Installation Recommendations for

PROFIBUS PA Cable
SPE Single Pair Ethernet
APL Cable

PURPOSE AND DISCLAIMER

This document is intended to support installers in the professional installation of PROFIBUS, SPE and APL cabling. The information contained is for informational purposes only and is subject to change. BizLink provides no warranty or liability for the accuracy of the information.

SAFETY INSTRUCTIONS

The importance of electrical safety during assembly is emphasized, including ensuring all cables are de-energized and damaged cables are replaced. When handling PROFIBUS, SPE or APL components, protective measures against electrostatic discharge (ESD) should be observed, such as touching grounded metal parts before handling.

FUNCTIONAL EQUIPOTENTIAL BONDING AND SHIELDING

These topics are covered in detail in the guideline “Functional Equipotential Bonding and Shielding for PROFIBUS and PROFINET” (Order no.: 8.101). The shield of the PROFIBUS, SPE and APL cable must be connected to the equipotential bonding system at various points, particularly at the PROFIBUS participant.

SYSTEMS WITH SAFETY TECHNOLOGY (PROFISAFE)

Special precautions apply to safety-related PROFIBUS participants. Requirements are placed on the certification of the devices, the power supply, and the cabling (e.g., no stub lines for RS485). A visual acceptance and quality check of the network after assembly are recommended. See also “PROFIBUS Assembly Guideline” (Order no.: 8.021).

BizLink Special Cables Germany GmbH Eschstrasse 1, 26169 Friesoythe, Germany
T +49 4491-291-5010 · Follow us on LinkedIn

Contact us

PROFIBUS, SPE and APL cables › Installation of CU cables

CABLE ROUTING
To avoid interference, it is recommended to lay PROFIBUS, SPE and APL cables separately from and with the largest possible distance to other cables. Crossings between different cable categories should be at right angles.

CABLE CLEARANCES
The minimum clearances between PROFIBUS, SPE and APL cables (shielded data cables) and power cables are specified in table 2 according to EN 50174-2(2018). These are based on assumptions such as the use of power cables up to 1000 V, a meshed equipotential bonding system, and the PROFIBUS, SPE and APL cable shield being terminated on both sides.

MECHANICAL PROTECTION
Cables should be laid in cable trays, plastic conduit, or metal armoured conduit to protect them from mechanical damage. The cable protection may need to be interrupted at 90° bends or building joints (e.g., expansion joints).

STORAGE AND TRANSPORT
During transport, storage, and installation, PROFIBUS/SPE/APL cables must be sealed at both ends with shrink caps to prevent moisture and dirt ingress.

TEMPERATURES
BizLink specifies minimum and maximum temperatures for installation, outside of which the mechanical resilience of the cable is reduced. Typical ranges are between –20 °C and +80 °C for copper cables.

TENSILE STRENGTH AND CRUSHING LOAD
The maximum tensile force must not be exceeded. The standard PROFIBUS, SPE and APL cable has a maximum tensile force of 100 N (~10 kg), while drag chain-compatible PROFIBUS, SPE and APL cables have a maximum tensile force of 50 N (~5 kg). Cables must not be crushed or run over.

BENDING RADII AND LOOP FORMATION
Minimum bending radii must not be undercut. When unrolling the cable from the drum, aids should be used to prevent loops and kinks.

TWISTING (TORSION)
Twisting the cable should be avoided as this degrades the electrical properties. Torsion-resistant cables should be used if necessary.

SHARP EDGES
Sharp edges must be deburred or protected by edge protectors to prevent cable damage during pulling.

POST-INSTALLATION
When laying additional cables, care must be taken not to damage existing PROFIBUS, SPE and APL cables. These cables should be the last to be inserted into cable ducts.

PROFIBUS, SPE and APL cables › Assembly

BUS TERMINATION
PROFIBUS, SPE and APL cables must be terminated at both ends of a segment. The termination consists of resistors or a combination of resistor and capacitor, depending on the PROFIBUS, SPE or APL cable type. It must be ensured that a bus termination is active only at the ends of the segment. In most cases, the terminations are integrated into the corresponding hardware.

MINIMUM CABLE LENGTHS
A minimum cable length of one meter between two PROFIBUS, SPE and APL bus participants is recommended, especially when using connectors without integrated inductivities or screw terminals.

CONNECTORS
Various connector types are used for copper cables, including 9-pin Sub-D connectors (IP20) and M12 connectors (IP65/67). Hybrid connectors allow for the combined supply of voltage and data.

CONNECTION TECHNIQUES
Assembly can be done using screw terminals or insulation displacement technology (IDT). With IDT, coordinated systems of connector, cable, and stripping tool must be used. Flexible PROFIBUS, SPE and APL cables generally do not require wire ferrules when suitable screw terminals are used. The specific regulations of the respective connector manufacturers apply.