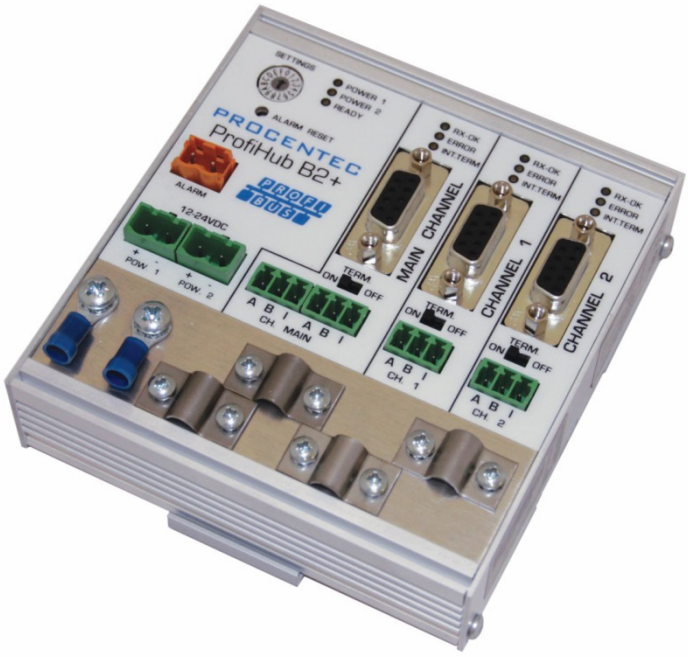

User Manual

ProfiHub B2+

2 Channel DP Redundant, Spur and Repeater Component

2 Isolated outgoing Channels.
Transparent for all **PROFIBUS DP protocols.**
RS 485 specifications for each channel.
Cable Redundancy
Max. 12 Mbps.
Max. 31 devices per channel.
Max. 1200 m spur line length.
No limit in serial placement.
No address required.
Integrated termination facilities.
Configurable grounding system.

IP 20 classification.
Extended temperature range.

Safety Guidelines
This manual contains notices which you should observe to ensure your own personal safety, as well as to protect the product and connected equipment. These notices are highlighted in the manual by a warning sign and are marked as follows according to the level of danger:


Draws your attention to important information on handling the product, a particular part of the documentation or the correct functioning of the product.

Warning
This device and its components may only be used for the applications described in this manual and only in connection with devices or components that comply with PROFIBUS and an RS 485 interface. This product can only function correctly and safely if it is transported, stored, set up, installed, operated and maintained as recommended.

Qualified Technicians
Only qualified technicians should be allowed to install and work with this equipment. Qualified technicians are defined as persons who are authorized to commission, to ground, to tag circuits and systems in accordance with established safety practices and standards. It is recommended that the technicians carry a Certified PROFIBUS Installer or Certified PROFIBUS Engineer certificate.

Disclaimer of Liability
We have checked the contents of this manual as much as possible. Since deviations cannot be precluded entirely, we cannot guarantee full agreement. However, the content in this manual is reviewed regularly and any necessary corrections included in subsequent editions. Suggestions for improvement are welcomed.

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Important Information

Purpose of the Manual
This manual explains how to put the ProfiHub B2+ into operation.

Recycling and Disposal
The parts of the ProfiHub can be recycled. For further information about environment-friendly recycling and the procedure for disposing your old equipment, please contact:

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Important Notices

WARNING

When the product is in use at an ambient temperature of 63 degrees Celsius or 145 degrees Fahrenheit, the housing of the ProfiHub B2+ will be hot. **Do not touch the housing!**

At normal operating temperatures of 25 degrees Celsius, the temperature of the housing will not exceed 35 degrees Celsius.

WARNING

When the product is in use at an ambient temperature of 63 degrees Celsius or 145 degrees Fahrenheit, the housing of the ProfiHub B2+ will be hot. **Do not touch wires which are in contact with the housing!**

WARNING

When the product is in use at an ambient temperature of 63 degrees Celsius or 145 degrees Fahrenheit, the housing of the ProfiHub B2+ will be hot. **Use wires suitable for these temperatures!**

HOT HOUSING warning located on the side of the housing. Make sure this warning is visible after wall installation. UL certification demands the warning to be visible during operation.

To comply with UL certification regulations (UL60950-1) the power supply must be a Limited Power Source (LPS) or NEC Class 2 or CEC Class 2 that cannot exceed 100VA.

According to UL60950-1, if a copper PROFIBUS cable is used outside, it is required to install surge protection that is suitable for PROFIBUS.

To comply with UL certification regulations the ProfiHub B2+ is to be used on altitudes under 2000 m.

Contents

1 Product Description

ProfiHub B2+ is an advanced, flexible and robust network component for PROFIBUS DP installations, to create backbone structures and long multi-device star/tree segments.

PROFIBUS DP is a high speed communication bus that must comply with strict rules concerning spur lines, because of possible reflections that could lead to communication disturbances. If spur lines or star segments are required, costly investments in repeaters have to be done. When redundancy is enabled, the ProfiHub B2+ is transformed to a low cost extremely reliable redundant repeater solution.

The innovative ProfiHub B2+ is the perfect component for such applications. It is an economic solution to realise reliable spur lines in high speed DP networks. They have the functionality of **2 galvanic isolated transparent repeaters** (offering 3 segments). This allows network structures with extended spur lines that individually can handle a maximum of 31 devices and a length equal to the main bus. **The ProfiHub B2+ refreshes a received message on one Channel and transfers it to the other Channels (chicken foot topology).**

Because the ProfiHub B2+ creates isolated segments, the devices can now be removed and added during operation. Also most electrical bus problems and EMC disturbances in a spur do not spread to the other segments. The intelligent logic and isolation circuits of the ProfiHubs do not change the bit width. This means the ProfiHubs do not have limitations in serial placement. The logic also detects the transmission speed automatically.

To assist the installation work, termination is integrated and can be switched on/off. The grounding concept is also selectable: direct or capacitive grounding. The ProfiHubs are powered by a 12 to 24 DC Voltage. For troubleshooting, maintenance and commissioning the ProfiHubs are equipped with LEDs on the outside, which indicate the status of each Channel (Data and Error).

If bus redundancy is enabled, 2 segments will form a redundant pair which is completely compatible with the ABB RLM01. An alarm contact is linked to events based on the status of the power supply and the bus redundancy status.

Fig. 1 - ProfiHub B2+

1.1 Product Features

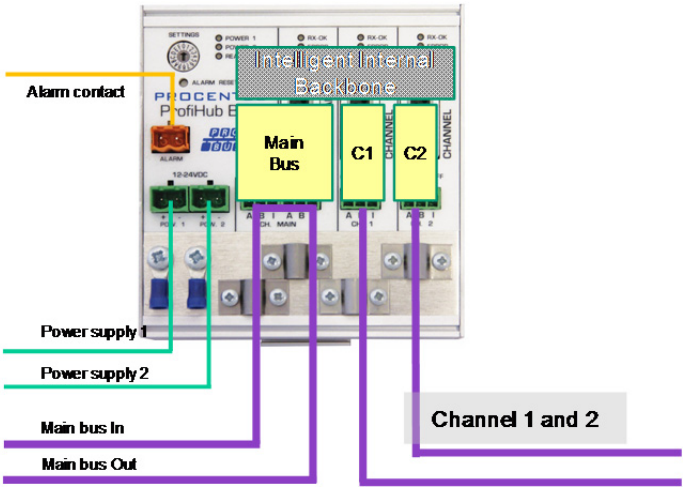

Fig. 2 - ProfiHub connections

- 2 Galvanic isolated outgoing channels (repeater segments).
- Transparent for all **PROFIBUS DP protocols.**
- **DP - RS 485 specifications** for each channel.
- **Cable redundancy** for channel 1+2
- **9.6 Kbps to 12 Mbps**.
- **31 devices** per channel.
- **1200 m spur line length** (depends on transmission speed).
- **Redundant** power supply
- No limit in serial placement or cascading of ProfiHubs.
- Alarm contact, with manual reset button.
- No address required.
- Integrated termination facilities (switches).
- Configurable grounding system (direct or capacitive).
- **IP 20** classification
- **Increased** temperature range
- **DNV / offshore** Certification ***(request pending, to be removed on approval)***
- **UL** approval ***(request pending, to be removed on approval)***

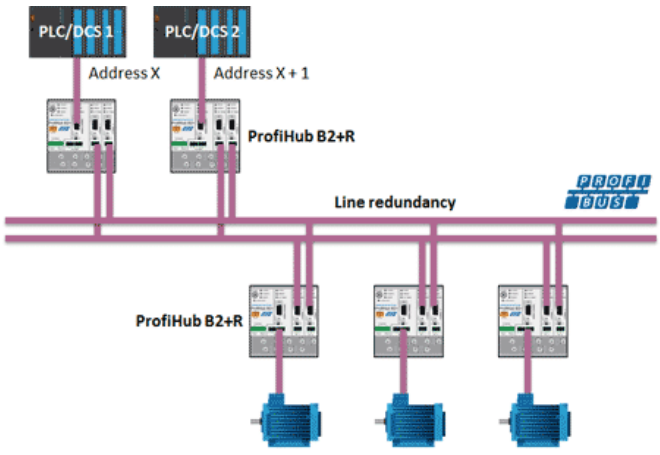

Fig. 3 - If bus redundancy is enabled, 2 segments will form a redundant pair. Short circuit protection on each spur line is automatically provided.

1.2 Application areas

- Dynamic spur lines to actuators, flow meters and pH analyzers.
- Removable drives and motors.
- Pull/Plug motor control centers (drawers).
- Roof mounted devices in tank farms.
- Barrier for non-galvanic isolated equipment.
- Networks with requirement for High Availability/uptime
- Large star/tree structured networks.

1.3 Additional Benefits

- Create a **redundant path** to other Hubs or COMbricks
- Hot slave **insertion and removal** during operation.
- **Short circuit protection** on each Channel.
- Compact and robust construction.
- Status and error display (per Channel).
- Suitable for all DP cables.
- Conveniently arranged networks.
- Easy extendable installations.
- On-board DB9 female connector on each channel for maintenance activities.
- Cost Savings.

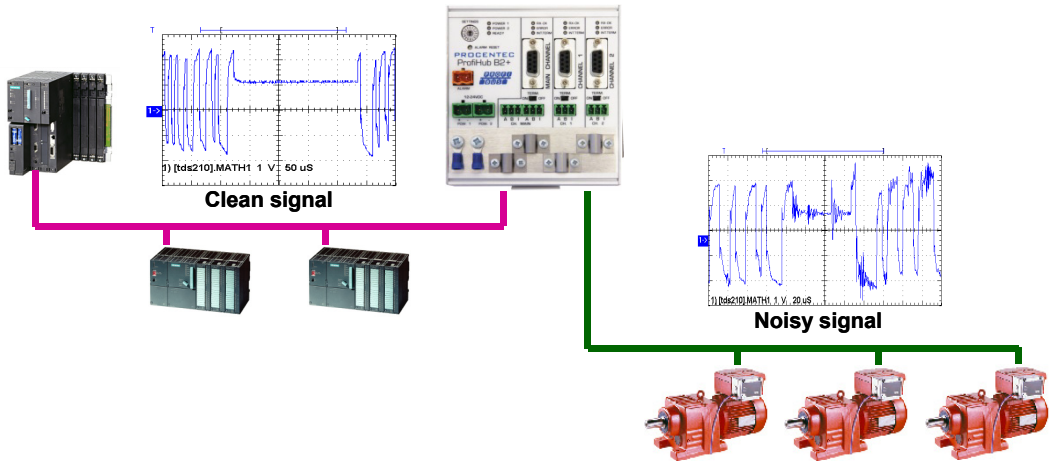

Fig. 4 - Because of the isolation and intelligence the ProfiHub provides, it can be used as a barrier for electrically sensitive segments. This keeps the backbone and other Channels clean.

1.4 Channel Structure

Each Channel is electrically isolated and internally connected to the transparent intelligent backbone. The termination is switchable and powered by the ProfiHub. The shielding of the PROFIBUS cable can be directly grounded or indirectly grounded (see the next paragraph).

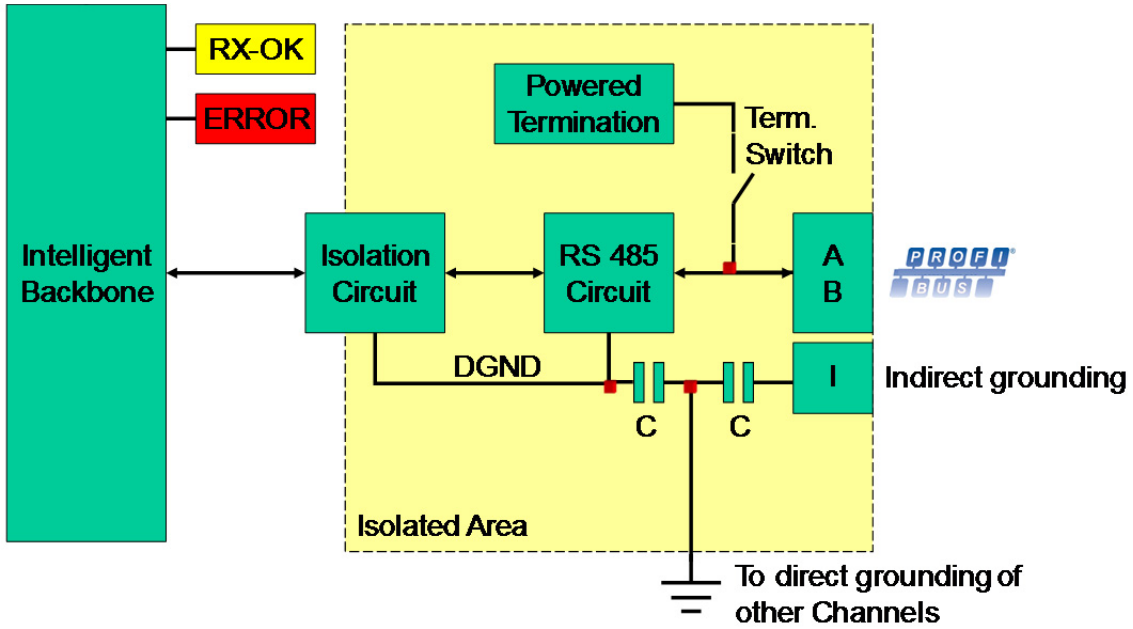

Fig. 5 - Channel structure

1.5 Grounding System

The ProfiHub B2+ can be grounded by 3 methods:
1) Direct grounding on the Ground Rail
2) Indirect grounding (through a capacitor)
3) Combination of direct and indirect.

The power supply must be grounded directly on the Ground Rail. The shielding of the PROFIBUS cables can be directly or indirectly grounded. If you do not want to ground all or some cables to the common ground, i.e. compensating current, the cable shielding must be connected to pin 'I' which stands for Indirect grounding. A capacitor with a parallel high value resistor will separate the 2 potentials (**Fig. 5**), ensuring protection of the signal against non-DC disturbances.
If by accident on 1 channel the Direct Grounding is connected with the Indirect Grounding, the connection to the Direct Grounding bypasses the capacitor in the Indirect Ground connection. The current on the shield will flow to Direct Ground.

1.6 Cable lengths for PROFIBUS DP

The cables on the Channels and the Main-Channel must comply with the PROFIBUS DP cable specifications for RS 485 (**Fig. 6**).

Baudrate (kbit/s)	9.6	19.2	45.45	93.75	187.5	500	1500	3000	6000	12000
Segment length (m)	1200	1200	1200	1200	1000	400	200	100	100	100
Segment length (feet)	3940	3940	3940	3940	3280	1310	656	328	328	328

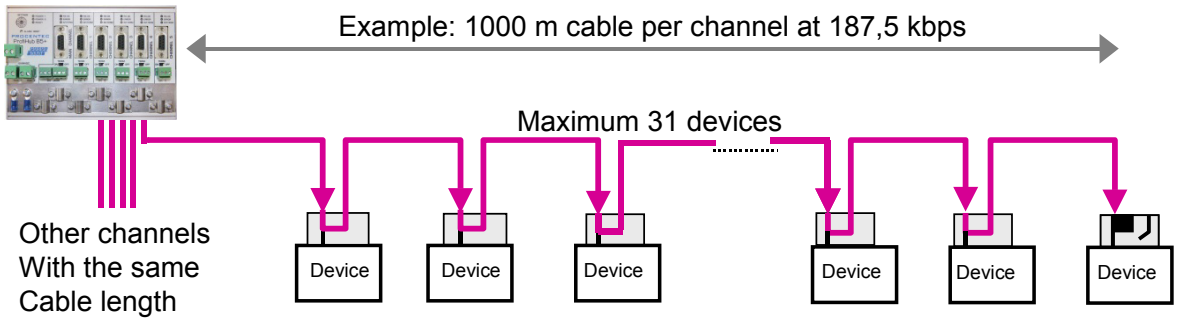

Fig. 6 - Cable lengths for PROFIBUS DP

1.7 Cable types for PROFIBUS DP

The cable type must comply with the PROFIBUS DP cable specifications for RS 485 (**Fig. 7**).

Parameter	Value
Wires	2 (twisted)
Impedance	135 .. 165 Ohm at 3 to 20 MHz
Capacity	< 30 pF/m
Loop resistance	< 110 Ohm/km
Wire diameter	> 0.64 mm
Wire area	> 0.32 mm^2

Fig. 7 - PROFIBUS DP cable specifications

The ProfiHub B2+ can handle cables based on multiple protection sheaths with an overall cable diameter between 6 to 12 mm (**Fig. 8**).

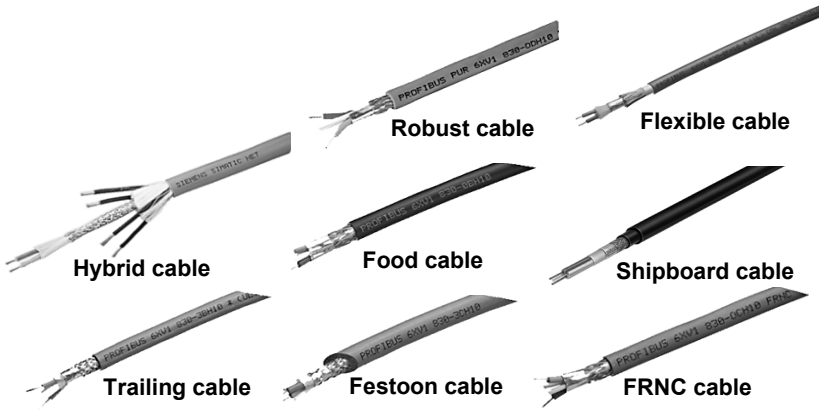

Fig. 8 - Cables with different protection sheaths.

1.8 Status LEDs

The Status LEDs on the ProfiHub are very useful for diagnostics.

	OFF	Blinking	ON
POWER 1 / 2	😐 Power is not switched on or an internal failure.	☹ Power supply not stable, redundant power supply interrupted or an internal failure.	☺ Power supply OK.
READY	😐 Power is not switched on or an internal failure.	☹ Trying to detect the transmission speed, but has not locked it yet.	☺ The transmission speed has been detected.
Main RX-OK	☹ No communication detected on the Main-Channel.	☺ 1 or more devices communicating on the Main-Channel.	☺ 1 or more devices communicating on the Main-Channel.
Main ERROR	☺ No problem has been detected.	☹ Problem in the cabling has been detected (Main Channel).	☹ Problem in the cabling has been detected (Main Channel).
Channel RX-OK	😐 There is no communication detected (on this Channel).	☺ 1 or more devices communicating (on this Channel).	☺ 1 or more devices communicating (on this Channel).
Channel ERROR	☺ No problem has been detected.	☹ Problem in the cabling has been detected (on this Channel).	☹ Problem in the cabling has been detected (on this Channel).
INT. TERM	Termination for this channel is OFF.	Internal failure.	Termination for this channel is ON.

2 Installation Instructions ProfiHub B2+

2.1 Location

The ProfiHub B2+ can be installed everywhere in a non-hazardous area that complies with IP 20 (DIN 40 050) and the specified temperature range of -25 to +70° Celsius or -13 to +158° Fahrenheit.

2.2 Position

The ProfiHub B2+ can be installed in every position, but it is recommended to install it with the cables pointing down. In this position it is also easier to read the status LEDs.

2.3 Mounting

The ProfiHub B2+ can be mounted on 35 mm DIN-rail with a minimum width of 167 mm. Mounting brackets are available for mounting the B2+ directly on a wall.

The supplied rubber studs need to be placed on the back of the housing of the ProfiHub B2+ for extra fixation. This is to prevent the product to potentially slide off the DIN-rail. See **Fig. 9** for an example.

Fig. 9 – Rubber studs on backside of housing

2.4 Power Supply

The two 2-pin screw type power connectors are located on the left of the ProfiHub B2+ (**Fig. 10**).
1 = **+** (left)
2 = **-** (right)

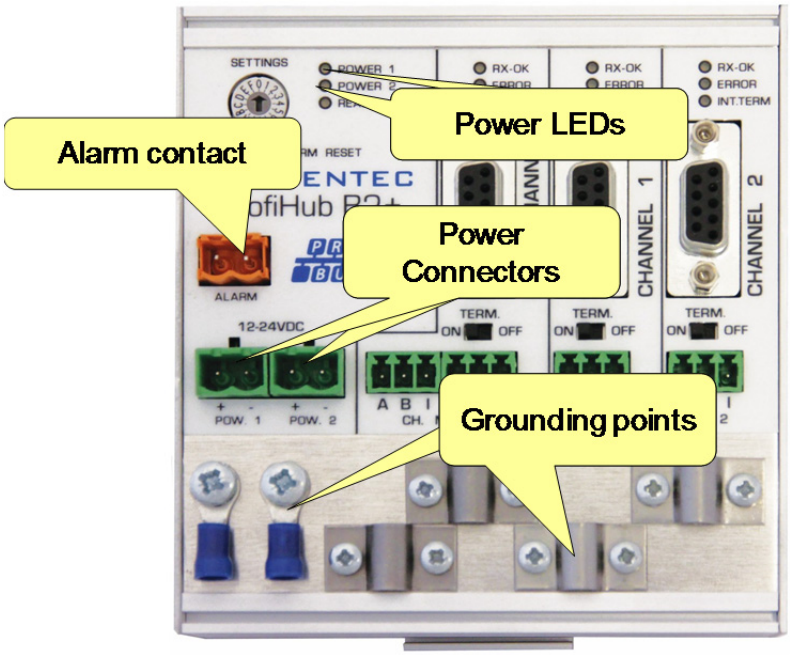

Fig. 10 - Power connectors and LEDs

Both power connectors are linked 1-on-1 to the internal power supply of the B2+. If one power supply fails, the other takes over without delay time. When redundancy is not required, it is sufficient to use one power connector. Please note that when using only one power supply, a voltage of max. 0.25 V will exist on the other unconnected power connector, like shown in **Fig. 11**.

If only one power supply is used, the alarm contact is closed. If two power sources are connected, the contact is open. As soon as one of the power supplies fails, the contact will close and the Power Indicator LED will blink.

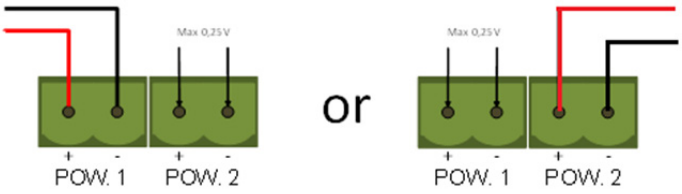

Fig. 11 – Maximum voltage on unconnected Power Connector

The power supply must comply with the following specifications:
- Limited Power Source (LPS) or NEC Class 2 or CEC Class 2
- Voltage: **12 - 24 VDC**
- Current: **min 275 mA**
- Wire diameter: **< 2.5 mm²**

Procedure
To connect the 24V supply to the 2-pin screw-type terminal, proceed as follows:
- Strip the insulation from the cable or the conductors for the 24V power supply.

- Add cable crimp terminals/wire ferrules to the conductors.
- Secure the crimp terminals in the screw-type terminal.

To connect the power supply, you need a 3 mm screwdriver.

Testing
If the power is switched on it can be diagnosed by the following indicators:
- LEDs should be blinking in a circular animation for a short time.
- The POWER LED of the respective power connector (1, 2 or both) is ON.
- The READY LED is ON or Blinking, depending on baud rate lock.

2.5 Grounding of the power

It is recommended to use a power supply with a ground lead (3-wire). Connect the ground lead of the power lead to the Ground Rail of the ProfiHub B2+. Connect the Ground Rail to the common ground with a separate ground lead. See **Fig. 12** for an example.

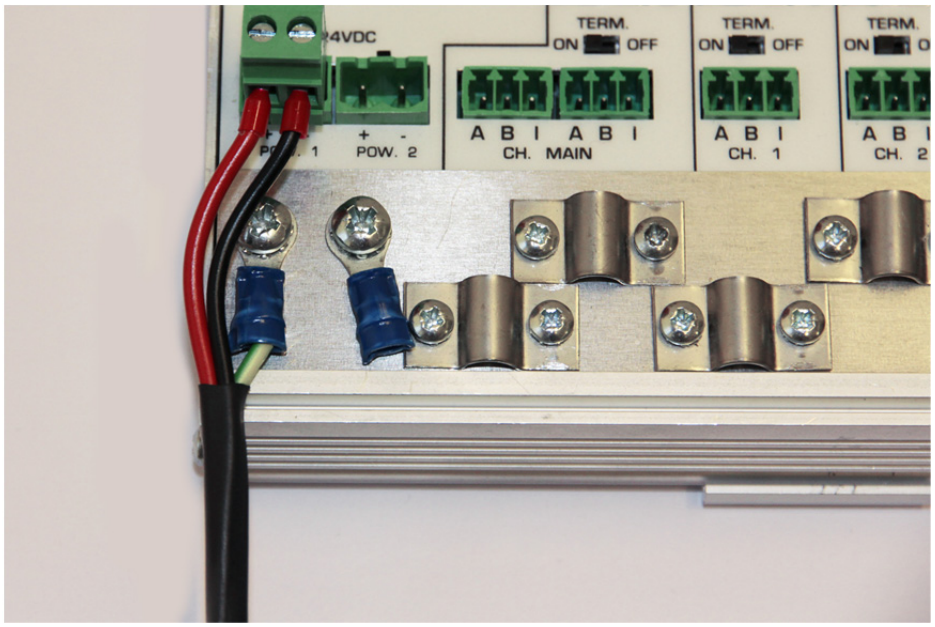

Fig. 12 – Connection to Ground Rail

2.6 Alarm contact

The ProfiHub B2+ features a potential-free relay contact. This alarm contact can be used to monitor the power supplies. Example applications are: Connect a LED tower, alarm buzzer, SMS server or use it as a digital signal for the PLC.

If only one power supply is used, the alarm contact is closed. If two power sources are connected, the contact is open. As soon as one of the power supplies fails, the contact will close and the Power Indicator LED will blink.

In the case of an interrupted power supply you can reset the contact by pressing the ‘Reset’ button. The contact will open and the LEDs will stop blinking.

The maximum power to be connected to the alarm contact is 24 VDC. The maximum switching current is 500 mA.

2.7 Backbone

Connect the DP backbone cable to the bottom-left connector of the Main-Channel (**Fig. 13**). If the ProfiHub is not the last device on the bus segment, connect the Bus-Out cable to the right connector of the Main-Channel (**Fig. 13**). The second method is to place a PROFIBUS standardized plug with an in/out cable on the DB9 connector.

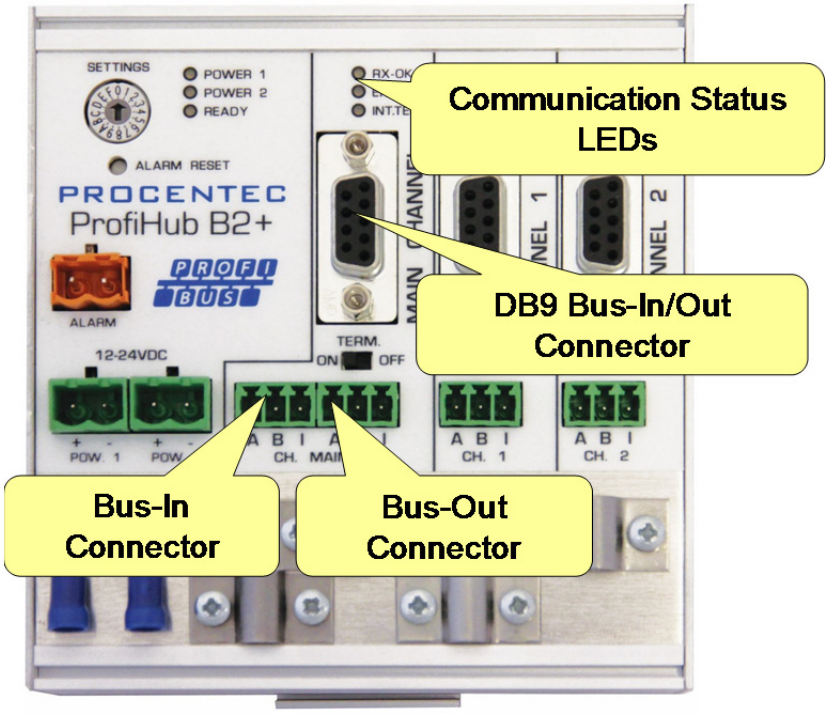

Fig. 13 - PROFIBUS DP backbone connection

Pin layout of the screw terminals:
Pin “A”: Green wire
Pin “B”: Red wire
Pin “I”: Indirect cable shielding
Note: Connecting the Indirect cable shielding is not required when the ground clips are used.

Testing
- If the Main-Channel recognizes valid PROFIBUS messages from one or more connected devices, the RX-OK LED of the Main Channel should be blinking.

2.8 Spur Segments

Connect the spur segments to the connectors of Channel 1 to 5 (**Fig. 14**). The second method is to place a PROFIBUS standardized plug on the DB9 connector of the specific Channel.

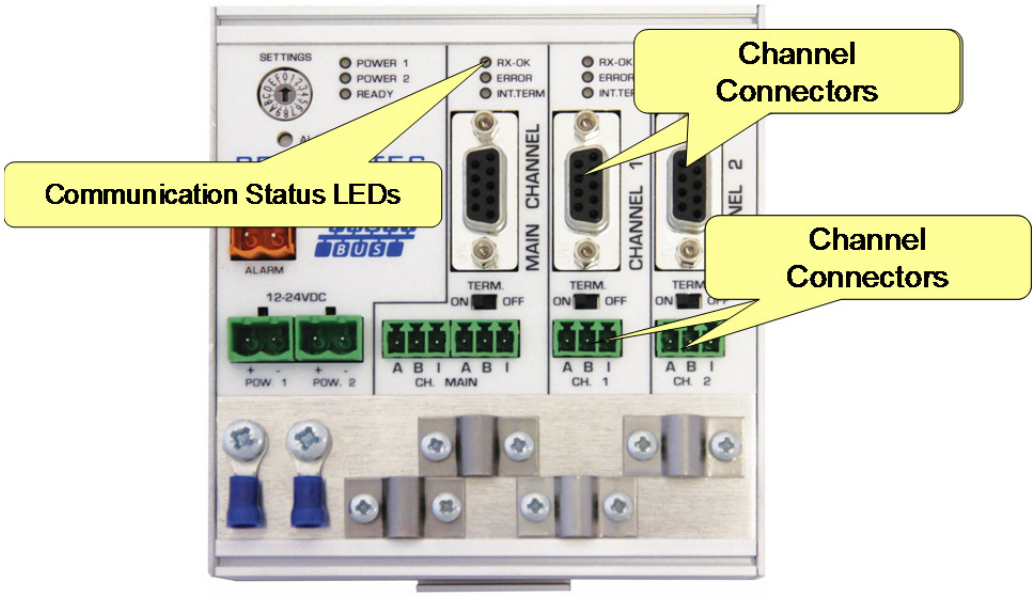

Fig. 14 - PROFIBUS DP spur connectors

Pin layout of the screw terminals:
Pin “A”: Green wire
Pin “B”: Red wire
Pin “I”: Indirect cable shielding
Note: Connecting the Indirect cable shielding is not required when the ground clips are used.

Testing
- If a Channel recognizes valid PROFIBUS messages from one or more connected devices, the RX-OK LED of the Channel should be blinking.

2.9 Termination

The termination of the Main-Channel has been set to OFF by default. If the ProfiHub is the last device on the segment, the termination must be set to ON (**Fig. 15**).

The termination of the Channels have been set to ON by default, because it is assumed that the new segment is started at the ProfiHub (**Fig. 15**).

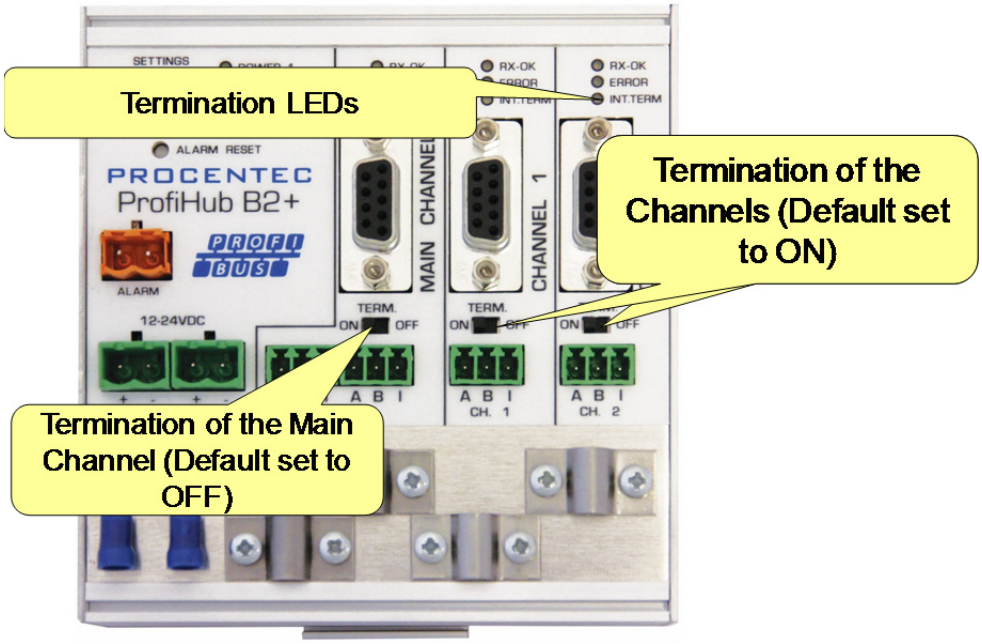

Fig. 15 - Termination Switches

The termination LED of the corresponding Channel is activated when the termination switch is set to ON.

When the DB9 connector is used and the cable starts at the ProfiHub, it is recommended to use the termination on the DB9 plug and NOT the ProfiHub. This way, the connector can be removed while maintaining termination on the bus.

2.10 Baudrate switch

The ProfiHub B2+ recognizes the transmission speed by default. If it is required that the ProfiHub B2+ is locked to a certain transmission speed, the baudrate switch should be set to the required value (**Fig. 16**).

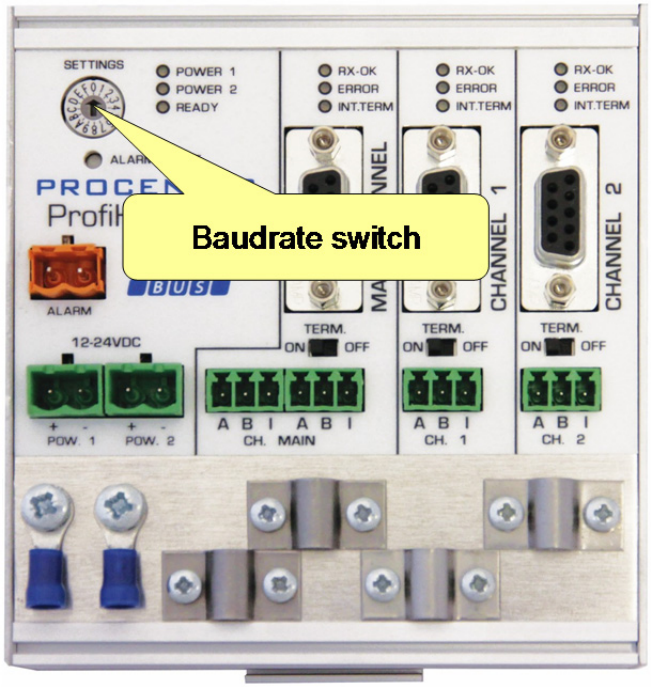

Fig. 16 - Baudrate speed switch

To set the rotary switch, use a 3 mm screwdriver.

Switch values:
0 = Normal repeating, Auto detect (**default**)
1 = 9.6 kbps
2 = 19.2 kbps
3 = 45.45 kbps
4 = 93.75 kbps
5 = 187.5 kbps
6 = 500 kbps
7 = 1500 kbps
8 = 3000 kbps
9 = 6000 kbps
A = 12000 kbps
B = Robust repeating, Auto detect
C = Robust repeating, redundancy on channel 1 and 2
D .. F = Reserved for future use

Please note that the position of the rotary switch is only sampled during start-up. Changing the position of the switch will not have effect during operation.

The auto baudrate detect feature will search for the correct baud rate within 10 seconds of receiving the first telegram. This baud rate lock will be lost after 50 seconds of incorrect or no message reception.

In robust repeating mode, only messages starting with a valid PROFIBUS start delimiter are repeated (SD1, SD2, SD3, SD4 and Short Acknowledge). In Normal mode, every bit is transferred immediately onto the other channels.

2.11 Channel Redundancy

To use the Redundancy option of the B2+, set the rotary switch to the 'C' position.
This enables the two channels (1 and 2) to be one redundant path to another B2+, to a B5+, a redundant COMbricks or to any other supporting product. See **Fig. 17** for an example.

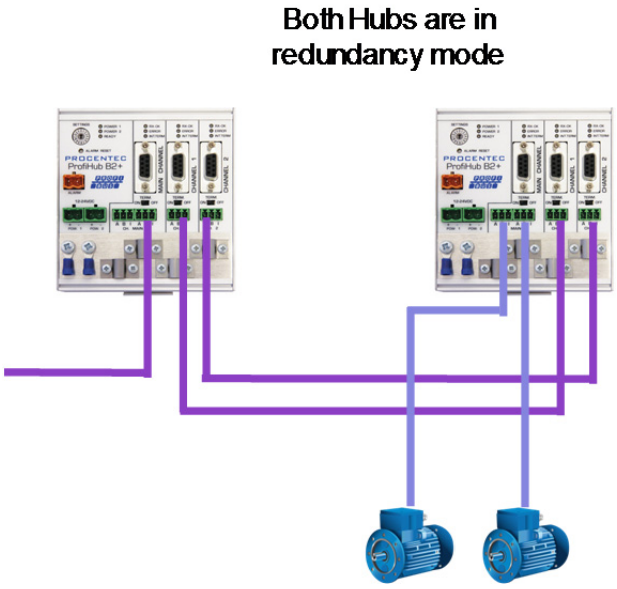

Fig. 17 - Redundant path between two ProfiHubs

The telegrams are transferred onto both redundant channels. The logic inside the ProfiHub determines which telegram is used to be transferred onto the other channels. A message received by a redundant channel is repeated on all other channels, except the other redundant channel. A message received by a normal channel is repeated on all other channels.

When one redundant cable breaks, the other cable ensures safe delivery of the telegram. In this event the built-in alarm contact will close. The red 'ERROR' LED will blink with an interval of 100ms. When the redundant path is fixed, press the 'ALARM RESET' pushbutton to reset the alarm.

ATTENTION:
Using the ProfiHub B2+ in Redundancy mode causes a delay in processing the telegrams. When used together with COMbricks in redundancy mode it is required to increase the default MinTSDR in the PLC bus parameters slightly. Recommended is to increase the MinTSDR with a value according to this table:

3 Technical Data ProfiHub B2+

Technical Data ProfiHub B2+	
Dimensions and weight	
Dimensions L x H x D (mm) with screws Weight	102 x 111 x 32 mm Approximately 320 g
Ambient conditions	
Operating temperature Isolation class	-25 to +70° Celsius -13 to +158° Fahrenheit IP 20 (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 Transmission speed detection Transmission speed switch	9.6 kbps to 12 Mbps (including 45.45 kbps) Auto detect (default) or selectable with rotary switch 0 = Normal repeating (Auto detect) (default) 1 = 9.6 kbps 2 = 19.2 kbps 3 = 45.45 kbps 4 = 93.75 kbps 5 = 187.5 kbps 6 = 500 kbps 7 = 1500 kbps 8 = 3000 kbps 9 = 6000 kbps A = 12000 kbps B = Robust repeating (auto detect) C = Robust repeating, redundancy on channel 1 and 2 D .. F = Same as 0
Transmission speed detection time	< 10 s (if it is set to auto detect)
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

Technical Data ProfiHub B2+	
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
Cable thickness Wire diameter Wire type	10 mm (when the ground rail is used) < 2.5 mm^2 Stranded or Solid core
Number of devices	Maximum 31 per Channel (including ProfiHubs, OLMs, Laptops/PCs, etc)
Termination	Integrated and switchable. Powered according to IEC 61158 (390/220/390 Ohms) - All Channels (default on) - Main-Channel (default off)
Cascading depth Redundancy	No limits Yes
Power supply specifications	
Nominal supply voltage Redundant power supply	12 to 24 VDC Yes
Current consumption	Min 275 mA at 12 V power supply (all Channels fully loaded)
Reverse polarity protection Cable thickness Wire diameter	Yes 10 mm (when the ground rail is used) < 2.5 mm^2
Alarm contact	
Voltage Current	Max. 24 VDC 0.5 A
Others	
MTBF	T.b.d.

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5 Order codes

Component	Order code	Remarks
 **ProfiHub B2+**	17210R	ProfiHub B2+ With redundant channels With Alarm contact With redundant power input

6 Glossary

Address	Unique number of a device connected to the network. With PROFIBUS this can be 0 to 126. 127 is a broadcast address.
Analyzer	Software tool to observe the protocol traffic. Combi-Analyzers can also inspect the signal quality. Other term: Bus Monitor. Example: ProfiTrace.
Backbone	The primary bus cable. Most of the time only the control systems, ProfiHubs and fiber optic couplers are connected to this cable. The field devices are connected behind the ProfiHubs and fiber optic couplers.
Bit Time (Tbit)	The bit time Tbit is the time, which elapses during the transmission of one bit. It depends on the baudrate and is calculated as follows Tbit = 1 (bit) / baudrate (bps). Examples: 12 Mbps --> Tbit = 83 ns 1.5 Mbps --> Tbit = 667 ns
Busparameters	Settings that define the timing behaviour on the bus. They are defined in the master. Examples: Tslot, MaxTSDR.
C	Capacitance.
DGND	Digital Ground.
DIN	German Institute for Standardization (www.din.de).
DP-V0	DP-V0 is the basic stage of the PROFIBUS DP communication protocol. DP-V0 devices (master and slaves) perform the following basic functionalities: - Cyclic exchange of I/O data between controlling and slave devices - Device, Identifier (module) and Channel related Diagnosis - Parameterization of DP-slaves - Configuration of DP-slaves
DP-V1	DP-V1 is the first stage of extension of PROFIBUS DP after DP-V0. DP-V1 devices shall comply with the following features: - Device related diagnosis is replaced by status and alarms. - The first three octets of the user parameterization data are now standardized - Optionally these devices may support: - Acyclic communication (MS1, MS2) - If alarms are used, MS1 shall be supported

DP-V2	DP-V2 is the second stage of extension of PROFIBUS DP after DP-V1. DP-V2 devices shall comply with the following features: - Data Exchange Broadcast (DxB) for slave to slave communication (publisher/subscriber principle). - Isochronous Mode (time tick synchronized operating slaves, e.g. drives) - Up- and/or download of Load Region Data (domains) - Clock Control (synchronization within slaves) and Time Stamping - Redundancy.
Electromagnetic Compatibility	*See EMC.*
EMC	The extent to which an electric or electronic device will tolerate electrical interference from other equipment (immunity), and will interfere with other equipment. Within the European Community as well as in other countries it is regulated by law that electric and electronic components and equipment comply with basic standards such as IEC 61000-6-2 or IEC 61326 or corresponding individual product standards.
Hub	A Hub refreshes a signal and passes the information on to all nodes which are connected to the Hub. Data frames which were received on one port are transferred to all the other ports (chicken foot topology).
MPI	Multiple Protocol Interface. Protocol defined by Siemens which uses the layer 1 and 2 of PROFIBUS (FDL).
PCB	Printed Circuit Board.
PROFIBUS DP	Acronym for "PROFIBUS for Decentralized Peripherals". Specification of an open fieldbus system with the following characteristics: - Polling master-slave-system (cyclic communications, MS0) - Flying masters with robin round token passing coordination (MM) - Connection based (MS1) and connectionless (MS2, MS3) acyclic communication between masters and slaves Options (e.g.): - Data exchange broadcast (DXB), i.e. slave to slaves communication - Isochronous mode of slaves - Clock synchronization - Redundancy PROFIBUS DP is standardized within IEC 61158 and IEC 61784, communication profile families 3/1 and 3/2 The term "PROFIBUS DP" also is a synonym for the RS485 based deployments within factory automation.
Repeater	Active physical layer device that receives and retransmits all signals over a different port to increase the distance and number of devices for which signals can be correctly transferred for a given medium.
Spur line	A cable attached to a bus segment with a T-connection . Spurs are not recommended with PROFIBUS DP. They are prohibited with 12 Mbps and PROFIsafe operations. German term is "Stichleitung".

Stub line	See *Spur line*.
Tbit	See *Bit Time*.
Termination	A (powered) resistor network at both ends of a segment to prevent reflections (with PROFIBUS DP the termination must be powered).
Topology	In a communications network, the pattern of interconnection between network nodes; e.g. bus, ring, star configuration.
PI	PROFIBUS International. The International PROFIBUS Organization based in Karlsruhe.
PNO	PROFIBUS Nutzer Organization. The German PROFIBUS Organization based in Karlsruhe.
Drop cable	See *Spur line*.
Reflection	Part of the original signal that is transmitted back along the cable. It corrupts the original signal.

7 Certificates

QualityMasters
ISO Certificering

certificate

QualityMasters hereby declares that

Procentec B.V.
Wateringen

has a management system that meets the requirements of the standard

NEN-EN-ISO 9001:2008

for the scope

Providing training courses, technical support, product development and the exploitation of the test laboratory.

Date of original approval	10-02-2003
Date of issue	10-04-2013
Valid until	10-02-2016
Certificate number	NL 6313uk

On behalf of Stichting QualityMasters,

N.B. The failure to meet the conditions as set forth in the certification agreement, or non-compliance with the given standard and/or guidelines, may lead to the suspension or cancellation of the certificate.
This certificate remains the property of Stichting QualityMasters, Nieuwland Parc 157, 3351 LJ Papendrecht.

PI PROFIBUS • PROFINET

Certificate
for a PI Competence Center

PI confirms that

PROCENTEC
Dennis van Booma
Turfschipper 41
2292 JC Wateringen
THE NETHERLANDS

is a fully accredited PI Competence Center for
PROFIBUS basic
PROFIBUS PA.

This certificate is granted according to the Quality of Services Agreement for PI Competence Centers and is valid until December 31, 2013.

(Official in Charge)

Chairmen of PI

(Jörg Freitag, Chairman)

(Michael J. Bryant, Deputy Chairman)

PROFIBUS

PI
PROFIBUS • PROFINET

Certificate

Authorization as PI Test Laboratory for PROFIBUS

PROFIBUS Nutzerorganisation e.V. accepts
PROCENTEC
Turfschipper 41
2292 JC Wateringen
The Netherlands

as authorized PI Test Laboratory for:

PROFIBUS Slave Devices

PA Profile Devices

The authorization is based on the assessment dated March 20, 2013, and the related assessment report.

The execution of the tests aimed in the PROFIBUS certification shall be conform to the PROFIBUS Standard and the valid guidelines.

This authorization is valid until December 31, 2014.

(Official in Charge)

Board of PROFIBUS Nutzerorganisation e. V.

(K. Schneider) (K.-P. Lindner)

PROFIBUS®

8 Revision History

Version 1.0
- First release.

9 Next versions

10 Notes

Other PROCENTEC products

PROFINET Cable Tester

- ✓ Suitable for 4- and 8-wire PROFINET and regular Ethernet cables.
- ✓ Suitable for straight and 90°, metal or plastic PROFINET plugs.
- ✓ Tests cable shielding!
- ✓ Detects short circuits, wire breaks, swaps, miswiring and split pairs.
- ✓ Large LCD clearly indicates the test results.
- ✓ 150 hours on one 9 V battery.
- ✓ Operating temperature: 0 to 50 °C.
- ✓ Just 1-key-press to start continuous testing.
- ✓ It can also test telephone and coax cable.

www.profinetcabletester.com

Compact PROFIBUS Repeater

- ✓ Single channel PROFIBUS repeater.
- ✓ Transparent.
- ✓ Latest RS 485 technology.
- ✓ Max. 12 Mbps.
- ✓ Auto baudrate detection.
- ✓ Redundant power supply.
- ✓ Digital glitch filtering.
- ✓ No limit in cascading.
- ✓ Integrated switchable termination.
- ✓ Diagnostic LEDs.
- ✓ DB9 connector for measurements.
- ✓ **IP 20 with DIN-rail mounting.**

www.procentec.com/profihub/b1/en