

PSSu H SB CAN(-T)



Decentralised system PSSuniversal I/O

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SD means Secure Digital.

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1.1 Validity of documentation

This documentation is valid for the product **PSSu H SB CAN** and **PSSu H SB CAN-T**. It is valid until new documentation is published.

Please also refer to the following documents:

- ▶ SafetyBUS p System Description
- ▶ SafetyBUS p Installation Manual
- ▶ PSSuniversal System Description
- ▶ PSSuniversal Installation Manual

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

1.1.1 Retaining the documentation

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

1.2 Overview of documentation

1 Introduction

The introduction is designed to familiarise you with the contents, structure and specific order of this manual.

2 Overview

This chapter provides information on the module's most important features.

3 Safety

This chapter must be read as it contains important information on safety and intended use.

4 Function Description

This chapter describes the module's individual components.

5 Installation

This chapter explains how to install the module.

6 Interfaces

This chapter describes the module's interfaces.

7 Operation

This chapter explains the display elements and advises on what to do if a fault occurs.

8 Technical Details

This chapter contains the product's technical details and order reference.

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 unit(s) 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.

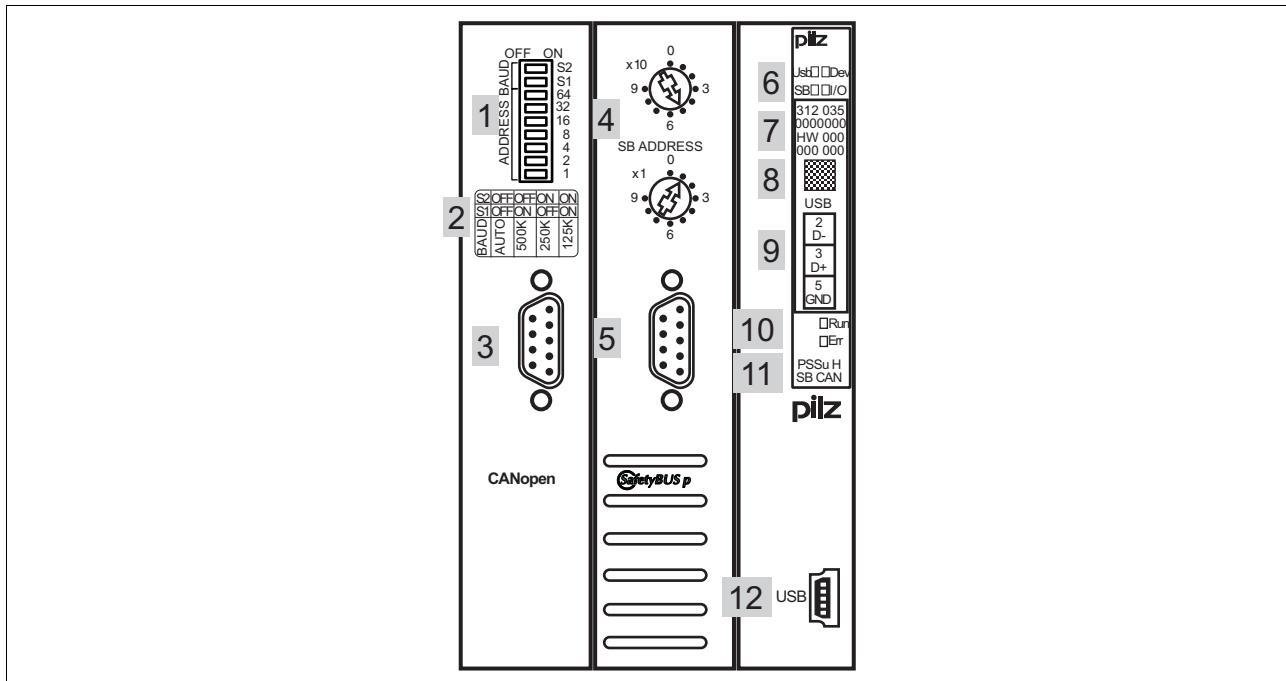
1 Introduction

2.1 Module features

The product has the following features:

- ▶ **SafetyBUS p** interface for
 - Failsafe inputs/outputs
- ▶ **CANopen** interface for
 - Standard inputs/outputs
 - Failsafe outputs with the local enable principle
- ▶ USB port for connection to a PC for
 - Commissioning
 - Service
- ▶ LEDs for:
 - System status
 - **SafetyBUS p** status
 - USB status
 - Status of the **CANopen** interface
- ▶ Electronic modules that can be used for input/output:
 - All failsafe modules
(PSSu E F...)
 - All standard modules
(PSSu E S...)
- ▶ Coated version of the module:
PSSu H SB CAN-T: for increased environmental requirements

2.2 Front view



Key:

- ▶ 1: Selector switch for setting the station address and transmission rate (CANopen)
- ▶ 2: Labelling strip with guidelines for setting the transmission rate (CANopen)
- ▶ 3: CANopen interface
- ▶ 4: Two selector switches for setting the device address (SafetyBUS p)
- ▶ 5: SafetyBUS p interface
- ▶ 6: LEDs for system diagnostics and SafetyBUS p diagnostics
- ▶ 7: Labelling strip with:
 - Order number
 - Serial number
 - Hardware version number
 - Firmware version number on delivery
- ▶ 8: Field for 2D code
- ▶ 9: Labelling strip with interface configuration of the USB port
- ▶ 10: LEDs for CANopen diagnostics
- ▶ 11: Description of head module
- ▶ 12: USB port (Mini-B)

3.1 Intended use

The module is designed for use in:

- ▶ Safety-related applications with
 - **SafetyBUS p**
 - **CANopen** With local enable principle
- ▶ Non-safety-related applications with
 - **CANopen**

The module **PSSu H SB CAN-T** is suitable for use where there are increased environmental requirements (see Technical Details).

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

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
- ▶ Use of the module outside the technical details (see chapter entitled "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 module is supported by programmable safety systems with SafetyBUS p interface, from FS operating system version 50/18.

Programmable safety systems with an older FS operating system version will have a restricted function range.

3.1 Intended use

The head module may be used in conjunction with the following electronic modules:

Module type	Module name
Voltage supply	PSSu E F PS(-T)
	PSSu E F PS1(-T)
	PSSu E F PS-P(-T)
	PSSu E F BSW(-T)
Digital input/output modules	PSSu E S 4DI(-T)
	PSSu E S 4DO 0.5(-T)
	PSSu E S 2DO 2(-T)
	PSSu E F 4DI(-T)
	PSSu E F 4DO 0.5(-T)
	PSSu E F 2DO 2(-T)
	PSSu E F 2DOR 8(-T)
	PSSu E F DI OZ 2(-T)
Analogue input/output modules	PSSu E S 2AI I se(-T)
	PSSu E S 4AI U(-T)
	PSSu E S 2AI U(-T)
	PSSu E S 2AO I(-T)
	PSSu E S 4AO U(-T)
	PSSu E S 2AO U(-T)
Counter modules	PSSu E S ABS SSI(-T)
	PSSu E S INC(-T)
Voltage distribution	PSSu E PD(-T)
	PSSu E PD1(-T)

The module's firmware can be updated to a later version using the Firmware Manager on the PSSUniversal Assistant. For the reason, the module's actual firmware version may not always match the firmware version printed on the front of the unit. Updating the firmware can also expand the module's functionality.



INFORMATION

The module's actual firmware version can only be established using the Firmware Manager on the PSSUniversal Assistant.

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 competent persons.

A competent person is someone who, because of their training, experience and current professional activity, has the specialist knowledge required to test, assess and operate the work equipment, devices, systems, plant and machinery in accordance with the general standards and guidelines for safety technology.

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 safety guidelines given in this description
- ▶ 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).

4.1 Module features

4.1.1 Integrated protection mechanisms

The module has the following protection mechanisms:

- ▶ Multi-channel diverse processor section
- ▶ Cyclical self tests
- ▶ Potentially isolated **SafetyBUS p** interface
- ▶ Potentially isolated **CANopen** interface
- ▶ When the PSSu E F PS1(-T) is used to supply the system, the module supply is buffered for 20 ms if the supply voltage is interrupted.

4.1.2 Supply voltage

Module supply

- ▶ The module supply provides the module with voltage.

4.2 SafetyBUS p

4.2.1 Connection to SafetyBUS p

A PSSu with SafetyBUS p interface is regarded as a bus subscriber in a SafetyBUS p network.

The "SafetyBUS p Installation Manual" and the "SafetyBUS p System Description" apply for subscribers in a SafetyBUS p network.

Detailed descriptions for commissioning are available in the online help for the PSS WIN-PRO system software. Step-by-step instructions can be found in the manual: "Getting Started: Full version of PSS WIN-PRO".

4.2.2 Selector switch for setting the device address

The device address of a PSSu is set via the two rotary switches "x 10" and "x 1".

Permitted device addresses are in the range $32_D \dots 95_D$. The same applies if the PSSu system is configured for SafetyBUS p 1 in the SafetyBUS p Configurator on the PSS WIN-PRO system software. The offset of 100_D for device addresses on SafetyBUS p 1 is calculated automatically from the bus configuration.

Rotary switch "SB ADDRESS": Switch designation	Key	Example: Device address 51_D
x 10	Set the tens	
x 1	Set the units	

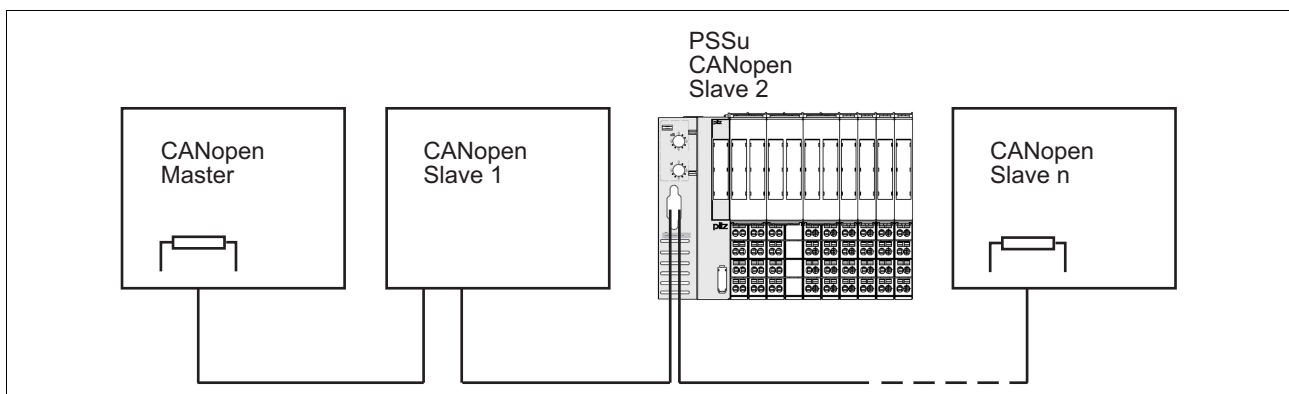
4.3 CANopen

4.3.1 Connection to CANopen

A PSSu system with CANopen interface is a passive subscriber (Slave) of the CANopen fieldbus.

The basic communication functions with CANopen conform to CiA DS-301 V3.0. The central controller (Master) reads input information from the slaves and writes output information to the slaves as part of each cycle.

Bus termination must be activated on both ends of the bus.



4.3 CANopen

4.3.2 Selector switch for setting the transmission rate

The transmission rate of a PSSu is set via the “BAUD” DIP switches S1 and S2.

“BAUD” DIP switch	Key				Example:
Switch designation	AUTO	500 KBit/s	250 kBit/s	125 kBit/s	Transmission rate 500 kBit/s
S2	OFF	OFF	ON	ON	OFF ON ADDRESS BAUD S2 S1 64 32 16 8 4 2 1
S1	OFF	ON	OFF	ON	
64	Station address				
32					
16					
8					
4					
2					
1					



INFORMATION

The transmission rate should **only** be set when the module is switched off (no voltage applied).

The settings are **only** transferred when booting. Any changes made to the settings during operation will **not** be transferred.

If the PSSu station has lots of telegrams to send via the CANopen fieldbus, make sure that the transmission rate is high enough, e.g. when several analogue input/output modules are used. If the transmission rate is too low, the PSSu may not be able to establish a connection to the CANopen fieldbus.

4.3 CANopen

4.3.3 Selector switch for setting the station address

The station address of a PSSu ("Node ID") is set via the "ADDRESS" DIP switches ("1", "2", "4", "8", "16", "32" and "64"). The DIP switches are binary coded. Permitted station addresses are in the range $0_D \dots 127_D$.

A station address is set via a combination of the relevant binary coded switches:

"ADDRESS" DIP switch	Key		Example
Switch designation	OFF	ON	Station address 116_D
S2	Transmission rate		
S1			
64	0	64_D	
32	0	32_D	
16	0	16_D	
8	0	8_D	
4	0	4_D	
2	0	2_D	
1	0	1_D	



INFORMATION

The station address should **only** be set when the module is switched off (no voltage applied).

The settings are **only** transferred when booting. Any changes made to the settings during operation will **not** be transferred.

Each station address on a CANopen network must be unique.

4.4 USB port

The following functions are available via the USB port:

- ▶ Show actual hardware
- ▶ Comparison of actual/registered hardware
- ▶ Display and update firmware versions
- ▶ Setting the parameters for the ST section

Parameters for the module's ST section can either be set via the fieldbus interface or via the USB port. Parameter setting via the USB port has priority over parameter setting via the fieldbus interface. Once parameters for the the head module have been set via the USB port, the ability to set parameters for the module via the fieldbus interface is disabled. The disable can be lifted in the PSSUniversal Assistant.

Procedure for connecting the head module via the USB port:

- ▶ Connect PC to head module via USB cable.
- ▶ Install USB driver.
- ▶ View the actual hardware registry in the PSSUniversal Assistant and call up other functions.

This way it is possible to copy and edit an existing configuration in the PSSUniversal Assistant.



INFORMATION

The USB driver can be found on the PSSUniversal Assistant CD-ROM, in the subdirectory \bin\PILZ_USB_DRIVER

5.1 General installation guidelines

Please also refer to the PSSuniversal Installation Manual.

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

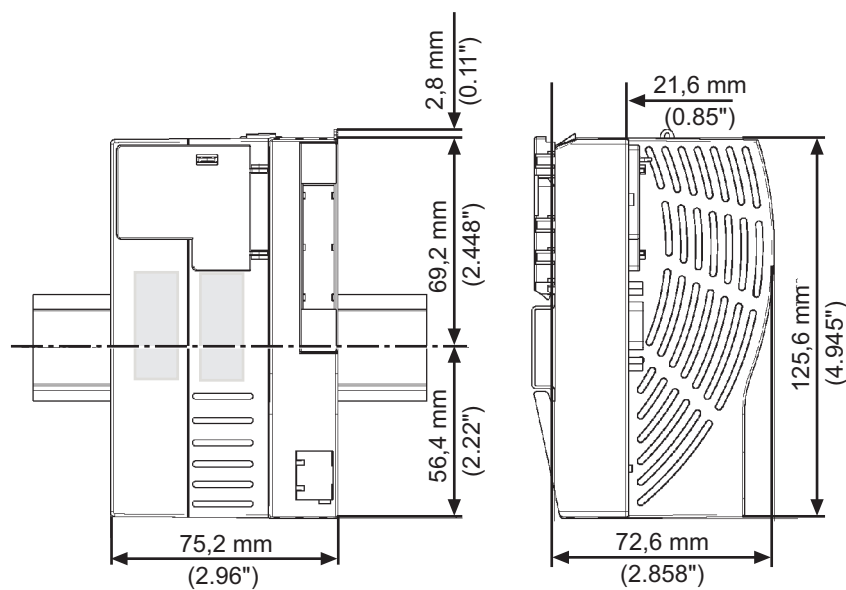


CAUTION!

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 arm-band.

5.1.1 Dimensions



5.2 Installing the head module

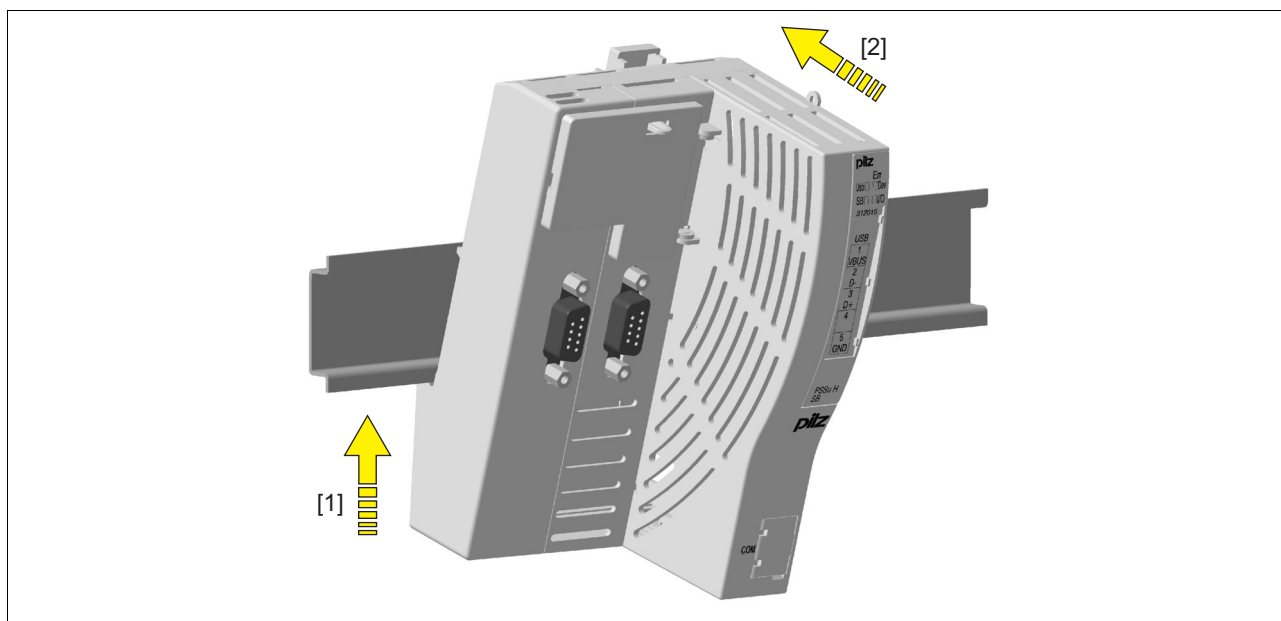
Prerequisite:

- ▶ The mounting rail must be installed.

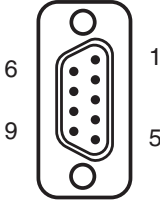
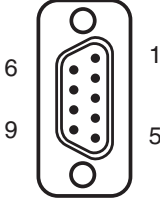
Procedure:

- ▶ Install an end bracket to the left of the head module or leave enough space for one.
- ▶ Slot the groove on the head module on to the mounting rail from below [1].
- ▶ Push the head module back [2] until you hear it lock into position.

Schematic representation:



6.1 Interface configuration

SafetyBUS p	Layout	
Male 9-pin D-SUB connector	1: n.c. 2: CAN_L (brown) 3: CAN_GND (white) 4: n.c. 5: CAN_SHLD 6: n.c. 7: CAN_H (green) 8: Supply voltage for fibre-optic couplers from Pilz 9: n.c.	
CANopen	Layout	
Male 9-pin D-SUB connector	1: n.c. 2: CAN_L 3: CAN_GND 4: n.c. 5: CAN_SHLD 6: GND ⁽¹⁾ 7: CAN_H 8: n.c. 9: n.c.	
USB	Layout	
Mini-B USB connector	1: n.c. 2: D- USB Data – 3: D+ USB Data + 4: n.c. 5: GND Ground	

► n.c. = not connected

► ⁽¹⁾ Not required for operation

6.1.1 Connection to SafetyBUS p

Please refer to the SafetyBUS p Installation Manual.

6.1.2 Connection to CANopen

The connection cable must conform to the requirements of CiA DS 102 V2.0.

Only shielded cable should be used as the CANopen connection cable. Connect the cable shield on the CANopen connection cable to Pin 5 of the 9-pin D-Sub connector. The relationship of the cable runs to the bit rate must be maintained.

6.1 Interface configuration

6.1.3 Connection via USB

Please note the requirements of the USB standard for USB 2.0 and for Mini-B USB ports.

The maximum cable runs for USB connection cable are 5 m.

7.1 Messages

All errors and faults detected by the electronic modules on a PSSu are signalled to the head module and entered in the head module's error stack. You can read the head module's error stack using the PSS WIN-PRO system software (SafetyBUS p, Domain 0).

Module error	Statement	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
ST communication error	Error during ST 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
Output error	Error during cyclical output test for short circuit. Possible causes: Short circuit, or output defective	Rectify the short circuit or change the faulty module
Test pulse error	Possible causes: Short circuit between a test pulse and a supply voltage, or a defective module	Rectify the short circuit or change the faulty module
Relay control error	Error during cyclical monitoring test of the relay coils	Change faulty relay module
Relay error	A relay position is faulty; possible cause: Defective relay contact	Change faulty relay 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
Error in the feedback loop	FS input detects an error in the feedback loop or FS input is defective	Check FS input, check the configuration of the feedback loop, check the signals, or check the wiring and contacts
Error in the local enable principle	FS output has reacted incorrectly or unexpectedly	Check the configuration of the FS output, or check the fieldbus signals in the FS and ST section
Input error	Error during the cyclical input test; possible cause: Input defective	Change faulty module
Overload/short circuit	Load on output too high	Rectify overload or short circuit

7.1 Messages

Module error	Statement	Remedy
Overload of the supply voltage for encoder	Supply voltage for encoder overloaded or short-circuited	Rectify overload or short circuit
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
Error in the overvoltage protection diodes	Overvoltage protection diodes are defective	Change faulty supply voltage module
Timeout error on the output	No data has been received for the output from the module bus for longer than 50 ms.	Check ST communication or configuration
Polarity error	Polarity of the periphery supply	Correct the polarity
Error in the periphery supply	Lower voltage limit exceeded on the periphery supply	Ensure there is a sufficient supply

(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 system software.

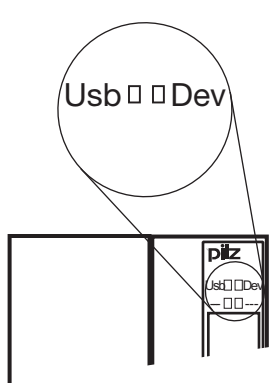
7.2 Display elements

Legend:

	LED on
	LED flashes
	LED off

7.2.1 Display elements for system diagnostics

The module has LEDs to display various PSSu states ("Usb" LED and "Dev" LED).

	LED			Key
	Description	Colour	Status	
	Usb	---		No data is being transmitted via the USB port
		Green		Data is being transmitted via the USB port
	Dev	---		PSSu system error, no start-up
		Green		PSSu running without error
		Red		Error in the head module
		Red		Error on the module bus (* ¹)

(*¹) An error on the module bus (flashing red LED) may be due to one of the following reasons, which are stored in the error stack:

1. The head module cannot determine the registered hardware. Possible causes:

- ▶ Module bus is incomplete
- ▶ Terminating resistor is missing.
- ▶ A module is defective
- ▶ A module does not have valid software.
- ▶ Invalid hardware registry
- ▶ Too many modules

7.2 Display elements

Remedy: Correct the hardware registry.

2. Error: A module is missing. Possible cause:

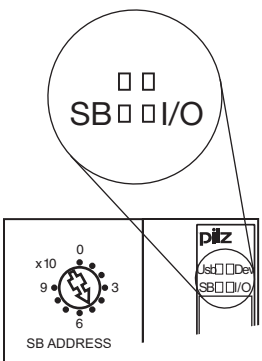
- ▶ The module has been removed.
- ▶ The module has an error and is no longer registering after a reset.
- ▶ The module has an error and switches to a system stop.
- ▶ The module no longer has a voltage supply.

Remedy: Rectify the above points.

7.2 Display elements

7.2.2 Display elements for SafetyBUS p diagnostics

The module has LEDs to display various SafetyBUS p states ("SB" LED and "I/O" LED).

	LED		Key	
	Designation	Colour		
	SB	---		No contact with SafetyBUS p (MD is not running or SBp wiring is faulty)
	SB	Green		There is contact with SafetyBUS p, but the MD does not recognise the SBp-Device. (faulty device address or SBp configuration)
				Connection to MD is running correctly.
	I/O	---		All the SBp-Device's I/O-Groups are in a STOP condition.
		Green		One of the SBp-Device's I/O-Groups is in a STOP condition.
				All the SBp-Device's I/O-Groups are in a RUN condition

7.2 Display elements

7.2.3 Display elements for CANopen diagnostics

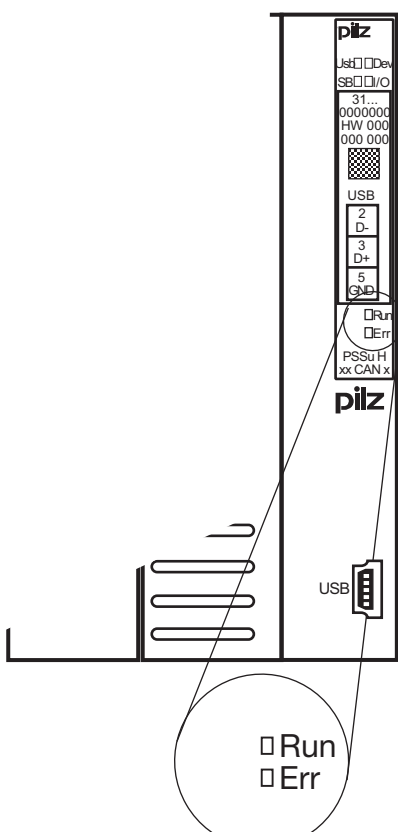
The module has LEDs to display various CANopen states (“Run” LED and “Err” LED).

Key:

	LED off	Permanently off
	LED flashes once	50 ms on, 50 ms off
	LED flashes once	200 ms on, 1000 ms off
	LED flashes twice	On twice for 200 ms, off for 200 ms in between, then off for 1000 ms
	LED flashes three times	On three times for 200 ms, off for 200 ms in between, then off for 1000 ms
	LED flashes four times	On four times for 200 ms, off for 200 ms in between, then off for 1000 ms
	LED flashes	200 ms on, 200 ms off
	LED on	Permanently on

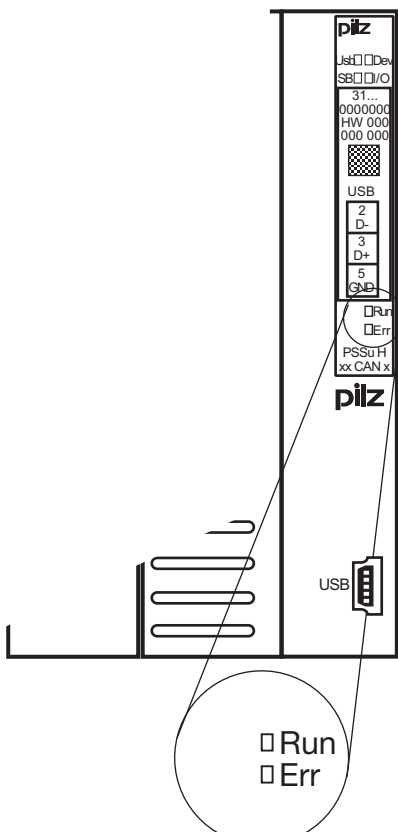
7.2 Display elements

“RUN” LED

	LED		Key	
	Designation	Colour		
	Run	- - -		No data transfer
		green		Automatic bit rate detection is running (together with “Err” LED).
		green		Module in “Pre-Operational” status
		green	 1	Module in “STOPPED” status
		green		Module in “Operational” status

7.2 Display elements

“Err” LED

	LED		Key	
	Designation	Colour		
	Err	---		No fault
		red		Automatic bit rate detection is running (together with “Run” LED).
		red		Invalid configuration
		red	 1	Error threshold value has been reached, the CAN controller has received too many error telegrams.
		red	 2	Monitoring error, addressing Master-Slave monitoring error, e.g. heartbeat monitoring
		red	 3	Error in “Synchronisation” status, synchronisation telegram not within the configured time.
		red	 4	Error in event timer
		red		CANopen isn't running

7.3 CANopen object description

7.3.1 Communication profile

In accordance with CiA 301 Application Layer and Communication Profile Version 4.1

Object	Index	Description
Device Type	1000	Device Classification
Error Register	1001	1-Byte error register, indicates the presence of a device error and its type.
Manufacturer Status Register	1002	Error register for displaying the manufacturer-specific error
COB-ID-SYNC	1005	CAN identifier for the SYNC message
Manufacturer Device Name	1008	Manufacturer-specific details
Manufacturer HW Version	1009	Manufacturer-specific details
Manufacturer SW Version	100A	Manufacturer-specific details
Guard Time	100C	Time interval for the node guarding protocol
Life Time Factor	100D	Timeout for the node guarding protocol
COB-ID EMCY	1014	CAN identifier for the EMCY message
Consumer Heartbeat Time	1016	Time interval for the heartbeat protocol
Producer Heartbeat Time	1017	Timeout for the heartbeat protocol
Identity Objekt	1018	Contains general information about the device (e.g. CANopen Vendor ID).
Module List	1027	List of the module identifiers in slot sequence (actual configuration)
Error Behaviour	1029	Specifies the status in which a device should be set if a device error or communication error occurs.
Server SDO Parameter	1200–127F	Parameter für Server-SDO
Rx PDO Parameter	1400–15FF	Communication parameter for Receive-PDO
Rx PDO Mapping	1600–17FF	Mapping parameter for Receive-PDO
Tx PDO Parameter	1800–19FF	Communication parameter for Send-PDO
Tx PDO Mapping	1A00–1BFF	Mapping parameter for Send-PDO

7.3 CANopen object description

7.3.2 Device profile

In accordance with CiA 401 Device Profile for Generic I/O Modules Version 3.0

Object	Index	Description
8-Bit Digital Input	6000	Digital input data: Grouping 8 input channels into one byte
Global Interrupt Enable	6005	Global interrupt enable, without having to adapt the interrupt masks
Interrupt Mask Any Change 8-Bit	6006	Specifies which I/O channels trigger an interrupt at any signal change.
Interrupt Mask Low-to-High 8-Bit	6007	Specifies which I/O channels trigger an interrupt when the signal changes from low to high.
Interrupt Mask High-to-Low 8-Bit	6008	Specifies which I/O channels trigger an interrupt when the signal changes from high to low.
8-Bit Digital Output	6200	Digital output data: Grouping 8 output channels into one byte
Error Mode Output 8-Bit	6206	Defines whether an output is to assume a predefined error value in the case of an error or "Stop Remote Node".
Error Value Output 8-Bit	6207	If the corresponding error mode is activated, the outputs are set to the preset values in the case of an error.
Analogue Input 16-Bit	6401	Object for up to 16 Bit wide analogue input values
Analogue Input Interrupt Trigger Selection	6421	Determines the events/triggers that initiate an interrupt for a specific channel.
Analogue Input Interrupt Source	6422	Determines which channels have triggered an interrupt.
Analogue Input Global Interrupt Enable	6423	Global interrupt enable, without having to adapt the interrupt masks
Analogue Input Interrupt Upper Limit Integer	6424	If activated, an interrupt is triggered if the input value is equal to or greater than the specified value.
Analogue Input Interrupt Lower Limit Integer	6425	If activated, an interrupt is triggered if the input value is lower than the specified value.
Analogue Input Interrupt Delta Unsigned	6426	Indicates the relative difference to the last reference value, where an interrupt is triggered if the value exceeds or drops below that reference value.
Analog Input Interrupt Negative Delta Unsigned	6427	Indicates the relative difference to the last reference value, where an interrupt is triggered if the value drops below that reference value.
Analog Input Interrupt Positive Delta Unsigned	6428	Indicates the relative difference to the last reference value, where an interrupt is triggered if that reference value is exceeded.
Analogue Output 16-Bit	6411	Object for up to 16 Bit wide analogue output values
Analogue Output Error Mode	6443	Object defines whether an output is to assume a predefined error value in the case of an error or "Stop Remote Node".
Analogue Output Error Value Integer	6444	If the corresponding error mode is activated, the outputs are set to the preset values in the integer format.

7.3 CANopen object description

7.3.3 Manufacturer-specific objects

Manufacturer-specific

Object Index (hex)	Object Subindex (decimal)	Contents	Description
2000	1–64	Digital FS input byte 1–64	Input byte for FS module on slot 0–63
2200	1–64	Digital FS output byte 1–64	Output byte for FS module on slot 0–63
2300	1–32	Analogue ST inputs status channel 1–32	Status byte for ST analog input channel 1–32
2500 ⁽¹⁾	1–12	Absolute encoder ST input status 1–12	Status byte for absolute encoder 1–12
2501 ⁽¹⁾	1–12	Absolute encoder ST input value 1–12	4 Bytes of counter data each for absolute encoders 1–12
2510 ⁽¹⁾	1–7	Incremental encoder ST input status 1–7	Status byte for incremental encoder input 1–7
2511 ⁽¹⁾	1–7	Incremental encoder ST input value 1	8 Bytes of counter data each for incremental encoder input 1–7
2512 ⁽¹⁾	1–7	Incremental encoder ST output function 1–7	Byte for function calls from the incremental encoder output 1–7
2513 ⁽¹⁾	1–7	Incremental encoder ST output value 1–7	4 Bytes of counter data each for incremental encoder output 1–7
2F01	1–64	PII (complete) Byte 1–64	Byte 1–64 of the process image of all inputs
2F11	1–64	PIO (complete) Byte 1–64	Byte 1–64 of the process image of all outputs
3001 ⁽²⁾	1–64	Set configuration word 1–64	Registered hardware for slot 0–63
3100		Output format	1. Head parameter (Intel/Motorola)
3101		Output sequence	2. Head parameter (slot-oriented)
3200	1–64	Open circuit diagn. Byte 1–64	Open circuit diagnostics for slot 0–63
3300 ⁽³⁾	1–64	Module operating mode Byte 1–64	Module operating mode for slot 0–63
3301	1–32	Channel operating mode analogue input word 1–32	Channel operating mode for analogue input channel 1–32
3302	1–32	Channel operating mode analogue output word 1–32	Channel operating mode for analogue output channel 1–32
3303 ⁽¹⁾	1–12	Channel operating mode absolute encoder word 1–12	Channel operating mode for absolute encoder 1–12
3304 ⁽¹⁾	1–7	Channel operating mode incremental encoder word 1–7	Channel operating mode for incremental encoder 1–7
3320	1–32	ADC-HW Preset Word 1–32	ADC hardware preset for analogue input channel 1–32
3321	1–32	Manufacturer switch-on value word 1–32	Manufacturer switch-on value for analogue output channel 1–32
3322	1	User switch-on value word 1–32	User switch-on value for analogue output channel 1–32
3330	1–32	Underrange-Limit Word 1–32	Underrange limit for analogue input channel 1–32
3331	1–32	Overrange-Limit Word 1–32	Overrange limit for analogue input channel 1–32

7.3 CANopen object description

Manufacturer-specific (continued)

Object Index (hex)	Object Subindex (decimal)	Contents	Description
3332	1–32	Limit value1 Word 1–32	Lower limit value for analogue input channel 1–32
3333	1–32	Limit value2 Word 1–32	Upper limit value for analogue input channel 1–32
3340	1–32	Manufacturer Scaling Offset Analogue Input Word 1–32	Manufacturer scaling offset for analogue input channel 1–32
3341	1–32	Manufacturer Scaling Offset Analogue Output Word 1–32	Manufacturer scaling offset for analogue output channel 1–32
3345	1–32	Manufacturer Scaling Gain Analogue Input Word 1–32	Manufacturer scaling gain for analogue input channel 1–32
3346	1–32	Manufacturer Scaling Gain Analogue Output Word 1–32	Manufacturer scaling gain for analogue output channel 1–32
3350	1–32	User Scaling Offset Analogue Input Word 1–32	User scaling offset for analogue input channel 1–32
3351	1–32	User Scaling Offset Analogue Output Word 1–32	User scaling offset for analogue output channel 1–32
3355	1–32	User Scaling Gain Analogue Input Word 1–32	User scaling gain for analogue input channel 1–32
3356	1–32	User Scaling Gain Analogue Output Word 1–32	User scaling gain for 1–32 analogue output channel 1–32
4000		Fieldbus diagnostics	5 Byte fieldbus diagnostic data

(¹) in development

(²) You can find the configuration of the electronic modules in the EDS file for the PSSuniversal CANopen interface under [3001sub0].

(³) You can find the operating modes of the analogue electronic modules in the EDS file for the PSSuniversal CANopen interface under [3300].

7.3 CANopen object description

7.3.4 Object overview

Inputs/outputs

Object Index	Object Subindex	Contents	Description
6000	1–64	Digital ST inputs	64 x PII Byte (digital) for ST modules
6200	1–64	Digital ST outputs	64 x PIO Byte (digital) for ST modules
2300	1–32	Analogue ST inputs (status)	Analogue PII for 32 ST word channels
6401	1–32	Analogue ST inputs (value)	Status bytes for 32 ST/FS word channels
6411	1–32	Analogue ST outputs	Analogue PIO for 32 ST word channels
2000	1–64	Digital FS inputs	64 x PII Byte (digital) for FS modules
2200	1–64	Digital FS outputs	64 x PIO Byte (digital) for FS modules
2500	1–12 (1)	ST absolute encoder (status)	12 x 1 status byte
2501	1–12 (1)	ST absolute encoder (value)	12 x 4 Bytes counter data
2510	1–7 (1)	ST incr. encoder input (status)	7 x 1 Status Byte
2511	1–7 (1)	ST incr. encoder input (value)	7 x 8 Bytes counter data
2512	1–7 (1)	ST incr. encoder output (function)	7 x 1 Byte for function calls
2513	1–7 (1)	ST incr. encoder output (value)	7 x 4 Bytes counter data

Complete process images

Object Index	Object Subindex	Contents	Description
2F01	1–64	PII (complete)	64 x PII Byte
2F11	1–64	PIO (complete)	64 x PIO Byte

Configurations

Object Index	Object Subindex	Contents	Description
1027	1–64	Actual configuration	64 x Word actual hardware registry
3001	1–64	Set configuration	64 x Word set hardware registry

7.3 CANopen object description

Parameters

Object Index	Object Subindex	Contents	Description
3100		Output format	
3101		Output sequence	
3200	1–64	Open circuit diagnostics	Open circuit diagnostics for max. 64 slots
3300	1–64	Module operating mode	Module operating mode for max. 64 slots
3301	1–32	Channel operating mode AI	Parameter for max 32 i/p analogue channels
3302	1–32	Channel operating mode AO	Parameter for max 32 o/p analogue channels
3303	1–12 ⁽¹⁾	Channel operating mode ABS	Parameter for max 12 ABS modules
3304	1–7 ⁽¹⁾	Channel operating mode INC	Parameter for max 7 INC modules
3320	1–32	ADC Hardware Preset	Parameter for max 32 i/p analogue channels
3321	1–32	Manufacturer switch-on value	Parameter for max 32 o/p analogue channels
3322	1–32	User switch-on value	Parameter for max 32 o/p analogue channels
3330	1–32	Underrange Limit	Parameter for max 32 i/p analogue channels
3331	1–32	Overrange Limit	Parameter for max 32 i/p analogue channels
3332	1–32	Limit value 1	Parameter for max 32 i/p analogue channels
3333	1–32	Limit value 2	Parameter for max 32 i/p analogue channels
3340	1–32	Manufacturer Scaling Offset AI	Parameter for max 32 i/p analogue channels
3341	1–32	Manufacturer Scaling Offset AO	Parameter for max 32 o/p analogue channels
3345	1–32	Manufacturer Scaling Gain AI	Parameter for max 32 i/p analogue channels
3346	1–32	Manufacturer Scaling Gain AO	Parameter for max 32 o/p analogue channels
3350	1–32	User Scaling Offset AI	Parameter for max 32 i/p analogue channels
3351	1–32	User Scaling Offset AO	Parameter for max 32 o/p analogue channels
3355	1–32	User Scaling Gain AI	Parameter for max 32 i/p analogue channels
3356	1–32	User Scaling Gain AO	Parameter for max 32 o/p analogue channels

Status information

Object Index	Object Subindex	Contents	Description
1002		Device status	Status byte
4000	1–5	Fieldbus diagnostics	5 Byte diagnostic data

⁽¹⁾ in development

8.1 Technical details

Technical details	
Application range	Standard/Failsafe
Maximum achievable category in accordance with EN 954-1	4
Maximum achievable SIL value	SIL3
Module's device code	0224h
Electrical data	
Internal supply voltage	
Supply voltage range of module supply	4.9 - 5.1 V
Current and power consumption from module supply	
Module's current consumption without FO connection	320 mA
FO connection's current consumption	120 mA
Module's power consumption without FO connection	1.60 W
FO connection's power consumption	0.60 W
Max. power dissipation of the module	1.60 W
Potential isolation between module supply and CANopen	700 V
Potential isolation between module supply and SafetyBUS p	700 V
SafetyBUS p	
Application range	Failsafe applications
Device address	32d ... 95d
Max. transmission rate	500 kBit/s
Cable runs	3,500 m
Transmission type	differential two-wire cable
Connection	Male 9-pin D-SUB connector
CANopen	
Application range	Standard applications Failsafe applications with local enable principle
Device type	Slave
Station address	1 .. 127d
Set via	DIP switch
Maximum data length of the fieldbus interface: Input	64 Byte
Maximum data length of the fieldbus interface: Output	64 Byte
Maximum data length of the fieldbus interface: Diagnostics	5 Byte
Transmission rates	1 MBit/s, 10 kbit/s, 100 kBit/s, 125 kBit/s, 20 kbit/s, 250 kBit/s, 50 kbit/s, 500 kBit/s, 800 kbit/s
Set via	automatic/DIP switch
Connection	Male 9-pin D-SUB connector
Protocol	CANopen Standard 4.0
Operating modes	Slave Mode
Certification	CiA
Description file	PSSuCO.eds
Manufacturer's ID	0189h
USB	
Connection	Mini-B connector

8.1 Technical details

Environmental data	
Climatic suitability	EN 60068-2-14, EN 60068-2-1, EN 60068-2-2, EN 60068-2-30, EN 60068-2-78
Ambient temperature	0 - 60 °C
Storage temperature	-40 - 70 °C coated version (-T)
Climatic suitability in accordance with EN 60068-2-78	-25 - 70 °C
Condensation	-40 - 70 °C coated version (-T)
	93 % r. h. at 40 °C
	no
	yes coated version (-T)
Max. operating height above sea level	5000 m coated version (-T)
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
Vibration to EN 60068-2-6	
Frequency	10 - 150 Hz
Max. acceleration	1g
Shock stress	
EN 60068-2-27	15g
	11 ms
EN 60068-2-29	10g
	16 ms
Protection type	
Mounting (e.g. cabinet)	IP54
Housing	IP20
Airgap creepage in accordance with EN 60664-1	
Overvoltage category	II
Pollution degree	2
Mechanical data	
Housing material	
Front	PC
Bottom	PC
Dimensions	
Height	128.4 mm
Width	75.2 mm
Depth	79.4 mm
Weight	170 g

Safety characteristic data						
Unit	Operating mode	EN ISO 13849-1 PL	EN 954-1 Category	EN IEC 62061 SIL CL	PFH [1/h]	t _M [year]
Logic	---	PL e (Cat. 4)	Cat. 4	SIL CL 3	2.88E-09	20

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

8.2 Order reference

Order reference	
Description	Order no.
PSSu H SB CAN (Head module with SafetyBUS p interface and CANopen interface)	312 035
PSSu H SB CAN-T (Head module with SafetyBUS p interface and CANopen interface, coated version)	314 035



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