

# **MPI/PROFIBUS Terminal Block Manual**

Version 1.1 as per November 2, 2004  
HW 1

Order No. 901-751-MPV01



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Note:

We have checked the content of this manual for conformity with the hardware and software described. Nevertheless, because deviations cannot be ruled out, we cannot accept any liability for complete conformity. The data in this manual have been checked regularly any necessary corrections will be included in subsequent editions. We always welcome suggestions for improvement.

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# Table of Contents

<b>1</b>	<b>Safety Information</b>	<b>6</b>
1.1	General	6
1.2	Restriction of access	7
1.3	Information for the user	7
1.4	Use as intended	7
1.5	Avoiding use not as intended	7
<b>2</b>	<b>Installation and Mounting</b>	<b>8</b>
2.1	Vertical and horizontal installation	8
2.1.1	Installation on a mounting rail	8
2.1.2	Mounting by direct screw connection	9
2.2	Minimum clearance	9
<b>3</b>	<b>Metal-Encapsulated MPI/Profibus Terminal Block</b>	<b>10</b>
3.1	Application and description of function	10
3.2	Connections	11
3.3	PG/OP	11
3.4	LEDs	11
3.5	Switch	12
3.6	Circuit examples	12
3.7	Technical data	13
3.7.1	Operating conditions	13
<b>4</b>	<b>MPI/Profibus Multiplexer</b>	<b>14</b>
4.1	Application and description of function	14
4.2	Connections	15
4.3	Connection female connectors	15
4.3.1	PG female connector	15
4.3.2	OP female connector	15
4.3.3	BUS female connector	16
4.4	LEDs	16
4.5	Switch	16
4.6	Circuit examples	16

4.7	Technical data	18
4.7.1	Operating conditions	18
<b>5</b>	<b>Accessories</b>	<b>19</b>
<b>6</b>	<b>Further documentation</b>	<b>19</b>

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# 1 Safety Information

Please observe the safety information given for your own and other people's safety. The safety information indicates possible hazards and provides information how you can avoid hazardous situations.

The following symbols are used in this manual:



*Caution, indicates hazards and sources of error*



*gives information*



*hazard, general or specific*



*danger of **electric shock***

## 1.1 General

The MPI/Profibus repeater is only used as part of a complete system.



*The operator of a machine system is responsible for observing all safety and accident prevention regulations applicable to the application in question.*



*During configuration, safety and accident prevention rules specific to the application must be observed.*



*EMERGENCY OFF facilities according to EN 60204 / IEC 204 must remain active in all modes of the machine system. The system must not enter an undefined restart.*



*Faults occurring in the machine system that can cause damage to property or injury to persons must be prevented by additional equipment. Such equipment must also ensure entry into a safe state in the event of a fault. Such equipment includes electromechanical safety buttons, mechanical interlocks, etc. (see EN 954-1, risk estimation).*



*Never execute or initiate safety-related functions using the operator terminal.*



*Only authorized persons must have access to the MPI/Profibus terminal block!*

## **1.2 Restriction of access**

The MPI/Profibus repeater is open equipment and must only be installed in electrical equipment rooms, cabinets, or housings. Access to the electrical equipment rooms, barriers, or housings may only be possible using a tool or key and only permitted to personnel having received instruction or authorization. See also Chapter 2.

## **1.3 Information for the user**

This manual is addressed to anyone wishing to configure or install the MPI/Profibus terminal block.

It is intended for use as a programming manual and reference work by the configuring engineer. It provides the installing engineer with all the necessary data.

The MPI/Profibus terminal block is for use in an MPI or Profibus network only. For that reason, the configuring engineer, user, installing technician must observe the standards, safety and accident prevention rules applicable in the particular application. The operator of the automation system is responsible for observing these rules.

## **1.4 Use as intended**

The MPI/Profibus terminal block must only be used as described in the manual.

## **1.5 Avoiding use not as intended**

Safety-related functions must not be controlled using the MPI/Profibus terminal block alone.

## 2 Installation and Mounting

The MPI/Profibus terminal block must be installed according to VDE 0100 IEC 364. The MPI/Profibus terminal block provides the degree IP20 and must be installed in the (control) cabinet.

Ambient temperature: 40 °C ... 60 °C



*Before you start installation work, disconnect all system components from the mains.*



*Danger of **electric shock***



*During installation, application-specific safety and accident prevention rules must be observed.*

### 2.1 Vertical and horizontal installation

The MPI/Profibus terminal block can be installed either vertically or horizontally.

#### 2.1.1 Installation on a mounting rail

Installation on 35 mm mounting rails to DIN EN 50 022):

- Hook the device into the upper edge of the mounting rail.
- Lock it by pressing downwards.

Removal:

- Retract the metal snap-lock fastener using a screw driver.
- Lift the device off the rail.



*To install the mounting rail adapter, use the original screws if possible. The thread of the screws must not be longer than 5 mm (M3 x 5).*

The mounting rail adapter on the rear can be removed. When doing so, no assembly parts are loosening in the housing. The mounting rail adapter can be screwed on again without opening the housing.



*Do not screw the screws more than 5 mm into the housing; otherwise, the electronics of the MPI/Profibus terminal block will be destroyed.*

### **2.1.2 Mounting by direct screw connection**

The MPI/Profibus terminal block can also be screwed on directly, without the mounting rail adapter. The hole pitch is 38 mm. M3 screws must be used.

## **2.2 Minimum clearance**

- There is no minimum clearance to be observed to adjacent modules.
- Make sure that enough clearance is provided beneath for the cable routing.
- Access to the front must be granted if you want to use the heavy-gauge conduit thread socket.
- Make sure that the front panel is well visible for diagnostic purposes.

## 3 Metal-Encapsulated MPI/Profibus Terminal Block

### 3.1 Application and description of function

The MPI/Profibus terminal block can be used to connect up to two devices to an MPI or PROFIBUS network. To this end, two 9-pin Sub D female connectors are to be found in the housing of the MPI/Profibus terminal block.

The bus can be segmented by inserting the terminal block. The individual segments can be separated and terminated via switch S1 (see Section 3.5 and Section 3.6).

Both female connectors are provided with 5 V DC for terminating the Profibus and 24 V DC for the power supply of MPI or PROFIBUS devices, such as SSW7, NetLink or operator terminals.

The MPI/Profibus terminal block can be mounted directly on a top-hat rail.



Fig. 3-1: MPI/Profibus terminal block



*Make sure that the cable clips are in contact with the shield over as large an area as possible.*

## 3.2 Connections

All connections are provided via terminals blocks (see Fig. 3-1). The terminal block need not be opened for connection. The shielding is provided via the cable clips.

Power supply	M	0 V	
	L+	+24 V	
	Protective earthing (PE)		
Segment 1	A1	Green cable	Segment 1 coming
	B1	Red cable	Segment 1 incoming
	A1'	Green cable	Segment 1 outgoing
	B1'	Red cable	Segment 1 outgoing
Segment 2	A1	Green cable	Segment 2 incoming
	B1	Red cable	Segment 2 incoming
	A1'	Green cable	Segment 2 outgoing
	B1'	Red cable	Segment 2 outgoing



*Make sure that the cable length does not exceed 3 m.*

## 3.3 PG/OP

An operator panel (OP) or a programming device ("PG") can be connected to the PG/OP female connector. This connection can also be used as a short tap line.

### Connector pin assignment

Pin	Profibus / Sub-D connector, 9-pin
1	-
2	M 24 V
3	DATA B
4	-
5	GND
6	+5 V
7	+24 V
8	DATA A
9	-

## 3.4 LEDs

The LED on the front side of the MPI/Profibus terminal block (see Fig. 3-1) informs you on its operating condition.

*LED PWR (green):*

24 V DC and 5 V DC power supplies existing.

### 3.5 Switch

The switch S1 serves for isolating the connected bus segments 1 and 2. The bus segment connected to A1/B1 and A1'/B1' is terminated and continues to work. The two female connectors PG/OP remain connected to bus segment 1. The bus segment connected to A2/B2 and A2'/B2' is disconnected and not terminated.

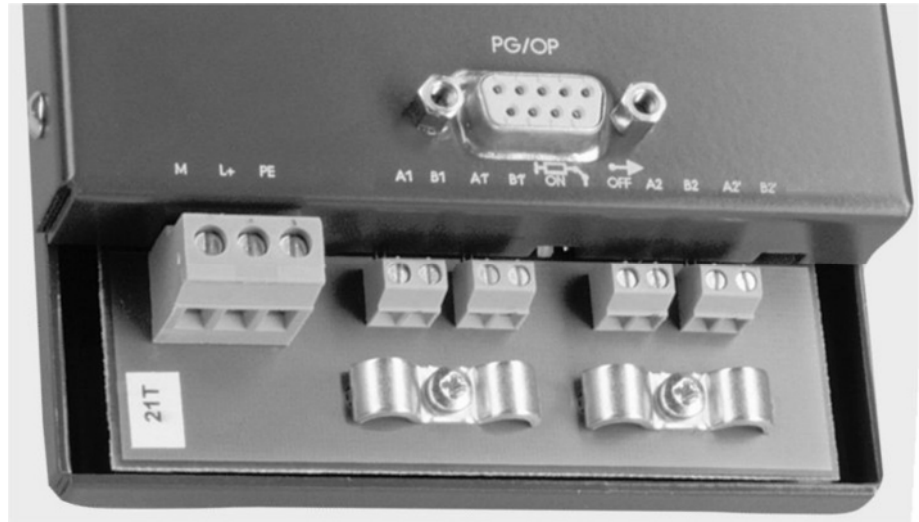


Fig. 3-2: MPI/Profibus terminal block connections

S1

### 3.6 Circuit examples

**!**  
 Always connect the bus lines as tap lines.  
 Furthermore, no ring connections must result between Ax/Bx and Ax'/Bx'.

The possible combinations of bus structures which can be realised can be derived from the block diagram (see Fig. 3-3). The switch can be used to disconnect the bus for start-up and diagnostics. Make sure that terminating resistors are connected only to the bus lines A1/B1 and A1'/B1'.

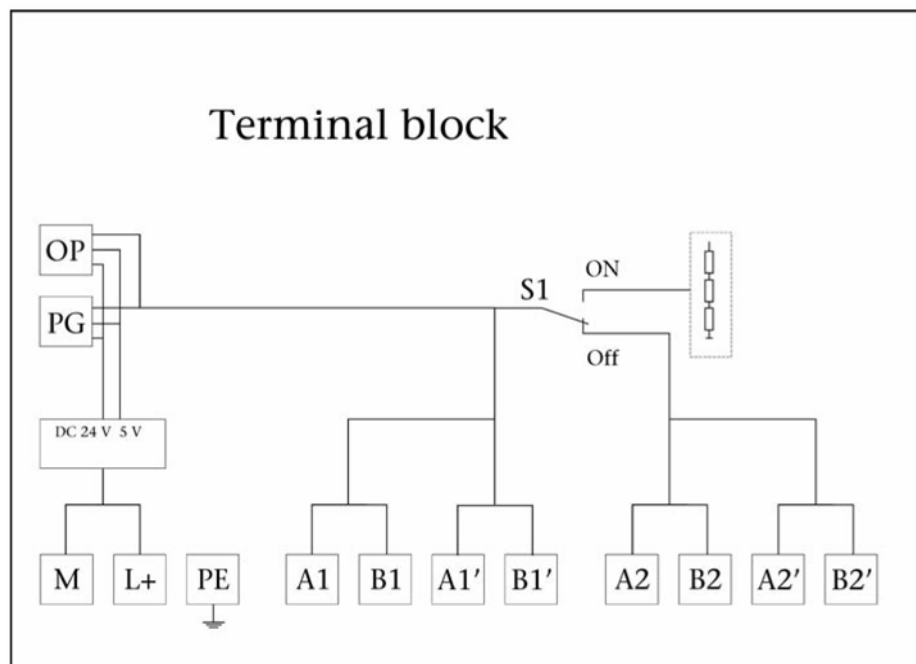


Fig. 3-3: Block diagram of the terminal block



*As far as the number of stations, line lengths and tap lines are concerned, observe the installation guidelines from Siemens AG.*

For complex bus structures, the bus can be realised using a tree-style or point-to-point connection scheme using terminal blocks.

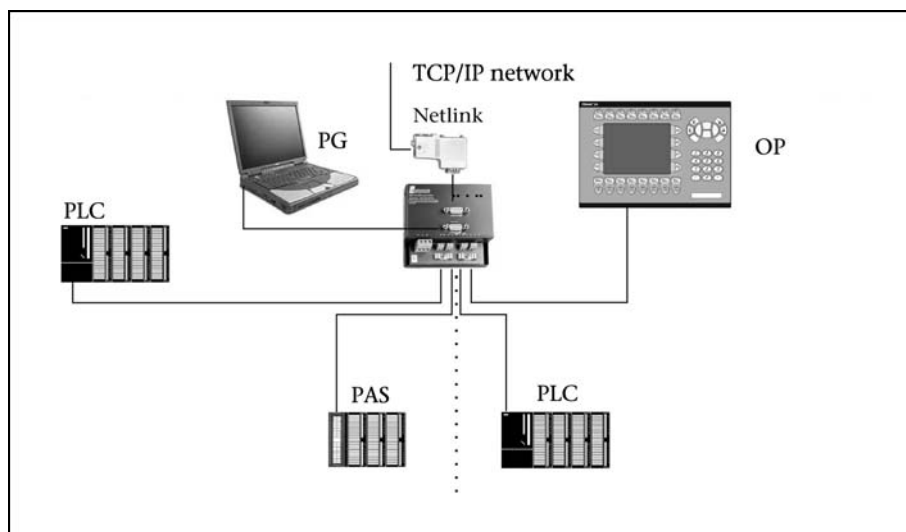


Fig. 3-4:  
Application example for  
max. 32 stations

## 3.7 Technical data

### 3.7.1 Operating conditions

Dimensions in mm (LxWxH)	115 x 110 x 35
Weight	approx. 230 g
Degree of protection of the housing	IP 20
<b>Supply system</b>	
Voltage	24 V DC
Current consumption	max. 200 mA at 24 V
Voltage display	5 V DC
Segment connection	4 x 2-pin terminal blocks
Interface	PG/OP
<b>Permissible ambient conditions</b>	
• Ambient temperature during operation	0 °C ... +60 °C
• Temperature during transport and storage	-25 °C ... +75 °C
<b>Profibus interface</b>	
Transfer rate	max. 12 Mbps
Connection female connector	2 x SUB-D 9-pin

## 4 MPI/Profibus Multiplexer

### 4.1 Application and description of function

The MPI/Profibus multiplexer can be used to connect up to three devices to one MPI or PROFIBUS interface. To this end, three 9-pin Sub D female connectors are to be found in the housing of the MPI/Profibus multiplexer.

The bus connection line can be connected either directly to the CPU or to any position within the bus. The power supply is provided via the connecting cable from the CPU. If no 24 V are present at the connection female connector used, external power supply is possible at the multiplexer.

The "PG" female connector has the full MPI assignment. A programming software can be run directly at this female connector via an SSW7 or PC adapter. This assignment is not relevant for the operation of PROFIBUS devices.

The bus can be segmented by inserting the multiplexer. The individual segments can be separated and terminated via switch S1 (see Section 4.5).

Both female connectors are provided with 5 V DC and 24 V DC for the power supply of MPI or PROFIBUS devices, such as SSW7, NetLink or operator terminals.

The MPI/Profibus multiplexer can be mounted either on a top-hat rail or a DIN rail using appropriate adapters (option), see Section 5.



Fig. 4-1: MPI/Profibus multiplexer with connection cable

## 4.2 Connections

The bus lines are connected via the connection cable and 9-pin Sub-D female connectors.

The external power supply 24 V DC is provided via terminal blocks (see Fig. 4-1). The multiplexer need not be opened for connection.

Power supply	M	0 V
	L+	+24 V

## 4.3 Connection female connectors

### 4.3.1 PG female connector

An operator panel (OP) or a programming device ("PG") can be connected to the PG female connector. This connection can also be used as a short tap line.

**Pin assignment of the "PG female connector"**

Pin	Profibus / Sub-D connector, 9-pin
1	-
2	M 24 V
3	DATA B
4	RTS-AS
5	GND
6	+5 V
7	+24 V
8	DATA A
9	RTS-PG

!  
Make sure that the cable  
length does not exceed  
3 m.

### 4.3.2 OP female connector

An operator panel (OP) or a programming device ("PG") can be connected to the PG female connector. This connection can also be used as a short tap line.

**Pin assignment of the "PG female connector"**

Pin	Profibus / Sub-D connector, 9-pin
1	-
2	M 24 V
3	DATA B
4	-
5	GND
6	+5 V
7	+24 V
8	DATA A
9	-

!  
Make sure that the cable  
length does not exceed  
3 m.

### 4.3.3 BUS female connector

The BUS female connector is intended for connection of the bus or of further devices.

#### Pin assignment of the BUS female connector

Pin	Profibus / Sub-D connector, 9-pin
1	-
2	M 24 V
3	DATA B
4	-
5	GND
6	+5 V
7	+24 V
8	DATA A
9	-

## 4.4 LEDs

The LED on the front side of the MPI/Profibus multiplexer (see Fig. 4-1) informs you on its operating condition.

*LED PWR (green):*

24 V DC and 5 V DC power supplies existing.

## 4.5 Switch

The switch S1 serves for isolating the connected bus segments 1 and 2. The bus segment connected using the connection cable is terminated and continues to work. The two female connectors PG/OP remain connected to bus segment 1. The bus segment connected to BUS is disconnected and not terminated.

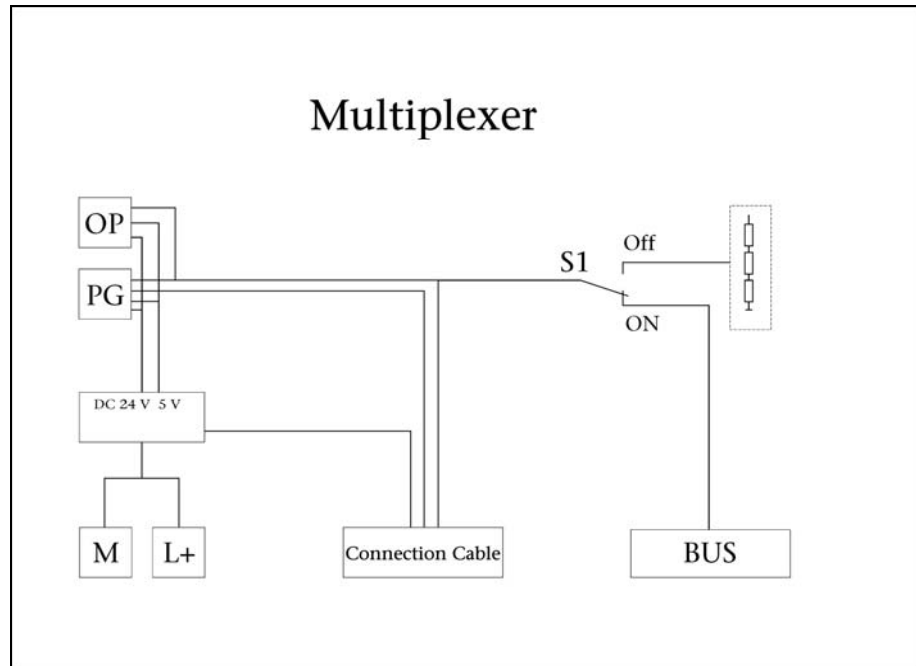
## 4.6 Circuit examples



*Always connect the bus lines as tap lines. Furthermore, make sure that no ring connections result between the female connectors PG, OP and BUS.*

The possible combinations of bus structures which can be realised can be derived from the block diagram (see Fig. 4-2). The switch can be used to disconnect the bus for start-up and diagnosis. Make sure that terminating resistors are connected only to the bus lines A1/B1 and A1'/B1'.

Fig. 4-2: Block diagram of the multiplexer with connection cable



#### Application example:

In addition to the existing PROFIBUS interface, a programming device and, for example, a network adapter can be connected to the PLC interface by inserting a multiplexer, without rewiring the bus.

In the case of more than 32 stations and / or long lines, it is recommended to use repeaters.

!   
 As far as the number of stations, line lengths and tap lines are concerned, observe the installation guidelines from Siemens AG.

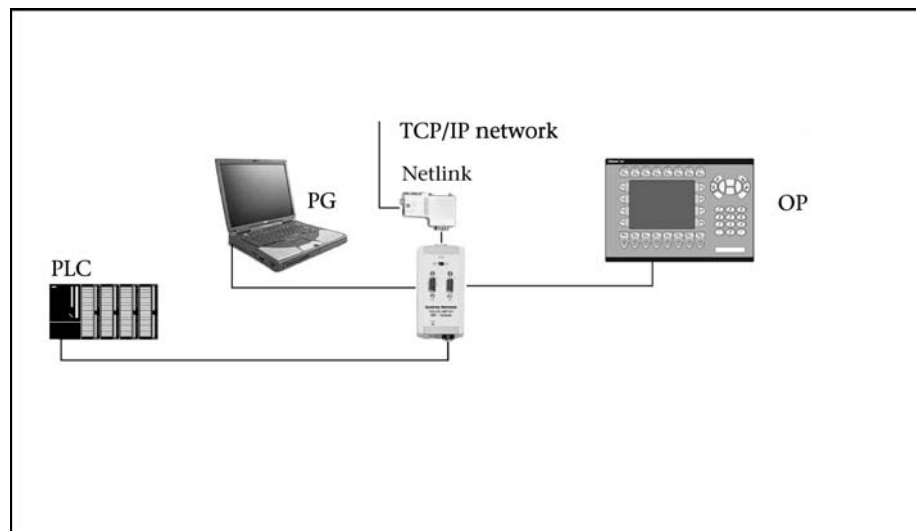


Fig. 4-3: Application example for max. 32 stations

## 4.7 Technical data

### 4.7.1 Operating conditions

Dimensions in mm (LxWxH)	125 x 67 x 30
Weight	ca. 135 g
Housing degree of protection	IP 20

#### Power supply

Voltage	24 V DC
Current consumption	max. 200 mA at 24 V
Voltage display	5 V DC
Segment connection	Sub-D connector, 9-pin 1.2 m cable
Interface	PG/OP/BUS

#### Permissible ambient conditions

- Ambient temperature during operation 0 °C ... +60 °C
- Temperature during transport and storage -25 °C ... +75 °C

#### Profibus interface

Transfer rate	max. 12 MBit/s
Profibus DP protocol	to EN 50 170
Connection socket	3 x SUB-D 9-pin

## 5 Accessories

Manual, German	900-972-0AA01
Manual, English	901-972-0AA01

Bus connector for PROFIBUS:

without prog. device connector 90° "smaller dim."	700-972-0BA12
with prog. device connector 90° "smaller dim."	700-972-0BB12
35° cable outlet, without prog. device connector	700-972-0BA41
35° cable outlet, with prog. device connector	700-972-0BB41
axial cable outlet	700-972-0CA11
Stripping tool for PROFIBUS	700-972-6AA00

Extension cable MPI bus, 5 m	700-751-6VK11
Extension cable MPI bus, 10 m	700-751-6VK21
Extension cable MPI bus, special lengths	700-751-6SO11

MPI-/PROFIBUS-Repeater	700-751-0AA01
PROFIBUS PG Dropcable	700-901-4BD00

## 6 Further documentation

Internet: [www.helmholz.de](http://www.helmholz.de), [www.profibus.de](http://www.profibus.de)

Siemens Manuals: "S7-300/S7-400 Installing and Wiring", "S7-300 Module Data"

"Profibus DP/DPV1", Manfred Popp, Hüthig Verlag

## Notes