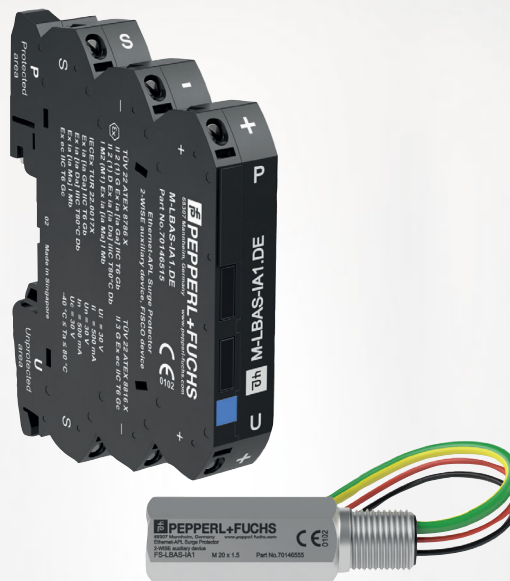


M-LBAS-IA1.*E, F*-LBAS-IA1

Ethernet-APL Surge Protector

Manual



Your automation, our passion.

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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	4
1.1	Content of this Document.....	4
1.2	Target Group, Personnel	4
1.3	Symbols Used	5
2	Product Specifications	6
2.1	Overview and Application.....	6
2.2	Use in PROFIBUS PA Applications.....	9
2.3	Dimensions and Component Overviews	10
2.3.1	F*-LBAS-IA1	10
2.3.2	M-LBAS-IA1.*E.....	10
3	Installation	12
3.1	Installation Requirements.....	12
3.2	Mounting.....	12
3.3	Connection	13
3.3.1	Connection M-LBAS-IA.*E.....	13
3.3.2	Connection F*-LBAS-IA1	15
4	Operation	17
5	Dismounting, Maintenance, and Repair	18
5.1	Disconnection of the Surge Protectors	18
5.1.1	Disconnection M-LBAS-IA1.*E	18
5.1.2	Disconnection F*-LBAS-IA1	19

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.



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.

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:



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

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

2 Product Specifications

2.1 Overview and Application

The Ethernet-APL Surge Protectors are designed to protect Ethernet-APL spur ports of Ethernet-APL rail field switches and field devices against voltage surges and indirect lightning. The design ensures Ethernet-APL network performance at 10 Mbit/s due to the compatibility of the device to the Ethernet-APL Port Profile Specification. To be protected ports of rail field switches and field devices need to be compliant to the Ethernet-APL Port Profile Specification which requires to withstand a minimum differential peak electric current of 25 A for a pulse shape of 8 μ s / 20 μ s according to IEC 61643-21.

The product family of Ethernet-APL surge protectors supports 2 different mounting options:

- M-LBAS-IA1.* DIN mounting rail version for cabinet installation
- F*-LBAS-IA1 thread type version for field mounting

The surge protectors are certified for use in intrinsically safe installations with type of protection Ex ia. The devices may be located in hazardous area Zone 1, Zone 21, Zone 2, and Zone 22 according to the Ethernet-APL intrinsically safe concept 2-WISE specified in IEC TS 60079-47.

M-LBAS-IA1.* types are also certified for use in FISCO applications.

F*-LBAS-IA1 type surge protectors are additionally certified as flameproof for installation in Zone 1 and Zone 2.

Note

For further information regarding Ethernet-APL refer to the "Engineering Guideline Ethernet-APL."

The surge protector F*-LBAS-IA1 for field mounting is designated to be installed directly at the housing of field devices or in an adequate separate housing. Normally, the housing has two opening. One is used to connect the spur cable through a cable gland, the other is used to install the surge protector.

- The version FS-LBAS-IA1 is intrinsically safe with ISO M20 thread.
- The version FN-LBAS-IA1 is intrinsically safe with 1/2" NPT thread.

The surge protector M-LBAS-IA1.* for cabinet installation is intended to protect field switch spur ports. The surge protectors are installed near to the field switch in a cabinet. The surge protector are mounted on a 35 mm x 7.5 mm DIN mounting rail according to EN 60715. The DIN mounting rail is used to attach the device in the switch cabinet and to ground the surge protectors. The DIN rail mounting ensures a ground connection for the device with the lowest possible resistance.

- M-LBAS-IA1.DE, intrinsically safe, shield directly connected to earth.
- M-LBAS-IA1.IE, intrinsically safe, shield connected to earth through a gas discharge tube (GDT).



M-LBAS-IA1.IE

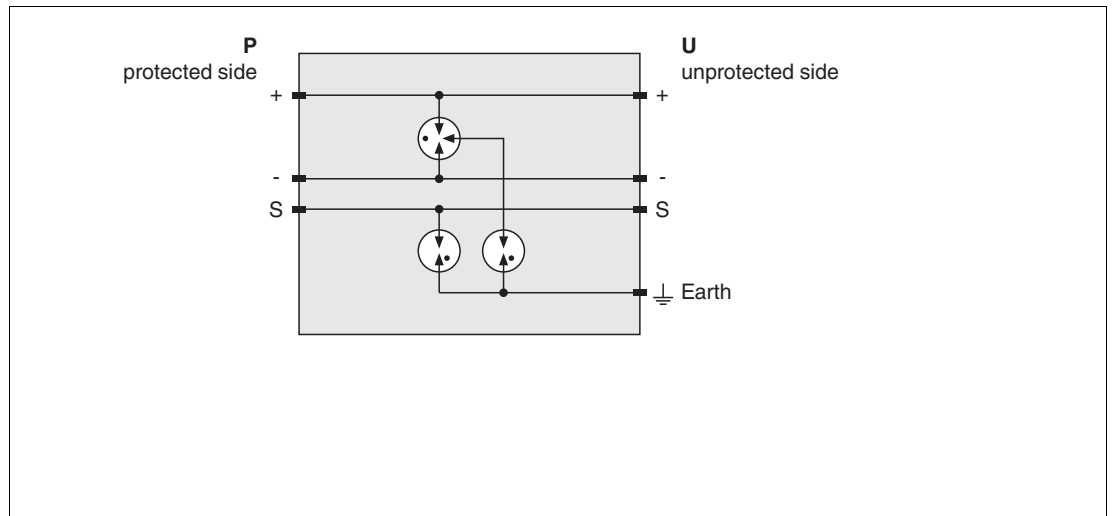


Figure 2.1 Circuit diagram M-LBAS-IA1.IE

- + APL+ (screw terminal 3+4)
- APL- (screw terminal 2+5)
- S Shielding (screw terminal 1)

M-LBAS-IA1.DE

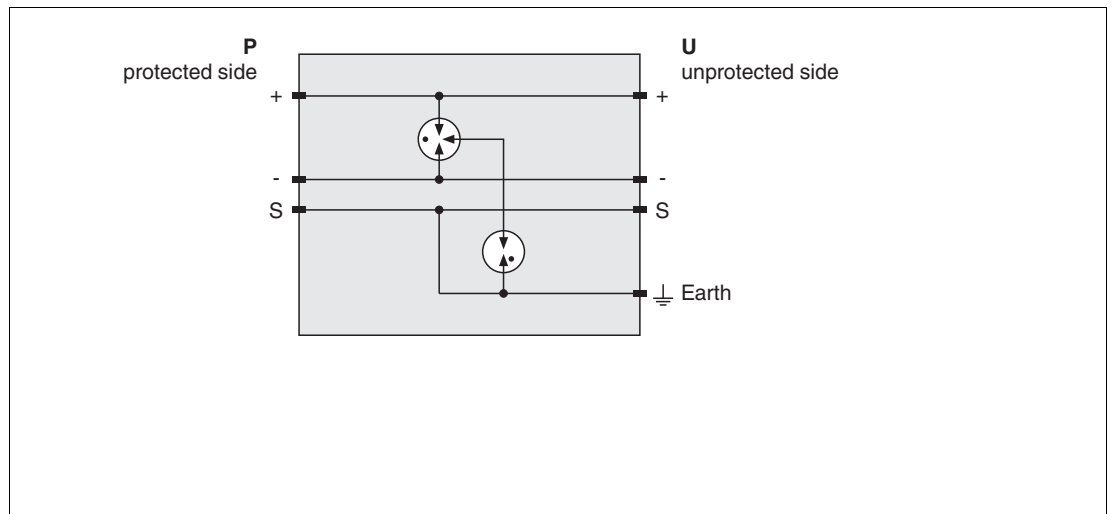


Figure 2.2 Circuit diagram M-LBAS-IA1.DE

- + APL+
- APL-
- S Shield

F*-LBAS-IA1

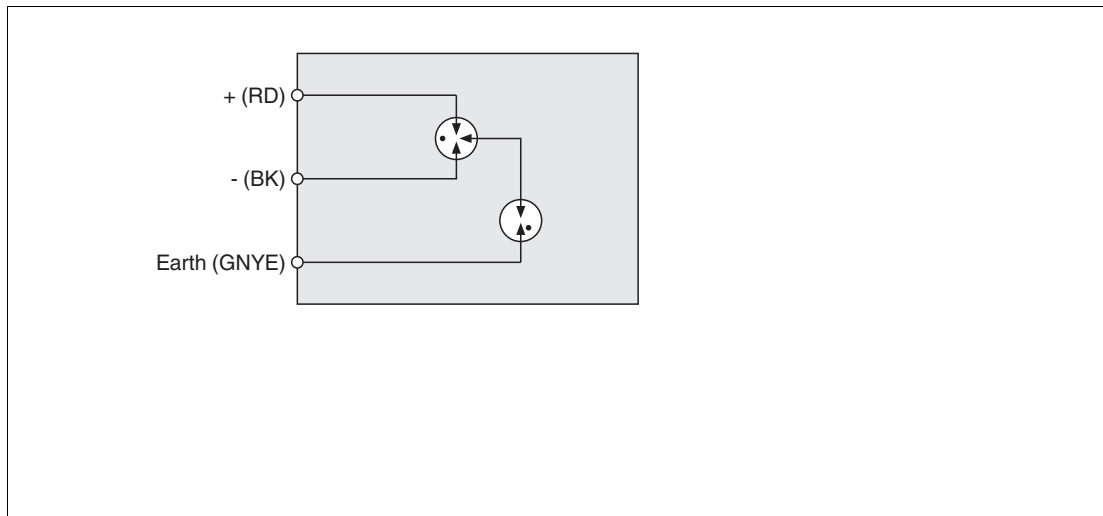


Figure 2.3 Circuit diagram F*-LBAS-IA1

- + (RD)** Red wire, APL+
- (BK)** Black wire, APL-
- Earth (GN/YE)** Green/yellow wire, earth

Cable Shield Grounding Concepts

The surge protectors for cabinet installation support the two cable shield grounding concepts specified by Ethernet-APL (see also "Engineering Guideline Ethernet-APL").

M-LBAS-IA1.DE - Direct Grounding

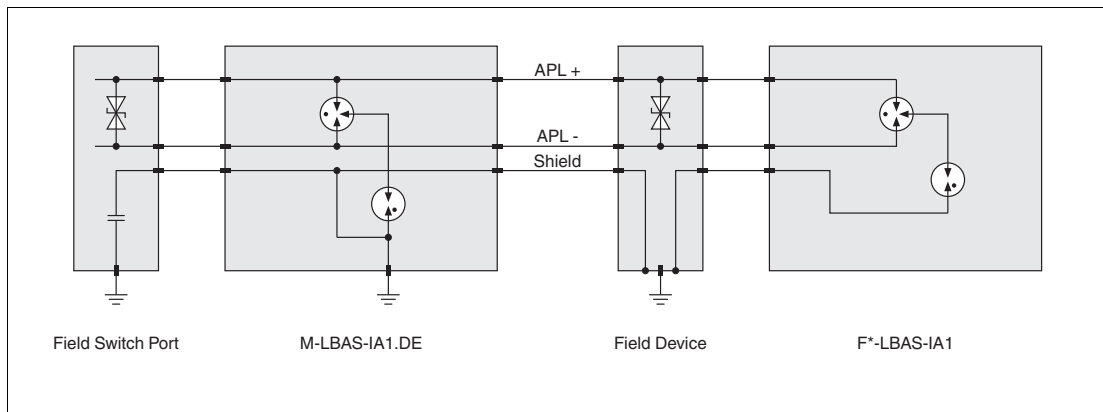


Figure 2.4 Spur configuration with direct grounding of the cable shield at both ends

The direct grounding of the cable shield at the switch through the surge protector and the direct grounding at the field device guarantees the highest rejection against electromagnetic interferences. The cable shield must be connected with low impedance to ground. Direct grounding at both ends shall only be used if the equipotential bonding system of an installation is controlled and equalized to prevent circulating electric currents.

M-LBAS-IA1.IE - Indirect Grounding

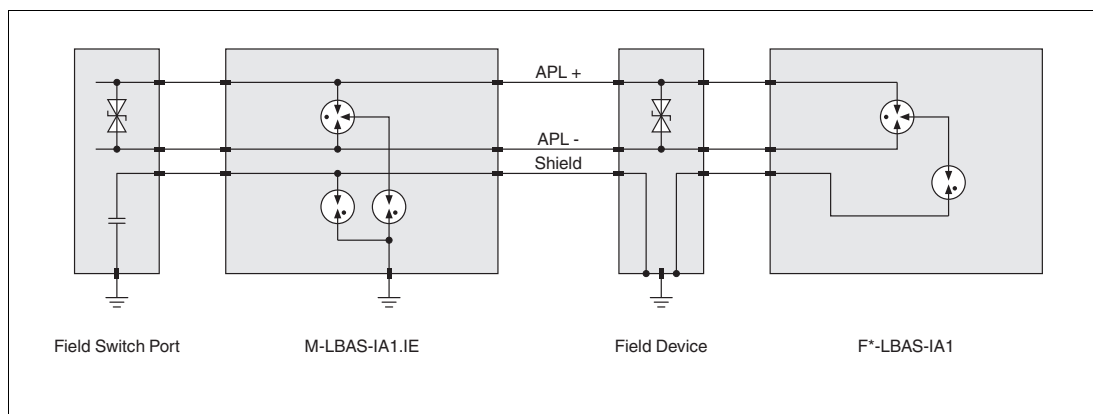


Figure 2.5 Spur configuration with indirect grounding of the cable shield at the switch port

The indirect grounding of the cable shield at the switch through the surge protector and direct grounding at the field device is used if direct grounding of both ends of the cable shield is not practical or could lead to shield ground loops or circulating electric currents. The surge protector version M-LBAS-IA1.IE does isolate in normal operation the shield from earth. The spur port of the rail field switches couple capacitively the shield to earth. When a surge or lightning occurs, the M-LBAS-IA1.IE discharges both leads and the cable shield to earth. The cable shield at the field device must be connected directly to earth.

2.2 Use in PROFIBUS PA Applications

Optionally, PROFIBUS PA devices are connectable to the spur ports of the Ethernet-APL rail field switch from Pepperl+Fuchs instead of Ethernet-APL field devices. Surge protectors for Ethernet-APL and PROFIBUS PA are technically different. Only a surge protector for Ethernet-APL can adequately protect an Ethernet-APL port and support its higher communication data rate. A surge protector for PROFIBUS PA does not support higher communication data rates of Ethernet-APL.

Combining the voltage protection of the switch spur port and Ethernet-APL surge protector provides adequate protection also for use with PROFIBUS PA.

Recommendation: To minimize the cost and effort for migration from a PROFIBUS PA to an Ethernet-APL field device, use an Ethernet-APL surge protector to protect the field switch port and a PROFIBUS PA surge protector to protect the field device. For the use in PROFIBUS PA installations, Pepperl+Fuchs provides the surge protector version F*LBF-I1.32. When migrating to an Ethernet-APL field device, only the surge protector at the field devices needs to be replaced.

2.3 Dimensions and Component Overviews

2.3.1 F*-LBAS-IA1

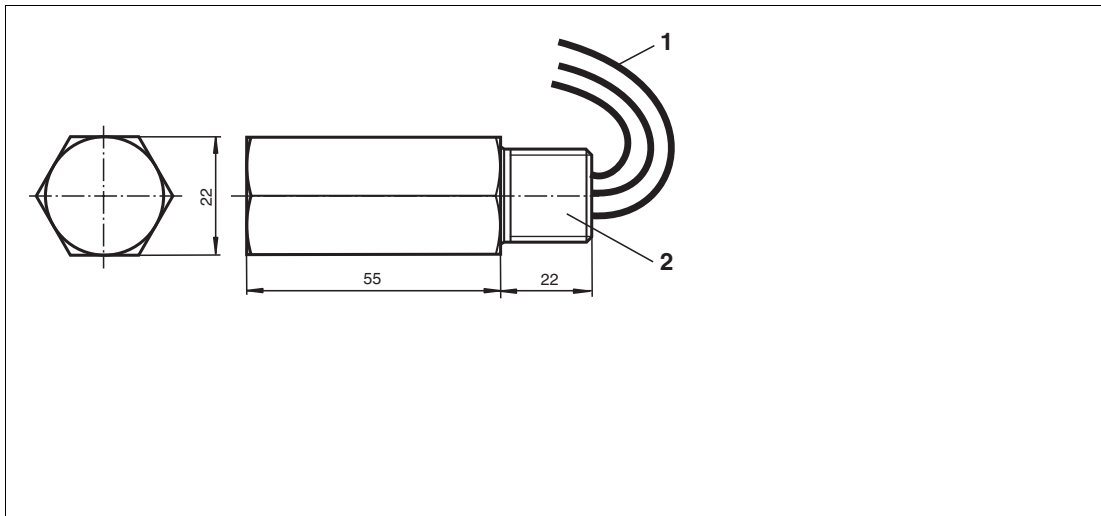


Figure 2.6

Position	Description	Color	Cable cross section	Cable length
1	APL+	Red	0.8 mm ²	100 mm
	APL-	Black	0.8 mm ²	100 mm
	Earth	Green/yellow	1.3 mm ²	100 mm
2	FS-LBAS-IA1: M20 x 1.5 thread			
	FN-LBAS-IA1: 1/2"NPT thread			

2.3.2 M-LBAS-IA1.*E

Dimensions

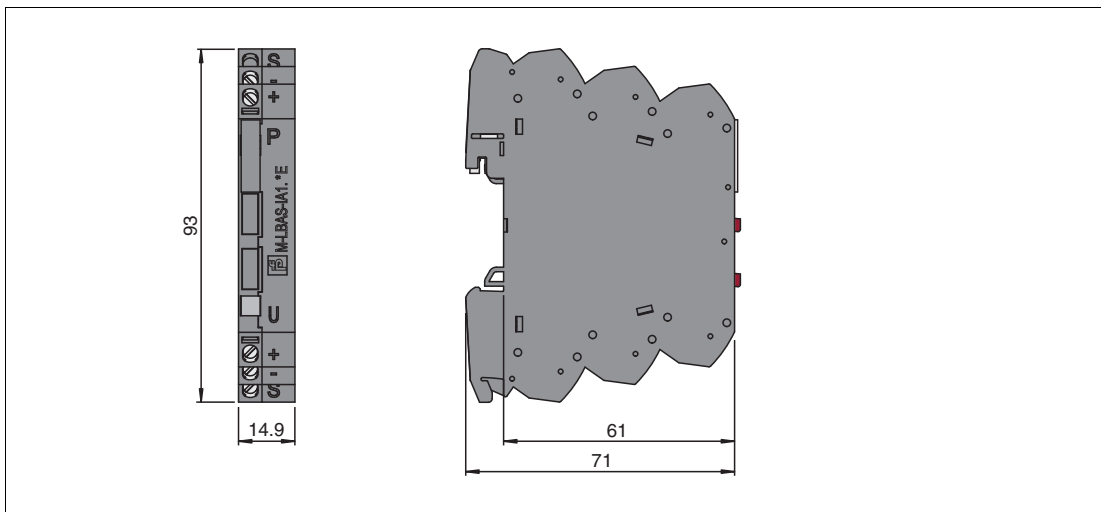


Figure 2.7

Assembly

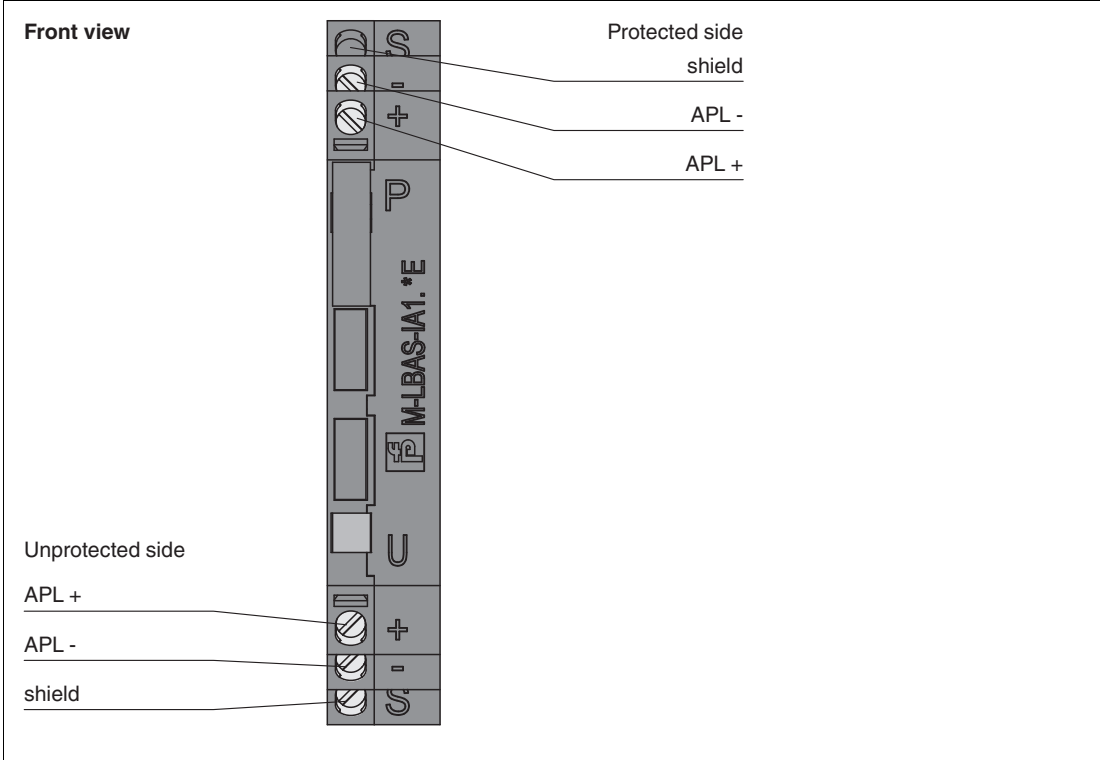


Figure 2.8

3 Installation

3.1 Installation Requirements

Prior to mounting, installation, and commissioning of the device you should make yourself familiar with the device and carefully read the instruction manual.

3.2 Mounting



Mounting M-LBAS-IA.*

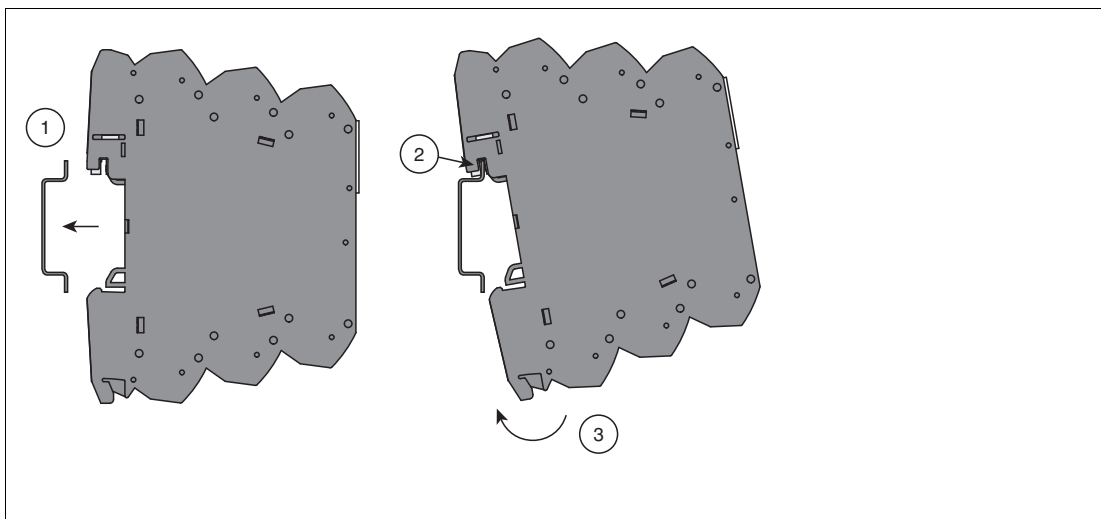


Figure 3.1



Note

Only use a 35 mm x 7.5 mm DIN mounting rail.

1. Position the rail field switch on the DIN mounting rail.
2. Use the top hook in order to hook the electronics onto the DIN mounting rail.
3. Move the bottom hook over the lower end of the DIN mounting rail until the locking mechanism engages.

↳ The device is fixed on the DIN mounting rail. The ground connection is established.



Mounting F*-LBAS-IA1

The surge protectors may be installed into a thread hole of a housing of the field device or an appropriate enclosure.



Note

To prevent the device from coming loose in the thread and to ensure the degree of protection., observe the following requirements:

- Use a sealing tape made of PTFE (Polytetrafluoroethylene).
- Wrap a sufficient amount of sealing tape layers tight around the external thread of the surge protector.
- For a tape with a thickness of 0.1 mm and a width of 12 mm 2 ... 3 layers are sufficient. For other sealing tape thicknesses the number of layers might need to be adjusted.
- Ensure that the sealing tape is not loosening when the surge protector is screwed into the enclosure.
- Place the tape at the position of the thread where sealing is required.

1. To screw in the surge protector into the thread hole, use a 20 mm wrench.

3.3

Connection



Danger!

Explosion hazard from live wiring of non-intrinsically safe circuits

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

Only connect or disconnect energized non-intrinsically safe circuits in the absence of a potentially explosive atmosphere.



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.

3.3.1

Connection M-LBAS-IA.*E



Note

- Keep the length of the unshielded wires as short as possible.
- The twist of the unshielded wire pair + and – should be extended to as close as practical to surge protector terminals.



Connecting the Cable via the Screw Terminals

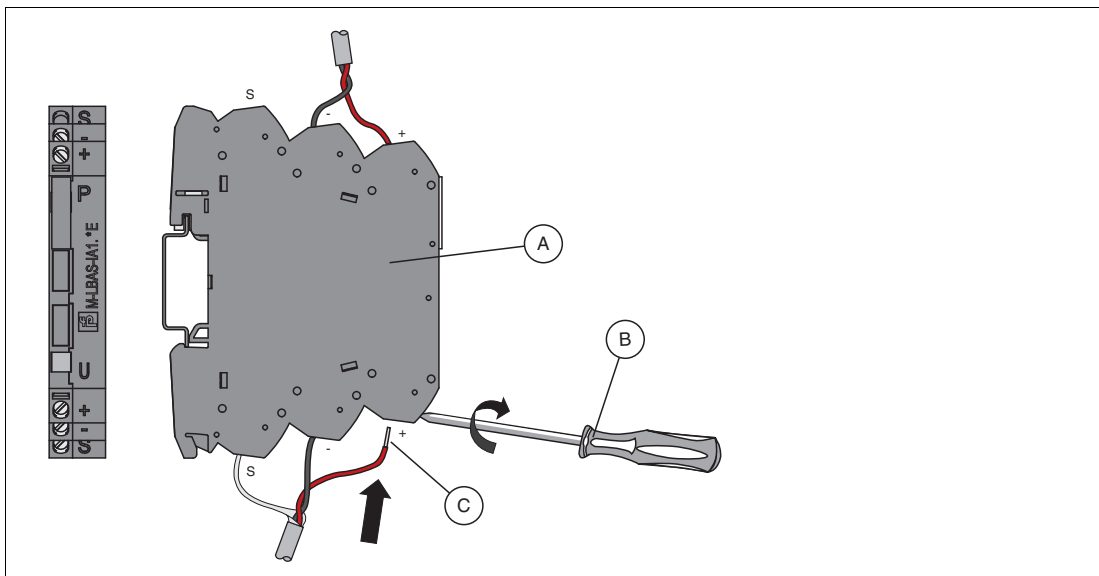


Figure 3.2

- A** Device with screw terminals
- B** Slot-head screwdriver
- C** Cable wire

1. Plug the protected cable wires APL+, APL– and shield of the cable connection to the switch port into the terminals on the device (top side “P”).



Note

Tightening Torque

Observe the tightening torque of the terminal screws. The tightening torque is 0.5 Nm ... 0.6 Nm.

2. Tighten the terminal screw with the slot-head screwdriver (B).
3. Plug the unprotected field cable wires APL+, APL– and shield into the terminals on the device (top side “U”).



Note

Tightening Torque

Observe the tightening torque of the terminal screws. The tightening torque is 0.5 Nm ... 0.6 Nm.

4. Tighten the terminal screw with the slot-head screwdriver (2).

Ground Connection

The surge protector with DIN rail mounting provides a clamp connection to the DIN mounting rail to discharge electric current in case of an overvoltage event. The DIN mounting rail needs to be connected to earth. Ensure that the cable from the DIN mounting rail to earth is short and has a minimum diameter of 4 mm².

Observe that the unprotected cabling does not affect the protected cabling. When laying the cables, ensure that the distance between the unprotected cabling connected to earth and the protected cabling is sufficient.

Example of a Correct Ground Connection

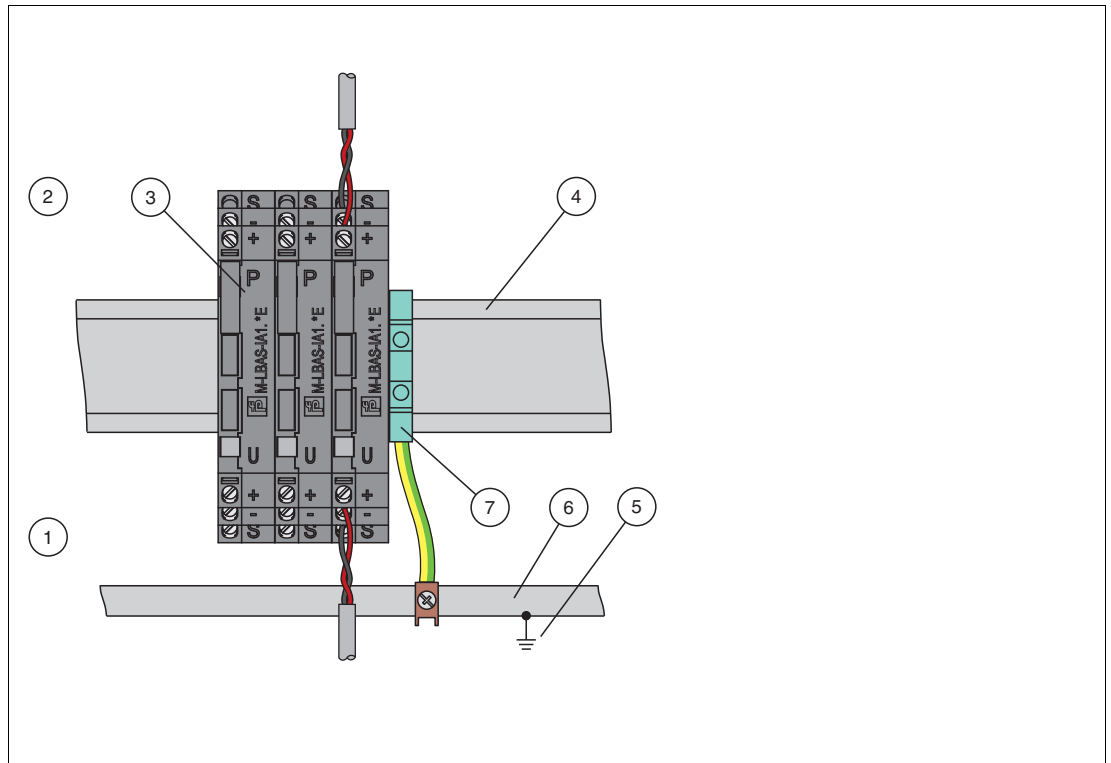


Figure 3.3

- 1 Unprotected side
- 2 Protected side
- 3 Surge protectors
- 4 DIN mounting rail
- 5 Earth connection
- 6 Equipotential bonding
- 7 Terminal block

3.3.2

Conection F*-LBAS-IA1



Note

- Observe the permissible core cross section of the terminals you want to attach to the wires of the surge protector (+ and – 0.8 mm², PE 1.3 mm²).
- Do not extend the wires.
- Keep the length of the wires as short as possible.
- The unshielded wire pair + and – should be twisted to as close as practical to the field device or junction box housing port terminals.



Connecting the Cable to Screw Terminals of a Field Device or Junction Box Housing

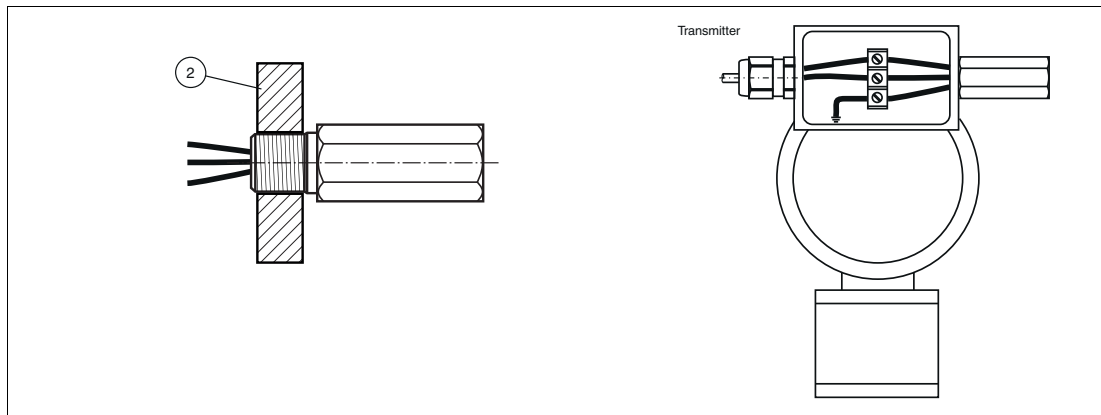


Figure 3.4

1. Plug the wires +, -, and PE of the cable to the terminals of the field device or junction box housing.
2. Tighten the terminal screw with the slot-head screwdriver (2). Observe the tightening torque of the terminal screws.

4

Operation



Danger!

Explosion hazard from live wiring of non-intrinsically safe circuits

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

Only connect or disconnect energized non-intrinsically safe circuits in the absence of a potentially explosive atmosphere.



Danger!

Explosion hazard from sparking when using operating elements on devices with equipment protection level Gc

Using operating elements in a potentially explosive atmosphere can cause sparks that can ignite the surrounding atmosphere.

Only use operating elements (e. g., switch, slider, button, etc.) in the absence of a potentially explosive atmosphere.

5 Dismounting, Maintenance, and Repair



Danger!

Danger to life from using damaged or repaired devices.

Using a defective or repaired device can compromise its function and its electrical safety.

- Do not use a damaged or polluted device.
- The device must not be repaired, changed or manipulated.
- If there is a defect, always replace the device with an original device from Pepperl+Fuchs.



Caution!

Property damage from use of inappropriate tool

Using an inappropriate tool may damage the housing.

Only use a slot-head screwdriver with a size of 3.0 x 0.5 mm.

5.1 Disconnection of the Surge Protectors



Danger!

Explosion hazard from live wiring of non-intrinsically safe circuits

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

Only connect or disconnect energized non-intrinsically safe circuits in the absence of a potentially explosive atmosphere.

5.1.1 Disconnection M-LBAS-IA1.*E



Removing the Cables from the Screw Terminal

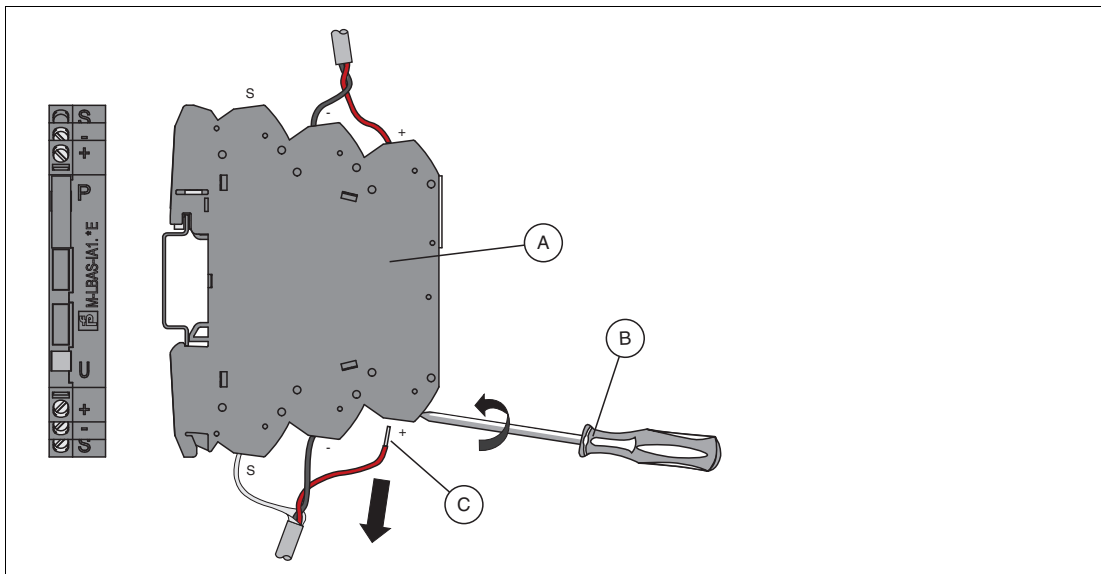


Figure 5.1

- A** Device with screw terminals
- B** Slot-head screwdriver
- C** Cable wire

1. Loosen the screw of the terminal with the slot-head screwdriver (B).
2. Pull the individual wires out of the terminal.



Dismounting the Surge Protector with DIN Rail Mounting

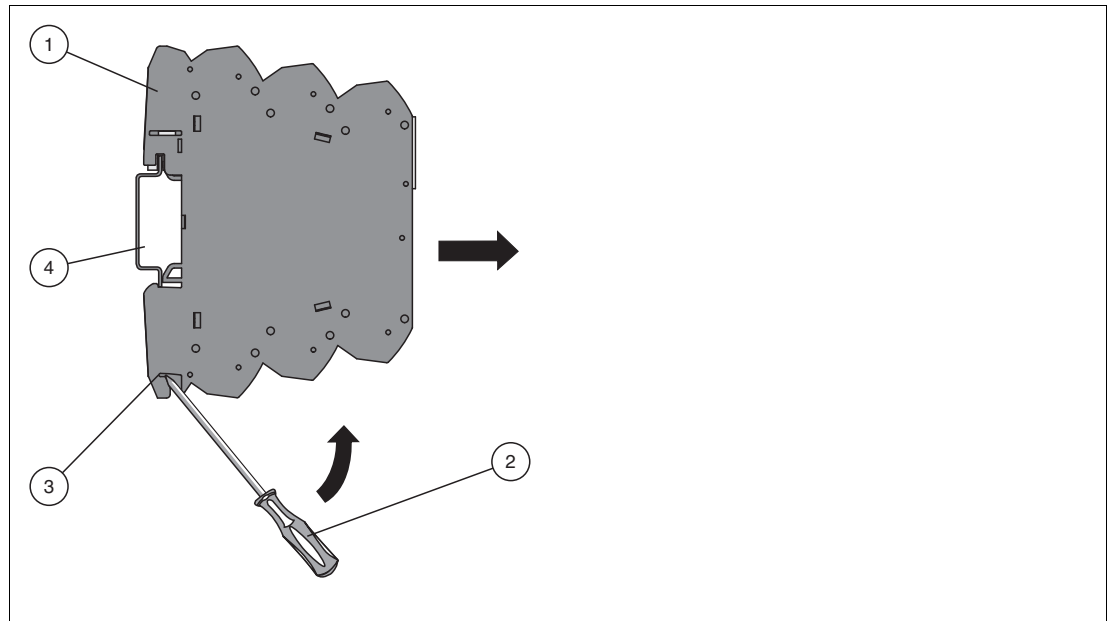


Figure 5.2

- | | |
|---|-----------------------|
| 1 | Device |
| 2 | Slot-head screwdriver |
| 3 | Mounting bracket |
| 4 | DIN mounting rail |

1. Insert the screwdriver (2) into the groove of the mounting bracket (3).
2. Press the screwdriver (2) in the specified direction until the lock on the DIN mounting rail (4) opens.
3. Remove the device (1) from the DIN mounting rail (4).

5.1.2 Disconnection F*-LBAS-IA1



Removing the Cables from the Screw Terminal of the Field Device or Junction Box Housing

1. Loosen the screw of the terminal with the slot-head screwdriver.
2. Pull the individual wires out of the terminal.



Dismounting of the Surge Protector with DIN Mounting Rail

1. Turn out the surge protector of the thread by using a 22 mm wrench.

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Explosion Protection

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- Level Measurement

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- Proximity Sensors
- Photoelectric Sensors
- Industrial Vision
- Ultrasonic Sensors
- Rotary Encoders
- Positioning Systems
- Inclination and Acceleration Sensors
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- Identification Systems
- Displays and Signal Processing
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