Anybus B1 Repeater Instruction Manual

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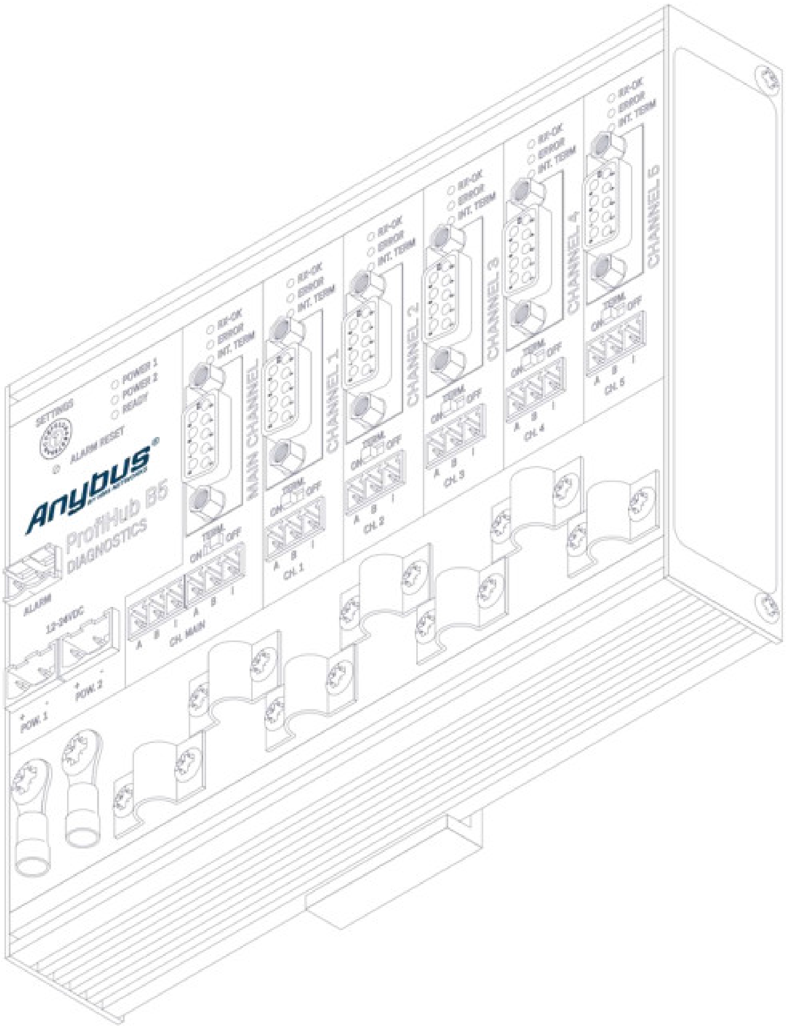

B1 Repeater
Installation manual

Contents

Introduction

The compact PROFIBUS DP Repeater B1 offers an economic alternative and tackles the technological limitations of the 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 B1 is identical to the ProfiHub; it can be cascaded unlimitedly and is equipped with the latest isolated RS 485 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 removable screw terminals of the PROFIBUS interface are pinned-out in a way that reversal mounting does not impact existing wiring. A DB9 connector is provided for ProfiTrace or other maintenance/engineering tools.
The power supply is redundant which makes it suitable for applications in which high availability is required and

consumes relatively low power which helps the environment.

Installation instructions

Location

The B1 can be installed everywhere in a non-hazardous area that complies with IP 20 (DIN 40 050) and the specified temperature range of -20 to +60°Celsius.

Position

The B1 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 status display and to perform measurements on the DB9 connector.

Mounting and dismounting

The B1 has to be mounted on a 35 mm DIN-rail with a minimum width of 60 mm. Fig. 1 and Fig. 2 illustrate how to mount and dismount the B1 on and from the DIN-rail.

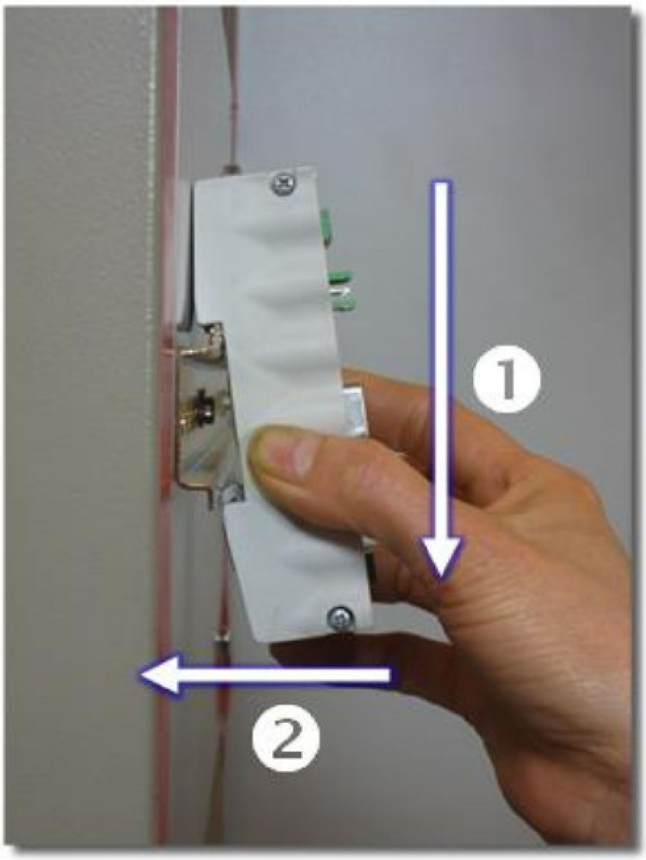

Fig. 1 Mounting; pull-down and push

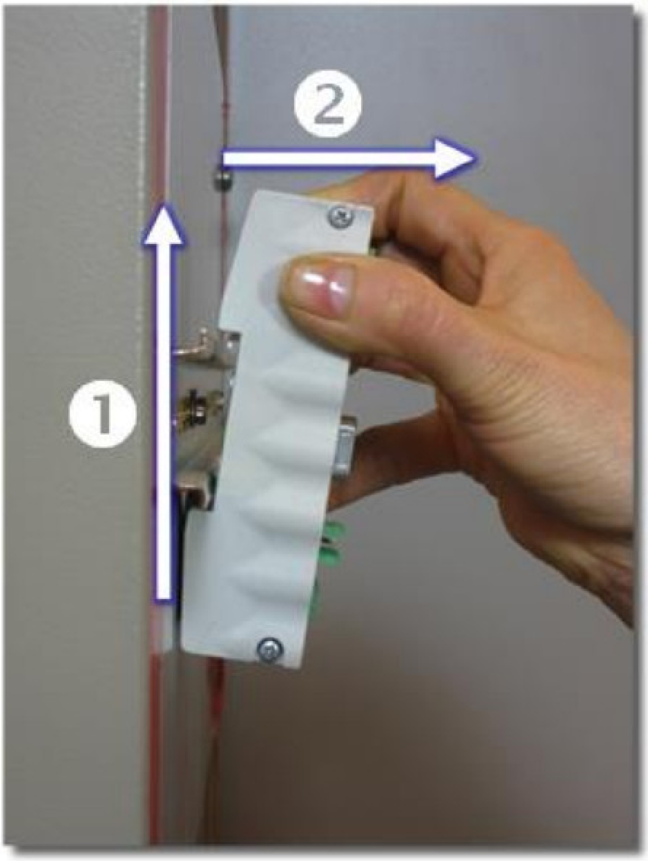

Fig. 2 Dismounting; Push-up and pull

Power supply

Parameters

The power supply has to comply with the following specifications:
Voltage: 19 to 28 Vdc
Current: Min. 65 mA

Wiring

The leads of both power connectors have to be wired as follows:
“+” = Positive Voltage
“-“ = 0 V
SH = Earth

Redundancy

Both power connectors are linked 1-on-1 to the internal power supply of the B1. If 1 power supply would fail, the other takes over without delay time. When redundancy is not required, it is sufficient to use 1 power connector. When the B1 is flipped 180° , the connectors can be used without alteration. Fig. 3 illustrates the location of the power supply connectors.

PROFIBUS

Connectors

Each channel has 2 connectors (IN and OUT).
They are both linked 1-on-1 when the termination is OFF.
When a channel of the repeater is NOT the last device on the segment, it doesn't matter which connector is utilized.
When the termination is ON the OUT connector is NOT connected.
When the B1 is flipped 180° , the wired connectors can be used without alteration.

Pin layout
Pin "A1/2": Green wire
Pin "B1/2": Red wire
Pin "SH": Cable shielding

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

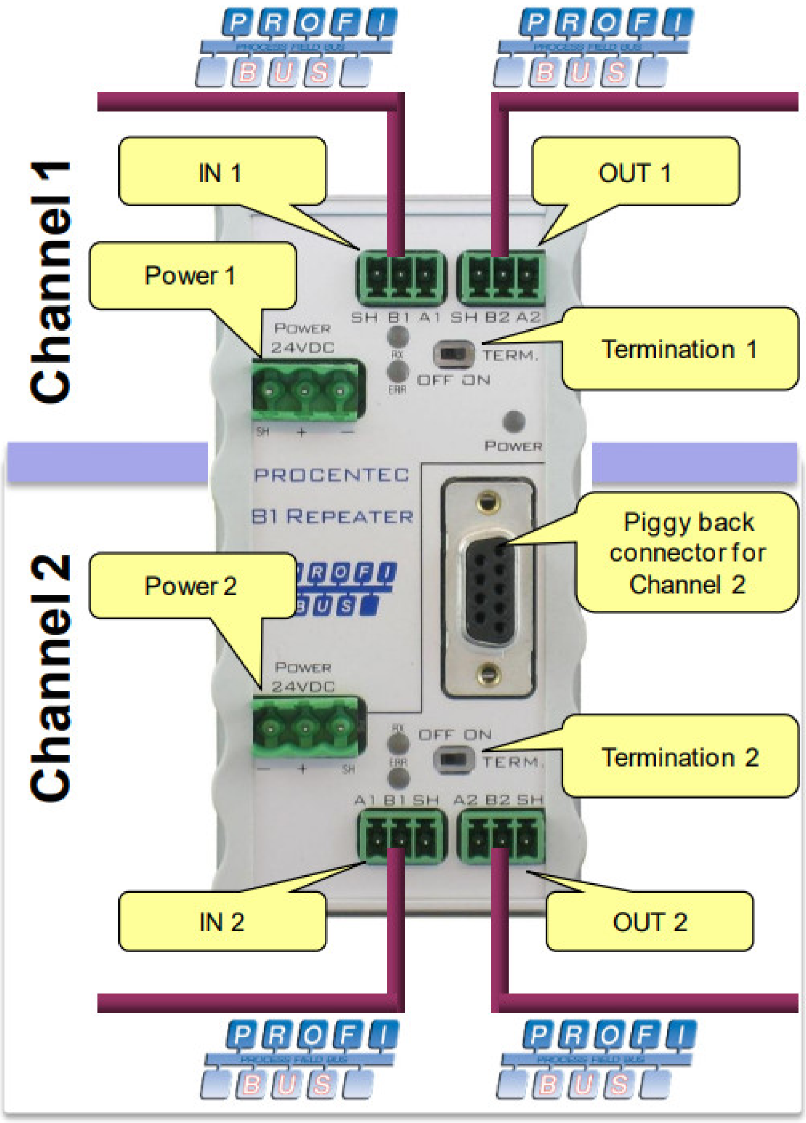

Fig. 3 Structure of the B1

Piggy back connector

The piggy back connector is 1-on-1 with channel 2.

Fig. 4 Using the Ground Clip

Ground Clip

It is recommended to use the supplied GC-01 ground clip to attach the cable shield to the screw connector, as shown in fig. 4, for easier shield connection and better strain relief.

The Ground Clip GC-01 can be ordered separately per 25pcs with order code: 101-00201B.

Diagnose-LEDs

	OFF	**Blinking**	**ON**
POWER	😐 Power is OFF or an internal failure.	☹ Power supply not stable or an internal failure.	☺ Power supply OK.
RX	☺ No communication detected (this Channel).	☺ 1 or more devices communicating (this Channel).	☺ 1 or more devices communicating (this Channel).
ERR	☺ No problem has been detected.	😐 Communication problem (this Channel).	😐 Communication problem (this Channel).

Technical Data

Technical Data ProfiHub B1	
Dimensions and weight Dimensions L x W x H (mm) Weight Mounting DIN-rail type	106 x 55 x 37 mm (excluding DIN-rail and plug-able screw connectors) 125 g (excluding plug-able screw connectors and packing material). 35mm × 7,5mm (EN 50022, BS 5584, DIN 46277-3)
Ambient conditions Operating temperature Isolation class	-20 to +60º Celsius -4 to +140º Fahrenheit IP 20 (IEC/EN 60529, DIN 40050)
Protocol specifications Supported Protocols Transmission speed Transmission speed detection Transmission speed detection time Data delay time Deviation	DP-V0, DP- V1, DP-V2, FDL, MPI, FMS, PROFIsafe, PROFIdrive and any other FDL based protocol. 9.6 kbps to 12 Mbps (including 45.45 kbps) Auto detect < 10 s detection and 50 s baudrate switchover time. At baudrate9.6 – 500 kbps 2.8 Tbit 1.5 Mbps 3.2 Tbit 3 Mbps 3.9 Tbit 6 Mbps 4.6 Tbit 12 Mbps 6.4 Tbit 2 bit times (over the complete message) for received messages is allowed and is corrected to nominal speed when transmitted.

PROFIBUS cable specifications Cable lengths Wire diameter Wire type Number of devices Termination Cascading depth Cascading units	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 < 2.5 mm2 Stranded or Solid core Max. 31 per Channel (including ProfiHubs, OLMs, Laptops/PCs , etc.) Integrated and switchable. Powered according to IEC 61158 (390/220/390 Ohms) No limit (only limited by busparameters of the master) With standard busparameters: At baudrate units 9.6 kbps 7 19.2 kbps 7 45.45 kbps 42 93.75 kbps 7 187.5 kbps 7 500 kbps 17 1.5 Mbps 23 3 Mbpss 19 6 Mbps 16 12 Mbps 15 Formula to calculate number of cascading units with adjusted T slot : Cascading units = (Tslot – maxTsdr) / (2 × Tdata_delay_time) T data_delay_time is described in protocol specifications on previous page. Example 1.5 Mbps, normal mode: Cascading units = (300-150) / (2×3.2) = 23
Power supply specifications Power supply operating voltage Power supply absolute max. rated voltage Redundant power supply Current consumption Power dissipation Reverse polarity protection Cable thickness	24 VDC 19 to 28 VDC Yes 65 mA at 24 VDC power supply Max. 2 W Yes < 2.5 mm^2

Connector lay-out 2x Power supply PROFIBUS screw terminals CH1 to 2 PROFIBUS DB9 Main Channel	Plug-able screw connector, pitch 5,08 mm Pin – : 0 VDC Pin + : 24 VDC Pin SH : Shield Plug-able screw terminal, pitch 3,81 mm Pin A: PROFIBUS A (green wire) Pin B: PROFIBUS B (red wire) Pin SH : Shield D Sub connector, 9 contacts (PROFIBUS specification) Pin 1: N.C. Pin 2: N.C. Pin 3: PROFIBUS – B Pin 4: PROFIBUS – RTS Pin 5: GND Pin 6: VPP Pin 7: N.C. Pin 8: PROFIBUS – A Pin 9: N.C. Housing: Shield Shield is connected internally to the DIN-rail
Standards and approvals CE FCC UL	EMC Directive 2014/30/EU, class A Digital Device RoHs Directive 2011/65/EU 47 CFR 15, Unintentional Radiator, class A Digital Device. Report reference: E365044-A1-UL Standards for safety: UL 60950-1, Information Technology Equipment – Safety – Part 1 General Requirements CAN/CSA C22.2 No. 60950-1-07, Information Technology Equipment – Safety – Part 1: General Requirements

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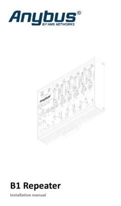
Documents / Resources

	**Anybus B1 Repeater** [pdf] Instruction Manual B1 Repeater, B1, Repeater

References

- User Manual