

PROFIBUS-DP-Slave Hardware



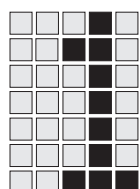
Programmable control systems PSS®

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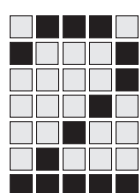
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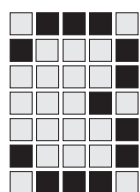
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This manual describes the hardware of the PROFIBUS-DP-Slave Module. A separate manual, "PROFIBUS-DP-SLAVE" deals with the configuration and programming of the module and is included with the PROFIBUS FB software package (Order No. 301 259).

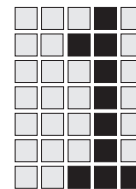
This manual is divided into the following chapters:

- 1) **Application in accordance with safety regulations**
Describes the application areas for the module and provides information on safety measures to be adopted both during installation and operation.
- 2) **Operation**
Explains the functions of the control devices on the front of the module.
- 3) **Appendix**
Contains the technical details and interface configuration.

WARNING!

Please read chapter 1 before using the module!

Notes



Application in Accordance with the Regulations

This module is a passive subscriber (Slave) of PROFIBUS-DP. It meets the requirements of the standard: EN 50 170 Volume 2, PROFIBUS.

The **PSS DP-S** module may only be used on the standard bus of the PSS 3000.

The **PSS1 DP-S** module may only be used on the standard bus of the PSS 3100.

The module is designed for use in an industrial environment. Problems of interference could occur if used within a domestic environment.

Safety Regulations

- **Please read the “Installation Manual” of the relevant safety controller before installing and commissioning the module.**
- The guarantee will be rendered invalid if the unit is opened or if any changes are made to the printed circuit boards, such as exchanging a component or carrying out soldering work. Units requiring repair must be returned to Pilz.
- Remember to keep as large a distance as possible between the safety controller and any electromagnetic fields, particularly when frequency converters are nearby. Where necessary, use suitable screening to separate the safety controller from the source of interference.

PROFIBUS Wiring

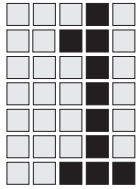
The screened cable should be earthed at the connector or at the point at which it enters the control cabinet!

Transmission Cable

The maximum length of the transmission cable is dependent on the baud rate. The standard recommends Type A cables (see below). Type B cables can only use shorter cable runs and lower baud rates.

The following cable runs are permitted, depending on the baud rate:

Baud rate (kbit/s)	9.6/19.2/93.75	187.5	500	1,500	3,000/6,000/12,000
Length (m) Type A	1200	1000	400	200	100
Length (m) Type B	1200	600	200	-	-

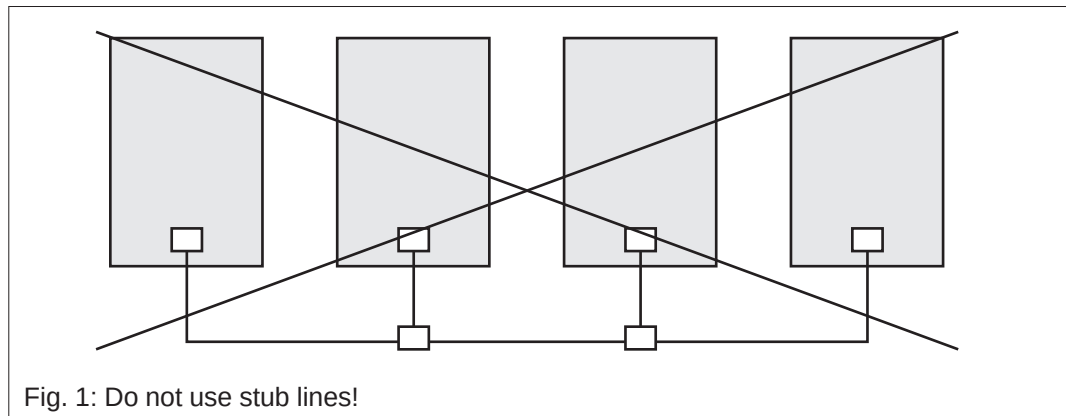


Application in Accordance with the Regulations

Requirements:

Parameters	Type A cable	Type B cable
Capacitor	<30 pF/m	<60 pF/m
Loop Resistance	<110 Ohm/km	-
Wire Diameter	>0.64 mm	>0.53 mm
Wire Cross-section	>0.34 mm ²	>0.22 mm ²
Impedance Level	135 ... 165 Ohm (3 20 MHz)	100 ... 130 Ohm (>100 kHz)

Do not use stub lines to connect subscribers (Fig. 1)!

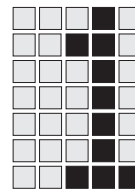


See Fig. 2 for a diagram showing the correct connection.

In practise, each subscriber connection represents a stub line (cable from the branching in the connector to the cable transceiver on the module, in the magnitude 20 to 50 mm). This means that practically no stub lines are permitted with faster baud rates.

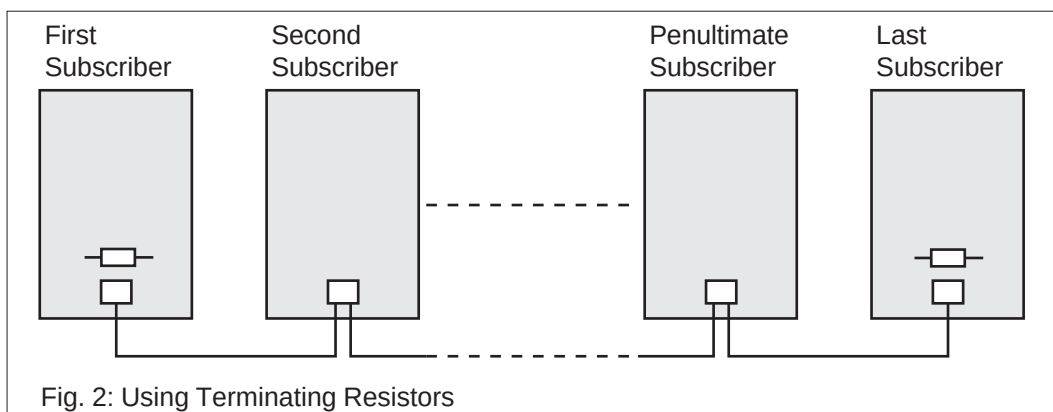
Example: With a baud rate of 1500 kBit/s the capacitance of all the stub lines must be less than 0.2 nF. With Type A cable this gives a maximum length of 6.6 m for all the stub lines. With 12 Mbits/s, only 1.6 m are permitted, which means that, with 32 subscribers, the limit would be 50 mm each.

With faster baud rates, therefore, you should use connectors with inline inductors. The inductors relate to a connected subscriber. If connectors are removed, mismatches occur which may lead to problems. **Please refer to the installation guidelines in the manual for the Master unit and the advice given in the standard, as well as advice issued by the PROFIBUS User Organisation (PNO).**



Application in Accordance with the Regulations

Connectors on the first and last subscribers should be fitted with terminating resistors.

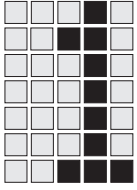


Various companies (Siemens, Erni,...) have designed special connectors which incorporate both the terminating resistor (may be switchable) and the inductors for impedance matching.

Examples: Siemens: GES7 972-0BA20-0XA0
 Erni: ERbic 104.050
 Deltron: DE 004830

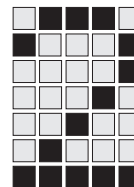
Installation

The module should be installed as described in the "PSS 3000/PSS 3100 Installation Manual".



Application in Accordance with the Regulations

Notes



Operation

This chapter explains the functions of the control devices on the front of the module. The module's operation as a subscriber on PROFIBUS is described in the "PROFIBUS-DP-Slave Software" Manual.

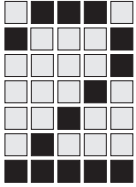
LEDs

The LEDs "RUN" and "FAULT" display the module's operating status.

LED "FAULT"	LED "RUN"	Description
off	off	No communication with the PSS
off	on	Transmitting data
off	flashes	Carrying out statistical diagnostics
on	off	Error on the PROFIBUS
flashes	off	Address error Remedy: Set a valid address
flashes	on	Carrying out diagnostics before data transmission
flashes	flashes	Fatal error Remedy: Restart the ST-Section or reset the module

Plug-in Connector

The interface to PROFIBUS-DP is on the front of the module. The layout of the 9-pin plug connector is described in the Appendix.

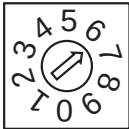
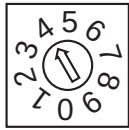


Operation

Setting the Station Address

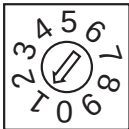
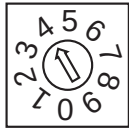
The station address is set using one slide switch and two rotary switches. Permitted values are: 0 ... 126 decimal.

Setting Addresses 0 99

+100		Set the slide switch to the +0 position.
+0		
x10		Using a small screwdriver, set the tens digit of the address on the upper rotary switch (set to "6" in the drawing).
x1		Set the ones digit of the address on the lower rotary switch (set to "4" in the drawing).

In the above drawing, address 64 is set as an example.

Setting Addresses 100 126

+100		Set the slide switch to the +100 position.
+0		
x10		Using a small screwdriver, set the tens digit of the address on the upper rotary switch (set to "1" in the drawing).
x1		Set the ones digit of the address on the lower rotary switch (set to "4" in the drawing).

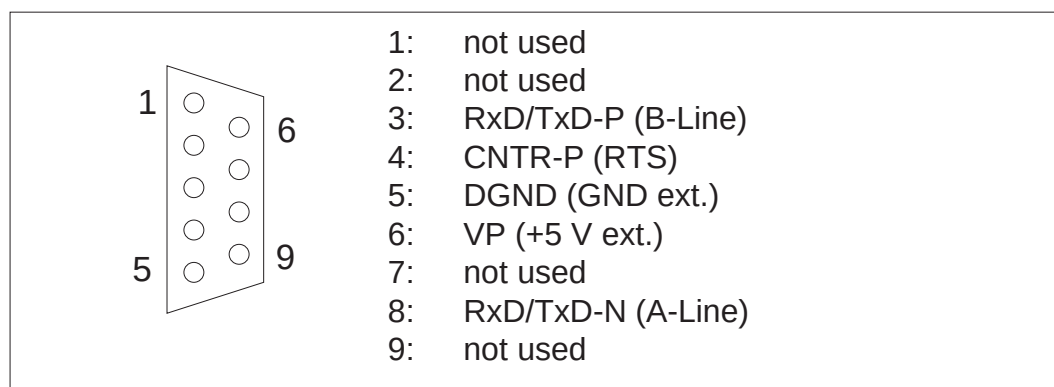
In the above drawing, address 114 is set as an example.



Appendix

Connector Pin Assignment

PROFIBUS is connected via a 9-pin D-Sub-connector.

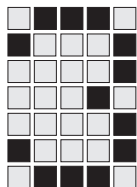


IMPORTANT!

- The A-Line (RxD/TxD-N) must always be connected to the A-Lines on all the other PROFIBUS-subscribers. In the same way, the B-Line (RxD/TxD-P) must only be connected to the B-Lines on the other PROFIBUS-subscribers. If communication is not achieved, check the connections using a circuit continuity tester.
- Connect the case of the connector to the screening on the PROFIBUS-cable. There is a low impedance connection between the case of the connector and the front plate of the module.
- The VP (+5 V ext.) and DGND (GND ext) signals must **not** be used to supply voltage to external units. The voltage is not short-circuit-protected. It supplies the terminating resistors on the bus cable.

Order References

Description	Order Reference
PSS DP-S	301 151
PSS1 DP-S	302 151
Software Package	301 259



Appendix

Technical Details

Supply Voltage	5 VDC (controller's power supply)
Power Consumption	Average 380 mA
Interface	9-pin plug connector
Unit Master File	PILZ2500.GSD
Ident-Number	0x2500
Baud Rates	9.6/19.2/93.75/187.5/500 kBit/s 1.5/3.0/6.0/12.0 MBit/s
Operating Modes	Freeze, Sync, Auto-Baud
Station Type	Modular, max. 32 stations
Max. Data Length	488 Byte
Input Data	244 Byte
Output Data	244 Byte
Data Transmission	In words
Data Consistency	Whole data length
Supported Diagnostics	Unit-specific
Protection Type	IP 20 (installed in module rack)
Ambient Temperature	0 ... +60 °C
Storage Temperature	-25 ... +70 °C
Climatic Conditions	IEC 68-2-14
Fitting Position	Vertical in module rack
Vibration to IEC 68-2-6	Frequency Range: 10 ... 100 Hz Amplitude: 0.1 mm, max. 5g
Shock to IEC 68-2-29	Acceleration: a) 10g, b) 30g Length of pulse: a) 16 ms, b) 11 ms Number of shocks: a) 1000 per axis, on 3 axes, b) 3 per axis, on 3 axes
EMC	Interference resistance conforms to EN 50 082-2 Interference emissions conform to EN 50 081-2
Weight	PSS DP-S: 850 g PSS1 DP-S: 270 g



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