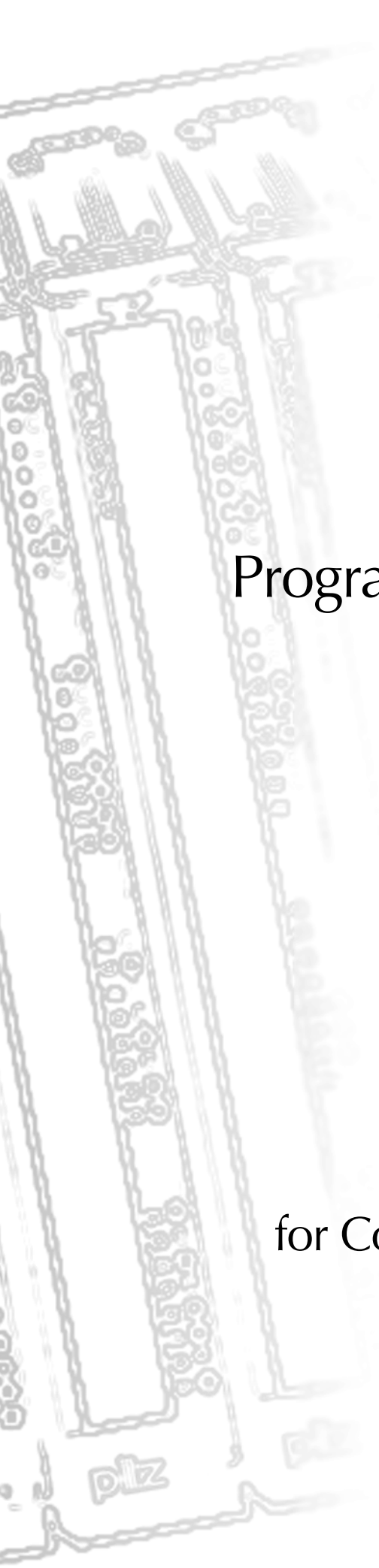


Programmable Safety Systems
PSS-Range

PROFIBUS-DP
for Compact 3rd Generation PSS
Operating Manual
Item No. 20 962-04

Contents

Introduction 1-1

Validity of documentation 1-1
Overview of documentation 1-2
Definition of symbols 1-3

Overview 2-1

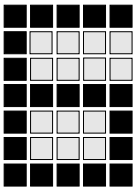
Safety 3-1

Function Description 4-1

Free addressing 4-3
Determining a start address 4-3
Programmable safety systems with a standard bus interface 4-3
Programmable safety systems with several standard bus interfaces 4-3
Setting slot and start address using PSS SW PG 4-4
Setting slot and start address using PSS WIN-PRO 4-4
Module code 4-4

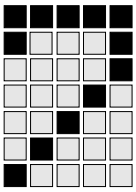
Interface 5-1

Contents

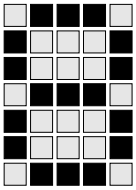


Operation **6-1**

Commissioning **6-1**
Display elements for PROFIBUS-DP **6-2**
Setting the station address **6-3**
Setting addresses 0 .... 99_D 6-3
Setting addresses 100_D .... 126_D 6-3



Technical Details **7-1**



Appendix **8-1**

Introduction

This operating manual explains how to use and operate the PROFIBUS-DP standard bus interface on a compact 3rd generation programmable safety system.

For installation details, guidelines on how to connect the inputs and a description of the SafetyBUS p interface, please refer to the operating manual for the relevent series (e.g. PSS SB 3006-3 series).

The communication drivers (standard function blocks) from the Pilz software package “ST-SB-DP-S” are required in order to transfer PSS data and set the parameters as Slave on PROFIBUS-DP. Data transfer and parameter settings are described in the

- PROFIBUS-DP Slave
  Software Manual

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

Validity of documentation

This documentation is valid for the PROFIBUS-DP standard bus interface on a compact 3rd generation programmable safety system (e.g.
PSS SB 3006 DP-S, PSS SB 3006 ETH DP-S).
It is valid until new documentation is published. The latest documentation is always enclosed with the unit.

Introduction

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 most important features of the PROFIBUS-DP standard bus interface.

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

4 Function Description
This chapter provides a brief overview of how to connect the programmable safety system with PROFIBUS-DP interface to PROFIBUS-DP.

5 Interface
This chapter describes the configuration of the PROFIBUS-DP interface.

6 Operation
This chapter explains how to commission the bus interface and advises on what to do if a fault occurs.

7 Technical Details

8 Appendix

Definition of symbols

Information in this manual that is of particular importance can be 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!

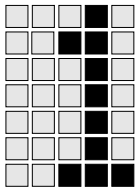
This warning must be heeded! It warns of a **hazardous situation that could lead to serious injury and death** and indicates preventive measures that can be taken.

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.

INFORMATION
This gives advice on applications and provides information on special features, as well as highlighting areas within the text that are of particular importance.



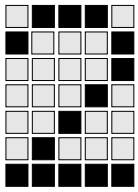
Notes

Overview

For non-safety related applications, the PSS can be incorporated into PROFIBUS-DP as a slave. Parameters for the slave must be set prior to communication. Parameters describe things such as configuration data, length of input/output data, station address, etc.

INFORMATION
Data exchange cannot start until the PROFIBUS master has received the parameter data set.

The parameter setup of the PSS as a PROFIBUS-DP slave conforms to the guidelines of the PROFIBUS User Group. The address for the PROFIBUS User Group can be found in the Appendix.



Notes

Safety

Intended use

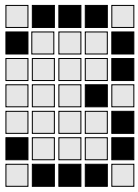
INFORMATION
The operating manual “PROFIBUS-DP for Compact 3rd Generation PSS” should be viewed as a supplement to the operating manual for the relevant series (e.g. PSS SB 3006-3 series). For this reason you should also refer to the “Safety” chapter in the relevant operating manual.

Compact 3rd generation programmable safety systems and the PROFIBUS DP interface are intended for use as follows:

- Safety-related applications
  Applications in the failsafe section of the PSS, including connection to SafetyBUS p
- Non-safety-related applications
  Applications in the standard section of the PSS, including connection to the PROFIBUS-DP standard bus system.

INFORMATION
Standard function blocks from the following Pilz software package are required for connection to PROFIBUS-DP:

- ST-SB-DP-S:
  Standard function block as communication driver for PROFIBUS-DP slave



Notes

Function Description

PROFIBUS-DP is designed for fast data exchange at field level. The PSS is a passive PROFIBUS-DP subscriber. The basic functions of communication with PROFIBUS-DP correspond to EN 50170. The central controller (master) reads input information from the slaves and writes output information to the slaves as part of each cycle. As well as the cyclical transfer of usable data, PROFIBUS-DP can also be used for diagnostics and commissioning functions. Data transfer is monitored via functions on both the master and the slave.

INFORMATION
Details of the parameter setup on the PSS can be found in the “PROFIBUS-DP Slave Software Manual”. This describes the drivers in the software package “ST-SB-DP-S”.

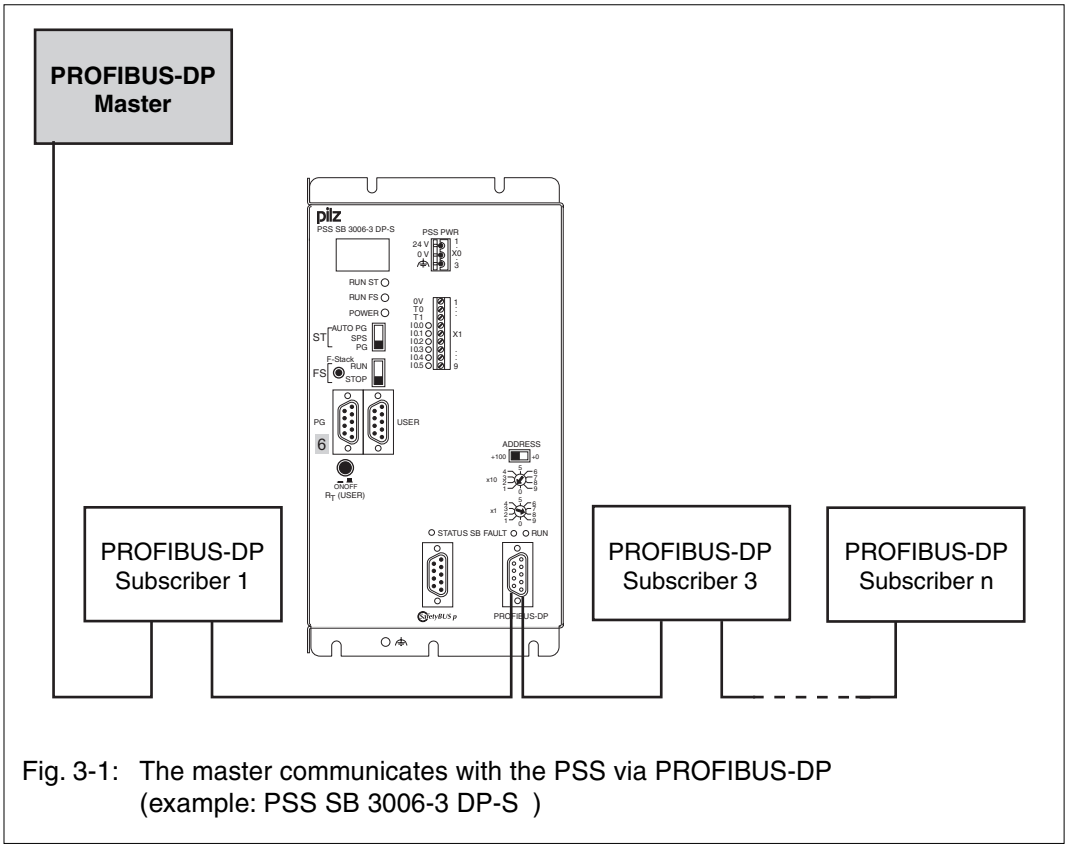


Fig. 3-1: The master communicates with the PSS via PROFIBUS-DP (example: PSS SB 3006-3 DP-S)

Function Description

The PSS is designed to be connected to PROFIBUS-DP via an RS 485 interface. A female 9-pin D-Sub connector is provided for connecting to PROFIBUS-DP.

INFORMATION
Details of the configuration of the PROFIBUS-DP interface can be found in Chapter 5, Interface.

The bus terminating resistors on PROFIBUS-DP are supplied from the PSS (5 VDC).

INFORMATION
During installation you should also refer to the guidelines published by the PROFIBUS-DP User Group.

A Dual-Port-RAM forms the interface between the PSS CPU and the PROFIBUS interface. It stores all the information required for data transfer as well as the data received and the data to be sent.

INFORMATION
Details of the structure and configuration of the data area can be found in the “PROFIBUS-DP Slave Software Manual”.
Please note, however, that the standard function block from the software package stores the contents of the addressable data area in a data block which is free to select. This is why the structure and configuration of the data block are described.

Free addressing

The Dual-Port-RAM of the PROFIBUS interface is being addressed by the safety system as an addressable module via the **addressable** data area (XW).
For standard bus interfaces with addressable data area a start address has to be defined as well as a slot. A PROFIBUS interface occupies 2048 words in the XW process image, beginning from the stated start address.

Determining a start address

Programmable safety systems with a standard bus interface

If a safety system of series PSS SB 3006-3 includes only a standard bus interface (e.g. PSS SB 3006-3 DP-S), the following applies:

- Slot = 2
- Start address = 0

On safety systems in the PSS 3047-3 and PSS 3075-3 series (e.g. PSS 3047-3 DP-S) the following applies:

- Slot = 7
- Start address = 0

Programmable safety systems with several standard bus interfaces

If a safety system of series PSS SB 3006-3 has several standard bus interfaces (e.g. PSS SB 3006 ETH DP-S) the procedure is as for centralised modules.

Start address = (Multiplier*[1]) x (Offset *[2])

*1
Multiplier:
As a multiplier, a whole number from the range of 0 ... 7 is permitted.

*2
Offset:
Number XW of the interface with the highest XW demand.

Example:

Slot	Interface		Multiplier	Start address
	Type	XW demand		
1	Ethernet	$2\ 048_D$	0	0_D
2	PROFIBUS	$1\ 024_D$	5	$10\ 240_D$

INFORMATION
The start address can be selected by means of the multiplier from the range 0 ... 16383_D. So the highest permitted start address is 14336_D (16383_D - 2048_D).

Setting slot and start address using PSS SW PG

When the PSS SW PG system software is used, the slot and start address are defined as follows:

- Slot: through parameters set on system data block DB004
- Start address: through parameters set on system data block DB005

The parameter settings for the system data blocks can be found in the “ST System Description”.

Setting slot and start address using PSS WIN-PRO

Slot and start address are set in the PSS configurator when using the PSS WIN-PRO system software.

Module code

If the correct name of the standard bus interface is to be displayed in the configuration test, the module code for each addressable standard bus interface has to be stored in the DB004. You can find the code (module code) of the standard bus interface in the “Technical details“ section.

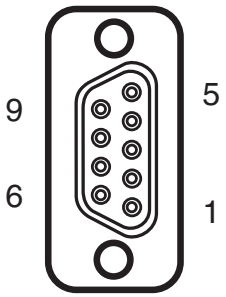
INFORMATION
The module code of a standard bus interface (PSS-range of modular programmable safety systems) corresponds to the module code of the corresponding central module (PSS-range of modular programmable safety systems).

PROFIBUS-DP interface (‘PROFIBUS-DP’)

Connection to PROFIBUS-DP is via a female 9-pin D-Sub connector. A detailed description of the PROFIBUS-DP interface can be found in the guidelines published by the PROFIBUS-DP User Group.

Female D-Sub connector

9-pin



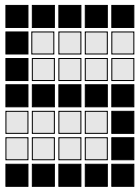
1: n.c.
2: n.c.
3: RxD/TxD-P (B-line)
4: CNTR-P (TTL level)
5: DGND (GND ext.)
6: VP (+5 V ext.)
7: n.c.
8: RxD/TxD-N (A-line)
9: n.c.

n.c. = not connected

Fig. 6-5: Configuration of the PROFIBUS-DP interface

NOTICE

- The two data lines are also called A and B on PROFIBUS.
  - Always connect the A-line (“RxD/TxD-N”) to the A-lines of all the other PROFIBUS subscribers.
  - The B-line (“RxD/TxD-P”) should only be connected to the B-lines of the other PROFIBUS subscribers.
  - If communication is not established, check the connections using a continuity tester.
- Connect the connector housing to the screening on the PROFIBUS cable. The connector housing should be connected with low impedance to the module’s front plate.
- Do **not** use the signals VP (+5 V ext.) and DGND (GND ext) to supply voltage to external devices! The voltage is not short circuit-proof. It supplies the terminating resistors on the bus cable.



Notes

Operation

Commissioning

... the PROFIBUS-DP interface

- Set the required station address for PROFIBUS-DP using the rotary switches on the front of the PSS (see section entitled “Setting the station address” on page 6-2).
- Connect the bus subscriber: Connect the PROFIBUS-DP master or PROFIBUS-DP subscriber to the interface labelled “PROFIBUS-DP” using the male 9-pin D-SUB connector.

NOTICE
You should also refer to the guidelines published by the PROFIBUS User Group.

Display elements for PROFIBUS-DP

LEDs “FAULT” and “RUN”
The LEDs “FAULT” and “RUN” display the operating status of the bus interface.

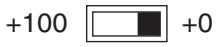
LED “FAULT”	LED “RUN”	Description
Off	Off	(Still) no communication with PSS
Off	Lights	Transferring data
Off	Flashes	Performing static diagnostics
Lights	Off	Error on PROFIBUS
Flashes	Off	Address error Remedy: set valid address
Flashes	Lights	Performing diagnostics prior to data transfer
Flashes	Flashes	Fatal error Remedy: Move the “ST” selector switch to “PG” and then back to “SPS” or start with the programming device

Operation

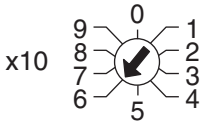
Setting the station address

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

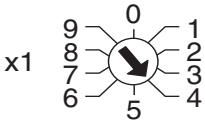
Setting addresses 0 .... 99_D



Set the slide switch to +0.



On the upper rotary switch, use a small screwdriver to set the tens digit for the address (“6” in the drawing).

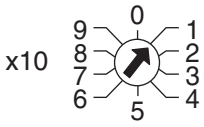


On the lower rotary switch, set the ones digit for the address (“4” in the drawing).

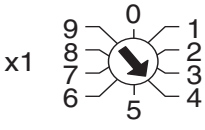
Address 64_D is shown in the drawing as an example.

Setting addresses 100_D .... 126_D

Set the slide switch to +100



On the upper rotary switch, use a small screwdriver to set the tens digit for the address (“1” in the drawing).

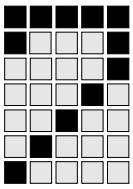


On the lower rotary switch, set the ones digit for the address (“4” in the drawing).

Address 114_D is shown in the drawing as an example.

Technical Details

PROFIBUS-DP	
Application range	Non-safety-related applications
Device type	Slave
Status indicator	LED
Station address	0 ... 126_D, selectable
Transmission rate	Max. 12 MBit/s
Connection	Female 9-pin D-Sub connector
Module	$B220_H$



Notes

Appendix

Address of the PROFIBUS User Group

PROFIBUS Nutzerorganisation e.V.
Haid-und-Neu-Str. 7
D-76131 Karlsruhe (GERMANY)
Tel: +49 721 96 58 590
Fax: +49 721 96 58 589
e-mail: germany@profibus.com
Internet: www.profibus.com

Changes in the documentation

Changes in version 20962-02

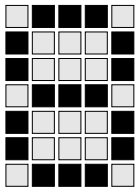
Old page	New page	Change
4-2	4-2	Text deleted: The PSS addresses... with corresponding communication modules.
—	4-3 to 4-4	New: Sections: “Free addressing“ and “Module code“
7-1	7-1	Technical details New: Module code

Changes in version 20962-03

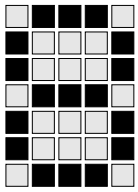
Old page	New page	Change
4-3	4-3	Defining the start address: PSS 3047-3 and PSS 3075-3 added
4-4	4-4	Defining the slot and start address using PSS SW PG: Reference to system data blocks
7-1	7-1	Technical details: Module code $B220_H$

Appendix

Notes



Notes



Notes

Hotline
+49 711 3409-444

...
In many countries we are represented by sales partners.

Please refer to our Homepage for further details or contact our headquarters.

www
www.pilz.com

Pilz GmbH & Co. KG
Sichere Automation
Felix-Wankel-Straße 2
73760 Ostfildern, Germany
Telephone: +49 711 3409-0
Telefax: +49 711 3409-133
E-Mail: pilz.gmbh@pilz.de

pilz
more than automation
safe automation

20 962-04-2005-11 Printed in Germany