YASKAWA

VIPA Networking Solutions

PBR | 920-1BD10 | Manual

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PROFIBUS Repeater D1

www.vipa.com/en/service-support/manuals

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1 General

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1.2 About this manual

Objective and contents

This manual describes the PROFIBUS Repeater 920-1BD10 from VIPA. It contains a description of the construction, project implementation and usage.

Product	Order number	as of state: HW
PBR-D1	920-1BD10	01

Target audience

The manual is targeted at users who have a background in automation technology.

1.3 Safety information

Applications conforming with specifications

The system is constructed and produced for:

- communication and process control
- general control and automation tasks
- industrial applications
- operation within the environmental conditions specified in the technical data
- installation into a cubicle

DANGER!
This device is not certified for applications in
– in explosive environments (EX-zone)

Documentation

The manual must be available to all personnel in the

- project design department
- installation department
- commissioning
- operation

CAUTION!

The following conditions must be met before using or commissioning the components described in this manual:

- Hardware modifications to the process control system should only be carried out when the system has been disconnected from power!
- Installation and hardware modifications only by properly trained personnel.
- The national rules and regulations of the respective country must be satisfied (installation, safety, EMC ...)

Disposal

National rules and regulations apply to the disposal of the unit!

2 Product description

The compact PROFIBUS DP Repeater D1 offers an economic alternative and tackles the technological limitations of existing repeaters. This first-class network component fulfils the electrical, mechanical and diagnostic requirements of the demanding modern industry.

- The advanced 12 Mbps core of the D1 is identical to the MultiRepeater B5 and B2; it can be cascaded unlimitedly and is equipped with the latest isolated RS485 interface. The data is constantly monitored for glitches which are digitally filtered out. Every channel has on-board switchable termination and can drive 31 devices.
- The robust M12 connectors of the PROFIBUS interface provide flexible wiring; a channel can be terminated or daisy-chained to a neighbouring component. An extra M12 connector is featured on the outgoing channel (channel 2) for maintenance/engineering tools.

3 Installation instruction

3.1 Location

The D1 can be installed everywhere in a non-hazardous area that complies with IP 66 (DIN 40 050) and the specified ambient temperature range of -25° ... +70° Celsius.

3.2 Position

The D1 can be installed in every position, but it is recommended to install it with Channel 2 pointing down. In this position it is easier to read the display.

3.3 Mounting and dismounting

The D1 has to be mounted on a flat surface, by using the four screw holes in the corners of the D1. The M5 mounting screws need to cover at least 3 mm.

3.4 Power supply

Parameters

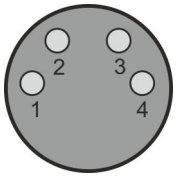
The power supply has to comply with the following specifications:

Voltage: 12 to 24 V DC

Current: min. 125 mA

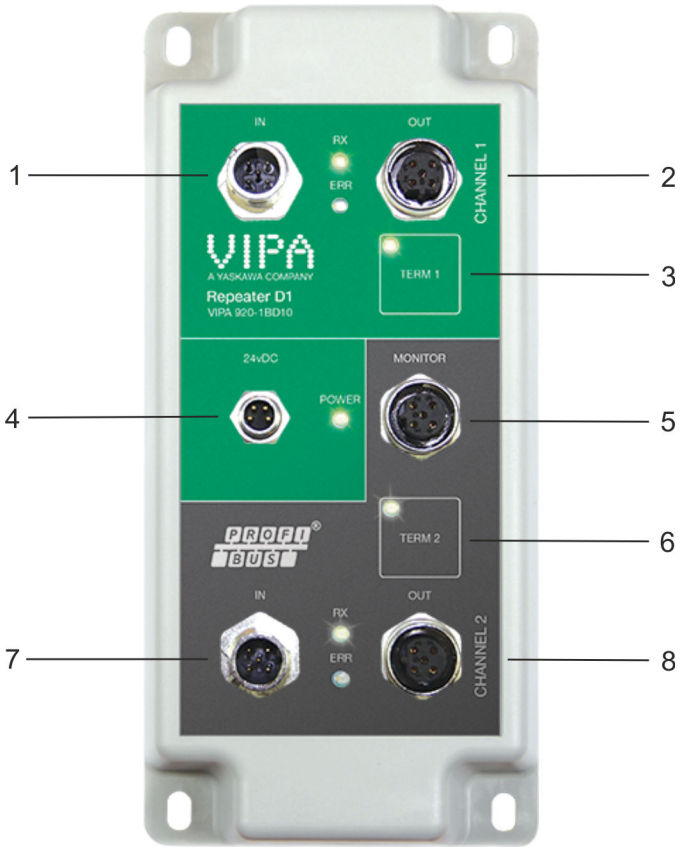
Wiring

The leads of both power connectors have to be wired as follows:



Pin	Wiring
1	+24 V GS
2	+24 V GS
3	0 V GND
4	0 V GND
Wire	Shield

3.5 PROFIBUS

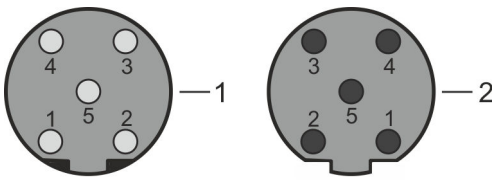


1 IN 1
2 OUT 1
3 Termination 1
4 Power
5 Monitor connector for channel 2
6 Termination 2
7 IN 2
8 OUT 2

Connectors

- Each channel has 2 connectors (IN and OUT).
- They are both linked 1-on-1, even when the termination is OFF.
- When a channel of the repeater is NOT the last device on the segment, it does not matter which connector (IN or OUT) is utilized.

Pin assignment



1 Plug
2 Jack

Pin	Wiring
1	+ 5V DC
2	A or green wire
3	DGND
4	B or red wire
5	not used
Wire	Shield

Termination

Each channel has its own termination which can be switched ON/OFF.

1. If one of the channels is not used, turn on the termination.
2. Press and hold the *[TERM]* button for 3 seconds.
3. The yellow "TERM" LED will illuminate.
   ⇨ After power down/up the D1 will remember the termination state.

Monitoring connector

The busmonitor connector is connected 1-on-1 with channel 2.

Not used connectors

Verify that the unused connectors have the protective cap screwed on tightly to avoid water or dirt entering the connector.

Robust Repeating mode

The D1 has two repeating modes: normal (default) and Robust Repeating. In normal mode the bits are transferred directly on the other channel with a minimal delay (see delay times on the next page). In Robust mode, the first byte is checked to verify if the following bits are a real PROFIBUS message. If the byte is illegal, the message will not be transferred to the other channel. This helps network stability in EMC sensitive environments.

1. To enable the Robust Repeating mode, press and hold both *[TERM]* buttons simultaneously for 5 seconds.
2. When Robust Repeating has been enabled, you will see the Power LED flashing quickly for 500 ms.
   ⇨ After that the Power LED will blink shortly every 5 seconds to indicate that Robust Repeating mode is enabled.
3. After power down/up the D1 will remember the repeating mode.

In Robust Repeating mode the delay time increases. ↬ *Chapter 4 'Technical data' on page 12*

Diagnostic LEDs

	OFF	Blinking	ON
POWER	Power is OFF or an internal failure	Power supply not stable or an internal failure Blinking every 5 sec: Robust Repeating mode enabled.	Power supply OK
RX	No communication detected (this Channel)	1 or more devices communicating (this Channel)	Internal error
ERR	No problem has been detected	Communication problem (this Channel)	Baud rate not found

4 Technical data

Order no.	920-1BD10		
Dimensions and weight			
Dimensions L x W x H (mm)	169 x 79 x 42 mm (height of housing excluding connectors: 28 mm)		
Weight	ca. 500 g		
Ambient conditions			
Operating temperature	-22° to +70 °C		
Isolation class	IP 66 (DIN 40 050)		
Protocol specifications			
Supported Protocols	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol.		
Transmission speed	9.6 kbps to 12 Mbps (including 45.45 kbps)		
Transmission speed detection	Auto detect		
Transmission speed detection time	< 10 s		
Data delay time	At Baudrate:	Normal mode:	Robust mode:
	9.6 - 93.75 kbps	≤1.7 Tbit	≤13.25 Tbit
	187.5 - 500 kbps	≤1.8 Tbit	≤13.30 Tbit
	1.5 Mbps	≤1.9 Tbit	≤13.40 Tbit
	3 Mbps	≤2.2 Tbit	≤13.60 Tbit
	6 Mbps	≤3.0 Tbit	≤14.00 Tbit
	12 Mbps	≤4.0 Tbit	≤15.00 Tbit
Delay time jitter	Max. ¼ bit time		
PROFIBUS cable specifications			
Cable lengths	1200 m at 9.6 kbps to 93.75 kbps		
	1000 m at 187.5 kbps		
	400 m at 500 kbps		
	200 m at 1.5 Mbps		
	100 m at 3 Mbps to 12 Mbps		
Number of devices	Max. 31 per channel (including MultiRepeaters, OLMs, etc.)		
Termination	Integrated and switchable (hold "TERM" button for 3 seconds). Powered according to IEC 61158 (390/220/390 Ohm)		
Cascading depth	No limits		
Power supply specifications			
Power connector	M8		
Nominal supply voltage	12 to 24 V DC		
Current consumption	125 mA at 24 V DC		

Order no.	920-1BD10
Power dissipation	max. 3 W
Reverse polarity protection	Yes