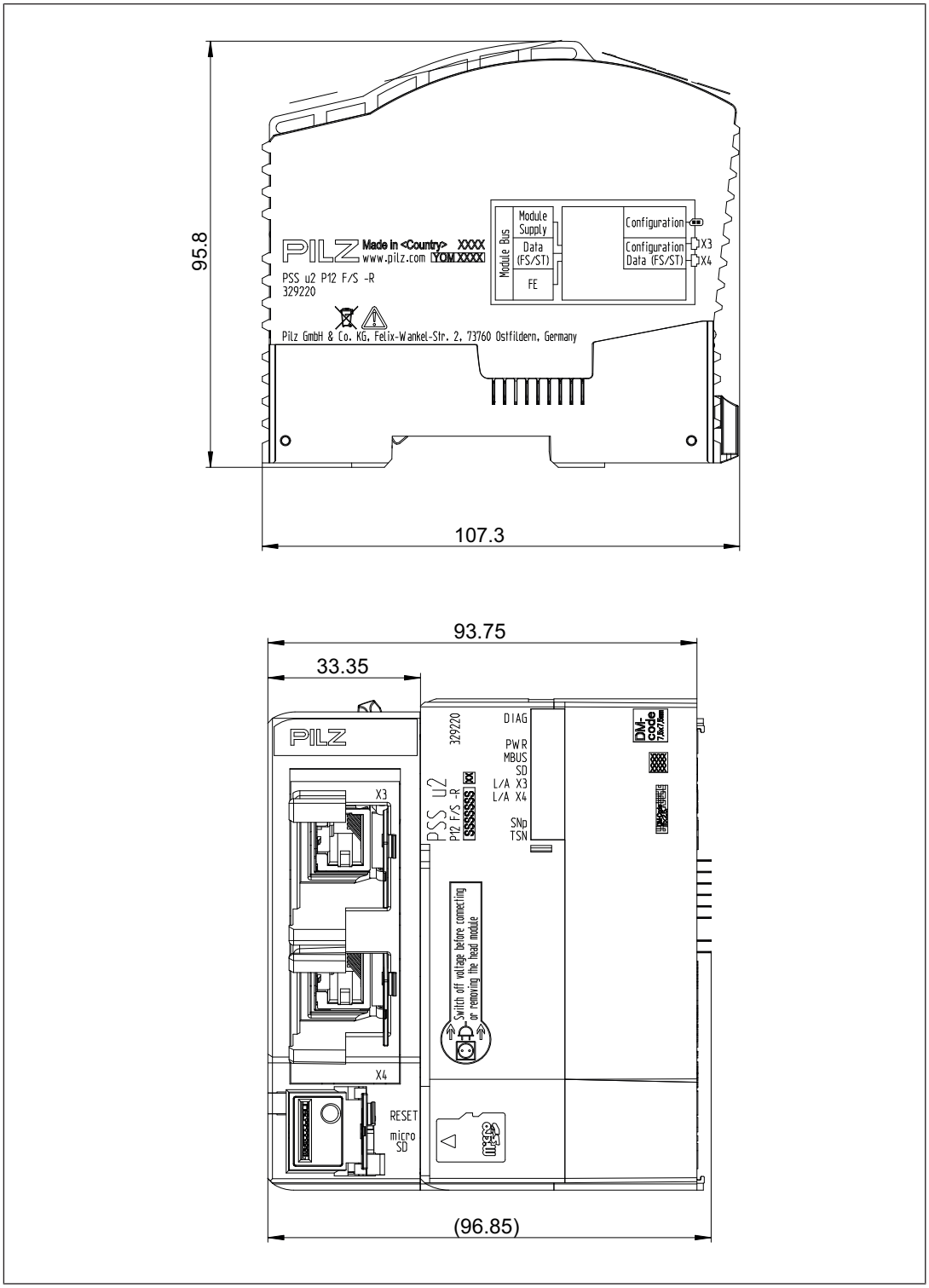


Fig.: Dimensions-head module PSS u2 P12 F/S -R (without main voltage supply module)

7.3 Installing the head module

Prerequisite:

- The **main voltage supply module PSS u2 PS1 -R is installed to the head module**. Main voltage supply modules may only be plugged or unplugged if the terminal block was removed previously.
- The mounting rail must be installed.
  The mounting rail can be installed horizontally or vertically.
  In vertical installation the head module must be installed on top and a derating of the module supply must be noted (see Operating manual Main voltage supply module).
- Backplanes are installed and the protective plate is fixed to the last backplane (protective plate is included in the scope of delivery of the PSS u2 PS1 -R main voltage supply).
- To the left of the backplane there is a sufficient distance to install the head module plus main voltage supply module.
- At least the first electronic module must not be installed on the backplane.

Further information on installation can be found in the following documents:

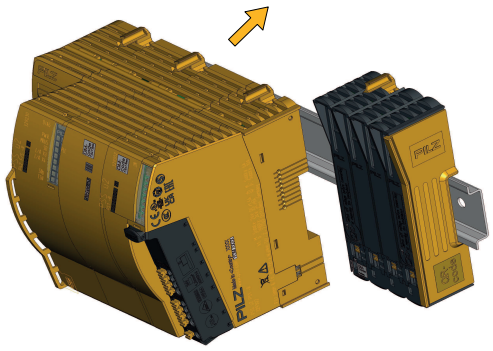
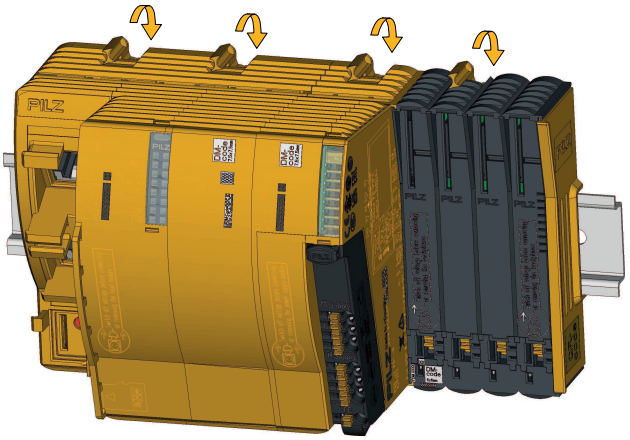
- Operating manual Main voltage supply module PSS u2 PS1 -R
- Installation Manual PSS u2 in the automation system PSS 4000

7.3.1 Install head module plus main voltage supply module

Prerequisite

The mounting rail must be installed.

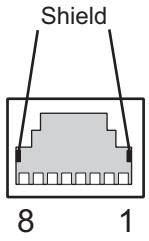
The backplane is installed and the cover plate is installed.

1. Plug the head module plus main supply voltage module on to the mounting rail. Note: The mounting rail interlock must be in the open position, to the left.	
2. Rotate the mounting rail interlocks to the right to lock the head module plus main supply voltage module on the mounting rail.	

8 Interface assignment

Further information on the Ethernet interface can be found in the System Description PSS 4000 (1001467).

Assignment of the interfaces on head modules with an RJ45 female connector

SafetyNET p	Assignment	
RJ45 female connector	1: TD+ 2: TD- 3: RD+ 4: n.c. 5: n.c. 6: RD- 7: n.c. 8: n.c.	

▸ n.c. = not connected

As an additional option, the data cable and locking connectors can be fastened with cable ties

INFORMATION

With the plug-in connection, please note that the data cable and connector have a limited mechanical load capacity. Appropriate design measures should be used to ensure that the plug-in connection is insensitive to increased mechanical stress (e.g. through shock, vibration). Such measures include, for example, fixed installation and strain relief (see graphic "Options for attaching the data cable to the head module").

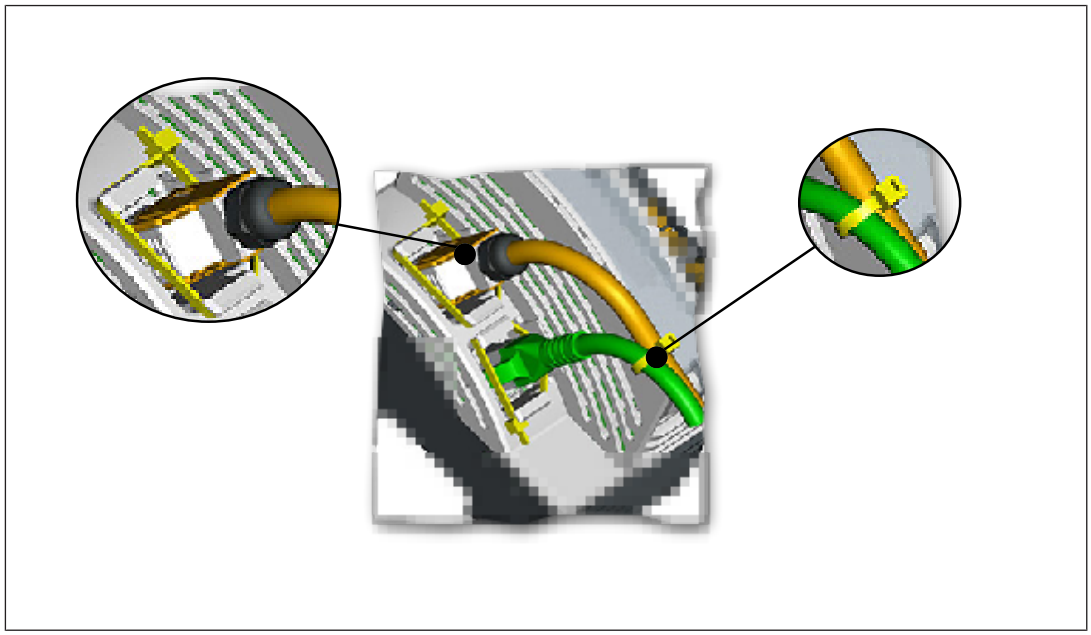


Fig.: Additional options for fastening the data cable on the head module and locking the connector using cable ties

- Remove the cable ties before pulling out the plug.

Sealing unused RJ45 sockets/microSD card/reset buttons

Sealing the cover flap protects against unauthorised access.

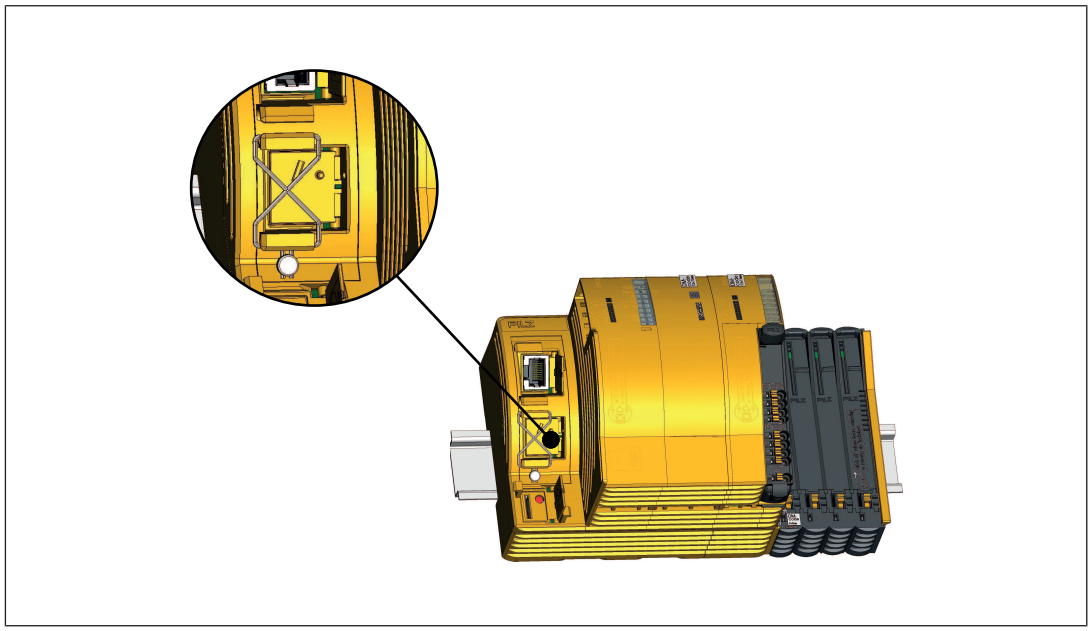


Fig.: Sealing the RJ45 sockets

9 Operation

9.1 Messages

The PSS u2 system provides many options for diagnostics, fault detection and communication with other PSS u2 systems.

Diagnostics for the PSS u2 system can be run via

- LEDs on the head module,
- Diagnostic list and diagnostic log.

All errors and malfunctions detected by the head module are entered in the diagnostic list and the diagnostic log. All errors and malfunctions detected by the electronic modules are entered in the diagnostic list and diagnostic log of the head module.

You can read the diagnostic list and diagnostic log, e.g. using the PAS4000 or the PSS 4000 OPC Server UA.

9.2 Display elements

The head module contains a number of status LEDs, which provide information about the status of the PSS u2 system and its system sections.

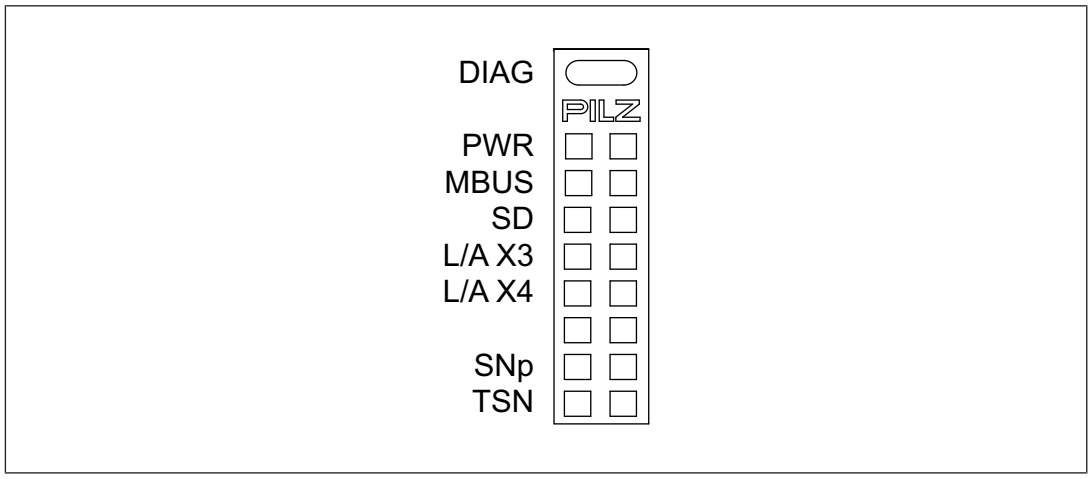


Fig.: Head module PSS u2 P12 F/S -R

Legend


LED on


LED flashes


LED flashes quickly


LED flickers


LED off

INFORMATION

When the PSS u2 system is restarted, the LEDs in the head module's left-hand column light up green in succession (green chase light) This indicates that a released firmware version from Pilz is installed. If a red chase light is displayed, then a test version of the firmware is installed on the head module. If a test version is installed, this is also indicated during operation. In this case, the "DIAG" LED flashes red.

9.2.1 DIAG

The "DIAG" LED indicates whether there is a fault or error on the device. Precise evaluation can be made via the diagnostic list.

Colour	Status	Description
Green		No message of "Error" or "Warning" severity is present for the device.
		▸ Device diagnostic list and device diagnostic log are being prepared. or ▸ When die DIAG, MBUS, PWR, SD CARD, SNp and TSN LEDs all flash green, the user has activated device identification.
Yellow		A message of at least "Warning" severity is present for the device (see diagnostic list).
Red		▸ A major FS error is present for at least one FS system section (see diagnostic list). or ▸ The firmware version has been manipulated.
		There is at least one message of "Error" severity present for the device, which can be recovered by the user (see diagnostic list).
		The installed PSS 4000 firmware has not been released. The firmware version is a test version, which may only be used for test purposes.

9.2.2 PWR

The "PWR" LED indicates the status of the supply voltage for the module supply.

Colour	Status	Description
---		Supply voltage for the module supply is missing.
Green		Supply voltage for the module supply is OK.
		When die DIAG, MBUS, PWR, SD CARD, SNp and TSN LEDs all flash green, the user has activated device identification.
		Updating the firmware.

9.2.3 MBUS

The "MBUS" LED indicates the status of the PSS u2 module bus.

Colour	Status	Description
---		The module bus is just being started or an internal error occurred on the module bus.
Green		FS and ST module bus are operating without error.
		When die DIAG, MBUS, PWR, SD CARD, SNp and TSN LEDs all flash green, the user has activated device identification.
Red		An error that can be repaired by the user has occurred on the module bus. See diagnostic list.

9.2.4 SD

The "SD" LED indicates the status of the SD card.

Colour	Status	Description
Green		Naming data and device project on the device and SD card match.
		▸ There is no device project and no naming data on the SD card. or ▸ Recovery mode: The file system of the SD card is in a consistent state and the SD card can be removed. or ▸ When die DIAG, MBUS, PWR, SD CARD, SNp and TSN LEDs all flash green, the user has activated device identification.
Yellow		Naming data and device project on the device and SD card do not match. The "deliberate operator action" is required to load into the device.
		Device is ready for "deliberate operator action". Status: Start of "deliberate operator action" (function of reset pushbutton)

Colour	Status	Description
Red		▸ SD card is missing. or ▸ SD card was not detected. or ▸ SD card is defective. or ▸ Recovery mode: For some reason, the file system of the SD card could not reconstruct a consistent state.
		Naming data and/or device project from the SD card may not be loaded into the device: ▸ Product type on the SD card does not match the product type of the device/head module. or ▸ "Bind device projects to devices" function: – The device does not have the device key that matches the device project. or – The device project does not have the project key that matches the device. and/or ▸ "Bind device projects to SD cards" function: The device project is bound to an SD card, but this SD card is not inserted in the device.

9.2.5 SNp

The "SNp" LED indicates the status of SafetyNET p.

Colour	Status	Description
---		SafetyNET p is not in operation: FS and ST SafetyNET p are not started.
Green		SafetyNET p is in operation: ▸ All expected data is being received. and/or ▸ There is no data configured that is expected to be received.
		SafetyNET p is in operation: ▸ After the device is started, the device is waiting for the first time for receive data. or ▸ FS SafetyNET p is in the operating state "FS SafetyNET p in RUN state with minor error". or ▸ ST SafetyNET p is in the operating state "ST SafetyNET p in RUN state with minor error". or ▸ When die DIAG, MBUS, PWR, SD CARD, SNp and TSN LEDs all flash green, the user has activated device identification.

9.2.6 L/A X3, L/A X4

The "L/A" LED indicates the status of the Ethernet network connection.

Colour	Status	Description
---		Network connection is missing.
Green		Network connection is available.
		Data traffic is taking place.

9.2.7 TSN

The "TSN" LED is on the device, but has no function. It flashes during device identification, but otherwise is off.

Colour	Status	Description
---		Irrelevant
Green		When die DIAG, MBUS, PWR, SD CARD, SNp and TSN LEDs all flash green, the user has activated device identification.

10 Technical Details

Where standards are undated, the 2022-01 valid editions apply.

General	
Certifications	**CE, TÜV**
Application range	**Standard/failsafe**
System sections	
FS resource	**Yes**
ST module bus PSS u2	**Yes**
FS module bus PSS u2	**Yes**
ST SNp interface	**Yes**
FS SNp interface	**Yes**
PROFIBUS-DP Slave	**No**
PROFINET IO DEVICE	**No**
Diagnostic Server	**No**
OPC Server	**No**
Programming	
Multi programming	**Yes**
Electrical data	
Internal supply voltage (module supply)	
Module's power consumption	**5,5 W**
CPU	
Real-time clock for time and date functions	
Resolution	**1 s**
Deviation	**+/- 10s/day**
Buffer time	**10 days**
Max. number of FS tasks	**1**
Min. cycle time of FS tasks	**6 ms**
Working memory (RAM)	**256 MB**
Memory for the user program FS resource	**20 MB**
Removable data medium	
Type	**microSD**
SafetyNET p interface	
Quantity	**2**
IP address (automatically off)	**169.254.X.Y**
Connection	**RJ45**
Transmission rates	**100 MBit/s**
Set via	**Automatic**
Max. number of ST-Tx and ST-Rx connections	**64**
Max. number of FS-Tx and FS-Rx connections	**64**
Cycle time (t_SNp RTFN)	**2 ... 60 000 ms**

Environmental data	
Application site	
in accordance with the standard	**EN 50125-3**
Application site	**Track area (1 m - 3 m)**
Climatic suitability	**EN 60068-2-1, EN 60068-2-14, EN 60068-2-2, EN 60068-2-30, EN 60068-2-78**
Ambient temperature	
in accordance with the standard	**EN 60068-2-14**
Temperature range	**-40 - 70 °C**
Storage temperature	
in accordance with the standard	**EN 60068-2-1/-2**
Temperature range	**-40 - 70 °C**
Climatic suitability	
in accordance with the standard	**EN 50125-3**
Humidity	**95 % r. h. at 40 °C**
Condensation during operation	**EN 60068-2-30**
Max. operating height above SL	**5.000 m**
EMC	**EN 50121-4, EN 61000-6-2, EN 61000-6-4, EN 61131-2 (Zone B)**
Broadband noise	
in accordance with the standard	**EN 60068-2-64**
Frequency	**5 - 2.000 Hz**
Acceleration	**2,3 m/s² eff.**
Shock stress	
in accordance with the standard	**EN 60068-2-27**
Number of shocks	**6**
Acceleration	**20 m/s²**
Duration	**11 ms**
Airgap creepage	
in accordance with the standard	**EN 61131-2**
Overvoltage category	**II**
Pollution degree	**2**
in accordance with the standard	**EN 50124-1**
Overvoltage category	**OV2**
Pollution degree	**PD2**
Protection type	
in accordance with the standard	**EN 60529**
Mounting area	**IP51**
Housing	**IP20**
Terminals	**IP20**
Potential isolation	
Potential isolation between	**Module supply and SafetyNET p**
Type of potential isolation	**Functional insulation**
Rated surge voltage in operating heights up to max. 2000 m	**1500 V**
Rated surge voltage in operating heights up to max. 5000 m	**800 V**

Mechanical data	
MTBF at 40 °C, 100 % duty cycle (8760 hours/year)	**123 Jahre**
Material	
Housing	**PC**
Bottom	**PC**
Dimensions	
Height	**107,4 mm**
Width	**93,7 mm**
Depth	**95,8 mm**
Weight	**260 g**

10.1 Safety characteristic data

Safety-related characteristics of the safety outputs

Safety-related characteristic data for railway applications must be considered for the overall system, see Safety Manual for Safety Architectures for Railway Applications (1006614).

The mission time of the module is T_M = 20 years.

11 Supplementary data

11.1 Operating height

The values stated in the technical details apply to the use of the device in operating heights up to max. 2000 m above SL. When used at higher levels, restrictions of the ambient temperature (standard IEC 61131-2) must be taken into account.

Operating height above SL [m]	Multiplication factors for the devices' ambient temperature
0 … 2000	1.0
3000	0.9
4000	0.8
5000	0.7

12 Network data

Protocol	Direction [*]	Transport protocol (IP version)	Port no.	Can be deactivated	Time-critical	Description
SNTP Server	In	UDP (IPv4)	123	Yes	No	Time synchronisation with SNTP
SNTP Client	Out	UDP (IPv4)	123	Yes	No	Time synchronisation with SNTP
SNp	In/out	UDP (IPv4)	40000	No	Yes	Communication via SafetyNET p for reading and retrieving ▸ Process data ▸ Status information ▸ Event messages
SNp MSC	In	UDP (IPv4)	40000	No	No	SafetyNET p communication with IP-Multicast for ▸ Scan network ▸ Device naming ▸ Device Identification

[*]

in: The communication partner starts communication with the product.

out: The product starts communication with the communication partner.

13 Order reference

13.1 Product

Product type	Features	Order no.
PSS u2 P12 F/S -R	Head module for PSS u2 in the automation system PSS 4000, decentralised I/O module with preprocessing of I/O signals, failsafe and standard, 2 RJ45 female connectors, SafetyNET p, slot for microSD card, for increased environmental requirements and railway applications	329220

13.2 Accessories

Power supply

Product type	Features	Order no.
PSS u2 PS1 -R	Main voltage supply module for PSS u2 head module for connecting module supply and periphery supply, connection for functional earth, potential isolation, for increased environmental requirements and railway applications	329302

Terminal block

Product type	Features	Order no.
PSS u2 T 9	Terminal block 9-pin for main voltage supply PSS u2 PSx	328832

Backplanes

Product type	Features	Order no.
PSS u2 B 4 -R	PSS u2, accessories, backplane, for electronic modules, 4 slots, for increased environmental requirements and railway applications, width 50.1 mm, height 107 mm, note the mounting distances.	327810

Labelling backplane

Product type	Features	Order no.
PSS u2 A LA E1 (10 pcs.)	Labelling strips for electronic module/head module 23.5 x 10.5 mm (10 x DIN A4 sheet)	328913
PSS u2 A LC B4 (10 pcs.)	Labelling bracket for backplane, scope of delivery: 10 pieces	328916

Shield connection element

Product type	Features	Order no.
PSS u2 A SH 4 (10 pcs.)	Shield connection element for module rack with 4 slots, scope of delivery: 10 pieces	328820

Terminal block

Product type	Features	Order no.
PSS u2 T 8 (1 pc.)	Terminal block 8-pin, scope of delivery: 1 piece	328840
PSS u2 T 8 (10 pcs.)	Terminal block 8-pin, scope of delivery: 10 pieces	328841
PSS u2 T 8 (5 x 10 pcs.)	Terminal block 8-pin, scope of delivery: 50 pieces	328842

Terminal block

Product type	Features	Order no.
PSS u2 T 16 (1 pc.)	Terminal block 16-pin, scope of delivery: 1 piece	328850
PSS u2 T 16 (10 pcs.)	Terminal block 16-pin, scope of delivery: 10 pieces	328851
PSS u2 T 16 (5 x 10 pcs.)	Terminal block 16-pin, scope of delivery: 50 pieces	328852

Labelling bracket

Product type	Features	Order no.
PSS u2 A LC E1 (10 pcs.)	Label holder for electronic module 23.5 x 10.5 mm, scope of delivery: 10 pieces	328910
PSS u2 A LC E2 (10 pcs.)	Label holder for electronic module 103 x 10.5 mm, scope of delivery: 10 pieces	328911
PSS u2 A LA E1 (10 pcs.)	Labelling strips for electronic module 23.5 x 10.5 mm (10 x DIN A4 sheet)	328913
PSS u2 A LA E2 (10 pcs.)	Labelling strips for electronic module 103 x 10.5 mm (10 x DIN A4 sheet)	328914

microSD cards

Product type	Features	Order no.
SD Memory Card 1GB industrial	PSS u2, accessories, microSD memory card, 1 GB, industrial, for PSS u2 head modules	328836
SD Memory Card 4GB industrial	PSS u2, accessories, microSD memory card, 4 GB, industrial, for PSS u2 head modules When used in the head module PSS u2 P42 F/S (-R), the hardware version of the head module must be ≥ HW 1.2 or YOM ≥ 2025.	328837
SD Memory Card 8GB industrial Cm	PSS u2, accessories, microSD memory card, 8 GB, industrial, WIBU CodeMeter technology, for PSS u2 head modules When used in the head module PSS u2 P42 F/S (-R), the hardware version of the head module must be ≥ HW 1.2 or YOM ≥ 2025.	328838

Cable

Product type	Features	Order no.
SafetyNET p Cable	SafetyNET p cable, standard, 4-core, sold by the metre, Cat5e (100MBit/s), PUR, yellow RAL1003, 2x2x0,35, colour single wires: White, yellow, blue, orange, minimum purchase 10 m	380000
Stripping tool	Tool for fast and multi-stage stripping of Ethernet and SafetyNET p cables, PU 1 set.	380070
SafetyNET p Connector RJ45 straight	RJ45 plug-in connector, straight, IP20, 4-pin, Cat5e, AWG 22 (4-core), cable diameter: 6.3 - 6.7 mm	380400
RJ45 Connector	RJ45 plug-in connector, straight, IP20, 8-pin, Cat6a, IDC connection, AWG 22, cable diameter: 5.5 - 8.5 mm	380401

Support

Technical support is available from Pilz round the clock.

Americas
Brazil
+55 11 97569-2804
Canada
+1 888 315 7459
Mexico
+52 55 5572 1300
USA (toll-free)
+1 877-PILZUSA (745-9872)

Asia
China
+86 400-088-3566
Japan
+81 45 471-2281
South Korea
+82 31 778 3300

Australia and Oceania
Australia
+61 3 95600621
New Zealand
+64 9 6345350

Europe
Austria
+43 1 7986263-444
Belgium, Luxembourg
+32 9 3217570
France
+33 3 88104003
Germany
+49 711 3409-444
Ireland
+353 21 4804983
Italy, Malta
+39 0362 1826711
Scandinavia
+45 74436332
Spain
+34 938497433
Switzerland
+41 62 88979-32
The Netherlands
+31 347 320477
Türkiye
+90 216 5775552
United Kingdom
+44 1536 462203

You can reach our international hotline on:
+49 711 3409-222
support@pilz.com

Pilz develops environmentally-friendly products using ecological materials and energy-saving technologies. Offices and production facilities are ecologically designed, environmentally-aware and energy-saving. So Pilz offers sustainability, plus the security of using energy-efficient products and environmentally-friendly solutions.

BLUEcoMPETENCE Alliance Member
Partner of the Engineering Industry Sustainability Initiative

German Standards
BRAND OF THE CENTURY 2022

Quality Management ISO 9001:2015 REG. NO. 2462
Environmental Management ISO 14001 REG. NO. 2462
Energy Management ISO 50001 REG. NO. 2462

We are represented internationally. Please refer to our homepage www.pilz.com for further details or contact our headquarters.

Headquarters: Pilz GmbH & Co. KG, Felix-Wankel-Straße 2, 73760 Ostfildern, Germany
Telephone: +49 711 3409-0, E-Mail: info@pilz.com, Internet: www.pilz.com

PILZ
THE SPIRIT OF SAFETY

1007182-EN-01, 2025-04 Printed in Germany