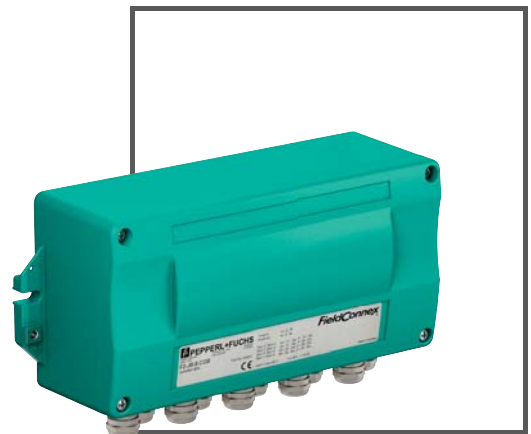


# MANUAL

## **F2-JB-#.I, F\*-JB-#.\***

### **Fieldbus Junction Boxes / Segment Protectors**



With regard to the supply of products, the current issue of the following document is applicable: The General Terms of Delivery for Products and Services of the Electrical Industry, published by the Central Association of the Electrical Industry (Zentralverband Elektrotechnik und Elektroindustrie (ZVEI) e.V.) in its most recent version as well as the supplementary clause: "Expanded reservation of proprietorship"

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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



**Note!**

This document does not substitute the instruction manual.



**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).

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
- Additional documents

## 1.2 Target Group, Personnel

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

Only appropriately trained and qualified personnel may carry out mounting, installation, commissioning, operation, maintenance, and dismounting 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:



### ***Danger!***

This symbol indicates an imminent danger.

Non-observance will result in personal injury or death.



### ***Warning!***

This symbol indicates a possible fault or danger.

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



### ***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.

## Informative Symbols



### ***Note!***

This symbol brings important information to your attention.



### **Action**

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

## 2 Type Code

Pepperl+Fuchs offers a wide range of fieldbus junction boxes. The following type code provides an overview of the fieldbus junction boxes available:

Housing type	
F2	Aluminum field housings for fieldbus junction boxes with 4, 6, or 8 spurs
F3	Aluminum field housings for fieldbus junction boxes with 2 spurs
F4	Aluminum field housings for fieldbus junction boxes with 1 spur
Type	
JB	Junction box
JBSC	Junction box with short-circuit protection (Segment Protector)
Application	
blank	for general purpose applications in non-hazardous areas and Zone 2/Class I, Div. 2
I	Intrinsically safe applications
Number of spurs	
1, 2, 4, 6 or 8	
Fieldbus type	
Empty	Suitable for FOUNDATION fieldbus and PROFIBUS MBP (for cable glands only)
FF	For FOUNDATION fieldbus only (plug version only)
PA	For PROFIBUS MBP only (plug version only)
Trunk connection	
CG	Cable gland, plastic, M16
CGB	Cable gland, brass, nickel plated, M16
CGS	Cable gland, stainless steel, M16
CGAB	Cable gland, brass for reinforced cable, M20
C	Conduit
7/8B	7/8" plug/socket, brass, nickel-plated
7/8S	7/8" plug/socket, stainless steel
M12B	M12 plug/socket, brass, nickel-plated
M12S	M12 plug/socket, stainless steel
spurjunction boxes connection	
Empty	Like trunk
CG	Cable gland, plastic, M16
CGB	Cable gland, brass, nickel plated, M16
CGS	Cable gland, stainless steel, M16
CGAB	Cable gland, brass for reinforced cable, M20
C	Conduit
7/8B	7/8" plug/socket, brass, nickel plated
7/8S	7/8" plug/socket, stainless steel
M12B	M12 plug/socket, brass, nickel plated
M12S	M12 plug/socket, stainless steel

This documentation applies to **all** fieldbus junction boxes.

This documentation consists of several sections, as follows:

- See chapter 3: This section covers all intrinsically safe fieldbus junction boxes for mounting in hazardous (classified) locations.
- See chapter 4: This section covers all fieldbus junction boxes suitable for application in explosion-hazardous (classified) locations of equipment category 3G, Zone 2 or Class I, Division 2.
- See chapter 5: This section covers all fieldbus junction boxes not suitable for application in explosion-hazardous (classified) locations.
- The rest of this documentation covers information that is applicable to **all** fieldbus junction boxes.



### 3 Fieldbus Junction Boxes (Type of Protection Ex i)

The following section applies to fieldbus junction boxes with the type of protection Ex i for installation in explosion hazardous (classified) locations. The information applies only in combination with the respective datasheets. These datasheets are available online at <http://www.pepperl-fuchs.com>.

#### 3.1 Intended Use

Fieldbus devices are often connected via spurs to the main line (trunk) of the fieldbus. Fieldbus junction boxes connect fieldbus devices to a fieldbus transmission line (main line, or trunk). The following versions are available with different outputs for connecting field devices:

- F2-JB-I... for up to 8 field devices
- F3-JB-I... for up to 2 field devices
- F4-JB-I... for 1 field device

For details on the type code, see chapter 2.

Fieldbus junction boxes can be used in any fieldbus system using the "Manchester bus powered" technology corresponding to IEC 61158-2. This includes the H1 bus of the FOUNDATION Fieldbus and the PROFIBUS PA. In newer documentation, the PROFIBUS PA is also known as the PROFIBUS MBP or PROFIBUS MBP-IS, if the intrinsically safe variants are meant.

Fieldbus junction boxes, depending on the type of protection of the power supply circuit, may be installed in equipment category 1G (Zone 0), 2 G (Zone 1) or 3 G (Zone 2), or in Class I, Division 1 and 2, Class II, Division 1 and 2, or Class III, Division 1 and 2 in the temperature class T4 of an explosion hazardous (classified) location.



#### **Danger!**

Explosion hazard from damaged electronic components

Premature wear of electronic components in a device that was previously used in a general electrical installation can cause sparks that can ignite the surrounding potentially explosive atmosphere.

Never install devices that have already been operated in general electrical installations in electrical installations used in combination with hazardous areas!

All applicable laws or Directives for the application or planned use must be observed.



#### **Note!**

Fieldbus junction boxes meet the requirements of FISCO and of Entity.

Fieldbus junction boxes are only approved for proper professional usage in accordance with the intended uses. Improper handling voids any claim made under the warranty and any manufacturer's liability.

Fieldbus junction boxes may only be operated by trained and qualified personnel in accordance with this documentation.



#### **Warning!**

Danger to life from improper use of the device

The safety of the operating personnel and the system is not ensured if the device is not used according to its intended use as described here.

Ensure that you use the device according to its intended use.

## 4 Fieldbus Junction Boxes with Short Circuit Current Limitation

The following section applies to fieldbus junction boxes with short circuit current limitation, suitable for installation in hazardous (classified) locations of equipment category 3G, Zone 2 or Class I, Division 2 and Zone 22 (non-conductive dust). The information applies only in combination with the respective datasheets. The datasheets are available online at <http://www.pepperl-fuchs.com>.



### **Note!**

#### **Operator responsibility**

The operator of the fieldbus system is responsible for planning, mounting, commissioning, operating, and maintaining the device.

### 4.1 Intended Use

Fieldbus devices are often connected via spurs to the main line (trunk) of the fieldbus. Fieldbus junction boxes connect fieldbus devices to a fieldbus transmission line (main line, or trunk). The following versions are available with different outputs for connecting field devices:

- F2-JBSC-...

For details on the type code, see chapter 2.

Fieldbus junction boxes can be installed in any fieldbus system using "Manchester bus powered" technology corresponding to IEC 61158-2 / ISA S50.02 for the United States of America.

All applicable laws or Directives for the application or planned use must be observed.

Fieldbus junction boxes are only approved for proper professional usage in accordance with the intended uses. Improper handling voids any claim made under the warranty and any manufacturer's liability.

Fieldbus junction boxes may only be operated by trained and qualified personnel in accordance with this documentation.



### **Warning!**



Danger to life from improper use of the device

The safety of the operating personnel and the system is not ensured if the device is not used according to its intended use as described here.

Ensure that you use the device according to its intended use.

## 4.2 Marking

Fieldbus junction boxes with short circuit current limitation for mounting in explosion hazardous (classified) locations are marked as follows:

F2-JBSC...
Pepperl + Fuchs
D-68301 Mannheim, Germany
F2-JBSC... *
TÜV 04 ATEX 2465 X
 II 3G EEx nA [L] IIC T4
 II 3 D Ex tD A22 IP54 T135 °C (non-conductive dust)

Fieldbus junction boxes may only be operated by trained professionals in accordance with this documentation.

## 4.3 Special Features

The fieldbus junction boxes F2-JBSC-... (Segment Protectors) have short circuit current limitation on the output (spur). The maximum permissible current is 40 mA per output. Short circuit current limitation is activated at 45 mA and has a square characteristic curve.

## 5 Fieldbus Junction Boxes for Installation in Non-Hazardous Areas

The following section applies to fieldbus junction boxes that are **not** suitable for installation in explosion-hazardous (classified) locations. The information applies only in combination with the corresponding datasheets. The datasheets are available online at <http://www.pepperl-fuchs.com>.

Fieldbus junction boxes for installation in non-hazardous areas are available in 2 variants:

- Fieldbus junction boxes without short circuit current limitation at the output (spur), F\*-JB-... (\* = 2, 3, 4)
- Fieldbus junction boxes with short circuit current limitation at the output (spur), so-called Segment Protectors, F2-JBSC-...



### **Note!**

#### **Operator responsibility**

The operator of the fieldbus system is responsible for planning, mounting, commissioning, operating, and maintaining the device.

### 5.1 Intended Use

Fieldbus devices are often connected via spurs to the main line (trunk) of the fieldbus. Fieldbus junction boxes connect fieldbus devices to a fieldbus transmission line (main line, or trunk). The following versions are available with different outputs for connecting field devices:

- F2-JB-... and F2-JBSC-... for up to 8 field devices
- F3-JB-... for up to 2 field devices
- F4-JB-... for 1 field device

For details on the type code, see chapter 2.

Fieldbus junction boxes can be installed in any fieldbus system using "Manchester bus powered" technology corresponding to IEC 61158-2 / ISA S50.02 for the United States of America.

All applicable laws or Directives for the application or planned use must be observed.

Fieldbus junction boxes are only approved for proper professional usage in accordance with the intended uses. Improper handling voids any claim made under the warranty and any manufacturer's liability.

Fieldbus junction boxes may only be operated by trained and qualified personnel in accordance with this documentation.



### **Warning!**

Danger to life from improper use of the device

The safety of the operating personnel and the system is not ensured if the device is not used according to its intended use as described here.

Ensure that you use the device according to its intended use.

## 6 Ambient Conditions

The following section applies to **all** fieldbus junction boxes.

The ambient temperature range of each fieldbus junction box can be found in its datasheet. The datasheets are available for download at <http://www.pepperl-fuchs.com>.

### 6.1 Fieldbus Junction Boxes with Type of Protection Ex i

At a maximum ambient temperature of 85 °C and a maximum current of 3 A, the maximum surface temperature of the fieldbus junction box is 100 °C.

### 6.2 Fieldbus Junction Boxes with Short Circuit Current Limitation

At a maximum ambient temperature of 70 °C, the maximum surface temperature of the fieldbus junction box is 120 °C.

## 7 Mounting and Dismounting

The following section applies to **all** fieldbus junction boxes.

### 7.1 General

Only trained and qualified personnel may mount or dismount the device.

The housing of the fieldbus junction boxes are designed for wall mounting.

- Mounting an F2 housing: Use 2 screws with a  $\text{Ø} = 6 \text{ mm}$ .
- Mounting an F3/4 housing: Use 2 screws with a  $\text{Ø} = 4 \text{ mm}$ .
- Choose mounting accessories that suit the existing mounting surface and ensure a secure attachment.

Observe the recognized rules of the technology and setup requirements when mounting and dismounting the device. Particularly when working on electrical systems, special safety requirements must be observed. Pay special attention to the following points:

1. Is the fieldbus junction box installed in accordance with specifications?
2. Is the fieldbus junction box free of damage?
3. Is degree of protection ensured?
4. Are all screws tightened securely?

The torque to be used on the fastening screws depends on the type of screws used.

Tighten the cover screws to a torque of 2.5 Nm.

### 7.2 Fieldbus Junction Boxes with the Type of Protection Ex i

When installing the fieldbus junction box with the type of protection Ex i in explosion hazardous (classified) locations, the following points are particularly important.

#### 7.2.1 Fieldbus Junction Box (Ex i) in Field Housing F\*-JB\*-I\*



**Danger!**

Explosion hazard from electrostatic charge

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

Avoid electrostatic charges during installation and operation of the device.



**Danger!**

Explosion hazard from insufficient preventative mounting

In equipment category 1G, Zone 0, operating the device without protective measures against potential ignition sources can cause sparks. This can ignite the surrounding potentially explosive atmosphere.

Ensure that the fieldbus junction box is mounted in such a way that ignition sources such as sparks caused by impact effects or friction of metals are excluded even in the event of rarely occurring operating faults.



**Danger!**

Explosion hazard from wrong plastic cable gland installation

In equipment category 1G, Zone 0, wrong installation of plastic cable glands on the device can cause sparks. These can ignite the surrounding potentially explosive atmosphere.

Ensure that fieldbus junction boxes with plastic cable glands are installed in such a way that the cable glands are secured against mechanical damage.

### 7.3 Fieldbus Junction Boxes with Short Circuit Current Limitation in Equipment Category 3G

Fieldbus junction boxes with short circuit current limiting may only be installed in hazardous (classified) locations of equipment category 3 G, i. e., Zone 2 or Class I, Division 2. Special attention must be paid to the following.

Only devices that are suitable for operation in Zone 2 or Class I, Division 2 may be connected to the circuits in this zone or class/division. The devices must also be suitable for the conditions at the installation location and must have the appropriate documents (manufacturer's declaration or certificate from a test facility).



**Danger!**

Explosion hazard from electrostatic charge

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

Avoid electrostatic charges during installation and operation of the device.

### 7.4 Mechanical Dimensions

#### 7.4.1 Mechanical Dimensions of the F2 Housing

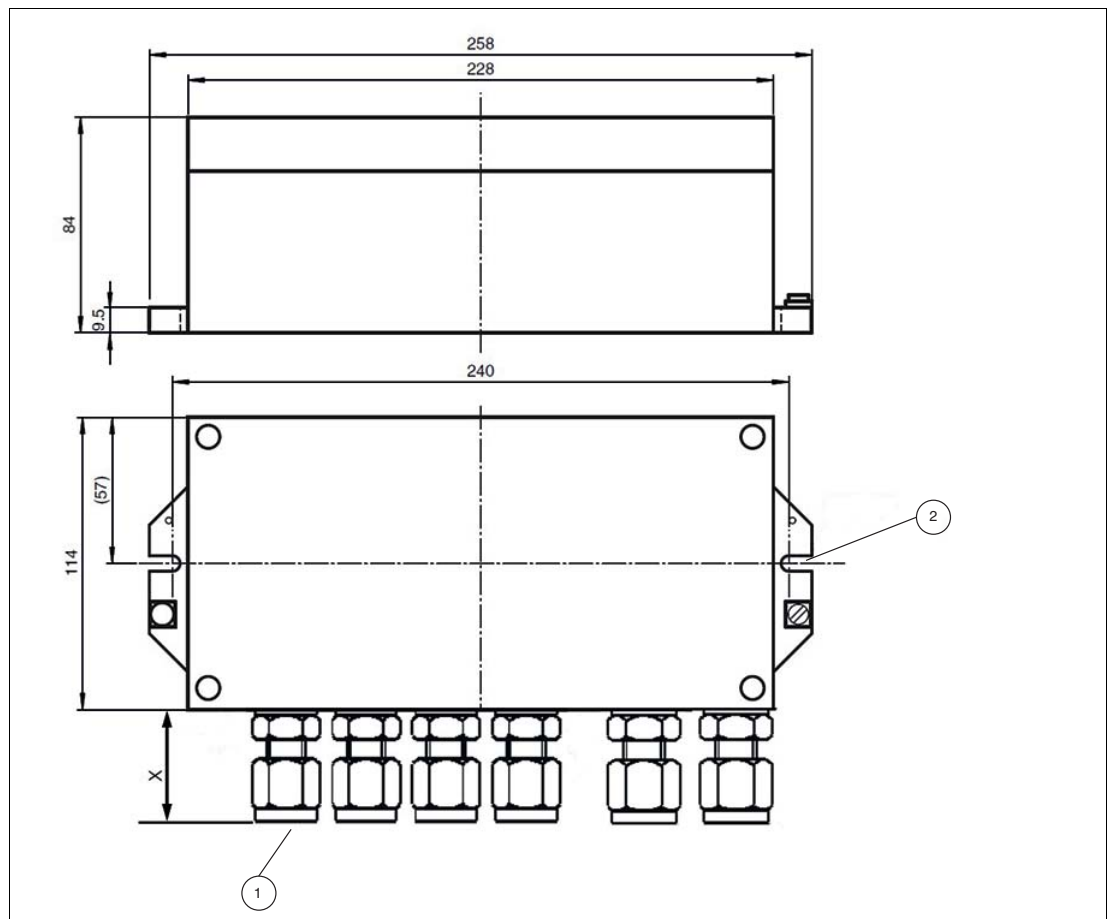


Figure 7.1 Mechanical dimensions of F2 housing

- X** Height of cable glands
- 1** Width across flats (AF)
- 2** Slot for fixing with screw M6

The dimensions X and AF depend on the type of cable gland. The dimensions can be read from the following table:

Type	X	AF
F2-JB...-CG...	≤ 26 mm	20
F2-JB...-CGB...	≤ 26 mm	20
F2-JB...-CGS...	≤ 26 mm	22
F2-JB...-CGAB...	≤ 46 mm	24

Table 7.1 Cable gland dimensions

## 7.4.2 Mechanical Dimensions of the F3 Housing

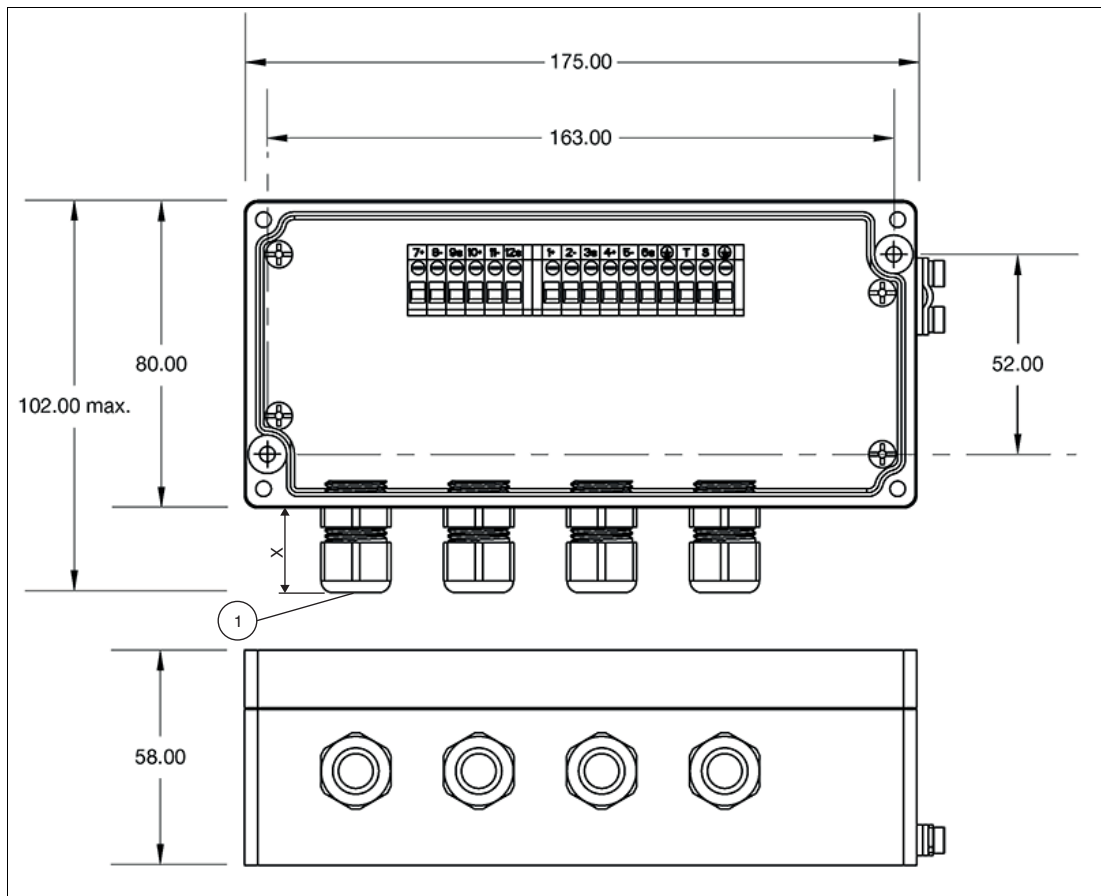


Figure 7.2 Mechanical dimensions of F3 housing

- X** Height of cable glands
- 1** Width across flats (AF)

The dimensions X and AF depend on the type of cable gland. The dimensions can be read from the table for the F2 housing, see chapter 7.4.1.



### 7.4.3 Mechanical Dimensions of the F4 Housing

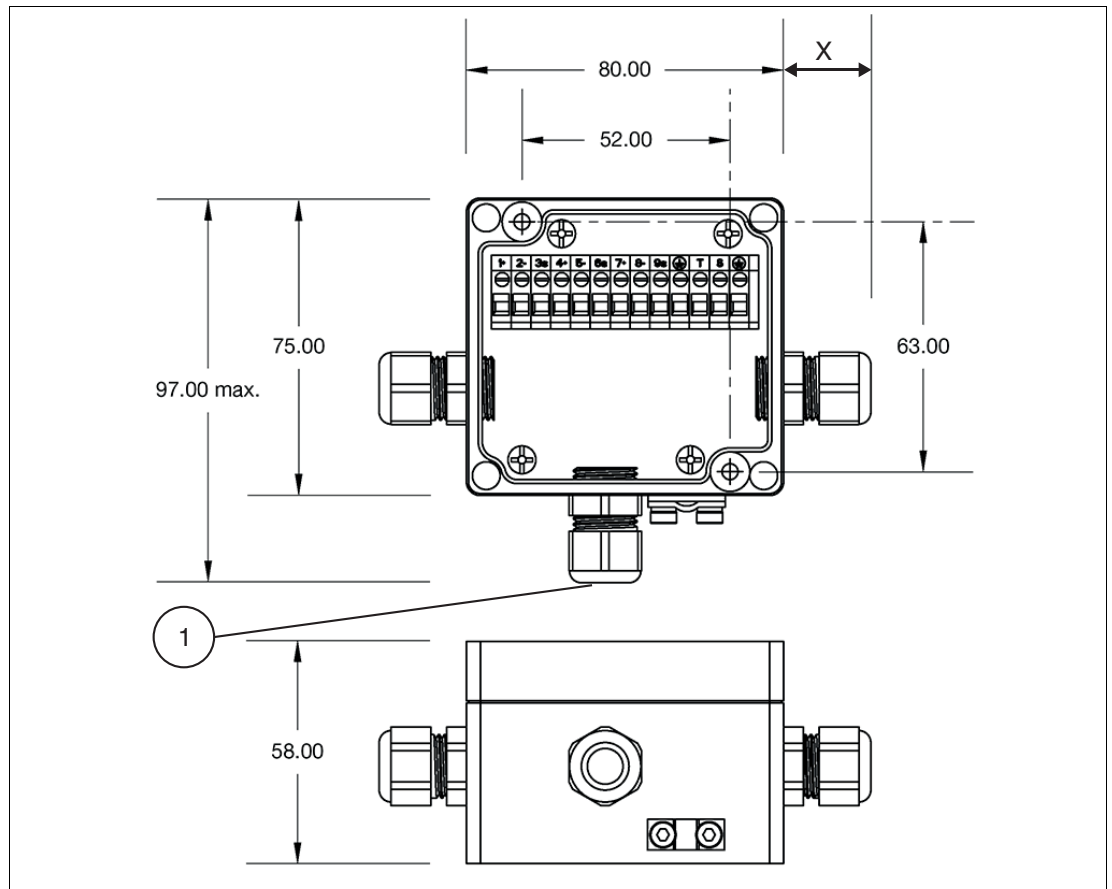


Figure 7.3 Mechanical dimensions of F4 housing

- X** Height of cable glands
- 1** Width across flats (AF)

The dimensions X and AF depend on the type of cable gland. The dimensions can be read from the table for the F2 housing, see chapter 7.4.1.

## 8 Installation/Commissioning

The following section applies to **all** fieldbus junction boxes.

### 8.1 General

Fieldbus junction boxes may only be operated by trained and qualified personnel in accordance with this documentation.

Take the cable parameters to be used from the installation instructions of the corresponding fieldbus system.

- Applies to fieldbus junction boxes with screw terminals: The insulation stripping length of the leads is 9 mm.
- If stranded conductors are used, the conductor ends must be protected from fraying, for instance by using wire end ferrules.
- The tightening torques of the screw terminals and the cable glands must be observed when connecting the fieldbus transmission lines.

### Tightening Torques

- Tightening torque of the screw terminals (if present): 0.4 Nm ... 0.5 Nm
- Tightening torques of the cable glands: The tightening torques of the cap nuts depend on the cable used and must therefore be determined by the user.  
The following information can serve as a rough guideline:

Junction Box Type	Cap nut
F*-JB**-...CG	2.5 Nm
F*-JB**-...CGB	4.11 Nm
F*-JB**-...CGS	4.11 Nm
F*-JB**-...CGAB	22 Nm

Table 8.1 Reference values for tightening torques



#### **Note!**

#### **Reference values for tightening torques**

The tightening torques listed in the table above are valid for fieldbus junction boxes for which identical cable glands are used for both trunks and spurs. It is possible for fieldbus junction boxes to be installed with different connection types for trunks and spurs. The tightening torques listed above are valid independently of whether cable glands are used for the trunk or the spurs or both.



#### **Note!**

#### **Ensure the degree of protection - cap nuts**

Tighten the cap nuts firmly. Note that the excessive tightening of the cap nuts can impair the degree of protection.

Fieldbus junction boxes with plug connections are always powered via a plug. Only hand-tighten the cap nut of the power plug.

Secure any unused plugs in such a way that the degree of protection is maintained.

Fieldbus junction boxes with cable glands are powered through the input, that is, through the second cable gland from the right (as seen from above).

To maintain the degree of protection, all unused cable glands must be plugged with a suitable sealing plug or replaced by a suitable stopping plug. The sealing and stopping plugs must be suitable for this application.



**Note!**

**Ensuring degree of protection - unused cable glands**

To ensure the degree of protection IP67, seal unused (M16 and M20) cable glands with M20 sealing plugs.

## 8.2 Fieldbus Junction Boxes (Ex i)

Fieldbus junction boxes may be installed in accordance with their ratings in Zones 0, 1, or 2, or in Class I, Division 1 and 2, Class II, Division 1 and 2, or Class III, Division 1 and 2.

If the installation takes place in accordance with FISCO, the maximum length of each spur is limited to 30 m.

If stranded conductors are used in explosion-hazardous areas, the conductor ends must be protected from fraying, e. g., by using wire end ferrules.

The diameter of individual wires in explosion-hazardous areas may not be < 0.1 mm. This also applies to the individual cores of stranded conductors.

During installation of intrinsically safe fieldbus junction boxes and segments, observe the standard IEC/EN 60079-14. For the Federal Republic of Germany, also observe the "National Foreword" of IEC/EN 60079-14.



**Note!**

**Type of protection**

For equipment category 1G, Zone 0, the circuit must meet the type of protection "ia".



**Danger!**

Explosion hazard from electrostatic charge

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

Avoid electrostatic charges during installation and operation of the device.



**Note!**

**EC-type examination certificate and special conditions**

Observe the EC-type examination certificate. Strictly adhere to any "Special conditions" specified there.

### 8.2.1 Fieldbus Junction Boxes (Ex i) in the Field Housing F\*-JB\*\*-I-\*\*\*

For metallic housings in explosion-hazardous areas, a suitable equipotential bonding according to IEC/EN 60079 is required. On the F2 housings, a grounding screw is provided for this purpose. The F3/F4 housings feature a grounding terminal. Connections must be secured against loosening and protected against corrosion. Corrosion protection can be achieved, e. g., by using tinned cable plates.

Only attach permanently laid cables and lines to the cable glands.

For the permissible cable diameters refer to the respective datasheet.

Provide a suitable strain relief (e. g., a suitable cable clamp).

Observe the mounting information, see chapter 7.2.1.

Before closing the cover, visually check the installation to ensure that the cover seal shows no visible damage. In case of damage, replace the seal with an original seal.

Tighten the cover screws to a torque of 2.5 Nm.

### 8.3 Fieldbus Junction Boxes with Short Circuit Current Limitation for Equipment Category 3 G

The integrated terminator may only be connected if all the following conditions apply:

- the fieldbus junction box is the last one on the segment
- the terminator of the field device is not in use

For the position of the slide refer to:

F2 housing: see chapter 9.1

F3 housing: see chapter 9.2

F4 housing: see chapter 9.3

Only devices suitable for operation in explosion-hazardous (classified) locations in Zone 2 or Class I, Division 2, and the local operating conditions may be connected to these circuits (see manufacturer's declaration or certificate from test facility).



**Danger!**

Explosion hazards from permanent live wiring

If you frequently connect or disconnect energized circuits in a Zone 2 or Class I, Division 2 potentially explosive atmosphere, there could be a probability that sparks might ignite the surrounding atmosphere.

Connect, disconnect, or switch circuits under voltage in Zone 2 or Class I, Division 2 only during installation, maintenance, or for repair purposes.

All unused cable glands must be plugged with a suitable sealing or stopping plug. The sealing or stopping plugs must be suitable for this application.



**Note!**

**Ensuring degree of protection**

To ensure the degree of protection IP54, secure any unused M12 or 7/8" connectors in an appropriate way.

The stopping plugs must only be replaced by cable glands that are adapted for the intended use. When mounting the cable glands, pay attention to the respective documentation.



**Note!**

**Ambient temperature range restrictions**

The ambient temperature range can be restricted by the sealing or stopping plug and the cable gland. will be. Observe the respective documentation when installing the cable gland.



**Danger!**

Explosion hazards from live connection or disconnection

If you connect or disconnect M12 or 7/8" connectors to or from energized circuits in a potentially explosive atmosphere, this can cause sparks that might ignite the surrounding atmosphere.

Always deenergize the circuit before connecting or disconnecting M12 or 7/8" connectors.

## 8.4 Grounding/Shielding of Fieldbus Transmission Lines

Shielding connections of spurs are internally connected with the "S" terminal. Shielding connections of trunks are internally connected with the "T" terminal. The grounding terminals are connected with the external grounding clamp.

If you intend to hard-ground the shields of spurs: Connect the terminal "S" with one of the "Earth" terminals using the accessory part JB-BR-TB.

If you intend to hard-ground the shields of trunks: Connect the terminal "T" with one of the "Earth" terminals using the accessory part JB-BR-TB.

By connecting a suitable capacitor between the "Earth" and "S" or "T" terminals, a capacitive ground of the shield of the corresponding fieldbus transmission line is achieved.

If terminals "S" or "T" are not connected with the "Earth" terminal, the shield of the fieldbus transmission line in question is not grounded.

If the shield of the trunk or spurs of a fieldbus transmission line is grounded for EMC Directive reasons, observe the following requirements closely: IEC/EN 60079-14, section 12.2.2.3, PNO Handbook PROFIBUS MBP, section 3.3.3, or FOUNDATION Fieldbus Application Guides, Sections 6.2 and 6.3.

## 9 Connection Layout

### 9.1 Connection Layout of the F2 Housing

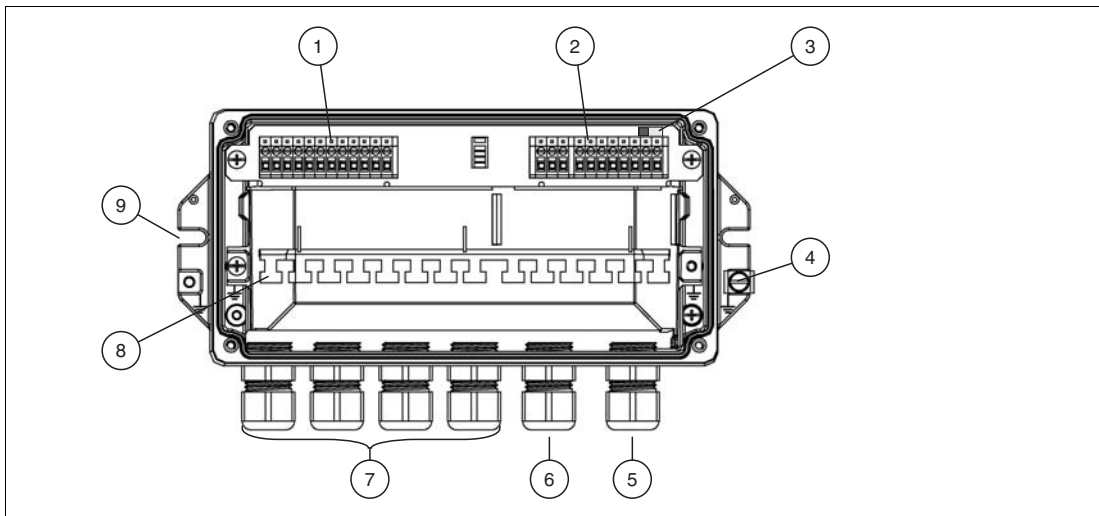


Figure 9.1 F2 housing (4, 6, or 8 outputs)

- 1 Connections for spurs
- 2 Connections for trunk
- 3 Slide switch terminator (only for non-explosion protected versions)
- 4 Grounding screw
- 5 Cable gland for trunk (output)
- 6 Cable gland for trunk (input)
- 7 Cable glands for spurs
- 8 Fastening option for connecting cables with cable fastener
- 9 Wall-mounting screw (6 mm)

Terminal	Function
1+, 2+, 3+, 4+, 5+, 6+, 7+, 8+	Spur (Spur) +
1-, 2-, 3-, 4-, 5-, 6-, 7-, 8-	Spur (Spur) -
1s, 2s, 3s, 4s, 5s, 6s, 7s 8s	Spur (Spur), shield
Ti+	Trunk, input (Trunk In) +
Ti-	Trunk, input (Trunk In) -
Tis	Trunk, input (Trunk In), shield
To+	Trunk, output (Trunk Out) +
To-	Trunk, output (Trunk Out) -
Tos	Trunk, output (Trunk Out), shield
Ts	Trunks, shield
S	Spurs, shield
Earth	Equipotential bonding

The "Tis" and "Tos" terminals are internally connected to terminal "T". Terminals "1s" ... "8s" are connected internally with terminal "S". The terminals "Earth" are connected to the external grounding clamp.

2018-03

## 9.2 Connection Layout of the F3 Housing

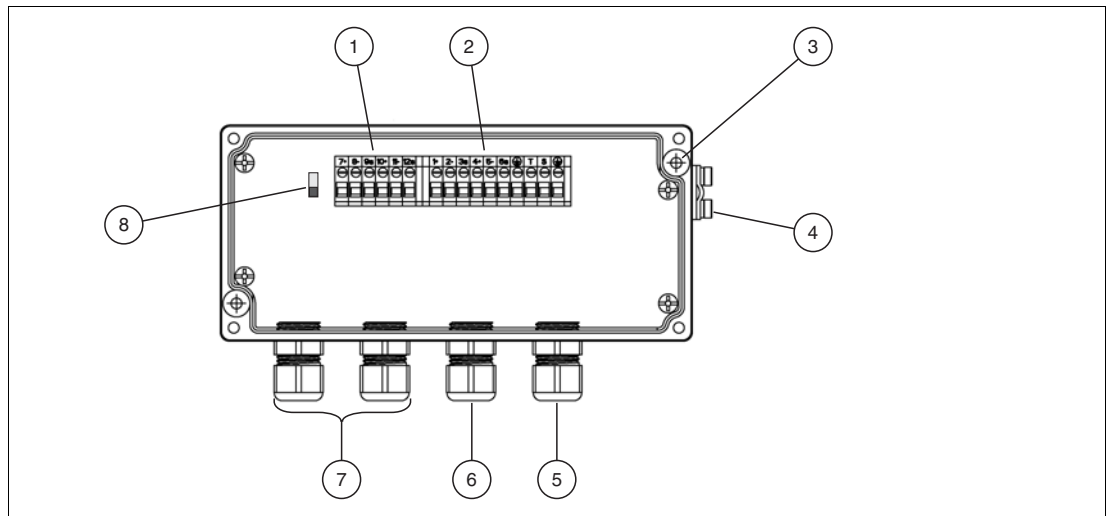


Figure 9.2 F3 housing (2 outputs)

- 1 Connections for spurs
- 2 Connections for trunk
- 3 Wall-mounting screw (4 mm)
- 4 Grounding clamp
- 5 Cable gland for trunk (output)
- 6 Cable gland for trunk (input)
- 7 Cable gland for spurs
- 8 Slide switch terminator (only for non-explosion-protected versions)

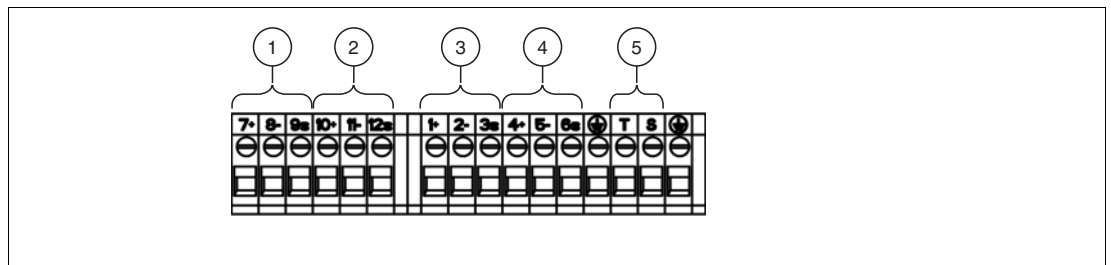


Figure 9.3 Connection layout of the terminal strip in the F3 housing (2 outputs)

- 1 Spur 1
- 2 Spur 2
- 3 Trunk In
- 4 Trunk Out
- 5 Shield

Terminals	Function
7+ and 10+	Spur +
8- and 11-	Spur -
9s and 12s	Spur, Shield
1+	Input: Trunk In +
2-	Input: Trunk In -
3s	Input: Trunk In, Shield
4+	Output: Trunk Out +
5-	Output: Trunk Out -
6s	Output: Trunk Out, Shield
T	Trunk, Shield
S	Spur, Shield
Earth	Equipotential bonding

The "3s" and "6s" terminals are internally connected to terminal "T". Terminals "9s" and "12s" are connected internally with terminal "S". The terminals "Earth" are connected to the external grounding clamp.

### 9.3 Connection Layout of the F4 Housing

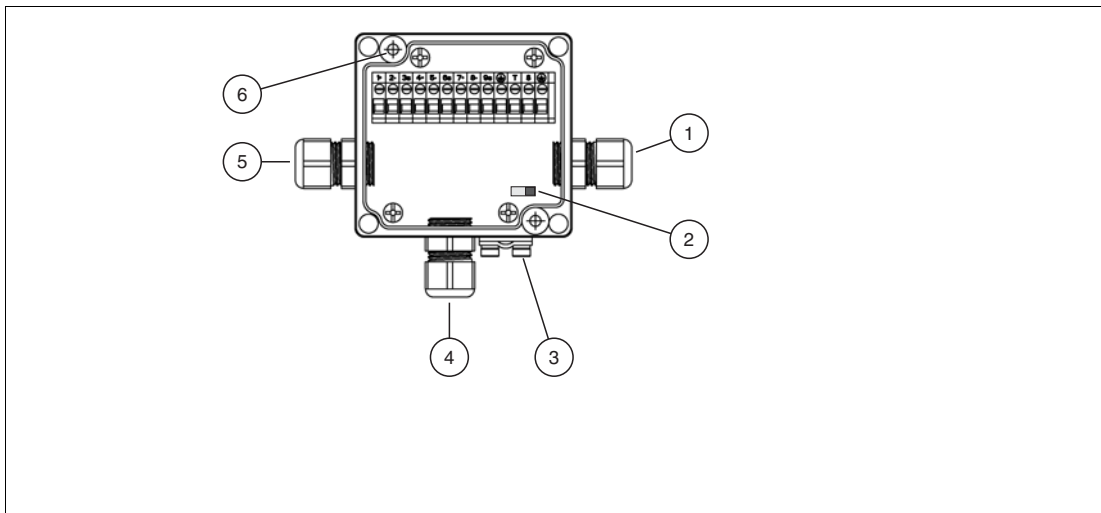


Figure 9.4 F4 housing (1 output)

- 1 Cable gland for trunk (output)
- 2 Slide switch terminator (only for non-explosion protected versions)
- 3 Grounding clamp
- 4 Cable gland for spur
- 5 Cable gland for trunk (input)
- 6 Wall-mounting screw (4 mm)



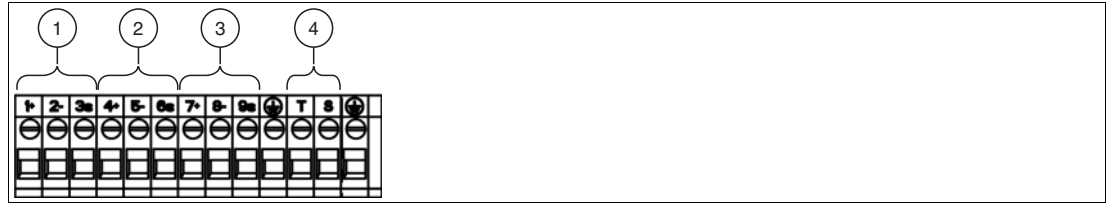


Figure 9.5 Layout of the connections of the internal terminal strip in the F4 housing (1 output)

- 1 Trunk In
- 2 Spur
- 3 Trunk Out
- 4 Shield

Terminal	Function
1+	Trunk, input (Trunk In) +
2-	Trunk, input (Trunk In) -
3s	Trunk, input (Trunk In), shield
4+	Spur (Spur) +
5-	Spur (Spur) -
6s	Spur (Spur), shield
7+	Trunk, output (Trunk Out) +
8-	Trunk, output (Trunk Out) -
9s	Trunk, output (Trunk Out), shield
T	Trunks, shield
S	Spurs, shield
Earth	Equipotential bonding

The "3s" and "9s" terminals are internally connected to terminal "T". Terminal "6s" is connected internally with terminal "S". The terminals "Earth" are connected to the external grounding clamp.



## 9.4 Connection Layout of Plug Connectors

M12 Connectors		7/8 in Connectors	
Socket	Plug	Socket	Plug

Table 9.1 Pinouts

For connectors contacts vary depending on the fieldbus system used.

PIN	PROFIBUS MBP Signal	FOUNDATION Fieldbus Signal
1	PA+	Data-
2	n. c. (GND)	Data+
3	PA-	Shield
4	Shield	n. c. (GND)

## 10 Maintenance of Cable Glands

The following section contains information concerning the installation and sealing of the cable glands.



### **Danger!**

Explosion hazard or danger to life from inadequate installation of cable glands

If you do not install cable glands according to the instructions given in the instruction manual, this can generate sparks that can ignite the surrounding potentially explosive atmosphere. Furthermore, insufficient installation practice can result in electric shock.

Ensure you carry out any cable gland installations in accordance with the instructions given in the instruction manual.

### **Installing Cable Glands**

When installing cable glands, observe the following:

- Only insert permanently laid cables and wires into the cable glands.
  - Ensure that the cables laid do not execute any strain on the cable glands.
  - For permissible cable diameters, refer to the respective datasheet.
- Use an appropriate strain relief clamp, e. g., a suitable cable clamp.
- Seal unused cable glands with a suitable plug or replace them with appropriate stopping plugs. Observe the required degree of protection.
  - For a choice of sealing plugs and stopping plugs, refer to the respective datasheets.
  - Note that the ambient temperature range can be restricted by the sealing plug or stopping plug.
- Protect plastic cable glands against mechanical hazard.



### **Note!**

#### **Careful when tightening cap nuts!**

- The cap nuts must be securely tightened. Tightening the cap nuts too much or not enough both can affect the degree of protection.
- The tightening torques of cap nuts vary, depending on the cable type used. For exact details refer to the documentation of your cable manufacturer.

## 10.1 Maintenance of the F\*-JB\*\*-...CG Cable Gland

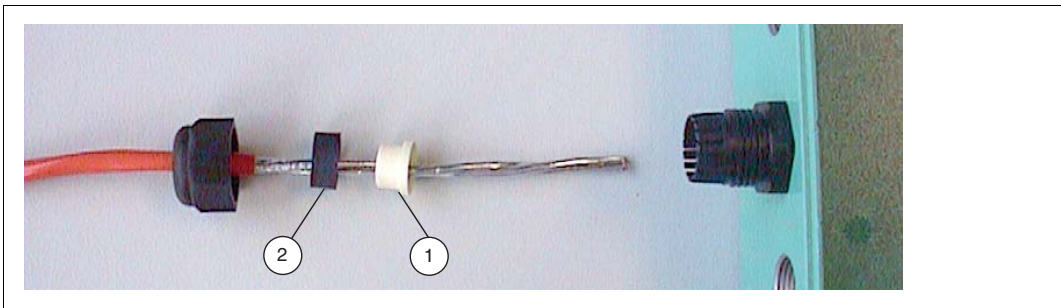


### Connectorizing Cables Using F\*...CG Cable Glands

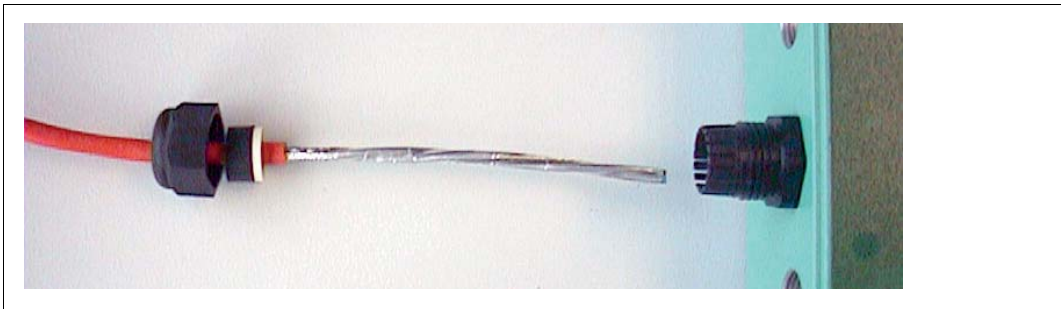
1. Strip the insulation of the cable up to about 160 mm.



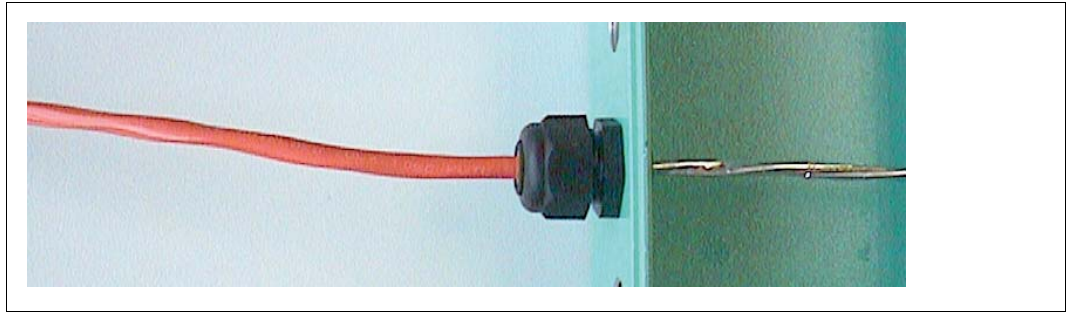
2. Loosen the cap nut and the seals from the device. Depending on the application, slip Seal 1 & Seal 2 or only the obligatory Seal 2 over the cable as shown:



1. Seal 1, used in the following instance: Type: M20 x 1.5, Terminal area: 5 ... 8 mm
2. Seal 2, obligatory
3. Move the required seal(s) over the cable until after the last seal about 5 mm insulation protrude before the stripped wire begins:



4. Insert the cable with the seals into the cable gland of the device and tighten the cap nut. The tightening torques of cap nuts vary depending on the cable type used and must be determined by the user. As a rule of thumb, the tightening torque is approx. 2.5 Nm for the F\*-JB\*\*-... .CG. See chapter 7.1.



## 10.2

### Maintenance of F\*-JB\*\*\*-...CGB and CGS Cable Glands

#### Connectorizing Cables Using F\*...CGB and CGS Cable Glands



1. Strip the insulation of the cable up to about 160 mm.



2. Loosen the cap nut from the device and push it onto the cable.

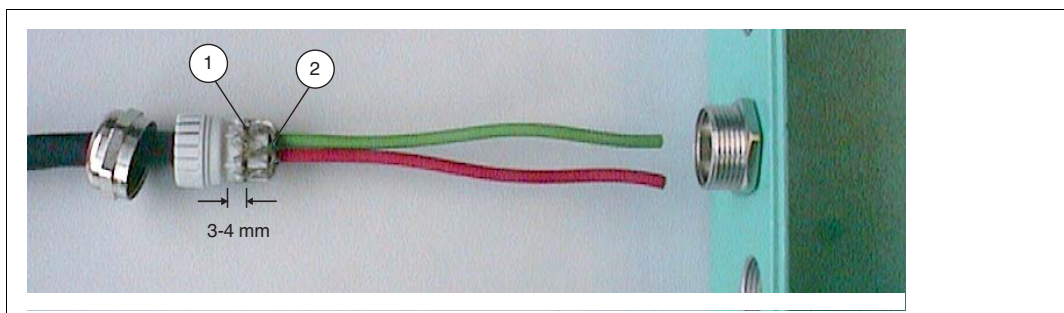


3. Remove the inner plastic piece and slip it onto the cable: move it far enough over the cable, so it completely surrounds the cable sheath. Ensure that no cable sheath protrudes behind the inner plastic piece.

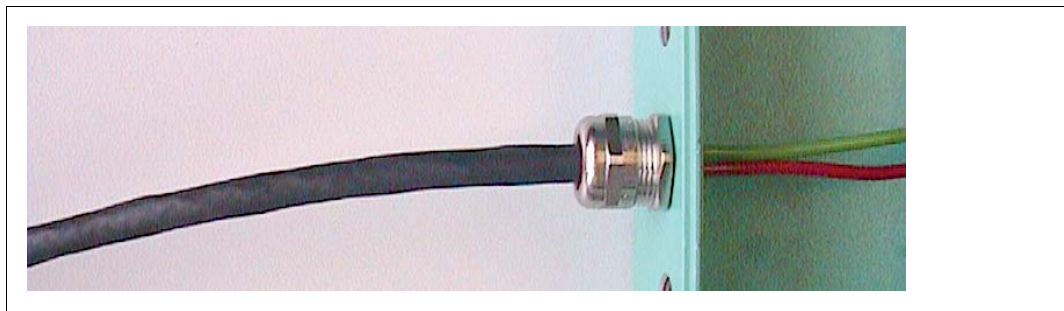




1. Inner plastic piece
2. O-ring
3. Invert the cable shield over the inside plastic piece and shorten it to a length of 3 ... 4 mm behind the O-ring.



1. O-ring
2. Inverted cable shield
3. Insert the cable wires with the inner plastic piece into the lower part of the cable gland.



4. Tighten the cap nut.  
The tightening torques of cap nuts vary depending on the cable type used and must be determined by the user. As a rule of thumb, the tightening torque is approx. 4.17 Nm for the F\*-JB\*\*-\*... .CGB and CGS. See chapter 7.1.

### 10.3 Maintenance of F\*-JB\*\*\*-...CGAB Cable Gland

For this cable gland, the type ADE No. 6 type 4F is used. For handling, refer to the following overview.

**CAPRI**  
MAINTIEN L'ENERGIE ELECTRIQUE  
36, rue des Fontenils - BP 6 - 41800 NOUAN-LE-FUZELIER  
Tél. : 02 54 95 24 00  
Site INTERNET : <http://www.capri-cables.com>

**PREPARATION DES CABLES ARMES**  
PREPARATION ARMORED CABLES

Tresse, Feuille, Filaire braidé, metal tape, single wire

Bague d'amarage  
Armour connecting and Ring clamping ring

Epanouissement de l'armure : Feuille, filaire ou tresse  
Spreading of armour: band, metal tape or wire

Cotes en mm  
All sizes in mm

Préparation Versions 3F & 4F		ØC	
A	D	A	B
4	35	10	8
5	40	12	13
6	45	15	18
7	50	17	23
8	55	20	31
9	60	22	34
10	65	24	39
11	70	26	46
12	75	28	54
13	80	30	62
14	85	32	72
15	95	34	87
16	100	36	97

**ENTREE DE CABLE Type ADE**  
ADE Type CABLE GLAND  
Pour Atmosphères explosives EExII-EExdIIB-EExdIIC ≤ 2000 cm<sup>3</sup>  
Explosive Atmospheres EExII-EExdIIB-EExdIIC ≤ 2000 cm<sup>3</sup>  
Certificat LCIE 97 ATEX 6008 X / Certificate LCIE 97 ATEX 6008 X

MARQUAGE : CAPRI CE 0081 ADE N°...00 II 2 G-D EExdIIB/EExeII

**MONTAGE**  
ASSEMBLY

**ADE 4F/4FM**  
Etanchéité sur gaine externe et interne  
Sealing on inner and outer sheath  
With armour connecting and clamping for metal tape single wire, braid

**ADE 3F/3F-IR**  
Etanchéité sur gaine interne  
Sealing on inner sheath

**ADE 1F**  
Etanchéité sur gaine externe  
Sealing on outer sheath  
Sans reprise d'armure  
Without armour clamping

**ENTREE DE CABLE Type ADE**

COUPLE DE SERRAGE	N°	4	5	6	7	8	9	10	11	12	13	14	15	16	17
4F/4FM	Chapeau / gland nut (Nm)	/	20	22	25	28	35	52	55	65	75	85	95	130	135
Chapeau interne / inner gland nut (Nm)	/	20	22	25	28	35	52	55	65	75	104	120	130	135	
3F/3F-IR	Chapeau / gland nut (Nm)	/	15	20	22	25	28	35	52	55	65	85	95	130	135
1F	Chapeau / gland nut (Nm)	15	20	22	25	28	35	52	55	65	75	104	120	130	135

**NOMENCLATURE**

1 - Chapeau externe / Outer gland nut  
2 - Grain / Washer  
3 - Bague d'étanchéité externe / Outer sealing ring  
4 - Chapeau interne / Inner gland nut  
5 - Bague d'amarage / Armour connecting and clamping ring  
6 - Foulloir / Washer  
7 - Bague d'étanchéité interne / Inner sealing ring  
8 - Corps Filetage ISO, NPT, PG / Body Thread ISO, NPT, PG  
M - Marquage / Marking

**SPECIFICATIONS TECHNIQUES**  
Conforme aux normes EN 50014, EN 50018, EN 50019, EN 50281-1-1.

Entrée de câble permettant le passage d'un câble Armé, ou non Armé dans une enveloppe :

- De sécurité augmentée EExeII tous volumes,
- Antidéflagrante EExdIIB tous volumes,
- Antidéflagrante EExdIIC volumes ≤ 2000 cm<sup>3</sup>

L'entrée de câble ADE 3F-IR est limitée aux atmosphères EExeII avec un IP65.

Utilisation Intérieure / Extérieure prévue pour les zones 1 & 2.

Gammes de température d'utilisation certifiées :

- - 40°C à + 100°C avec bague Néoprène,
- - 70°C à + 220°C avec bague Silicone.

Etanchéité IP 68 - 10 bars suivant CEI 529.

Raccrochage de tous câbles Non Armés : Un amarage efficace du câble doit être réalisé à proximité de l'entrée de câble par un dispositif approprié ou par un module d'amarage.

**TECHNICAL SPECIFICATIONS**  
Approval EN 50014, EN 50018, EN 50019, EN 50281-1-1.

Flameproof and Increased Safety cable gland for armoured or unarmoured cable :

- EExe II all volumes,
- EExd IIB all volumes,
- EExd IIC volumes ≤ 2000 cm<sup>3</sup>

ADE 3F-IR Cable gland is limited to explosive atmospheres EExe with IP65.

Indoor and Outdoor for zone 1 and 2 certified use temperatures :

- - 40°C, a + 100°C with Neoprene sealing,
- - 70°C, a + 220°C with Silicone sealing.

IP 68 - 10 bars CEI 529.

To connect unarmoured cable : clamping must be realised nearby the cable gland by a device or a clamping module.

## 10.4 Sealing Plug

Unused cable entries or cable glands must be closed with a sealing plug to maintain the degree of protection. When mounting the sealing plug, the cable entry must be provided with all seals.



### Mounting the Sealing Plug

1. Remove the cap nut (2) from the lower part of the cable entry (3).



Figure 10.1 Establishing the required degree of protection with a sealing plug

- 1 Sealing plug
  - 2 Cap nut
  - 3 Lower part of the cable entry.
2. Push the sealing plug (1) into the cable entry or cable gland as far as it will go.
  3. Tighten the cap nut securely. Observe the tightening torques, see chapter 10.1, see chapter 10.2.





## 11 Repair and Maintenance

The transmission behavior of the fieldbus junction box is stable even over long periods of time. Thus, there is no need for regular adjustments or the like. No other maintenance work is required.



## 12 Troubleshooting

Fieldbus distributors that are operated in explosion-hazardous areas must not be modified. In case of a fault, the fieldbus junction box must always be replaced.

Defective housing parts (e. g., the cover seal) may only be replaced by original parts. Repairs may only be carried out by specially trained and authorized personnel.



## 13

### Disposal

Disposal of devices and their packaging material must be performed in compliance with the applicable laws and guidelines of the corresponding country.

The devices do not contain batteries which need to be disposed of separately from the products.



## 14

## Appendix

### 14.1

### Accessories

Function	Type code
Stopping plug M12 connector	VAZ-V1-B
Stopping plug M20, approved for explosion-hazardous area	CG EX Plug MT 20X

# PROCESS AUTOMATION – PROTECTING YOUR PROCESS



## Worldwide Headquarters

Pepperl+Fuchs GmbH  
68307 Mannheim · Germany  
Tel. +49 621 776-0  
E-mail: [info@de.pepperl-fuchs.com](mailto:info@de.pepperl-fuchs.com)

For the Pepperl+Fuchs representative  
closest to you check [www.pepperl-fuchs.com/contact](http://www.pepperl-fuchs.com/contact)

[www.pepperl-fuchs.com](http://www.pepperl-fuchs.com)

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