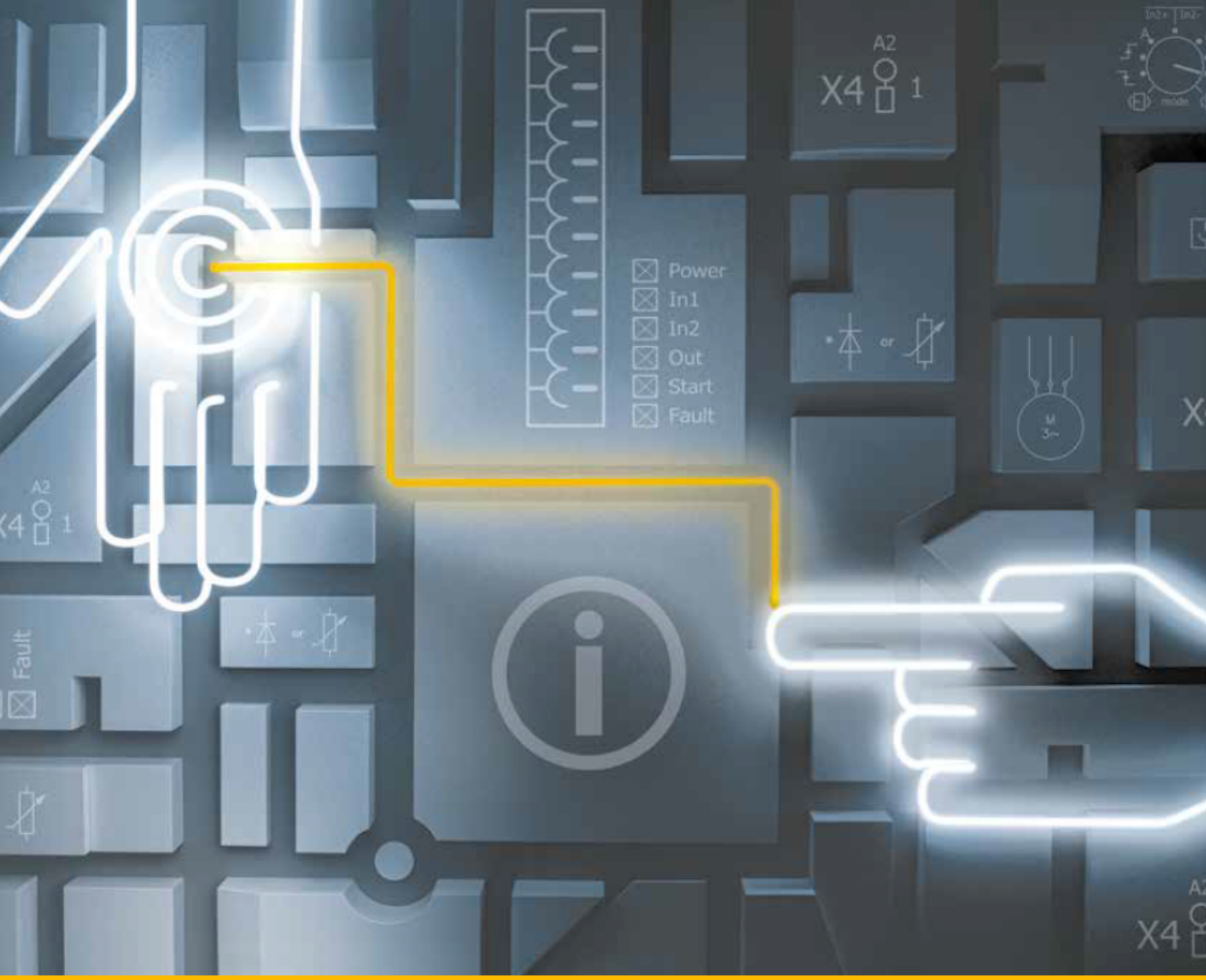


PSS u2 P0 F/S EIP2

PILZ
THE SPIRIT OF SAFETY

Operating Manual-1005376-EN-04
- Remote I/O system PSS u2




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

This documentation is valid for the product PSS u2 P0 F/S EIP2 hardware version 3.0 or higher. It is valid until new documentation is published.

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.

Please refer to the PSS u2 Installation Manual.

1.3 Third-party manufacturer licence information

The head modules include Open Source software with various licences.

Further information is available in the document "Licence information PSS u2 P0 F/S EIP2" (document number 1005754) at www.pilz.com.

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

Application of the product PSS u2 P0 F/S EIP2:

Head module to connect the system to EtherNet/IP™ with the CIP Safety™ protocol. The head module can be connected to a scanner as an adapter.

The product has the following features:

- **EtherNet/IP** interface with CIP Safety Protocol
- DIP switch for setting the IP address and for activating BOOTP
- LEDs for:
  - System status
  - **EtherNet/IP** status
  - Module bus
  - Diagnostics
- Electronic modules that can be used for input/output:
  - All failsafe modules (PSS u2 EF...)
  - All standard modules (PSS u2 ES...)

2.2 Front view

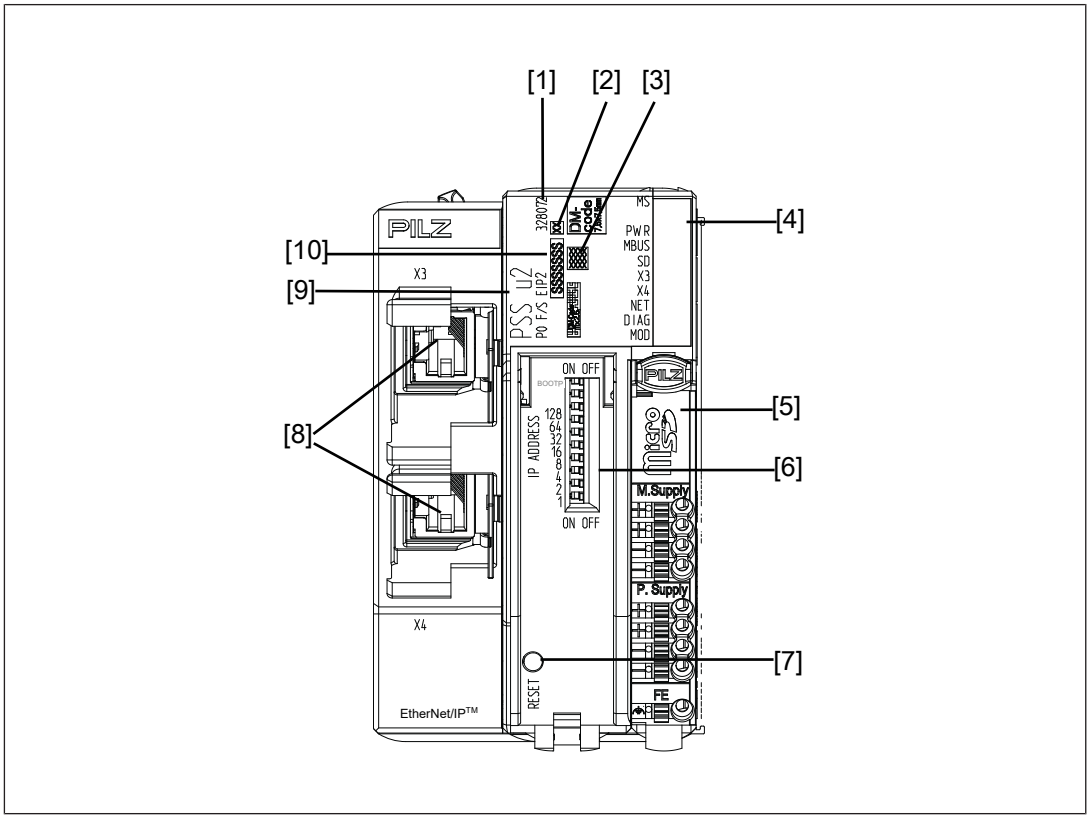


Fig.: Front view PSS u2 P0 FS EIP2

Legend

1 Order number
2 Hardware version
3 Devices MAC address
4 LEDs for status display
5 Terminal block for connecting the supply voltages (supplied with the device)
6 DIP switch for setting the IP address and for activating BOOTP
7 Reset pushbutton
8 EtherNet/IP interface X3 and X4: RJ45 socket
9 Product name
10 Serial number

2.3 Scope of supply

- Head module PSS u2 P0 F/S EIP2 with:
  - 1 x Terminal block 9-pin

3 Safety

3.1 Intended use

The module PSS u2 P0 F/S EIP2 may only be used in the PSS u2 system.

The module is designed for use in

- safety-related applications with
  - CIP Safety via **EtherNet/IP**
- non-safety-related applications with
  - **EtherNet/IP**

The module meets the requirements of EN IEC 61508 up to SIL CL 3.

The module can be used in furnaces in accordance with EN 298.
Please note:

- To protect against transient power failures (EN 61000-4-11) the AC power supply used for the system must meet a secondary buffering for 30 ms.

Intended use includes making the electrical installation EMC-compliant. The module is designed for use in an industrial environment. 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 manual,
- Any use of the module that is not in accordance with the technical details.

Please also note the CIP Safety requirements (see CIP Safety requirements on the user [📖 21]). Further information is available at www.odva.org.

3.2 System requirements

INFORMATION

The module is supported by

- PASconfig from Version 4.0.0
  - We recommend that you always use the latest version (download from www.pilz.com).

3.3 Safety regulations

3.3.1 Safety assessment

Before using a device, a safety assessment in accordance with the Machinery Directive is required.

The product as an individual component fulfils the functional safety requirements in accordance with EN ISO 13849 and EN IEC 62061. However, this does not guarantee the functional safety of the overall plant/machine. To achieve the relevant safety level of the overall plant/machine's required safety functions, each safety function needs to be considered separately.

3.3.2 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.

3.3.3 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.).

3.3.4 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.

4.1 Implemented security measures

- The password is saved in an encrypted format.
- If a password is changed, you will be prompted to enter the old password for authentication.
- No firmware downgrades are allowed. This prevents outdated firmware with vulnerabilities from being loaded onto the product.

4.2 Required security measures

- The product is not protected from physical manipulation or from reading of memory contents during physical access. Use appropriate measures to ensure that there is no physical access by unauthorised persons. You should also use security seals so that you can detect any manipulation of the product or interfaces. Installation inside a lockable control cabinet is recommended as a minimum measure.
- The configuration computer that accesses the product has to be protected from attacks by a firewall or other suitable measures. We recommend that a virus scanner is used on this configuration computer and updated regularly.
- PASconfig must be installed by an administrator in a secure IT network according to the proven best practice rules for Windows computers.
- If necessary, protect the configuration computer and the product from unauthorised use by assigning passwords and taking further measures if required. We also recommend that the user logged on to this configuration computer does not have administrator rights.
- Assign only safe passwords. When assigning passwords, please note:
  - If possible, the password should not be available in dictionaries.
  - The password should not be made up of standard variants and repetitions or keyboard patterns (so not: 1234abcd).
  - Use a password manager for optimum management of complex passwords.
  - Language-independent characters are not available in every keyboard language.
  - Make sure you regularly change the passwords of the user accounts on the system and/or ask the users to change their passwords themselves.
  - Make the users aware of the responsible use of their access data.
- As soon as possible, install firmware updates that Pilz provides for the product.
- Log data may contain personal data. Only store exported logs on a storage medium that is adequately protected.

- Before disposal, the product must be safely decommissioned. To do this, all the data must be deleted from the device.
  - Set the configuration back to its default settings or delete the configuration.
  - Switch off the product.
  - If the product includes a removable data medium, remove it and format it at the computer. Do not carry out a quick formatting. Alternatively, you can use a program to safely delete data or destroy the memory mechanically.

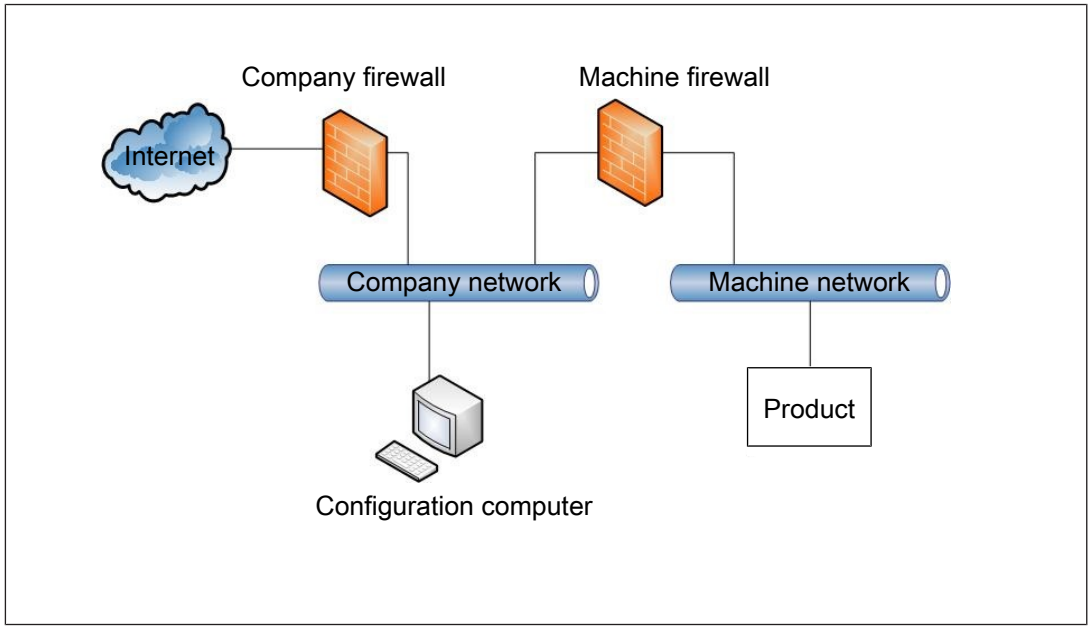


Fig.: Example network topology

- Note the network data [📖 37] for risk analysis and the security measures.

5 Function description

5.1 Block diagram

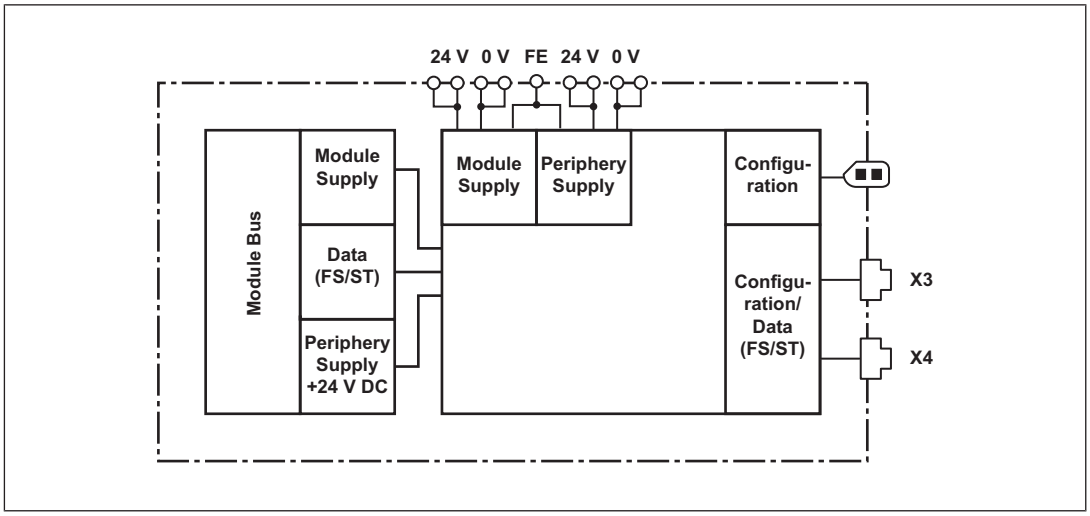


Fig.: Block diagram PSS u2 P0 F/S EIP

5.2 Supply voltage

- Module supply
  - – supplies voltage to the head module
  - – supplies voltage to downstream modules (right-hand side)
- Periphery supply
  - – supplies voltage to the sensors, actuators and test pulses

When the supply voltage is fed in separately, the module supply and periphery supply are galvanically isolated. If galvanic isolation is not required, a common power supply may be used for the periphery supply and module supply.

Ensure you comply with the maximum output power of the module supply and periphery supply (see "Technical details [📖 34]"). If the power consumption is higher, an additional supply voltage module is required to refresh the periphery supply. The module supply cannot be refreshed.

- Module supply

  The total power consumption of all module racks and electronic modules must be ≤ the maximum output power.

- Periphery supply

  The total power consumption of the sensors, actuators and test pulses supplied via the input/output modules must be ≤ the maximum output power.

  If the periphery supply is missing, the "PWR" LED flashes and a message is entered in the diagnostic list.

5.3 Integrated protection mechanisms

The module has the following protection mechanisms:

- multi-channel diverse processor section
- cyclical self tests
- potentially isolated interface

Buffering:

Module supply failures are buffered for 20 ms.

5.4 MicroSD card

If you use the optional removable data medium, then data that is relevant for the device exchange will be stored on the data medium.

NOTICE

The microSD card includes safety data. Ensure that the microSD card is plugged in before commissioning. After commissioning, use PASconfig to check the FS check sum of the system on the microSD card. It has to match to the FS check sum of the configured system. To ensure that final data are stored on the data medium, do not remove the microSD card before completing the checking.

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

5.5 Reset button

Carrying out a warm reset (restart)

Procedure:

- Press the Reset pushbutton for less than 5 seconds.

Performing a cold start/reboot command initiates the following procedure:

- Processing is aborted

  All LEDs apart from the “PWR” LED are shut down
- System is initialised

  Head module is ready for operation and the "MS" LED flashes green
- System switches to "Operational" state

  Head module is in operation and the "MS" LED lights up green
- Operational entry in the error stack

Impact after a restart:

- Inputs retain their current input values
- Substitute values are used for the outputs until the connection to the controller has been re-established.

Copying the device project from the removable data medium to the PSS u2 system

Prerequisites

- A removable data medium must be plugged into the PSS u2 system.
- The removable data medium may not be empty or defective.
- The device project on the removable data medium must match the product type.

Procedure:

- Press the Reset pushbutton for more than 5 seconds. The SD LED flashes yellow.
- Release the Reset pushbutton, then press and release it again within 10 seconds.
- The device project will be copied from the removable data medium to the device.

If the required files are not on the removable data medium, the device exchange scenario is not performed and an entry is written in the error stack.

If no removable data medium is inserted, an original reset is performed.

- Default values:
  - IP address: 192.168.1.1
  - Subnet mask: 255.255.0.0
  - Gateway address: 192.168.1.1

Effects of the original reset:

- ST and FS configuration data is deleted
- Error stack is not deleted
- The head module is restarted automatically.

5.6 EtherNet/IP

5.6.1 Connection to EtherNet/IP

Decentralised input/output

- The head module enables the PSS u2 to be used as a modular, decentralised input/output module.
- The head module receives signals from a higher level control system; it processes these signals 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 and passes them on to a higher level control system.

All the project data is stored in the head module.

5.6.2 Setting the IP address

The IP address can be set using:

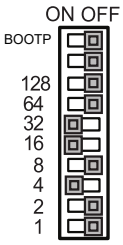
- DIP switch
- PASconfig (see Online help for PASconfig)
- BOOTP

Setting via the DIP switch

The DIP switch only allows the last byte of the IP address to be set (192.168.1.xxx). xxx is the value that can be set with the DIP switch.

Subnet mask used: 255.255.255.0.

The DIP switch is binary coded. An IP address is set via a combination of the relevant binary coded switches:

"IP-ADDRESS" dip switch	Meaning		Example
Switch designation	**ON**	**OFF**	**IP address 192.168.1.52**
128	128_D	0	
64	64_D	0	
32	32_D	0	
16	16_D	0	
8	8_D	0	
4	4_D	0	
2	2_D	0	
1	1	0	

Setting IP address in PASconfig

The DIP switch has precedence over the setting in PASconfig. The IP address set in PASconfig is only used if the DIP switch is set to 0 or 255.

Setting using BOOTP

BOOTP will be activated only when the DIP switch is set to BOOTP **and** no IP address was configured yet in PASconfig.

- If BOOTP was activated, the head module with the IP address 0.0.0.0 will start and wait for the IP assignment by BOOTP.

If an IP address or a safety network number was already set using PASconfig, no IP address can be set via BOOTP even when the DIP switch is set to BOOTP.

To use BOOTP after an IP address was already configured in PASconfig, an original rest must be carried out. This will reset the IP address to the default value.

5.6.3 Projects

The head module as an Ethernet/IP adapter can be used with different control systems that act as a scanner.

- Special features when using a control system from Rockwell Automation:

  To configure the head module you will need the RSLogix 5000 software or Studio 5000 Logix Designer from Rockwell Automation and PASconfig. To simplify configuration, you can export the PSS u2 configuration from PASconfig to a *.l5x file and import it into RSLogix from Version 30.

- Special features when using a control system from Schneider Electric SE:

  We recommend that you use the device description file (EDS) from Pilz. The EDS file is available on the Internet at www.pilz.de.

5.6.4 Diagnostic Object (0x64)

The Diagnostic Object makes diagnostic events available.

Class 0x64 Instance 0

Attribute ID	Name	Value	Description
1	Revision	1	Version of the Diagnostic Object
2	Max Instance	1	Max. number of Instances
3	Number of Instances	1	Number of Object Instances
6	Number of Class Attributes	7	Number of the last available Class Attribute
7	Number of Instance Attributes	2	Number of the last available Instance Attribute

Class 0x64 Instance 1

Attribute ID	Name	Bit	Value	Description
1	Diagnostic Byte ST (INT8U)	0	0	No error
			1	Fatal error on ST part
		1	0	No error
			1	ST error on head module
		2	0	No error
			1	Error on ST module
		3…7	0	Reserved
2	Diagnostic Byte FS (INT8U)	0	0	No error
			1	Fatal error on FS part
		1	0	No error
			1	Error on head module
		2	0	No error
			1	Error on FS module
		3…7	0	Reserved

The Diagnostic Object supports the following services:

Service Code	Class	Instance	Service Name	Description
$0E_{hex}$	Yes	Yes	Get_Attribute_Single	Read the value of one attribute
01_{hex}	Yes	Yes	Get_Attribute_All	Read the value of all attributes

5.6.5 ST process image

Instance 101 in the Assembly Object (0x04) is used for the process image of the ST outputs.

Instance 104 in the Assembly Object (0x04) is used for the process image of the ST inputs.

Heartbeat instance in the Assembly Object (0x04): 198

Listen Only instance in the Assembly Object (0x04): 199

The sequence of the data in the process image depends on the slot number (beginning with slot 1). The length of the ST process data depends on the number of configured ST modules. If a module has a process image, the process image always occupies at least 1 byte, even if not all bits are used.

The valid bits of the ST outputs are transferred in the process image of the ST inputs.

Example of the process image of the ST inputs:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Slot	Module
0	n.u.	n.u.	n.u.	n.u.	I3	I2	I1	I0	1	PSS u2 ES 4DI
1	n.u.	n.u.	n.u.	n.u.	I3	I2	I1	I0	2	PSS u2 ES 4DID
2	n.u.	n.u.	n.u.	n.u.	n.u.	n.u.	V1	V0		
3	I7	I6	I5	I4	I3	I2	I1	I0	3	PSS u2 ES 8DI
4	I7	I6	I5	I4	I3	I2	I1	I0	4	PSS u2 ES 8DID
5	n.u.	n.u.	n.u.	n.u.	V3	V2	V1	V0		
6	n.u.	n.u.	n.u.	n.u.	V3	V2	V1	V0	5	PSS u2 ES4DOD
7	V7	V6	V5	V4	V3	V2	V1	V0	6	PSS u2 ES 8DOD
8	V7	V6	V5	V4	V3	V2	V1	V0	7	PSS u2 ES 16DOD
9	V15	V14	V13	V12	V11	V10	V9	V8		

Legende:

- I: Input
- n.u.: not used
- V: Valid bit

Example of the process image of the ST outputs:

Byte	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	Slot	Module
0	n.u.	n.u.	n.u.	n.u.	O3	O2	O1	O0	5	PSS u2 ES4DOD
1	O7	O6	O5	O4	O3	O2	O1	O0	6	PSS u2 ES 8DOD
2	O7	O6	O5	O4	O3	O2	O1	O0	7	PSS u2 ES 16DOD
3	O15	O14	O13	O12	O11	O10	O9	O8		

Legende:

- O: Output
- n.u.: not used

5.7 CIP Safety

System limits

- A maximum of 24 FS modules can be used.

5.7.1 FS process image of inputs

Instance 772 in the Assembly Object (0x04) is used for the process image of the FS inputs.

- In the process image of the FS inputs, the Combined Input Status (CIS) is used to indicate whether all FS input modules supply valid values. The Combined Input Status is always assigned Byte 0.
  - CIS = 0: Not all FS input modules supply valid values
  - CIS = 1: All the FS input modules supply valid values
- In the process image of the FS inputs, the Combined Input Status (COS) is used to indicate whether all FS output modules supply valid values. The Combined Output Status is always assigned Byte 1.
  - COS = 0: Not all FS output modules deliver valid values
  - COS = 1: All FS output modules deliver valid values

Combined Input Status (CIS) and Combined Output Status (COS):

Byte	Bits	Meaning
0	0	Combined Input Status (CIS)
	1…7	Not used
1	0	Combined Output Status (COS)
	1…7	Not used

- The sequence of the further FS input data depends on the slot number (beginning with slot 1). The length of the FS input data depends on the number and the type of configured FS modules. If a module has a process image, the process image always occupies at least 1 byte, even if not all bits are used.

.

5.7.2 FS process image of outputs

Instance 769 in the Assembly Object (0x04) is used for the process image of the FS outputs.

The sequence of the FS output data depends on the slot number (beginning with slot 1). The length of the FS output data depends on the number and the type of configured FS modules.

FS process image of the outputs with missing FS output modules

INFORMATION

The FS process image of outputs must not be empty. If not FS output module is used in the project, the head module will automatically create FS output data. These FS output data must be entered in the higher-level control system.

Properties of the automatically created FS output data:

- Length 1 Byte
- No access to the FS output data in the user program of the higher-level control system
- No valid bit

5.7.3 Restart interlock

The grouping of the FS inputs/FS outputs is determined by the user program in the control system.

The Combined Input Status (CIS) and Combined Output Status (COS) bits (see FS process image of inputs [📖 19]) have the value “0” if one of the FS inputs or one of the FS outputs is faulty. Once an error at the FS inputs or FS outputs has been rectified, the modules are operational again immediately and the value of the status bits automatically changes to “1”. The CIP Safety Protocol does not contain any restart interlock. The restart interlock must be configured in the user program.

FS inputs

Example of the configuration of a restart interlock:

- In the user program of the programmable safety system, the value for CIS=0 must be saved in a control variable.
- The user program must link this control variable logically to every safe input with AND.
- The user program must reset this control variable to valid by reintegration. Only then will the values of the safe inputs be valid again.

FS outputs

Example of the configuration of a restart interlock:

- In the user program of the programmable safety system, the value for COS=0 must be saved in a control variable.
- The user program must link this control variable logically to every safe output with AND.
- The user program must reset this control variable to valid by reintegration. Only then will the values of the safe inputs be valid again.

5.7.4 CIP Safety requirements on the user

When using the device with the CIP Safety Protocol, you must verify whether the following requirements are met:

- If you are configuring an SIL3 device directly in the workstation, you must compare the transferred Safety Configuration ID and configuration data with the Safety Configuration ID and configuration data displayed in the workstation.
- You must run your own user tests to verify that the configuration data has been downloaded correctly.
- LEDs are not safe and should only be used for non-safety-related purposes. Use LEDs only for general diagnostics during commissioning or troubleshooting. Do not use LEDs for display during operation.
- For every safety network or safety subnet, you must issue a Safety Network Number (SNN) that is unique across the entire system.
- If you configure the Safety Configuration Identifier (SCID), also known as the Configuration Signature, of a safety connection with “0”, you must ensure that the scanner and the adapter are configured correctly.
- In the scanner you must only use the “automatic” setting for the Safety Network Number (SNN) if the system is not safety-related.
- Before installing a safety device in a safety network, you must delete a configuration already existing on this device.
- Before changing a safety device, you must ensure that the replacement device is configured correctly. After making the change, verify that the exchanged device is working properly.

5.8 System reaction times

Calculation of the processing times for dual-channel signals.

FS cycle time of the module

The FS cycle time t_{FS_Cycle} of the module is 4 ms.

Worst-case reaction time of an input

Calculation of the maximum time between a signal changing at the input and the signal being available at the fieldbus interface:

Worst-case reaction time of an input = $7 * t_{FS\_Cycle} + t_{ProcIM\_ofd}$

t_{ProcIM_ofd} : Maximum processing time of the input module when a fault occurs, see under "Reaction time" of the input module.

Worst-case reaction time of an output

Calculation of the maximum time between the signal being received at the fieldbus interface and the output switching:

Worst-case reaction time of an output = $6 * t_{FS\_Cycle} + t_{ProcOM\_ofd}$

t_{ProcOM_ofd} : Maximum processing time of the output module when a fault occurs, see under "Reaction time" of the output module.

6 Installation

6.1 General installation guidelines

Please refer to the PSS u2 Installation Manual.

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

NOTICE

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.

6.2 Dimensions in mm

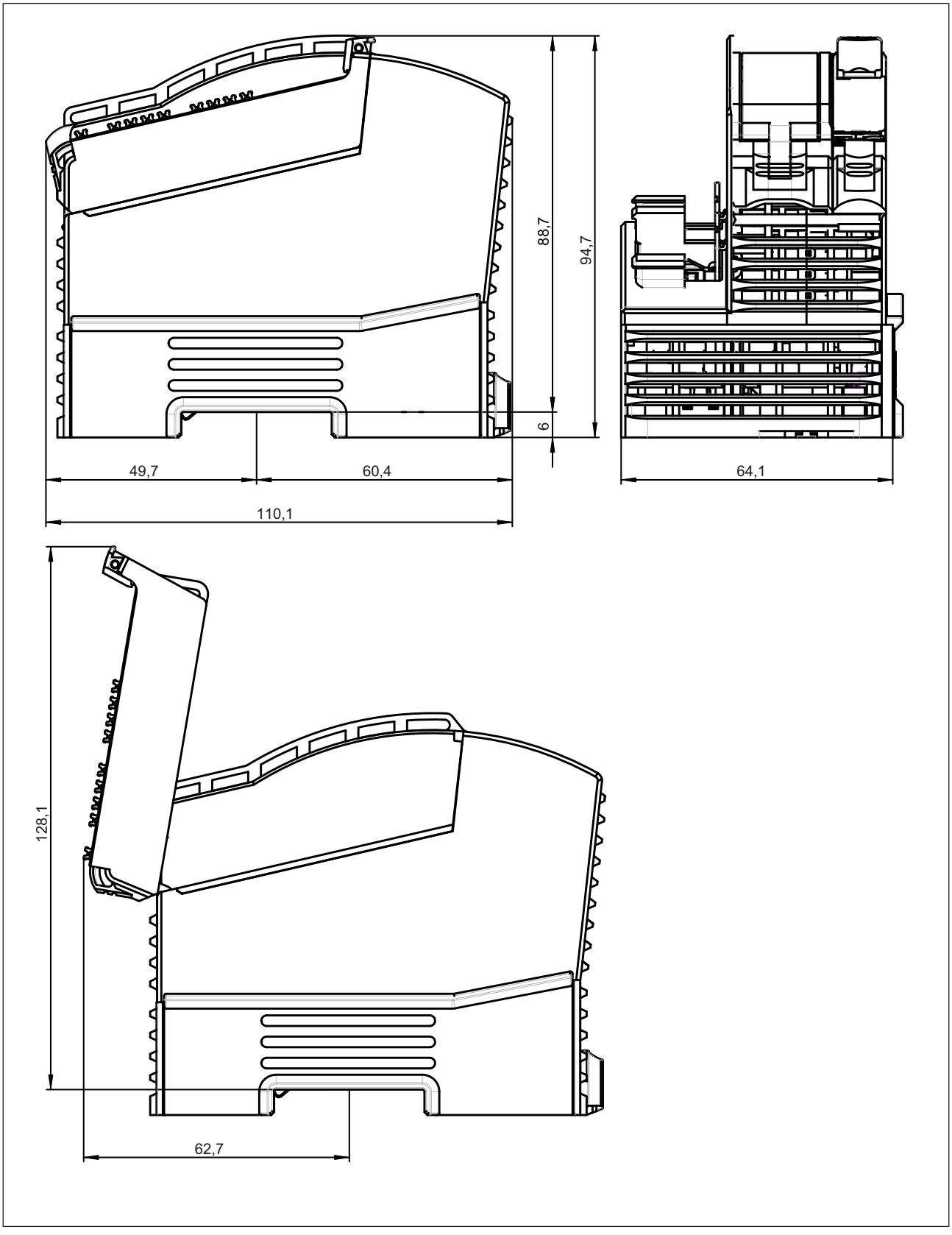
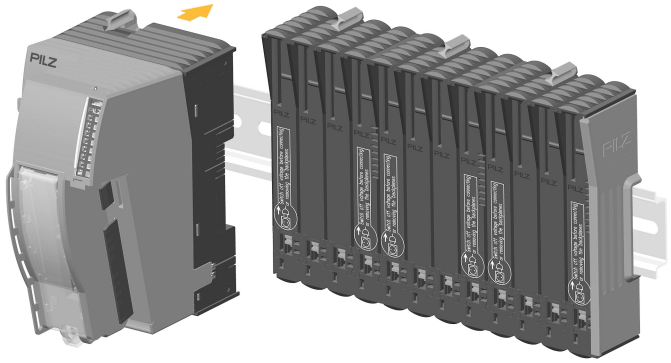
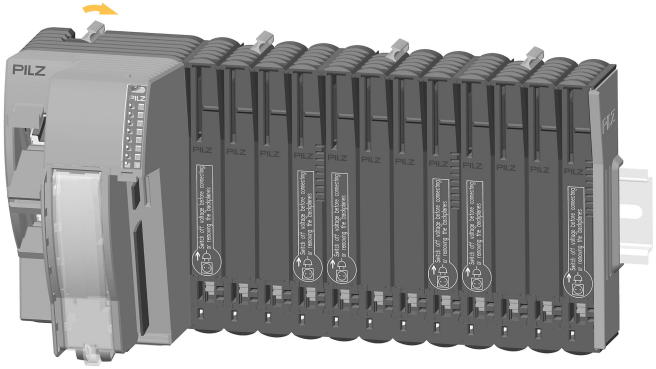


Fig.: Dimensions in mm

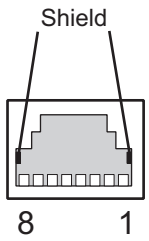
6.3 Installing the head module

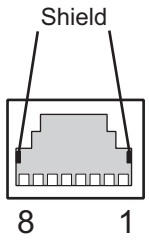
Prerequisite:

The mounting rail must be installed.

1. Plug the head module on to the mounting rail. Please note: The mounting rail interlock must be in the open position, to the left.	
2. Rotate the mounting rail interlock to the right to lock the head module on the mounting rail	

7 Interfaces

X3		
RJ45 female connector	8-core CAT-5 Ethernet patch cable	

X4		
RJ45 female connector	8-core CAT-5 Ethernet patch cable	

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").

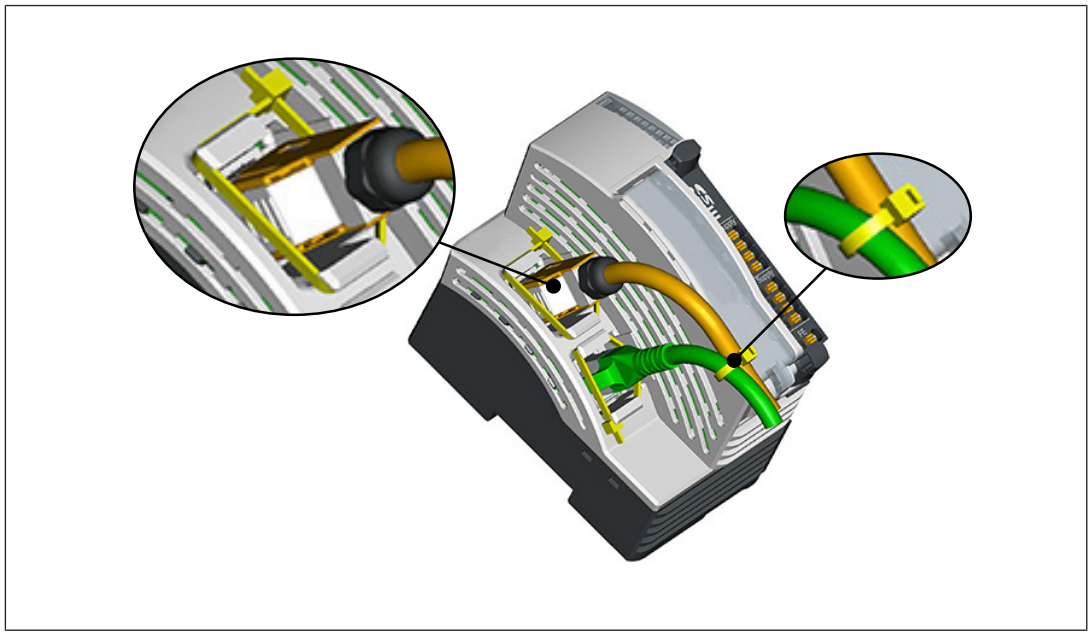


Fig.: Additional options for fastening the data cable on the head module and locking the connector using cable ties

- Remove the cable ties before pulling the plug.

8 Wiring

8.1 General wiring guidelines

- The requirements of the supply voltages can be found under "Technical details [📖 34]".
- Protective separation must be ensured for the external power supplies that generate the supply voltages. Failure to do so could result in electric shock.
- The supply voltages must be extra low voltages with safe electrical separation (PELV or SELV) in accordance with VDE 0100, Part 410. The external power supplies must comply with the current applicable standard EN 60950-1, EN 61140, EN 50178 or EN 61558-1.
- UL requirement: The supply voltages for module supply and periphery supply must be extra low voltages with safe electrical separation (PELV or SELV) in accordance with UL 61010-2-201 (IEC 61010-2-201:2013).
- The maximum current load for the periphery supply is 8 A.
- Earth the 0 V supply on the periphery supply or monitor each supply group for earth faults.
- The connection of the 0 V supply to the central earth bar or earth fault monitor must be in accordance with relevant national regulations (e.g. EN 60204-1, NFPA 79:17-7, NEC: Article 250).
- Details of the minimum range for cable cross sections on connection terminals can be found under "Technical details [📖 34]".
- Use copper wiring.
- The mounting rail must be earthed on both sides.

8.2 Connecting the module

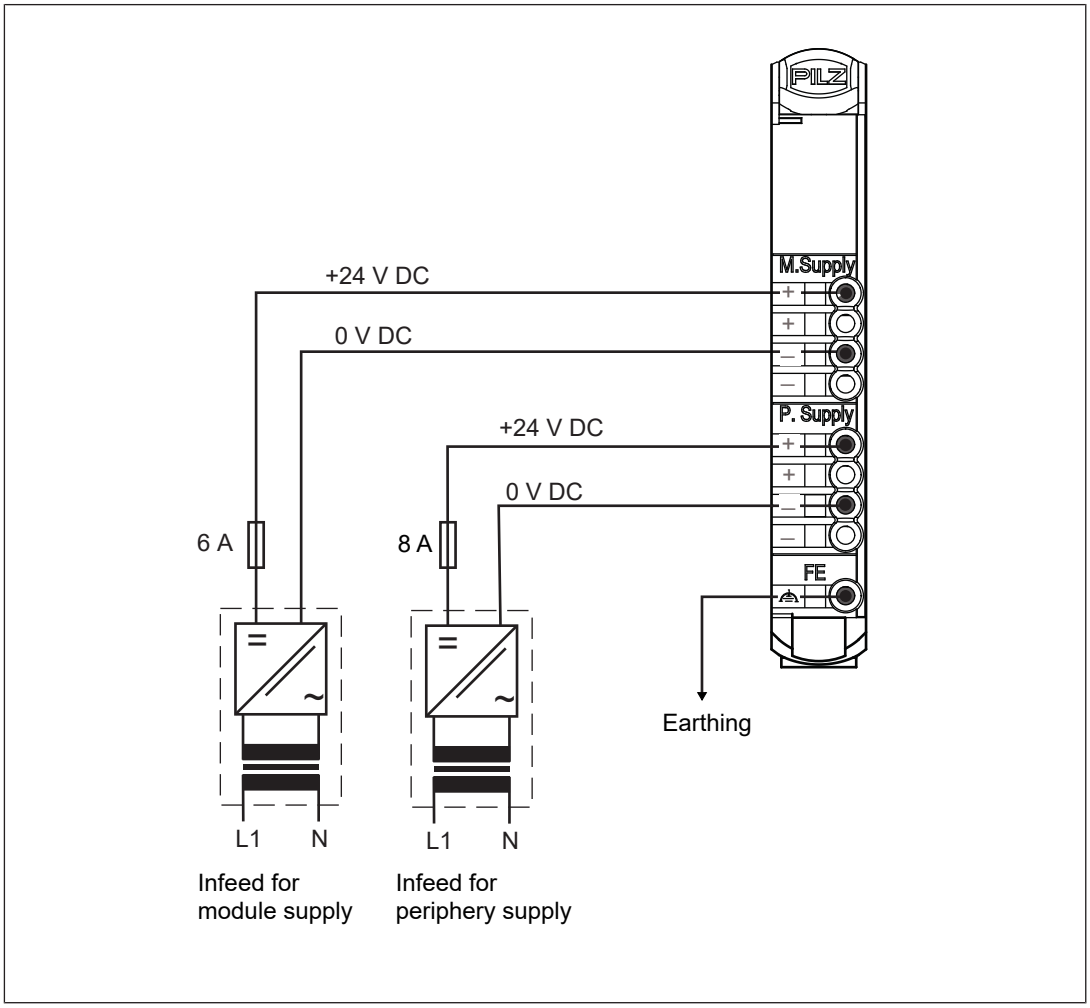


Fig.: Separate power supplies for module supply and periphery supply

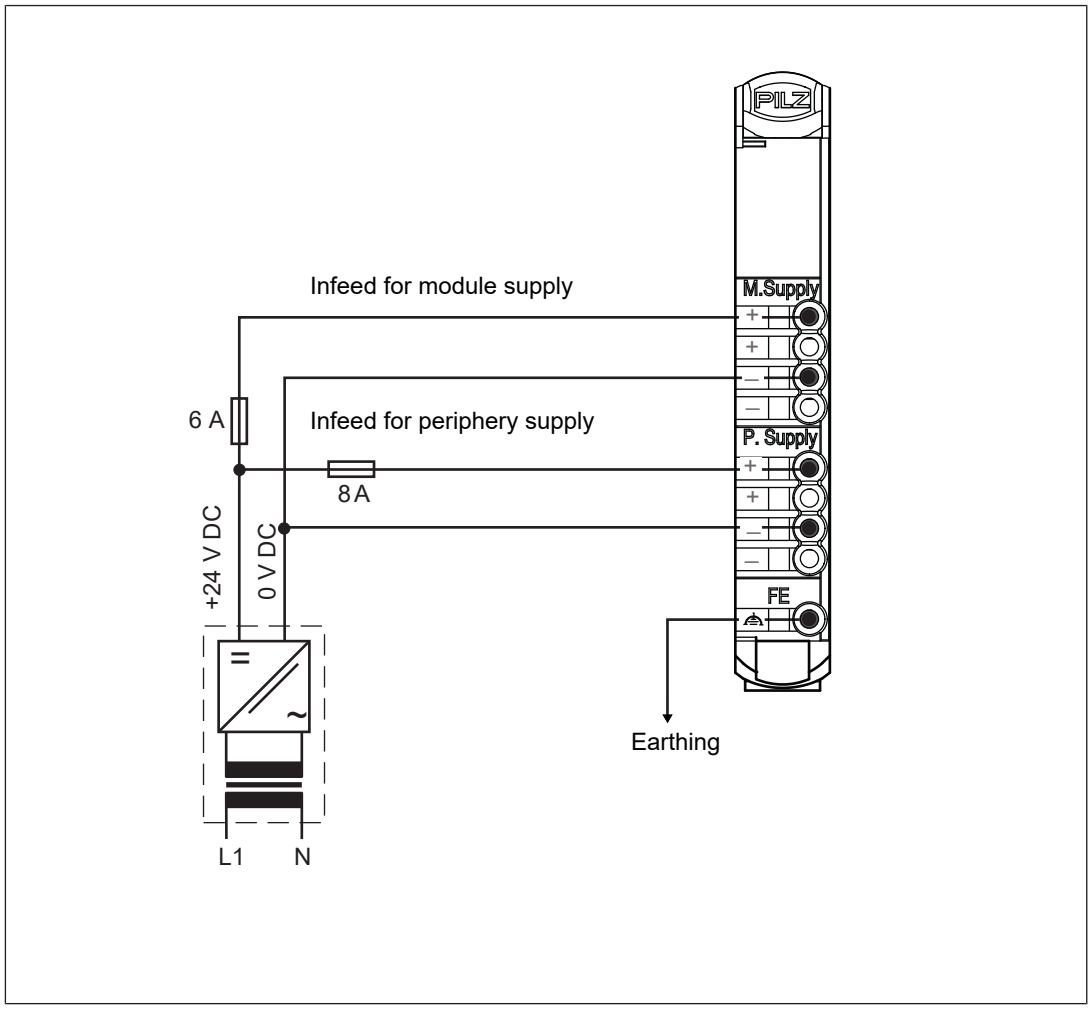


Fig.: Common power supply for module supply and periphery supply

Use the following fuses:

Module supply: max. 6 A characteristic B/C

Periphery supply: max. 10 A characteristic B/C

9 Operation

9.1 Display elements

The head module contains a number of status LEDs, which provide information on the status of various system sections.

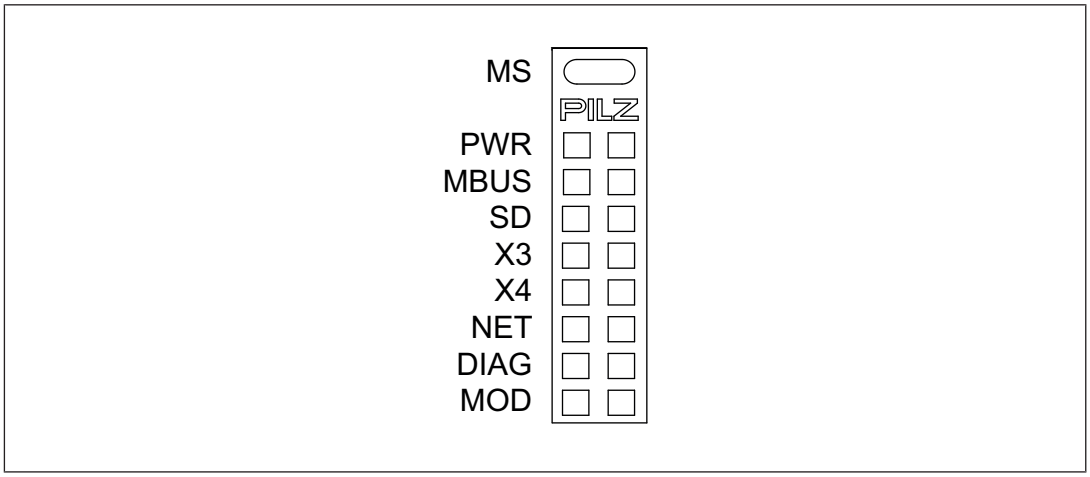


Fig.: LEDs of the head module PSS u2 P0 F/S EIP2

9.1.1 MS

Colour	State	Meaning
- - -	●	No supply voltage/not ready for operation
Green	◐	Head module ready for operation
Green	☼	Head module in operation
Red	◐ϟ	Module bus error
Red	☼	Head module error
Red	◐	Updating firmware

9.1.2 PWR

Colour	State	Meaning
- - -	●	No supply voltage
Yellow	☼	Periphery supply is not available
Green	☼	Periphery supply and module supply ok

9.1.3 MBUS

The "MBUS" LED indicates the status of the ST module bus.

Colour	State	Meaning
- - -	●	ST module bus not in operation
Green		ST module bus operating without error
Yellow		The configured hardware registry does not match the actual hardware registry

9.1.4 SD

Colour	State	Meaning
- - -	●	No microSD card present
Yellow		Confirmation for accepting the device project and configuration expected
Green		microSD card present

9.1.5 X3, X4

These status LEDs are the display elements for the interfaces (X3 and X4). Each of the two interfaces is assigned an LED. Various operating and fault states are displayed via the LEDs.

X3, X4

Colour	State	Meaning
---	●	No network connection
Green		Network connection present
Green		Data traffic is error-free

9.1.6 NET

Colour	State	Meaning
- - -	●	Device switched off or not online
Green		No active network connections
Green		Active network connections available
Red		One or more I/O connections timed out
Red		Communication has failed
Red/green		Device has discovered a network access error and the connection has failed or the device is in self-test

9.1.7 DIAG

The “DIAG” LEDs indicate whether a diagnostic message is present.

Colour	State	Meaning
Red	☼	Diagnostic entry present
---	●	No diagnostic entry present

9.1.8 MOD

Colour	State	Meaning
---	●	No supply voltage present
Green	☼	Device in operation
Green	◐	Device is in Idle or Standby mode
Red	◐	Repairable error
Red	☼	Internal error
Red/green	◐	Device is in self-test or the configuration is not complete

Legend

☼ LED on

◐ LED flashes

◐ϟ LED flashes briefly

● LED off

10 Maintenance and repair

No maintenance work is required on a PSS u2 system. Please return faulty PSS u2 systems and/or modules to Pilz.

INFORMATION

When replacing modules and PSS u2 systems, observe the information on assembly/disassembly in the PSS u2 installation guidelines.

11 Technical Details

General	
Certifications	**CE, EAC, TÜV, UKCA, cULus Listed**
Application range	**Standard/failsafe**
Module's device code	**C008h**
Electrical data	
Supply voltage	
for	**Module supply**
Voltage	**24 V**
Kind	**DC**
Voltage tolerance	**-30 %/+25 %**
Output of external power supply (DC)	**28,8 W**
Output of external power supply (DC) at no load	**5 W**
Max. output power	**22 W**
Residual ripple DC	**5 %**
Potential isolation	**Yes**
Buffer time	**20 ms**
Supply voltage	
for	**Periphery supply**
Voltage	**24 V**
Kind	**DC**
Voltage tolerance	**-30 %/+25 %**
Max. permitted current	**8 A**
Output of external power supply (DC)	**192 W**
Output of external power supply (DC) at no load	**0,5 W**
Residual ripple DC	**5 %**
Potential isolation	**Yes**
Removable data medium	
Type	**microSD**
EtherNet/IP (TM) adapter	
Vendor ID	**181**
Product ID	**255**
Device type	**Adapter**
Cycle time (RPI)	**1 ... 3200 ms**
Maximum data length	**508 Byte**
Maximum number of I/O connections	**1**
Certification	**ODVA**
Transmission rate	**100 Mbit/s**
CIP Safety	
Cycle time (RPI)	**10 … 3200 ms**
Maximum data length	**248 Byte**
Maximum number of I/O connections	**2**

Environmental data	
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	**0 - 60 °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 60068-2-78**
Humidity	**93 % r. h. at 40 °C**
Condensation during operation	**Not permitted**
Max. operating height above SL	**2000 m**
EMC	**EN 61131-2 (Zone B)**
Vibration	
in accordance with the standard	**EN 60068-2-6**
Frequency	**8,4 - 150 Hz**
Acceleration	**10 m/s²**
Shock stress	
in accordance with the standard	**EN 60068-2-27**
Acceleration	**150 m/s²**
Duration	**11 ms**
Airgap creepage	
in accordance with the standard	**EN 61131-2, UL/IEC 61010-2-201**
Overvoltage category	**II**
Pollution degree	**2**
Protection type	
Housing	**IP20**
Mounting area (e.g. control cabinet)	**IP54**
Potential isolation	
Potential isolation between	**Supply voltage for module supply and periphery supply**
Type of potential isolation	**Functional insulation**
Rated surge voltage	**2500 V**
Potential isolation between	**Supply voltage for module supply and module supply**
Type of potential isolation	**Functional insulation**
Rated surge voltage	**2500 V**
Potential isolation between	**Periphery supply and module supply**
Type of potential isolation	**Functional insulation**
Rated surge voltage	**2500 V**
Potential isolation between	**Module Supply and EtherNet/IP (TM)**
Type of potential isolation	**Functional insulation**
Rated surge voltage	**1500 V**

Mechanical data	
Material	
Bottom	**PPE**
Top	**PC**
Connection type	**Spring-loaded terminal**
Mounting type	**plug-in**
Conductor cross section with spring-loaded terminals: Flexible with/without crimp connector	**0,15 - 1,5 mm², 26 - 14 AWG**
Dimensions	
Height	**110,1 mm**
Width	**64,1 mm**
Depth	**94,7 mm**
Weight	**230 g**

Where standards are undated, the 2017-05 latest editions shall apply.

11.1 Safety characteristic data

NOTICE

You must comply with the safety characteristic data in order to achieve the required safety level for your plant/machine.

Operating mode	EN ISO 13849-1: 2015 PL	EN ISO 13849-1: 2015 Category	EN IEC 62061 SIL CL/max. SIL	EN IEC 62061 61508 PFH [1/h]	EN/IEC 61511 61508 SIL	EN/IEC 61511 61508 PFD	EN ISO 13849-1: 2015 T_M [year]
2-channel	**PL e**	**Cat. 4**	**SIL CL 3**	**2,80E-09**	**SIL 3**	**8,91E-05**	**20**

All the units used within a safety function must be considered when calculating the safety characteristic data.

INFORMATION

A safety function's SIL/PL values are **not** identical to the SIL/PL values of the units that are used and may differ from these.

The safety-related characteristic data (PFH, PFD) are mean values. They have been calculated at an average ambient component temperature of 40 °C.

12 Network data

Log	Direction	Transport log	Port no.	Can be deactivated	Time-critical	Description
Tool interface	In	TCP	18080	No	No	Communication with the configuration tool
EtherNet/IP	In	TCP		No	No	EtherNetIP GET service
EtherNet/IP	In	TCP		No	No	EtherNetIP SET service
EtherNet/IP	In	TCP		No	Yes	Log data
EtherNet/IP	In/out	UDP		No	Yes	Process data

13 Order reference

Product type	Features	Order no.
PSS u2 P0 F/S EIP2	Head module with EtherNet/IP connection	328072

13.1 Accessories

Terminal block

Product type	Features	Order no.
PSS u2 T 9 SD (1 pc.)	Terminal block 9-pin for head module, supplied with: 1 piece	328831

microSD card

Product type	Features	Order no.
µSD memory card 1GB industrial	microSD memory card 1GB, industrial version, for PSS u2 head modules	328836

Shield connection element

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

Labelling bracket

Product type	Features	Order No.
PSS u2 A LC E1 (10 pcs.)	Labelling bracket for electronic module 23.5 x 10.5 mm, scope of delivery: 10 pieces	328910
PSS u2 A LC E2 (10 pcs.)	Labelling bracket 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

14 EC declaration of conformity

This product/these products meet the requirements of the directive 2006/42/EC on machinery of the European Parliament and of the Council. The complete EC Declaration of Conformity is available on the Internet at www.pilz.com/downloads.
Representative: Pilz GmbH & Co. KG, Felix-Wankel-Str. 2, 73760 Ostfildern, Germany

15 UKCA-Declaration of Conformity

This product(s) complies with following UK legislation: Supply of Machinery (Safety) Regulation 2008.
The complete UKCA Declaration of Conformity is available on the Internet at www.pilz.com/downloads.

Representative: Pilz Automation Technology, Pilz House, Little Colliers Field, Corby, Northamptonshire, NN18 8TJ United Kingdom, eMail: mail@pilz.co.uk

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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.

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