

F200-IS megablock range

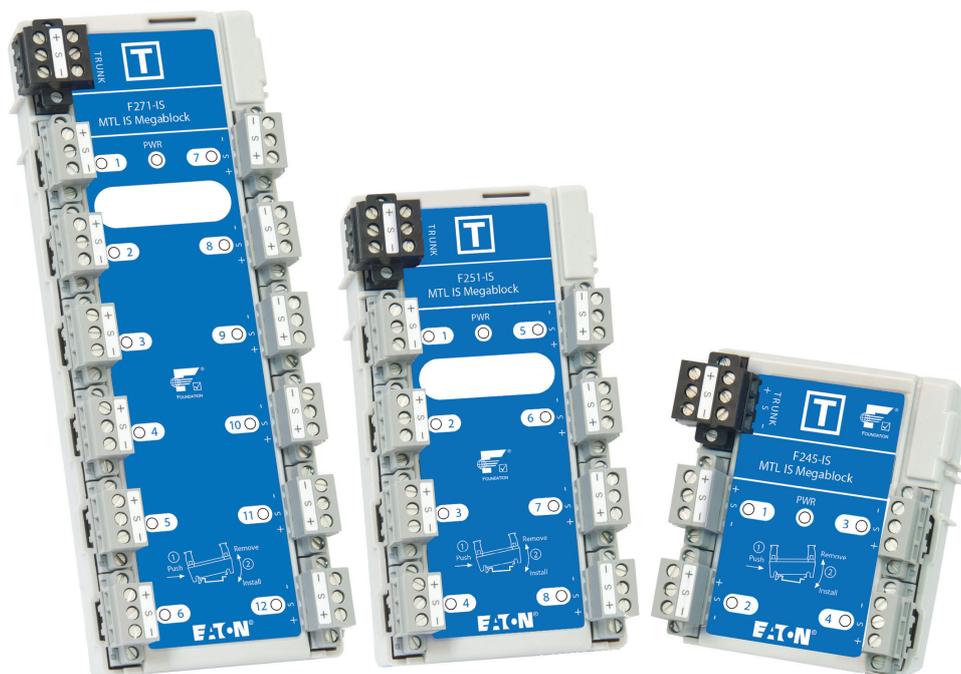
MTL intrinsically safe fieldbus device couplers



ATEX 502-999



IEC Ex 503-320



Powering Business Worldwide

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>

CONTENTS

	DECLARATION OF CONFORMITY	ii
	GENERAL SAFETY INFORMATION	iv
1	OVERVIEW	1
2	DESCRIPTION	1-2
3	COMPONENTS AND ACCESSORIES	2
4	MECHANICAL	2
4.1	Mounting orientation	2
4.2	Enclosure requirements	2
4.2.1	General requirements	2
4.2.2	Outdoor mounting	3
4.3	DIN-rail mounting	3
4.3.1	Mounting procedure	3
4.4	Removal from DIN-rail	3
5	ELECTRICAL CONNECTIONS	4
5.1	DC Power Requirements	4
5.2	Trunk connections	4
5.3	Spur port connections	5
5.4	Cable screen connections	5
5.5	Surge protection	5
6	TESTING	6
6.1	Power LED	6
6.2	Spur LEDs	6
7	ROUTINE MAINTENANCE	6
8	ATEX SAFETY INSTRUCTIONS (502-999)	8
8.1	General	8
8.2	Installation	8
8.3	Inspection and maintenance	9
8.4	Repair	9
8.5	Marking	9
8.6	Special conditions for safe use	9
8.7	Typical certification marking	9
8.8	ATEX- Control drawing	10
9	IEC Ex INSTALLATION INSTRUCTIONS (503-320)	12
9.1	General	12
9.2	Installation	12
9.3	Inspection and maintenance	12
9.4	Repair	12
9.5	Marking	13
9.6	Special conditions for safe use	13
9.7	IEC Ex- Control drawing	14

GENERAL SAFETY INFORMATION

The following methods are used in this manual to alert the user to important information:-

	WARNING!
	Warnings are provided to ensure operator safety and MUST be followed.

CAUTION
Cautions are provided to prevent damage to the instrument.

NOTE
These are used to give general information to ensure correct operation.

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.

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

	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 and the product datasheet
- 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).

	WARNING!
	If these assemblies have been used previously in general electrical installations, they MAY NOT be used in explosion-hazard area applications.

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.

F200-IS megablock range MTL Fieldbus device couplers

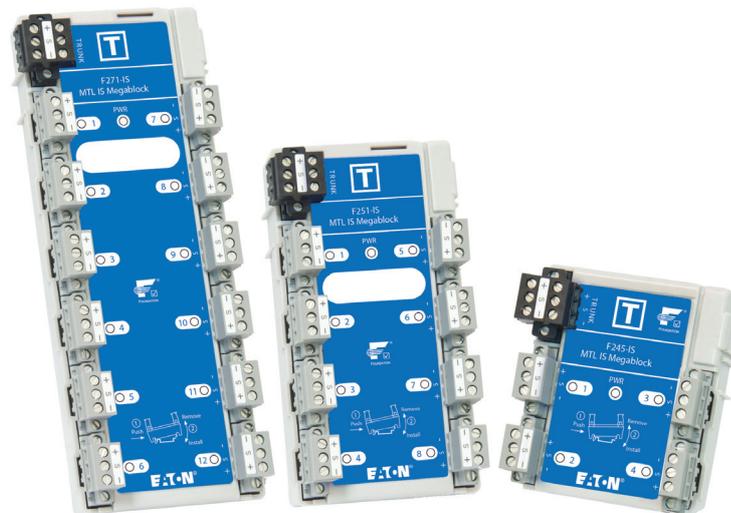


Figure 1.1 - Megablock models F271-IS, F251-IS and F245-IS

1 OVERVIEW

F200-IS Megablocks are DIN-rail mounted, device couplers for FOUNDATION™ fieldbus or Profibus PA networks. They allow connection of field devices to the segment trunk cable and provide short-circuit protection to the segment.

Megablocks minimize hand wiring and allow individual devices to be added to and removed from the segment without disrupting network communication.

Megablocks are available in four, eight, and twelve port versions. Multiple Megablocks are easily wired together to allow larger segments to be constructed.

Individual surge-protector modules (FS32) can also be fitted to any of the Megablock fieldbus terminals to provide protection against induced surges and transients that can potentially destroy or degrade certain components inside the F200-IS Megablocks.

2 DESCRIPTION

Simple and reliable interconnection

Each Megablock has dedicated connections for the fieldbus “home run” or trunk cable. Trunk connections are identified by their black connector. Numbered (grey) connectors are provided for each spur.

Wiring connections to the Megablock are made using pluggable connectors (screw terminal type are standard, but other connection styles are available). These allow wire terminations to be made to the individual connectors, which are then plugged into the Megablock. Devices can be connected and disconnected easily during commissioning. On completion, the connector retaining screws are tightened to secure each connector to the Megablock.

Short-circuit protection

To minimize susceptibility to single points of failure, F200-IS Megablocks are provided with built-in SpurGuard™ short-circuit protectors, which prevent the entire Fieldbus segment from being pulled down in the event of a short circuit on any one of the individual field devices or spur cable runs.

NOTE

During a short circuit, the shorted spur draws more current than a normal Fieldbus device - this must be taken into account in segment design.

Diagnostic aids

Each Megablock comes with a green LED to indicate whether DC Power is present, and a red LED next to each numbered spur indicates when the spur is in short circuit.

3 COMPONENTS AND ACCESSORIES

Product part numbers and their descriptions are listed below.

Part Number	Description
F24x-IS[-PC]*	4-way Megablock
F25x-IS[-PC]*	8-way Megablock
F271-IS[-PC]*	12-way Megablock
FS32	Spur surge protector module
F300-BAR-5	FS32 grounding bars for trunk - pack of 5
F304-BAR-10	FS32 grounding bars for F304 - pack of 10 †
F308-BAR-10	FS32 grounding bars for F308 - pack of 10 †
F312-BAR-10	FS32 grounding bars for F312 - pack of 10 †

* The standard connector for the Megablock is a pluggable screw terminal (elevator type). Pluggable spring-clamp connectors rely on constant spring pressure to maintain contact with the wire. To order Megablocks with pluggable spring-clamp connectors, add a -PC suffix to the part number (i.e. F251-IS-PC).

† One bar provides grounding for one side of the Megablock. Therefore up to two bars may be required for each Megablock.

4 MECHANICAL

4.1 Mounting orientation

Megablocks mount vertically or horizontally on 35mm DIN rail within a field junction box. The use of DIN rail end stops are recommended to prevent sliding (especially for vertical installations).

Eight, and twelve port Megablocks have areas on their body for labelling so that segments can be easily identified according to plant standards.

4.2 Enclosure requirements

4.2.1 General requirements

Megablocks may be mounted in hazardous (classified) areas – see sections 8 & 9. The following conditions must also be satisfied to ensure safe and reliable operation.

- Prevent any form of pollution that could compromise the operation of the unit. For example, choose an unpolluted location or a suitable enclosure to protect the assembly.
- Provide an adequate level of mechanical protection. This can be achieved by selecting a protected location, a suitable enclosure, or a combination of both.
- Ensure that all cable entries and connections are secure by making provision for the careful routing and securing of all cables.
- Provide adequate security against unauthorized interference.
- Conform to the permitted ambient temperature range of -50°C to $+70^{\circ}\text{C}$.

4.2.2 Outdoor mounting

In addition to the General Requirements above, if the Megablock is mounted in an outdoor location, use a suitable enclosure with a minimum of IP54 ingress protection. A higher level of ingress protection rating will be necessary if the working atmosphere is, or can be, corrosive, or if the enclosure is subject to wet or dusty environments.

4.3 DIN-rail mounting

The Megablocks are designed for mounting on 35mm x 7.5mm T-section “top hat” DIN rail to EN50022 and use built-in DIN rail clips to attach to the rail.

4.3.1 Mounting procedure

Megablocks are attached to the DIN rail using a “push-and-tilt” method- as illustrated on the body label and in Figure 4.1 below.

Tilt the Megablock towards the trunk-connector side of the Megablock and then engage the DIN-rail clips under the ledge of the DIN rail. Push the Megablock against the edge of the rail then rotate the Megablock until it sits flat onto the DIN rail, then release the pressure to allow the clips on the other side to engage.

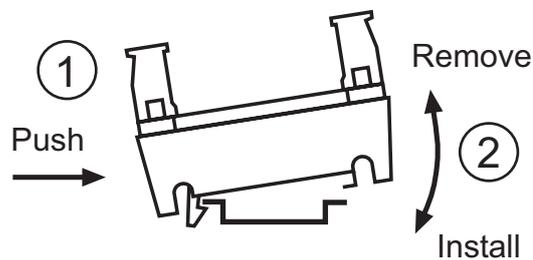


Figure 4.1: DIN Rail Installation and Removal

4.4 Removal from DIN-rail

Referring to Figure 4.1, push the Megablock against the edge of the DIN rail, tilt the other side of the Megablock up and away from the DIN rail, then release the side pressure to disengage the DIN rail clips from the DIN rail ledge.

5 ELECTRICAL CONNECTIONS

The Trunk and Spur connectors are pluggable (with securing screws) and available in the standard screw-terminal version or a spring-clamp version. Megablocks with spring clamp connectors have a -PC suffix on the Megablock part number. See Figures 5.1 and 5.2. The terminals can accept the following conductor sizes:

Type	Conductor size
Screw terminals	0.14 to 2.5mm ²
Spring clamp terminals (-PC)	0.20 to 2.5mm ²

NOTE

A torque screwdriver set between 0.5 - 0.6Nm is recommended for tightening all terminal screws.

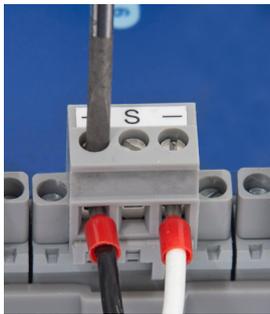


Figure 5.1: Screw Terminal

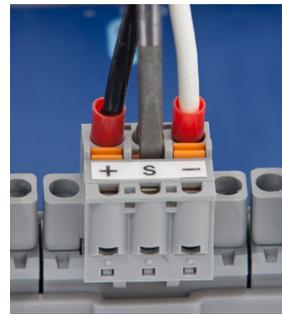


Figure 5.2: Spring Clamp

NOTE

When wiring to spring-clamp terminals, use a screwdriver with a 3-4 mm blade to depress the spring-clamp button before inserting the termination cable. See Figure 5.2.

5.1 DC Power Requirements

Megablocks draw DC power from the fieldbus trunk segment they are connected to. The minimum DC input voltage, and current required, vary with the Megablock type. Refer to the F200-IS datasheet for exact current requirements. The maximum input voltage is 24V DC, but a lower voltage may be required in order to achieve safety in some hazardous area applications- refer to the Control Drawings in Sections 8 & 9 of this manual.

5.2 Trunk connections

Each trunk connector provides two sets of interlinked (+), (-) and cable screen (S) connections.

The second connection enables the user to onward connect the trunk to a further Megablock and avoids breaking the upstream connection if the Megablock needs to be removed.

See Section 5.4 for information on cable screen grounding.

NOTE

For models with the "-HV" suffix, the Trunk connector only supports one set of connections

5.3 Spur port connections

Each spur port connector provides (+), (-) and cable screen (S) connections. See section 5.4 for information on cable screen grounding.

5.4 Cable screen connections

The 'S' screen terminals for the trunk and the spurs are interconnected/commoned within the F200-IS device and should be grounded at only *one point* for the whole segment (i.e. a single-point ground). The recommended position for that connection is in the control room close to the power supply at the DCS, or else in accordance with local system practice.

5.5 Surge protection

Each fieldbus terminal, trunk or spur, on a Megablock can be fitted with an FS32 surge protector to prevent damage to the internal components. The FS32 uses the same pluggable connector as the field connector; so the field connector is removed, the FS32 inserted and the original field connector is fitted to the FS32. See Figure 5.3 & 5.4.

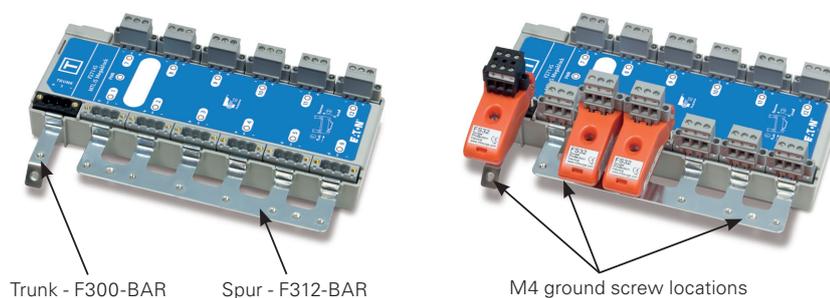


Figure 5.3: Typical grounding bars

Figure 5.4: With some FS32 modules

Mounting brackets, known as "grounding bars," can be fitted into ready moulded positions on both sides of the Megablock. (Grounding bar types are chosen to suit the model- see page 2.) The FS32 has a central mounting screw to provide a mechanical and electrical connection to the grounding bar. The bar must then be wired to a low-impedance, protective local ground point in order to dissipate any induced surge currents.

To mount FS32 surge protection modules on a Megablock:

1. Remove and retain the pluggable terminals from one side of the Megablock.
2. Locate the grounding bar lugs in the moulded positions on the side of the Megablock and press it firmly into place- see Figure 5.3.
3. Repeat 1 and 2 for the other side of the Megablock, if required.
4. Use an M4 screw and ring terminal (not supplied) to connect *each* grounding bar to a suitable low-impedance ground point- see Figure 5.4.
5. Mount an FS32 into one of the empty sockets and tighten its two plug screws, then tighten the grounding screw into the mounting bar.
6. Insert one of the pluggable terminals into the FS32 and tighten its securing screws.
7. Repeat 5 and 6 for all the other FS32 modules.

A separate grounding bar (F300-BAR) is used for the trunk connector, which must be similarly connected to ground- see Figures 5.3 & 5.4.

Follow a similar procedure to the one above for the trunk circuit.

6 TESTING

6.1 Power LED

Each Megablock has a green power LED (labelled PWR). This LED lights when the segment DC voltage exceeds 10V to indicate power is present.

6.2 Spur LEDs

A red LED is located next to each Megablock spur port. The LED lights when the SpurGuard™ current-limiting function is activated by a short-circuit on the spur.

7 ROUTINE MAINTENANCE

Check the general condition of the installation periodically to make sure that no deterioration has occurred. At least every two years (and more frequently for particularly harsh environments) check that:

- cable, wire connections, terminations, and screens are in good condition
- the green Power LED is lit
- no red spur LEDs are lit
- no signs of damage or corrosion are present

	WARNING!
	The plastic parts can store static charge. Clean only with a damp cloth to prevent static buildup.

THIS PAGE IS LEFT INTENTIONALLY BLANK

8 ATEX SAFETY INSTRUCTIONS (502-999)

The following information is in accordance with the Essential Health and Safety Requirements (Annex II) of the EU Directive 2014/34/EC [the ATEX Directive- safety of apparatus] and is provided for those locations where the ATEX Directive is applicable.

8.1 General

- a) In common with all other electrical apparatus installed in hazardous areas, this apparatus must only be installed, operated and maintained by competent personnel. Such personnel shall have undergone training, which included instruction on the various types of protection and installation practices, the relevant rules and regulations, and on the general principles of area classification. Appropriate refresher training shall be given on a regular basis. [See clause 4.2 of EN 60079-17].
- b) This apparatus meets the requirements of electrical apparatus in accordance with EN 60079-0:2012+A11:2013 and EN 60079-11:2012.
- c) This apparatus provides protection against all the relevant additional hazards referred to in Annex II of the directive, such as those in clause 1.2.7.

8.2 Installation

- a) The installation must comply with the appropriate European, national and local regulations, which may include reference to the IEC code of practice IEC 60079-14. In addition, particular industries or end users may have specific requirements relating to the safety of their installations and these requirements should also be met. For the majority of installations the Directive 1999/92/EC [the ATEX Directive - safety of installations] is also applicable.
- b) This apparatus is an electrical apparatus and is normally mounted in a hazardous area (Zone 1 or 2). It must be mounted in an enclosure with an IP54 or better rating according to EN 60529.
- c) This apparatus must not be subjected to mechanical and thermal stresses in excess of those permitted in the certification documentation, this safety information and the product specification. The product must be protected by an enclosure to prevent physical damage.
- d) The apparatus must not be installed in a position where it may be attacked by aggressive substances and must be protected from excessive dust, moisture and other contaminants by the enclosure.
- e) Mount on 7.5mm x 35mm 'top hat' DIN Rail according to the instructions on the device cover. Use DIN Rail end stops is recommended for vertical DIN Rail installations.
- f) Connect using Fieldbus Checkmarked cable per Control Drawing, section 8.8 on page 10.



ATEX 502-999

8.3 Inspection and maintenance

- a) Inspection and maintenance should be carried out in accordance with European, national and local regulations which may refer to the IEC standard IEC 60079-17. In addition, specific industries or end users may have specific requirements which should also be met.
- b) Access to the internal circuitry must not be made during operation or at any other time.
- c) If the outer enclosure of the apparatus needs to be cleaned, this should be done with a cloth lightly moistened by a dilute mixture of detergent in water.

8.4 Repair

This product must not be repaired. It must be replaced by an equivalent certified product.

8.5 Marking

Each F200-IS Megablock is marked with the following information:

Company Name and Address (shown below)

Product Number

Certificate number- **LCIE 17 ATEX 3010 X**

Ex classification- **II 1 G Ex ia IIC T4 Ga**

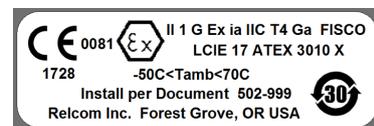
CE mark and Notified Body Number (LCIE)- **0081**

Ambient Temperature range- **-50C ≤ Tamb ≤ 70C**

8.6 Special Conditions for Safe Use

- The equipment must be only connected to certified associated intrinsically safe equipment. This combination must be compatible in regards to the intrinsically safe rules.
- The F200-IS Megablock **MUST** be mounted in an IP54 (minimum) rated enclosure. The enclosure must be selected in order to avoid electrostatic charging hazard.
- Ambient temperature range: -50°C to +70°C.

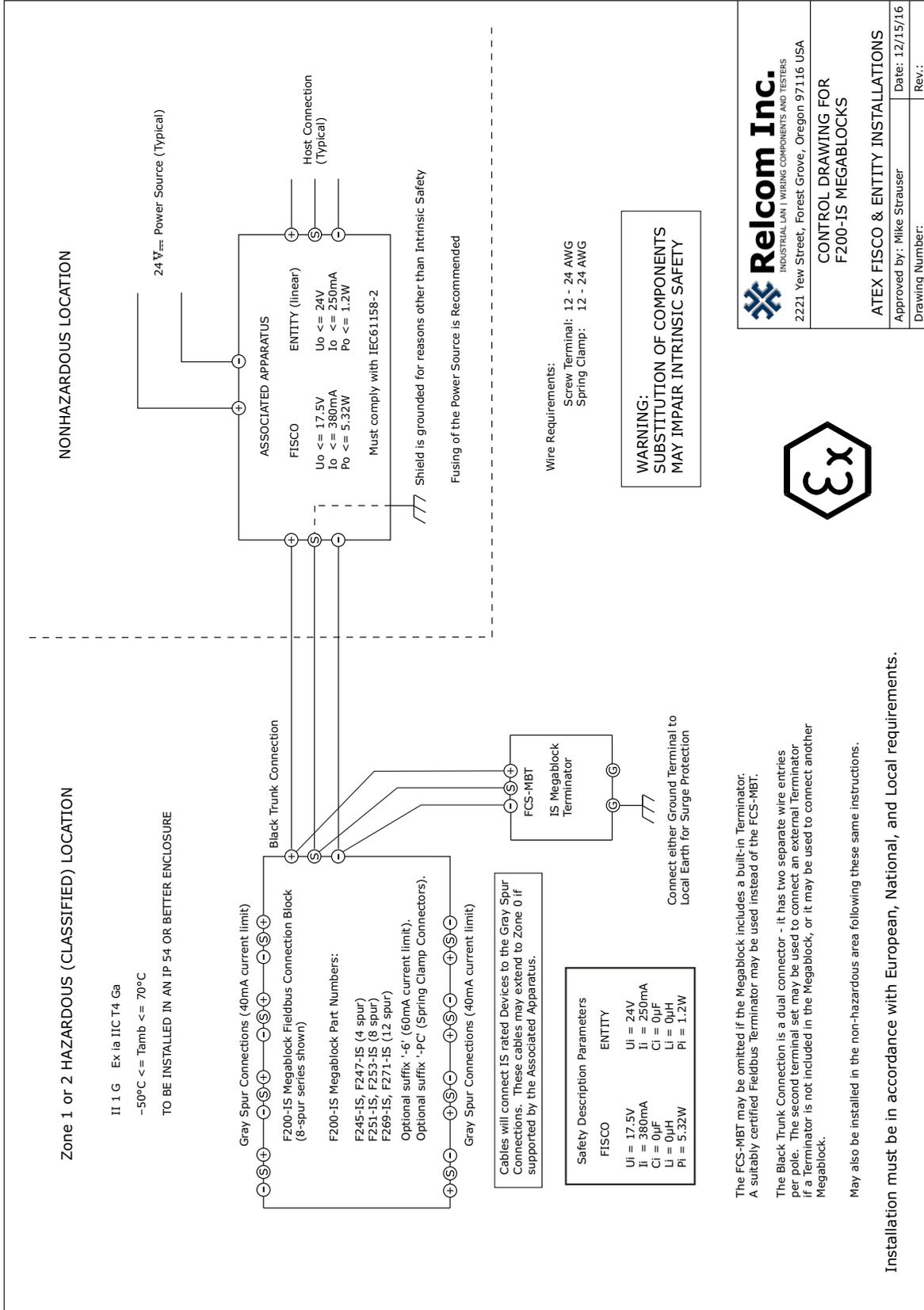
8.7 Typical certification marking



NOTE

For details of IECEx approvals see Section 9 starting on page 12.

8.8 ATEX - Control drawing



THIS PAGE IS LEFT INTENTIONALLY BLANK

9 IEC Ex INSTALLATION INSTRUCTIONS (503-320)

9.1 General

- a) In common with all other electrical apparatus installed in hazardous areas, this apparatus must only be installed, operated and maintained by competent personnel. Such personnel shall have undergone training, which included instruction on the various types of protection and installation practices, the relevant rules and regulations, and on the general principles of area classification. Appropriate refresher training shall be given on a regular basis.
- b) This apparatus meets the requirements of electrical apparatus in accordance with IEC 60079-0:2011 and IEC 60079-11:2011.

9.2 Installation

- a) The installation must comply with the appropriate European, national and local regulations, which may include reference to the IEC code of practice IEC 60079-14. In addition, particular industries or end users may have specific requirements relating to the safety of their installations and these requirements should also be met.
- b) This apparatus is an electrical apparatus and is normally mounted in a hazardous area (Zone 1 or 2). It must be mounted in an enclosure with an IP54 or better.
- c) This apparatus must not be subjected to mechanical and thermal stresses in excess of those permitted in the certification documentation, this safety information and the product specification. The product must be protected by an enclosure to prevent physical damage.
- d) The apparatus must not be installed in a position where it may be attacked by aggressive substances and must be protected from excessive dust, moisture and other contaminants by the enclosure.
- e) Mount on 7.5mm x 35mm 'top hat' DIN Rail according to the instructions on the device cover. Use DIN Rail end stops is recommended for vertical DIN Rail installations.
- f) Connect using Fieldbus Checkmarked cable per Control Drawing, section 9.7 on page 14.

9.3 Inspection and maintenance

- a) Inspection and maintenance should be carried out in accordance with national and local regulations which may refer to the IEC standard IEC 60079-17. In addition, specific industries or end users may have specific requirements which should also be met.
- b) Access to the internal circuitry must not be made during operation or at any other time.
- c) If the outer enclosure of the apparatus needs to be cleaned, this should be done with a cloth lightly moistened by a dilute mixture of detergent in water.

9.4 Repair

This product must not be repaired. It must be replaced by an equivalent certified product.



IEC Ex 503-320

9.5 Marking

Each F200-IS Megablock is marked with the following information:

- a) Company Name and Address (shown below)
- b) Product Number
- c) Certificate number – IECEx LCI 11.0068X
- d) Ex classification – Ex ia IICT4 Ga
- e) Ambient Temperature range-- $-50\text{C} \leq T_{\text{amb}} \leq 70\text{C}$

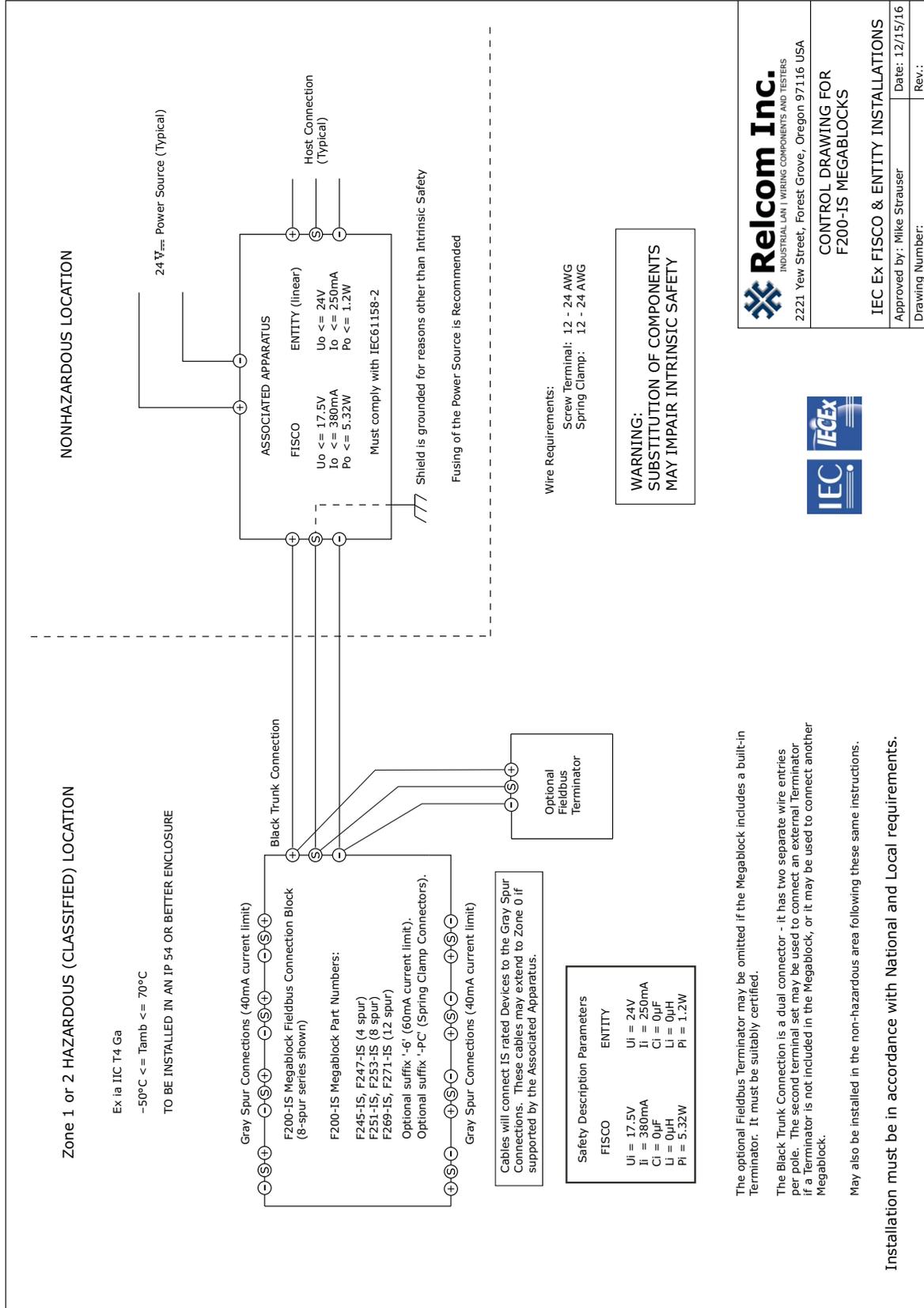
9.6 Special Conditions for Safe Use

- The equipment must be only connected to certified associated intrinsically safe equipment. This combination must be compatible in regards to the intrinsically safe rules.
- The F200-IS Megablock MUST be mounted in an IP54 (minimum) rated enclosure. The enclosure must be selected in order to avoid electrostatic charging hazard.
- Ambient temperature range: -50°C to $+70^{\circ}\text{C}$.



IEC Ex 503-320

9.7 IEC Ex - Control drawing



THIS PAGE IS LEFT INTENTIONALLY BLANK

AUSTRALIA

MTL Instruments Pty Ltd,
10 Kent Road, Mascot, New South Wales, 2020, Australia
Tel: +61 1300 308 374 Fax: +61 1300 308 463
E-mail: mtl-salesanz@eaton.com

BeNeLux

MTL Instruments BV
Ambacht 6, 5301 KW Zaltbommel
The Netherlands
Tel: +31 (0)418 570290 Fax: +31 (0)418 541044
E-mail: mtl.benelux@eaton.com

CHINA

Cooper Electric (Shanghai) Co. Ltd
955 Shengli Road, Heqing Industrial Park
Pudong New Area, Shanghai 201201
Tel: +86 21 2899 3817 Fax: +86 21 2899 3992
E-mail: mtl-cn@eaton.com

FRANCE

MTL Instruments sarl,
7 rue des Rosieristes, 69410 Champagne au Mont d'Or
France
Tel: +33 (0)4 37 46 16 53 Fax: +33 (0)4 37 46 17 20
E-mail: mtlfrance@eaton.com

GERMANY

MTL Instruments GmbH,
Heinrich-Hertz-Str. 12, 50170 Kerpen, Germany
Tel: +49 (0)22 73 98 12-0 Fax: +49 (0)22 73 98 12-2 00
E-mail: csckerpen@eaton.com

INDIA

MTL India,
No.36, Nehru Street, Off Old Mahabalipuram Road
Sholinganallur, Chennai- 600 119, India
Tel: +91 (0) 44 24501660 /24501857 Fax: +91 (0) 44 24501463
E-mail: mtlindiasales@eaton.com

ITALY

MTL Italia srl,
Via San Bovio, 3, 20090 Segrate, Milano, Italy
Tel: +39 02 959501 Fax: +39 02 95950759
E-mail: chmninfo@eaton.com

JAPAN

Cooper Crouse-Hinds Japan KK,
MT Building 3F, 2-7-5 Shiba Daimon, Minato-ku,
Tokyo, Japan 105-0012
Tel: +81 (0)3 6430 3128 Fax: +81 (0)3 6430 3129
E-mail: mtl-jp@eaton.com

NORWAY

Norex AS
Fekjan 7c, Postboks 147
N-1378 Nesbru, Norway
Tel: +47 66 77 43 80 Fax: +47 66 84 55 33
E-mail: info@norex.no

RUSSIA

Cooper Industries Russia LLC
Elektrozavodskaya Str 33
Building 4
Moscow 107076, Russia
Tel: +7 (495) 981 3770 Fax: +7 (495) 981 3771
E-mail: mtlrussia@eaton.com

SINGAPORE

Eaton Industries Pte Ltd
100G Pasir Panjang Road, Interlocal Centre
#07-08 Singapore 118523
Tel: +65 6645 9888 Fax: +65 6297 4819
E-mail: sales.mtlsing@eaton.com

SOUTH KOREA

Cooper Crouse-Hinds Korea
7F, Parkland Building 237-11 Nonhyun-dong Gangnam-gu,
Seoul 135-546, South Korea.
Tel: +82 6380 4805 Fax: +82 6380 4839
E-mail: mtl-korea@eaton.com

UNITED ARAB EMIRATES

Cooper Industries/Eaton Corporation
Office 205/206, 2nd Floor SJ Towers, off. Old Airport Road,
Abu Dhabi, United Arab Emirates
Tel: +971 2 44 66 840 Fax: +971 2 44 66 841
E-mail: mtlgulf@eaton.com

UNITED KINGDOM

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

AMERICAS

Cooper Crouse-Hinds MTL Inc.
3413 N. Sam Houston Parkway W.
Suite 200, Houston TX 77086, USA
Tel: +1 281-571-8065 Fax: +1 281-571-8069
E-mail: mtl-us-info@eaton.com