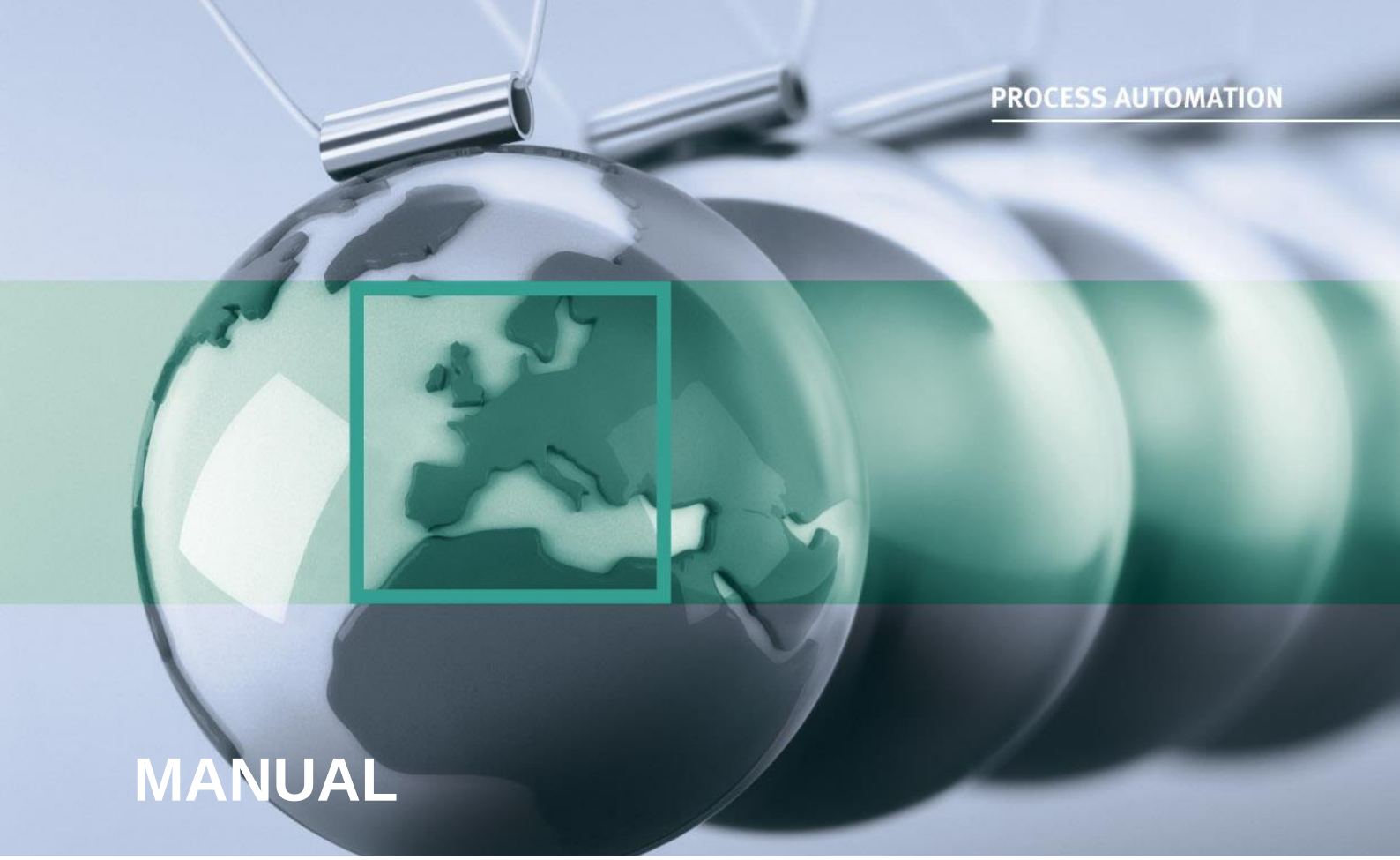

PROCESS AUTOMATION

MANUAL

Segment Protector Junction Box
F.SP5.???.???.1.?.???.???.????
F.SP5.???.???.1.?.????-Y######

Your automation, our passion.

PEPPERL+FUCHS

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1 General Notes

Pepperl+Fuchs endeavours to ensure that all information contained herein is accurate. Pepperl+Fuchs also reserve the right to change information contained herein without prior announcement. Pepperl+Fuchs are not liable for damages, irrespective of their nature, incurred by the use or the non-use of the information.
This manual is property of Pepperl+Fuchs and may not be reproduced or distributed in whole or part without the prior written permission of Pepperl+Fuchs.
Pepperl+Fuchs' liability is limited to typical and foreseeable damages. The liability resulting from the German Product Liability Act is not affected by this.
Applicable law is the law of the Federal Republic of Germany. Place of jurisdiction is Mannheim.
The manual is only valid when used in conjunction with the corresponding instruction manual(s) and the equipment data sheet(s).

Symbols used
This document contains information that you must read for your own personal safety and to avoid property damage. The warning signs are displayed in descending order depending on the hazard category, as follows:

Danger!
This symbol indicates a warning about a possible danger. In case of ignoring the consequences may range from personal injury to death.

Warning!
This symbol indicates a warning about a possible fault or danger. In case of ignoring the consequences may cause personal injury or heaviest property damage.

2 Safety

Refer to instruction manual(s).

3 Intended Use

The Junction Box is equipped with one or more R2 Segment Protector(s) with integrated diagnostics, a device coupler which connects 4 ... 12 instruments to the segment with intrinsic safety.
In addition it could be equipped with appropriated accessories like grounding bar, surge protector, terminator, etc.

3.1 Installation area

The Junction Box may be installed in

- hazardous area category 3G Zone 2
- hazardous area category 3D Zone 22

in accordance with ATEX Directive.

The Junction Box may be installed in

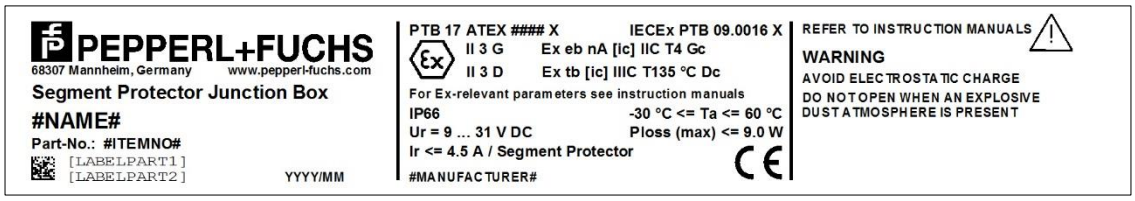
- hazardous area Zone 2
- hazardous area Zone 22

in accordance with IECEx Scheme.

The permitted installation area depends on the configuration of the Junction Box and can be identified on the nameplate.

3.2 Marking

Each Junction Box is labelled as shown below:



Note: The nameplate shows a typical content.

Allocation variables:

#NAME#:	*Type code (e.g. F.SP5.S20.H24.1.0.H02.H02.D100)*
#ITEMNO#:	*Part-No. (e.g. 268459-100030)*
[LABELPART1]:	*Serial-No. digit 1-7 (e.g. 4 000 002)*
[LABELPART2]:	*Serial-No. 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)*

Electrical data:

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

The Ex-marking, the warnings and the electrical data depend on the configuration of the Junction Box.
For the Ex-relevant parameters please refer to the attached datasheets.

The ratings shown are the maximum values for explosion protection and must not be exceeded for safe operation. Also refer to the technical data in the corresponding datasheets.

4 Mounting and Installation

Refer also to 3rd. party instruction manual(s) supplied with the Junction Box.

4.1 Mounting

Mounting should only be performed by suitably qualified personnel.
The Glass Fibre Reinforced Polyester (GRP) enclosure can be mounted via the through-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.

The following steps need to be considered during the mounting process:

1. Remove any temporary protection or packing materials.
2. Expanding anchors should be used when mounting on concrete, or suitably sized bolts, nuts and anti-vibration washers when mounting to a steel framework.
3. When the boxes are mounted directly onto the wall, they shall rest evenly only on the fastening points provided for this purpose, and they shall be fixed in such a way that they cannot twist or turn.
4. The screw used shall match the fixing hole and must not damage the opening (e.g. use of a washer).
5. The Junction Box shall be fixed 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 centres are moulded into the rear face of the GRP enclosure or the dimensions of the fixing centres are provided in the drawing.
7. During mounting the accepted technical rules and installation regulations must be considered.

Excessive tightening of fixing screws can result in damage to the Junction Box.

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

4.2 Installation

4.2.1 Cable Entries

The 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 it has to be ensured that:

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 it has to be ensured that:

1. the devices used are suitably certified for the hazardous area of application
2. the devices used do not reduce the IP rating 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

4.2.2 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 fitted at the bottom of the enclosure.
It has to be ensured that:

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

4.2.3 Connections

For connection details see wiring schematic of the Junction Box.
The terminals provided are suitable for the following conductor cross sections:

Type	Conductor cross section (mm²)	AWG	Torque (Nm)	Stripping length (mm)
Segment Protector R2-SP-IC*.0	0,2 - 2,5	24 - 14	0,4 - 0,5	7
Segment Protector R2-SP-IC*.1	0,5 - 2,5	20 - 14	-	10
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 disconnector (MFT)	0,5 - 2,5	20 - 14	2,5	9

Note: If Surge Protectors type TCP-LBF-IA1.36* or SCP-LBF-IA1.36* are supplied than the same torque value like for the Segment Protector needs to be applied.

It has to be ensured that:

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

Tightening torque: If screw terminals are used the above given torque values need to be applied.
Ensure that connectors are mechanically locked.

If stranded cables cores are used in an explosion hazardous area, the un-insulated strands must be protected from spreading e.g. by fitting bootlace ferrules.

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

4.3 Grounding and shielding

4.3.1 Grounding the enclosure

The Junction Box is provided with an internal/external earth stud for a plant safety earth. A bonding conductor with a minimum cross-sectional area of 4 mm^2 must be connected to the earth stud. Depending on the size of the earth stud the following torque values need to be applied:

Size	Conductor cross section	Torque
M6	up to 25 mm^2	3 Nm
M10	up to 70 mm^2	10 – 20 Nm

4.3.2 Grounding/Shielding the Spurs

The Junction Box provides 2 options for the shield connection of the Spurs:

1. Each spur cable shield is connected to local earth if connected directly to the screen terminal “S” of the Segment Protector.
   If Surge Protectors are installed than the shield is connected to local earth through a gas discharge tube if connected directly to the screen terminal “S” of the Surge Protector.
2. All spur cable shields are connected together if connected to the screen bar. Depending on the selected screen bar option the screen bar itself is either connected to the earth stud and so therefore to local earth or the screen bar is isolated.

For more details see Segment Protector Manual.

4.3.3 Grounding/Shielding the Trunk cable

The Junction Box provides 1 option for the shield connection of the Trunk:

1. The Trunk cable shield is connected to local earth if connected directly to the screen terminal “S” of the Segment Protector.
   If a Surge Protector is installed than the shield is connected to local earth through a gas discharge tube if connected directly to the screen terminal “S” of the Surge Protector.

For more details see Segment Protector Manual

5 Operation

Once wiring has been completed and before closing the lid, a visual inspection must be performed to ensure that there are no visible signs of damage on the lid gasket. In the event of damage, the gasket must be suitably repaired or replaced.
Ensure that the lid is correctly located and properly locked down using the fittings provided.
The Junction Box could be equipped in addition to the lid screws also with captive clamps. These captive clamps are an additionally accessory whereas the lid screws are still required to meet the ingress protection.

Lid screws should be tightened with a torque of 2 Nm.
Over tightening can impair the degree of protection.

5.1 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 explosive atmosphere is present.

5.2 Spur Disconnection

The intrinsically safe spur connections may be connected or disconnected while the circuit is live even if combustible gases are present.

5.3 Trunk Disconnection

Explosion hazard – Do not connect or disconnect the trunk connections unless the power has been switched off or the area is known to be non-hazardous.

The 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. in the event of a fault.
It employs a 2-step removal process, which guarantees that a potentially formed ignition spark remains inside the flameproof enclosure when lifting off a module and thus makes sure that the ignition spark has extinguished and the module is volt-free.

6 Fault elimination

Junction Boxes and the electrical and electronic devices which are used in explosion hazardous area applications must not be altered in any way.
In the event of a fault, the Junction Box or the device(s) must be replaced. Defective enclosure parts must be replaced with original parts only. Fault elimination work may only be performed by suitably qualified and authorised personnel.

7 Disposal

The packaging materials and the Junction Box must be disposed of in accordance with the regulations pertaining to the country in which they are installed.
No batteries which need to be separately disposed of are contained within the Junction Box.

8 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

To avoid electrostatic charging, the enclosure or installed equipment should only be wiped or cleaned using a damp cloth.

9 Technical data

	F.SP5.S*	F.SP5.P*	Others
Manufacturer	Pepperl+Fuchs GmbH Lilienthalstraße 200 68307 Mannheim Germany		
Mechanical specifications			
Enclosure cover	detachable hinged door with captive retaining screws	detachable cover with captive retaining screws	see documentation
Degree of protection	see nameplate	see nameplate	see nameplate
Material			
Housing	stainless steel 1.4404 / AISI 316L	polyester, impact resistant, glass fiber reinforced	see documentation
Surface	electropolished	black molded finish	see documentation
Seal	neoprene, fire-resistant, one piece	silicone, one piece	see documentation
Material thickness	body: 1.5 mm cover: 1.5 mm gland plate: 3.0 mm	body: 4.0 mm cover: 4.0 mm grounding plate: 3.0 mm	see documentation
Dimensions	see type code or documentation	see type code or documentation	see documentation
Mounting	thru-holes Ø11 mm	thru-holes Ø6.5 mm	see documentation
Grounding	grounding bolt M10 , brass	grounding bolt M6 , stainless steel	see documentation
General specifications			
Installed components	see type code and documentation For technical data on installed electronic component see data sheet.		
Data for application in connection with Ex-areas			
Certificate	PF 16 CERT 3134 X	PF 16 CERT 3134 X	see documentation
Group, category, type of protection	see nameplate	see nameplate	see nameplate
Directive conformity	see EU-Declaration of conformity	see EU-Declaration of conformity	see EU-Declaration of conformity
IECEx approval	IECEx PTB 09.0016	IECEx PTB 09.0016	IECEx PTB 09.0016
Type of protection	see nameplate	see nameplate	see nameplate

10 Type code

Family					.	Housing			.	Ex	Channels / Outputs		.	Fieldbus	.	Terminals	.	Cable entries Trunk			.	Cable entries Spurs			.	Accessories				Product -No.								Description
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Type code position no. for standard junction boxes
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19	20	21	22	23	24	25	26	27	28	29	30	Type code position no. for engineered junction boxes
F	.	S	P	5	.	?	?	?	.	?	?	?	.	1	.	?	.	?	?	?	.	?	?	?	.	?	?	?	?									F.SP5.???.???.1.?.???.???.????
F	.	S	P	5	.	?	?	?	.	?	?	?	.	1	.	?	.									?	?	?	?	-	Y	#	#	#	#	#	#	F.SP5.???.???.1.?.????-Y######
Electronic type																																						
F	.	S	P	5	.																																	Segment Protector Junction Box
						Enclosure type																																**Material - W x H x D**
						C	S	X	.																													Stainless steel 1.4404 (AISI 316L) - engineered size
						C	V	X	.																													Stainless steel - engineered size
						C	P	X	.																													Polyester glass-fiber reinforced - engineered size
						C	A	X	.																													Aluminium - engineered size
						C	M	X	.																													Mild steel - engineered size
						L	S	X	.																													Stainless steel 1.4404 (AISI 316L) - engineered size
						L	V	X	.																													Stainless steel - engineered size
						L	P	X	.																													Polyester glass-fiber reinforced - engineered size
						L	A	X	.																													Aluminium - engineered size
						L	M	X	.																													Mild steel - engineered size
						S	1	3	.																													Stainless steel 1.4404 (AISI 316L) - 306 x 306 x 163 mm
						S	2	0	.																													Stainless steel 1.4404 (AISI 316L) - 380 x 380 x 213 mm
						P	1	2	.																													Polyester glass-fiber reinforced - 271 x 271 x 136 mm
						P	2	0	.																													Polyester glass-fiber reinforced - 544 x 271 x 136 mm
										Certification																												
										B																												ATEX (Zone 2 + Zone 22)
										D																												IECEx (Zone 2 + Zone 22)
										E																												non Ex (only safe are)
										H																												ATEX + IECEx (Zone 2 + Zone 22)
											Channels / No. of Terminals																											
											0	4	.																									4 channels / terminals
											0	6	.																									6 channels / terminals
											0	8	.																									8 channels / terminals
											1	0	.																									10 channels / terminals
											1	2	.																									12 channels / terminals
											1	6																										2x 8 channels / terminals
											2	0																										2x 10 channels / terminals
											2	4	.																									2x 12 channels / terminals
											n	n	.																									n channels / terminals

Family					.	Housing			.	Ex	Channels / Outputs		.	Fieldbus	.	Terminals	.	Cable entries Trunk			.	Cable entries Spurs			.	Accessories				Product -No.								Description
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**Type code position no. for standard junction boxes**
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19	20	21	22	23	24	25	26	27	28	29	30	**Type code position no. for engineered junction boxes**
F	.	S	P	5	.	?	?	?	.	?	?	?	.	1	.	?	.	?	?	?	.	?	?	?	.	?	?	?	?									**F.SP5.???.???.1.?.???.???.????**
F	.	S	P	5	.	?	?	?	.	?	?	?	.	1	.	?	.									?	?	?	?	-	Y	#	#	#	#	#	#	**F.SP5.???.???.1.?.????-Y######**
Fieldbus type																																						
														1	.																								Foundation Fieldbus H1 + Profibus PA
Terminal type of electronic / Spur terminals / Terminal type of electronic and Trunk options																																					
																0	.																						screw terminals
																3	.																						spring terminals
																6	.																						Screw terminals + Trunk disconnector (MFT) f. 1 segment
																7	.																						Screw terminals + Trunk disconnector (MFT) f. 2 segments
																A	.																						Spring terminals + Trunk disconnector (MFT) f. 1 segment
																B	.																						Spring terminals + Trunk disconnector (MFT) f. 2 segments
Entries																																						
Trunk																		**Spur**																				**Size M20**
																		H	0	2	.	H	0	2	.													Blanking plug plastic
																		H	0	3	.	H	0	3	.													Blanking plug brass nickel plated
																		H	0	4	.	H	0	4	.													Blanking plug stainless steel
																		G	P	2	.	G	P	2	.													Cable gland plastic
																		G	B	2	.	G	B	2	.													Cable gland brass nickel plated
																		G	S	2	.	G	S	2	.													Cable gland stainless steel
																		G	N	2	.	G	N	2	.													Cable gland brass nickel plated for armoured cables
																		G	A	2	.	G	A	2	.													Cable gland stainless steel for armoured cables
Tag plate																																						
																										0												without
																										A												Plastic (120x30mm)
																										B												Stainless steel (120x30mm)
																										C												Plastic (95x20mm)
																										D												Stainless steel (95x20mm)
Screen bar																																						
																											0												without
																											1												with (connected to PA)
																											2												with (isolated)

Family					.	Housing			.	Ex	Channels / Outputs		.	Fieldbus	.	Terminals	.	Cable entries Trunk			.	Cable entries Spurs			.	Accessories				Product -No.								Description
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	**Type code position no. for standard junction boxes**
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	19	20	21	22	23	24	25	26	27	28	29	30	**Type code position no. for engineered junction boxes**
F	.	S	P	5	.	?	?	?	.	?	?	?	.	1	.	?	.	?	?	?	.	?	?	?	.	?	?	?	?									**F.SP5.???.???.1.?.???.???.????**
F	.	S	P	5	.	?	?	?	.	?	?	?	.	1	.	?	.									?	?	?	?	-	Y	#	#	#	#	#	#	**F.SP5.???.???.1.?.????-Y######**
Surge protection																																						
																										0													without
																										4													Surge protection trunk (TCP-LBF-IA1.36.IE.0)
																										5													Surge protection spurs (SCP-LBF-IA1.36.IE.0)
																										6													Surge protection trunk with diagnosis (TCP-LBF-IA1.36.IE.1)
																										7													Surge protection spurs with diagnosis (SCP-LBF-IA1.36.IE.1)
																										9													Surge protection trunk (TCP-LBF-IA1.36.IE.0) and spurs (SCP-LBF-IA1.36.IE.0)
																										B													Surge protection trunk with diagnosis (TCP-LBF-IA1.36.IE.1) and spurs (SCP-LBF-IA1.36.IE.0)
																										C													Surge protection trunk (TCP-LBF-IA1.36.IE.0) and spurs with diagnosis (SCP-LBF-IA1.36.IE.1)
																										D													Surge protection trunk with diagnosis (TCP-LBF-IA1.36.IE.1) and spurs with diagnosis (SCP-LBF-IA1.36.IE.1)
Additional accessories																																						
																											0	-											without
																											T	-											with external bus terminator
																											L	-											Leakage Sensor (ELS-1)
																											D	-											Document pocket (A4)
																											3	-											with external bus terminator + Leakage Sensor (ELS-1)
																											4	-											with external bus terminator + Document pocket (A4)
																											5	-											Leakage Sensor (ELS-1) + Document pocket (A4)
																											6	-											with external bus terminator + Leakage Sensor (ELS-1) + Document pocket (A4)
																														Y	#	#	#	#	#	#	Product ID

Your automation, our passion.

Explosion Protection

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- Signal Conditioners
- Fieldbus Infrastructure
- Remote I/O Systems
- HART Interface Solutions
- Wireless Solutions
- Level Measurement
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- Electrical Explosion Protection Equipment
- Solutions for Explosion Protection

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- Industrial Vision
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- Rotary Encoders
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- AS-Interface
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- Logic Control Units

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