

SDD ES PROFIBUS



PSEN sensor technology

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Introduction

Validity of documentation

This documentation is valid for the product SDD ES PROFIBUS. It is valid until new documentation is published.

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

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.

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.

Overview

Scope of supply

Fieldbus module SDD ES PROFIBUS

Unit features

SDD ES PROFIBUS is an active subscriber (Master) of Safety Device Diagnostics

- Backlit display
- LEDs for
 - Supply voltage
 - Fieldbus interface
 - Safety states and diagnostic information for the safety devices
 - Error
- Multifunction switch for menu control
- Plug-in connection terminals: Either spring-loaded terminal or screw terminal available as an accessory (see Order references for accessories).
- ▶ 6 contacts that can be used as input contacts and/or output contacts (GPIO)



Legend

- X1 > Supply voltage 0 V, 24 V
 - Functional earth
- X2 Profibus interface
- X4 > TX: Outgoing communication to the safety devices
 - RX: Incoming communication from the safety devices
 - 1 6: Configurable inputs/outputs for connecting signal inputs/outputs from additional devices (not incorporated in Safety Device Diagnostics)
- [1] LED Power
- [2] LED Profibus
- [3] LED Devices
- [4] LED Start up
- [5] LED Fault
- [6] Display
- [7] Multifunction switch

Safety

Intended use

The SDD ES PROFIBUS is used for communication between connected safety devices and the Profibus DP-V0. The Profibus DP-V0 is designed for data exchange at field level.

Application of the product SDD ES PROFIBUS:

- Evaluate and display diagnostic data and status information from safety devices
- Connect safety devices and Profibus DP-V0
- Process and display data from the PROFIBUS
- Transfer diagnostic data and status information from the safety devices to Profibus DP-V0

Appropriate safety devices are listed in the document "System Description Safety Device Diagnostics".

The SDD ES PROFIBUS may not be used for safety-related functions.

The following is deemed improper use in particular

- > Any component, technical or electrical modification to the product,
- Use of the product outside the areas described in this manual,
- ▶ Use of the product outside the technical details (see Technical details [↓ 20]).



NOTICE

EMC-compliant electrical installation

The product is designed for use in an industrial environment. The product may cause interference if installed in other environments. If installed in other environments, measures should be taken to comply with the applicable standards and directives for the respective installation site with regard to interference.

Safety regulations

Additional documents that apply

Please read and take note of the following documents:

- Operating manual for the relevant Pilz safety device
- Operating manual of a passive junction, for example:
 - PSEN ix2 F4 code
 - PSEN ix2 F8 code
 - PDP67 F 4 code
 - PSEN Y junction

System description "Safety Device Diagnostics"

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

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.

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.).

Disposal

When decommissioning, please comply with local regulations regarding the disposal of electronic devices (e.g. Electrical and Electronic Equipment Act).

Function description

Operation

The SDD ES PROFIBUS is configured and started automatically after the supply voltage is switched on.

LEDs indicate the status of the SDD ES PROFIBUS and communication between the safety devices and Modbus/TCP Client.

The SDD ES PROFIBUS sends telegrams to the connected safety devices via a ring protocol.

The following types of data are transferred to the fieldbus and read in.

- Process data
 - Information and commands on safety functions (OSSD, guard locking, ...)
- Device data

- Material number, serial number, product version, actuator ID, ...

- Configuration data
 - Behaviour of the control of safety devices with guard locking (control of the guard locking via SDD can be switched on and off on PROFINET, EtherNET/IP and ETH using Autoinit)

Communication with connected control systems or control elements is via the bus interface Profibus DP-V0.

The station address is set on the display with the multifunction switch.



INFORMATION

The GSD file is available on the Internet at www.pilz.de.

Data structure

The input and output data is divided into the following data areas:

- Data for the overall system and for the SDD ES PROFIBUS
- Data for the connected safety devices
- List of specified changes of state and events
- Control system telegrams for the safety devices and responses from the safety devices

The data structure, including a list of the possible events, is described in detail in the System Description "Safety Device Diagnostics".



Block diagram

Installation

- The safety relay should be installed in a control cabinet with a protection type of at least IP54.
- ▶ Use the notch on the rear of the unit to attach it to a DIN rail (35 mm).
- When installed vertically: Secure the unit by using a fixing element (e.g. retaining bracket or end angle).
- > Push the device upwards or downwards before lifting it from the DIN rail.



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.

Commissioning

Wiring

General wiring guidelines

Please note:

- ▶ Information given in the Technical details [□ 20] must be followed.
- ▶ Use copper wiring with a temperature stability of 75 °C.
- ▶ External measures must be used to connect the 🚔 terminal to the functional earth.
- The device must be supplied from the same power supply as the connected safety devices.
- The power supply must meet the regulations for extra low voltages with protective electrical separation (SELV, PELV).

Connecting the supply voltage

Connect the supply voltage to the fieldbus moduleSDD ES PROFIBUS :

- > 24 V terminal: + 24 VDC
- 0 V terminal: 0 V

Connection to fieldbus

The connection to PROFIBUS-DP is made via a female 9-pin D-Sub connector in accordance with the guidelines of the PROFIBUS User Group (PNO).



n.c. = not connected

Please note the following when connecting to PROFIBUS-DP:

- > Only use metal plugs or metallised plastic plugs
- > Twisted pair, screened cable must be used to connect the interfaces

Setting the station address

The station address of the SDD ES PROFIBUS is set on the display with the multifunction switch.

- 1. Press the multifunction switch to change to the menu **Settings -> Profibus Config**.
- 2. Make sure that SSA = ON is selected.
- 3. Switch to the *Restart* menu and press the multifunction switch to confirm the restart of the SDD ES PROFIBUS





Operation

The SDD ES PROFIBUS is ready for operation when the "Power" LED is lit and the "Fault" LED is unlit.

Legend

×	LED on
€–	LED flashes

LED off

LED	Status		Meaning / action
Power	•		Supply voltage is outside the permitted range (see Technical details [20])
	$\dot{\mathbf{x}}$	green	Supply voltage is present
Profibus			Bus connection is not available
	-X-	green	Bus connection available
Devices	-X-		All connected devices are enabled
	¢-	green	At least one connected device is not enabled
Start up	٠		Normal operation
	À.	Yel- low	Device data is being polled
Fault	٠		Normal operation
	Q-	red	Fault on the SDD ES PROFIBUS.
			Check the supply voltage, wiring and configura- tion of the SDD ES PROFIBUS.
	-)0(Internal fault on the SDD ES PROFIBUS
			Remedy: Replace the device

Display

Structure

The LC display has five lines. Information can be shown and settings can be made on the display.

Press the multifunction switch to switch to the first menu level.



Legend

- [1] Display of LED supply voltage
- [2] Display of menu levels
- [3] Software version
- [4] Display of possible actions at menu level

▲▼ Rotate multifunction switch = menu item up or down

< Press multifunction switch = back one level

Operate menu

The menu settings are made on the device's display via a multifunction switch. You can switch between the menu levels by pressing or rotating the multifunction switch.

Press multifunction switch



- Confirm selection/setting
- Switch to sub-menu
- Exit menu: <- Back</p>

Rotate multifunction switch up or down



Switch menu entries or display potential values

Menu structure

The LC display has a max. five lines.

It displays information and navigates the menu.

The status of the supply voltage is displayed in the first line, followed by 4 lines containing the menu levels.

Menu	Description
Settings	Information about I/O mapping on the connected safety devices and about the network configuration of the SDD ES PROFIBUS
Device History	Information about previous changes of state (en- ables and guard locking) of a connected safety device and status information
Device Info	Information about the connected safety devices
Device Event	Message on the change of state of a safety device

Menu settings

GPIO-Mapping

Value range	Meaning
PLC	Value is set by control system
1-16	1-16 represents a connected safety device. If the actuator enable is set for this safety device, the GPIO is set to 24 V.
	If the value ≠ PLC, the control system has no ac- cess to the input/output channel.

Profibus Conf.

Option	Value range	Meaning
SSA	On / Off	SSA status (status when delivered = On)
		When SSA = On, the Node-ID is assigned by the PROFIBUS-DP Master
	Locked	SSA Lock Telegram set by PROFIBUS-DP Master. As a result, this station is locked for telegrams. The lock can be cancelled by setting another SSA value via the multifunction switch.
Node ID	1-125	Display or change the set Node-ID
Restart		Trigger a restart of the SDD ES PROFIBUS in order to adopt the amended node configuration settings.

Info

Option	Meaning
Ver:	Product version
SVN:	Software version
SN:	Serial number of safety device
Node ID	Node-ID that is currently set

Device History menu

Device History

Option	Value range	Meaning
Status		Display of message number. The message number is incremented up to 150. Then the oldest mes- sages are overwritten. All message numbers are deleted by switching off the supply voltage.
Device	1-16	Number of device
Safety Gate	•	Actuator is within the response range
	\$	Actuator is not within the response range
♥in sec		Time at which the safety gate was opened (seconds since power-on)
Lock	•	Guard locking activation
	\$	Guard locking activation

Device Info menu

Device Info

Option	Value range	Meaning	
♦ ♦		Number of safety devices (Safety Gate) = Number of diamonds represented	
		State of safety devices (Safety Gate enable):	
	•	Ready	
	\$	Not available	
♦ ♦		Number of safety devices (guard locking) = Number of diamonds represented	
		State of the safety devices (guard locking):	
	•	activated	
	\$	deactivated	
I/0	~~~~	State of the configurable inputs/outputs	
Device n/x	1/1 – 16/16	Device n of x connected devices	

Option	Value range	Mea	ning
xxx	Max. 16 charac- ters (letters, numbers and special charac- ters)	Equipment identifier (on a fieldbus module with web server)	
Coded Switch	e.g. coded switch	Infor	mation about device type (*1)
Ready	♦ / ♦	Statu	us of safety device
		•	Ready
		\$	Not available
Safety Gate	♦ / ♦	Statu	us of safety gate
		•	Actuator within the response range
		\$	Actuator not within the response range
Lock	♦ / ♦	Statu	is of guard locking
		•	activated
		\$	deactivated
OSSD1	♦ / ♦	Status of OSSD1	
		•	ON state
		\$	OFF state
OSSD2	♦ / ♦	Status of OSSD2	
		•	ON state
		\$	OFF state
INPUT1	♦ / ♦	Status Input 1	
INPUT2	♦ / ♦	Statu	ıs Input 2
Coding	C, F, U	Pilz	coding type ^(*1)
		C = coded, F = fully coded, U = uniquely fully coded	
TeachIn free	1-8	Number of teach-in processes remaining (*1)	
Temp °C		Temperature of a safety device in °C. The temper- ature of one safety device is updated every two minutes; with 16 safety devices, for example, the temperature of the first safety device is updated every 32 minutes.	
Act.#		Actuator short name	
Ident#		Material number of safety device (*1)	
SN#		Serial number of safety device (*1)	

(*1) Value on restart

Device Event menu

Device Event

Option	Meaning
Event Nr. x	Display of consecutive event numbers (event num- ber is incremented up to 150 and then the oldest number is overwritten)
Device x	Number of device
Message # x	Display of a message or message number (the messages are described in detail under Messages for safety device diagnostics)

Dimensions in mm





Technical details

General	
Certifications	CE, cULus Listed
Electrical data	
Supply voltage	
for	Module supply
Voltage	24 V
Kind	DC
Output of external power supply (DC)	2 W
Status indicator	Display, LED
Inputs	
Number	6
Semiconductor outputs	
Number	6
Short circuit-proof	yes
Semiconductor outputs (standard)	
Switching capability	
Voltage	24 V
Current	0,04 A
Power	1 W
Fieldbus interface	
Fieldbus interface	Profibus DP-V0

Fieldbus interface	
Device type	Slave
Log	PROFIBUS
Station address	1 125d
Transmission rates	1,5 MBit/s, 12 MBit/s, 187,5 kBit/s, 19,2 kBit/s, 3 MBit/s, 45,45 kBit/s, 500 kBit/s, 6 MBit/s, 9,6 kBit/ s, 93,75 kBit/s
Connection	9-pin D-Sub male connector
Galvanic isolation	yes
Times	
Supply interruption before de-energisation	20 ms
Environmental data	
Ambient temperature	
In accordance with the standard	EN 60068-2-14
Temperature range	0 - 55 °C
Storage temperature	
In accordance with the standard	EN 60068-2-1/-2
Temperature range	-25 - 70 °C
Climatic suitability	
In accordance with the standard	EN 60068-2-30, EN 60068-2-78
Humidity	90 % r. h. at 55 °C
Condensation during operation	Not permitted
Max. operating height above sea level	2000 m
EMC	EN 61000-4-3, EN 61000-4-5, EN 61000-4-6, EN 61000-6-4
Vibration	
In accordance with the standard	EN 60068-2-6
Frequency	5 - 150 Hz
Acceleration	1g
Shock stress	
In accordance with the standard	EN 60068-2-27
Acceleration	15g
Duration	11 ms
Protection type	
In accordance with the standard	EN 60529
Mounting area (e.g. control cabinet)	IP54
Housing	IP20
Terminals	IP20
Potential isolation	
Potential isolation between	PROFIBUS and system voltage
Type of potential isolation	Functional insulation
Rated surge voltage	2500 V
Mechanical data	
Mounting position	Any
DIN rail	
Top hat rail	35 x 7,5 EN 50022

Mechanical data	
Material	
Bottom	PC
Front	PC
Тор	PC
Connection type	Spring-loaded terminal, plug-in, screw terminal, plug-in
Conductor cross section with screw terminals	
1 core flexible	0,25 - 2,5 mm², 24 - 12 AWG
Dimensions	
Height	115 mm
Width	45 mm
Depth	95 mm
Weight	160 g

Where standards are undated, the 2016-02 latest editions shall apply.

Order reference

Product

Product type	Features	Order no.
SDD ES PROFIBUS	PROFIBUS fieldbus module for Safety Device Diagnostics	540 132

Accessories

Product type	Features	Order no.
SDD ES SET SCREW TERMIN- ALS	Screw terminals, plug-in	540 120
SDD ES SET SPRING LOADED TERMINALS	Spring-loaded terminals, plug-in	540 121

Product type	Connection X1	Connection X2	Connec- tion X3	Order no.
PSEN Y junction M12 SENSOR	M12, 8-pin, pin	M12, 8-pin, socket	M12, 8- pin, socket	540 315
PSEN Y junction M12 cable channel	M12, 8-pin, pin	M12, 8-pin, socket	M12, 8- pin, socket	540 316
PSEN T junction M12	M12, 8-pin, socket	M12, 8-pin, pin	M8, 4-pin, pin	540 331
PSEN Y junction M8-M12/ M12 PIGTAIL	M12, 8-pin, socket	M12, 8-pin, pin	M8, 8-pin, socket	540 337
PSEN Y junction M12-M12/ M12 PIGTAIL	M12, 8-pin, socket	M12, 8-pin, pin	M12, 8- pin, socket	540 338

Product type	Features	Connector X1	Connector X2	Connector X3	Order no.
PSEN ml Y junction M12		M12, 8-pin male connector	M12, 8-pin fe- male connector	M12, 12-pin fe- male connector	570486
PSEN ml / PSENcs Y junction M12		M12, 8-pin fe- male connector	M12, 8-pin male connector	M12, 8-pin fe- male connector	570489

EC declaration of conformity

This/(These) product(s) fulfil the requirements of the low voltage directive 2006/95/EG. The complete EC Declaration of Conformity is available on the Internet at www.pilz.com/down-loads.

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Support

Technical support is available from Pilz round the clock.

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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.









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