



► PSS u2 ES 8DID (-R)

PILZ
THE SPIRIT OF SAFETY

Operating Manual-1003612-EN-05

- PSS u2 in the automation system PSS 4000
- 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.

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SD means Secure Digital

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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 ES 8DID from Version HW 1.0, FW 1.1. It is valid until new documentation is published.

This documentation is valid for the product PSS u2 ES 8DID -R from Version HW 1.0, FW 1.1. 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 Terminology

PSS u2 system

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

Remote I/O system PSS u2

PSS u2 system without control functionality that provides I/Os. The I/Os can be controlled via a fieldbus.

The configuration is performed in the tool PASconfig.

PSS u2 in the automation system PSS 4000

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

The configuration is performed in the tool PAS4000.

Basic type

The basic versions of PSS u2 modules are called base type modules (e.g. PSS u2 EF 8DI).

R-type

PSS u2 modules that are suitable for use with increased environmental requirements and railway applications are called R-type modules (e.g. PSS u2 EF 8DI -R).

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

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 ES 8DID (-R):

Electronic module with digital inputs and expanded diagnostics for standard applications.

The product has the following features:

- ▶ 8 type 3 digital inputs in accordance with IEC 61131-2
- ▶ Configurable input filter time: 0 ... 25.5 [ms]
- ▶ Configurable pulse stretching: 0 ... 255 [ms]
- ▶ 4 Voltage outputs to supply the sensors
- ▶ Current load capacity per output: 0,25 A
 - Short circuit proof
 - Overload-proof
- ▶ Energy-saving functions
- ▶ The module provides advanced diagnostic data:
 - Overload
 - Short circuit
 - Undervoltage
- ▶ LEDs for:
 - Status of inputs
 - Status of voltage outputs
 - Module error
 - Operating status
- ▶ **R-type:**
for increased environmental requirements and railway applications

2.2 Side view right-hand

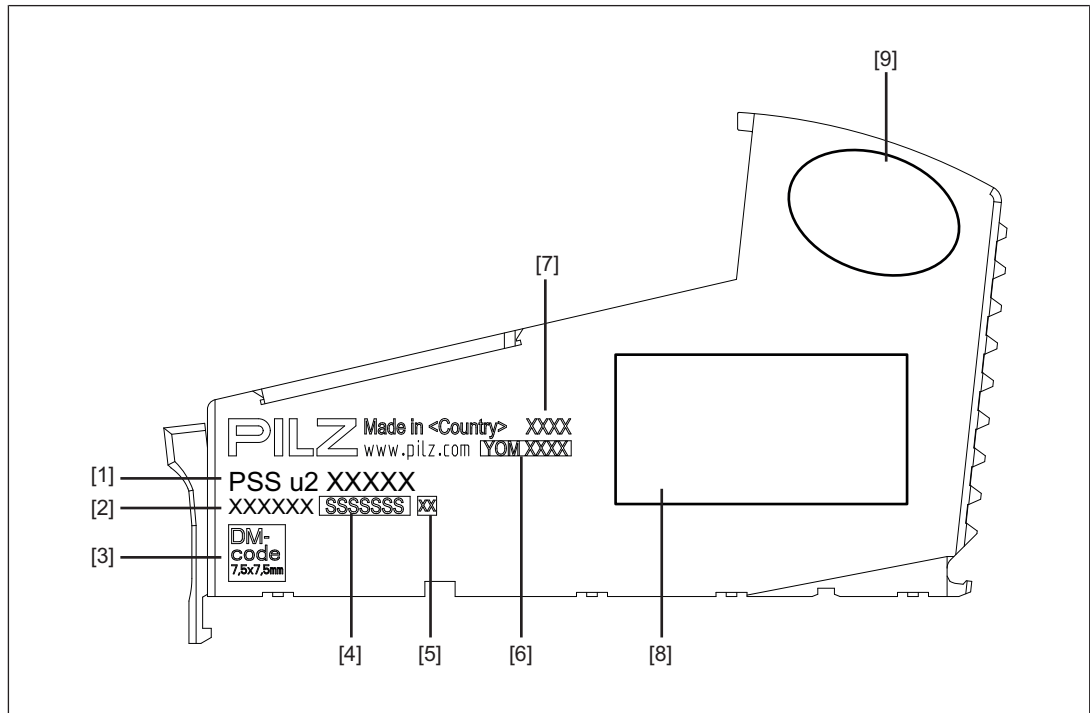


Fig.: Electronic module without terminal block, side view

Legend

[1]	Product Name
[2]	Order number
[3]	2D code product information
[4]	Serial number
[5]	Hardware version
[6]	"YOM" year of manufacture
[7]	Production site
[8]	Placeholder for block diagram
[9]	Placeholder for approval tags

3 Safety

3.1 Intended use



INFORMATION

If the module name is not explicitly named, the details apply to all the variants of the module.

Use in a PSS u2 system

The module PSS u2 ES 8DID may be used in the following PSS u2 systems (see [Terminology \[5\]](#)):

- ▶ Remote I/O system PSS u2
- ▶ PSS u2 in the automation system PSS 4000 (generation 2)

The module PSS u2 ES 8DID -R may be used in the following PSS u2 system (see [Terminology \[5\]](#)):

- ▶ PSS u2 in the automation system PSS 4000 (2nd generation)

The module/backplane/safety controller should be installed in a protected environment, see documents:

- ▶ Installation Manual PSS u2 in the automation system PSS 4000 (1006253), under "Installation in a protected space"
- ▶ Installation Manual Remote I/O system PSS u2 (1004152), under "Installation in a protected space"

Make sure that only authorised personnel have access to the products.

Standard applications

The module may be used for standard applications.

Standard inputs

The module has standard inputs.

Application areas

- ▶ Use on machinery and in an industrial environment (2006/42/EC and EU 2023/1230)
The modules PSS u2 ES 8DID (-R) can be used for **non-safety-related** applications (see [Technical details \[32\]](#)).

- ▶ Use in railway applications (CENELEC)

Depending on the selected railway architecture (see Safety Manual, under Safety architectures for railway applications (1006614)), the module PSS u2 ES 8DID -R meets the requirements of EN 50126, EN 50129, EN 50159, EN 50716 and EN 45545, safety category SIL 0 (basic integrity), (see [Technical details \[32\]](#)).

Only R-type modules may be used in a PSS u2 system for railway applications.

► Increased environmental requirements

The module PSS u2 ES 8DID -R is suitable for use where there are increased environmental requirements (see [Technical details \[32\]](#)).

Only R-type modules may be used in a PSS u2 system in applications with increased environmental requirements.

Operating height

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 \[36\]](#)).

EMC-compliant installation

Intended use includes making the electrical installation EMC-compliant. Please refer to the guidelines stated in the relevant installation manuals (see [Additional documents that apply \[11\]](#)).

Improper use

The following is deemed improper use in particular

- Any component, technical or electrical modification to the module,
- Use of the module outside the areas described in this operating manual,
- Any use of the module that is not in accordance with the technical details.

Software tools

The module PSS u2 ES 8DID is supported by:

- PASconfig from Version 1.0.0
- PAS4000 from Version 1.29.0

The module PSS u2 ES 8DID -R is supported by:

- PAS4000 from Version 1.29.0



INFORMATION

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

Backplane

The module PSS u2 ES 8DID may be installed on the following backplanes:

- PSS u2 B 1
- PSS u2 B 4

The module PSS u2 ES 8DID -R may be installed on the following backplanes:

- PSS u2 B 1 -R
- PSS u2 B 4 -R

Terminal blocks

The module may be used in conjunction with the following terminal block:

- ▶ 16-pin terminal block

3.1.1 Third-party manufacturer licence information

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

Further information is available in the document "Third-party manufacturer licence information PSS u2 ES 8DID (-R)/PSS u2 ES 8DOD 0.5A (-R)" (document number 1007366) at www.pilz.com.

3.2 Safety regulations

3.2.1 Additional documents that apply

Please read and take note of the following documents:

- ▶ Installation Manual remote I/O system PSS u2 (1004152)
- ▶ Installation Manual PSS u2 in the automation system PSS 4000 (1006253)
- ▶ System Description PSS 4000 (1001467)
- ▶ Safety Manual PSS 4000 (1001468)

With railway applications you should also refer to:

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

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

3.2.2 Use of qualified personnel

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

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

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

- ▶ Are familiar with the basic regulations concerning health and safety / accident prevention,
- ▶ Have read and understood the information provided in the section entitled Safety
- ▶ Have a good knowledge of the generic and specialist standards applicable to the specific application.

3.2.3 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.).

3.2.4 Disposal

- ▶ When decommissioning, please comply with local regulations regarding the disposal of electronic devices, such as the Electrical and Electronic Equipment Act.

4 Security

To protect 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.

Carry out a risk assessment in accordance with VDI/VDE 2182 or IEC 62443-3-2 and plan the security measures with care.

If you have any questions about implementation, please contact technical support.

Report security gaps or security incidents in connection with a Pilz product to the Pilz Product Security Incident Response Team at <https://www.pilz.com/psirt>.

4.1 Security (remote I/O system PSS u2)

Further information on Security can be found in the operating manuals of the relevant head modules.

4.2 Security (PSS u2 in the automation system PSS 4000)

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

5 Function description

5.1 Block diagram

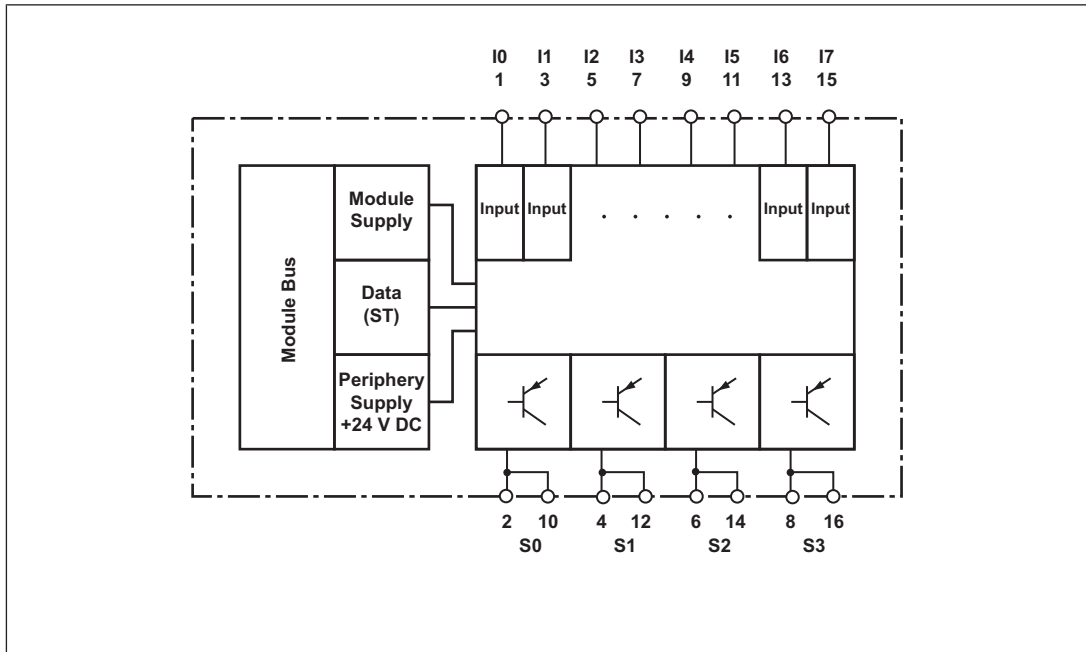


Fig.: Block diagram PSS u2 ES 8DID (-R)

5.2 Supply

- ▶ The module is supplied with voltage via the head module/main voltage supply module PSS u2 PSx (-R) connected to the head module.

When the supply voltage for the periphery supply is interrupted, the periphery supply is buffered for 20 ms. The buffering is designed for the input currents.

5.3 Inputs

- ▶ The status of the inputs is signalled to the head module via the module bus.
 - ▶ The inputs are fitted with a configurable software filter.
 - ▶ Pulse stretching can be configured for the inputs.
 - ▶ All signals that are shorter than the signal suppression time $t_{\text{pulse_sup}}$ are filtered out. The signal suppression time depends on the configured software filter time (t_{filter}).

$$t_{\text{pulse_sup}} = t_{\text{filter}} - 300 \mu\text{s}$$
 - ▶ The module detects any signals that are present at the input for longer than the minimum signal time $t_{\text{signal_min}}$.

$$t_{\text{signal_min}} = t_{\text{filter}} + t_{\text{ProcIM}}$$
- t_{ProcIM} : Input processing time (see [Technical details](#) [32]).

- A signal is always detected and signalled to the head module's PII if it is present for longer than the sum of the following times:
 - Minimum signal time $t_{\text{signal_min}}$
 - ST scan time

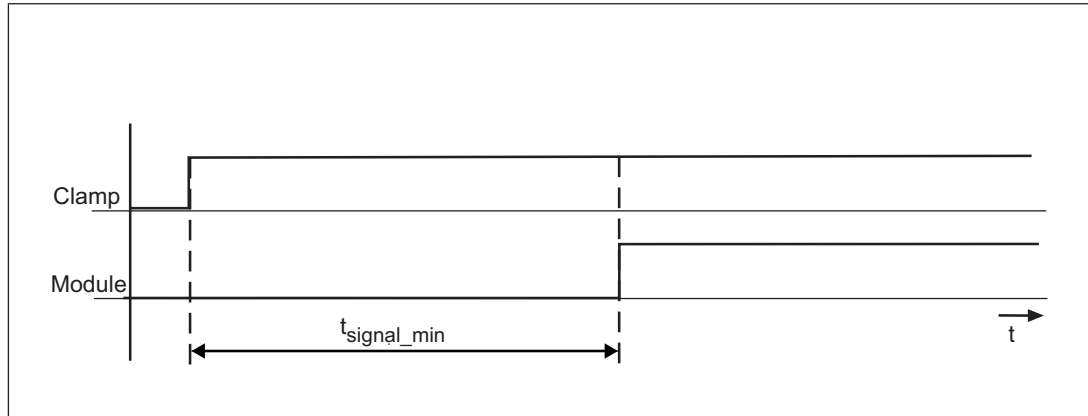


Fig.: Software filter

Legend

Clamp Signal at the terminal

Module Filtered signal in the module

$t_{\text{signal_min}}$ Time for which a signal must be present at the input in order to be detected

Pulse stretching:

The module stretches a 1-signal or 0-signal at the input terminals to the configured pulse stretch time t_{stretch} . If the signal is longer than the pulse stretch time, then it is not stretched any further.

Signal requirements at the terminals:

The 0-signal and the subsequent 1-signal together must be present at the input for longer than twice the configured pulse stretch time t_{stretch} .

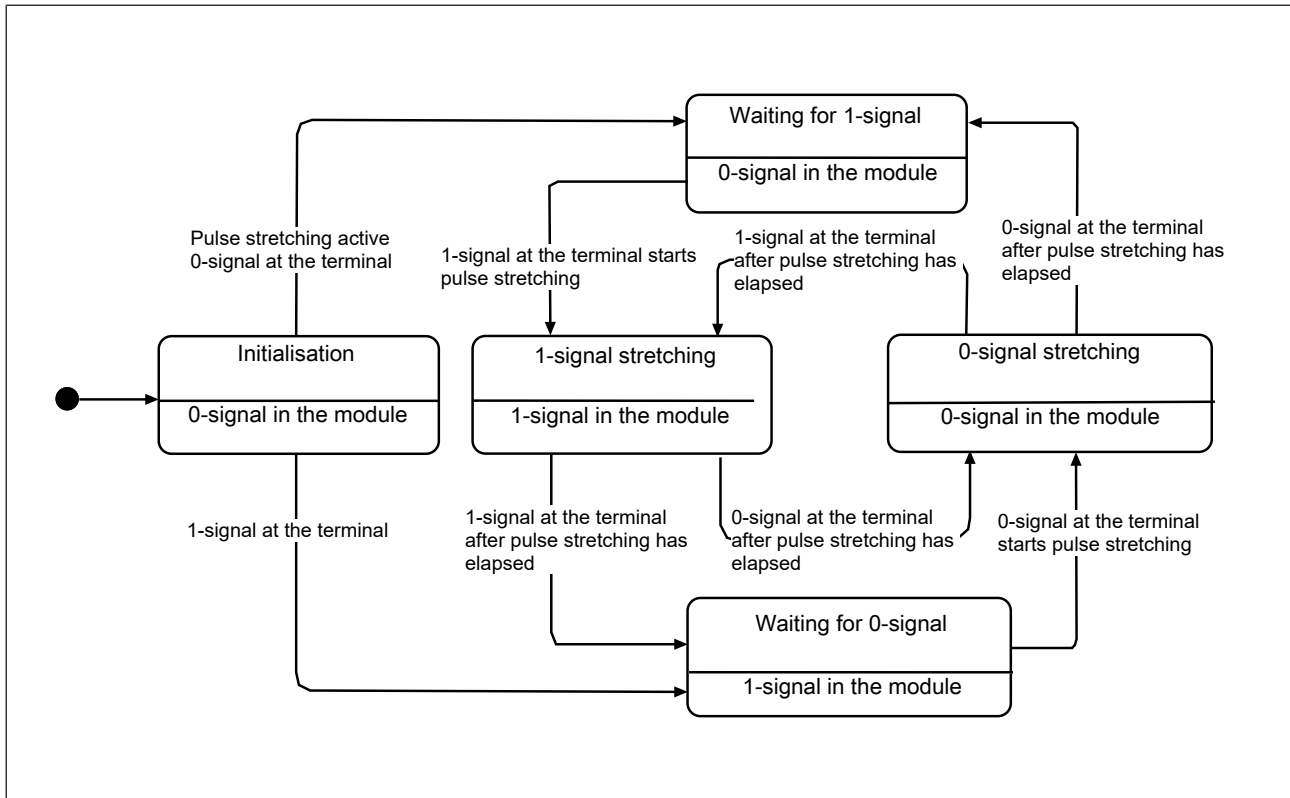


Fig.: States for pulse stretching

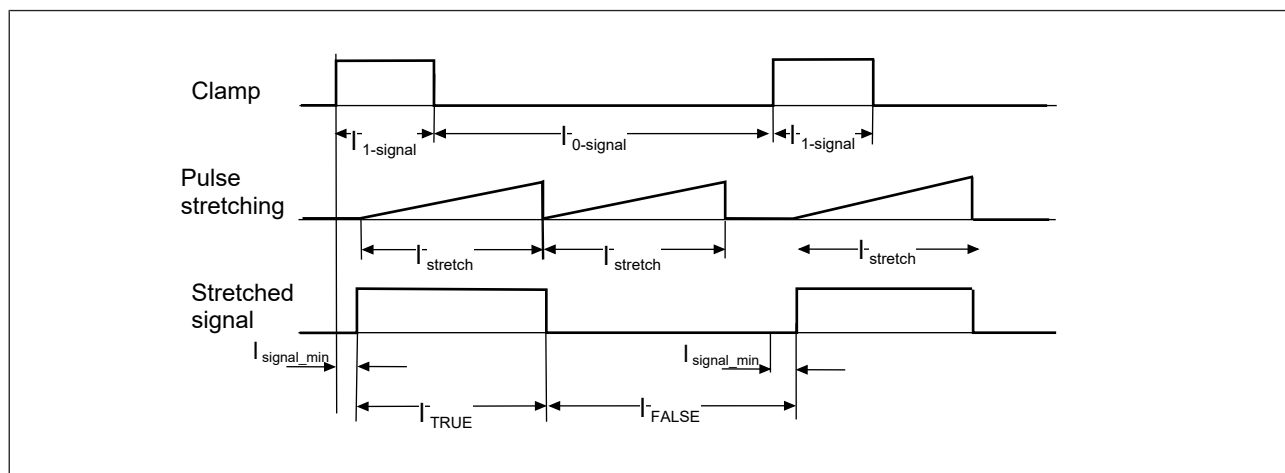


Fig.: Timing diagram: pulse stretching > signal duration of 1-signal

Legend

Clamp Signal at the terminal

Pulse stretching Pulse stretching

Stretched signal Stretched signal

$t_{1\text{-signal}}$ Duration of 1-signal

t_{stretch} Duration of pulse stretching

$t_{\text{signal_min}}$ Time for which a signal must be present at the input in order to be detected

t_{TRUE} Stretched 1-signal in the module

t_{FALSE} Stretched 0-signal in the module

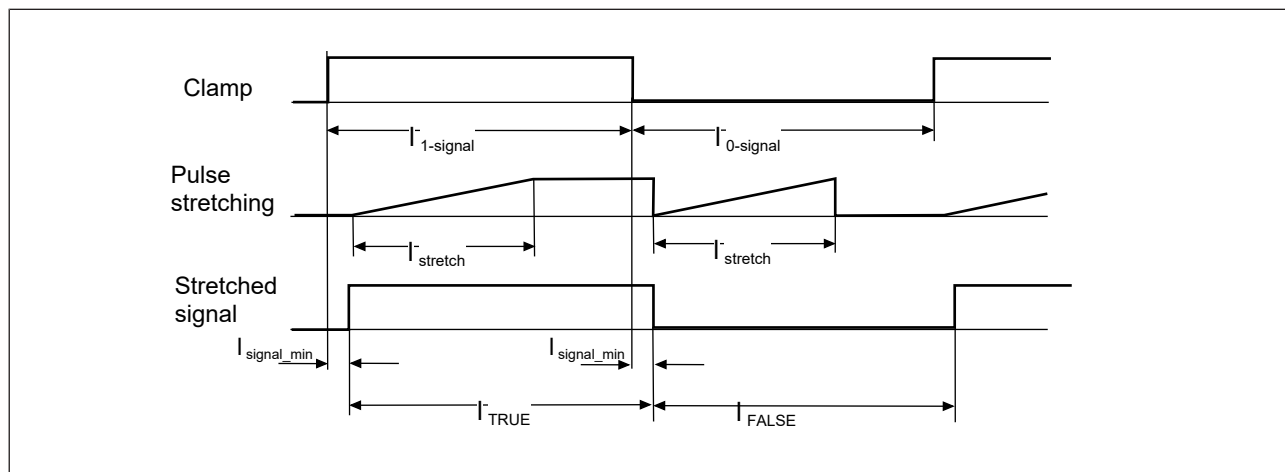


Fig.: Timing diagram: pulse stretching $\leq$ signal duration of 1-signal

Legend

Clamp Signal at the terminal

Pulse stretching Pulse stretching

Stretched signal Stretched signal

$t_{1\text{-signal}}$ Duration of 1-signal

t_{stretch} Duration of pulse stretching

- $t_{\text{signal_min}}$ Time for which a signal must be present at the input in order to be detected
- t_{TRUE} Stretched 1-signal in the module
- t_{FALSE} Stretched 0-signal in the module
(The stretch is when $t_{0\text{-signal}} < t_{\text{stretch}}$)

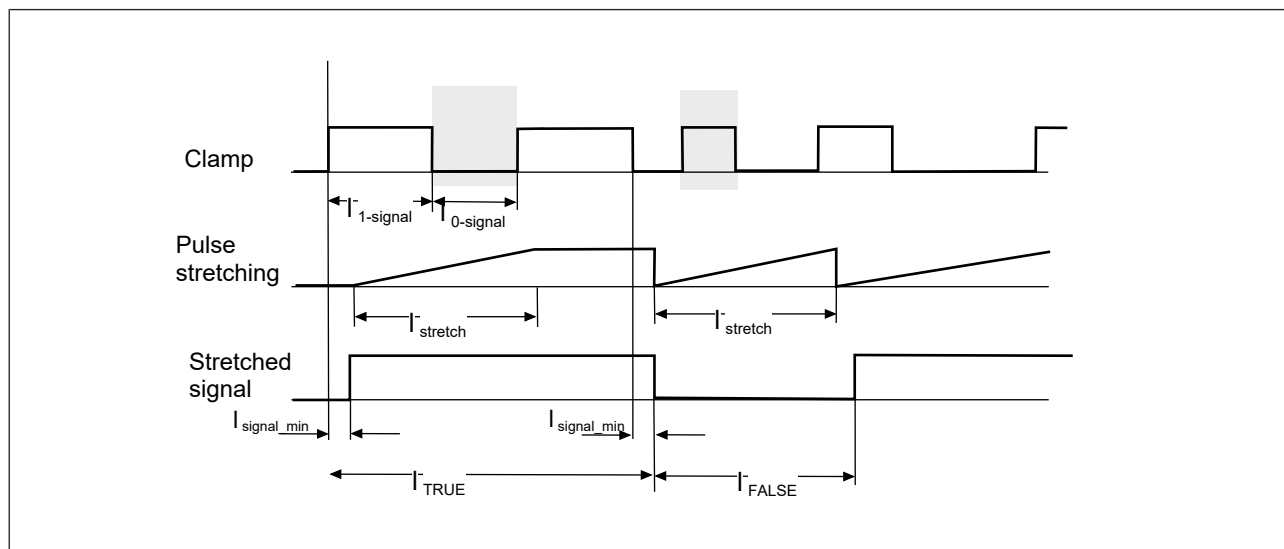


Fig.: Timing diagram: pulse stretching with variable signal duration

Legend

- Clamp Signal at the terminal
- Pulse stretching Pulse stretching
- Stretched signal Stretched signal
- $t_{1\text{-signal}}$ Duration of 1-signal
- t_{stretch} Duration of pulse stretching
- $t_{\text{signal_min}}$ Time for which a signal must be present at the input in order to be detected
- t_{TRUE} Stretched 1-signal in the module
- t_{FALSE} Stretched 0-signal in the module
- Grey shaded Signals that are not detected during stretching area

5.4 Voltage outputs

- ▶ The periphery supply is available at the voltage outputs.
- ▶ The voltage outputs supply the sensors at the inputs.
- ▶ The voltage outputs are protected against overload and short circuit.

5.5 Reaction times

Information on the reaction times is available in the operating manuals for the head modules or in the System Description PSS 4000.

5.6 Energy-saving functions

The energy-saving levels are controlled by the head module and are not configurable. The module supports the following energy-saving levels:

- ▶ Switching off the LEDs
 - The LEDs have two energy-saving levels:
 - Switching off the LEDs to display the terminal status
 - Switching off the LEDs to display the module and terminal status
- ▶ Switching off the terminals
 - The module switches off the voltage at the voltage outputs.
 - Signal states at the digital inputs are signalled to the PII.
- ▶ Standby mode
 - All module functions are inactive.
 - The LEDs for displaying the module and terminal status are switched off.

6 Structure of the process image (Remote I/O system PSS u2)

When the electronic module is used in the remote I/O system, the data described below are available.

ST-P11

The module occupies 2 Byte in the process image of inputs.

P11		Meaning (terminal)	Status
Byte 0	Bit 0	Input data I0 (1)	0: "0"-signal (0 V) at the input 1: "1"-signal (+ 24 V) at the input
	Bit 1	Input data I1 (2)	
	Bit 2	Input data I2 (3)	
	Bit 3	Input data I3 (4)	
	Bit 4	Input data I4 (5)	
	Bit 5	Input data I5 (6)	
	Bit 6	Input data I6 (7)	
	Bit 7	Input data I7 (8)	
Byte 1	Bit 0	Valid bit of voltage output S0	0: Error at the voltage output 1: No error at the voltage output
	Bit 1	Valid bit of voltage output S1	
	Bit 2	Valid bit of voltage output S2	
	Bit 3	Valid bit of voltage output S3	
	Bit 4 - 7		Constant "0"

7 I/O data of the module (PSS u2 in the automation system PSS 4000)

When the electronic module for PSS u2 is used in the automation system PSS 4000, the data described below are available.

7.1 Available I/O data in the I/O mapping

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

I/O data name (terminal)	I/O data type	Data element: Data type	Meaning	Status
I0(1)	ST_I_DI	Data: BOOL	Input data I0	0: "0"-signal (0 V) at the input 1: "1"-signal (+ 24 V) at the input
I1(3)	ST_I_DI	Data: BOOL	Input data I1	
I2(5)	ST_I_DI	Data: BOOL	Input data I2	
I3(7)	ST_I_DI	Data: BOOL	Input data I3	
I4(9)	ST_I_DI	Data: BOOL	Input data I4	
I5(11)	ST_I_DI	Data: BOOL	Input data I5	
I6(13)	ST_I_DI	Data: BOOL	Input data I6	
I7(15)	ST_I_DI	Data: BOOL	Input data I7	
VoltageOutput-Status_S0(2,10)	ST_I_DI	Data: BOOL	Status of voltage output S0	0: Error at the voltage output 1: No error at the voltage output
VoltageOutput-Status_S1(4,12)	ST_I_DI	Data: BOOL	Status of voltage output S1	
VoltageOutput-Status_S2(6,14)	ST_I_DI	Data: BOOL	Status of voltage output S2	
VoltageOutput-Status_S3(8,16)	ST_I_DI	Data: BOOL	Status of voltage output S3	

7.2 Other I/O data

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

- ▶ Valid bit of input I0
- ▶ Valid bit of input I1
- ▶ Valid bit of input I2
- ▶ Valid bit of input I3
- ▶ Valid bit of input I4
- ▶ Valid bit of input I5
- ▶ Valid bit of input I6
- ▶ Valid bit of input I7
- ▶ Valid bit for VoltageOutputStatus_S0
- ▶ Valid bit for VoltageOutputStatus_S1
- ▶ Valid bit for VoltageOutputStatus_S2

► Valid bit for VoltageOutputStatus_S3

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

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

8 Installation

8.1 General installation guidelines



NOTICE

R-type electronic modules may only be installed on R-type backplanes.



CAUTION!

Risk of material damage

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

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



CAUTION!

Risk of material damage

Electrostatic discharge can damage components.

- Ensure against discharge before touching the product, e.g. by touching an earthed, conductive surface or by wearing an earthed arm-band.

8.1.1 Dimensions

The dimensions include the backplane, electronic module and terminal block.

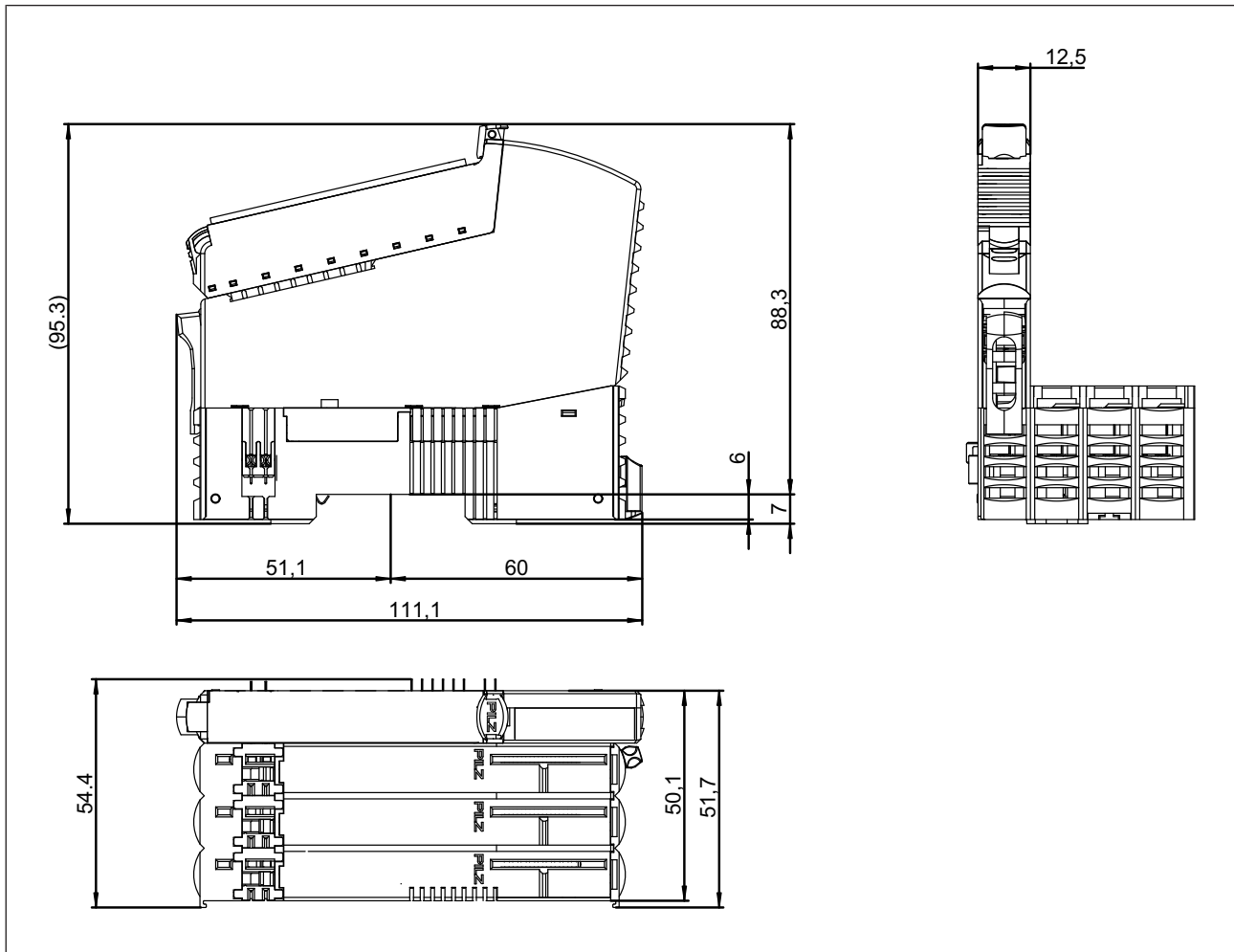


Fig.: Dimensions in mm, including backplane, electronic module and terminal block

8.2 Inserting and removing an electronic module

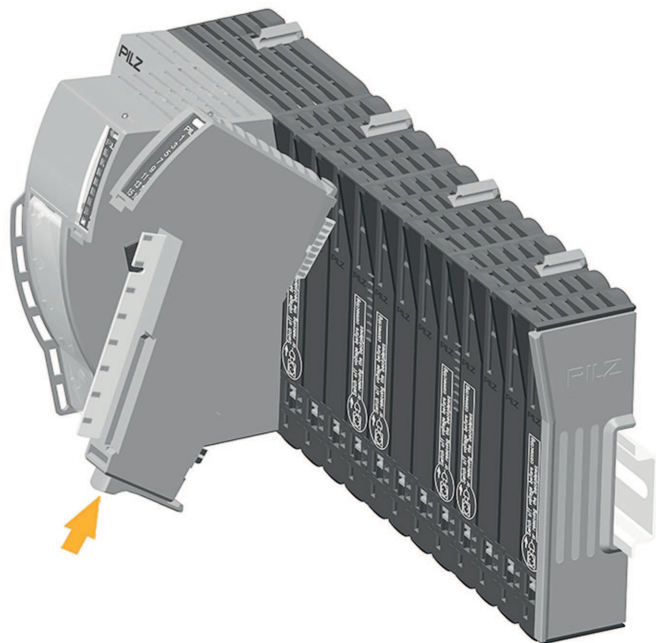
Please note:

- ▶ 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.

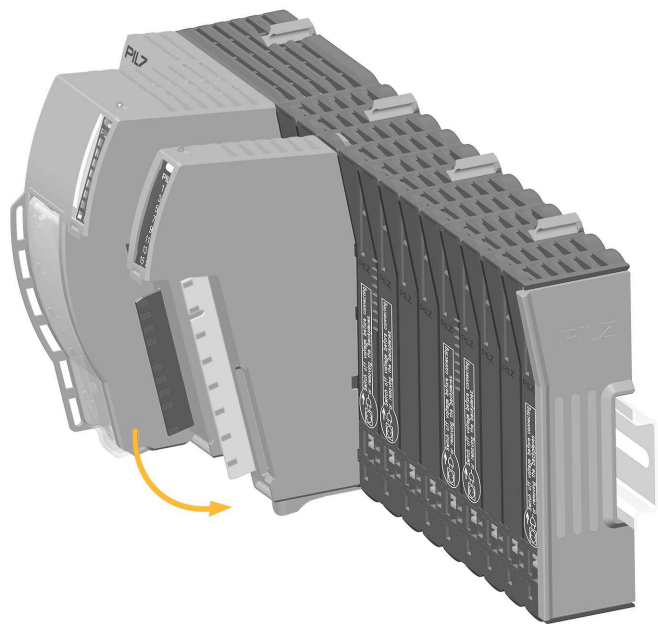
The following illustrations in chapters "Inserting an electronic module", "Removing an electronic module" and "Changing an electronic module during operation" are displayed as an example in the remote I/O system PSS u2 (see [Terminology](#) [ 5]).

8.2.1 Inserting an electronic module

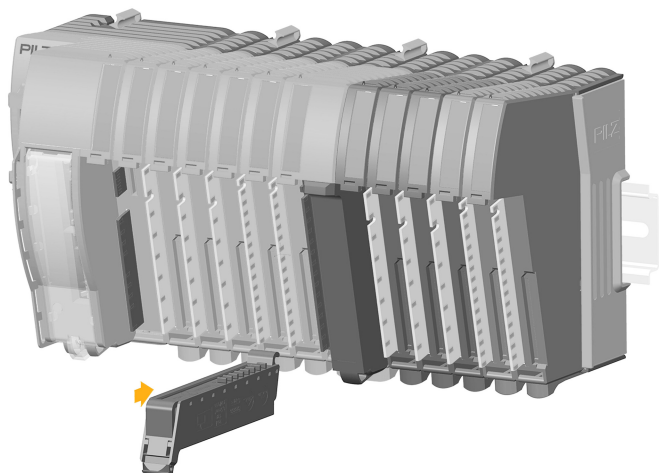
1. Insert the electronic module into the suspension lug on the backplane.



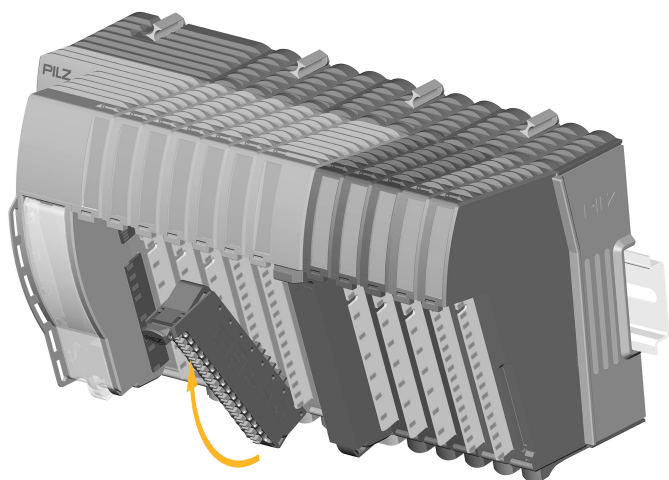
2. Swivel the electronic module downwards until you hear it click into place.



3. Insert the terminal block into the suspension lug on the module.

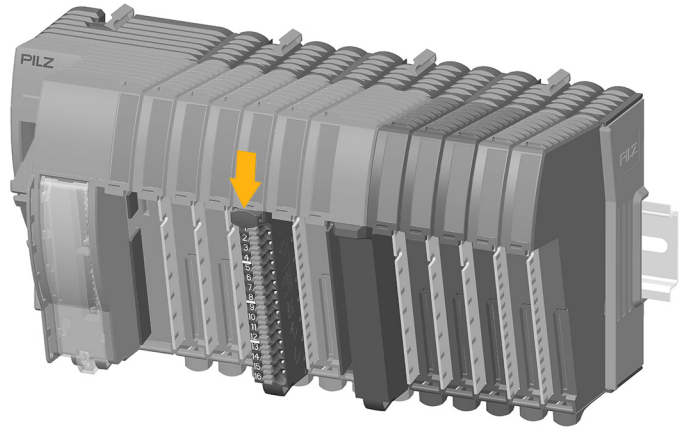


4. Swivel the terminal block upwards until you hear it click into place.

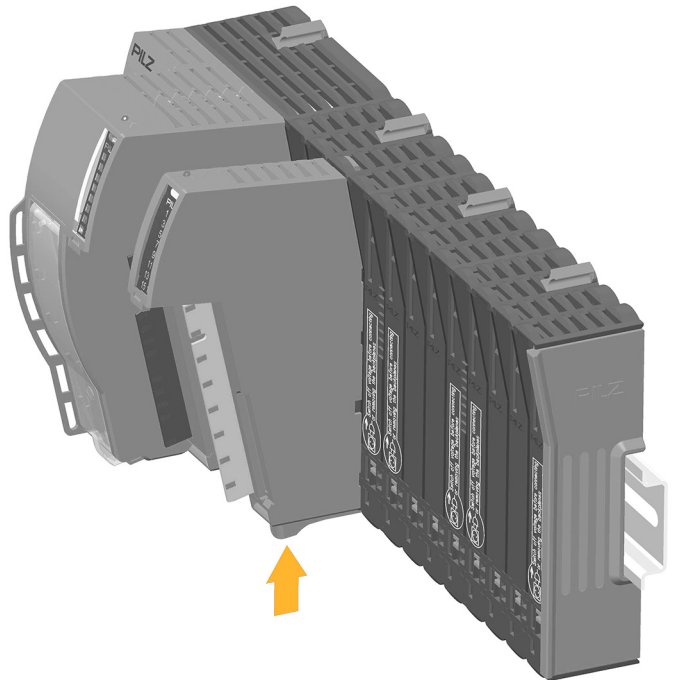


8.2.2 Removing an electronic module

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.



8.2.3 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 (exchanging an electronic module with identical product ID).
- ▶ The module is detected automatically as soon as it 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 with a different product ID).

- ▶ Insert electronic module

Effects

- ▶ Module bus communication between the other modules is not interrupted.
- ▶ To detect the new module the following steps may be necessary:
 - Creating a new configuration or changing an existing configuration
 - Download of the configuration to the head module
 - Restart of the head module (supply voltage on/off) or warm reset via reset button.

9 Wiring

9.1 General wiring guidelines

Please note:

- ▶ Signal lines do not have to be shielded.

9.1.1 Connection mechanism for terminal blocks

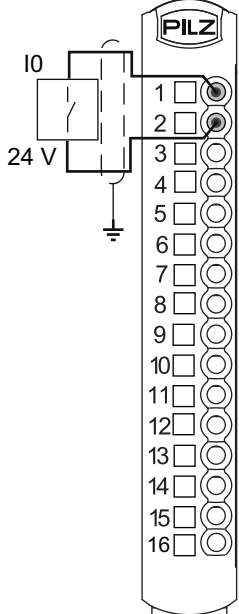
Procedure:

- ▶ 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 mm² (AWG26).
- ▶ The maximum cable cross section for field connection terminals on the terminal blocks is 1.5 mm² with ferrules (AWG14)
- ▶ Use copper wiring.

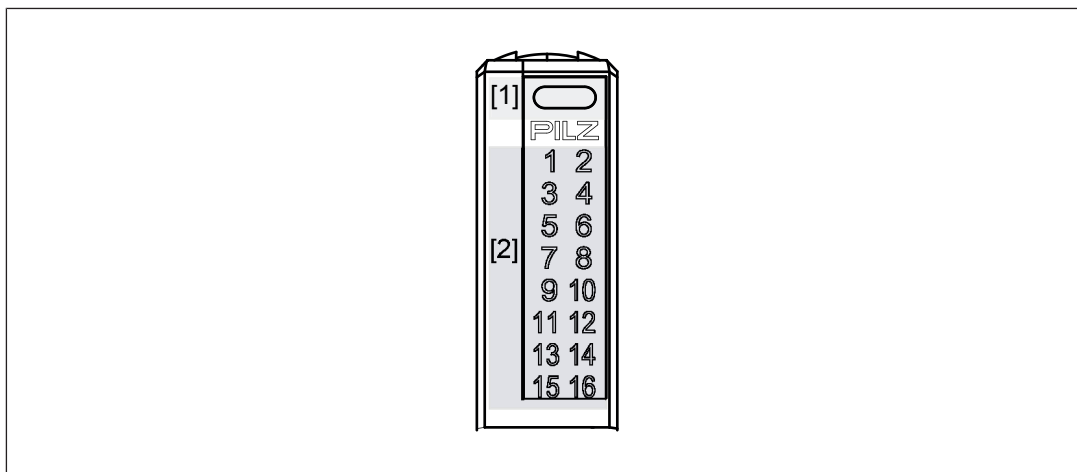
9.2 Terminal configuration

Terminal configuration	Connection example
1: Input I0 2: Voltage output S0 3: Input I1 4: Voltage output S1 5: Input I2 6: Voltage output S2 7: Input I3 8: Voltage output S3 9: Input I4 10: Voltage output S0 11: Input I5 12: Voltage output S1 13: Input I6 14: Voltage output S2 15: Input I7 16: Voltage output S3	1-channel sensor Supply of the sensor via the voltage output S0 

10 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.

10.1 Display elements and messages



Legend

[1] Module status display

[2] Terminal status display

The module can detect the following module states:

[1]	Colour [1]	[2]	Colour [2]	Meaning	Further information
	--			Module not ready for operation	
	Green			Module ready for operation	
	Green		Green	Module is in operation and there is a "1" signal at the relevant input or 24 V at the relevant voltage output	
	Green		--	Module is in operation and there is a "0"-signal at the relevant input or 0 V at the relevant voltage output	
	Red		--	Configuration error Module was inserted in the wrong slot. Use of unreleased firmware	
	Red		--	Internal errors	See module's diagnostic log

[1]	Colour [1]	[2]	Colour [2]	Meaning	Further information
	Red		Green	The module status display and both terminal status displays on the relevant voltage output flash synchronously Short circuit/overload/undervoltage	See module's diagnostic log
	Red		--	Temperature warning: too warm ^[1]	See module's diagnostic log
	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 voltage outputs are switched off.
- the inputs continue to be read and appear in the ST-PII. The valid bits for the voltage 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



LED flashes



LED off

11 Technical details

Where standards are undated, the 2025-03 valid editions apply.

General	328311	327311
Certifications	CE, UKCA, cULus Listed	CE, UKCA, cULus Listed
Application range	Standard	Standard
Module's device code	000Bh	0x0C0B
Electrical data	328311	327311
Supply voltage		
Max. power consumption of an input	0,11 W	0,11 W
Internal voltage supply (module supply)		
Module's power consumption	0,26 W	0,26 W
Periphery's voltage supply (periphery supply)		
Module's power consumption with no load	0,22 W	0,22 W
Max. power consumption of a voltage output	0,13 W	0,13 W
Max. power dissipation of module	1,9 W	1,9 W
Process data remote IO system PSS u2	328311	327311
Number of ST input bytes; if the assignment is incomplete, the assigned bits are stated in brackets	2(12)	2(12)
Inputs	328311	327311
Quantity	8	8
Signal level at g0 h	-3 - +5 V DC	-3 - +5 V DC
Signal level at "1"	11 - 30 V DC	11 - 30 V DC
Voltage at inputs	24 V DC	24 V DC
Input type in accordance with EN 61131-2	3	3
Input current range	3 - 3,5 mA	3 - 3,5 mA
Max. processing time of input when signal changes from "1" to "0"	0,3 ms	0,3 ms
Max. processing time of input when signal changes from "0" to "1"	0,3 ms	0,3 ms
Min. processing time of input when signal changes from "1" to "0"	0,005 ms	0,005 ms
Min. processing time of input when signal changes from "0" to "1"	0,005 ms	0,005 ms
Software filter time	0 ms ... 25,5 ms	0 ms ... 25,5 ms
Potential isolation	Yes	Yes
Semiconductor outputs	328311	327311
Output	S0 ... S3	S0 ... S3

Voltage outputs	328311	327311
Number of outputs for periphery supply	4	4
Function of outputs for periphery supply	Sensor supply	Sensor supply
Rated voltage	24 V DC	24 V DC
Max. output current at rated voltage	0,25 A	0,25 A
Short circuit-proof	Yes	Yes
Potential isolation	Yes	Yes
Environmental data	328311	327311
Application site		
in accordance with the standard	–	EN 50125-3
Application site	–	Minimum 1m distance from track
Climatic suitability	EN 60068-2-1, EN 60068-2-2, EN 60068-2-30, EN 60068-2-78, EN IEC 60068-2-14	EN 60068-2-1, EN 60068-2-2, EN 60068-2-30, EN 60068-2-78, EN IEC 60068-2-14
Ambient temperature		
Temperature range	-25 - 60 °C	-40 - 70 °C
in accordance with the standard	UL 61010	UL 61010
Max. temperature in accordance with UL	-25 - 60 °C	-40 - 60 °C
Storage temperature		
Temperature range	-40 - 70 °C	-40 - 70 °C
Climatic suitability		
in accordance with the standard	EN 60068-2-78	EN 60068-2-78
Humidity	95 % r. h. at 40 °C	95 % r. h. at 40 °C
Condensation during operation	Not permitted	EN 60068-2-30
Max. operating height above SL	5000 m	5000 m
EMC	EN 12015, EN 12016, EN 298, EN 50156-1, EN 61000-6-7, EN 61131-2 (Zone B), EN IEC 61000-6-2, EN IEC 61000-6-4	EN 12015, EN 12016, EN 298, EN 50121-4, EN 50156-1, EN 61000-6-7, EN 61131-2 (Zone B), EN IEC 61000-6-2, EN IEC 61000-6-4
Vibration		
in accordance with the standard	EN 60068-2-6	EN 60068-2-6
Frequency	8,4 - 150 Hz	8,4 - 150 Hz
Acceleration	10 m/s²	10 m/s²
Broadband noise		
in accordance with the standard	–	EN 60068-2-64
Frequency	–	5 - 2.000 Hz
Acceleration	–	2,3 m/s² eff.

Environmental data	328311	327311
Shock stress		
in accordance with the standard	EN 60068-2-27	EN 60068-2-27
Number of shocks	6	6
Acceleration	150 m/s²	150 m/s²
Duration	11 ms	11 ms
in accordance with the standard	EN 60068-2-27	EN 60068-2-27
Number of shocks	1000	1000
Acceleration	100 m/s²	100 m/s²
Duration	16 ms	16 ms
Airgap creepage		
in accordance with the standard	EN 50156-1, EN 81-20	EN 50156-1, EN 81-20
Overvoltage category	III	III
Pollution degree	2	2
in accordance with the standard	EN 61131-2	EN 61131-2
Overvoltage category	II	II
Pollution degree	2	2
in accordance with the standard	–	EN 50124-1
Overvoltage category	–	OV2
Pollution degree	–	PD2
Protection type		
in accordance with the standard	EN 60529	EN 60529
Housing	IP20	IP20
Terminals	IP20	IP20
Potential isolation	328311	327311
Potential isolation	not evaluated by UL	not evaluated by UL
Potential isolation between	Input/output and module supply	Input/output and module supply
Type of potential isolation	Functional insulation	Functional insulation
Rated surge voltage in operating heights up to max. 2000 m	2500 V	2500 V
Rated surge voltage in operating heights up to max. 5000 m	2500 V	2500 V
Potential isolation between	Input/output and functional earth	Input/output and functional earth
Type of potential isolation	Functional insulation	Functional insulation
Rated surge voltage in operating heights up to max. 2000 m	2500 V	2500 V
Rated surge voltage in operating heights up to max. 5000 m	2500 V	2500 V
Mechanical data	328311	327311
MTBF at 40 °C, 100 % duty cycle (8760 hours/year)	–	282 Jahre
Material		
Housing	PC	PC
Mounting type	plug-in	plug-in

Mechanical data	328311	327311
Dimensions		
Height	110,8 mm	110,8 mm
Width	12,5 mm	12,5 mm
Depth	72,5 mm	72,5 mm
Weight	34 g	36 g

12 Supplementary data

12.1 Operating height

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

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

13 Order reference

13.1 Product

Product type	Features	Product ID
PSS u2 ES 8DID	PSS u2, electronic module for standard applications, 8 digital inputs, advanced diagnostics, configurable pulse stretching, terminal block PSS u2 T 16 required (not supplied with the system).	328311
PSS u2 ES 8DID -R	PSS u2, electronic module for standard applications, 8 digital inputs, advanced diagnostics, configurable pulse stretching, for increased environmental requirements and railway applications, terminal block PSS u2 T 16 required (not supplied with the system).	327311

13.2 Accessories

Terminal block

Product type	Features	Product ID
PSS u2 T 16 (1 pc.)	Terminal block 16-pin, scope of delivery: 1 piece	328850
PSS u2 T 16 (10 pcs.)	Terminal block 16-pin, scope of delivery: 10 pieces	328851
PSS u2 T 16 (5 x 10 pcs.)	Terminal block 16-pin, scope of delivery: 50 pieces	328852

Labelling bracket

Product type	Features	Product ID
PSS u2 A LC E1 (10 pcs.)	Label holder for electronic module 23.5 x 10.5 mm, scope of delivery: 10 pieces	328910
PSS u2 A LC E2 (10 pcs.)	Label holder for electronic module 103 x 10.5 mm, scope of delivery: 10 pieces	328911
PSS u2 A LA E1 (10 pcs.)	Labelling strips for electronic module 23.5 x 10.5 mm (10 x DIN A4 sheet)	328913
PSS u2 A LA E2 (10 pcs.)	Labelling strips for electronic module 103 x 10.5 mm (10 x DIN A4 sheet)	328914

Label holder for terminal block

Product type	Features	Product ID
PSS u2 A LC T3 (10 pcs.)	Label holder for terminal block 61 x 11.5 mm, scope of delivery: 10 pieces	328912

Coding elements

Product type	Features	Product ID
PSS u2 A CE E (10 pcs.)	Coding elements for electronic modules, scope of delivery: 10 pieces	328860

Backplane

Product type	Features	Product ID
PSS u2 B 1	PSS u2, accessories, backplane, for electronic modules, 1 slot, width 12.6 mm, height 107 mm, note the mounting distances	328811
PSS u2 B 4	PSS u2, accessories, backplane, for electronic modules, 4 slots, width 50.1 mm, height 107 mm, note the mounting distances	328810
PSS u2 B 1 -R	PSS u2, accessories, backplane, for electronic modules, 1 slot, for increased environmental requirements and railway applications, width 12.6 mm, height 107 mm, note the mounting distances	327811
PSS u2 B 4 -R	PSS u2, accessories, backplane, for electronic modules, 4 slots, for increased environmental requirements and railway applications, width 50.1 mm, height 107 mm, note the mounting distances	327810

14 EU/EC declaration of conformity

These products meet the requirements of the directive 2006/42/EC on machinery up to and including 19 January 2027, and the EU regulation 2023/1230 of the European Parliament and of the Council from 20 January 2027. The full EU and EC declaration of conformity is available to download at www.pilz.com/manuals.

Authorised representative: Pilz GmbH & Co. KG, Felix-Wankel-Str. 2, 73760 Ostfildern, Germany

15 UKCA-Declaration of Conformity

These products comply 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/manuals.

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► Support

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