Installation Instructions

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MV0512-0002b-E

Data Transmission System POWERTRANS® Ib

Order Number
0512xx-...

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Assembly and starting operation

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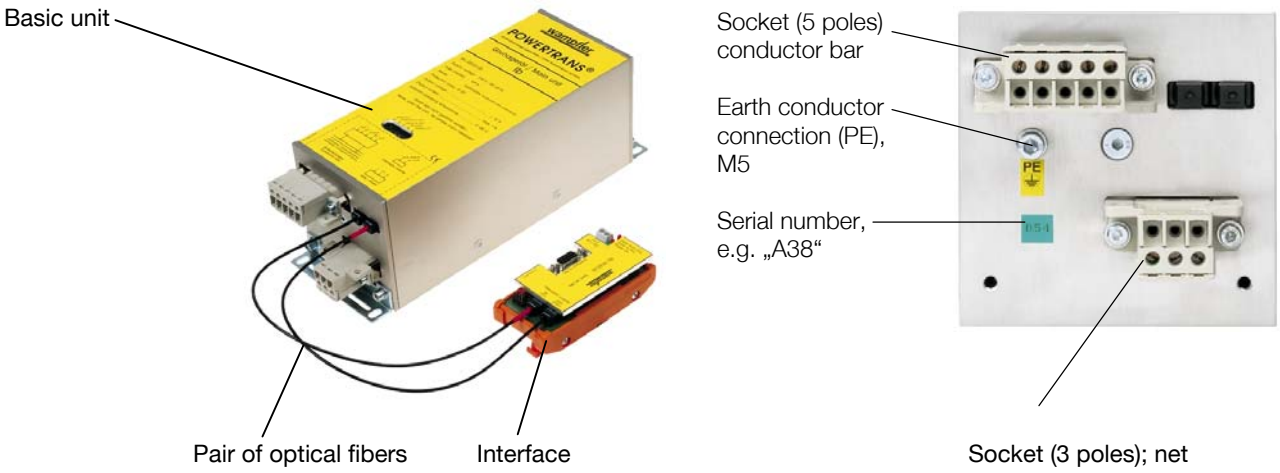
Volume of delivery

Please verify immediately if the material has been delivered completely. The relevant document is the advice note.

- 1 basic unit with socket (3 poles) for the voltage supply and socket (5 poles) for the conductor bar connection. 2 pc support bracket with fasteners are enclosed loose.
- 1 interface
- 1 pair of optical fibers pre-manufactured

One functional unit POWERTRANS® Ib includes the following standard elements:



Transport damage

Transport damage can only be claimed if the supplying company is advised immediately.

Please enclose the following documents to your return shipment:
- Company, contact and address
- Order and serial number
- Description of the failure

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Personal security

- Switch off all units/machines/systems that are affected by the assembly
  Disconnect these units/machines/systems from the power supply if required.
- Control the correct operation of the safety systems (e.g. emergency stop buttons)
- Install warning signs if required, to avoid starting the operation unintentionally.
- A system must only be programmed and configured while it is not in operation!
- When starting the operation make sure to apply a voltage of ±70 V on the data cables!
- After having completed the mounting/repair works, carry out a test run of the systems and check the correct operation of the safety systems!
- Only release systems that work without any fault!
- We assume that you are familiar with the appropriate knowledge of mechanics and electricity!

Equipment security

- The data transmission system fulfills the quality requirements of ISO 9001.
- POWERTRANS® Ib units and accessories leave our company – with regard to safety technology - in a perfect condition.
- **Do not open the basic equipment and the interface!**
  Opening the case affects the operational security and voids the warranty!
- On POWERTRANS® Ib units the interface entry – and the conductor bar entry – are short-circuit proof.
- Place the data and current supply cables in such a way that none of the cables will be caught during operation and that no cable will be squashed, bent or damaged in any way.

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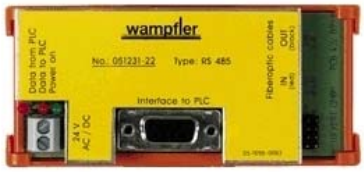
Fixation of the basic unit and interface

The support brackets of the basic unit can be fixed at the front or long side.
Basic unit and interface should be arranged in such a way that any interference from other components (e.g. frequency inverters or relay boards) will be prevented. We recommend a minimum distance of 100 mm.

Long-side fixation possibility for the support brackets



The interface must be fixed on a mounting bar TS 35 (cap bar).

Electric connection (also see standard connection diagram)

- For operation without interference we recommend equipping the supply system with a line filter and a differential current control unit.
- To assure continuity, even when the power supply plug is disconnected, the basic unit is equipped with an additional PE connector (M5). This is to provide a protection from electricity arcing from the conductor bar system in case of disturbance.
- The POWERTRANS® Ib unit presents a bus unit. The Sub-D, respectively DH+ connection on the interface component, is connected by a shielded cable according to the specifications given by the SPS manufacturer. In principle each bus segment has to be terminated on both ends. On Profibus applications for example, the bus terminators in the sockets have to be activated accordingly. On DH+ bus systems, the bus terminators have to be activated from “outside” as well.

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Shielding

Shielding is a method to reduce (damp) electromagnetic environmental influences.

Interference currents on cable shield are led off to ground over the shield bus that has a conductive connection to the ground conductor. In order to avoid that those interference currents might become a source of disturbance themselves, it is very important to provide a low-impedance connection to the protective conductor.
In general the shield of the cables should only be connected on one side. Only a one-sided connection of the shield will allow good interference suppression in high frequencies.

The shield of the data cable is connected according to the specifications of the corresponding SPS manufacturer (often at the socket case).

Operation signal

- Signaling by the four LEDs (POWER, DATA TO PLC, DATA FROM PLC and DIRECTION) shows, that there is a correct data exchange between the individual POWERTRANS® Ib units.
- Depending on the data transmission rate the LEDs will flash or shine permanently.

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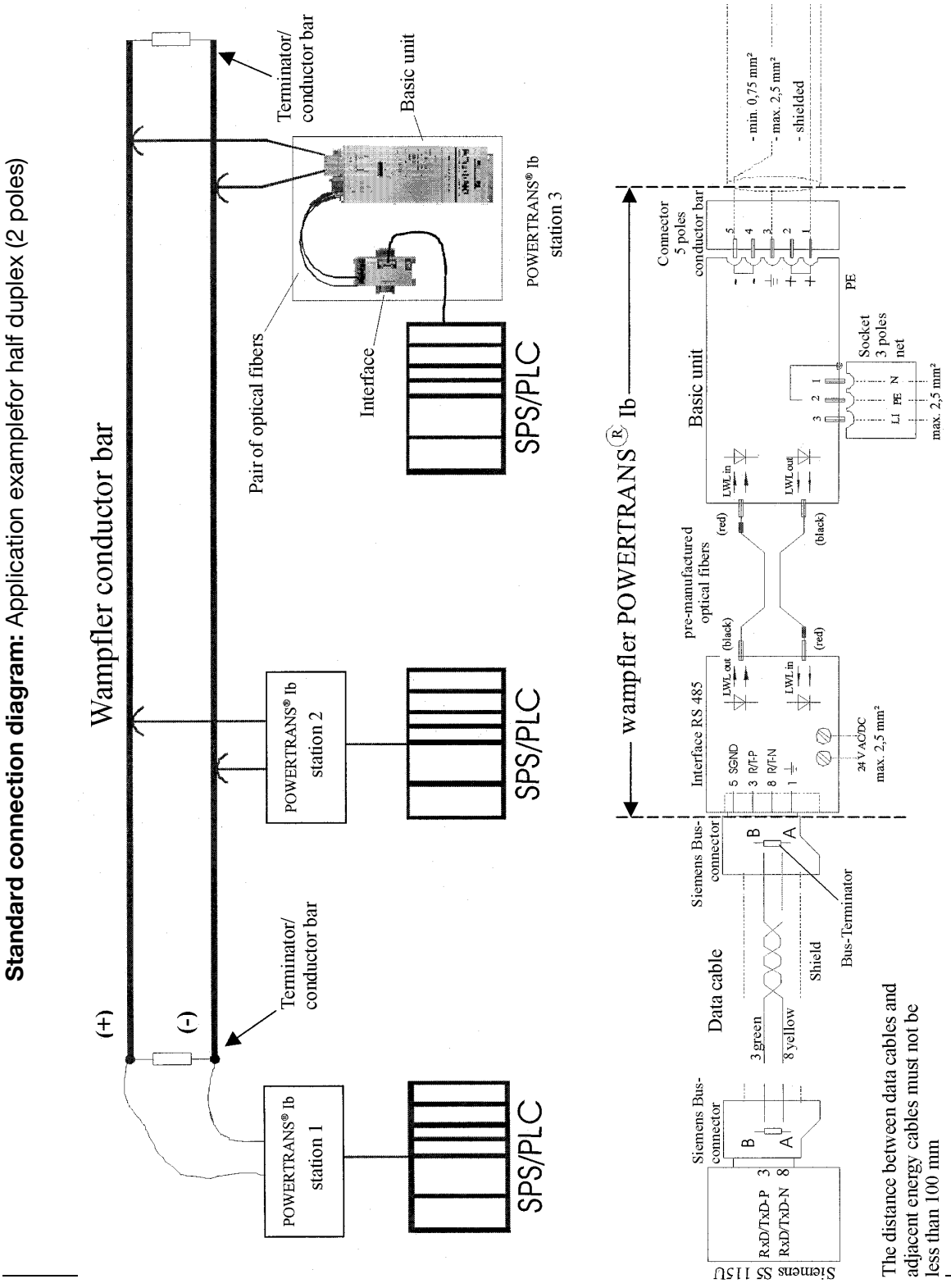
Standard connection diagram: Application examplefor half duplex (2 poles)



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Signals / (LED)

• Green	Power	Signifies voltage supply
• Red	Monitor	(not connected)
• Yellow	Data to PLC	Signifies data out: Data from POWERTRANS® Ib to SPS active
• Orange	Data from PLC	Signifies data in: Data from SPS to POWERTRANS® Ib active
• Red	Direction	Signifies the data flow Red shines → data flow from conductor bar to POWERTRANS® Ib Red does not shine → data flow from POWERTRANS® Ib to conductor bar

Signals / LED in case of disturbance

	Problem	LED at Master active	LED at Slave active	LED at Interface
Polarity reversal of cables	to the conductor bar at one or several POWERTRANS® Ib units	all are illuminated	data from PLC data to PLC	The same function as on the basic unit
	of the optical fibers at the master	data to PLC	data to PLC	
	of the optical fibers at the slave	all are illuminated	data to PLC data from PLC	
Interruption of cables	of the supply to the conductor bar at one or several units	all are illuminated	data to PLC	
	of the optical fiber from the **OUT** of the „Master-POWERTRANS® Ib“	all are illuminated	all are illuminated	
	of the optical fiber from the **IN** of the „Master-POWERTRANS® Ib“	data to PLC	data to PLC	
	of the optical fiber from the **OUT** of the „Slave-POWERTRANS® Ib“	data to PLC data from PLC direction	data to PLC data from PLC	
	of the optical fiber from the **IN** of the „Slave-POWERTRANS® Ib“	all are illuminated	data to PLC data from PLC	
	from the SPS at the „Master-POWERTRANS® Ib“	data to PLC	data to PLC	
	of the SPS at the „Slave-POWERTRANS® Ib“	all are illuminated	data from PLC data to PLC	

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Cause for disturbance

1. Voltage supply at the POWERTRANS® Ib basic unit/interface not available.
2. Data cable not properly connected.
3. Supply to the transmission medium not properly connected (check polarity reversal!).
4. Optical fiber not properly connected (check polarity reversal!).
5. Interruption in the transmission medium (when shutdown or in operation).
6. Terminators/conductor bar not connected.
7. POWERTRANS® Ib basic unit or interface module defective.

Elimination of disturbance

1. Check voltage supply.
2. Check data cable (position of poles, connection of shielding, connection of the bus-terminators according to the specifications of the SPS manufacturer).
3. Check supply to the conductor bar; connect shielding (see standard connection diagram).
4. See standard connection diagram.
5. Check transmission medium (e.g. conductor bars and conductors, couplers, feeding) for continuity. To short cut the transmission medium (e.g. conductor bar) the POWERTRANS® Ib unit can be directly connected to a two-wire cable for testing.
6. Control terminators at the beginning and end of the conductor bar.
7. Control equipotential bonding, voltage respectively current between „N“ and „PE“ must be „0“.
8. For testing of the interface module the two interface modules can be connected direktly (without the basic unit) by the fibre optic cable.
   For testing of the basic unit the two basic unit can be connected directly by cables instead of the conductor rail.

   Install replacement unit, order replacement unit at short notice if required.

Return defective unit for repair together with the following data:
- company, contact, address
- retour number
- order and serial number
- description of the fault

8. In general the transmission rate – depending on the application – should be chosen as low as possible. Adjusting the selection of response times and repeat times during the programming of the bus-system by the operator can secure its function in particular cases.

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Special requirements for DH+ Interface Module

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Recommendations for using the DH+ interface module:

1. Use at least 2 collectors on each data rail. In case of extreme or dirty environment 3 collectors are recommended. At least space for a third collector should be considered.

2. Use silver graphite collector shoes.

3. Use datametal conductor rails (stainless steel).

4. Do not use in extended temperature (beyond 0 to +50°C) or corrosive atmosphere environments.

5. Perform maintenance of collector arms, shoes and conductor rails according to the maintenance instruction of the used conductor rail type, at least every 3 month (dirty contacts and rails, contact wear, contact bounce).

6. Refer to A-B publication “Industrial Automation Wiring and Grounding Guidelines for Noise Immunity”, (Publication 1770-4.1).

7. Recommendations relating to DH+ cabling and products:
   - Limit baud rate to 57.6 K or 115.2 K
   - Limit DH+ cable length: 1000 ft at 115.2 K and 2000 ft at 57.6 K
   - Limit number of DH+ nodes to 16
   - Use 82 Ω terminators and daisy chain routing

   Note: Some older DH+ products are not compatible with 82 Ω including the following list:
   1771-KA, KA2, KF, KX1
   1773-KAA, KAB
   1774-KA
   1775-KA, GA, RM, S4A, S4B, SR
   1784-KS
   1785-KA3, -KE (Series A or B), -540
   8200 products

8. Error detection should be implemented by the application:
   The application program or ladder logic should continually monitor communication errors and retry status (error counts and retry counts) that is provided in A-B products. Errors and retries should not normally occur. If they do, maintenance should be performed as soon as possible.

9. A device should be programmed or configured only when the device is not moving on the rails.

10. No claims are made that this equipment is appropriate for any level of safety risks. Safety protection should be provided by the application design using appropriate independent means.

Note:

1. **“A-B”: Allen-Bradley brand of products from Rockwell Automation, a business of Rockwell International Corporation.**

2. **“DH+”, “Data Highway Plus”, Allen-Bradley” and “PLC” are trademarks of Rockwell Automation, a business of Rockwell International Corporation.**

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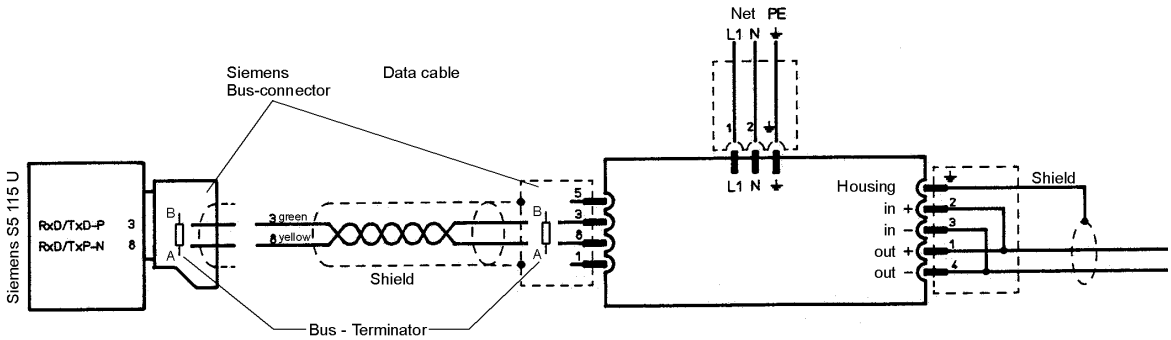
Compatibility between POWERTRANS® Ia and POWERTRANS® Ib

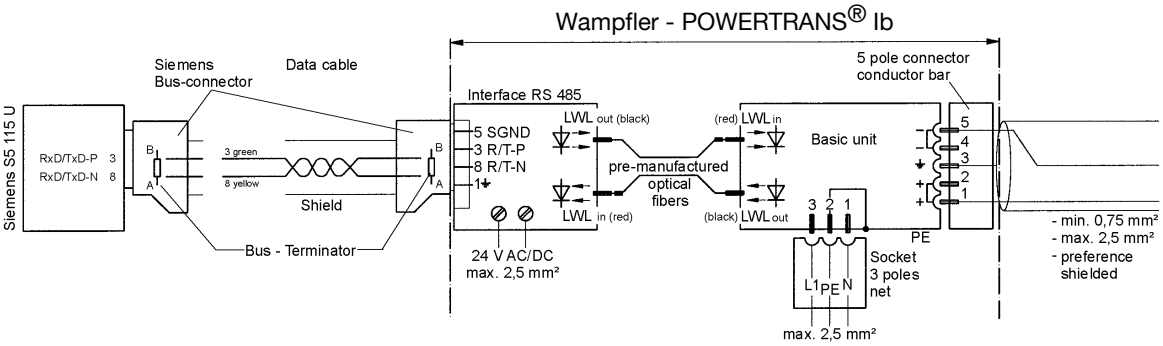
For replacement of POWERTRANS® Ia by POWERTRANS® Ib please refer to the following instructions:

1. Electrical wireing

POWERTRANS® Ia



POWERTRANS® Ib



POWERTRANS® Ib will replace POWERTRANS® Ia. POWERTRANS® Ib is electrically compatible but needs an additional 24 V AC/DC supply voltage for the interface unit.

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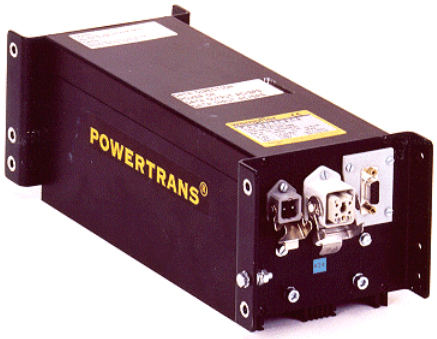
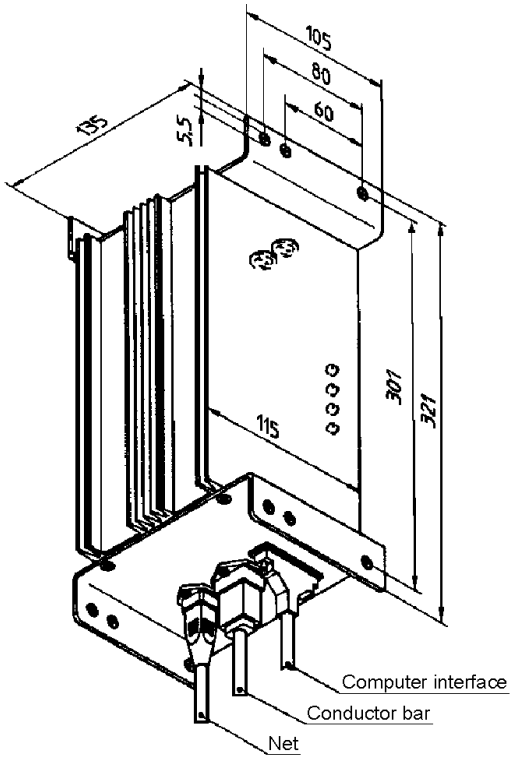
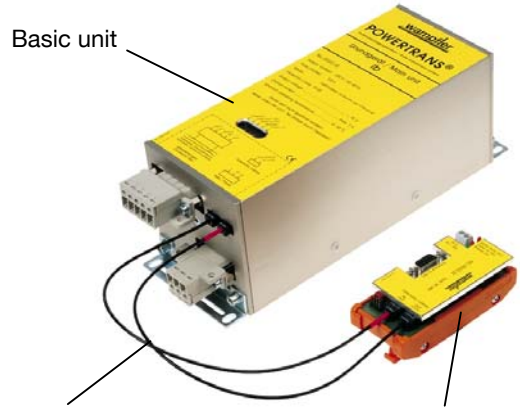
2. Installation and dimensions

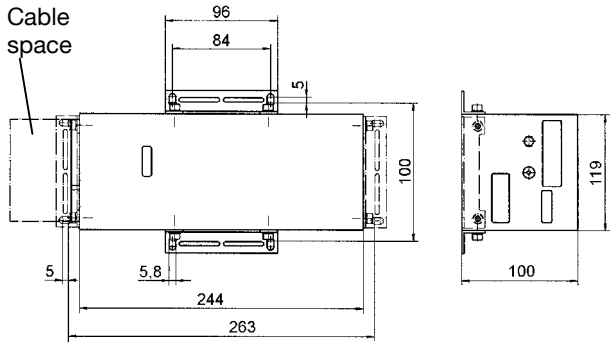
POWERTRANS® Ia



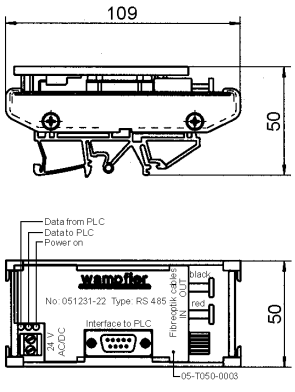


POWERTRANS® Ib





Basic unit



Interface

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3. Replacement

In case of the replacement of POWERTRANS® Ia by POWERTRANS® Ib please refer to the following procedure:

1) Switch off the power supply of all POWERTRANS® Ia units.

2) Disconnect the plug at the defective POWERTRANS® Ia unit, dismount the unit.

3) Check the size for the location for POWERTRANS® Ib basic unit und interface module (see 2. Installation and dimensions).

4) Install POWERTRANS® Ib basic unit and interface module and connect the fibre optic cables (see standard connection diagram).

5) Install the 24 V power supply for the interface module and connect it to the module (see standard connection diagram).

6) Cut the plugs of the cables (power supply and conductor rail) of the POWERTRANS® Ia unit and connect them to the plugs of the POWERTRANS® Ib basic unit (see standard connection diagram). Connect the plugs to the basic unit.

   Note: Adjustment of the data rate at the POWERTRANS® Ib is not necessary.

7) Connect the plug of the bus cable to the interface module. If the interface module is the last bus device switch on the bus terminator in the plug.

   Note: The bus terminator for the bus cable is intergrated in the POWERTRANS® Ia-unit. In the interface module of POWERTRANS® Ib the bus terminator is not integrated, therefore bus cables with intergrated bus termintor in the plugs have to be used.

8) Check the correct connection of all cables (respect to false polarity!).

9) Switch on power supply 24 V and 115/230 V.

10) Function controll by LED´s (see signals /LED).

Attention: The carry out of the replacement is only allowed by qualified and skilled electrical personnel!