

PBD-10

Operating Manual Profibus-Display

Please keep for further use !

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Printing

This manual was produced on a personal computer using MS-Word for Windows. The text was printed in *Arial* type.

Fonts

Italics and **bold** type are used for the title of a document or to emphasize text passages.

Passages written in `Courier` show text which is visible on the display as well as software menu selections.

"< >" refers to keys on your computer keyboard (e.g. <RETURN>).

Note

Text following the "NOTE" symbol describes important features of the respective product.

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Literature

LSPM2 User Description/Manual (Siemens)

Profibus, Klaus Bender
Published by Hanser Verlag
ISBB 3-446-17283-1

Revision History

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Note:

The cover of this document shows the current revision status and the corresponding date. Since each individual page has its own revision status and date in the footer, there may be different revision statuses within the document.

Drawings that are in the appendix have their own revision history.

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Revision	Date
As a standard now, the interface is designed for a baud-rate of up to 12 Mbaud	18.09.1997
Additional data format: Long-Integer	01.10.1997
New structured, completions	18.02.1998
Programming tips for S5 and S7 users (Chapter 5.1)	10.02.2003

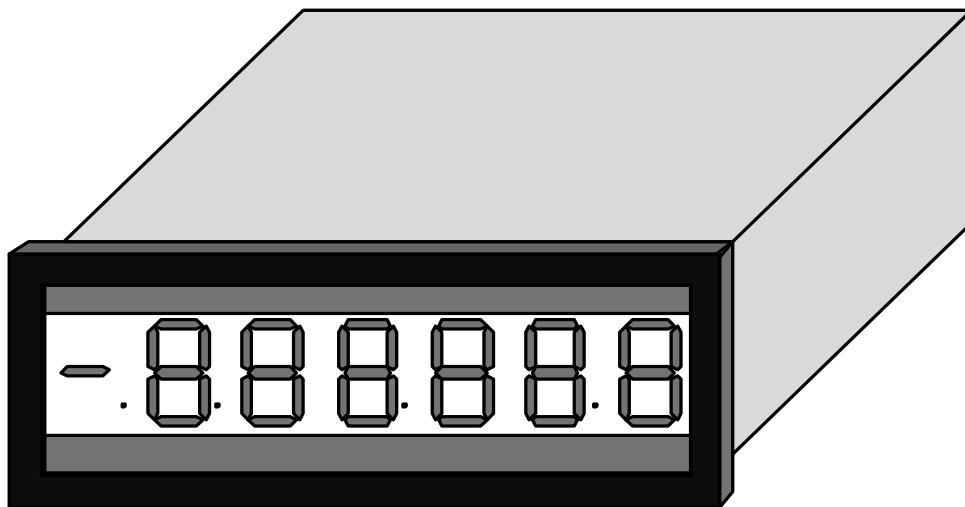
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Dimension drawing	www.tr-electronic.de/f/04-K703-VR001

1 General Description

The **PBD-10** is a display module suitable for front panel mounting. The display consists of 7-segments-LEDs and offers 6 digits plus prefix. The height of the digits is 20 mm (0.8 in.) so they can be read easily even from a distance up to 10 m (33 feet). The case complies with DIN 43700 for switch panel cabinets with a front measuring 144 * 48 mm (5.7 * 1.9 in.). Mounting is done from rear using the clamps which are attached at the sides of the case.

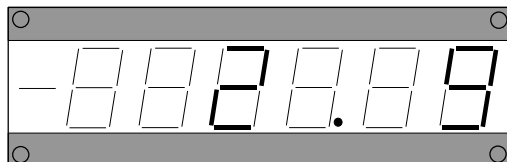
Various additional features are available as an option, i.e. SSI-interface or 16 digital inputs. For special applications the device may be programmed through a RS485-interface.



2 Description of the Function

Upon power supply, the **PBD-10** performs a self-test routine. All digits are being counted upwards parallel from 0 to 9. In case an additional option is connected, the row of LEDs above the display will be also tested. After the test is completed, the programmed values are displayed for 1 second. Then the connection to the fieldbus will be tested. If no connection is present, the message '**L2 Err**' appears on the display. A fully functional module displays data instantaneously.

Example for the displayed programming values



beginning on the right side:

figure 1-2:	address	= 9
figure 4:	data format	= 2 (Long-Integer)
point:	number of digits after the decimal point	= 2

3 Description of the Fieldbus Interface

The Sinec L2-DP-connection is performed by the ASIC 'LSPM2' which is the slave in the bus system. It is addressed by the master through layer 2 of the 7-layer model. Upon receiving an error-free telegram, the LSPM2 automatically generates the requested answer telegrams. The information exchange is kept simple and works beneath any possible PROFIBUS telegrams.

During standard operation the **PBD-10** will only process error-free SD1- or SD2-telegrams. All other telegrams will be ignored.

The standard version of the module receives and displays 32 bit data. In case an error occurs, it will be send back to the Master via diagnosis port E Bit 7. If no more telegrams are received by the bus, the message 'L2 Err' appears on the display.

If the **PBD-10** is equipped with a SSI-interface or digital inputs, a second LSPM2 with a separate bus address will be used.

The Sinec L2-DP bus interface is opto-coupled and mounted to a 9-pole DSub-adapter with standard connections. The resistors necessary at the ends of the bus can be activated with jumpers. As a standard, the interface is designed for a baud-rate of up to 12 Mbaud. As an option, a baud-rate of up to 12 Mbaud is possible. Upon reset, the interface module automatically searches for the baud-rate on the Sinec L2-bus and then moves to normal operation.

4 Display initialization

To initializing the display, on the diskette 490-00406 in the directory "PBD10" you can find the following type and picture files:

TRSL2dax.200

Type file for the commissioning to a Siemens IM308 C Profibus interface card and a SIMATIC S7 control.

TRSL2dtx.200

Type file for the commissioning to a Siemens IM308 B Profibus interface card and a SIMATIC S5 control.

TRSL2d_n.bmp / TRSL2d_s.bmp

Bitmaps (picture files) for the device display.

Before COM-ET-200 will be started copy all these files in its work- or picture directory on your PC or PG.

At the initializing by the master following parameters will be submitted:

Address of station	=	value adjusted on the display (see on page 9/11)
1. Octet of the parameter telegram	=	1000 0000B without Watch Dog
	or	1000 1000B with Watch Dog

In addition to the 7 parameter bytes 5 bytes of user-parameter will be submitted. These are all = 00H.

PNO Identification No.	=	1345
------------------------	---	------

In the configuration telegram will be transferred 2 ID-bytes:

ID-byte 1	=	A3	(32 bit output with consistence)
ID-byte 2	=	00	(no inputs)

More detailed information can be found inside the user manual of the LSPM2 (see remarks on literature).

5 Format of the Data

The data transfer uses either the Floating-Point Format according to IEEE Std. 754, Short Real Number with 32 bits, as provided in the definition of layer 7 of the PROFIBUS, or the Long-Integer Format (Adjustment of the data format see chapter 6.2 up page 11).

Floating-Point Format

31	30	23	22	0
s	e			m

s = sign bit (1 = negative)
 e = binary biased exponent (bias = 127)
 m = mantissa

The value of the number 'v' is defined as follows:

$0 < e < 255 : v := (-1)^s * 2^{(e-127)} * (1.m)$
 $e = 0, m = 0 : v := 0.0$

Long-Integer Format (32 Bit)

D3				D2	D1	D0
	2 ²	2 ¹	2 ⁰	Data value MSB	Data value	Data value LSB
	Adjustable point (max. 5 digits)					

Within of D0 - D2 negative values are shown as a 24 bit two's complement value.

5.1 References for the use of the display at a S5- or a S7-control

If the display is used on a Siemens-S5-control, it must be paid attention to the fact that the S5-control does not use the IEEE-Floating-Point data format. At first, it is therefore necessary to convert a S5-Floating-Point number into the IEEE-format. Then, the number must be converted from Motorola-format into the Intel-format, since the S5 works with Motorola-format.

If the display is used on a Siemens-S7-control, a Floating-Point number must be converted only from Motorola-format into the Intel-format, since the Siemens-S7 is also using the Floating-Point format according to the IEEE standard. For the conversion by the S7 the "Instruction TAD" can be used.

6 Programming

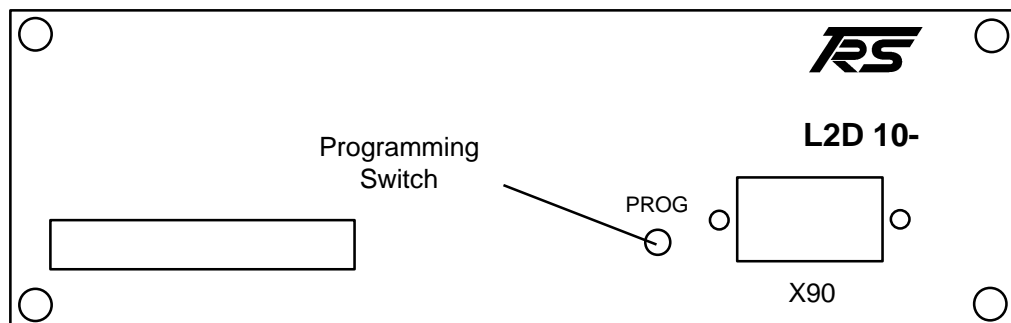
Before connecting the **PBD-10** to the Sinec-L2-DP-Bus the address, the number of digits after the decimal point and the data format must to be programmed.

6.1 Version 1.00 (max. 1,5 Mbaud)

Version see on the data plate

First of all the power supply has to be switched off. Then the 'Prog.'- switch on the back panel has to be held pressed (if necessary, use tool) while the power is being switched on. After releasing the 'Prog.'- switch the unit is set to the programming mode.

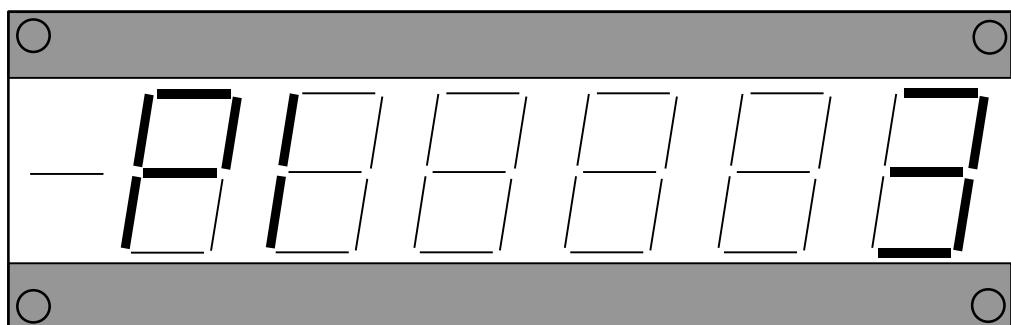
Back view of PBD-10



Addressing (programming mode P1)

The display shows 'P1' on the left side and the current address on the right side. When pressing the 'Prog.'- switch again for more than 1 sec. the unit counts up the addresses automaticly. After reaching the desired address, the switch has to be released. By pressing the switch for > 300 msec. the address counts up one by one.

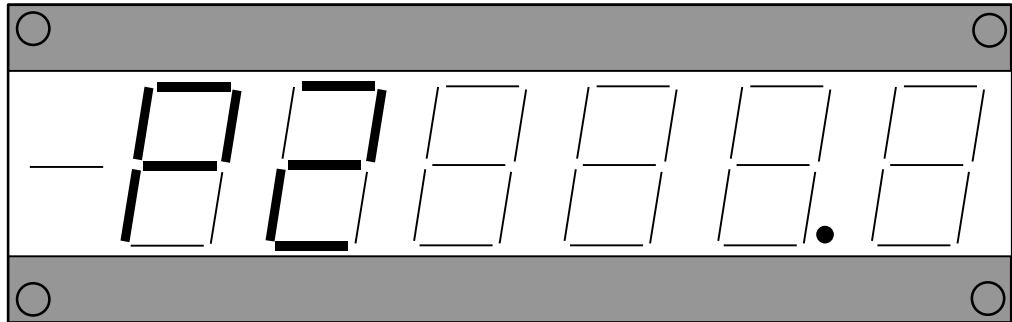
Front view of PBD-10



Number of digits after the decimal point (programming mode P2)

By a double-click of the 'Prog.'-switch the device is set to programming mode 'P2'. The left side of the display shows 'P2'. By pressing the switch for > 3000 msec. the decimal point moves any time one step to the left.

Front view of PBD-10

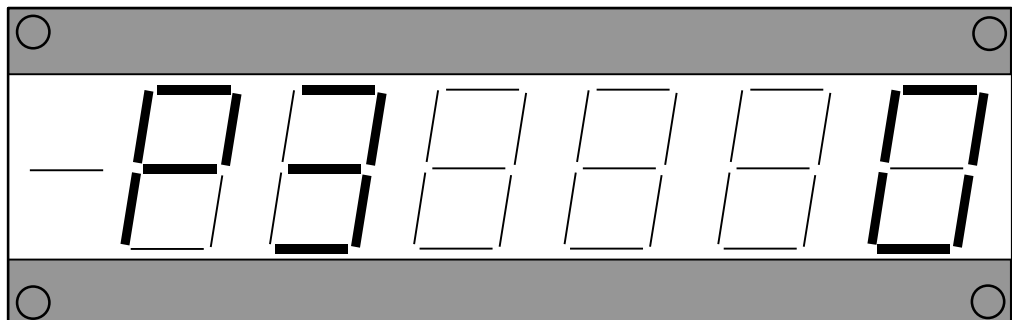
**Save (programming mode P3)**

Another double-click switches to mode 'P3'.

In case of needing to change the altered values again, at this point another double-click will return to mode 'P1'. Pressing the switch for > 300 msec. stores the values set on the display. After saving, the adjusted values are being displayed for 3 sec (see "Description of the Function" on page 5). The set values will be preserved until another programming procedure is being performed.

By switching the power supply off and on the device is back to normal operation mode.

Front view PBD-10

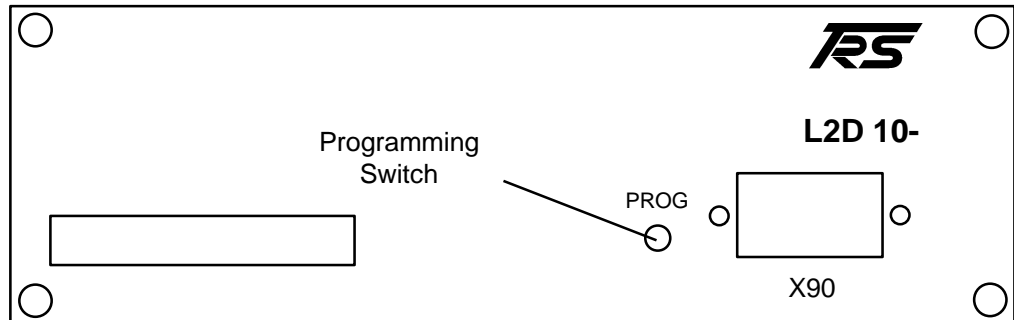


6.2 Version 2.00 (max. 12 Mbaud)

Version see on the data plate

First of all the power supply has to be switched off. Then the 'Prog.'- switch on the back panel has to be held pressed (if necessary, use tool) while the power is being switched on. After releasing the 'Prog.'- switch the unit is set to the programming mode.

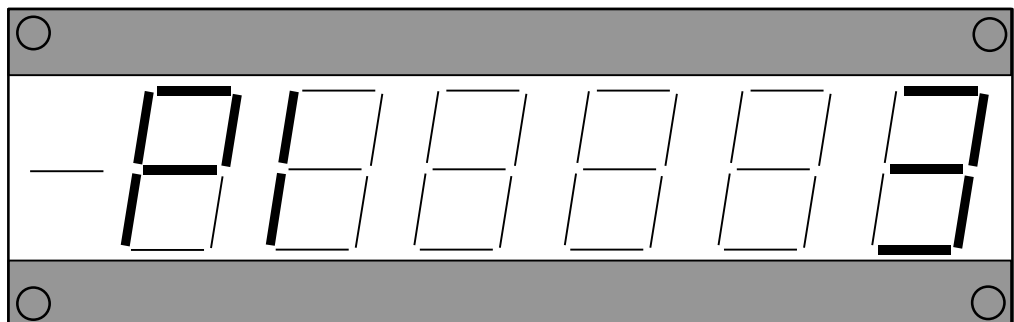
Back view of PBD-10



Addressing (programming mode P1)

The display shows 'P1' on the left side and the current address on the right side. When pressing the 'Prog.'- switch again for more than 1 sec. the unit counts up the addresses automatically. After reaching the desired address, the switch has to be released. By pressing the switch for > 300 msec. the address counts up one by one.

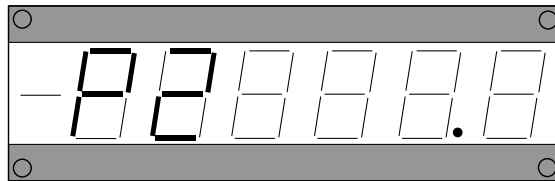
Front view of PBD-10



Number of digits after the decimal point (programming mode P2)

By a double-click of the 'Prog.'-switch the device is set to programming mode 'P2'. The left side of the display shows 'P2'. By pressing the switch for > 3000 msec. the decimal point moves any time one step to the left.

Front view of PBD-10



Data format (programming mode P3)

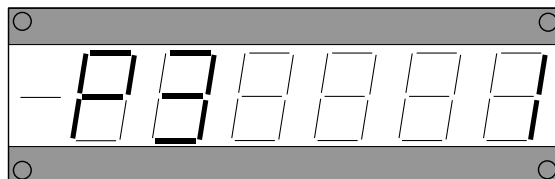
By a double-click of the 'Prog.'-switch the device is set to programming mode 'P3'. By pressing the switch for > 300 msec. the data format changes:

1 = Floating-Point

2 = Long-Integer

The communication of the number of digits in Long-Integer Format can only be caused if no digits in the programming mode 'P2' adjusted (no decimal point is visible). If the interchange values of the number of digits > 5 the number of digits after the decimal point will be limited automatic to five.

Front view of PBD-10



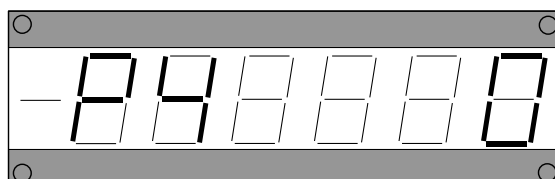
Save (programming mode P4)

Another double-click switches to mode 'P4'.

In case of needing to change the altered values again, at this point another double-click will return to mode 'P1'. Pressing the switch for > 300 msec. stores the values set on the display. After saving, the adjusted values are being displayed for 3 sec (see "Description of the Function" on page 5). The set values will be preserved until another programming procedure is being performed.

By switching the power supply off and on the device is back to normal operation mode.

Front view PBD-10



7 Inserting the Bus-End Resistors

The devices hooked to the Sinec-L2-DP-Bus must have termination resistors at each end. After removing the back panel of the unit the resistors can be activated by jumping the two now visible bridges through the red bridge jumpers that sit on one side.

8 Connectors

8.1 X10

Power Supply and RS485

Combicon 3,81, 6-pole

Pin		
1	+24 V	(Input)
2	0 V	(Input)
3	+24 V	(connected internally to pin 1, useable as output for a max. of 3 Amp.)
4	0 V	(connected internally to pin 2, useable as output for a max. of 3 Amp.)
5	RS485 +	(optional)
6	RS485 -	(optional)
7	/BT	(optional, must not be connected)
8	GND	

8.2 X20

Sinec L2-DP-Connector
opto-coupled

Dsub Connector, 9-pole

Pin	
1	nc
2	nc
3	B
4	RTS
5	GND
6	+5 V L2
7	nc
8	A
9	nc

9 Technical Data

Power Supply:	24 V DC ($\pm 20\%$)
Power Consumption:	120 mA (all segments switched on, without options)
Housing:	Plastic housing for switch board insertion according to DIN 43700
Measurements: (W * H * D)	144 * 48 * 115 mm (depth without plugs) (5.7 * 1.9 * 4.5 in.)
for switch board frame:	138+1 mm * 45+0.6 mm (DIN 43700)
Weight:	400 g
Operating Temperature:	0°C .. +55°C
Storage Temperature:	-20°C ..+70°C

10 Order Notes

Order Key

PBD-10.xxx

|_____000 = Basic Version (display only)