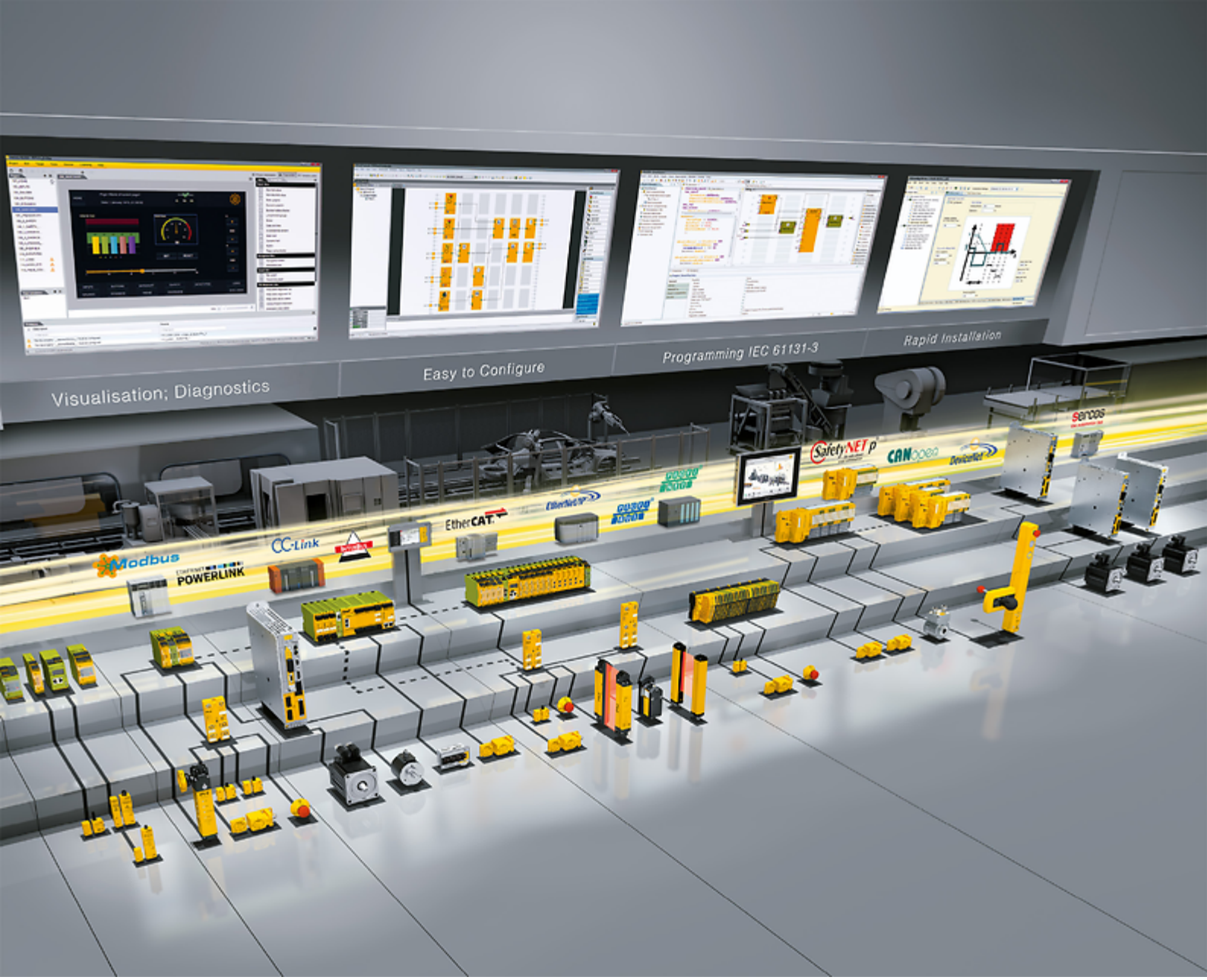


PSS u2 EF 2DO TP 2A

PILZ
THE SPIRIT OF SAFETY

- PSS u2 in the automation system PSS 4000
- Remote I/O system PSS u2

Operating Manual-1003624-EN-03

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 EF 2DO TP 2A hardware version 01 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 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

Module structure:

A module consists of

- an electronic module,
- a terminal block with cage clamp terminals and
- a module carrier

The electronic modules are plugged into the backplane and determine the function. The backplane is used for communication between the head module and the electronic modules and forms the carrier unit for the electronic modules. The terminal block is plugged into the electronic modules and is used to connect the field wiring.

Details of the terminal blocks that can be used are available under "Intended Use".

2.1 Module features

Application of the product PSS u2 EF 2DO TP 2A:

Electronic module with digital dual-pole outputs for failsafe applications

The product has the following features:

- 2 dual-pole digital outputs
  - Semiconductor technology
  - Switches to 24 V (O0+) and 0 V (O0-)
  - Current load capacity: 2 A
  - Short circuit-proof
  - Overload-proof
  - Free from feedback
  - Configurable open circuit detection
  - Configurable switch-off delay
  - Configurable maximum test duration
  - Configurable repetition time of the expanded on tests
- Energy-saving functions
- LEDs for:
  - Switch status of each output
  - Module error

3 Safety

3.1 Intended use

The module provides failsafe outputs and may be used for failsafe applications in the PSS u2 system.

The module meets the requirements of EN IEC 61508 up to and EN ISO 13849-1 up to PL e.

The outputs may be used to switch:

- Resistive loads
- Inductive loads
- Capacitive loads

The programmable safety system should be installed in a protected environment that meets at least the requirements of pollution degree 2. Example: Protected inside space or control cabinet with protection class IP54.

Make sure that only authorised personnel have access to the programmable safety system.

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.

The module PSS u2 EF 2DO TP 2A may be used in conjunction with the following terminal block:

- 8-pin terminal block

3.2 System requirements

INFORMATION

The module is supported by

- PASconfig from version 1.0.0
  - 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 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, 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.

3.3.3 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 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

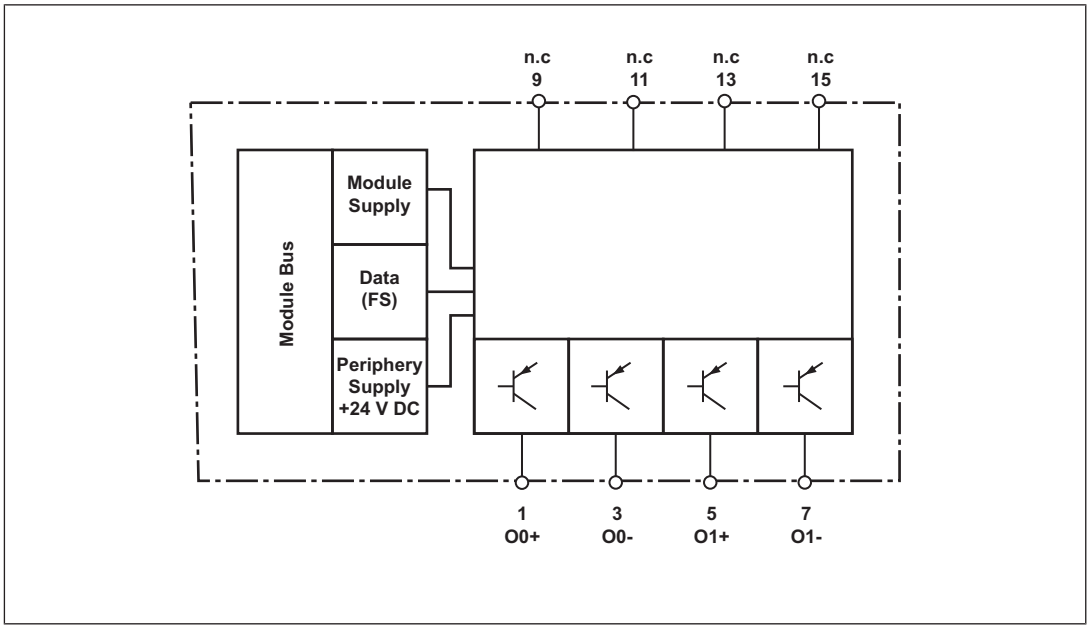


Fig.: Block diagram PSS u2 EF 2DO TP 2A

4.2 Supply

- The module is supplied with voltage via the head module.
- The periphery supply provides the outputs with voltage.
- The module routes the periphery supply from the module bus to the terminals on the terminal blocks.

4.3 Outputs

Signals at the output

- “0” signal (0 V) at the output (O0+/O0-):
  - Output is high impedance
  - No current to the load
- “1” signal (+24 V) at the output (O0+/O0-):
  - Output is low impedance
  - Current is supplied to the load

Output

- The head module sets the output status via the module bus.
- The max. capacity at an output depends on the load (see characteristic). Connecting a higher capacity may lead to an error.
- Operation with electronic contactors has not been tested and may lead to errors. Please contact our Customer Support team if you are using electronic contactors.
- Open circuit detection

- Cannot be used as a single-pole output

Output tests (not configurable)

- Asymmetric test in error-free operation
  - In this test, one output transistor is switched on and the other switched off for the test duration t1 as a maximum. The load is not switched on because of the test. If errors are detected during this test, than an advanced on test is run.
  - The maximum test duration t1 can be configured.
  - The repetition time of the asymmetric test t2 is determined by the head module.
- Advanced on test in the event of an error
  - The test is run for the test duration t1 as a maximum
  - The maximum test duration t1 can be configured.
  - The test enables precise error diagnostics
  - The first test ([1] in the diagram) in the advanced on test is always run directly after an asymmetric test, in which an error has occurred. It is used to determine the cause of the error.
  - Further tests ([2] to [*n*] in the diagram) are run after a repetition time t3. The repetition time t3 can be configured. These tests are used to check whether an error is still present.
  - The load must not switch on because of the test.
  - The following errors are detected:

    Shorts across contacts (external error)

    Short circuits and interruptions on the transistors

    Short circuits and open circuit on the connected load

Function diagrams for the output test

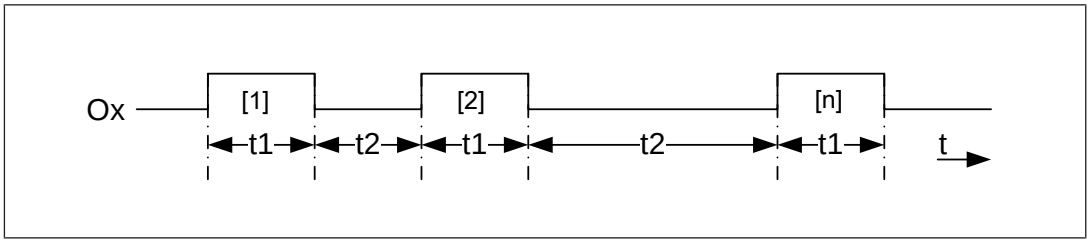


Fig.: Asymmetric test (only run in error-free operation). The switching capability of O+ and O- is checked in separate tests.

Legend

t_1 Configurable maximum test duration (default value: 3 ms)

t_2 Repetition time between asymmetric tests in error-free operation. The time is not configurable and is determined by the head module.

[1] [2] [n] Asymmetry tests

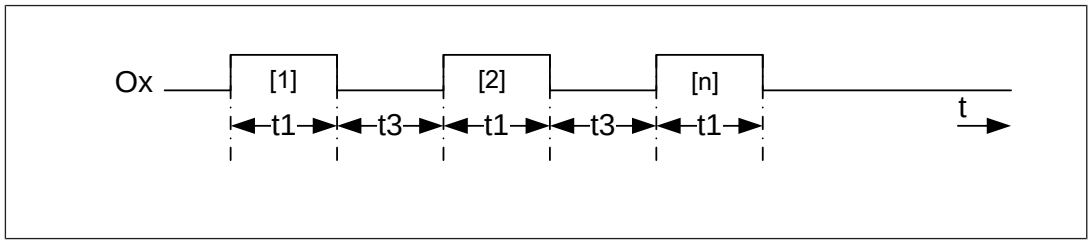


Fig.: Advanced on test (only run in the event of an error)

Legend

t_1 Configurable maximum test duration (default value: 3 ms)

t_3 Repetition time of advanced on test in the event of an error (default value: approx. 30 s)

[1] [2] [n] Advanced on tests

INFORMATION

For the maximum test duration t1, set a maximum value at which the load can neither switch on nor switch off. By setting a maximum permitted test duration t1 for your application you increase availability and improve fault detection.

WARNING!

The advanced on tests can cause a capacitive load to switch on unintentionally.

It is essential to note the test duration t_1 and the repetition time of the advanced on test in case of an error.

- The module will detect an open circuit between outputs Ox+ and Ox-.
- The behaviour after an open circuit is detected is configurable:
  - Switch off output and send error message.

    The outputs are switched off and an error message is sent. The open circuit is registered in the PII and the open circuit bits [16] are set to "0".
  - Send error message only.

    The module's outputs are not switched off. The open circuit is registered in the PII.
  - Ignore open circuit detection

    The outputs are **not** switched off and **no** error message is sent.

    The open circuit is **not** registered in the PII and the open crcuit bits [16] remain at "1".

- Loads over 10 kOhm may mistakenly be detected as an open circuit.

Switch-off delay

FS outputs can be switched off with a delay. Even if the process image of outputs switches from "1" to "0", a "1" signal may remain at the output for the duration of the delay. If there is another "1" signal during the switch-off delay, the switch-off delay time is reset again and restarts at the next "0" signal.

In the event of external errors, e.g. if the connection to the controller is lost, the output is switched off after the set switch-off delay.

However, in the event of internal module errors, the switch-off delay cannot be guaranteed.

Default value: 0 ms (immediate shutdown).

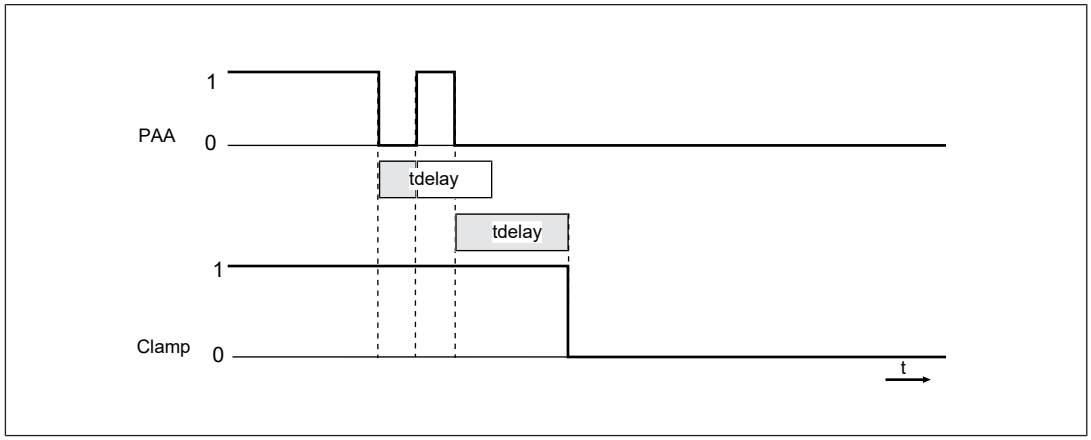


Fig.: Switch-off delay

Legend

PIO	Process image of outputs
tdelay	Configured switch-off delay time
	If there is another "1" signal, the time is reset and restarts at the next "0" signal
Clamp	Signal at the terminal

4.4 Output capacitance C

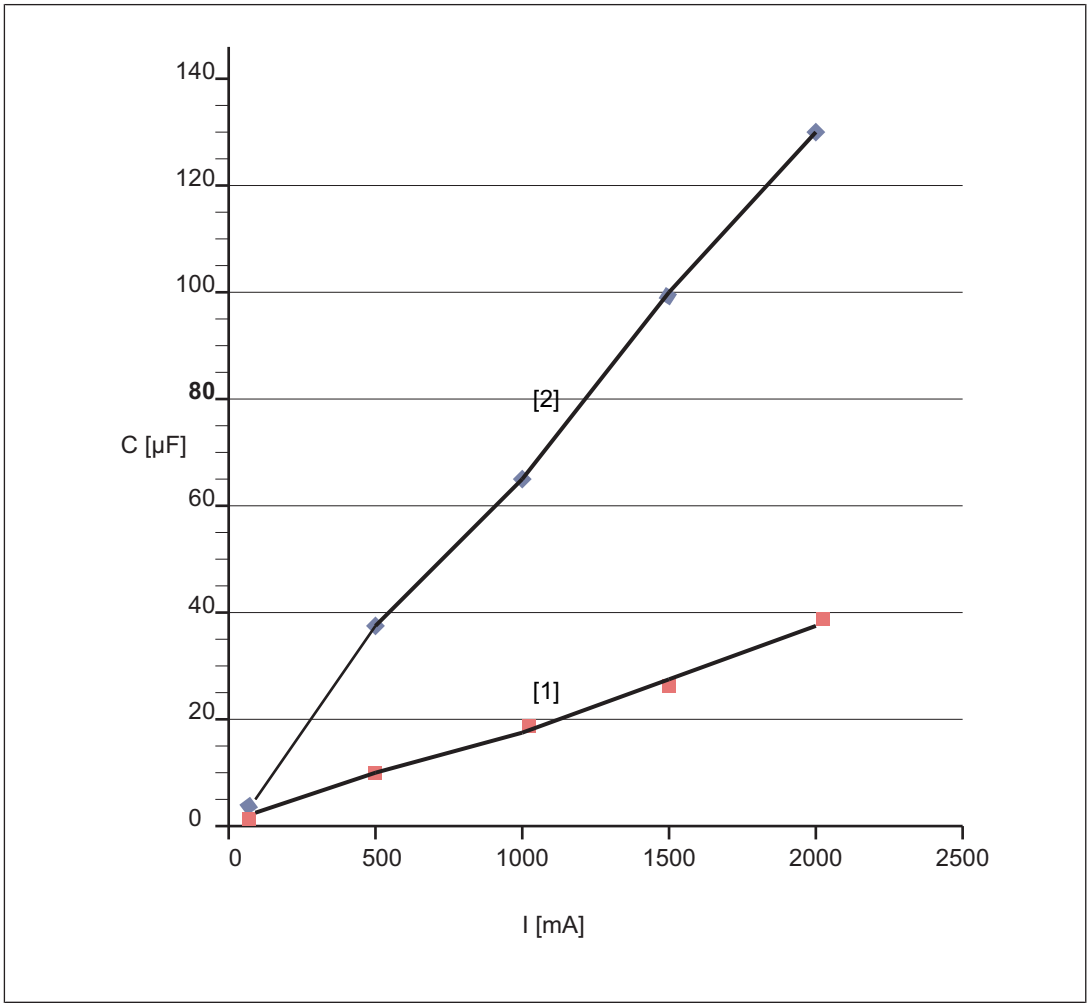


Fig.: Output capacitance C dependent on load current I

Legend

[1] Max. test duration 1 ms

[2] Max. test duration 3 ms

4.5 Integrated protection mechanisms

The module has the following protection mechanisms:

- Common second shutdown route, tested regularly
- Cyclical output tests
- Tests for shorts between the outputs

The module provides the following diagnostic data:

- Start-up error
- Configuration error
- FS communication error
- Temperature error: too warm
- Temperature error: too hot
- Open circuit
- Short circuit of load and/or overload
- Interrupted T and/or internal error
- Short circuit of a terminal to the same potential and/or internal error
- Short circuit of a terminal to another potential

4.6 Energy-saving functions

The energy levels are supported by the head module and are not configurable. The module supports the following energy levels:

– Switching off the LEDs that display the module and terminal status

– Switching off the LEDs that display the terminal status

4.7 Reaction times

Detailed information on the reaction times is available in the operating manual of the head modules.

5 Address assignment

The module occupies one bit address in the process image of the outputs.

PIO	Meaning	State
Bit 0	Output data O0	0: "0" signal (0 V) at the output 1: "1" signal (+ 24 V) at the output
Bit 1	Output data O1	
Bit 2-7	None	Constant "0"

The module occupies the following Bit address in the process image of inputs:

PII	Meaning	State
Bit 0	Valid bit of output O0	0: Output error 1: The signal in the PIO corresponds to the output signal
Bit 1	Valid bit of output O1	
Bit 2	Open circuit at output O0	0: Open circuit at output 1: No open circuit at output
Bit 3	Open circuit at output O1	
Bit 4-7	None	Constant "0"

6 Installation

6.1 General installation guidelines

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.

6.1.1 Dimensions

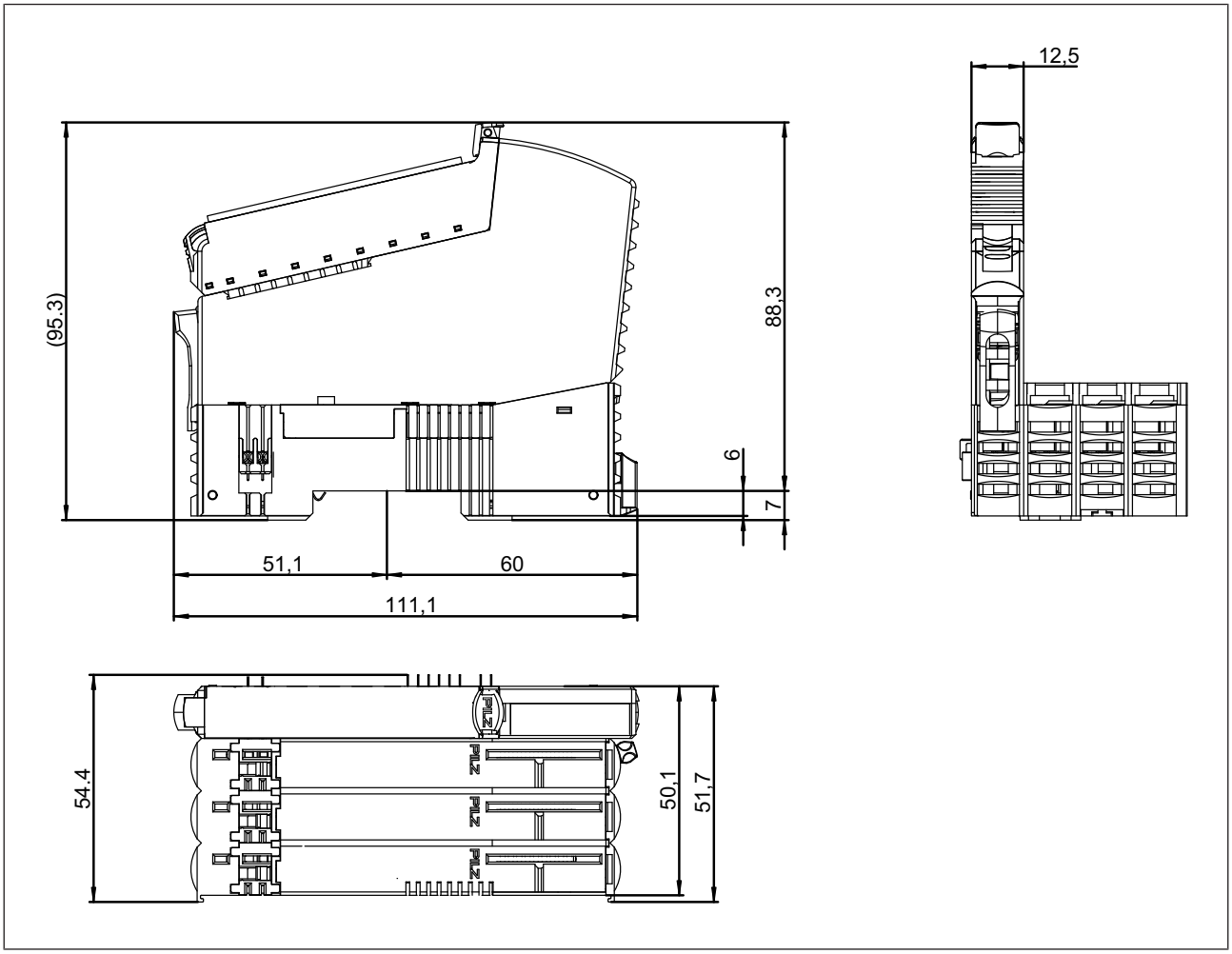


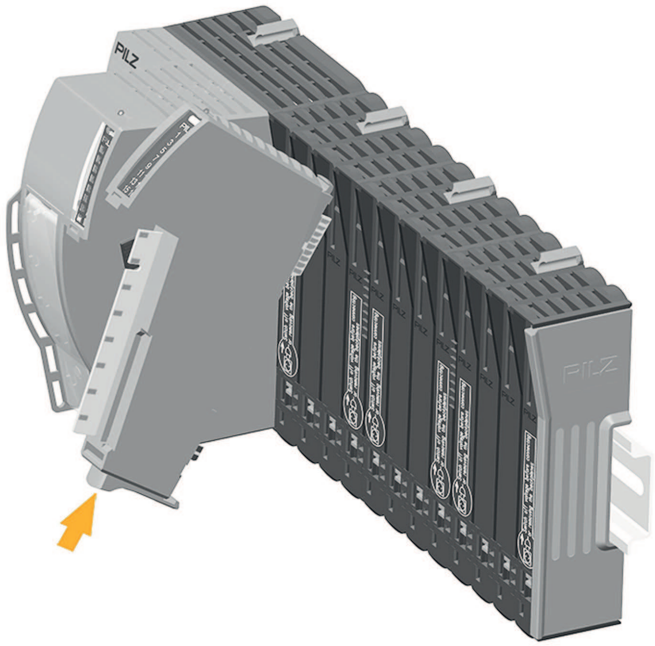
Fig.: Dimensions in mm, including backplane, electronic module and terminal block

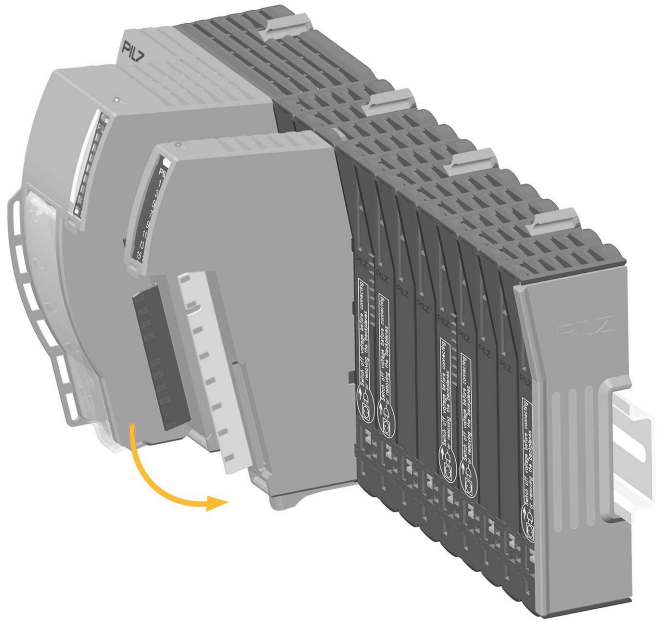
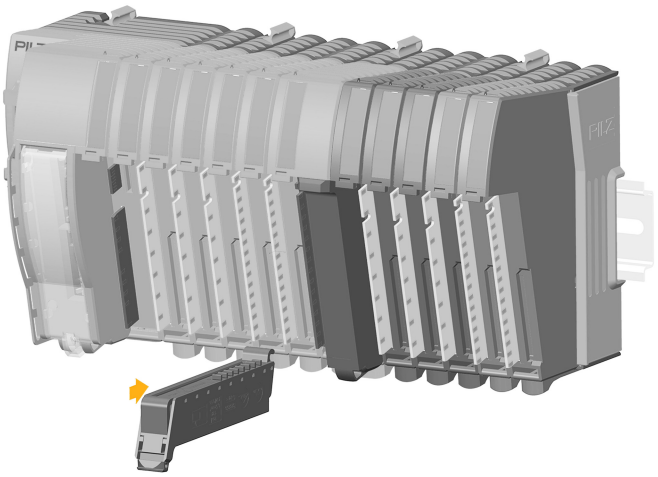
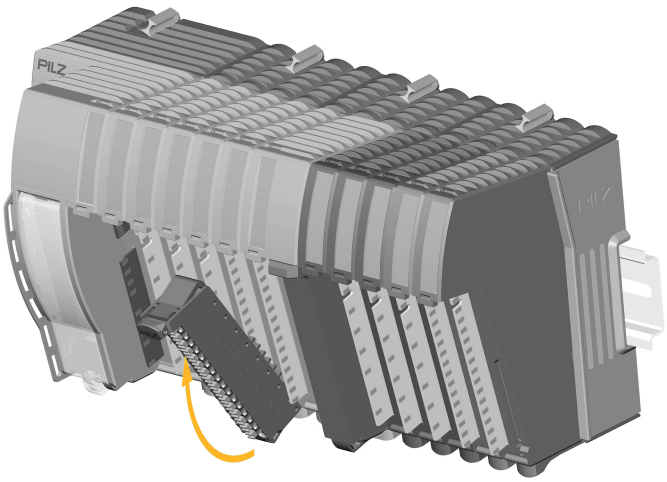
6.2 Inserting and removing an electronic module

Please note:

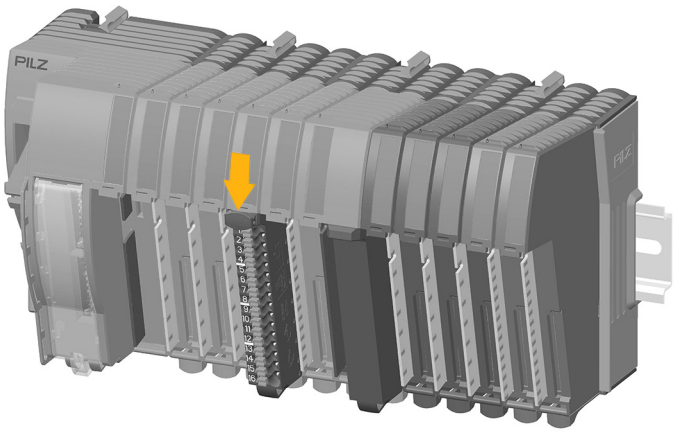
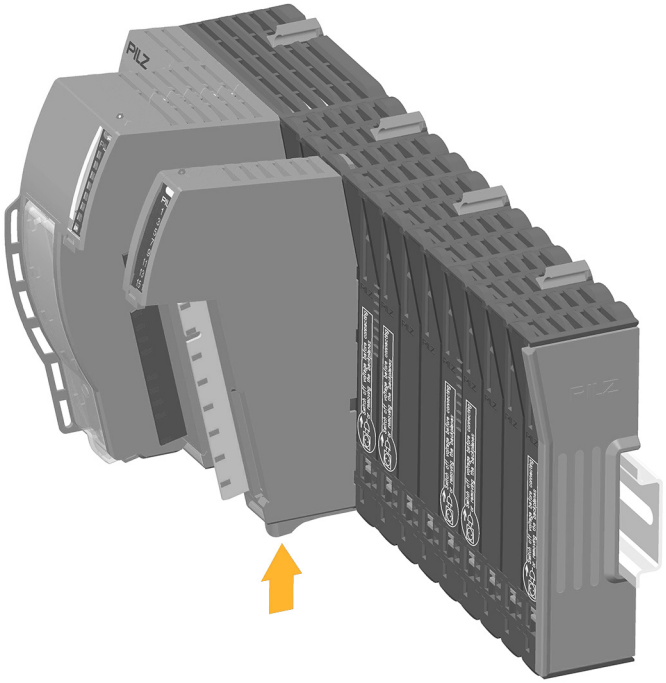
- Backplane must be installed first.
- Electronic modules may only be plugged or unplugged if the terminal block has been removed first.
- The mechanics of the electronic modules are designed for 20 plug in/out cycles.
- On electronic modules with outputs, the terminal block may only be inserted and removed when the load is switched off. Unforeseeable error reactions may be triggered if modules are inserted and removed under load.

6.2.1 Inserting an electronic module

1. Insert the electronic module into the suspension lug on the backplane.	

2. Swivel the electronic module downwards until you hear it click into place.	
3. Insert the terminal block into the suspension lug on the module.	
4. Swivel the terminal block upwards until you hear it click into place.	

6.2.2 Removing an electronic module

1. Press the unlocking mechanism on the terminal block that is shown by the arrow and pull off the terminal block forward.	
2. Press the unlocking mechanism that is shown by the arrow and pull off the electronic module upwards.	

6.2.3 Changing an electronic module during operation

An electronic module can be hot swapped.

Effects:

- Module bus communication between the other modules is not interrupted.
- The configuration data is retained.
- The module is detected automatically as soon as the module is re-inserted.

Procedure:

1. Removing an electronic module
2. Inserting an electronic module

A new electronic module can be inserted during operation.

Procedure:

- Inserting an electronic module

Effects:

- Module bus communication between the other modules is not interrupted.
- To detect the new module the following steps can be necessary:
  - Creating a new configuration or changing an existing configuration
  - Download of the configuration to the head module
  - Restart of the head module. After a restart, the system behaves as after a warm reset using a reset pushbutton (see operating manual of the head module, chapter “Reset pusbutton", section "Carrying out a warm reset (restart)").

7 Wiring

7.1 General wiring guidelines

Please note:

- When used for applications in accordance with EN IEC 62061, SIL CL 3: connect two actuators connected in series within the load circuit!
- The actuators may be connected using unshielded cables.
- The outputs do not need suppression for inductive loads.
- Use copper wiring.

7.1.1 Connection mechanism for terminal blocks

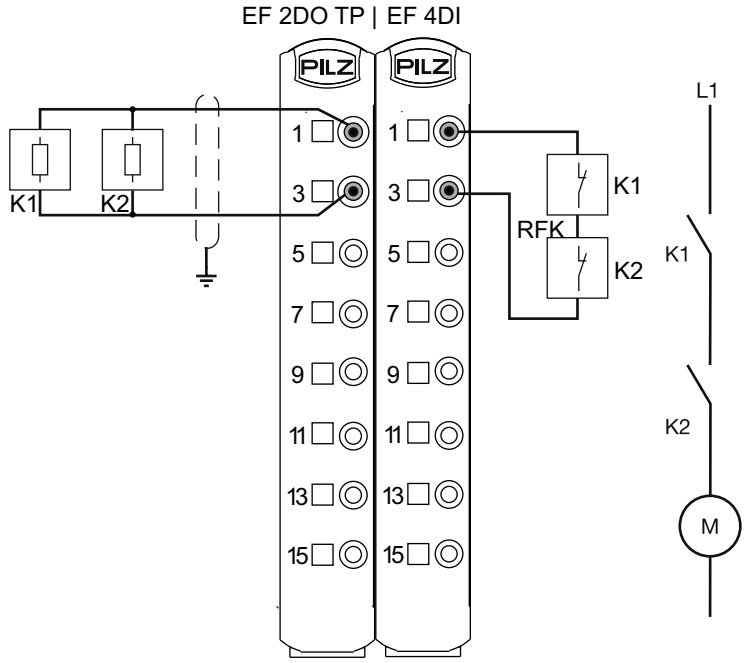
Procedure:

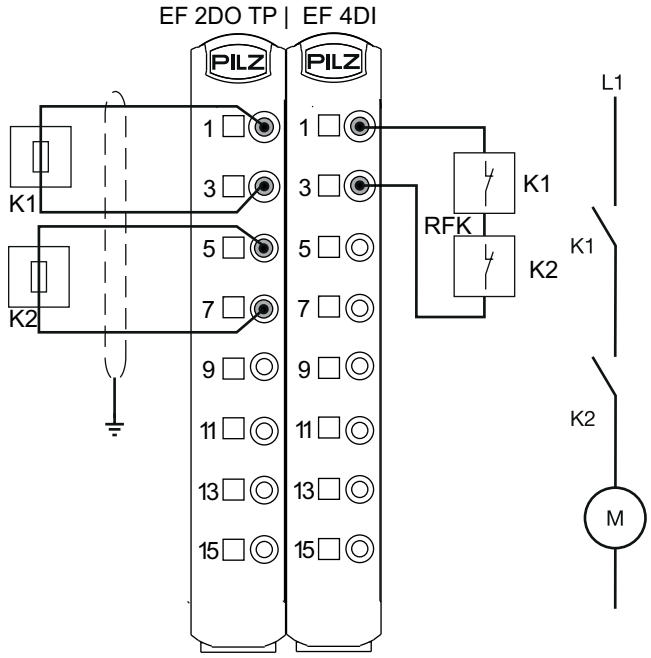
- Use a flat head screwdriver.
- Strip the wire back 9 mm.
- Feed the stripped cable as far as it will go into the opening for the spring-loaded terminal.
- Check that the cable is firmly seated.

Please note:

- The minimum cable cross section for field connection terminals on the terminal blocks is 0.15 mm^2 (AWG26).
- The maximum cable cross section for field connection terminals on the terminal blocks is 1.5 mm^2 with ferrules (AWG14)
- Use copper wiring.

7.2 Terminal configuration

Terminal configuration	Connection example
1: Output O0+ (2-pole positive-switching) 3: Output O0- (2-pole negative-switching) 5: Output O1+ (2-pole positive-switching) 7: Output O1- (2-pole negative-switching) 9: n.c. 11: n.c. 13: n.c. 15: n.c.	1-channel actuator with feedback loop on the module PSS u2 EF 4DI 

Terminal configuration	Connection example
1: Output O0+ (2-pole positive-switching) 3: Output O0- (2-pole negative-switching) 5: Output O1+ (2-pole positive-switching) 7: Output O1- (2-pole negative-switching) 9: n.c. 11: n.c. 13: n.c. 15: n.c	2-channel actuator with feedback loop on the module PSS u2 EF 4DI 

7.3 Function test during commissioning

An error must be simulated for each safety-related output during commissioning: The anticipated error reaction must occur when an output has an error against a supply voltage.

INFORMATION

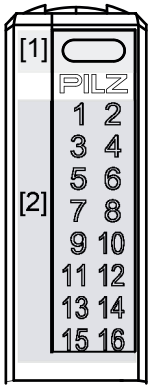
The safety-related test must be performed on the load and not on the output terminal.

8 Operation

The status of the module is displayed via a red and a green LED. The status of the terminals is displayed via a green LED. If there is a module error, the module status display will light up red. The error will be signalled to the head module and will be entered in the head module's diagnostic log.

8.1 Display elements and messages

Only the terminal status displays 1, 3, 5 and 7 are active.



Legend

[1] Module status display

[2] Terminal status display

The module can detect the following states:

[1]	Colour [1]	[2]	Colour [2]	Meaning	Further information
●	--	●	--	Module not ready for operation	
◐	green	●	--	Module ready for operation	
☼	green	☼	green	Module in operation and there is a "1"-signal at the output	
☼	green	●	--	Module in operation and there is a "0"-signal at the output	
◐ϟ	red	●	----	Configuration error Module was inserted in the wrong slot.	
☼	red	●	--	Internal error/firmware update	See module's diagnostic log
◐	red	◐	green	The module status display and the affected terminal status displays flash synchronously Short circuit / overload / short across contacts / open circuit at terminal see LED [2]	See module's diagnostic log.

[1]	Colour [1]	[2]	Colour [2]	Meaning	Further information
◐	red	●	green	Temperature error: too warm (1)/	See module's diagnostic log
		☼		warning, e.g. undervoltage	
◐	red	◐	green	The module status display and all terminal status displays flash synchronously Periphery supply is missing/temperature error: Too hot (1)	See module's diagnostic log

([1]) There are two levels of overtemperature.

- Too warm:

  If the module temperature exceeds a threshold value, then:

  – a warning is sent to the head module.

  If the temperature drops back below the threshold value, the module sends an all-clear.

- Too hot:

  If the module temperature exceeds another threshold value, then:

  – an error message is sent to the head module

  – the outputs are switched off

  – The valid bits for the outputs are set to "0"

  After the "too hot" message has been received, if the temperature drops back below the "too warm" threshold value, the module will switch to an error-free state.

Legend

☼ LED on

◐ LED flashes

◐ϟ LED flashes briefly

● LED off

9 Technical Details

General	
Certifications	**CE, EAC, KOSHA, TÜV, UKCA, cULus Listed**
Application range	**Failsafe**
Module's device code	**404Dh**
Number of FS output bits	**2**
Number of FS status bits	**4**
Electrical data	
Internal supply voltage (module supply)	
Module's power consumption	**0,55 W**
Periphery's supply voltage (periphery supply)	
Voltage range	**16,8 - 30 V**
Module's current consumption with no load	**30 mA**
Module's power consumption with no load	**0,9 W**
Max. power consumption of a dual-pole semiconductor output	**0,65 W**
Max. power dissipation of module	**2,75 W**
Permitted loads	**inductive, capacitive, resistive**
Semiconductor outputs	
Max. duration of on time during self test	**100 - 12700 µs**
Max. duration of off time during self test	**100 - 12700 µs**
Max. processing time of semiconductor output when signal changes from "1" to "0"	**8 ms**
Max. processing time of semiconductor output when signal changes from "0" to "1"	**8 ms**
Potential isolation from system voltage	**yes**
Short circuit-proof	**yes**
Semiconductor outputs, 2-pole	
Number of dual-pole semiconductor outputs	**2**
Permitted current range	**0,00 - 2,50 A**
Typ. output current at "1" signal and rated voltage of semiconductor output	**2 A**
Residual current at "0" signal	**0,03 mA**
Max. pulsed current for t < 100 ms	**12 A**
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**

Environmental data	
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 sea level	**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	
In accordance with the standard	**EN 60529**
Housing	**IP20**
Mounting area (e.g. control cabinet)	**IP54**
Potential isolation	
Potential isolation between	**Semiconductor output 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**
Mechanical data	
Material	
Housing	**PC**
Mounting type	**plug-in**
Dimensions	
Height	**110,8 mm**
Width	**12,5 mm**
Depth	**72,5 mm**
Weight	**37 g**

Where standards are undated, the 2015-04 latest editions shall apply.

9.1 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 62061 SIL CL	EN 62061 PFH_D [1/h]	IEC 61511 SIL	IEC 61511 PFD	EN ISO 13849-1: 2015 T_M [year]
2-channel	**PL e**	**Cat. 4**	**SIL CL 3**	**2,02E-10**	**SIL 3**	**1,75E-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 be different. We recommend that you use the PAScal software tool to calculate the safety function's SIL/PL values.

The safety-related characteristic data (PFH, PFD) are mean values. They have been calculated at an average ambient component temperature of 40 °C and apply for the ambient temperature range stated in the technical details.

10 Order reference

10.1 Product

Product type	Features	Order no.
PSS u2 EF 2DO TP 2A	Electronic module	328140

10.2 Accessories

Terminal block

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

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

Label holder for terminal block

Product type	Features	Order no.
PSS u2 A LC T3 (10 pcs.)	Label holder for terminal block 61 x 11.5 mm, scope of supply: 10 pieces	328912

Coding elements

Product type	Features	Order no.
PSS u2 A CE E (10 pcs.)	Coding elements for electronic modules, scope of supply: 10 pieces	328860

Backplanes

Product type	Features	Order no.
PSS u2 B 1	Backplane, 1 slot	328811
PSS u2 B 4	Backplane, 4 slots	328810

11 EC declaration of conformity

This product/these products meet the requirements of the directive 2006/42/EC for 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.
Authorised representative: Norbert Fröhlich, Pilz GmbH & Co. KG, Felix-Wankel-Str. 2, 73760 Ostfildern, Germany

12 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/support/downloads.

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

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 21 60880878-216
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 7986263-0
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
Turkey
+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

BRANDS OF THE CENTURY PILZ 2019 GERMAN STANDARDS

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, Telefax: +49 711 3409-133, E-Mail: info@pilz.com, Internet: www.pilz.com

PILZ
THE SPIRIT OF SAFETY

1003624-EN-03, 2022-07 Printed in Germany