

9373-FB3

MTL Fieldbus Barrier Assembly, 12 spur, Stainless Steel enclosures

- For FOUNDATION™ fieldbus networks in hazardous areas
- Complete enclosure systems for 12 intrinsically safe spur connections
- Mount in Zone 1 (gas) or 21 (dust) with spurs connected into Zone 0
- Compatible with FISCO and Entity-certified fieldbus instruments
- Compact, modular construction
- Ergonomic mechanical design
- Pluggable system components, without 'gas free' constraints
- Optional, integrated surge protection for trunk and spurs



(Surge protectors shown are not included as standard)

The 9373-FB3 is a third-generation product, in a successful range of Eaton Fieldbus Barrier Systems. The field-mounted enclosure contains a barrier that receives power and FOUNDATION™ fieldbus H1 communications via a non-intrinsically safe trunk and converts this to a number of galvanically isolated, intrinsically safe, spur connections.

The trunk terminals are implemented as increased safety (Ex e) and the spur terminals as intrinsically safe (Ex ia) for connection to IS fieldbus instruments in IIC, Zone 0 hazardous areas. The spur connections are compatible with both FISCO and Entity-certified field instruments.

The fieldbus barrier is mounted in a 316L stainless steel, increased safety, Ex e enclosure that segregates spur and trunk cabling in accordance with hazardous area certification. Inside the enclosure, the incoming trunk wiring terminates in a separate compartment containing increased safety (Ex e) trunk wiring terminals. This compartment has a protective cover to deter interference, and carries a warning to the user not to work on trunk wiring without first isolating the power. A fieldbus terminator is included for the trunk wiring to ensure correct termination of the wiring and prevent unwanted reflections and signal disturbances.

The system described in this manual provides 12 spurs of "simplex" type- meaning they are not intended to provide

redundancy between spurs. Each spur is short circuit protected, so that other devices continue to operate in the presence of field wiring faults.

Surge protection can be added on individual outgoing spurs by the use of individual Spur Surge protection modules (part no. FS32). Similarly, trunk surge suppression (part no. TP32) is available to protect the fieldbus barrier against damaging voltage and current surges on the incoming trunk wiring.

The stainless steel enclosure may be installed in a Zone 1, Zone 2, Zone 21 or Zone 22 hazardous area; in which case, the trunk wiring must be implemented using suitably protected cable. It provides excellent chemical and moisture resistance and is suitable for use in a wide range of corrosive environments.

The 9373-FB3 fieldbus barrier enclosure is bus-powered and requires 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 enclosure is supplied pre-drilled for all trunk and spur cable entries and internal trunking provides adequate separation between the trunk and spur cables. It is also fitted with Ex eb tb certified blanking plugs and a breather.

SPECIFICATION

SPURS

No. of spurs	12
Total current per spur	0 - 32mA
Total current limit per spur (max.)	45mA
Spur short circuit current (max.)	4.5mA
Total current available (all spurs)	300mA
Spur voltage @ 20°C	≥ 10V @ 40mA
Open circuit voltage	12V min

Number of field devices

1 per spur

Maximum spur length

120m (depending on the number of spurs per fieldbus segment)

Galvanic isolation (to EN 60079-11)

Trunk to spurs: 1.5kV (test voltage)

Spur to spur: no isolation

Spur surge protection

Plug-in module (part number FS32) - see separate data sheet

Trunk surge protection

Optional surge protector (part number TP32) - see separate data sheet

TRUNK

Data rate

31.25kbaud

Data transmission between trunk and spurs

passive, no repeater function

Number of trunk connections

2 (in & out), internally connected

Maximum number of 937x-FB3-Px modules per segment

2

Input voltage range (trunk)

16 - 32Vdc

Voltage drop (trunk in to trunk out)

0V

Maximum rated current (trunk in to trunk out)

2A

Low voltage monitoring

Input voltage < 16V, spurs de-energized

DC current consumption, mA

		937x-FB3 @ 16V		
		@16V	@24V	@32V
No load on each spur	typ.	68mA	48mA	43mA
	max.	75mA	56mA	51mA
1 spur @ 20mA	typ.	93mA	67mA	53mA
	max.	100mA	75mA	60mA
All spurs @ 20mA	typ.	355mA	224mA	170mA
	max.	360mA	230mA	175mA
All spurs @ 20mA 1 short circuit	typ.	333mA	213mA	162mA
	max.	340mA	220mA	165mA
Max. Load 300mA Total	typ.	392mA	258mA	210mA
	max.	410mA	270mA	215mA

Fieldbus terminator

Provides 100Ω + 1μF according to IEC 61158-2, with enable/disable feature

Reverse polarity protection on trunk

Yes

ELECTRICAL CONNECTIONS

Trunk wiring terminals

Type: 3-way, pluggable, black, Ex eb certified

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.2 to 2.5	0.2 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable, blue

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.25 to 2.5	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with links in the Trunk Terminal area)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

BARRIER LED INDICATORS

Trunk Power (PWR)

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

Spurs (tri-colour, per spur)

Colour	Steady	Flashing
Green	Channel powering spur - spur OK	Channel powering spur - spur open
Red	Internal fault	N.A.
Yellow	Short to shield	Short circuit or current limit
Off	Supply < 16V or no supply	N.A.

EPS MTL9373-FB3

September 2021

PHYSICAL NETWORKS

IEC61158-2
FOUNDATION™ fieldbus H1

Profile type (according to FF-816)

Type 163 (isolated device coupler)
Designed to comply with FF-846

HAZARDOUS AREA APPROVALS

Location of equipment

Safe area or Zone 1 IIC T4 or Zone 21 IIC T80°C
hazardous area, when mounted in a
suitable enclosure

Location of connected spur equipment

Safe area or Zone 0 IIC hazardous area

Certification codes

Ⓔ II 2(1) GD
or Ex db eb ib mb [ia Ga] T4 Gb if
TP32 trunk surge protector fitted,
Ex eb ib mb [ia Ga] IIC T4 Gb
Ex tb IIC T80°C Db

Certificate numbers

Baseefa19ATEX0023X
IECEX BAS 19.0016X

Safety description (spurs)

U_o = 16.4V
 $I_{o \text{ peak}}$ = 247.9mA
 $I_{o \text{ continuous}}$ = 107.1mA
 P_o = 1.02W
 C_i = 0
 L_i = 0

Spurs in accordance with FISCO specification

CABLE GLANDS

The following M20 cable glands are Ex eb tb equipment certified, better than IP66 rated and suitable for use with the 9373-FB Series Fieldbus Barriers. They can be supplied separately and are available to order individually using the following part numbers.

MTL Order No.	Manufacturer and Type	Description (Qty 1)
FCS-1000-P20	Jacob 50.620 PASWL/Ex	Plastic gland
FCS-1000-C20	Capri 816694	Nickel-plated brass gland
FCS-1000-A20	Capri 846694	Armoured nickel-plated brass gland
FCS-1000-S20	Capri 816699	Stainless steel gland
FCS-1000-R20	Capri 846699	Armoured stainless steel gland

ASSOCIATED LITERATURE

Instruction Manuals -
Compact Fieldbus Barrier Module **INM MTL937x-FB3-Px**
Compact Fieldbus Barrier System **INM MTL9373-FB3**

ENVIRONMENTAL

Ambient temperature

Operation	Storage
-20°C ... +60°C	-40°C ... +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326-1:2013
NAMUR NE 21

Shock & Vibration

Vibration:

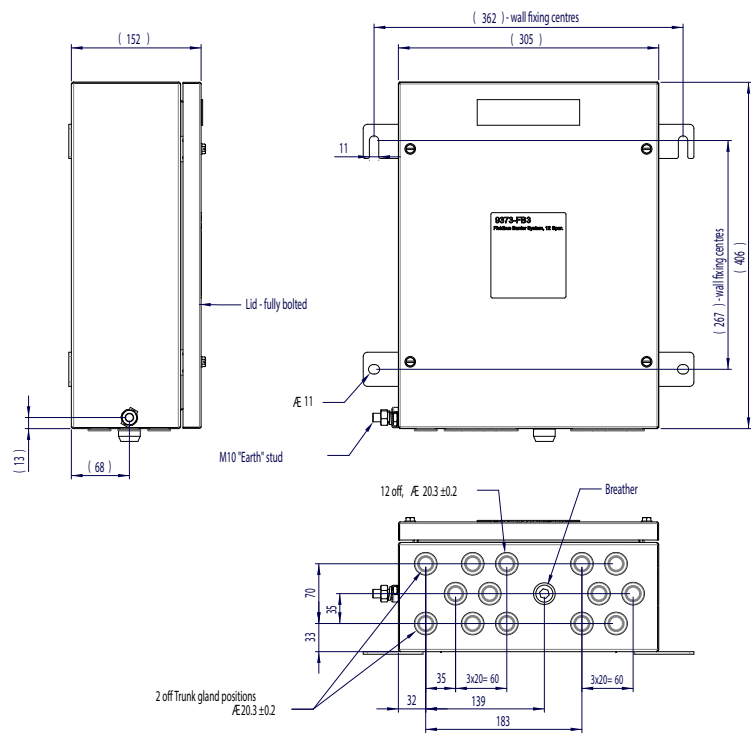
BS EN 60068-2-6: 2008 Test Fc: 1g
BS EN 60068-2-64: 2008 Test Fh

Shock:

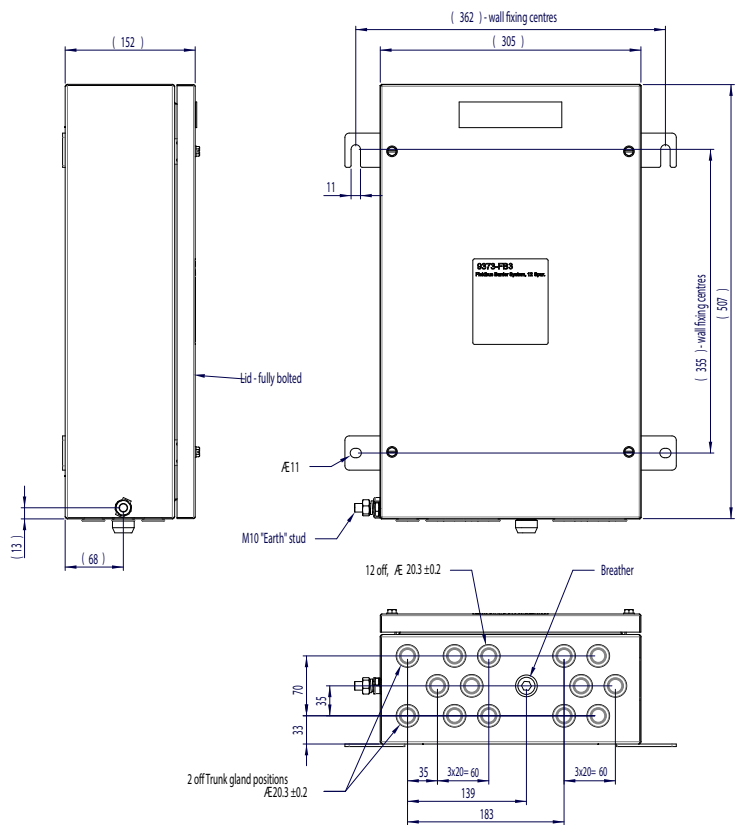
BS EN 60068-2-27: 2009 Test Ea: 15g

DIMENSIONS (mm)

Fieldbus Barrier Small
 enclosure dimensions
 - No additional terminals



Fieldbus Barrier Standard
 enclosure dimensions
 - Up to 13 additional terminals for parking spare trunk cables



EPS MTL9373-FB3

September 2021

ORDERING INFORMATION

9373-FB3- [] [] [] [] [] - [] [] [] [] []

Connector type	
Pluggable screw terminal	S
Pluggable spring clamp	C

Enclosure options	
Electropolished, Bolted, no document wallet	S
Electropolished, hinged, quarter-turn lock, no document wallet	A
Electropolished, bolted, with document wallet	B
Electropolished, Hinged (LHS) and quarter-turn lock, with document wallet	C
Brushed, Bolted, no document wallet	D
Brushed, Hinged (LHS) and quarter-turn lock, no document wallet	E
Brushed, Bolted, with document wallet	F
Brushed, Hinged (LHS) and quarter-turn lock, with document wallet	G

Tag Label options	
Blank Traffolyte, self-adhesive, supplied loose	1
Engraved Traffolyte, self-adhesive, fitted	2
Blank Traffolyte, mechanical-fit, supplied loose	3
Engraved Traffolyte, mechanical-fit, fitted	4
Blank stainless steel, mechanical-fit, supplied loose	5
Engraved stainless steel, mechanical-fit, fitted	6

Additional terminals (M20 Spur cable entries and Trunk Out in all cases)	
No additional terminals (M20 Trunk In)	1
Terminals on DIN-rail 2x spare Trunk cable pairs (M25 Trunk In)	2*
Terminals on DIN-rail 4x spare Trunk cable pairs (M25 Trunk In)	3*
Terminals on DIN-rail 4x spare Trunk cable pairs (M32 Trunk In)	4*

Spare field for future options	
N	Future option 1 (initially Null)

Cable entry plugs & breather options	
V	Plastic transit plugs in all entries, NiBr breather
W	Plastic transit plugs in all entries, SS breather
X	Ex e certified NiBr blanking plugs in all entries, NiBr breather
Y	Ex e certified plastic blanking plugs in all entries, NiBr breather
Z	Ex e certified SS blanking plugs in all entries, SS breather

Spur surge Protection options	
N	No spur surge protection
1	FS32 spur surge protector fitted to spur 1
2	FS32 spur surge protector fitted to spurs 1 - 2
3	FS32 spur surge protector fitted to spurs 1 - 3
4	FS32 spur surge protector fitted to spurs 1 - 4
5	FS32 spur surge protector fitted to spurs 1 - 5
6	FS32 spur surge protector fitted to spurs 1 - 6
7	FS32 spur surge protector fitted to spurs 1 - 7
8	FS32 spur surge protector fitted to spurs 1 - 8
9	FS32 spur surge protector fitted to spurs 1 - 9
A	FS32 spur surge protector fitted to spurs 1 - 10
B	FS32 spur surge protector fitted to spurs 1 - 11
C	FS32 spur surge protector fitted to spurs 1 - 12

Trunk Surge Protection options	
N	No trunk surge protection
A	TP32 Trunk surge protector fitted; Trunk Out connection not available (spares only)
B	TP32 Trunk surge protector fitted, Trunk Out connection available (spares only)
C	FS32-XE Trunk surge protector fitted; Trunk out connection available

*Select N, B or C 'Trunk Surge Protection' with these options

Example : 9373-FB3- [S] [S] [4] [1] [-] [C] [6] [V] [N]

Compact Fieldbus Barrier with pluggable screw terminals
Stainless steel enclosure with Electropolished, Bolted, no document wallet
Engraved Traffolyte tag label fitted to tag label bracket
M20 clearance entries for Trunk In and Out, no additional terminals
Fitted FS32-XE Trunk surge protector
FS32 spur surge protector fitted to spurs 1 - 6
Plastic transit plugs in all entries, NiBr breather



Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2021 Eaton
All Rights Reserved
Publication No. EPS MTL9373-FB3 Rev 4 160921
September 2021

Enclosure Size

Small enclosure:	[] [] [] [] 1 - N [] [] [] []
	[] [] [] [] 1 - C [] [] [] []

All other combinations will be supplied with standard size enclosures.

Please consult with the Eaton/MTL Sales team for any combination of features not listed here

EUROPE (EMEA):
+44 (0)1582 723633
mtlenquiry@eaton.com

THE AMERICAS:
+1 800 835 7075
mtl-us-info@eaton.com

ASIA-PACIFIC:
+65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

9377-FB3-Px

MTL Compact Fieldbus Barrier Module 12 spur

- For FOUNDATION™ fieldbus networks in hazardous areas
- Mount in Zone 1 (gas) with spurs connected into Zone 0
- Easy mounting via DIN-rail or panel fixing
- Compatible with FISCO and Entity-certified fieldbus instruments
- Compact, modular construction
- Optional, integrated surge protection for trunk and spurs



(Surge protectors shown are not included as standard)

The **9377-FB3-Px Fieldbus Barrier module** is a further enhancement of the established 937x product range, and provides a compact and economic solution for Foundation fieldbus networks in hazardous area applications. The field-mounted barrier receives power and FOUNDATION™ fieldbus H1 communications via a non-intrinsically safe trunk and converts this to a number of galvanically isolated, intrinsically safe, spur connections.

The **trunk terminals** are implemented as increased safety (Ex e) and the spur terminals as intrinsically safe (Ex ia) for connection to IS fieldbus instruments in IIC, Zone 0 hazardous areas. The spur connections are compatible with both FISCO and Entity-certified field instruments.

For **Zone 1 hazardous area mounting** the fieldbus barrier must be mounted in a suitable, increased safety, (Ex e) enclosure that will segregate spur and trunk cabling in accordance with hazardous area requirements. Complete, pre-assembled enclosure systems are also available-consult Eaton. The barrier module has a separate compartment, which contains increased safety (Ex e) trunk wiring terminals where the incoming trunk wiring terminates. This compartment has a protective cover to deter interference, and carries a warning to the user not to work on trunk wiring without first isolating the power. A fieldbus terminator is included; this can be disabled where the fieldbus trunk is extended to a second Fieldbus Barrier Module.

A **single barrier module** provides 12 spur connections. Each spur is short circuit protected, so that other devices continue to operate in the presence of field wiring faults.

Surge protection can also be added on the spur connections by the use of individual Spur Surge protection modules (part no. FS32). Surge protection of the fieldbus trunk connection can be provided using protector type TP32-I-NDI; consult Eaton MTL for pre-engineered enclosure systems containing appropriate electrical and mechanical hardware.

The **9377-FB3-Px fieldbus barrier module** is bus-powered and requires 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-x2 range of redundant power supplies.

The **module has four mounting lugs** with holes, enabling it to be mounted to a suitable mounting plate inside an enclosure using either bolts or fixed studs. Alternatively, it has built-in mounting clips to permit it to be mounted onto 'top-hat' DIN rail, 35mm x 7.5mm, complying with EN60715 or similar local standards.

SPECIFICATION

SPURS

No. of spurs	12
Total current per spur	0 - 32mA
Total current limit per spur (max.)	45mA
Spur short circuit current (max.)	4.5mA
Total current available (all spurs)	300mA
Spur voltage @ 20°C	≥ 10V @ 40mA
Open circuit voltage	12V min

Number of field devices

1 per spur

Maximum spur length

120m (depending on the number of spurs per fieldbus segment)

Galvanic isolation (to EN 60079-11)

Trunk to spurs: 1.5kV (test voltage)

Spur to spur: no isolation

Spur surge protection

Plug-in module (part number FS32) - see separate data sheet

Trunk surge protection

Optional surge protector (part number TP32) - see separate data sheet

TRUNK

Data rate

31.25kBaud

Data transmission between trunk and spurs

passive, no repeater function

Number of trunk connections

2 (in & out), internally connected

Maximum number of 937x-FB3-Px modules per segment

2

Input voltage range (trunk)

16 - 32Vdc

Voltage drop (trunk in to trunk out)

0V

Maximum rated current (trunk in to trunk out)

2A

Low voltage monitoring

Input voltage < 16V, spurs de-energized

DC current consumption for, mA

		937x-FB3 @ 16V		
		@16V	@24V	@32V
No load on each spur	typ.	68mA	48mA	43mA
	max.	75mA	56mA	51mA
1 spur @ 20mA	typ.	93mA	67mA	53mA
	max.	100mA	75mA	60mA
All spurs @ 20mA	typ.	355mA	224mA	170mA
	max.	360mA	230mA	175mA
All spurs @ 20mA 1 short circuit	typ.	333mA	213mA	162mA
	max.	340mA	220mA	165mA
Max. Load 300mA Total	typ.	392mA	258mA	210mA
	max.	410mA	270mA	215mA

Fieldbus terminator

Provides 100Ω + 1μF according to IEC 61158-2, with enable/disable feature

Reverse polarity protection on trunk

Yes

ELECTRICAL CONNECTIONS

Trunk wiring terminals

Type: 3 - way, pluggable, black, Ex eb certified

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.2 to 2.5	0.2 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable, blue

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.25 to 2.5	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with links in the Trunk Terminal area)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

BARRIER LED INDICATORS

Trunk Power (PWR)

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

Spurs (tri-colour, per spur)

Colour	Steady	Flashing
Green	Channel powering spur - spur OK	Channel powering spur - spur open
Red	Internal fault	N.A.
Yellow	Short to shield	Short circuit or current limit
Off	Supply < 16V or no supply	N.A.

EPS MTL9377-FB3-Px

September 2020

PHYSICAL NETWORKS

IEC61158-2
FOUNDATION™ fieldbus H1

Profile type (according to FF-816)

Type 163 (isolated device coupler)
Designed to comply with FF-846

Order as:

9377-FB3-PS

12-spur Fieldbus Barrier module, screw terminals

9377-FB3-PC

12-spur Fieldbus Barrier module, spring clamp terminals

ASSOCIATED LITERATURE

Instruction Manual - stainless steel enclosures **INM9373-FB3-Px-SS**

HAZARDOUS AREA APPROVALS

Location of equipment

Safe area or Zone 1 IIC T4 or Zone 21 hazardous area,
when mounted in a suitable enclosure

Location of connected spur equipment

Safe area or Zone 0 IIC hazardous area

Certification codes

⊕ II 2(1) G
Ex eb ib mb [ia Ga] IIC T4 Gb

Certificate numbers

Baseefa 19 ATEX0024U
IECEX BAS 19.0017U

Safety description (spurs)

U_o = 16.4V
 $I_{o\ peak}$ = 247.9mA
 $I_{o\ continuous}$ = 107.1mA
 P_o = 1.02W
 C_i = 0
 L_i = 0

Spurs in accordance with FISCO specification

ENVIRONMENTAL

Ambient temperature

Operation	Storage
-20°C ... +65°C	-40°C ... +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326-1:2013
NAMUR NE 21

Shock & Vibration

Vibration:

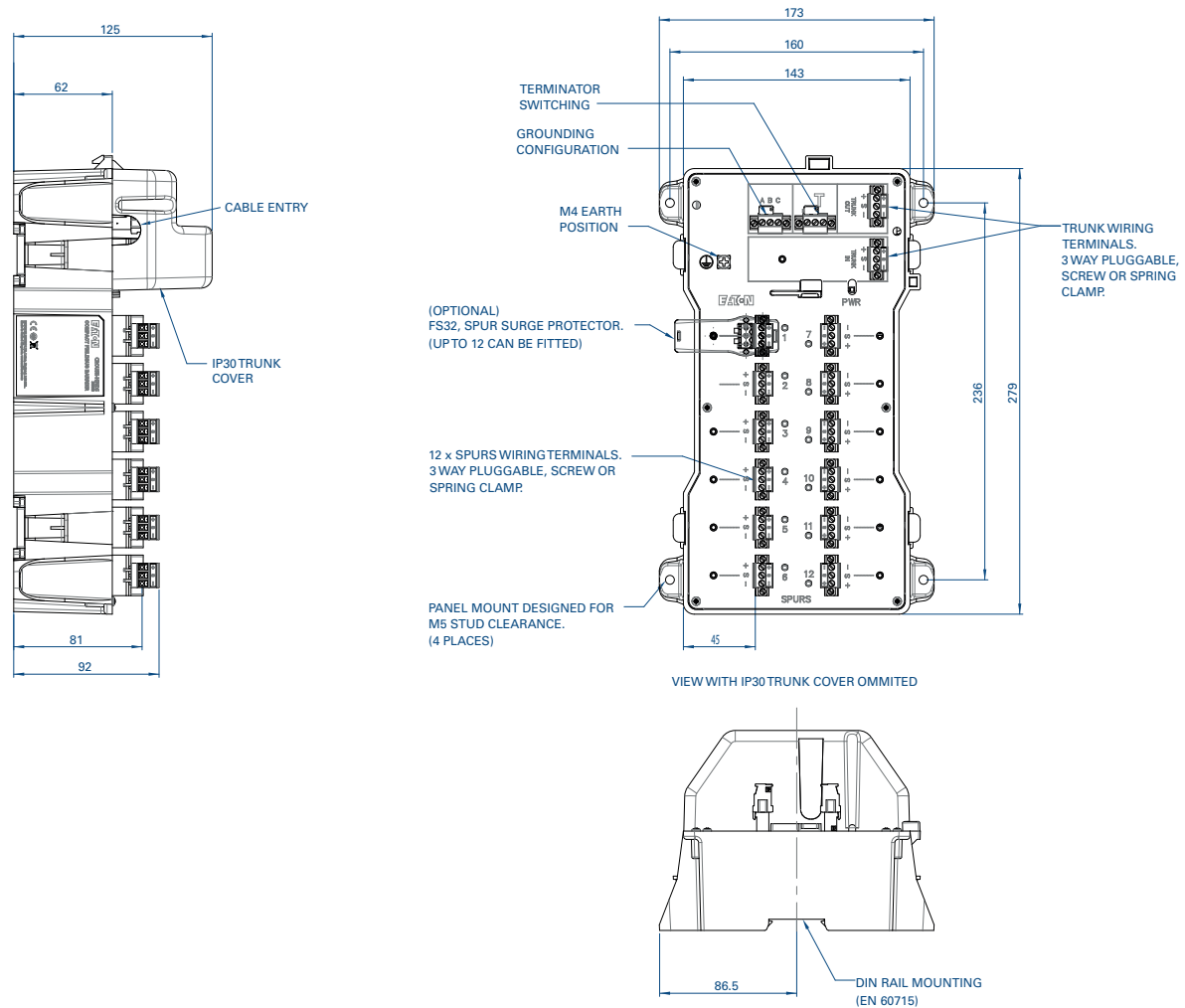
BS EN 60068-2-6: 2008 Test Fc: 1g
BS EN 60068-2-64: 2008 Test Fh

Shock:

BS EN 60068-2-27: 2009 Test Ea: 15g

ORDERING INFORMATION

DIMENSIONS



Eaton Electric Limited,
 Great Marlings, Butterfield, Luton
 Beds, LU2 8DL, UK.
 Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
 E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2019 Eaton
 All Rights Reserved
 Publication No. EPS MTL9377-FB3-Px Rev 2 290920
 September 2020

EUROPE (EMEA):
 +44 (0)1582 723633
mtlenquiry@eaton.com

THE AMERICAS:
 +1 800 835 7075
mtl-us-info@eaton.com

ASIA-PACIFIC:
 +65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

937x-FB2-Px-SS range

Fieldbus Barriers, 6 and 12 spur, Stainless Steel (SS) enclosures

- For FOUNDATION™ fieldbus networks in hazardous areas
- Complete enclosure system for 6 or 12 intrinsically safe spur connections
- Mount in Zone 1 (gas) or 21 (dust) with spurs connected into Zone 0
- Compatible with FISCO and Entity certified fieldbus instruments
- Compact, modular construction
- Ergonomic mechanical design
- Pluggable system components, without 'gas free' constraints
- Optional, integrated surge protection for trunk and spurs



The 937x-FB2-Px-SS range of Fieldbus Barriers are field-mounted wiring hubs that create up to twelve intrinsically safe spur connections from a high-energy trunk, for connection to suitably certified FOUNDATION™ fieldbus H1 instruments. Capable of supporting heavily loaded fieldbus segments and long trunk cable lengths, the Fieldbus Barriers may be installed in Zone 1 (gas) or Zone 21 (dust) hazardous areas, with the trunk wiring implemented using suitably protected cable and increased safety (Ex e) connection facilities.

Each intrinsically safe spur is capable of supporting a FISCO or 'Entity' certified fieldbus device located in a Zone 0 or 1 hazardous area. The short-circuit protected spurs are galvanically isolated from the trunk and require no protective ground connection in the field.

Unlike conventional Fieldbus Barrier products that are based on stand-alone modules, the 937x-FB2-Px range is supplied as complete, factory-assembled systems in stainless steel (SS) enclosures that do not require additional wiring, customised housing or complex ancillary components. Electrical and mechanical aspects of the design are integrated for a ergonomic solution for 'High Energy Trunk' applications in hazardous areas.

The key modular components of the system (Fieldbus Barriers and Surge Protectors) may be 'hot-plugged' by design and without gas-clearance procedures or separate isolating switches. This virtually eliminates the risk associated with hazardous area maintenance activities, speeds module replacement and avoids the need for specialist operator training.

Optional features include pluggable surge protection components for the fieldbus trunk and individual spurs. Connection facilities with generous room for cable management are provided within the Fieldbus Barrier enclosure for the trunk and spur wiring. Where appropriate, the trunk wiring may be extended from one Fieldbus Barrier enclosure to another.

Enclosure systems for 6 or 12 spurs are supported. For added flexibility, the 12-spur enclosure can be specified part-populated with one 6-spur barrier module installed. This permits future expansion from six to twelve spurs simply by plugging in an additional module.

The 937x-FB2-PC-SS range of Fieldbus Barriers are bus-powered and requires no additional power supply in the field. When used with a fieldbus host control system, power for the trunk may be provided by MTL F800 or 9180 range of fieldbus power supplies in redundant or non-redundant format.



Powering Business Worldwide

Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2018 Eaton
All Rights Reserved
Publication No. EPS 937x-FB2-Px-SS Rev 2
June 2018

937x-FB2-Px-SS

June 2018

SPECIFICATION

SPURS	9371-FB2	9373-FB2	9374-FB2* (expandable)
No. of spurs	6	12	6 (+6)
No. of 9377-FB-R modules installed	1	2	1 (+1)
Current per spur	0 - 32mA	0 - 32mA	0 - 32mA
Total current all spurs (max.)	192mA	384mA	192 (+192)mA

Current limit per spur (max.) 45mA
 Spur short circuit current (max.) 4.5mA
 Spur voltage @ 20°C ≥ 10V @ 40mA
 No-load voltage 12V min.

Number of field devices
 1 per spur

Maximum spur length
 120m (depending on the number of spurs per fieldbus segment)

Galvanic isolation (to EN 60079-11)
 Trunk to spurs: 1.5kV (test voltage)
 Spur to spur: no isolation
 Module to module: 30V

Spur surge protection
 Plug-in module (part number FS32) - see separate specification

TRUNK

Data rate
 31.25kbaud

Data transmission between trunk and spurs
 passive, no repeater function

Number of trunk connections
 2 (in & out), internally connected
 Spare trunk in

Maximum number of 9377-FB-R modules per segment
 3 (total 18 spurs)

Input voltage range (trunk)
 16–32V DC

Voltage drop (trunk in to trunk out)
 0V

Maximum rated current (trunk in to trunk out)
 5A

Low voltage monitoring
 Input voltage < 16V, spurs de-energized

DC current consumption, mA

		@ 16V		@ 24V		@ 32V	
		9371	9373	9371	9373	9371	9373
No load on each spur	typ.	35.3	70.6	29.1	58.2	22.3	44.6
	max.	37.0	73.0	30.0	60.0	23.0	46.0
1 spur @ 20mA	typ.	62.4	97.7	44.2	73.3	36.7	59.0
	max.	75.0	150.0	46.0	76.0	53.0	106.0
All spurs @ 20mA	typ.	158.8	317.6	110.3	220.6	86.9	173.8
	max.	164.0	328.0	114.0	228.0	90.0	180.0
All spurs @ 20mA 1 short circuit	typ.	146.0	304.3	101.8	212.1	81.0	167.4
	max.	150.0	314.0	105.0	219.0	83.0	173.0
All spurs @ 32mA	typ.	233.9	467.8	158.1	316.2	122.1	244.2
	max.	244.0	487.0	163.0	326.0	126.0	252.0

Power dissipation (max.) All spurs at 32mA	9371-FB2	9373-FB2	9374-FB2*
	1.8W	3.6W	1.8 (+1.8)W

* See ordering information

Fieldbus terminator

Plug-in module (part number F93-XE) supplied with each 937x-FB2 enclosure.
 Provides 100Ω + 1μF according to IEC 61158-2 - see separate specification

Trunk surge protection

Plug-in module (part number 9376-SP) - see separate specification

Reverse polarity protection

Yes

ELECTRICAL CONNECTIONS

Trunk wiring terminals

Type: Ex e
 Colour: Black

Cable types and capacity	Cable cross-section, mm²
Rigid cable	0.5 to 2.5
Flexible cable	0.5 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable
 Colour: Blue

Cable types and capacity	Cable cross-section, mm²
Rigid cable	0.2 to 2.5
Flexible cable	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with wire link in the Trunk Terminal Area)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

Trunk and spur cable shields are not interconnected within 9377-FB-R module itself.

Equipotential earth/ground connection facility

M10 earth/grounding stud on bottom face of enclosure

BARRIER LED INDICATORS

Trunk Power (PWR)

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

Spurs (tri-colour, per spur)

Colour	Steady	Flashing
Green	Channel powering spur - spur OK	Channel powering spur - spur open
Red	Internal fault	N.A.
Yellow	Short to shield	Short circuit or current limit
Off	Supply < 16V or no supply	N.A.

937x-FB2-Px-SS

June 2018

PHYSICAL NETWORKS

IEC61158-2

FOUNDATION™ fieldbus H1

Profile type (according to FF-816)

Type 163 (isolated device coupler)

Compliant with FF-846

HAZARDOUS AREA APPROVALS

Location of equipment

Safe area or Zone 1 IIC T4 or Zone 21 hazardous area

Location of connected spur equipment

Safe area or Zone 0 IIC hazardous area

Certification codes

Ex II 2(1) GD

Ex de ib mb [ia Ga] IIC T4 Gb

Ex tb IIIC T80°C Db

Certificate numbers

Baseefa 14ATEX0112X

IECEx BAS 14.0058X

Safety description (spurs)

U_o = 16.4V

$I_{o\ peak}$ = 249.5mA

$I_{o\ continuous}$ = 109mA

P_o = 898mW

U_i = 16.4V

C_i = 0

L_i = 0

Spurs in accordance with FISCO standard IEC 60079-11

ENVIRONMENTAL

Ambient temperature (system)

Operation	Storage
-40°C ... +70°C	-40°C ... +75°C

Ambient temperature (9377-FB-R module)

-40°C ... +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326-1:2013

NAMUR NE 21

Shock & Vibration

Vibration:

BS EN 60068-2-6: 2008 Test Fc: 1g

BS EN 60068-2-64: 1995 Test Fh: 1g

Shock:

BS EN 60068-2-27: 1993 Test Ea: 15g

MECHANICAL

Enclosure Materials

Silver, Stainless Steel (SS)

Mounting position (recommended)

On vertical plane, with glands and breather on underside

Cable/Breather entries

Trunk: 2 x M20

Spurs: 6 or 12 x M20, depending on model

Breather 1 x M20

Enclosures can be shipped with no stopping plugs or pre-fitted with an Ex e nickel-plated brass breather and Ex e nickel-plated brass plugs in all cable gland holes. The gland plugs must be replaced only with Ex e equipment certified cable glands capable of maintaining the IP level of the enclosure type.

Ingress Protection

Enclosure: IP66

Intrinsically safe terminals: IP20

Ex e terminals: IP30

Enclosure sizes - see dimension drawing for details

9371-FB2-Px-SS (6 spurs) 271 x 306 x 139mm

9373-FB2-Px-SS (12 spurs) 271 x 443 x 139mm

Enclosure Weights †

MTL Part number	Weight (kg)
9371-FB2-Px-SS	5.7
9373-FB2-Px-SS	8.5
9374-FB2-Px-SS	7.6

† excludes any cable glands or surge protection items

ORDERING INFORMATION

Order as:

9371-FB2-Px-SS	6-spur Fieldbus Barrier enclosure with one 6-spur 9377-FB-R module installed.
9373-FB2-Px-SS	12-spur Fieldbus Barrier enclosure system with two 6-spur 9377-FB-R modules installed.
9374-FB2-Px-SS	12-spur Fieldbus Barrier enclosure system with one 6-spur 9377-FB-R module installed. (Expandable to 12-spur by addition of a second 9377-FB-R module) <i>(Note: All enclosures are pre-wired and include a F93-XE Fieldbus terminator module) Where Px = PS (pluggable screw terminal connectors or PC (pluggable spring clamp connectors)</i>
9377-FB-R	Fieldbus Barrier 6-spur, pluggable module
F93-XE	Fieldbus terminator
9376-SP	Trunk surge protection module
FS32	Spur surge protection module

ASSOCIATED LITERATURE

Instruction Manual

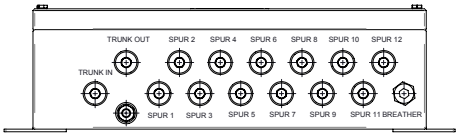
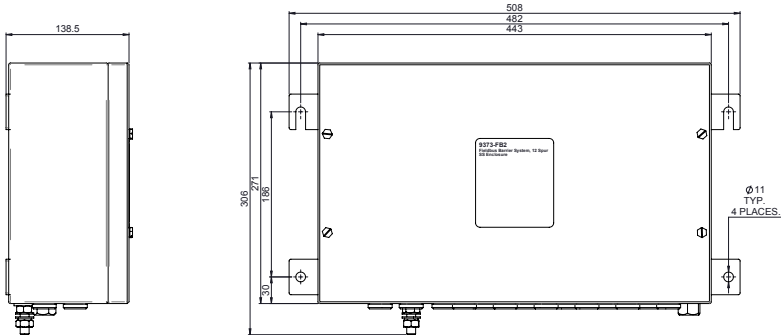
INM937x-FB2-Px-SS

937x-FB2-Px-SS
June 2018

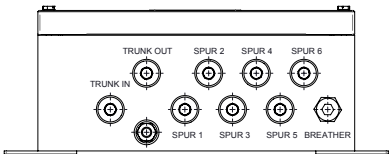
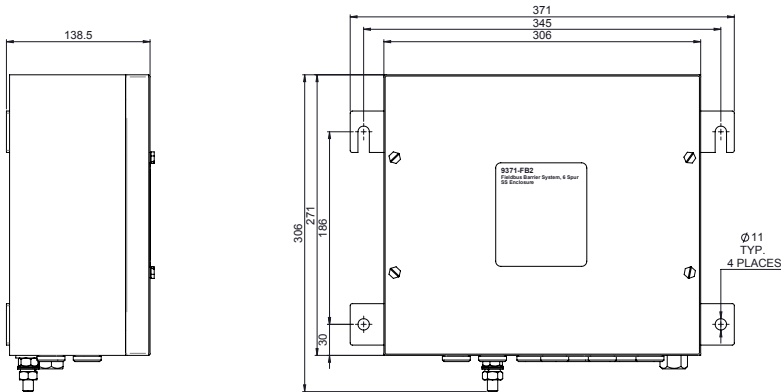
DIMENSIONS (mm)

Mounting holes: 6.5mm slot, 12mm head max.

9373-FB2-Px-SS
9374-FB2-Px-SS



9371-FB2-Px-SS



Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com
© 2018 Eaton
All Rights Reserved
Publication No. EPS 937x-FB2-Px-SS Rev 2 290618
June 2018

EUROPE (EMEA):
+44 (0)1582 723633
mtlenquiry@eaton.com
THE AMERICAS:
+1 800 835 7075
mtl-us-info@eaton.com
ASIA-PACIFIC:
+65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

937x-FB2-Px-PP range

Fieldbus Barriers, 6 and 12 spur,
Glass Reinforced Polyester
(GRP) enclosures

- For FOUNDATION™ fieldbus networks in hazardous areas
- Complete enclosure system for 6 or 12 intrinsically safe spur connections
- Mount in Zone 1 (gas) or 21 (dust) with spurs connected into Zone 0
- Compatible with FISCO and Entity certified fieldbus instruments
- Compact, modular construction
- Ergonomic mechanical design
- Pluggable system components, without 'gas free' constraints
- Optional, integrated surge protection for trunk and spurs



(9373-FB2-PS-PP version shown)

The 937x-FB2-Px-PP range of Fieldbus Barriers are field-mounted wiring hubs that create up to twelve intrinsically safe spur connections from a high-energy trunk, for connection to suitably certified FOUNDATION™ fieldbus H1 instruments. Capable of supporting heavily loaded fieldbus segments and long trunk cable lengths, the Fieldbus Barriers may be installed in Zone 1 (gas) or Zone 21 (dust) hazardous areas, with the trunk wiring implemented using suitably protected cable and increased safety (Ex e) connection facilities.

Each intrinsically safe spur is capable of supporting a FISCO or 'Entity' certified fieldbus device located in a Zone 0 or 1 hazardous area. The short-circuit protected spurs are galvanically isolated from the trunk and require no protective ground connection in the field.

Unlike conventional Fieldbus Barrier products that are based on stand-alone modules, the 937x-FB2-PC-PP range are supplied as a complete, factory-assembled systems in a glass reinforced plastic (GRP) enclosures that does not require additional wiring, customised housing or complex ancillary components. Electrical and mechanical aspects of the design are integrated, providing the industry's first complete, ergonomic solution for 'High Energy Trunk' applications in hazardous areas.

The key modular components of the system (Fieldbus Barriers and Surge Protectors) may be 'hot-plugged' by design and without gas-clearance procedures or separate isolating switches. This virtually eliminates the risk associated with hazardous area maintenance activities, speeds module replacement and avoids the need for specialist operator training.

Optional features include pluggable surge protection components for the fieldbus trunk and individual spurs. Connection facilities with generous room for cable management are provided within the Fieldbus Barrier enclosure for the trunk and spur wiring. Where appropriate, the trunk wiring may be extended from one Fieldbus Barrier enclosure to another.

Enclosure systems for 6 or 12 spurs are supported. For added flexibility, the 12-spur enclosure can be specified part-populated with one 6-spur barrier module installed (model no. 9374-FB2-PC-PP-001). This permits future expansion from six to twelve spurs simply by plugging in an additional module.

The 937x-FB2-PC-PP range of Fieldbus Barriers are bus-powered and requires no additional power supply in the field. When used with a fieldbus host control system, power for the trunk may be provided by MTL F800 or 9180 range of fieldbus power supplies in redundant or non-redundant format.

SPECIFICATION

SPURS	9371-FB2	9373-FB2	9374-FB2* (expandable)
No. of spurs	6	12	6 (+6)
No. of 9377-FB-R modules installed	1	2	1 (+1)
Current per spur	0 - 32mA	0 - 32mA	0 - 32mA
Total current all spurs (max.)	192mA	384mA	192 (+192)mA

Current limit per spur (max.)	45mA
Spur short circuit current (max.)	4.5mA
Spur voltage @ 20°C	≥ 10V @ 40mA
No-load voltage	12V min.

Number of field devices
1 per spur

Maximum spur length
120m (depending on the number of spurs per fieldbus segment)

Galvanic isolation (to EN 60079-11)

Trunk to spurs:	1.5kV (test voltage)
Spur to spur:	no isolation
Module to module:	30V

Spur surge protection

Plug-in module (part number FS32) - see separate specification

TRUNK**Data rate**

31.25kbaud

Data transmission between trunk and spurs

passive, no repeater function

Number of trunk connections

2 (in & out), internally connected
Spare trunk in

Maximum number of 9377-FB-R modules per segment

3 (total 18 spurs)

Input voltage range (trunk)

16–32V DC

Voltage drop (trunk in to trunk out)

0V

Maximum rated current (trunk in to trunk out)

5A

Low voltage monitoring

Input voltage < 16V, spurs de-energized

DC current consumption, mA

		@ 16V		@ 24V		@ 32V	
		9371	9373	9371	9373	9371	9373
No load on each spur	typ.	35.3	70.6	29.1	58.2	22.3	44.6
	max.	37.0	73.0	30.0	60.0	23.0	46.0
1 spur @ 20mA	typ.	62.4	97.7	44.2	73.3	36.7	59.0
	max.	75.0	150.0	46.0	76.0	53.0	106.0
All spurs @ 20mA	typ.	158.8	317.6	110.3	220.6	86.9	173.8
	max.	164.0	328.0	114.0	228.0	90.0	180.0
All spurs @ 20mA 1 short circuit	typ.	146.0	304.3	101.8	212.1	81.0	167.4
	max.	150.0	314.0	105.0	219.0	83.0	173.0
All spurs @ 32mA	typ.	233.9	467.8	158.1	316.2	122.1	244.2
	max.	244.0	487.0	163.0	326.0	126.0	252.0

Power dissipation (max.) All spurs at 32mA	9371-FB2	9373-FB2	9374-FB2*
	1.8W	3.6W	1.8 (+1.8)W

* See ordering information

Fieldbus terminator

Plug-in module (part number F93-XE) supplied with each 937x-FB2 enclosure.
Provides 100Ω + 1μF according to IEC 61158-2 - see separate specification

Trunk surge protection

Plug-in module (part number 9376-SP) - see separate specification

Reverse polarity protection

Yes

ELECTRICAL CONNECTIONS**Trunk wiring terminals**

Type: Ex e
Colour: Black

Cable types and capacity	Cable cross-section, mm²
Rigid cable	0.5 to 2.5
Flexible cable	0.5 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable
Colour: Blue

Cable types and capacity	Cable cross-section, mm²
Rigid cable	0.2 to 2.5
Flexible cable	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with wire link in the Trunk Terminal Area)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

Trunk and spur cable shields are not interconnected within 9377-FB-R module itself.

Equipotential earth/ground connection facility

M10 earth/grounding stud on bottom face of enclosure

BARRIER LED INDICATORS**Trunk Power (PWR)**

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

Spurs (tri-colour, per spur)

Colour	Steady	Flashing
Green	Channel powering spur - spur OK	Channel powering spur - spur open
Red	Internal fault	N.A.
Yellow	Short to shield	Short circuit or current limit
Off	Supply < 16V or no supply	N.A.

937x-FB2-Px-PP

November 2016

PHYSICAL NETWORKS

IEC61158-2

FOUNDATION™ fieldbus H1

Profile type (according to FF-816)

Type 163 (isolated device coupler)

Designed to comply with FF-846

HAZARDOUS AREA APPROVALS

Location of equipment

Safe area or Zone 1 IIC T4 or Zone 21 hazardous area

Location of connected spur equipment

Safe area or Zone 0 IIC hazardous area

Certification codes

Ex II 2(1) GD

Ex de ib mb [ia Ga] IIC T4 Gb

Ex tb IIIC T80°C Db

Certificate numbers

Baseefa 14ATEX0112X

IECEx BAS 14.0058X

Safety description (spurs) pending

U_o = 17.5V

$I_{o\text{ peak}}$ = 249.5mA

$I_{o\text{ continuous}}$ = 113mA

P_o = 982mW

U_i = 17.5V

C_i = 0

L_i = 0

Spurs in accordance with FISCO standard IEC 60079-11

ENVIRONMENTAL

Ambient temperature (system)

Operation	Storage
-20°C ... +65°C	-40°C ... +75°C

Ambient temperature (9377-FB-R module)

-40°C ... +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326-1:2013

NAMUR NE 21

Shock & Vibration

Vibration:

BS EN 60068-2-6: 2008 Test Fc: 1g

BS EN 60068-2-64: 1995 Test Fh: 1g

Shock:

BS EN 60068-2-27: 1993 Test Ea: 15g

MECHANICAL

Enclosure Materials

Black, Glass Reinforced Plastic (GRP)

Mounting position (recommended)

On vertical plane, with glands and breather on underside

Cable/Breather entries

Trunk: 2 x M20

Spurs: 6 or 12 x M20, depending on model

Breather 1 x M20

Enclosures are pre-fitted with an Ex e nickel-plated brass breather and Ex e nickel-plated brass plugs in all cable gland holes. The gland plugs must be replaced only with Ex e equipment certified cable glands capable of maintaining the IP level of the enclosure type.

Ingress Protection

Enclosure: IP66

Intrinsically safe terminals: IP20

Ex e terminals: IP30

Enclosure sizes - see dimension drawing for details

9373-FB2-Px-PP (6 spurs) 271 x 271 x 136mm

9373-FB2-Px-PP (12 spurs) 554 x 271 x 136mm

Enclosure Weights †

MTL Part number	Weight (kg)
9371-FB2-Px-PP	4.5
9373-FB2-Px-PP	8.10
9374-FB2-Px-PP	7.15

† excludes any cable glands or surge protection items

Labels

Internal wiring diagram is attached to inside of enclosure cover. An adhesive backed, Traffolyte (phenolic plastic) tag label is supplied loose and can be engraved with the tag number if details are supplied when ordering

ORDERING INFORMATION

Order as:

9371-FB2-Px-PP	6-spur Fieldbus Barrier enclosure with one 6-spur 9377-FB-R module installed, spring clamp connectors.
9373-FB2-Px-PP	12-spur Fieldbus Barrier enclosure system with two 6-spur 9377-FB-R modules installed, spring clamp connectors.
9374-FB2-Px-PP	12-spur Fieldbus Barrier enclosure system with one 6-spur 9377-FB-R module installed, spring clamp connectors. (Expandable to 12-spur by addition of a second 9377-FB-R module) <i>(Note: All enclosures are pre-wired and include a F93-XE Fieldbus terminator module) Where Px = PS (pluggable screw terminal connectors or PC (pluggable spring clamp connectors)</i>
9377-FB-R	Fieldbus Barrier 6-spur, pluggable module
F93-XE	Fieldbus terminator
9376-SP	Trunk surge protection module
FS32	Spur surge protection module

ASSOCIATED LITERATURE

Instruction Manual

IMM937x-FB2-Px-PP

937x-FB2-Px-PP

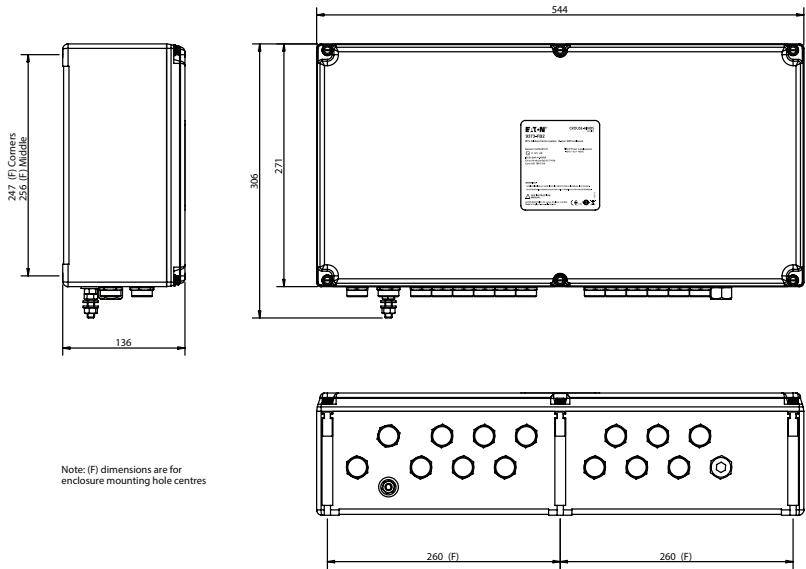
November 2016

DIMENSIONS (mm)

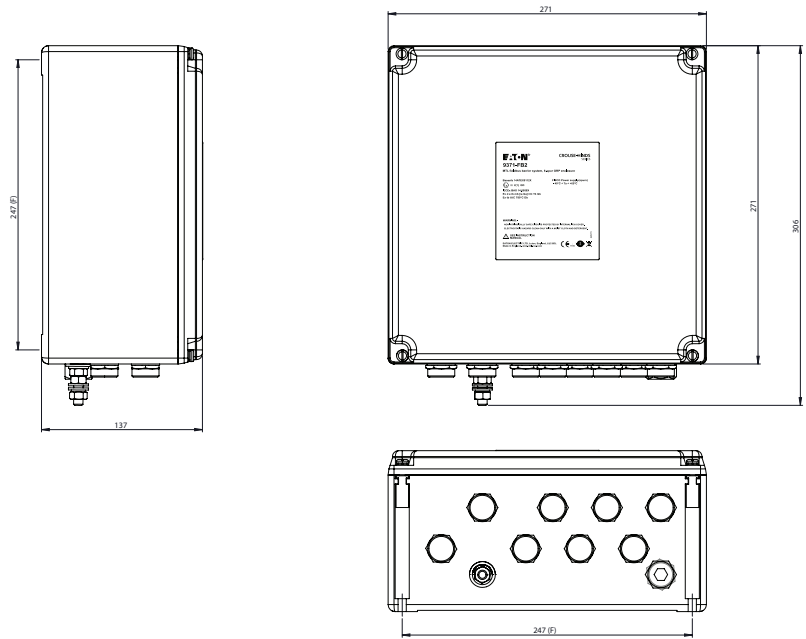
Mounting holes: 6.5mm slot, 12mm head max.

9373-FB2-Px-PP

9374-FB2-Px-PP



9371-FB2-Px-PP



Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2016 Eaton
All Rights Reserved
Publication No. EPS 937x-FB2-Px-PP Rev 3 071116
November 2016

EUROPE (EMEA):
+44 (0)1582 723633
mtlenquiry@eaton.com

THE AMERICAS:
+1 800 835 7075
mtl-us-info@eaton.com

ASIA-PACIFIC:
+65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

9387-FB2, 9388-FB2 6/12-Spur, Open-Frame, Fieldbus barrier

- For Foundation™ fieldbus networks in hazardous areas
- Pre-assembled system components for 6 or 12 intrinsically safe spur connections
- For assembly into user-specified field enclosures
- Spurs compatible with FISCO and "Entity-certified" fieldbus instruments
- Ergonomic mechanical design
- Pluggable system components without "gas free" constraints
- Optional, integrated surge protection for trunk and spurs



The 9387-FB2 (6-spur) and 9388-FB2 (12-spur) Fieldbus Barrier assemblies provide intrinsically safe spur connections from a high-energy trunk, for connection to suitably certified Foundation™ fieldbus H1 instruments. Each unit comprises pre-wired and assembled system components on a stainless steel baseplate, for installation into a suitably certified field enclosure. Connection facilities are provided for the trunk and spur wiring, as well as all electronic modules needed to support a fully-working Fieldbus Barrier. In a typical application, an Ex e (increased safety) certified field enclosure will be selected to allow installation in a Zone 1 hazardous area; third-party approval of the enclosure and contents is normally required. Alternative uses include applications that are not satisfied by the 9370-FB2 range of Fieldbus Barriers in standard enclosures, such as the installation of multiple fieldbus segments inside a single field enclosure.

Each intrinsically safe spur is capable of supporting a FISCO or 'Entity' certified fieldbus device located in a Zone 0 or 1 hazardous area. The short-circuit protected spurs are galvanically isolated from the trunk and require no protective ground connection in the field. The units are bus powered and require no additional power supply in the field. When used with a fieldbus host control system, power for the trunk may be provided by MTL power supplies in redundant or non-redundant format.

The 9387-FB2 and 9388-FB2 share the unique features of Eaton's class-leading 9370-FB range of Fieldbus Barrier system. The key modular components of the system (Fieldbus Barrier, Terminator and Surge Protectors) may be 'hot-plugged' by design and without gas-clearance procedures or separate isolating switches. This virtually eliminates the risk associated with hazardous area maintenance activities, speeds module replacement and avoids the need for specialist operator training. Optional features include pluggable surge protection components for the fieldbus trunk and individual spurs.



Powering Business Worldwide

Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2016 Eaton
All Rights Reserved
Publication No. EPS 9380-FB2 Rev 1
November 2016

MTL 9380-FB2 range

November 2016

SPECIFICATION

SPURS

	9387-FB2	9388-FB2
# of spurs	6	12
# of 9377-FB-R modules installed	1	2
Current per spur	0 - 40mA	0 - 40mA
Total current all spurs (max.)	240mA	480mA
Current limit per spur (max.)	45mA	
Spur short circuit current (max.)	4.5mA	
Spur voltage @ 20°C	≥ 10V @ 40mA	
No-load voltage	12V min.	
Number of field devices	1 per spur	
Maximum spur length	120m (depending on the number of spurs per fieldbus segment)	
Galvanic isolation (to EN 60079-11)		
Trunk to spurs:	1.5kV (test voltage)	
Spur to spur:	no isolation	
Module to module:	30V	
Spur surge protection	Plug-in module (part number FS32) - see separate specification	
* See ordering information		

TRUNK

Data rate	31.25kBaud
Data transmission between trunk and spurs	passive, no repeater function
Number of trunk connections	2 (in & out), internally connected, spare trunk in
Maximum number of 9377-FB-R modules per segment	3 (total 18 spurs)
Input voltage range (trunk)	16–32V DC
Voltage drop (trunk in to trunk out)	0V
Maximum rated current (trunk in to trunk out)	5A
Low voltage monitoring	Input voltage < 16V, spurs de-energized
DC current consumption for	6 spur (9387-FB2) and 12 spur (9388-FB2) units (mA)

		@ 16V		@ 24V		@ 32V	
		9387	9388	9387	9388	9387	9388
No load on each spur	typ.	35.3	70.6	29.1	58.2	22.3	44.6
	max.	37.0	73.0	30.0	60.0	23.0	46.0
1 spur @ 20mA	typ.	62.4	97.7	44.2	73.3	36.7	59.0
	max.	75.0	150.0	46.0	76.0	53.0	106.0
All spurs @ 20mA	typ.	158.8	317.6	110.3	220.6	86.9	173.8
	max.	164.0	328.0	114.0	228.0	90.0	180.0
All spurs @ 20mA	typ.	146.0	304.3	101.8	212.1	81.0	167.4
	max.	150.0	314.0	105.0	219.0	83.0	173.0
1 short circuit All spurs @ 32mA	typ.	233.9	467.8	158.1	316.2	122.1	244.2
	max.	244.0	487.0	163.0	326.0	126.0	252.0

Power dissipation (max.)	9387-FB2	9388-FB2
All spurs at 32mA	1.8W	3.6W

Fieldbus terminator

Plug-in module (part number F93-XE) supplied with each 937x-FB2 enclosure.
Provides 100Ω + 1μF according to IEC 61158-2 - see separate specification

Trunk surge protection

Plug-in module (part number 9376-SP) - see separate specification

Reverse polarity protection

Yes

ELECTRICAL CONNECTIONS

Trunk wiring terminals

Type: Ex e

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.5 to 2.5	0.5 to 2.5
Flexible cable	0.5 to 2.5	0.5 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.25 to 2.5	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with wire connections in the Trunk Terminal Assembly)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

Equipotential earth/ground connection facility

M10 earth/grounding stud on baseplate

BARRIER LED INDICATORS

Trunk Power (PWR)

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

Spurs (tri-colour, per spur)

Colour	Steady	Flashing
Green	Channel powering spur - spur OK	Channel powering spur - spur open
Red	Internal fault	Internal fault
Yellow	Short to shield	Short circuit, current limit
Off	Supply < 16V or no supply	N.A.

MTL 9380-FB2 range

November 2016

PHYSICAL NETWORKS

IEC61158-2
FOUNDATION™ fieldbus H1
Profile type (according to FF-816)
Type 163 (isolated device coupler)
Designed to comply with FF-846

HAZARDOUS AREA APPROVALS

Location of equipment
Zone 1 IIC T4 hazardous area when mounted inside a suitably certified Ex e enclosure

Location of connected spur equipment

Zone 0 IIC hazardous area
Certification codes
E II 2(1) G
Ex d e ib mb [ia Ga] IIC T4 Gb (-40°C ≤ Ta ≤ 75°C)

Certificate numbers
Baseefa 14ATEX0111U
IECEX BAS14.0057U
Note: 9387-FB2 and 9388-FB2 are product ordering codes. The certification documents refer to the 937x components that comprise these assemblies.
'U' denotes a unit that requires further equipment for use in hazardous areas, i.e. a suitably certified enclosure.

Safety description (spurs)

U_o = 16.4V
I_{o peak} = 249.5mA
I_{o continuous} = 109mA
P_o = 898mW
U_i = 16.4V
C_i = 0
L_i = 0

Spurs in accordance with FISCO standard IEC 60079-27

ENVIRONMENTAL

Ambient temperature (inside selected enclosure)

Operating	Storage
-40°C ... +75°C	-40°C ... +75°C

Relative humidity
< 95%, non-condensing

Electromagnetic compatibility
EN 61326-1:2013
NAMUR NE 21

Shock & Vibration

Vibration:
BS EN 60068-2-6: 2008 Test Fc: 1g
BS EN 60068-2-64: 1995 Test Fh: 1g
Shock:
BS EN 60068-2-27: 1993 Test Ea: 15g

MECHANICAL

Mounting position (recommended)

On to a vertical plane. The component must be mounted in an appropriately certified enclosure typically rated to IP66 when used in hazardous areas.
When used in safe areas, the enclosure must provide ingress protection of at least IP20.

Protection

Intrinsically safe terminals IP20
Non-IS terminals IP30

Weights †

MTL Part number	Weight (kg)
9387-FB2	2.7
9388-FB2	4.5

† includes barrier(s) and terminator but excludes any surge protection items

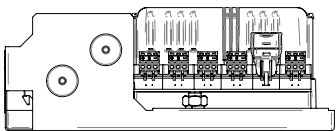
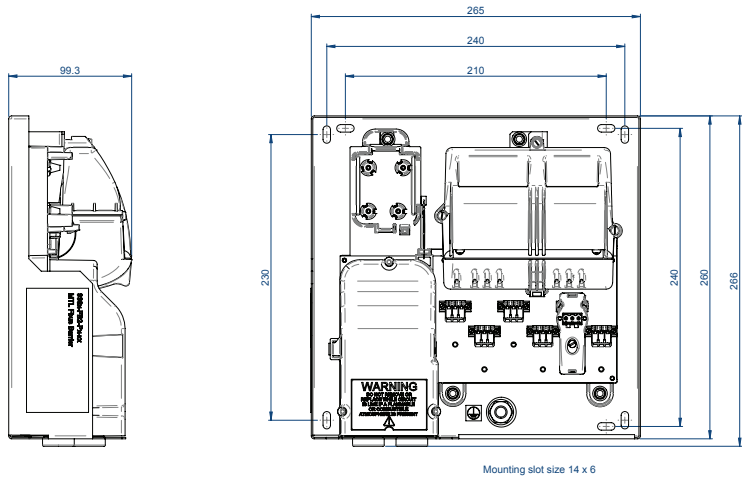
ORDERING INFORMATION

Order as:

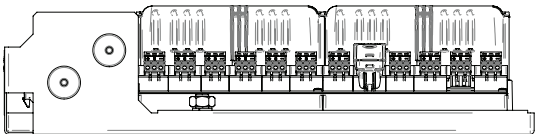
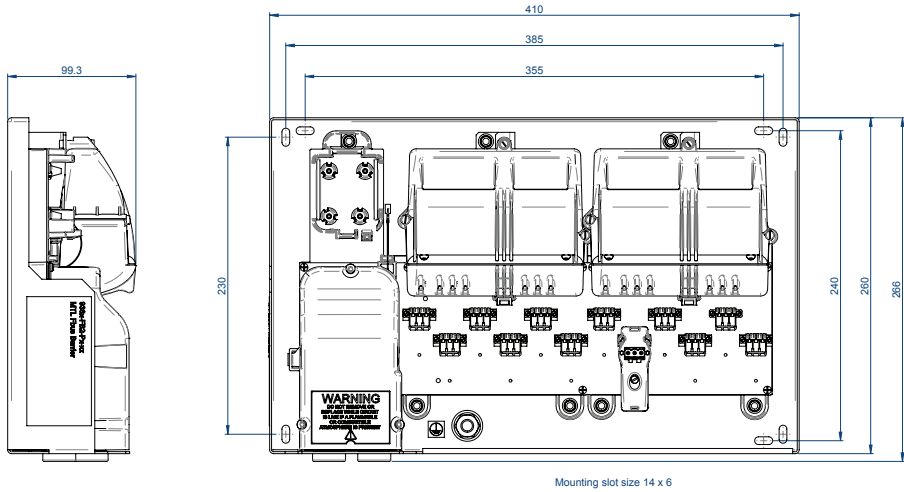
9387-FB2-xx	6-spur Fieldbus Barrier system with one 6-spur 9377-FB-R module installed.
9388-FB2-xx	12-spur Fieldbus Barrier system with two 6-spur 9377-FB-R modules installed.
Where xx =	PS (pluggable screw terminal connectors) PC (pluggable spring clamp connectors) <i>(Note: All assemblies are pre-wired and include a F93-XE Fieldbus terminator module)</i>
9377-FB-R	Fieldbus Barrier 6-spur, pluggable module
F93-XE	Fieldbus terminator
9376-SP	Trunk surge protection module
FS32	Spur surge protection module

DIMENSIONS (mm)

9387-FB2-xx
6-way baseplate assembly



9388-FB2-xx
12-way baseplate assembly
(showing two, spur surge protection modules)



9372-FB range

Redundant fieldbus barrier enclosures, 5/6 spur

- For For FOUNDATION™ fieldbus networks in hazardous areas
- Redundant configuration for super-high system availability
- Complete enclosure systems for up to 6 intrinsically safe spur connections
- Failure alarm direct to host control system via integrated fieldbus device
- Mount in Zone 1 (gas) or 21 (dust) with spurs connected into Zone 0
- Compatible with FISCO and Entity certified fieldbus instruments
- Ergonomic mechanical design
- Pluggable system components, without 'gas free' constraints
- Optional, integrated surge protection for trunk and spurs



(Surge protection products shown are not included as standard)

The **9372-FB Redundant Fieldbus Barriers** are field-mounted wiring hubs that create up to six intrinsically safe spur connections from a high-energy trunk, for connection to suitably certified FOUNDATION™ fieldbus H1 instruments. They may be installed in Zone 1 (gas) or Zone 21 (dust) hazardous areas, with the trunk wiring implemented using suitably protected cable and increased safety (Ex e) connection facilities.

Each enclosure system uses duplicated **Fieldbus Barrier modules** in a redundant configuration to achieve significantly higher system availability than equivalent 'simplex' units. The 9372-FB may therefore be selected for critical process applications where failure of the Fieldbus Barrier would otherwise result in unacceptable downtime or lost production. It is also ideal for use in Fieldbus Safety Instrumented Function (SIF) networks in which nuisance trips cannot be tolerated. Failure annunciation to the host control system is provided by means of an integrated FOUNDATION™ fieldbus device with Digital Input Function Block capability.

In common with conventional **Fieldbus Barriers**, each intrinsically safe spur is capable of supporting a FISCO or 'Entity' certified fieldbus device located in a Zone 0 or 1 hazardous area. The short-circuit protected spurs are galvanically isolated from the trunk and require no protective ground connection in the field.

The **9372-FB redundant fieldbus barrier** is based on our revolutionary **9370-FB range** of products, which are supplied

as complete, factory-assembled enclosure systems that do not require additional wiring, customised housings or complex ancillary components. Electrical and mechanical aspects of the design are integrated, providing the industry's first complete, ergonomic solution for 'High Energy Trunk' applications in hazardous areas.

Uniquely, the key modular components of the system (Fieldbus Barrier, Terminator and Surge Protectors) may be 'hot-plugged' by design and without gas-clearance procedures or separate isolating switches. This virtually eliminates the risk associated with hazardous area maintenance activities, speeds module replacement and avoids the need for specialist operator training.

Optional features include pluggable surge protection components for the fieldbus trunk and individual spurs. Connection facilities with generous room for cable management are provided within the Fieldbus Barrier enclosure for the trunk and spur wiring.

For added flexibility, a redundant-capable enclosure can be specified part-populated with one 6-spur module (model no. 9375-FB). This permits future upgrading from simplex to redundant mode simply by plugging in an additional Fieldbus Barrier module and optional alarm module.

The **9372-FB Fieldbus Barrier** is **bus powered** and requires no additional power supply in the field. When used with a fieldbus host control system, power for the trunk may be provided by redundant power supplies.



Powering Business Worldwide

Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2016 Eaton
All Rights Reserved
Publication No. EPS9372-RD Rev 6
November 2016

9372-FB range

November 2016

SPECIFICATION

SPURS

	9372-FB* Redundant 5-spur	9375-FB* Redundant- enabled 6-spur
No. of spurs	5 (6 th spur allocated to alarm module)	6
No. of 9377-FB modules installed	2	1 (upgradable to 2)
Current per spur	0 - 32mA	0 - 32mA
Total current all spurs (max.)	160mA	192mA
Current limit per spur (max.)	45mA	
Spur short-circuit current (max.)	4.5mA	
Spur voltage @ 20°C	≥ 10V @ 40mA	
No-load voltage	12V min.	
Number of field devices	1 per spur	
Maximum spur length	120m (depending on the number of spurs per fieldbus segment)	
Galvanic isolation (to EN 60079-11)	Trunk to spurs: 1.5kV (test voltage) Spur to spur: no isolation	
Spur surge protection	Plug-in module (part number FS32) - see separate specification	

TRUNK

Data rate	31.25kbaud
Data transmission between trunk and spurs	passive, no repeater function
Number of trunk connections	2 (in & out), internally connected
Maximum number of 9377-FB-R modules per segment	2 redundant pairs (total 10 spurs**)
Input voltage range (trunk)	16–32V DC
Voltage drop (trunk in to trunk out)	0V
Maximum rated current (trunk in to trunk out)	5A
Low voltage monitoring	Input voltage < 16V, spurs de-energized
Typical DC current consumption for 9372-FB (mA)	

		@ 16V	@ 24V	@ 32V
No load on each spur	typ.	77.9	62.9	49.6
	max.	80.0	65.0	51.0
1 spur @ 20mA	typ.	102.8	81.1	64.3
	max.	120.0	84.0	80.6
All spurs @ 20mA	typ.	201.7	144.1	114.2
	max.	208.0	149.0	118.0
All spurs @ 20mA 1 short-circuit	typ.	185.0	135.6	106.5
	max.	191.0	140.0	110.0
All spurs @ 32mA	typ.	276.5	191.9	149.4
	max.	288.0	198.0	154.0

Power dissipation (max.)

2.5W (all spurs at 32mA)

Fieldbus terminator

Plug-in module (part number 9378-FT) supplied with each 9372-FB or 9375-FB enclosure.

Provides 100Ω + 1μF according to IEC 61158-2 - see separate specification

Trunk surge protection

Plug-in module (part number 9376-SP) - see separate specification

Reverse polarity protection

Yes

Failure alarm

Failure of either 9377-FB-R barrier module in redundant mode is annunciated over FOUNDATION™ fieldbus via state change of DI Function Block in 9379-ALM alarm module (standard in 9372-FB enclosure)

ELECTRICAL CONNECTIONS

Trunk wiring terminals

Type: Ex e

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.5 to 4.0	0.5 to 4.0
Flexible cable	0.5 to 2.5	0.5 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.25 to 2.5	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with wire connections in the Trunk Terminal Assembly)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

Trunk and spur cable shields are not interconnected within 9377-FB-R module.

Equipotential earth/ground connection facility

M10 earth/grounding stud on side wall of enclosure

BARRIER LED INDICATORS

Trunk Power (PWR)

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

* See ordering information

** 9372-FB supports 5 spurs, 9375-FB supports 5 spurs when alarm module is fitted or 6 spurs, when alarm module not fitted. Total of 12 spurs supported for 2 x 9375-FB with no alarm module fitted.

*** The FF-846 Isolated Device Coupler registration does not include tests for hardware redundancy. Although operation of the redundancy mechanism has been thoroughly tested, registration of the redundant capability is not implied by the application of the Foundation's checkmark.

9372-FB range

November 2016

HAZARDOUS AREA APPROVALS

Location of equipment

Safe area or Zone 1 IIC T4 or Zone 21 hazardous area

Location of connected spur equipment

Safe area or Zone 0 IIC hazardous area

Certification marking

Ex II 2(1)GD Ex d e ib mb [ia Ga] IIC T4 Gb
Ex tb IIIC T80°C Db

Certificate numbers

Baseefa09ATEX0185X
IECEx BAS09.0082X

Safety description (spurs)

U_o = 17.5V
 $I_{o peak}$ = 246mA
 $I_{o continuous}$ = 215mA
 P_o = 912mW
 U_i = 17.5V
 C_i = 0
 L_i = 0

Spurs in accordance with FISCO standard IEC 60079-11

ENVIRONMENTAL

Ambient temperature (system)

PP-System	SS-System	Storage (PP or SS)
-40°C to +65°C	-40°C to +70°C	-40°C to +75°C

Ambient temperature (9377-FB-R module)

-40°C to +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326-1:2006
NAMUR NE 21

Shock & Vibration

Vibration:

BS EN 60068-2-6: 2008 Test Fc: 1g
BS EN 60068-2-64: 1995 Test Fh: 1g

Shock:

BS EN 60068-2-27: 1993 Test Ea: 15g

MECHANICAL

Materials

937x-FB-xx-SS*	937x-FB-xx-PP*
316L Stainless Steel	Black, Glass Reinforced Plastic (GRP)

* See ordering information

Enclosure sizes - see dimension drawings for details

GRP, 5 spurs** 554 x 271x 136mm
Stainless steel, 5 spurs** 428 x 271x 130mm

** See footnote on page 2

Mounting position (recommended)

On vertical plane, with glands and breather on underside

Cable/Breather entries

Trunk: M20 x 2; Spurs: M20 x 6 Breather: M20 x 1

Enclosures are pre-fitted with a breather and Ex e nickel-plated brass plugs in all cable gland holes. These must be replaced only with Ex e equipment certified cable glands capable of maintaining the IP level of the enclosure type. See ordering information for gland options.

Protection

Stainless steel enclosures (937x-FB-xx-SS): IP66

GRP enclosures (937x-FB-xx-PP): IP66

Intrinsically safe terminals: IP20

Ex e terminals: IP30

PHYSICAL NETWORKS

IEC61158-2

FOUNDATION™ fieldbus H1

Profile type (according to FF-816)

Type 163 (isolated device coupler) FF-846***

ORDERING INFORMATION

Order as:

9372-FB-xx-XX	5-spur Redundant Fieldbus Barrier enclosure system with two 9377-FB-R Fieldbus Barrier modules and one 9379-ALM alarm module installed.
9375-FB-xx-XX	5/6-spur Fieldbus Barrier enclosure system with one 9377-FB-R Fieldbus Barrier module installed. (Upgradable to redundant operation by addition of a second 9377-FB-R module and optional 9379-ALM alarm module).
Where xx =	PS (pluggable screw terminal connectors) PC (pluggable spring clamp connectors)
Where XX =	SS – 316L Stainless Steel PP – Glass Reinforced Plastic (GRP) - Black (Note: All enclosures are pre-wired and include a 9378-FT Fieldbus terminator module)
9377-FB-R	Fieldbus Barrier module, 6-spur, pluggable
9379-ALM	Alarm module
9378-FT	Fieldbus terminator, pluggable
9376-SP	Trunk surge protection module, pluggable
FS32	Spur surge protection module, pluggable

CABLE GLANDS

The following M20 cable glands are Ex e equipment certified, better than IP65 rated and suitable for use with the 9370-FB range of Fieldbus Barriers. They can be supplied separately and are available to order using the following part numbers.

Order No.	Manufacturer and Type	Description (Qty 1)
FCS-1000-P20	Jacob 50.620 PASWL/Ex	Plastic gland
FCS-1000-C20	Capri 816694	Nickel-plated brass gland
FCS-1000-A20	Capri 846694	Armoured nickel-plated brass gland
FCS-1000-S20	Capri 816699	Stainless steel gland
FCS-1000-R20	Capri 846699	Armoured stainless steel gland

ASSOCIATED LITERATURE

Instruction Manual - GRP enclosures

Instruction Manual - stainless steel enclosures

INM9370-RD-PP

INM9370-RD-SS

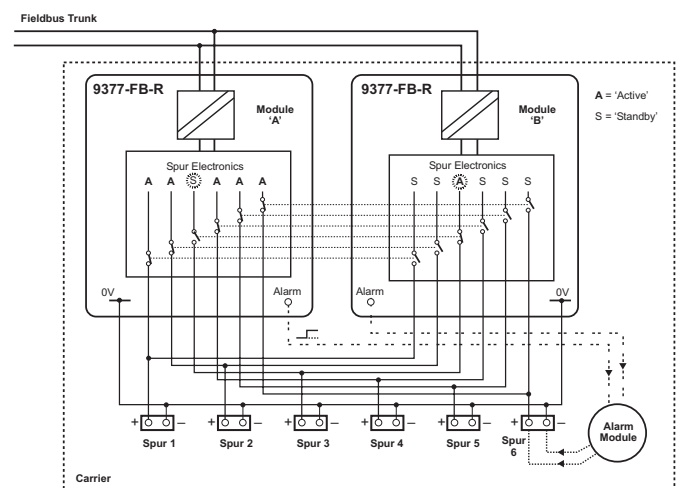


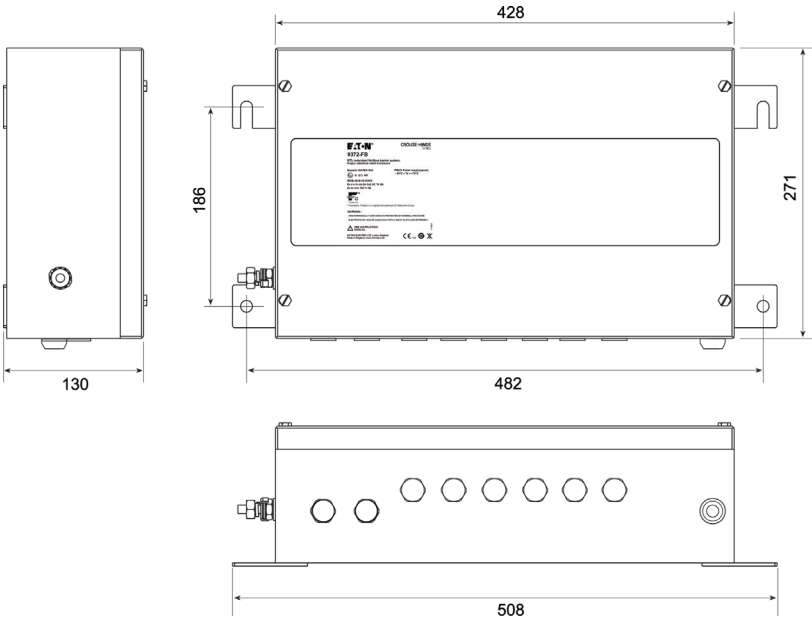
Figure 1 - Illustrating spur redundancy and use of optional Alarm module

9372-FB range
November 2016

DIMENSIONS (mm)

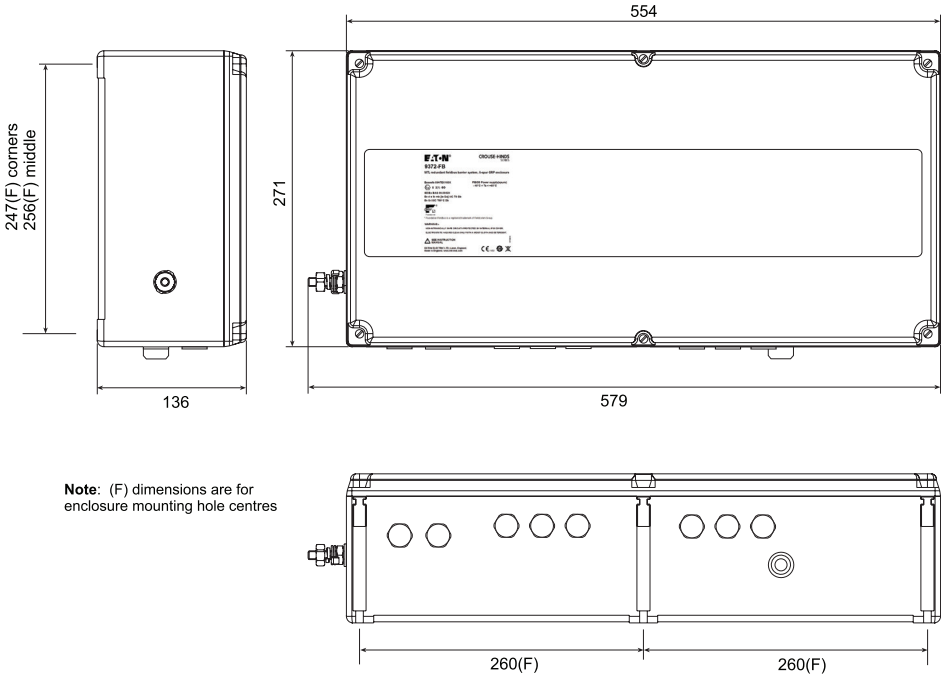
Stainless Steel Enclosure
Mounting holes: Ø 10.8mm

9372-FB-xx-SS
9375-FB-xx-SS



GRP Enclosure
Mounting holes: 6.5mm slot, 12mm head max.

9372-FB-xx-PP
9375-FB-xx-PP



Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2016 Eaton
All Rights Reserved
Publication No. EPS9372-RD Rev 6
November 2016

EUROPE (EMEA):
+44 (0)1582 723633
mtlenquiry@eaton.com

THE AMERICAS:
+1 800 835 7075
mtl-us-info@eaton.com

ASIA-PACIFIC:
+65 6 645 9888
sales.mtlsing@eaton.com

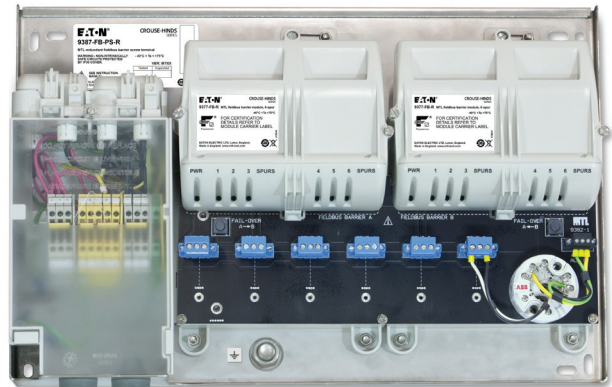
The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

9387-FB-xx-R

Open-frame, redundant fieldbus barrier



- For FOUNDATION™ fieldbus networks in hazardous areas
- Pre-assembled system components for up to 5 intrinsically safe spur connections
- For assembly into user-specified field enclosure
- Spurs compatible with FISCO and "Entity-certified" fieldbus instruments
- Ergonomic mechanical design
- Pluggable system components without "gas free" constraints
- Optional, integrated surge protection for trunk and spurs



The 9387-FB-R (5-spur) Open-frame redundant fieldbus barrier provides intrinsically safe spur connections from a high-energy trunk, for connection to suitably certified Foundation™ fieldbus H1 instruments. The unit comprises pre-wired and assembled system components on a stainless steel baseplate, for installation into a suitably certified field enclosure. Connection facilities are provided for the trunk and spur wiring, as well as all electronic modules needed to support a fully-working Fieldbus Barrier. In a typical application, an Ex e (increased safety) certified field enclosure will be selected to allow installation in a Zone 1 hazardous area; third-party approval of the enclosure and contents is normally required.

The assembly uses duplicated fieldbus barrier modules in a redundant configuration to achieve significantly higher system availability than equivalent 'simplex' units. The 9387-FB-R may therefore be selected for critical process applications where failure of the Fieldbus Barrier would otherwise result in unacceptable downtime or lost production. It is also ideal for use in Fieldbus Safety Instrumented Function (SIF) networks in which nuisance trips cannot be tolerated. Failure annunciation to the host control system is provided by means of an integrated FOUNDATION™ fieldbus device with Digital Input Function Block capability.

In common with conventional fieldbus barriers, each intrinsically safe spur is capable of supporting a FISCO or 'Entity' certified fieldbus device located in a Zone 0 or 1 hazardous area. The short-circuit protected spurs are galvanically isolated from the trunk and require no protective ground connection in the field.

The 9387-FB-R redundant fieldbus barrier assembly is based on the 9370-FB range of products, which are supplied as complete, factory-assembled systems that do not require additional wiring or complex ancillary components. The electrical and mechanical aspects of this design have been integrated to provide the industry's first complete, ergonomic solution for 'High Energy Trunk' applications in hazardous areas.

Uniquely, the key modular components of the system (Fieldbus Barrier, Terminator and Surge Protectors) may be 'hot-plugged' by design and without gas-clearance procedures or separate isolating switches. This virtually eliminates the risk associated with hazardous area maintenance activities, speeds module replacement and avoids the need for specialist operator training. Further optional features include pluggable surge protection components for the fieldbus trunk and individual spurs.

The 9387-FB-R Fieldbus barrier assembly is bus powered and requires no additional power supply in the field. When used with a fieldbus host control system, power for the trunk may be provided by redundant MTL power supplies.

SPECIFICATION**SPURS****Number of spurs**

5 (6th spur allocated to alarm module)

Number of 9377-FB-R modules

2

Current per spur

0 - 32mA

Total current all spurs (max.)

160mA

Current limit per spur (max.)

45mA

Spur short circuit current (max.)

4.5mA

Spur voltage

≥ 10V @ 40mA

No-load voltage

12V min.

Number of field devices

1 per spur

Maximum spur length

120m (depending on the number of spurs per fieldbus segment)

Galvanic isolation (to EN 60079-11)

Trunk to spurs: 1.5kV (test voltage)

Spur to spur: no isolation

Module to module: 30V

Spur surge protection

Plug-in module (part number FS32) - see separate specification

* See ordering information

TRUNK**Data rate**

31.25kBaud

Data transmission between trunk and spurs

passive, no repeater function

Number of trunk connections

2 (in & out), internally connected

Input voltage (trunk)

16-32V DC

Voltage drop (trunk in to trunk out)

0V

Maximum rated current (trunk in to trunk out)

5A

Low voltage monitoring

Input voltage < 16V, spurs de-energized

Typical DC current consumption for 9387-FB

		@ 16V	@ 24V	@ 32V
No load on each spur	typ.	77.9	62.9	49.6
	max.	80.0	65.0	51.0
1 spur @ 20mA	typ.	102.8	81.1	64.3
	max.	120.0	84.0	80.6
All spurs @ 20mA	typ.	201.7	144.1	114.2
	max.	208.0	149.0	118.0
All spurs @ 20mA 1 short-circuit	typ.	185.0	135.6	106.5
	max.	191.0	140.0	110.0
All spurs @ 32mA	typ.	276.5	191.9	149.4
	max.	288.0	198.0	154.0

Power dissipation (max.)

2.5W (all spurs at 32mA)

Fieldbus terminator

Plug-in module (part number 9378-FT) supplied with each 9387-FB-R or 9388-FB-R assembly.

Provides 100Ω + 1μF according to IEC 61158-2 - see separate specification

Trunk surge protection

Plug-in module (part number 9376-SP) - see separate specification

Reverse polarity protection

Yes

Failure alarm

Failure of either 9377-FB-R barrier module in redundant mode is annunciated over FOUNDATION™ fieldbus via state change of

DI Function Block in 9379-ALM alarm module

ELECTRICAL CONNECTIONS**Trunk wiring terminals**

Type: Ex e

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.5 to 4.0	0.5 to 4.0
Flexible cable	0.5 to 2.5	0.5 to 2.5

Spur field wiring terminals

Type: 3-way, pluggable

Cable types and capacity	Screw cage clamp - mm ²	Spring cage clamp - mm ²
Rigid cable	0.2 to 2.5	0.2 to 2.5
Flexible cable	0.25 to 2.5	0.25 to 2.5

Grounding of cable screens (trunk & spurs)

(Configured with wire connections in the Trunk Terminal Assembly)

Options	Trunk	Spurs
1 Single point grounding	Grounded at host	Trunk & spur screens joined
2 Local grounding of spurs	Grounded at host	Grounded at field enclosure

Equipotential earth/ground connection facility

M10 earth/grounding stud on baseplate

BARRIER LED INDICATORS**Trunk Power (PWR)**

	ON	OFF
Green	Supply voltage > 16V, internal supply healthy	Supply voltage < 16V or no supply

Spurs (tri-colour, per spur)

Colour	Steady	Flashing
Green	Channel powering spur - spur OK	Channel powering spur - spur open
Red	Internal fault	N.A.
Yellow	Short to shield	Short circuit, current limit
Off	Supply < 16V or no supply	N.A.

PHYSICAL NETWORKS

IEC61158-2

FOUNDATION™ fieldbus H1

Profile type (according to FF-816)

Type 163 (isolated device coupler) FF-846*

HAZARDOUS AREA APPROVALS**Location of equipment**

Zone 1 IIC T4 hazardous area when mounted inside a suitably certified enclosure

Location of connected spur equipment

Zone 0 IIC hazardous area

Certification codes

Ex II 2(1) G

Ex d e i b mb [ia Ga] IIC T4 Gb (-40°C to +75°C)

Certificate numbers

Baseefa 09 ATEX0184U

IECEX BAS09.0081U

Note: 9387-FB-R is a product ordering code. The certification documents refer to the **937x** components that comprise the 9387-FB-R.

'U' denotes a unit that requires further equipment for use in hazardous areas, i.e. a suitably certified enclosure.

Safety description (spurs) $U_o = 17.5V$ $I_{o\ peak} = 249.5mA$ $I_{o\ continuous} = 113mA$ $P_o = 982mW$ $U_i = 17.5V$ $C_i = 0$ $L_i = 0$

Spurs in accordance with FISCO standard IEC 60079-11

ENVIRONMENTAL**Ambient temperature (inside selected enclosure)**

Operating	Storage
-40°C ... +75°C	-40°C ... +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326-1 : 2013

NAMUR NE 21

Shock & Vibration**Vibration:**

BS EN 60068-2-6: 2008 Test Fc: 1g

BS EN 60068-2-64: 1995 Test Fh: 1g

Shock:

BS EN 60068-2-27: 1993 Test Ea: 15g

MECHANICAL**Mounting position (recommended)**

On to a vertical plane

Protection

Intrinsically safe terminals IP20

Non-IS terminals IP30

Weight

4.8kg

(includes two barrier(s) and the trunk terminator but excludes any surge protection items)

ORDERING INFORMATION

Order as:

9387-FB-xx-R

5-spur Redundant Fieldbus Barrier assembly with two 9377-FB-R Fieldbus Barrier modules and one 9379-ALM alarm module installed.

Where **xx** =

PS = pluggable screw terminal connectors
PC = pluggable spring-clamp connectors

(Note: All assemblies are pre-wired and include a 9378-FT Fieldbus terminator module)

9377-FB-R

Fieldbus Barrier module, 6-spur, pluggable Alarm module

9379-ALM

Fieldbus terminator, pluggable

9378-FT

Trunk surge protection module, pluggable

9376-SP

Spur surge protection module, pluggable

FS32**ASSOCIATED LITERATURE**

Instruction Manual

INM9380-RD

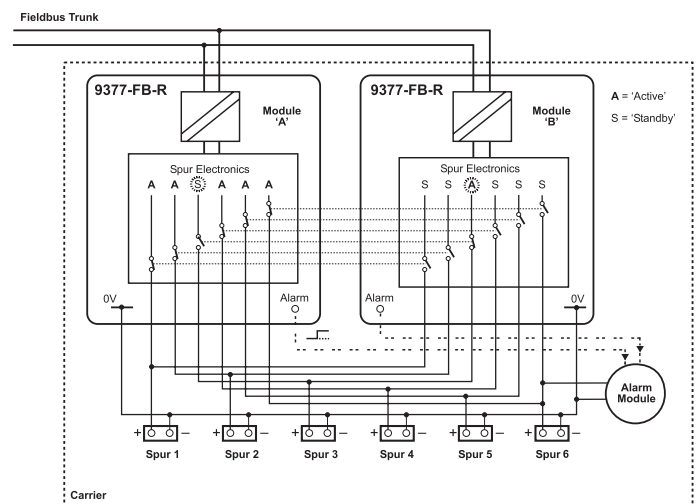
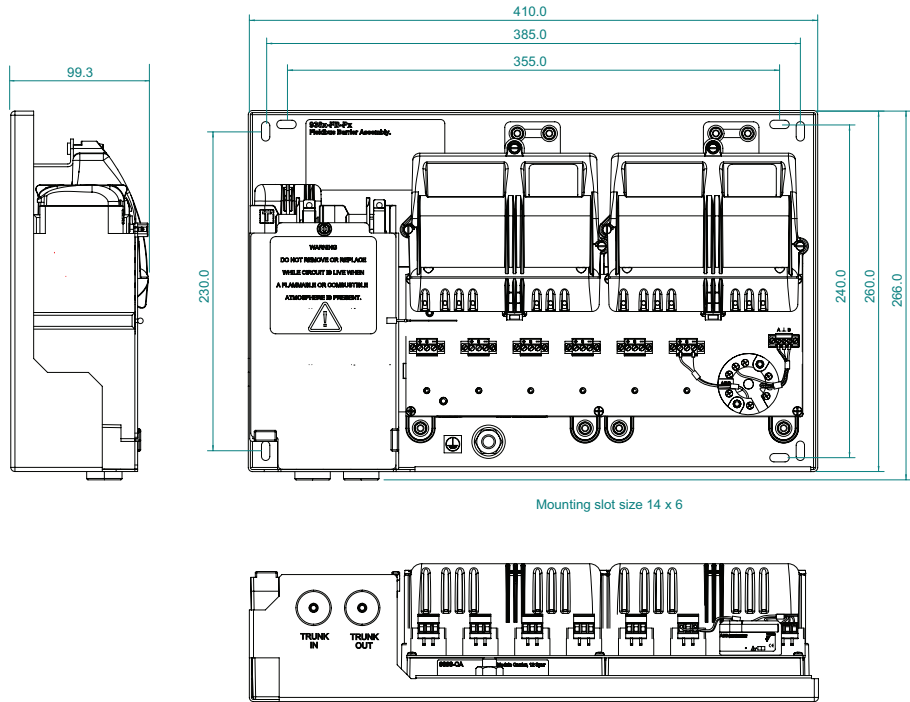


Figure 1 - Illustrating spur redundancy and use of optional Alarm module

* The FF-846 Isolated Device Coupler registration does not include tests for hardware redundancy. Although operation of the redundancy mechanism has been thoroughly tested, registration of the redundant capability is not implied by the application of the Foundation's checkmark.

DIMENSIONS (mm)

9387-FB-xx-R
5-spur baseplate assembly



9376-SP

Trunk Surge Protector

- Designed for use with MTL9370-FB range of fieldbus barrier system for FOUNDATION™ fieldbus networks in hazardous areas
- Effective protection against adjacent lightning strikes and power-induced surges
- 10kA surge protection level
- $\pm 32\text{V}$ operating voltage range
- Transparent to fieldbus signals
- Fast reaction time
- 'Live pluggable' in Zone 1 hazardous areas without gas clearance



The **9376-SP Trunk surge protector** is designed for use in the MTL 9370-FB range of fieldbus barrier system. It prevents surges and transient over-voltages induced on the trunk of the fieldbus network from damaging the system's internal components such as the fieldbus barrier module and terminator. Designed specifically for installation on the trunk terminal assembly inside the system enclosure, its pluggable construction allows it to be installed either during initial installation or later in the life of the apparatus.

The use of **specially certified connectors** allows the 9376-SP module to be removed and replaced in the fieldbus barrier enclosure in a Zone 1 hazardous area while the fieldbus trunk remains energised and without gas clearance procedures.

The **9376-SP's multi-stage hybrid surge protection** network uses a combination of solid state electronics and a gas-filled discharge tube (GDT) to provide surge protection up to 10kA. It is completely transparent to the operation of the fieldbus, and allows the signals to pass without attenuation while diverting surge currents safely to ground and clamping output voltages to safe levels.

Fully automatic in operation, the 9376-SP reacts immediately to make sure that the protected equipment is never exposed to damaging surges between the fieldbus lines or between the lines and ground. It resets automatically without manual intervention.

When combined with a similar performance device at the host end (e.g. MTL FP32 surge protector), there is effective protection for equipment at both ends of the fieldbus trunk.

Devices are also available to provide surge protection for the intrinsically safe spurs of MTL 9370-FB fieldbus barrier system - refer to product type FS32.

The 9376-SP meets IEC 61158-2 for 31.25kb/s systems such as FOUNDATION™ fieldbus and PROFIBUS-PA.

SPECIFICATION

Maximum surge current

10kA (8/20µs waveform) per line

Leakage current

<1mA @ working voltage

Working voltage

±32Vdc

Maximum continuous operating voltage

±32V peak normal mode

±225V peak common mode

Limiting voltage

62V @ 3kA 8/20µs

Capacitance

Line — Line — 40pF

Line — Earth (Ground) — 80pF

Attenuation

−1dB — 7kHz to 7.5MHz

Electrical connections

Ex de subminiature plugs, compatible with sockets of Trunk Terminal Assembly in 9370-FB range fieldbus barrier systems

ENVIRONMENTAL

Ambient temperature limits

−40°C to +75°C — working

−40°C to +85°C — storage

Relative humidity

5% to 95% RH (non-condensing)

Vibration

BS EN 60068-2-6: 2008 Test Fc: 1g

BS EN 60068-2-64: 1995 Test Fh: 1g

Shock

BS EN 60068-2-27: 1993 Test Ea: 15g

Ratings in accordance with IEC 61643-21

Nominal voltage	U_n	32V
Rated voltage (MCOV)	U_c	36V
Nominal current	I_n	1.6A
Nominal discharge current (8/20µs)	I_{sn}	3kA
Max discharge current (8/20µs)	I_{max}	10kA
Lightning impulse current (10/350µs)	I_{imp}	1.5kA
Residual voltage @ I_{sn}	U_p	62V
Voltage protection level @ 1kV/µs	U_p	<45V
Bandwidth	f_G	73MHz
Capacitance	C	40pF
Series resistance	R	0.5Ω
Operating Temperature Range		−40°C to +75°C
Category tested		A2, B2, C1, C2, C3, D1
Overstressed fault mode ($I_n = 3kA$)		12kA
Impulse durability (8/20µs)		5kA
Degree of protection (when installed)		IP40
AC durability $1A_{rms}$		5T
Service conditions 80kPa - 160kPa		5% - 95% RH

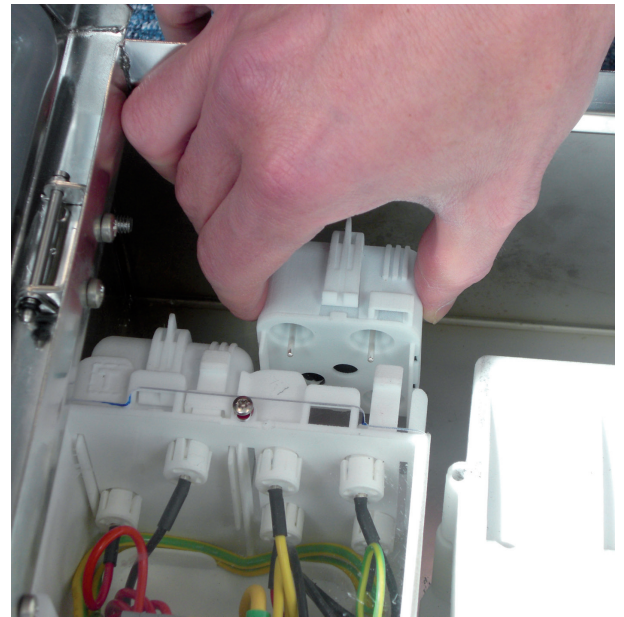


Figure 1: Fitting the 9376-SP module to the Trunk Termination Assembly (TTA) inside the system enclosure

HAZARDOUS AREA APPROVALS

Declaration of conformity

MTL14AOC9376SP

Certification code

Baseefa 09ATEX0324U

Ⓔ II 2 G Ex d e mb IIC Gb (−40°C ≤ Ta ≤ 75°C)

IECEX BAS10.0005U

Ex d e mb IIC Gb (−40°C ≤ Ta ≤ 75°C)

MECHANICAL

Weight

165g approx.

Dimensions

See diagram

ORDERING INFORMATION

Order code - 9376-SP

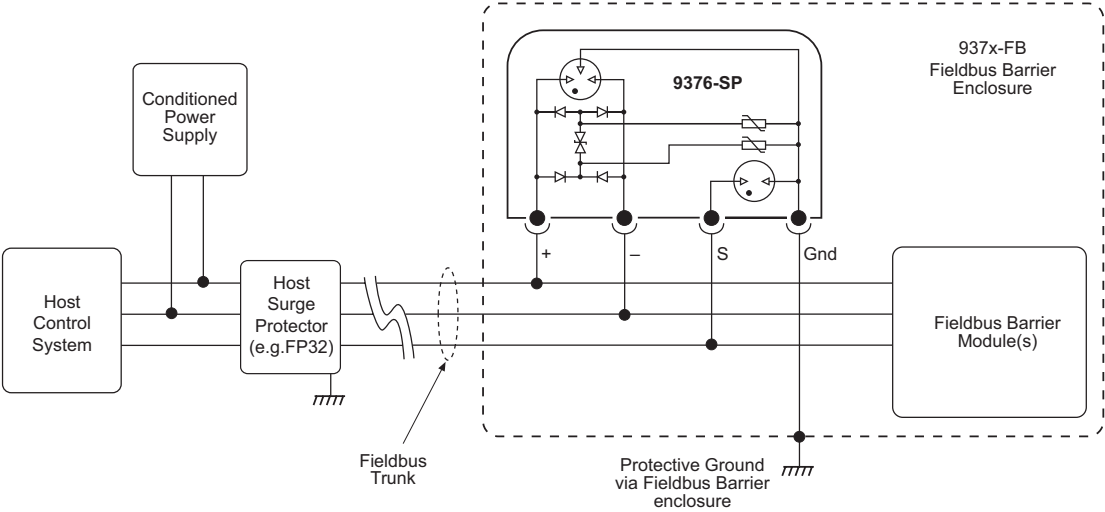
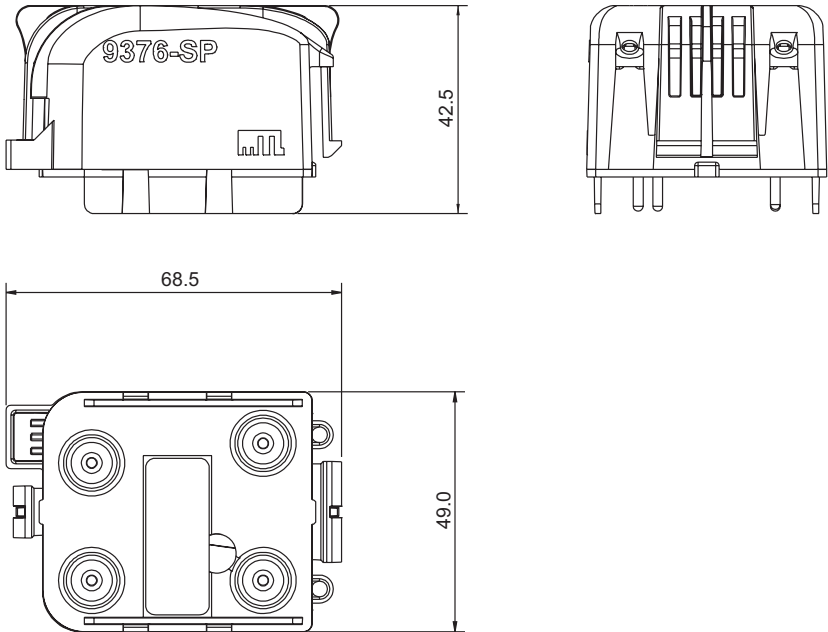


Figure 2: Application of the 9376-SP in the 937x-FB Fieldbus Barrier Enclosure

DIMENSIONS (mm)



Eaton Electric Limited,
 Great Marlings, Butterfield, Luton
 Beds, LU2 8DL, UK.
 Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
 E-mail: mtlenquiry@eaton.com
www.mtl-inst.com
 © 2016 Eaton
 All Rights Reserved
 Publication No. EPS 9376-SP Rev 4 151116
 November 2016

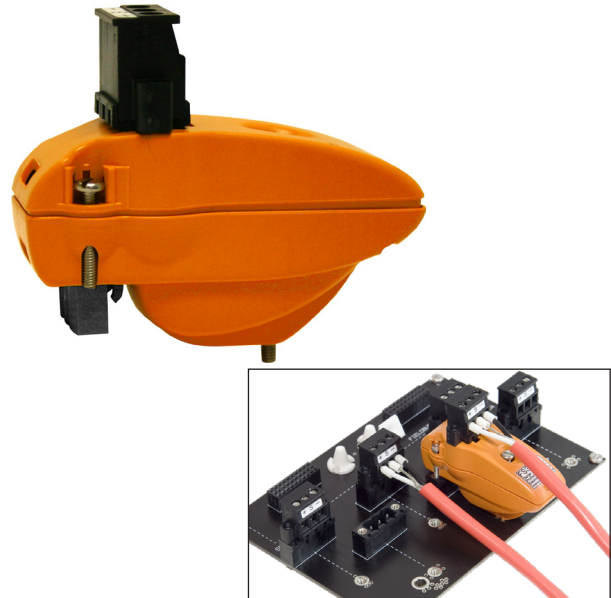
EUROPE (EMEA):
 +44 (0)1582 723633
mtlenquiry@eaton.com
THE AMERICAS:
 +1 800 835 7075
mtl-us-info@eaton.com
ASIA-PACIFIC:
 +65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

MTL FS32 range

Surge protection for fieldbus components

- Protects intrinsically safe spurs on MTL 937x-FB range fieldbus
- 20kA maximum surge current per line
- Plug connectors for quick and easy connection or rewiring
- Meets the requirements of IEC61158-2:2004
- Can be used on MTL Megablocks or other fieldbus equipment
- 10 year product warranty



The FS32 surge protection device prevents surges and transient over-voltages conducted along the Trunk or Spurs of fieldbus systems from damaging the associated electronics such as terminators, spur blocks and the bus control equipment. Designed to fit Eaton's latest MTL fieldbus barrier product to protect spurs the FS32 can also be used to protect spurs on Megablock wiring hubs. This space saving design helps to reduce the size of junction boxes and ease installation.

The multi-stage hybrid surge protection network at the heart of the FS32 uses a combination of solid state electronics and a gas-filled discharge tube (GDT) to provide surge protection up to 20kA. This impressive surge protection circuit is design to exhibit exceptionally low line resistance and has negligible voltage drop to the spurs.

In operation the FS32 does not adversely affect the performance or operation of the fieldbus or connected equipment, it allows signals to pass with little attenuation while diverting surge currents safely to earth (ground) and clamping output voltages to safe levels.

Fully automatic in operation the FS32 devices react immediately to make sure that the equipment is never exposed to damaging surges between lines or the lines to earth (ground). Reacting instantaneously the FS32 redirects surges safely to earth (ground) and then resets automatically.

The FS32 represents the next generation of surge protection to be fitted on FOUNDATION™ fieldbus Systems. The space saving form factor allows the FS32 to be connected directly to the terminal receptacle on the module carrier of the 9370 fieldbus barrier. The earth (ground) is connected through the mounting screw in one simple operation. The field spur cable termination block plugs directly into the FS32 allowing fast and effective retro fitting if desired with no additional hardware being required.

For general purpose Megablock wiring hubs FCS-MBx, FCS-MBx-SG, FCS-MBx-SG-T, F300 Range and Intrinsically Safe Megablock wiring hubs F240 - F273 the FS32 represents a simple solution for the fitting of surge protection with the addition of the FS32-BAR earthing (grounding) arrangement. Furthermore the FS32 can also be used on fieldbus power supplies such as the F800 to protect the trunk.

A 10 year no fuss warranty is available as standard for the FS32, so if a correctly connected device should fail for any reason simply return it for a free replacement.



Powering Business Worldwide

Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2022 Eaton
All Rights Reserved
Publication No. EPS 901-169 Rev F
October 2022

MTL FS32 range

October 2022

SPECIFICATION

All figures typical at 25°C (77°F) unless otherwise stated

Maximum surge current

20kA (8/20µs waveform) per line

Leakage current

0.1µA @ working voltage

Working voltage

±32Vdc

Maximum continuous operating voltage

±36V peak normal mode

±225V peak common mode

Limiting voltage

62V @ 3kA 8/20µs

Line resistance

0.1 Ohm per line

Capacitance

Line — Line — 40pF

Line — Earth (Ground) — 80pF

Attenuation

-1dB — 7kHz to 7.5MHz

Ambient temperature limits

-40°C to +75°C

(-40°F to +167°F) (working)

-40°C to +80°C

(-40°F to +176°F) (storage)

Humidity

5% to 95% RH (non-condensing)

Electrical connections

Plug/header screw terminal

Weight

40g

Dimensions

See figure 1

EMC compliance

BS EN 61326-1:2013

Electrical Safety

BS EN 61643-21:2001

INSTALLATION

Directly plugs into MTL 934x-FB and Relcom mega-blocks.

ORDERING INFORMATION

FS32

FS32-BAR

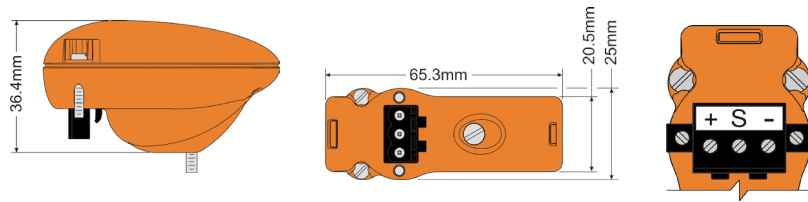


Figure 1 Dimensions (as supplied)

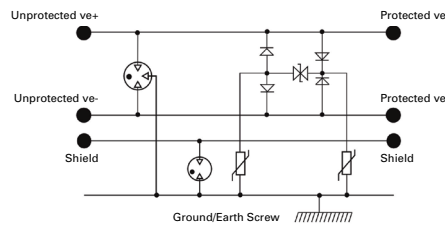
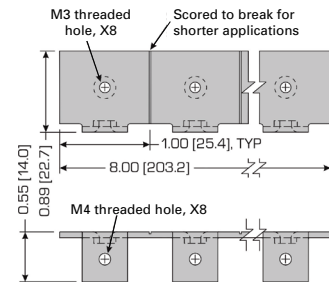


Figure 2 AC and DC connections



Part No. FS32-BAR
Ground bar for Megablocks

TO ORDER SPECIFY - Order by module, as listed in the specification table below.

Model		FS32
Nominal voltage	U_n	32V
Rated voltage (MCOV)	U_c	36V
Nominal current	I_n	1.6A
Nominal discharge current (8/20µs)	i_{sn}	3kA
Max discharge current (8/20µs)	I_{max}	20kA
Lightning impulse current (10/350µs)	I_{imp}	2.5kA
Residual voltage @ i_{sn}	U_p	62V
Voltage protection level @ 1kV/µs	U_p	<45V
Bandwidth	f_G	73MHz
Capacitance	C	40pF
Series resistance	R	0.1
Operating temperature range		-40°C to +75°C
Category tested		A2, B2, C1, C2, C3, D1
Overstressed fault mode $i_n=3kA$		22kA
Impulse durability (8/20µs)		10kA
Degree of protection		IP20
AC durability		1A _{rms} , 5T
Service conditions		80kPa- 160kPa 5% - 95% RH

Tested in accordance to IEC 61643-21

HAZARDOUS AREA APPROVALS

For the latest certificate information ,see www.mtl-inst.com/certificates



Powering Business Worldwide

Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2022 Eaton
All Rights Reserved
Publication No. EPS 901-169 Rev F 251022
October 2022

EUROPE (EMEA):
+44 (0)1582 723633
mtlenquiry@eaton.com

THE AMERICAS:
+1 800 835 7075
mtl-us-info@eaton.com

ASIA-PACIFIC:
+65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

9378-FT

Fieldbus Terminator

- For use with MTL 9370-FB range of fieldbus barrier systems for FOUNDATION™ fieldbus networks in hazardous areas
- Terminates fieldbus trunk for optimum signal quality
- Complies with IEC 61158-2
- 'Live pluggable' in Zone 1 hazardous areas without gas clearance



The 9378-FT fieldbus terminator provides “far end” termination of the trunk cable for MTL 9370-FB range of fieldbus barriers in Foundation™ fieldbus networks. Designed specifically for installation on the Trunk Terminal Assembly inside the system enclosure, its pluggable construction allows it to be installed simply in whichever enclosure is at the end of the fieldbus segment.

Specially certified connectors in the 9378-FT allow it to be removed and replaced while powered from the mating sockets on the trunk terminal assembly in a Zone 1 hazardous area.

SPECIFICATION

Termination type

Provides 100W + 1μF according to IEC 61158-2

ENVIRONMENTAL

Ambient temperature

-40°C to +75°C

Relative humidity

< 95%, non-condensing

Electromagnetic compatibility

EN 61326 – 1: 2006

EN 55022 class A

NAMUR NE 21

Vibration

BS EN 60068-2-6: 2008 Test Fc: 1g

BS EN 60068-2-64: 1995 Test Fh: 1g

Shock

BS EN 60068-2-27: 1993 Test Ea: 15g

HAZARDOUS AREA APPROVALS

Location of module

Safe area,
IEC Zone 2 IIC T4 hazardous area,
IEC Zone 1 IIC T4 hazardous area

Certification code

E II 2G Ex de mb IIC T4 Gb

-45°C < T_a < 75°C

Certificate numbers

Baseefa 09 ATEX0323U

IECEX BAS 09.0087U

MECHANICAL

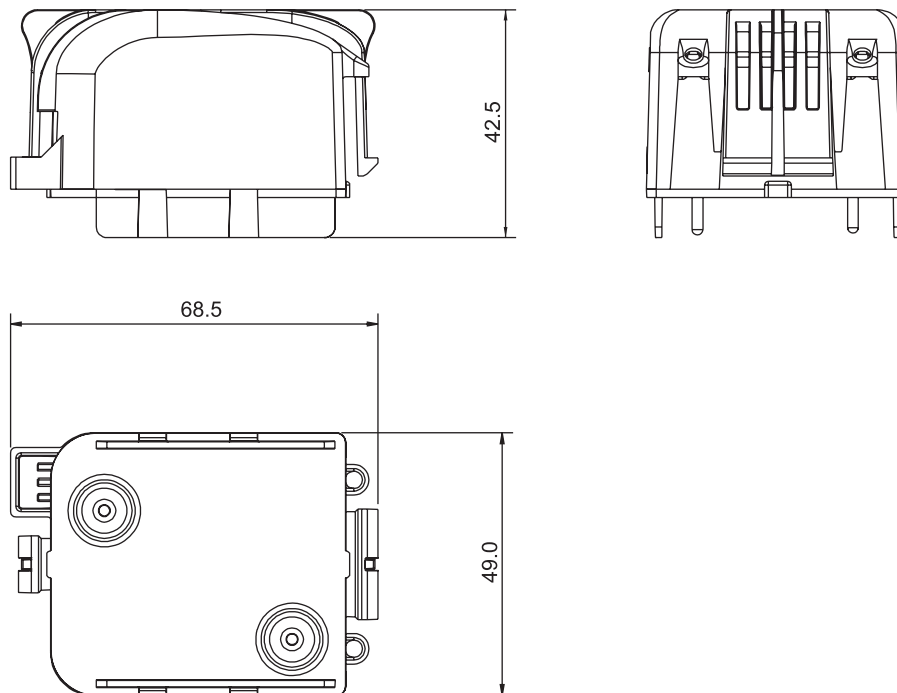
Weight

120g approx.

Dimensions

See diagram

DIMENSIONS (mm)



Powering Business Worldwide

Eaton Electric Limited,
Great Marlings, Butterfield, Luton
Beds, LU2 8DL, UK.
Tel: + 44 (0)1582 723633 Fax: + 44 (0)1582 422283
E-mail: mtlenquiry@eaton.com
www.mtl-inst.com

© 2016 Eaton
All Rights Reserved
Publication No. EPS 9378 Rev 3 150616
November 2016

EUROPE (EMEA):
+44 (0)1582 723633
mtlenquiry@eaton.com

THE AMERICAS:
+1 800 835 7075
mtl-us-info@eaton.com

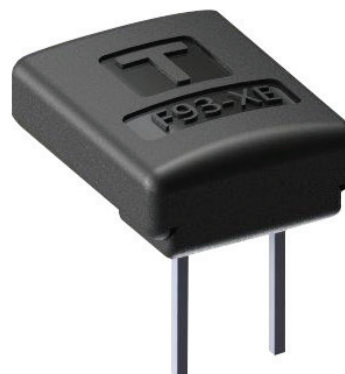
ASIA-PACIFIC:
+65 6 645 9888
sales.mtlsing@eaton.com

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.

MTL F93-XE

Fieldbus barrier terminator

- Designed for use in the MTL 937x-FB2 (enclosure system) and 938x-FB2 (open frame) fieldbus barriers.
- Provides "far-end" termination in FOUNDATION fieldbus™ H1 networks.
- Suitable for mounting in a Safe area or a Zone 2 or Zone 1 location.



The **MTL F93-XE fieldbus barrier terminator** should be used where the fieldbus barrier is the last (or only) device coupler on the segment. The segment must be terminated correctly to ensure that optimum signal quality is maintained.

The Trunk Termination Area has provision for a fieldbus terminator to be fitted when required. Terminator model F93-XE is used with these fieldbus barriers to provide the correct termination on the trunk segment.

Outline technical specification

Model number F93-XE	
Description	Fieldbus terminator, removable ^{Note 1}
Intended application	MTL 937x-FB2 Fieldbus Barrier range
Technical compliance	IEC 61158-2 FOUNDATION™ fieldbus H1
Electrical characteristics	100Ω, 1μF nominal
Hazardous area approval	ATEX; IECEx Method of protection: Ex m (encapsulated)
Construction	Nylon-based polyamide encapsulated body over FR4 printed wiring board
Reliability	Polarity insensitive; Fault-tolerant design ^{Note 2}
Means of connection	Via Ex e certified spring clamp or screw terminal connectors on 937x-FB2 range module carrier Connector pitch: 10 mm
Marking	Carries part number and 'T' symbol
Dimensions (body)	22.9 x 18.5 x 8.4 mm nom.
Colour	Black

Notes:

1. Removal and replacement must not be undertaken unless the area in which the equipment is installed is known to be non-hazardous, or the circuit to which it is connected has been de-energised.
2. Fieldbus termination maintained in event of internal open-circuit component fault.