

**F.SPE**

**Segment Protector  
Field Junction Box**

**Manual**



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With regard to the supply of products, the current issue of the following document is applicable:  
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# 1 Introduction

## 1.1 Content of this Document

This document contains information that you need in order to use your product throughout the applicable stages of the product life cycle. These can include the following:

- Product identification
- Delivery, transport, and storage
- Mounting and installation
- Commissioning and operation
- Maintenance and repair
- Troubleshooting
- Dismounting
- Disposal



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### Note

This document does not substitute the instruction manual.

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### Note

For full information on the product, refer to the instruction manual and further documentation on the Internet at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

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### Note

For specific device information such as the year of construction, scan the QR code on the device. As an alternative, enter the serial number in the serial number search at [www.pepperl-fuchs.com](http://www.pepperl-fuchs.com).

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The documentation consists of the following parts:

- Present document
- Instruction manual
- Datasheet

Additionally, the following parts may belong to the documentation, if applicable:

- EU-type examination certificate
- EU declaration of conformity
- Attestation of conformity
- Certificates
- Control drawings
- Functional safety manual
- Additional documents

## 1.2 Target Group, Personnel

Responsibility for planning, assembly, commissioning, operation, maintenance, and dismantling lies with the plant operator.

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismantling of the product. The personnel must have read and understood the instruction manual and the further documentation.

Prior to using the product make yourself familiar with it. Read the document carefully.

## 1.3 Symbols Used

This document contains symbols for the identification of warning messages and of informative messages.

### Warning Messages

You will find warning messages, whenever dangers may arise from your actions. It is mandatory that you observe these warning messages for your personal safety and in order to avoid property damage.

Depending on the risk level, the warning messages are displayed in descending order as follows:



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#### **Danger!**

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.

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#### **Warning!**

This symbol indicates a possible fault or danger.

Non-observance may cause personal injury or serious property damage.

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#### **Caution!**

This symbol indicates a possible fault.

Non-observance could interrupt the device and any connected systems and plants, or result in their complete failure.

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### Informative Symbols



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#### **Note**

This symbol brings important information to your attention.

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#### **Action**

1. This symbol indicates a paragraph with instructions. You are prompted to perform an action or a sequence of actions.

## 2 Intended Use

The field junction box is equipped with one or more Segment Protector(s) that connect field devices via one output each to the trunk of a segment in accordance with IEC 61158-2. In addition, the field junction box could be equipped with appropriated accessories like grounding bar, surge protector, terminator, etc.

### 2.1 Installation Area

The field junction box may be installed in the following hazardous areas in accordance with Directive 2014/34/EU:

- hazardous area equipment category 2G Zone 1
- hazardous area equipment category 2D Zone 21

The field junction box may be installed in the following hazardous areas in accordance with IECEx scheme:

- hazardous area Zone 1
- hazardous area Zone 21

The permitted installation area depends on the configuration of the field junction box and can be identified on the nameplate.

The field junction box can be installed in other country-specific hazardous areas, refer to the nameplate with the corresponding approval.

### 2.2 Marking

Each field junction box is labeled as shown below:

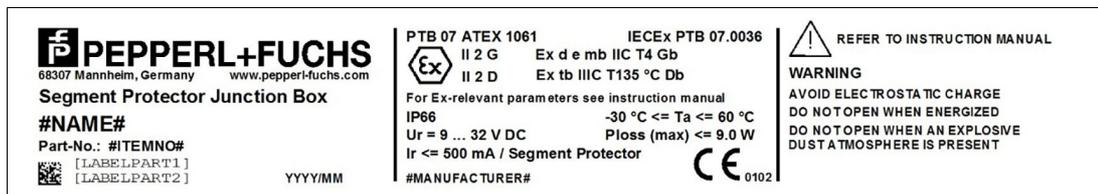


Figure 2.1 Note: The nameplate is an example and shows a typical content.

Allocation variables:	
#NAME#	Type code (e.g., F.SPE.S30.A24.1.0.GP2.GP2.A13T) For more information about the type code, see datasheet.
#ITEMNO#	Item number (e.g., 214264-0005)
[LABELPART1]	Serial number digit 1-7 (e.g., 4 000 002)
[LABELPART2]	Serial number digit 8-14 (e.g., 0 995 100)
YYYY/MM	Date of production (e.g., 2017/07)
#MANUFACTURER#	Country of production (e.g., Made in Germany)

Table 2.1

Electrical data:	
Ur	Rated voltage
Ir	Rated current
Ploss (max)	max. allowed power loss inside the enclosure based on the given ambient temperature

Table 2.2

The Ex-marking, the warnings and the electrical data depend on the configuration of the field junction box. For the Ex-relevant parameters, refer to the drawings.

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**Danger!**

Explosion hazard

The ratings shown are the maximum values for explosion protection and must not be exceeded for safe operation.

Ensure that the component operates within the limits of the rated value.

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## 3 Installation

Refer also to third party instruction manual(s) supplied with the field junction box.

### 3.1 Mounting

Mounting should only be performed by suitably qualified personnel.

The Glass Fibre Reinforced Polyester (GRP) enclosure can be mounted via the thru-holes that are exposed when the lid is removed.

The metal enclosure can be mounted via the external mounting brackets that are attached to the enclosure.



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#### Caution!

Property damage from overtightening

Excessive tightening of fixing screws can result in damage to the field junction box.

Observe the tightening torque.

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#### Warning!

Risk of invalidating the guarantee

The improper installation and operation of the enclosures can result in invalidating the guarantee.

- Observe the installation and operation instructions.
- 



### Mounting the Field Junction Box

1. Remove any temporary protection or packing materials.
2. Use expansion anchors when mounting on concrete, or suitably sized bolts, nuts and anti-vibration washers when mounting to a steel framework.
3. When the field junction boxes are mounted directly onto the wall, ensure that field junction boxes rest evenly only on the fastening points provided for this purpose, and fix the field junction boxes in such a way that they cannot twist or turn.
4. Use a screw that match the fixing hole and ensure that the screw does not damage the opening (e.g., use of a washer).
5. Fix the field junction box with a minimum of two diagonally opposed screws (for GRP enclosures) or at all mounting brackets (for metal enclosures).
6. Use the enclosure as a template when marking fixing points. Alternatively, the dimensions of the fixing centers are molded into the rear face of the GRP enclosure or the dimensions of the fixing centers are provided in the drawing.
7. During mounting, observe the accepted technical rules and installation regulations.

### 3.2 Cable Entries

The field junction box can be supplied either with cable glands, stopping plugs, or clearance holes, or a mixture of them.

If cable glands are already assembled, ensure the following:

1. the tightening torque for the cap is applied according the instruction manual of the cable glands
2. unused cable glands must be fitted either with sealing plugs (if supplied) or must be replaced with stopping plugs

If cable glands or stopping plugs will be assembled on site, ensure the following:

1. the devices used are suitably certified for the hazardous area of application
2. the devices used do not reduce the degree of protection given on the nameplate
3. the devices used do not reduce the ambient temperature range given on the nameplate
4. the cable glands are correctly dimensioned for the cable diameters
5. the devices are installed according the installation instruction of the manufacturer
6. the tightening torques are applied according the installation instruction of the manufacturer
7. unused cable entries must be fitted either with cable glands and sealing plugs or with stopping plugs

### 3.3 Cables

The requisite cable parameters should be taken from the installation instructions of the particular fieldbus system.

The cables enter the enclosure via cable glands usually fitted at the bottom of the enclosure.

Ensure the following:

1. the cable diameter fits into the range of the used cable gland
2. the cabling is not strained and adequate strain relief is provided
3. creepage and clearance distances have been maintained

### 3.4 Connections

For connection details, see wiring schematic of the field junction box.

The terminals provided are suitable for the following conductor cross sections:

Type	Conductor cross section		Torque [Nm]	Stripping length [mm]
	[mm <sup>2</sup> ]	AWG		
Segment Protector R-SP-E12	0.2 ... 2.5	24 ... 14	0.5 ... 0.6	8
Trunk terminal block (screw type)	0.14 ... 2.5	26 ... 14	0.5 ... 0.6	9
Trunk terminal block (spring type)	0.08 ... 2.5	28 ... 14	-	10
Earth clamp	0.5 ... 4.0	20 ... 12	1.2	16
Trunk disconnect (MFT)	0.5 ... 2.5	20 ... 14	2.5	9

Table 3.1

Ensure the following:

1. only one wire per terminal clamp has been installed
2. unused conductors are terminated correctly or securely tied down and insulated and not left floating within the enclosure
3. clearance and creepage distances have been maintained
4. all unused terminal screws are tightened down
5. connectors are mechanically locked

The diameter of individual conductors in explosion hazardous areas must be greater than 0.1 mm. This also applies to the wires in stranded conductors.



**Danger!**

Danger to life from incorrect installation

Incorrect installation of cables and connection lines can compromise the function and the electrical safety of the device.

- Observe the permissible core cross section of the conductor.
- When using stranded conductors, crimp wire end ferrules on the conductor ends.
- Use only one conductor per terminal.
- When installing the conductors the insulation must reach up to the terminal.
- Observe the tightening torque of the terminal screws.



**Danger!**

Explosion hazard from exposed conductors

Exposed conductors of inadequately attached cables can cause sparks that can ignite the surrounding potentially explosive atmosphere.

When installing the device ensure that the cables are adequately attached.

## 3.5 Grounding and Shielding

### 3.5.1 Grounding the Enclosure

The field junction box is provided with an internal/external ground bolt (earth stud) for a plant equipotential bonding. A bonding conductor with a minimum cross-sectional area of 4 mm<sup>2</sup> must be connected to the ground bolt. Depending on the size of the ground bolt, apply the following torque values:

Size	Conductor cross section	Torque
M6	up to 25 mm <sup>2</sup>	3 Nm
M10	up to 70 mm <sup>2</sup>	10 Nm ... 20 Nm

Table 3.2

### 3.5.2 Grounding/Shielding the Spurs

The field junction box provides 1 option for the shield connection of the spurs:

1. All spur cable shields are connected together when connected to the separate shield bar. Depending on the selected shield bar option, the shield bar itself is either connected to the ground bolt and therefore to local earth or the shield bar is isolated.

For more details, see Segment Protector manual.

### 3.5.3 Grounding/Shielding the Trunk Cable

The field junction box provides 1 option for the shield connection of the trunk:

1. All spur cable shields are connected together when connected to the separate shield bar. Depending on the selected shield bar option, the shield bar itself is either connected to the ground bolt and therefore to local earth or the shield bar is isolated.

For more details, see Segment Protector manual.

## 4 Operation

Once wiring has been completed and before closing the lid, check for visible signs of damage on the lid gasket. If damaged, the gasket must be suitably repaired or replaced.

Ensure that the lid is correctly located and properly locked down using the screws provided. In addition to the lid screws, the field junction box could be equipped with captive clips. These captive clips are an additionally accessory, while the lid screws are still required to meet the degree of protection.



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### Warning!

Risk of impair the degree of protection

Overtightening can impair the degree of protection.

Observe the tightening torque of 2 Nm for lid screws.

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### 4.1 Opening of the Enclosure

The enclosure can be opened while energized only if no warning "DO NOT OPEN WHILE ENERGIZED" is attached to the enclosure (e.g., on the nameplate) or when no potentially explosive atmosphere is present.

### 4.2 Spur Disconnection



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#### Danger!

Explosion hazard from live wiring of circuits

If you connect or disconnect energized circuits in a potentially explosive atmosphere, sparks can ignite the surrounding atmosphere.

Only connect or disconnect energized circuits in the absence of a potentially explosive atmosphere.

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### 4.3 Trunk Disconnection



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#### Danger!

Explosion hazard from live wiring of circuits

If you connect or disconnect energized circuits in a potentially explosive atmosphere, sparks can ignite the surrounding atmosphere.

Only connect or disconnect energized circuits in the absence of a potentially explosive atmosphere.

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The field junction box could be equipped with one or more MFTs (**M**ulti-**F**unction**T**erminal(s)). The MFT allows maintenance without a hot work permit in a hazardous area. It provides the facility to isolate the live trunk from the device coupler during live operation without affecting other devices on the segment, e.g., when a fault occurs.

It employs a 2-step removal process to ensure the following conditions:

1. the potentially formed ignition spark remains inside the explosionproof enclosure when lifting off a module
2. the ignition spark has extinguished and the module is volt-free

## 5 Fault Elimination

The field junction box and the electrical and electronic devices that are used in explosion-hazardous area applications must not be altered in any way.

When a fault occurs, the field junction box or the device(s) must be replaced.

Faulty enclosure parts must be replaced with original parts only.

Only suitably qualified and authorized personnel may perform fault elimination work.

## 6 Maintenance

The equipment supplied is essentially maintenance free, however the following maintenance procedure or checks should be undertaken in order to ensure the safe operation of the equipment:

No.	Activity	Frequency
1	Check that the lid seal is not damaged and is in place	Each time the enclosure is opened
2	Check that all lid screws are in place and secured	Each time the enclosure is opened
3	Check that the mounting bolts are tight and corrosion free	Annually
4	Check the security of all cable glands	Annually
5	Check the enclosure for damage	Annually
6	Check that all screw terminals are secured	Annually
7	Check that all leads are not damaged and secured	Annually
8	Check that the condensation drain is clean and functioning	Each time the enclosure is opened

Table 6.1



### **Danger!**

Explosion hazard from electrostatic charge

Electrostatic charges can discharge and consequently ignite a surrounding potentially explosive atmosphere while maintaining the device.

Only use a damp cloth when wiping or cleaning the enclosure or installed equipment.

## 7 Disposal

The packaging and the field junction box must be disposed in compliance with the applicable laws and guidelines of the respective country.

No batteries that need to be separately disposed of are contained within the field junction box.

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## Explosion Protection

- Intrinsic Safety Barriers
- Signal Conditioners
- FieldConnex® Fieldbus
- Remote I/O Systems
- Electrical Ex Equipment
- Purge and Pressurization
- Industrial HMI
- Mobile Computing and Communications
- HART Interface Solutions
- Surge Protection
- Wireless Solutions
- Level Measurement

## Industrial Sensors

- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
- Fieldbus Modules
- AS-Interface
- Identification Systems
- Displays and Signal Processing
- Connectivity

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