Instruction manual
MTL fieldbus networks

April 2020
INM9120 Rev 8

# NET9000 Fieldbus Connections

## 912x-IS FISCO power supplies

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

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**IMPORTANT NOTICE**

The user's attention is drawn to the important safety information provided in Appendix A.

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# 1 ABOUT THIS MANUAL

The purpose of this manual is to provide the user with information on the installation, connection, test and maintenance of the MTL912X range of **F**ieldbus **I**ntrinsically **S**afe **CO**ncept (FISCO) power supplies.

**Cautionary Note:** 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].

This instruction manual supplements the requirements of nationally accepted codes of practice, for example, IEC/EN 60079-11 in Europe. All installations should comply with the relevant sections of these codes.

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.

## 1.1 PRODUCT DESCRIPTION

The 9121-IS and 9122-IS are fieldbus repeater isolators that can relay fieldbus signals between a host in a safe, or Zone 2 hazardous area and IS field devices in a Zone 1 hazardous area. They provide DC power and an impedance terminator tothe IS fieldbus and also, if required, to the host fieldbus.

### 1.1.1 Model 9121-IS

This can provide 120mA current, which typically would power at least six field devices in IEC Gas Group IIC environments, where a typical device is considered to have a current consumption of 20mA

### 1.1.2 Model 9122-IS

For Gas Group IIB environments the 9122-IS can provide a higher output current of 256mA, which will power at least twelve field devices rated at 20mA.

# 2 INSTALLATION

## 2.1 MOUNTING & ENCLOSURE REQUIREMENTS

### 2.1.1 General

These power supplies may be mounted in safe areas, Zone 2 hazardous areas but, wherever they are located, the mounting conditions must:

(a) maintain safe segregation distances for units and IS wiring.

(b) prevent any form of pollution that could compromise the operation, or safety of the unit. For example, an unpolluted location or a suitable enclosure could be chosen.

(c) provide an adequate level of mechanical protection. This can be achieved by selecting a protected location, a suitable enclosure,or a combination of both.

(d) ensure that all cable entries and connections are secure by making provision for the careful routing and securing of all cables.

(e) provide adequate security against unauthorised inter

(f) ensure that the permitted ambient temperature range of the units (–40°C to + 70°C) is not exceeded. Power dissipation within the enclosure and the use of shading against direct sunlight should be considered.

### 2.1.2 Outdoor mounting

Where power supplies are mounted in outdoor locations then the use of a suitably approved enclosure is recommended. For Zone 2 locations, Ex e or Ex n enclosures are an economic solution that satisfy the minimum acceptable criteria of a 7Nm impact test and IP54 ingress protection. However, in some locations a higher degree of ingress protection or corrosion resistance may be necessary or desirable. The emphasis should be placed on the suitability for the application rather thanthe extent of certification,

### 2.1.3 Wiring segregation

The intrinsically safe wiring must be segregated from all other wiring.When units are mounted in several parallel rows it is common practice for alternate rows to be reversed, so that the wiring can share common looms or trunking. Because this involves alternate rows being mounted "upside down", this technique may be used only when the units are NOT required to operate at the maximum ambient temperature (for the reasons stated in the previous paragraph).

## 2.2 MOUNTING

### 2.2.1 Orientation

The 912x range of power supplies can be mounted on type T35 [top hat] DIN-rail, or surface mounted. In either case, the orientation must allow air to be naturally convected through the unit to achieve the maximum cooling effect. To make use of the full temperature range specified for a unit it must be mounted on a vertical surface with the switches at the top - as shown in the right-hand part of Figure 1.

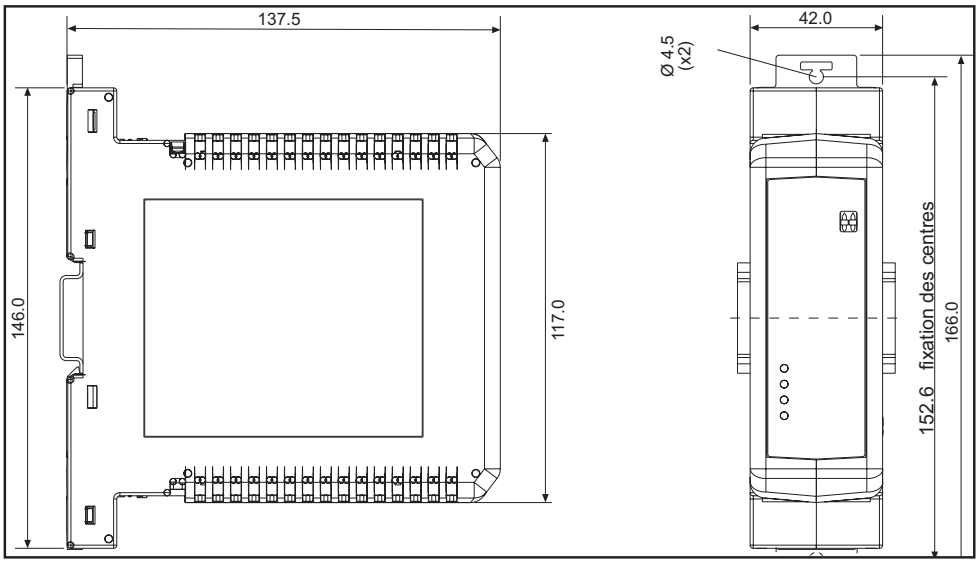



**Figure 1 Dimensions of 912x-IS**

### 2.2.2 Mounting FISCO power supplies on DIN rail

Press the unit onto the DIN rail (type T35) as shown in figure 2, with the intrinsically safe (IS terminals (marked with blue labels) facing the IS field wiring connections.

**Figure 2 - Mounting on DIN rail**

To remove a unit from the rail, insert a screwdriver blade into the clip as shown in figure 3 and lever the clip gently outwards; pivot the isolator off the rail.

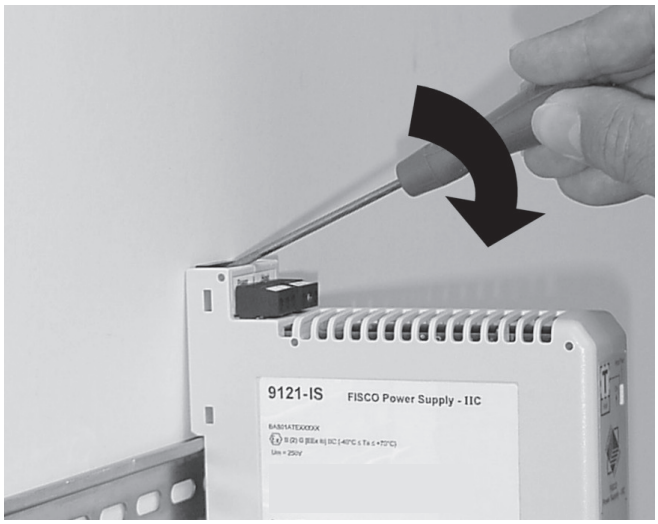



**Figure 3 - Removing from DIN rail**

### 2.2.3 Surface mounting FISCO power supplies

To surface mount a 912X- IS power supply, ease out the DIN rail clips at each end (in the manner shown in Figure 3) to reveal mounting brackets, which contain clearance holes for M4 screws or bolts.

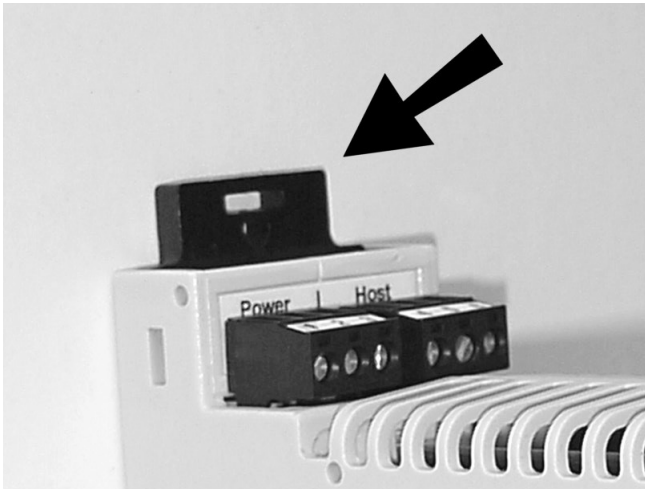



**Figure 4 - Surface mounting brackets**

## 2.3 SIGNAL AND POWER CONNECTIONS

### 2.3.1 General

All units have removable signal and power plugs. The plugs can be supplied with either screw-clamp (912X–IS–**PS**) or sprung cage-clamp (912X–IS–**PC**) terminals as shown in figure 5.

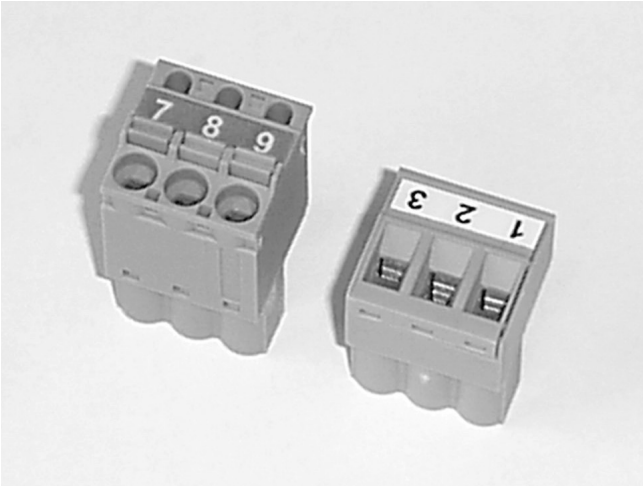



**Figure 5 - Spring clamp and screw clamp plugs.**

The user can decide whether it will be easier to wire the power supply with the connector plugs in-situ, or to remove them. If the connectors are removed for wiring, ensure that the correct one is being wired; the plugs use a mechanical key system to prevent accidental cross connection - they are NOT interchangeable.

Ensure that enough cable is provided to permit future removal of the plugs for maintenance or replacement.

To remove a connector plug insert a screwdriver blade behind it as shown in figure 6 and lever the connector gently outwards.

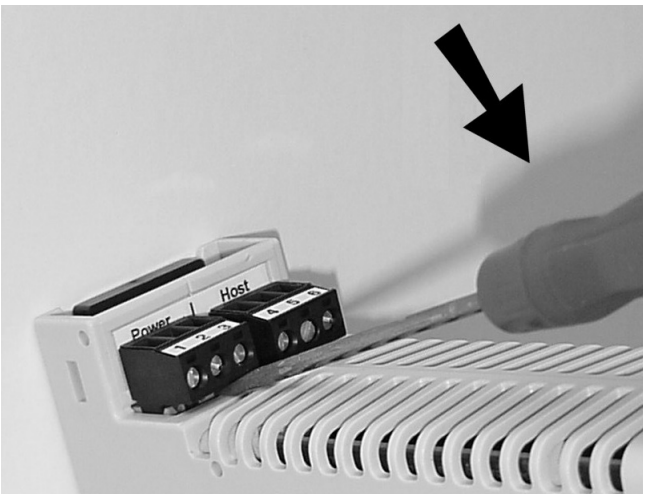



**Figure 6 - Removing power and signal connectors.**

The conductors or ferrules used with these connectors should be between 14 and 24 AWG (1.6 and 0.5mm dia) in size. If two large conductors need to be accommodated, e.g. two-ve connections on the Power connector, then a twin ferrule should be used.

### 2.3.2 Host and IS fieldbus connections

The block diagram (Figure 7) shows terminals 5 and 8 marked with an 'S'. This indicates a termination point for the fieldbus cable screen. These are termination points only, with no internal connection.

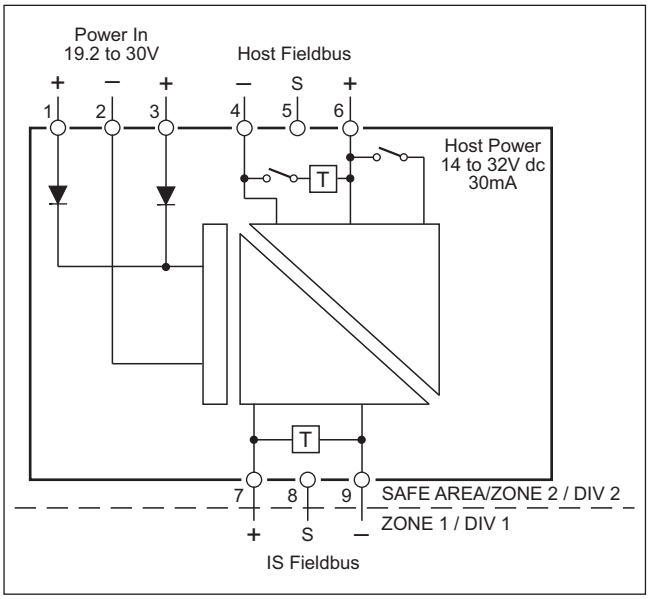



**Figure 7 - Power supply block diagram**

### 2.3.3 Power connection

The 912X-IS units can accommodate two power inputs for applications that require redundancy.Internal steering diodes ensure correct power sharing.

Connect supplies as indicated below

| | | **+ ve to terminal** | **- ve to terminal** |
|---|---|---|---|
| **Single power input** | Power 1 | 1 or 3 | 2 |
| **Redundant power** | Power 1 | 1 | 2 |
| | Power 2 | 3 | 2 |

## 2.4 MAKING CONNECTIONS

### 2.4.1 Screw clamp connector

(a) Strip back the insulation of conductors (7mm- recommended strip length- See note).

(b) Check the terminal assignments, as indicated on the side label of the unit.

(c) Insert conductor into connector and tighten screws.

### 2.4.2 Spring (cage) clamp connector

(a) Strip back the insulation of conductors (10 mm- recommended strip length- See note).

(b) Check the terminal assignments, as indicated on the side label of the unit.

(c) Press screwdriver blade into groove on spring clamp; fully insertconductor; remove screwdriver.

Note if the wires are to be fitted with crimp ferrules consult ferrule manufacturer's recommendation

## 2.5 FINISHING.

Wire up individual FISCO power supplies in accordance with wiring schedules. Power supply connections can be onward linked from one power plug to the next (i.e. 'daisy-chained').

Segregate intrinsically safe wiring from other wiring into separatetrunking or looms wherever possible to avoid errors and maintain atidy installation.

# 3 SETUP AND TESTING

## 3.1 SWITCHES

Two switches are provided on the front face of the power supply, located in the top right-hand corner. Operation of these switches requires the use of a small screwdriver, or similar

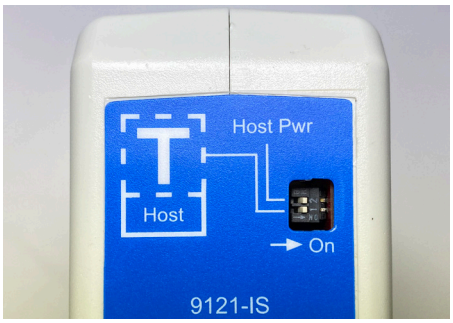



**Figure 8 - Host power supply and host trunk terminator**

### 3.1.1 "Host Pwr" switch

Some host fieldbus I/O cards need to draw 10–20mA of current from the fieldbus in order to operate. If this is required, the "Host Pwr" switch on the 912X–IS unit should be set to the ON position. The voltage provided on the fieldbus is in the range 14–32 V dc, at a maximumcurrent of 30 mA

**IMPORTANT** - If more than one 912X–IS power supply is connected to the same host segment, **only one** of them should have its "Host Pwr" switched to the ON position. All the others on this same host segment must have their "Host Pwr" switch set to OFF.

| | |
|---|---|
| ⚠ | **WARNING !**<br>If the equipment is mounted in Zone 2, the Host Power and Terminator switches shall only be operated if the equipment is de-energised or the area is known to be gas free. |

### 3.1.2 Terminator switch

**A terminator is required at each end of a fieldbus segment.** If a single 912X–IS power supply is connected to the remote end of a host segment, a terminating impedance must be applied by setting its "T (Host)" switch to ON. A fieldbus terminator must also be applied, or connected, at the host end of the segment

**IMPORTANT -** If more than one 912X–IS power supply is connected to the same host segment, **only one** of them should have its "T (Host)" terminator switch set to ON. All the others on this same host segment must have their "T (Host)" switch set to OFF**,**.

| | |
|---|---|
| ⚠ | **WARNING !**<br>If the equipment is mounted in Zone 2, the Host Power and Terminator switches shall only be operated if the equipment is de-energised or the area is known to be gas free. |

## 3.2 TESTING

The following checks refer to the LED indicators (see Figure 9)

**Power LED (green)**
This should normally be ON. If not, check the power connections.

**Fault LED (red)**
This should normally be OFF. If it is ON, it indicates:

(a) a short circuit on the IS fieldbus or,
(b) excessive transmitter load, i.e too many field devices.

**Host or IS LED (yellow)**
Both of these should normally be ON.

OFF indicates a permanent comms error and flashing indicates an occasional communications error.

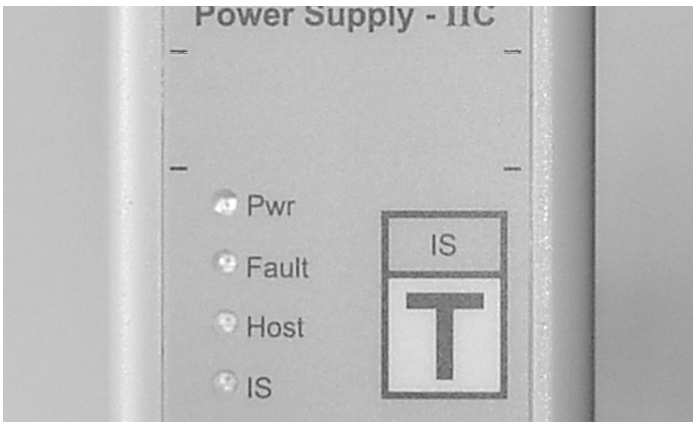



**Figure 9 - FISCO power supply tag area and LED's**

## 3.3 TAG LABELLING

Space has been provided on the front label to apply a self-adhesive tag label. The space for a tag label is located above the LED indicators and measures 30mm wide by 9mm high. See Figure 9

# 4 MAINTENANCE

**IMPORTANT NOTE**

If any power supply is suspected of being faulty, return it to Eaton's MTL product line, or the representative from whom it was purchased, for repair or replacement. DO NOT make repairs or modifications. The safe operation of the unit, and hence the safety of the site, can be affected by unauthorised changes. Tests and maintenance checks should be limited to those described in this and the Testing section.

## 4.1 ROUTINE MAINTENANCE

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

a) power supplies are of the types specified in the relevant documentation;

b) power supplies and connectors are correctly and legibly tagged, connectors are plugged into the corresponding power supplies and tag details comply with the relevant documentation;

c) power supplies are securely clipped to the DIN rail;

d) all cable connections are properly made to the plugs;

e) all plugs are fully inserted;

f) all connecting cables are of the specified type and rating; are correctly routed and segregated (particularly when fitted in enclosures) and are not frayed or otherwise damaged;

g) all cable screens are properly earthed;

h) there is no sign of damage or corrosion.

If the outer case of a FISCO unit requires cleaning, use a cloth dampened with a dilute mixture of detergent and water. Special care should be taken to ensure that no liquid or debris enters the unit via the ventilation slots.

## 4.2 ENCLOSURES

The only maintenance needed for enclosures is cleaning and periodic visual inspections. Clean external surfaces only, using soap and water; do not use chemical solvents or proprietary cleaning fluids.

Every year, or more frequently in harsh environments, inspect enclosures and check that they are mounted securely and show no signs of damage that would impair their performance.

Remove any accumulation of water inside (using the drain plug, if fitted). Check cable gland nuts are still tight and that all connections are properly made.

# 5 APPENDIX A - ATEX INFORMATION

The Essential Health and Safety Requirements (Annex II) of the EU Directive 2014/34/EU [the ATEX Directive- safety of apparatus] requires that the installation manual of all equipment used in hazardous areas shall contain certain information. This annex is included to ensure that this requirement is met. It compliments the information presented in this document and does not conflict with that information. It is only relevant to those locations where the ATEX directives are applicable

## 5.1 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 also meets the requirements of protection 'n' in accordance with IEC/EN 60079-15.

### 5.1.1 9121-IS and 9122-IS only

a) This apparatus has been designed to meet the requirements of associated electrical apparatus in accordance with IEC/EN 60079-0 and IEC/EN 60079-11.

b) This apparatus also meets the requirements of protection 'n' in accordance with IEC/EN 60079-15.

## 5.2 Installation

a) The installation should 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) The apparatus must not be subjected to mechanical and thermal stresses in excess of those permitted in the certification documentation,this manual and the product specification. If necessary the product must be protected by an enclosure to prevent mechanical damage.

c) 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 contaniments by an enclosure.

### 5.2.1 9121-IS and 9122-IS only

a) This apparatus is an associated electrical apparatus and is normally mounted in a non-hazardous [safe] area. It meets the requirements of Category 3 apparatus and may be installed in a Zone 2 location providing that the relevant installation conditions are met. When mounted in a Zone 2 location the apparatus must be provided with an enclosure, which offers an additional degree of protection appropriate to the area classification.

| | |
|---|---|
| ⚠ | **WARNING !**<br>If the equipment is mounted in Zone 2, the Host Power and Terminator switches shall only be operated if the equipment is de-energised or the area is known to be gas free. |

## 5.3 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.

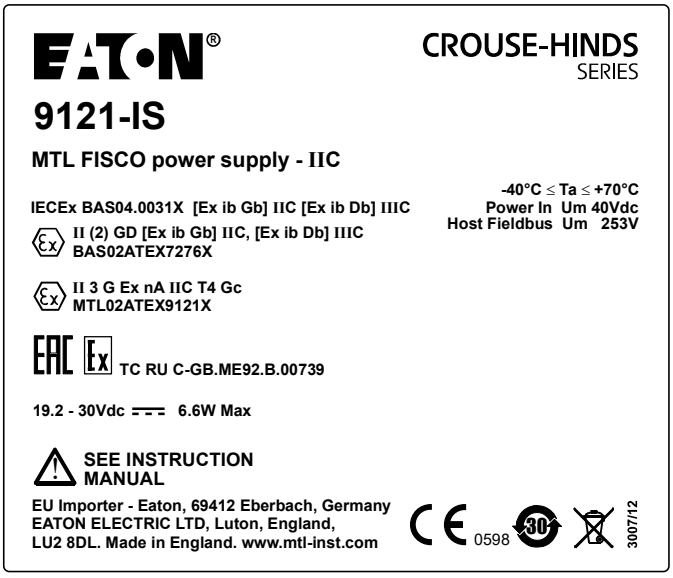
c) If the outer enclosure of the apparatus needs to be cleaned, this should be done with a cloth lightly moistened by a dilute mixture of detergent in water.

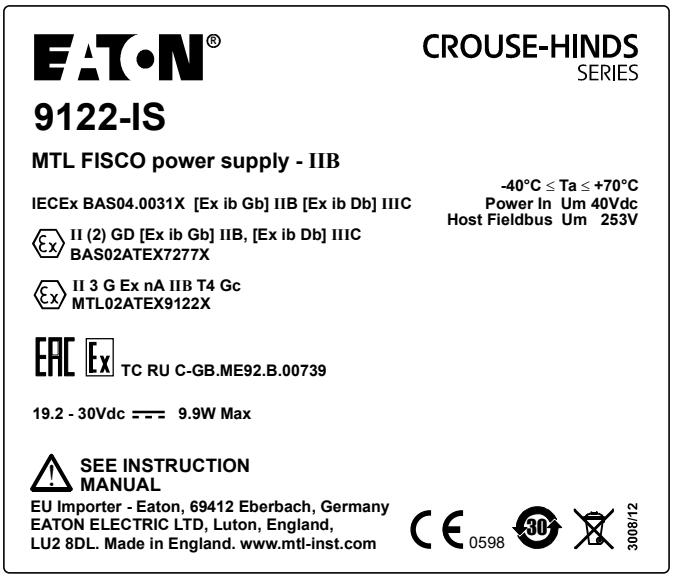
## 5.4 Repair

a) The products cannot be repaired by the user and must be replaced with an equivalent certified product. Repairs should only be carried out by the manufacturer or his authorised agent.

## 5.5 Marking

a) The products each have their own labels which are reproduced below. In addition the serial number and/or date of manufacture are marked on the individual apparatus. This manual applies to products manufactured and date marked during or after the year 2020



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