



▶ PSSu E F BSW(-T)

PILZ
THE SPIRIT OF SAFETY

Operating Manual-21372-EN-07

- Decentralised system PSSuniversal I/O



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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.

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SD means Secure Digital

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1 Introduction

1.1 Validity of documentation

This documentation is valid for the products PSSu E F BSW and PSSu E F BSW-T. It is valid until new documentation is published.

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

Electronic module to switch off the periphery supply for failsafe applications

1.1.1 Retaining the documentation

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

1.2 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 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.

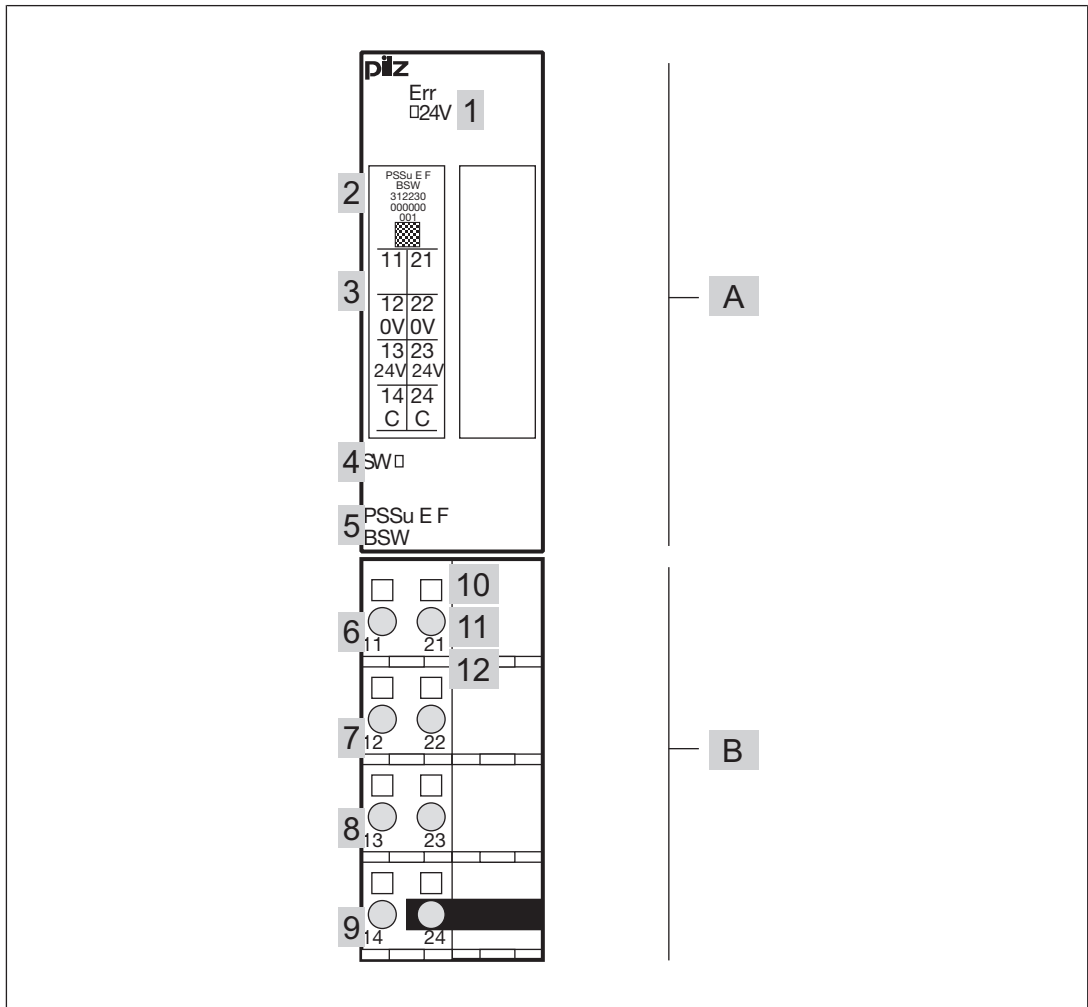
Details of the base modules that can be used are available in the chapter entitled “Intended Use”.

2.2 Module features

The product has the following features:

- ▶ Infeed for periphery supply
- ▶ Infeed for C-rail supply
- ▶ Failsafe switching off of the periphery supply (block switching)
- ▶ LEDs for:
 - Switch status of periphery supply
 - Periphery supply
 - Module error
- ▶ Application range depends on the base module
- ▶ T-type:
 - PSSu E F BSW-T: for increased environmental requirements

2.3 Front view



Legend:

- ▶ A: Electronic module
- ▶ B: Base module
- ▶ 1: LED for module diagnostics
- ▶ 2: Labelling strip with:
 - Name of electronic module
 - Order Number
 - Serial number
 - Hardware version number
 - 2D code
- ▶ 3: Labelling strip for the terminal configuration on the base module
- ▶ 4: Status LEDs
- ▶ 5: Name of electronic module
- ▶ 6: Connection level 1
- ▶ 7: Connection level 2
- ▶ 8: Connection level 3

- ▶ 9: Connection level 4
- ▶ 10: 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
- ▶ 11: Round connection holes (connection levels 1, 2, 3 and 4) for connecting the signal lines
- ▶ 12: Mounting slot for colour marker to label the connection level (connection levels 1, 2, 3 and 4)

3 Safety

3.1 Intended use


The module meets the requirements of EN IEC 61508 up to SIL3 and EN 954-1 up to Category 4.


The module may be used to switch off the periphery supply on standard modules.

- ▶ If the module is used to switch off standard output modules (e.g. PSSu E S 4DO 0.5 or PSSu E S 2DO 2), Category 3 of EN 954-1 can be achieved.
- ▶ If the module is used to switch off modules of type PSSu E PD, Category 4 of EN 954-1 can be achieved.

The module may be used to switch:

- ▶ Resistive loads
- ▶ Inductive loads

The module PSSu E F BSW-T is suitable for use where there are increased environmental requirements (see [Technical details](#) [ 32]).

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](#) [ 36]).

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
- ▶ Any use of the module that is not in accordance with the technical details.



INFORMATION

The module is supported by the PSSuniversal Configurator and PSSuniversal Assistant from Version 1.4.0. We recommend that you always use the latest version (download from www.pilz.de).

The PSSu E F BSW module may be used in conjunction with the following base modules:

- ▶ PSSu BS 2/8 S
- ▶ PSSu BS 2/8 C

The module PSSu E F BSW-T may be used in conjunction with the following base modules:

- ▶ PSSu BS 2/8 S-T
- ▶ PSSu BS 2/8 C-T

**WARNING!**

The module may **not** be used in combination with compact modules or modules with relay outputs in safety-related applications.

3.2 Safety regulations

3.2.1 Use of qualified personnel

The products may only be assembled, installed, programmed, commissioned, operated, maintained and decommissioned 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. To be able to inspect, assess and operate devices, systems and machines, the person has to be informed of 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.

3.2.2 Warranty and liability

All claims to warranty and liability will be rendered invalid if

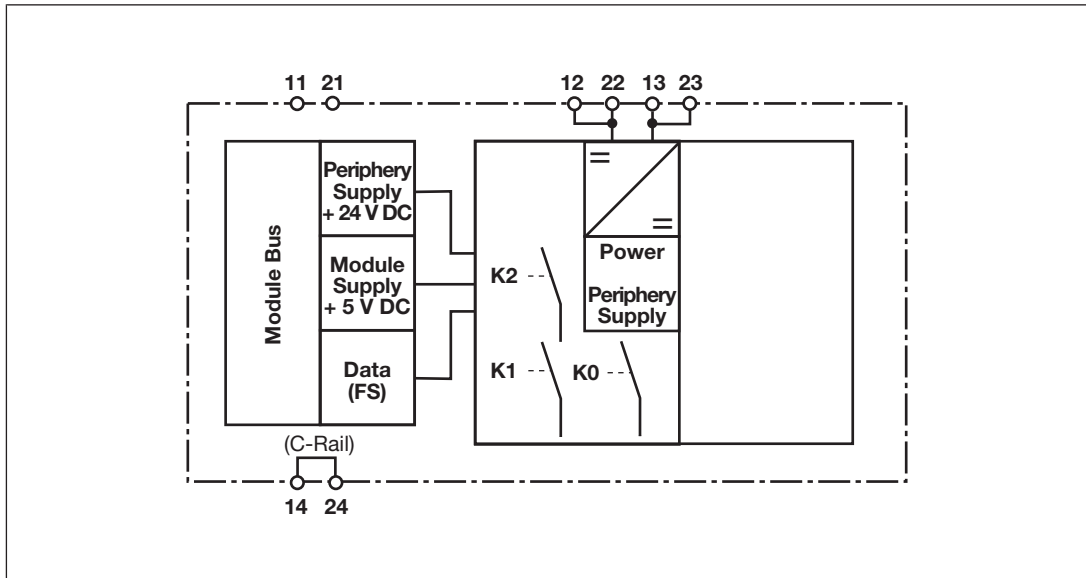
- ▶ The product was used contrary to the purpose for which it is intended,
- ▶ Damage can be attributed to not having followed the guidelines in the manual,
- ▶ Operating personnel are not suitably qualified,
- ▶ Any type of modification has been made (e.g. exchanging components on the PCB boards, soldering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

3.2.3 Disposal

- ▶ In safety-related applications, please comply with the mission time T_M 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 Function description

4.1 Block diagram



4.2 Module features

4.2.1 Integrated protection mechanisms

The module has the following protection mechanisms:

- ▶ Periphery supply
 - Voltage monitoring (exceeding upper/lower limit)
- ▶ 2 relay contacts connected in series to feed the periphery supply: +24 V DC
- ▶ 1 relay contact to feed the periphery supply: 0 V DC
- ▶ Thermistor monitor

The module provides the following diagnostic data:

- ▶ Start-up error
- ▶ Configuration error
- ▶ FS communication error
- ▶ Bus termination error
- ▶ Temperatur error: Too warm
- ▶ Temperatur error: Too hot
- ▶ Relay control error
- ▶ Relay error
- ▶ Block switching output error
- ▶ Overvoltage error
- ▶ Undervoltage error
- ▶ Error in the overvoltage protection diodes

4.2.2 Functions

Module supply

- ▶ The module supply provides the module with voltage.

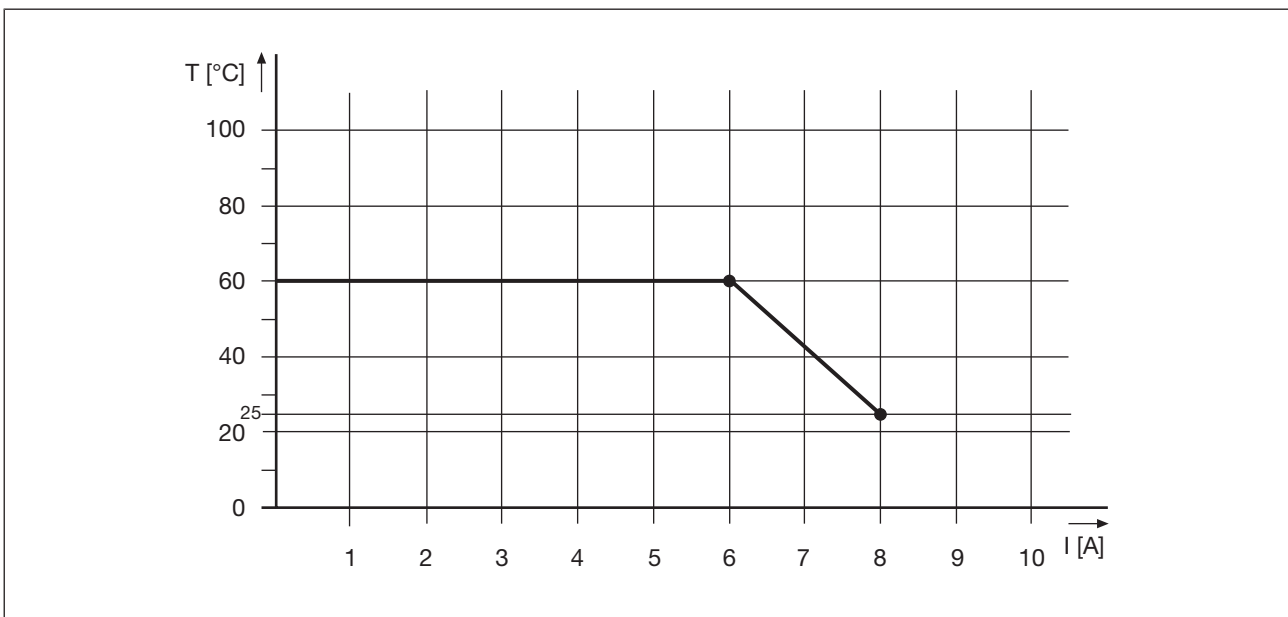
Voltage infeed

- ▶ Refreshing the periphery supply: The relevant base module interrupts the connection to the incoming (left-hand) periphery supply and C-rail on the module bus.
- ▶ Supply to the module bus:
 - Periphery supply for subsequent modules (right-hand side)
 - C-rail supply for subsequent modules (right-hand side)
- ▶ The module does not automatically switch off the periphery supply in the case of under or overvoltage. However, there will be a visual signal ("24 V" LED) and a message will be sent to the head module (entry in the error stack).

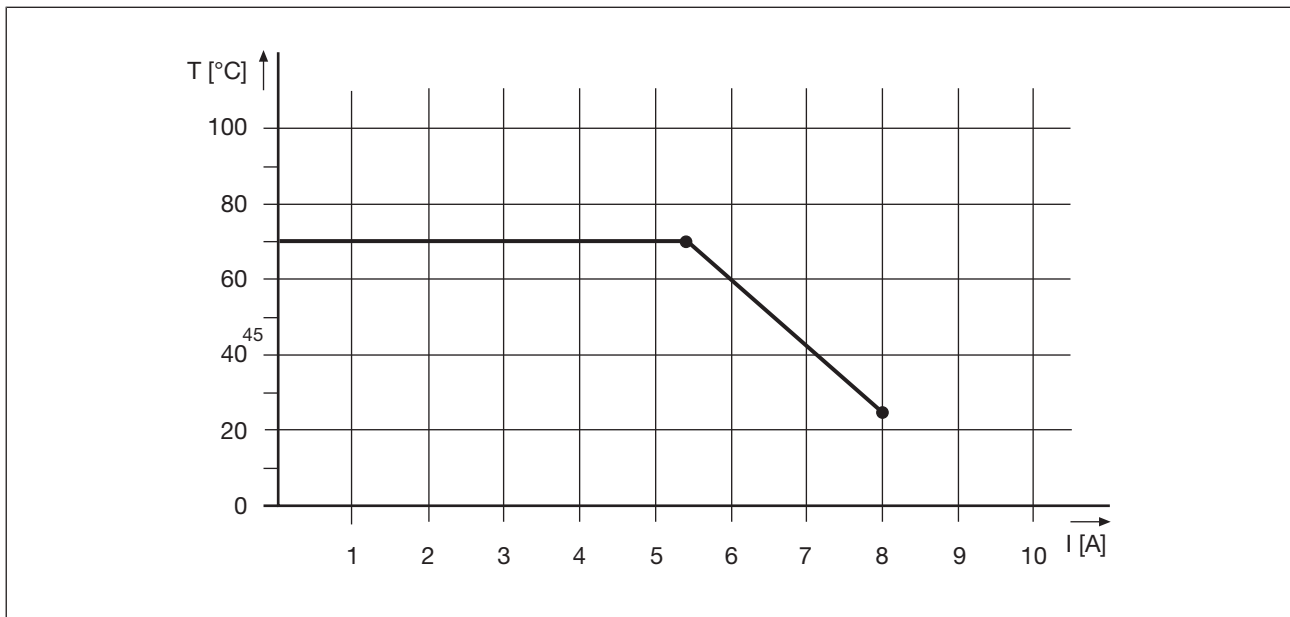
Block switching

- ▶ The module is used to switch off the periphery supply safely on standard modules that are arranged in blocks.
- ▶ Each output block requires its own block switching module.
- ▶ The periphery supply can be switched off via the controller's failsafe user program.
- ▶ The periphery supply is switched off if a module error is detected.
- ▶ A new supply voltage module or a terminating plate signifies the end of an output block.
- ▶ The relationship between the load current and the operating temperature is illustrated in the following derating diagram. The operating point should be below the characteristic curve.

Derating diagram (PSSu E F BSW): Permitted ambient temperature T dependent on load current I



Derating diagram (PSSu E F BSW-T): Permitted ambient temperature T dependent on load current I



4.3 Configuration

Functions for block switching can be defined in the PSSUniversal Configurator on the PSS WIN-PRO system software. Block switching is addressed as an FS output in the system software:

- ▶ Read access through the standard bus system:
"R" configuration



INFORMATION

The PSSUniversal Configurator on the PSS WIN-PRO system software must be used to define the I/O-Groups to which FS inputs and outputs belong (SafetyBUS p). The PSSu can be divided into sections A and B for this purpose. All the FS outputs on a PSSu always belong to section A.

Section A and section B on a PSSu may belong to different I/O-Groups.

Further information on configuration is available in the PSSUniversal Configurator's online help.

4.3.1 Addressing with SafetyBUS p

The SafetyBUS p address of an output is composed of the device address and the consecutive number of the FS output (<Device.address>.<Number of output>)

The following SafetyBUS p addresses are possible:

SafetyBUS p network	Address range
SafetyBUS p0	O32.00 _D ... O95.31 _D
SafetyBUS p 1	O132.00 _D ... O195.31 _D

4.3.2 Addresses in the process image

The module occupies one bit address in the process image. The process image in which the outputs are shown depends on the configuration of the FS outputs.

Configuration	SafetyBUS p	Standard bus system	
	FS-PIO	ST-PII	ST-PIO
None	1 Bit	---	---
Read ST ("R")	(e.g.: 32.00)	1 Bit	---

4.3.3 FS error behaviour

In the case of a safety-related error on an FS output, all FS outputs in the affected I/O-Group (SafetyBUS p) are shut down.

In the case of a safety-related error on an FS input, the process image of all FS inputs in the affected I/O-Group (SafetyBUS p) is set to zero.

The I/O-Group switches to a STOP condition. An error telegram is then triggered on SafetyBUS p and the error is entered in the PSSuniversal error stack.

5 Installation

5.1 General installation guidelines

Please refer also to the PSSuniversal Installation Manual.

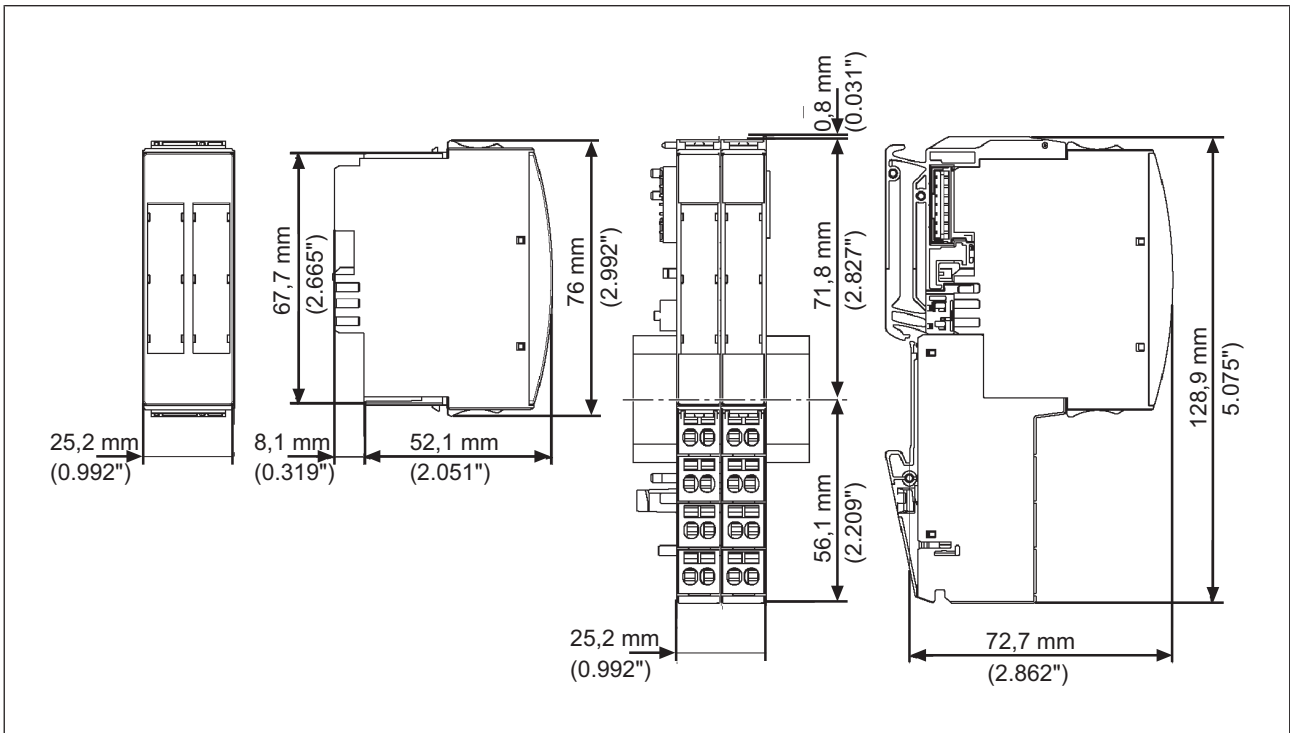


NOTICE

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.

5.1.1 Dimensions



5.2 Installing the base module

Prerequisite:

- ▶ The head module must be installed.
- ▶ If the head module does not have an integrated power supply, a supply voltage module must be installed to the right of the head module.

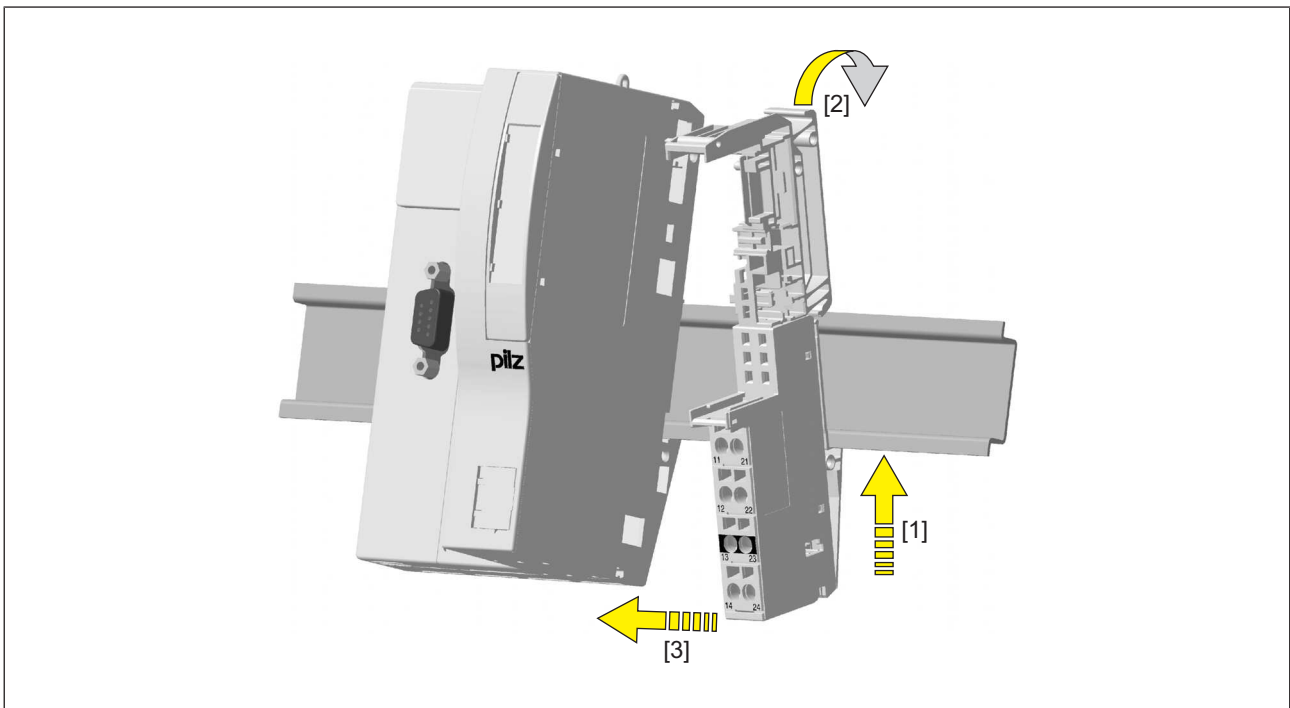
Please note:

- ▶ 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].

Schematic representation:



5.3 Inserting and removing an electronic module

Please note:

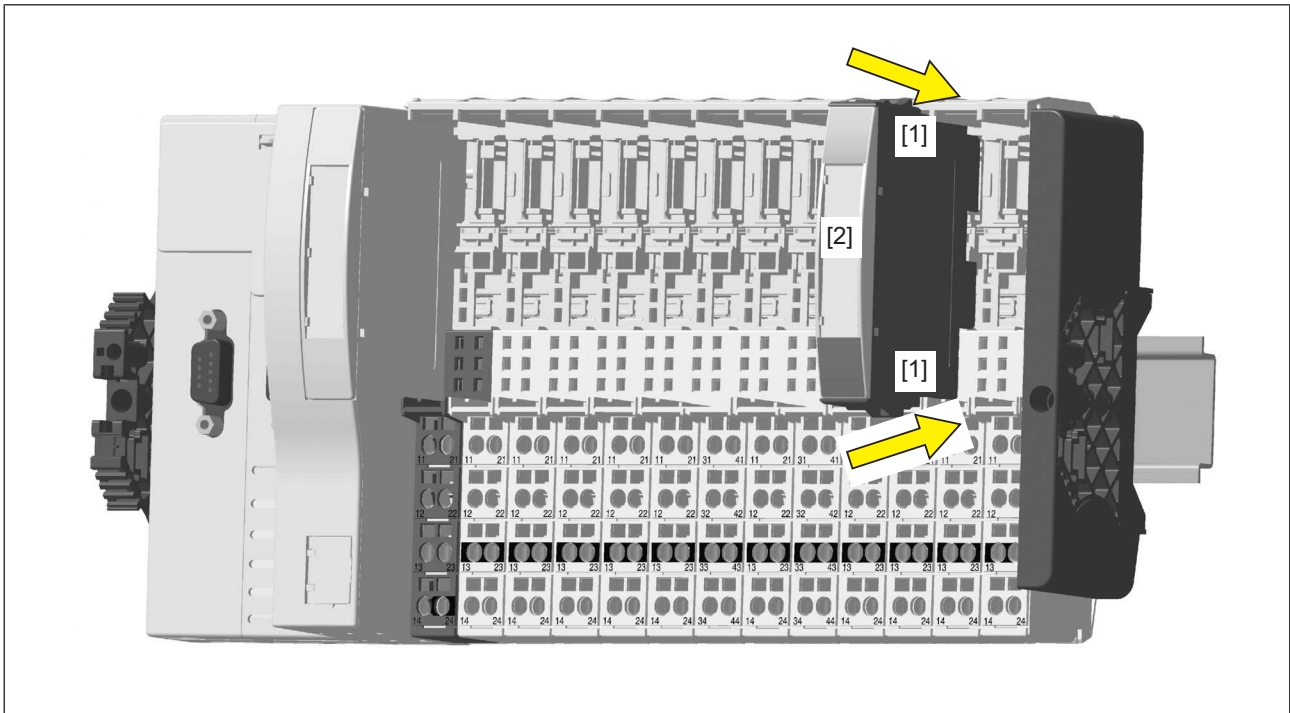
- ▶ Only insert on to base modules that are already installed.
- ▶ Preferably these base modules should be ready wired.
- ▶ Electronic modules with outputs may only be inserted and removed when the load is switched off. Unforeseeable error reactions may be triggered if modules are inserted and removed 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:

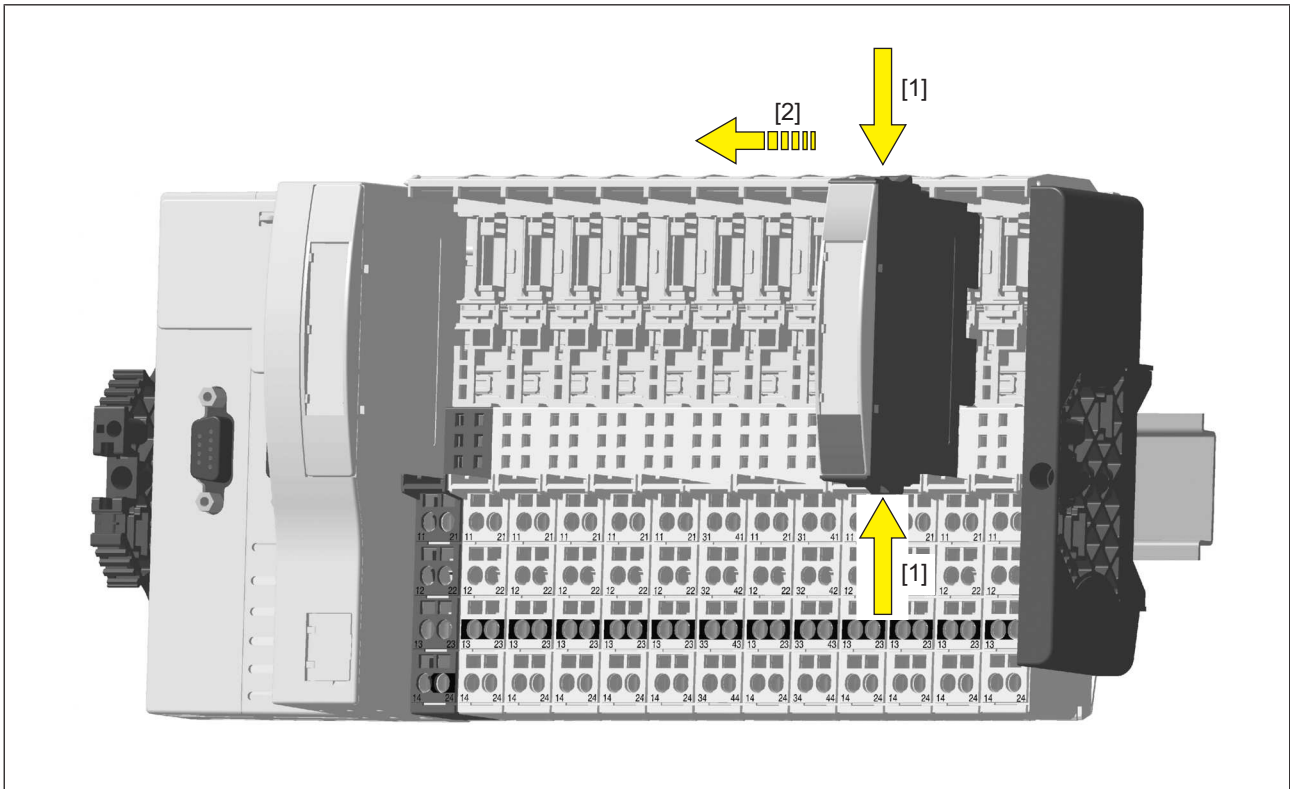


5.3.2 Removing an electronic module

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

The electronic module can be hot swapped. The configuration data is retained when a module is swapped.

Effects:

- ▶ System environment A:
 - In the event of a potential FS communication error, the FS section of the PSSu system and all relevant I/O-Groups (SafetyBUS p) switch to a STOP condition.



CAUTION!

Sparking can cause interference and errors!

Only change the module when the load is switched off!

6 Wiring

6.1 General wiring guidelines

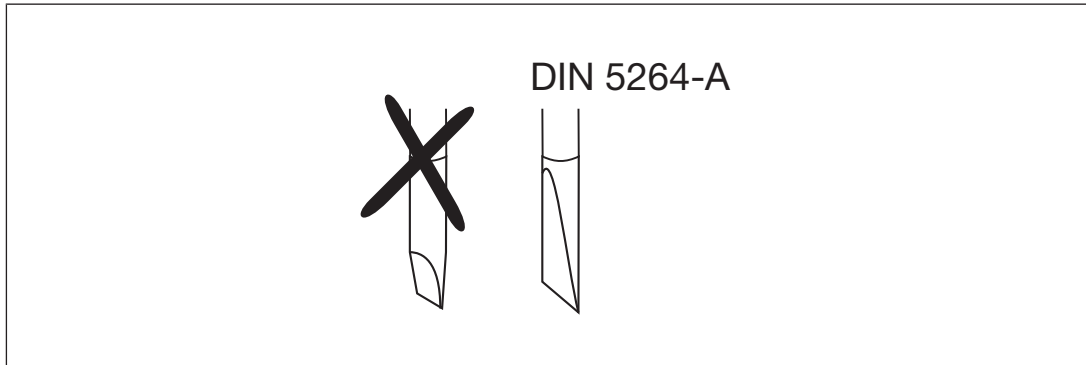
Please note:

- ▶ Please refer to the technical details regarding the requirements of the supply voltages.
- ▶ Safe electrical isolation must be ensured for the external power supplies that generate the supply voltages. Failure to do so could result in electric shock.
- ▶ The external power supplies must comply with the current applicable standard EN 60950-1, EN 61140, EN 50178 or EN 61558-1.
- ▶ The maximum current load for the C-rail is 10 A. Please refer to the derating diagram.
- ▶ Permitted infeed at the C-rail:
 - PE
 - 0 V
 - Shield
 - - 30 VDC ... +30 VDC
 - - 48 VAC ... + 48 VAC
- ▶ 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 the relevant national regulations (e.g. EN 60204-1, NFPA 79:17-7, NEC: Article 250).
- ▶ Minimum range for cable cross sections on connection terminals in mm²:
 - Power supply: 1.5 (AWG16) ... 2.5 (AWG12)
 - Functional earth: 1.5 (AWG16) ... 2.5 (AWG12)
- ▶ Use copper wiring.
- ▶ To prevent contact welding, a fuse should be connected before the periphery supply in-feed (see Technical details).

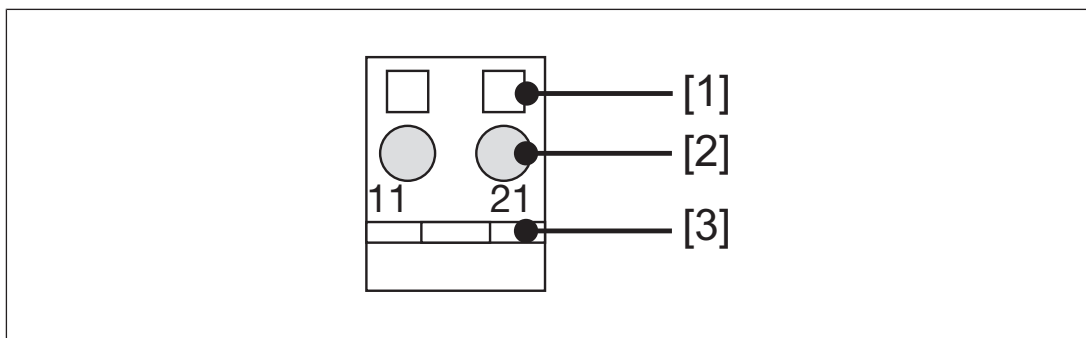
6.1.1 Mechanical connection of the base modules

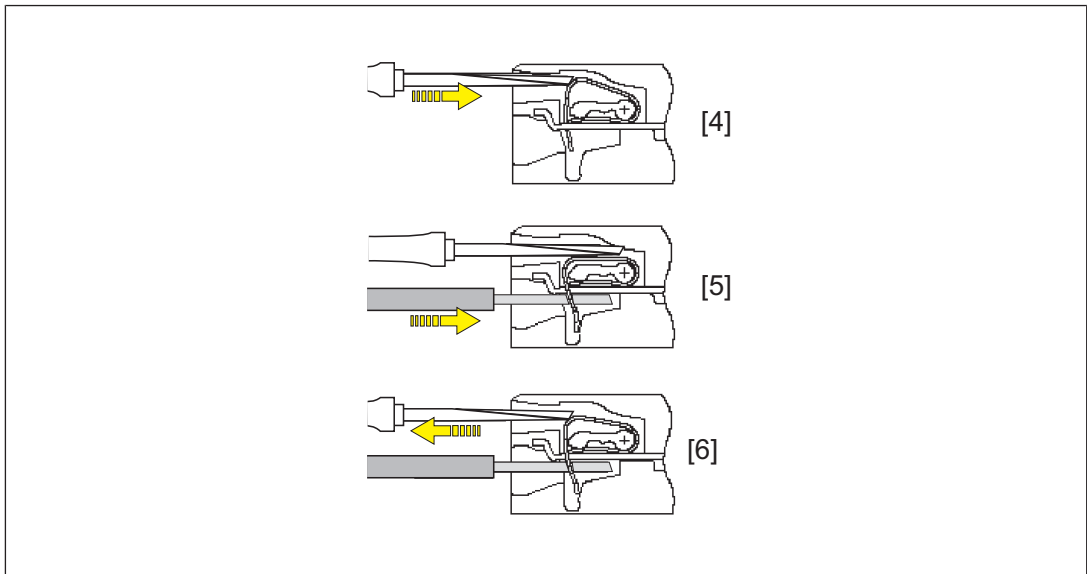
Procedure:

- ▶ Use a flat blade screwdriver (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.





Please note:

- ▶ The minimum cable cross section for field connection terminals on the base modules is 0.14 mm² (AWG26).
- ▶ The maximum cable cross section for field connection terminals is:
 - Digital inputs: 1.5 mm² (AWG16)
 - Digital outputs: 2.0 mm² (AWG14)
 - Inputs/outputs on the counter modules: 1.5 mm² (AWG16)
 - Analogue inputs/outputs: 1.5 mm² (AWG16)
 - Communication cables: 1.5 mm² (AWG16)
 - Test pulse outputs: 1.5 mm² (AWG16)
 - Power supply: 2.5 mm² (AWG12)
 - Functional earth: 2.5 mm² (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 mm², 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.
 - Maximum torque setting: 0.8 Nm
- ▶ Use copper wiring.

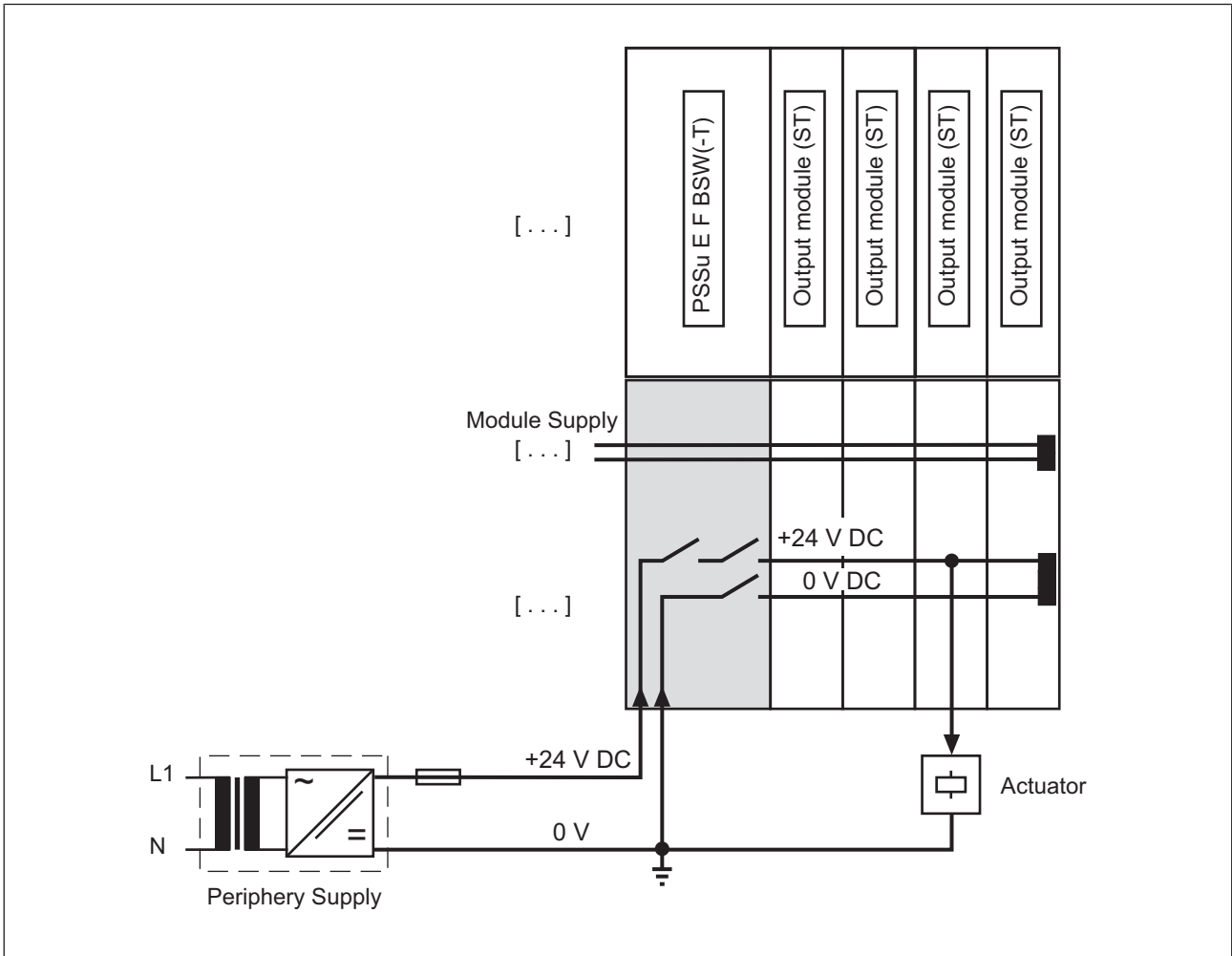
6.2 Terminal configuration

► Supply module

- To switch on/off the periphery supply to input/output blocks (block switching)
- To interrupt the incoming (left-hand) periphery supply and C-rail supply
- To provide subsequent (right-hand) modules with the periphery supply and C-rail supply

Base module	Terminal configuration	
Screw terminals: PSSu BS 2/8 S PSSu BS 2/8 S-T Cage clamp terminals: PSSu BS 2/8 C PSSu BS 2/8 C-T	11: Not connected 21: Not connected 12 -22: 0 V periphery supply, interrupted to the left (12-22 linked within the base module) 13 -23: +24 V periphery supply interrupted to the left (13-23 linked within the base module) 14 -24: C-rail supply, interrupted to the left (14-24 linked within the base module)	

Switching an earthed actuator

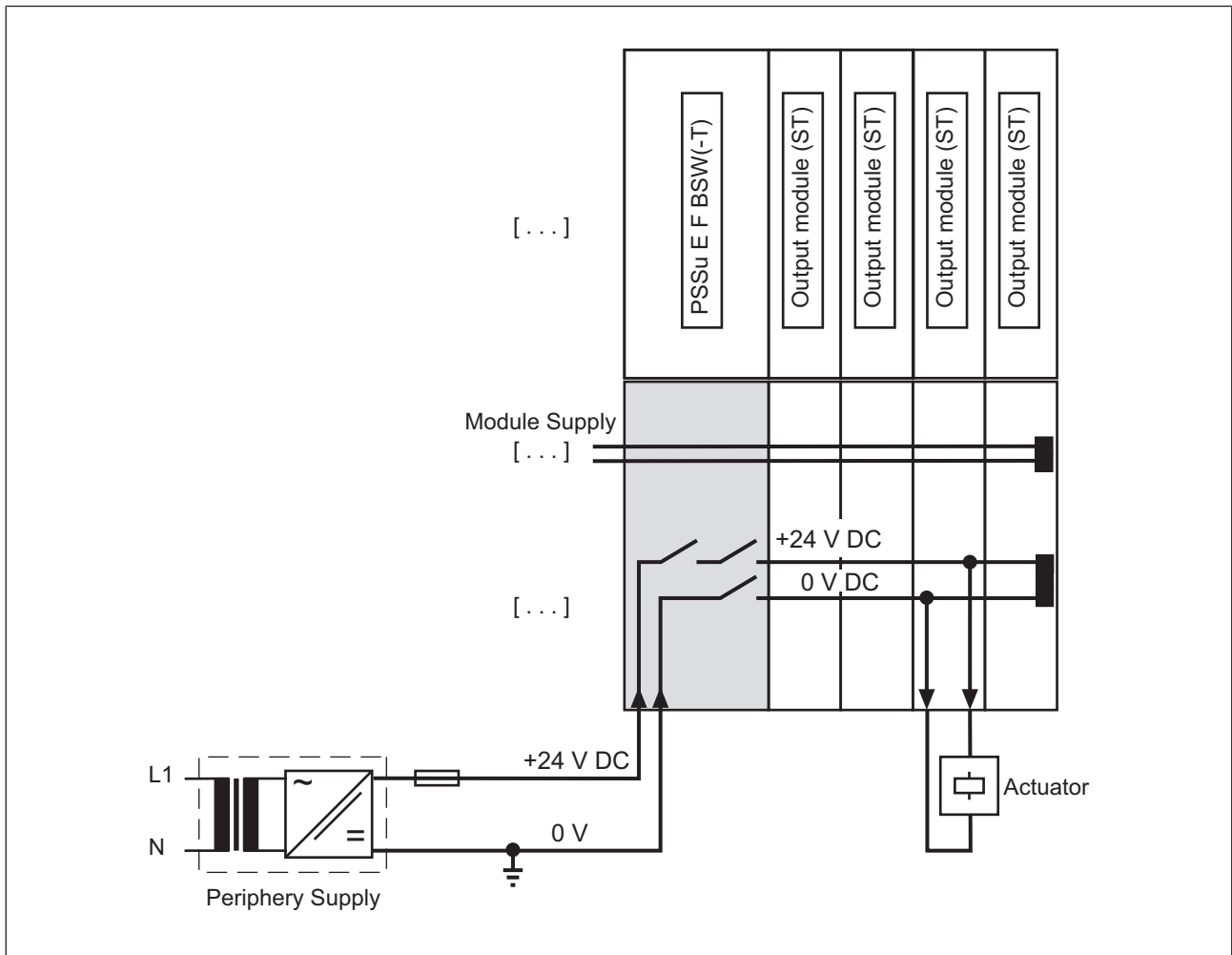


On earthed actuators, the actuator's 0 V connection must be connected to 0 V of the periphery supply (external supply voltage).

Reason: The switch (0 V periphery supply) in the PSSu E F BSW module is bridged when the actuator's earthed 0 V connection is connected to 0 V on the connected periphery supply. In this case, the PSSu E F BSW registers a short circuit between 0 V of the external supply voltage and 0 V of the connected periphery supply.

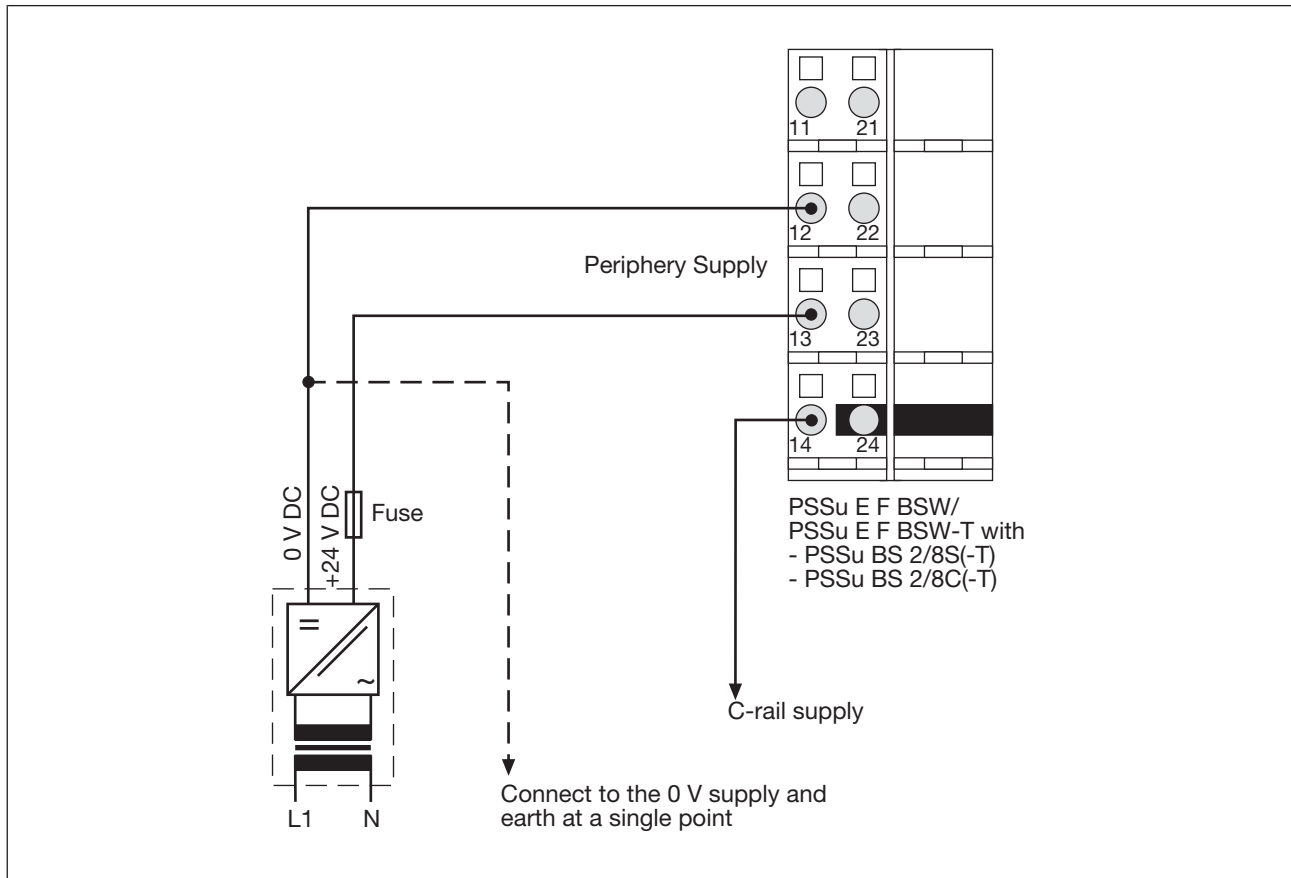
Error reaction: The PSSu will not start and all affected I/O-Groups (SafetyBUS p) remain in a STOP condition.

Switching a floating actuator



A floating actuator must be connected to the 0 V connection and to the 24 V connection of the connected periphery supply.

6.3 Connecting the module



If you are using actuators for safety-related functions, it is essential that you note the following:

- ▶ A safety assessment must be made for each individual application.
- ▶ Input modules may not be used within an output block. If an error occurs, input modules could supply an external voltage which cannot be switched off.
- ▶ The position of each single actuator must be monitored, e.g. via an FS feedback loop with test pulses.
- ▶ To prevent contact welding, a fuse should be connected before the periphery supply in-feed (see Technical details).
- ▶ The following applies for floating actuators:
All actuator masses must be fed back to the output modules.
- ▶ The following applies for earthed actuators:
The possibility of a short circuit to + 24 V of the external supply voltage must be excluded.

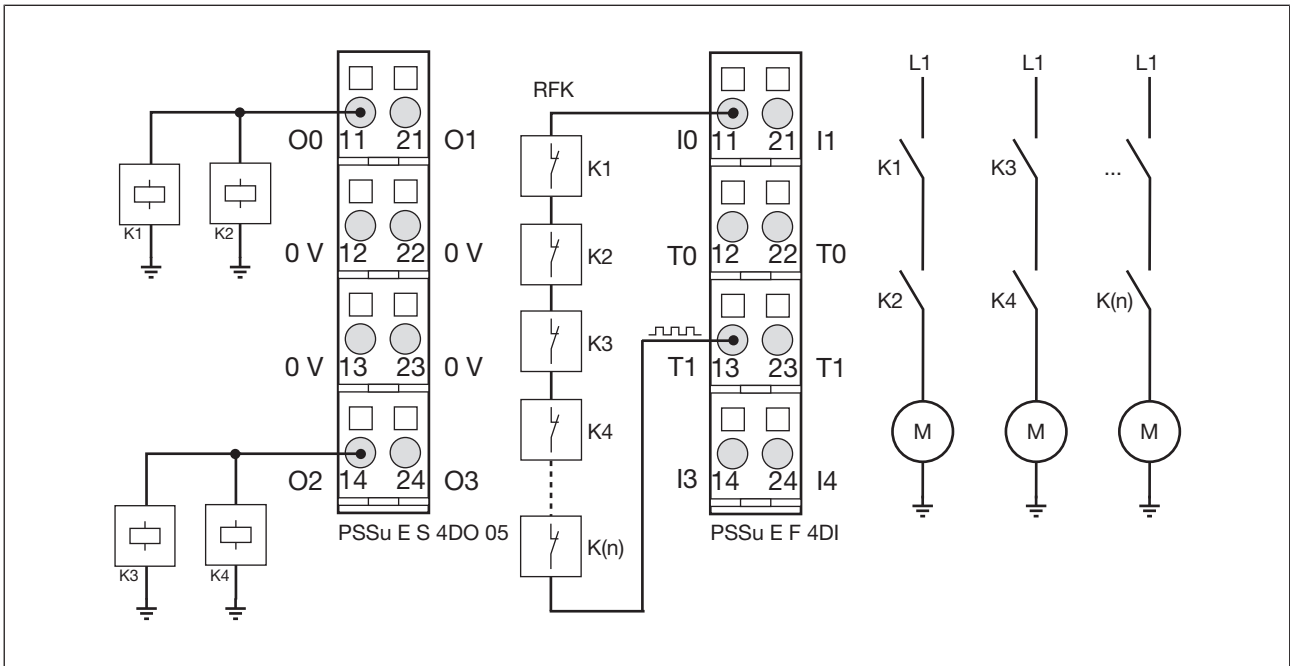
When using modules of type PSSu E PD in an output block, please note the following:

- ▶ Do not connect capacitive loads.
- ▶ During the power-up test, the relay contacts are tested with pulses of up to 60 ms.

Connection example

- ▶ Block switching with dual-channel operation and redundant actuator.
- ▶ The ST output module PSSu E S 4DO 0.5 belongs to the output block of the PSSu E F BSW module.
- ▶ The FS input module for forming the feedback loop (PSSu E F 4DI with test pulses) belongs to another supply group, which is not shut down.
- ▶ A maximum of SIL2 of EN IEC 61508 can be achieved.

Connection example for block switching:



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.
FS communication error	Error during FS communication	Change faulty module.
Bus termination error	There is no terminating plate or there is a bad contact with the module bus.	Install a terminating plate with integrated end bracket or insert the base modules together correctly.
Temperature error: Too warm ⁽¹⁾	Ambient temperature too high: Error stack entry	Ensure there is sufficient ventilation in the control cabinet or prevent overload.
Temperature error: Too hot ⁽¹⁾	Ambient temperature too high: Reset the module and stop the affected I/O-Groups (SafetyBUS p)	Ensure there is sufficient ventilation in the control cabinet or prevent overload.
Overvoltage error	A system voltage or infeed is too high.	Stabilise the supply or change the faulty supply voltage module.
Undervoltage error	A system voltage or infeed is too low.	Stabilise the supply or change the faulty supply voltage module.
Relay control error	Error during cyclical monitoring test of the relay coils	Change faulty module.
Block switching output error	Error during cyclical monitoring test of the relay contacts. Possible external cause: Voltages being fed back to the relay contacts	Check the supply voltage and the wiring.

⁽¹⁾ There are two levels of overtemperature.

► Too warm:

If a module's temperature exceeds a threshold value, the module sends a warning to the head module. If the temperature drops back below the threshold value, the module sends an all-clear.



► Too hot:

If a module's temperature exceeds a further threshold value, the module sends an error message to the head module and triggers an I/O-Group stop.

Further information on PSSu error messages is available in the online help for the PSS WIN-PRO system software.

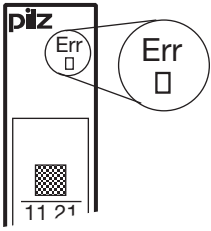


7.2 Display elements

Legend

-  LED on
-  LED off

7.2.1 Display elements for module diagnostics

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

	LED			Meaning
	Name	Colour	Status	
	Err	---		No error
	Red		Module error	

7.2.2 Display elements for supply voltage

The module has the following display elements:

- ▶ "24 V" LED
To display the status of the external supply voltage
- ▶ "SW" LED
To display the status of the connected periphery supply

	LED			Key
	Description	Colour	Status	
	24 V	---	●	No external supply voltage or error in the external supply voltage
		green	☀	External supply voltage is error-free
SW	---	●	Periphery supply for subsequent block is switched off.	
	green	☀	Periphery supply for subsequent block is switched on.	

8 Technical Details

General	312230	314230
Certifications	CE, EAC, KOSHA, TÜV, UKCA, cULus Listed	CE, EAC, KOSHA, TÜV, UKCA, cULus Listed
Application range	Standard/failsafe	Standard/failsafe
Module's device code	0C02h	0C02h
Number of FS output bits	1	1
Application in system environment A		
from FS firmware version, other head modules	4	4
from FS firmware version PSSu H F PN	1	1
Electrical data	312230	314230
Supply voltage		
for	Periphery supply	Periphery supply
Voltage	24 V	24 V
Kind	DC	DC
Voltage tolerance	-30 %/+25 %	-30 %/+25 %
Current load capacity at UB	8 A	8 A
Rated surge voltage	3050 V	3050 V
Internal supply voltage (module supply)		
Module's power consumption	1,65 W	1,65 W
Potential isolation	3050 V	3050 V
Periphery's supply voltage (periphery supply)		
Module's current consumption with no load	40 mA	40 mA
Module's power consumption with no load	0,96 W	0,96 W
Max. power dissipation of module	2,5 W	2,5 W
Relay outputs	312230	314230
Utilisation category in accordance with UL		
in accordance with	UL	UL
Voltage	240 V AC G. P.	240 V AC G. P.
with current	3 A	3 A
Voltage	24 V DC G. P. Resistive	24 V DC G. P. Resistive
with current	3 A	3 A
Pilot Duty	3,0 A	3,0 A
Contact fuse protection		
in accordance with the standard	VDE 0660	VDE 0660
Blow-out fuse, quick	10 A	10 A
Blow-out fuse, slow	6 A	6 A

Relay outputs	312230	314230
Max. processing time of block switching when signal changes from "1" to "0"	120 ms	120 ms
Max. processing time of block switching when signal changes from "0" to "1"	850 ms	850 ms
Environmental data	312230	314230
Climatic suitability	EN 60068-2-1, EN 60068-2-14, EN 60068-2-2, EN 60068-2-30, EN 60068-2-78	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	EN 60068-2-14
Temperature range	0 - 60 °C	-40 - 70 °C
Max. temperature in accordance with UL	60 °C	60 °C
Storage temperature		
in accordance with the standard	EN 60068-2-1/-2	EN 60068-2-1/-2
Temperature range	-25 - 70 °C	-40 - 70 °C
Climatic suitability		
in accordance with the standard	EN 60068-2-30, EN 60068-2-78	EN 60068-2-30, EN 60068-2-78
Humidity	93 % r. h. at 40 °C	93 % r. h. at 40 °C
Condensation during operation	Not permitted	Short-term
Max. operating height above SL	2000 m	5000 m
EMC	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-6-2, EN 61000-6-4	EN 61000-4-2, EN 61000-4-3, EN 61000-4-4, EN 61000-4-5, EN 61000-4-6, EN 61000-6-2, EN 61000-6-4
Vibration		
in accordance with the standard	EN 60068-2-6	EN 60068-2-6
Frequency	10 - 150 Hz	10 - 150 Hz
Amplitude	0,35 mm	0,35 mm
Acceleration	1g	1g
Shock stress		
in accordance with the standard	EN 60068-2-27	EN 60068-2-27
Number of shocks	6	6
Acceleration	15g	15g
Duration	11 ms	11 ms
in accordance with the standard	EN 60068-2-27	EN 60068-2-27
Number of shocks	1000	1000
Acceleration	10g	10g
Duration	16 ms	16 ms
Airgap creepage		
in accordance with the standard	EN 60664-1	EN 60664-1
Overvoltage category	II	II
Pollution degree	2	2

Environmental data	312230	314230
Protection type		
in accordance with the standard	EN 60529	EN 60529
Housing	IP20	IP20
Terminals	IP20	IP20
Mounting area (e.g. control cabinet)	IP54	IP54
Mechanical data	312230	314230
Material		
Bottom	PC	PC
Front	PC	PC
Coding	PA	PA
Mounting type	plug-in	plug-in
Dimensions		
Height	76 mm	76 mm
Width	25,2 mm	25,2 mm
Depth	60,2 mm	60,2 mm
Weight	87 g	90 g
Mechanical coding		
Type	I	I
Colour	Yellow	Yellow

Where standards are undated, the 2015-03 latest editions shall apply.

8.1 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/ maximum SIL	EN IEC 62061 PFH ₀ [1/h]	EN/IEC 61511 SIL	EN/IEC 61511 PFD	EN ISO 13849-1: 2015 T _M [year]
–	PL e	Cat. 3	SIL CL 3	7,48E-10	SIL 3	1,13E-05	20

If the module is operated at an ambient temperature above 60° C, the values stated in the table for PFH₀ and PFD will need to be doubled when a safety function is calculated.

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 be different. We recommend that you use the PAScal software tool to calculate the safety function's SIL/PL values.

8.2 Service life table

Service life of BSW module based on the number of downstream modules

Number of ST modules	Cycles x1000
1	200
2	80
3	30
4	25
5	22
6	20
7	18
8	16

The safety-related characteristic data applies provided the number of cycles is not exceeded (see technical details). Once the number of cycles is exceeded, the module must be exchanged.

9 Supplementary data

9.1 Permitted 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

10 Order reference

10.1 Product

Product type	Features	Order no.
PSSu E F BSW	Electronic module, base type	312230
PSSu E F BSW-T	Electronic module, T-type	314230

10.2 Accessories

Base modules

Product type	Features	Order no.
PSSu BS 2/8 S	Base module with screw terminals, for use only as the first module after the head module	312656
PSSu BS 2/8 S-T	Base module with screw terminals, for use only as the first module after the head module, T-type	314656
PSSu BS 2/8 C	Base module with cage clamp terminals, for use only as the first module after the head module	312657
PSSu BS 2/8 C-T	Base module with cage clamp terminals, for use only as the first module after the head module, T-type	314657

► Support

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