

9371-FB-XX-SS – 6-spur 9373-FB-XX-SS – 12-spur

Fieldbus Barrier Assemblies

(for Version 2 models and later)



Declaration of Conformity

A printed version of the Declaration of Conformity has been provided separately within the original shipment of goods. However, you can find a copy of the latest version at <http://www.mtl-inst.com/certificates>


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GENERAL SAFETY INFORMATION

Safety instructions for installation and operating personnel


The operating instructions provided here contain **essential safety instructions** for installation personnel and those engaged in the operation, maintenance and servicing of the equipment.

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|  | WARNING! |
| | Failure to comply with these instructions can endanger the lives or health of personnel and risk damage to the plant and the environment. |

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|  | WARNING! |
| | The responsibility for planning, installation, commissioning, operation and maintenance, particularly with respect to applications in explosion-hazard areas, lies with the plant operator. |

Before commencing installation or commissioning:

- Read and understand the contents of this manual
- Ensure installation and operating personnel have received adequate training for this task
- Ensure that any operating instructions are fully understood by the personnel responsible.
- Observe national and local installation and mounting regulations (e.g. IEC 60079-14).

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|  | WARNING! |
| | These assemblies may not be used in explosion-hazard area applications if they have been used previously in general electrical installations. |


During operation:

- Make the relevant instructions available at all times to the operating personnel.
- Observe safety instructions.
- Observe national safety and accident prevention regulations.
- Operate the equipment within its published specification.
- Servicing, maintenance work or repairs not described in this manual must not be performed without prior agreement with the manufacturer.
- Any damage to this equipment may render its explosion protection null and void.
- No changes to any of the components that might impair their explosion protection are permitted.

If any information provided here is not clear:

- Contact Eaton's MTL product line or one of its representatives.

Note: Improper installation and operation of the enclosure can result in the invalidation of the guarantee.

| | |
|--|-------------------------------------|
| 9371-FB-PC-SS | |
| MTL fieldbus barrier, 6-spur spr clmp ss | |
| Tested <input type="text"/> | SN: XXXXXXXXXX <input type="text"/> |
| Inspected <input type="text"/> | VER: 03 |
| EATON ELECTRIC LTD Luton, England. Made in England.  | |

Example of internal label showing version number

937X-FB-XX-SS Fieldbus Barrier 6- & 12-spur, stainless steel enclosure

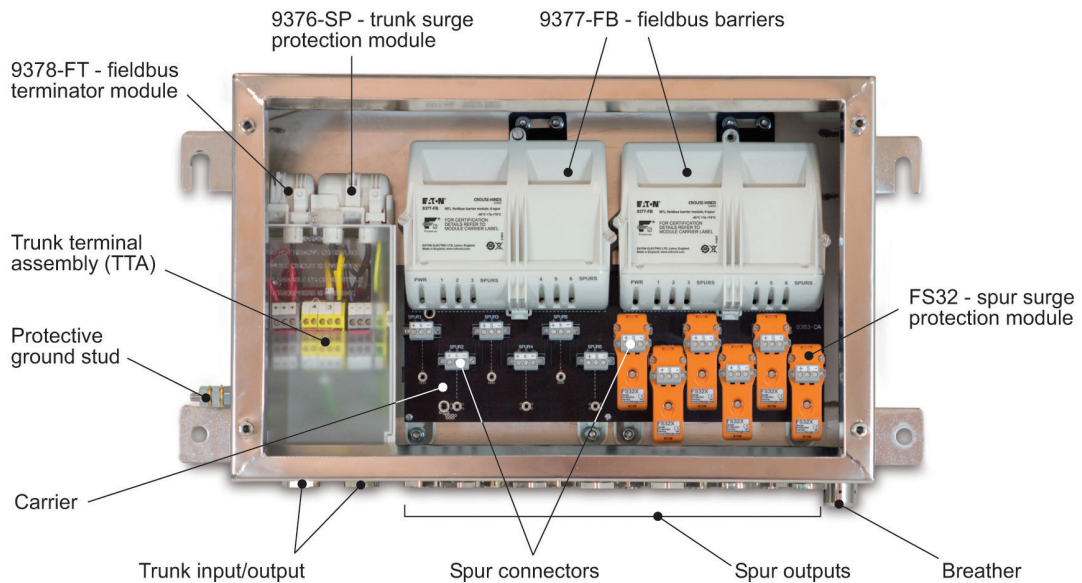


Figure 1.1 - Example of model 9373-FB-ST-SS with trunk surge protection module and six FS32 spur surge protection modules

1 OVERVIEW

This manual relates to *Version 2 and later* Fieldbus Barrier enclosures. For details of earlier versions refer to manual INM9370-SS-1.

IMPORTANT: Enclosures from *Version 4 onwards* are fitted with the latest type of fieldbus barrier, the **9377-FB-R**. The earlier **9377-FB** barrier **cannot be fitted** to the *Version 4 (and later)* enclosures, but the newer barrier can be retro-fitted to earlier *Version 2 and Version 3* enclosures. The **9377-FB-R** modules have similar or improved electrical specifications to **9377-FB** in every respect - see datasheet.

(Note: The enclosure version number is below the bar code on the product label on the right-hand inside wall of the enclosure - see label example on page iv opposite.)

This manual explains the installation and maintenance procedures for the 937x-FB-XX-SS Fieldbus Barrier enclosures and must be read in association with the product datasheets that contain the electrical data.

The 9371-FB-XX-SS and 9373-FB-XX-SS Fieldbus Barrier enclosures are field-mounted wiring hubs that create six or twelve intrinsically safe spur connections, respectively, from a single non-intrinsically safe trunk, for connection to FOUNDATION™ fieldbus H1 fieldbus instruments. The incoming fieldbus trunk and the output spurs may optionally be fitted with surge-protection devices.

The enclosure material is electrochemically polished 316 stainless steel and may be installed in a Zone 1 or Zone 2 hazardous area.

The following enclosure types are available by ordering the appropriate model number.

9371-FB-XX-SS Fieldbus Barrier system, 6-spur, stainless steel enclosure

9373-FB-XX-SS Fieldbus Barrier system, 12-spur, stainless steel enclosure

Where XX = PS (pluggable screw terminal connectors) or
PC (pluggable spring clamp connectors)

2 DESCRIPTION

The model numbers given comprise a stainless steel, increased safety, Ex e enclosure containing one or two carrier-mounted fieldbus barriers. A single barrier module converts a single, non-intrinsically safe fieldbus trunk into six intrinsically safe (IS) spur connections for connection to FOUNDATION™ fieldbus H1 fieldbus instruments.

Inside the enclosure, the incoming trunk wiring enters a separate compartment, called the Trunk Terminal Assembly (TTA) that contains increased safety (Ex e) trunk wiring terminals. This assembly has a protective cover to deter interference, and carries a warning to the user about working on trunk wiring without first isolating the power. A fieldbus Terminator module (part no. 9378-FT) is supplied pre-fitted on the TTA. This is to remain installed if the enclosure is at the end of the segment. If the incoming fieldbus trunk will be onward linked to a further node on the segment the terminator can be removed.

The spurs are galvanically isolated from the trunk allowing the user to choose the type of grounding scheme most suitable to their system. Spur short-circuit protection is provided by the barrier and surge protection can also be added on individual outgoing spurs by the use of individual Spur Surge protection modules (part no. FS32).

An optional Trunk Surge module (part no. 9376-SP) can be plugged into the TTA to protect the fieldbus barrier against damaging voltage and current surges on the incoming trunk wiring.

The polished stainless steel enclosures may be installed in a Zone 1 or Zone 2 hazardous area; in which case, the trunk wiring must be implemented using suitably protected cable. They provide excellent chemical and moisture resistance and are suitable for use in a wide range of corrosive environments.

The 937x-FB-XX-SS fieldbus barrier enclosures are bus-powered and they require no additional power supply in the field. When used with a fieldbus host control system, power for the trunk MUST be provided only by a supply conforming to IEC 61158-2, e.g. MTL F800 or MTL 918x range of redundant power supplies.

The enclosures are supplied pre-drilled for all trunk and spur cable entries and fitted with Ex e certified blanking plugs and a breather.


3 MECHANICAL INSTALLATION

See Figures 3.1 and 3.2 for the dimensions, fixing locations and cable gland positions for both enclosure models.

3.1 Mounting overview

Before mounting an enclosure, consider the following points.


- a) The permitted ambient temperature range external to the enclosure (-40°C to $+70^{\circ}\text{C}$) must not be exceeded. Avoid radiant heat by locating the enclosure away from direct sunlight or local sources of heat.
- b) The enclosure has an ingress protection rating of IP65 or IP66 (to EN60529) depending on the manufacturing date. The mounting location should be chosen to comply with the rating of the enclosure.
- c) The enclosure is designed for mounting on a vertical surface, with the cable entry at the lowest point, as shown in the upper part of Figure 3.1 or Figure 3.2.
- d) Adequate security should be provided against unauthorised interference.
- e) All the necessary gland holes have been prepared in the enclosure. One has a breather fitted and the others are fitted with appropriate blanking plugs. Where the blanking plugs are replaced by cable gland, the fitted glands must be Ex e certified and have an ingress protection (IP) rating that maintains the overall rating of the enclosure.
- f) All cable gland holes must be fitted with either a suitable cable gland or blanking plug.

| | |
|---|---|
|  | WARNING! |
| | It is not permitted to create additional holes in the enclosure as this would violate the certification. |

3.2 Preparation

- a) Remove any temporary protection or packing materials.
- b) The enclosure can be mounted on any suitable structure using the enclosure's integral mounting brackets.
- c) The fixing bolts must be suitable for the mounting surface and the environmental conditions.
- d) Prepare holes in the mounting surface, on the centres shown in Figure 3.1 or 3.2, to accept suitable screws/bolts for mounting.
- e) It is advisable before mounting, to do any necessary replacement of the cable entry blanking plugs with a suitable gland. For further details see Section 3.1 e) & f).

3.3 Mounting

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|  | WARNING! |
| | <p>To minimise the risk of ignition by electrical apparatus in hazardous areas, efficient installation, inspection and maintenance of apparatus and systems is essential, and the work should be carried out by suitably trained personnel in accordance with the prevailing code of practice.</p> <p>The certification documents specify "Conditions for safe use" that must be adhered to and the copy certificate supplied should be studied and understood. Additionally it is recommend that a working knowledge of IEC EN 60079 -14 be attained, as this standard provides guidance in respect to the installation of electrical equipment in hazardous areas.</p> |

3.3.1 Fixing the enclosure to a surface

The enclosure can be used as a template. With help from at least one other person, hold it in the position required and mark the surface through the top slotted lugs only (as shown in Figures 3.1 and 3.2). Open up these hole positions to a suitable size and depth.

For concrete/masonry

- a) Fit washers onto two expanding fixing bolts and screw the bolts into prepared holes to a depth that will allow the enclosure to be safely hung on them.
- b) Support the enclosure on these top bolts and mark the lower fixing points on the mounting surface through the mounting lugs.
- c) Remove the enclosure and put it to one side. Open up, to a suitable size and depth, the hole positions that were marked on the mounting surface.
- d) Re-hang the enclosure on the top bolts and fit the bottom fixing bolts (and washers) for the lower lugs and secure them.
- e) Finally, tighten all fixing bolts to the manufacturers recommended torque value.

For a steel structure


- a) After marking and preparing the top holes, put the enclosure in position and fix it with bolts, washers and nuts.
- b) Drill through the holes in the bottom lugs and fit the fixing bolts as for the top lugs.

After mounting the enclosure

Check that:

- it has not suffered any damage,
- the IP rating is not affected; for example, by distortion of the enclosure,
- the mounting bolts/nuts are all tightened as recommended above.

4 INITIAL ELECTRICAL INSTALLATION

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|  | WARNING! |
| | Before starting any electrical installation work, ensure that the incoming trunk connection is isolated from any source of power. |

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| CAUTION |
| The temperature inside the enclosure could rise to 75°C. Ensure that all cables and cable glands fitted are rated to withstand these temperatures. |

4.1 Overview

Obtain access to the contents of the enclosure by removing the lid which is secured to the body of the enclosure by captive screws. Loosen these screws to obtain entry.

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|---|
| CAUTION |
| The lid is connected to the enclosure body with a protective grounding cable. DO NOT leave the lid hanging by this link cable while work is carried out! |

- The enclosure receives power from the incoming trunk cable and requires no further source of power.
- The equipment shall only be powered from supplies conforming to IEC 61158.
- Type 'A' fieldbus cable is recommended for fieldbus trunk connections.
- The terminal blocks for the trunk fieldbus cables have either screw terminal connectors or cage clamp connectors according to the enclosure model specified, but both are suitable for cables from 0.5mm²/AWG 20 up to 2.5mm²/AWG 14.

On completion of installation, check all blanking plugs and cable glands are tightened to ensure IP rating of the enclosure is maintained.

For details of the enclosure wiring for the two system types see Appendix 1.

4.2 Grounding

Two distinct ground concepts should be recognised before wiring of the enclosure begins:

- a) Local protective earth-ground- mandatory
- b) Cable shield

These two concepts and their implementation are explained below.

4.2.1 Protective local ground

This ground connection is required to ensure that any exposed metal work in, or on, the enclosure does not present a hazard to personnel; it also provides a low impedance earth grounding circuit for any surge protection items used in the enclosure. An external M10 earth-grounding stud is provided on the side wall of the enclosure to enable a connection to be made to the local ground.

Use a ring terminal to make a good quality, plant safety earth connection (4mm² cross-sectional area or better) to this bolt and tighten it to a recommended torque of 5Nm.

Note: It is important to prevent this connection from loosening and also to protect it from corrosion against the stainless steel grounding stud.

Where the trunk and spur cables are protected by steel wire armour, this should be treated as part of the "protective" ground. Normal practice is to bond the armour to the plant structure at both ends of each cable. Where armour-protected cables enter the Fieldbus Barrier enclosure, the armour must be connected to the enclosure body using suitable cable glands.


4.2.2 Cable shield ground

The cable shield is normally electrically isolated from the protective earth ground, although the two may be deliberately interconnected in some grounding arrangements.

The cable shield wiring of the trunk and spur cables should be connected to the local terminals marked with an 'S'.

The enclosures can be configured by the user to either of two grounding methods. The user should adopt the one that conforms to their system's normal grounding method.

Whichever method is used, it is important to connect the screen/shield to a ground at only one end of the cable. The following two options are available to the user.

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|  | WARNING! |
| | <p>The following may involve changes to wiring in the Trunk Terminal Assembly. No part of the Trunk Terminal Assembly may be worked while the enclosure is powered, unless the environment is known to be non-hazardous.</p> |

4.2.2.1 Single point of grounding at host; trunk & spur shields interconnected

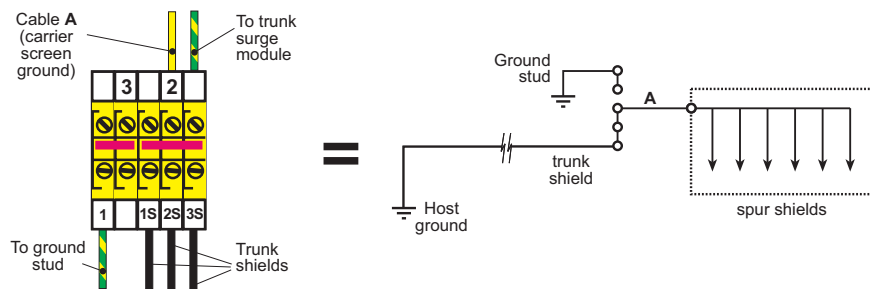


Figure 4.1 - Option 1

In many installation, the preferred method of grounding is to ground the fieldbus cable shields at one point only, normally at the fieldbus power supply. In this case, the trunk and spur cable shields are connected to each other at the Fieldbus Barrier and are not connected to ground in the field. For this arrangement, connect the carrier shield ground wire (Cable A) into Terminal 2.

Note: this is the default grounding method for factory-supplied 937x-FB enclosures.

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| IMPORTANT NOTE |
| <p>937x-FB enclosures are factory-supplied with Option 1 grounding. If power is applied locally, for example during commissioning, when the trunk cable shield is NOT providing a ground connection, the spur cable shields must be grounded according to Option 2.</p> <p>When the trunk cable shield ground has been fully instated (or restored), the grounding method should be returned to Option 1.</p> |

4.2.2.2 Trunk shield grounded at host; spur cable shields grounded at barrier

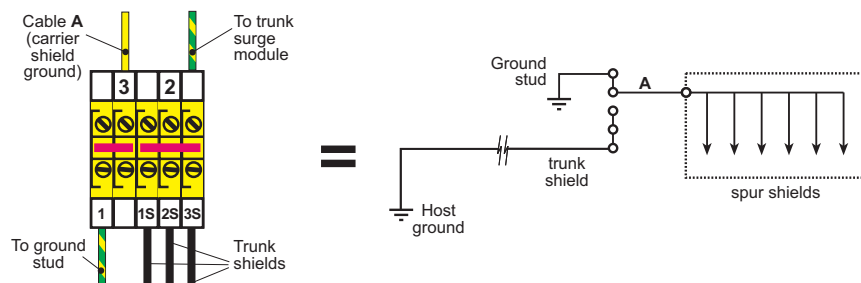


Figure 4.2 - Option 2

With this arrangement, the fieldbus trunk shield is separated from the spur cable shields. It should be adopted if plant or local regulations require that the spur cable shields be grounded at the Fieldbus Barrier. For this arrangement, connect the carrier shield ground wire (Cable A) into Terminal 3.

Note: After configuring the required grounding option, tighten all screw terminals to a recommended torque of 0.6 Nm.