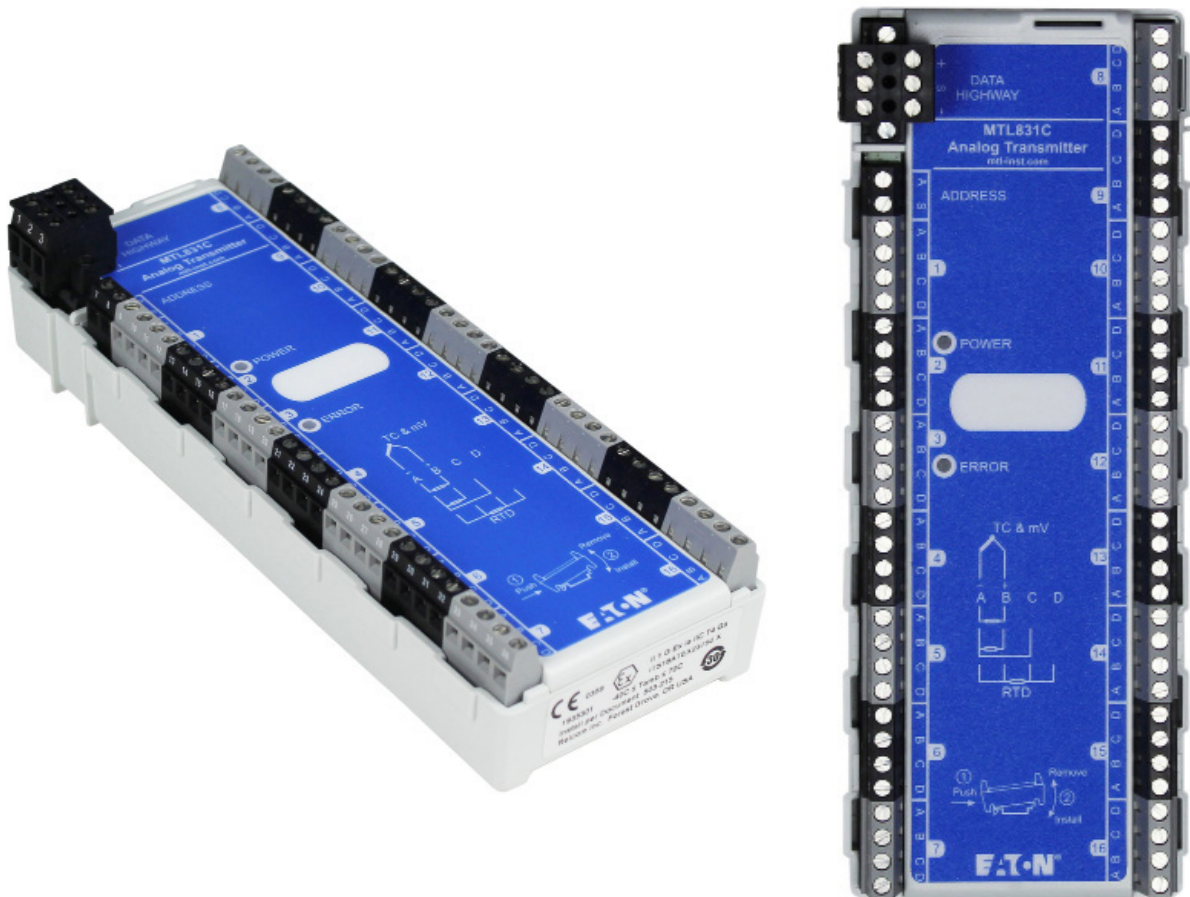


MTL831C

Analog Transmitter



DECLARATION OF CONFORMITY

A printed version of the Declaration of Conformity has been provided separately within the original shipment of goods. However, you can find a copy of the latest version at -

<http://www.mtl-inst.com/certificates>

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GENERAL SAFETY INFORMATION

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 support or one of its representatives.

NOTE

Improper installation and operation of the enclosure can result in the invalidation of the warranty.

MTL831C

Analog Transmitter

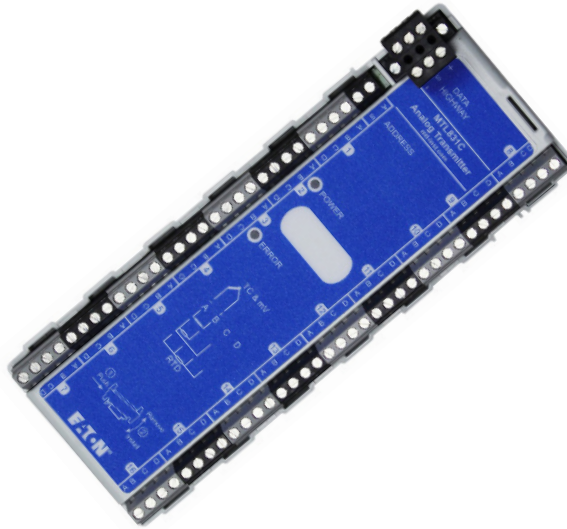


Figure 1.1 - MTL831C Analog Transmitter

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 60079-14 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 ABOUT THIS MANUAL

The purpose of this manual is to provide the user with information on the installation, connection and configuration of the MTL831C Analog Transmitter.

1.1 Related documents

This manual does NOT cover the connection or configuration of the MTL838C receiver. For details of these items consult:

- **INM MTL838C** Receiver Instruction Manual
- **INM MTL838C-MBT** Receiver Instruction Manual

For IS installations the **MTL5553** Isolator/power supply will be required. For details of these items consult:

- **INM MTL5500** range manual (MTL5553)

Other related manuals:

- **EPS MTL830C** Temperature Multiplexer system datasheet
- **EPS MTL830C-MBT** Temperature Multiplexer system datasheet
- **INM MTL838C-MBF** Modbus implementation manual
- **INM MTL83xC LLMUX** PC SW Manual- LLMUX
- **INM MTL83xC Modbus** PC SW Manual- Modbus
- **TSN MTL838C Modbus** Introduction to Modbus support notes

1.2 Product description

The MTL831C Analog Transmitter can transfer a number of hazardous area input signals to the safe area down a data highway consisting of a single shielded, twisted-pair cable. It is intrinsically safe and can therefore be mounted in Zone 0 hazardous areas or hazardous locations.

The MTL831C can monitor up to 16 inputs from THC or millivolt sources or 2, 3 or 4-wire RTDs or potentiometers. Multiple versions of the MTL831C are available to support fixed and pluggable screw terminal input options. See the Components and Accessories section for part numbers.

A data highway is provided that can carry both signal and power over distances up to 2km, depending on the application, the cable and the (noise) environment. Shielded twisted pair is highly recommended.

At the other end of the data highway, an MTL838C Receiver translates the information transmitted from the MTL831C. Multiple versions of the MTL838C are available to support different control system interfaces. See the Components and Accessories section for part numbers. One or two MTL831Cs may be connected to a single MTL838C. The MTL838C provides a *Modbus® serial data output representation of the inputs together with status information.

When the MTL831C transmitter is mounted in the hazardous area, the data highway must be protected by an MTL5553 Isolator/Power Supply mounted in the safe area.

** Modbus® is a registered trademark of Schneider Automation Inc.*

2 GETTING STARTED

Installation of the MTL831C multiplexer transmitter is divided into three main topics.

- **Mechanical Installation** - how to mount the MTL831C and how it may be fitted into an enclosure.
- **Electrical Connections** - the sensor and highway connections. If units are installed in our enclosures, it details any special wiring arrangements.
- **Configuration** - the address is configured with a user supplied jumper wire. The remaining configuration is either over a Modbus® link or software on a PC.

NOTE

A new user might find it helpful to set up the system, or a simple version of it, in an indoor test area to gain familiarisation before undertaking installation on site.

3 COMPONENTS AND ACCESSORIES

Product part numbers and their descriptions are listed below.

Part Number	Description
MTL831C	Analog Transmitter (with fixed screw terminal inputs)
MTL831C-PS	Analog Transmitter (with pluggable screw terminal inputs)
MTL838C	Receiver (Modbus/RS-485 Interface)
MTL838C-MBT	Receiver (Modbus/TCP Interface)
MTL5553	Isolator/Power Supply

A standard USB Type C cable (not supplied by Eaton) is required to configure the MTL838C

4 MECHANICAL INSTALLATION

4.1 Location

The MTL831C can be installed in either safe or hazardous areas (including Zone 0) depending upon the requirements of the application.

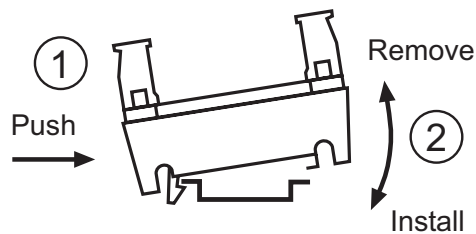
4.2 Mounting options

The MTL831C must be mounted on a vertical plane on vertical or horizontal DIN rail to meet accuracy specifications. Heat sources causing a temperature gradient in the MTL831C may cause accuracy outside of specifications. The unit can be mounted on T-section DIN-rail. Eaton has a range of enclosures- ENC8, ENC8-SS, ENC83 or ENC83-SS- to provide suitable IP67 protection if the transmitter is located in an exposed area.

4.2.1 Mounting on T-section DIN-rail

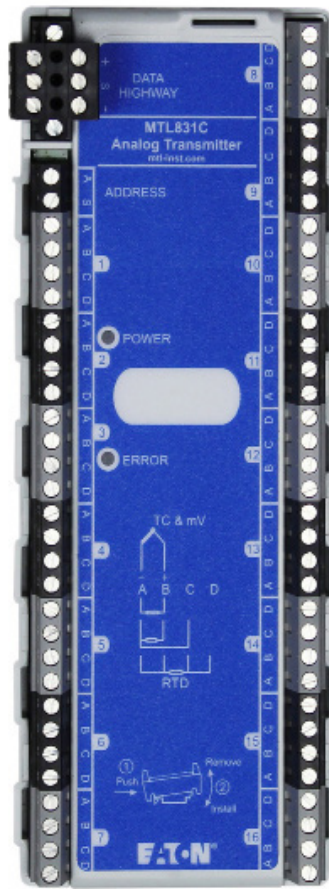
To install, tilt the MTL831C to the left and hook to the left side of the standard 35mm DIN46277 T-section rail. Push to the right and allow the unit to rotate down to sit flat on the DIN Rail. Allow it to spring back to the left and the right side will hook to the DIN Rail.

To remove, push the MTL831C to the right and tilt the right side away from the DIN Rail. While tilted, allow it to spring back to the left and remove from the DIN Rail.



5 CONNECTIONS

The connection terminals are along the edges of the Analog Transmitter. These are divided into input sensor terminals (1 to 16), the Address terminals (A, S), and the data highway terminals (+, S,-), as shown below.



5.1 Address

Leaving these two pins (A, S) open, sets the address of the MTL831C to "1". A jumper on these two pins sets the address to "2". Either is valid for a system with only one MTL831C connected to the MTL838C. When two MTL831Cs are connected to a single MTL838C, they must be addressed uniquely. If they are on the same address, only one will communicate with the MTL838C. The address affects where the data is seen in the PC Software and what is available on the RS485 ports:

ADDRESS	PC Software	Modbus Port A or B	LLMUX Emulation
1	MTL831C #1 tab	Channels 1-16	Link 1, channels 1-16
2	MTL831C #2 tab	Channels 17-32	Link 2, channels 1-16

5.2 Electrical connections

The data highway connector is pluggable (with securing screws) and has standard screw-terminals for connecting wiring. The MTL831C-PS sensor ports use pluggable connectors without securing screws. Cables for pluggable connectors without securing screws are to be secured and supported

Type	Conductor size
Pluggable screw terminals	0.14 to 2.5mm ²
Fixed screw terminals	0.14 to 1.4mm ²

NOTE

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



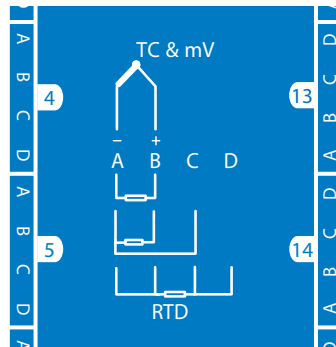
Screw Terminal

5.3 Sensor inputs

Sensors connected to the MTL831C should not be earthed. This avoids differences in earth potential that could affect measurement accuracy or damage the MTL831C. If sensors must be earthed they should be located close to each other to avoid differences in earth potential.

5.4 RTD inputs

The 16 channels can be configured for 2, 3 or 4 wire mode as shown in the connection diagram on the unit overlay. Software configuration is also required to select the proper measuring method. This is done via PC Software or Modbus. By default the MTL831C is configured for mV inputs.



5.5 THCs and mV inputs

Connect up to 16 THC or mV inputs directly to the input terminals as shown on the overlay connection diagram making sure the polarity is correct.

5.6 THC Burnout Detection

The MTL838C/MTL831C system provides for thermocouple burnout detection. This is implemented by periodically measuring the resistance of the thermocouple and comparing it to the initial measurement. If the resistance increases by more than 50 ohms, a warning is available in the sensor status (readings are still available). For more information, see the instructions for the MTL838C Receiver. The following are events that lock in the initial resistance measurement:

- The MTL831C is powered up (initial resistance measurement is locked in after 30 seconds).
- A Channel configured as a THC goes open for at least 1.3 second and then closed (this is intended to reset the initial value when the THC is replaced).
- A Channel that was not configured as a THC is changed to a THC. This configuration change would come from the PC software or Modbus.

5.7 Mixed Inputs

It is possible to mix any combination of different input sensor types on the 16 input channels.

Connect the different sensors appropriately, as shown in the connection diagram on the unit overlay.

5.8 Data highway

The data highway connection is also the source of DC power for the MTL831C. It is important that the polarity of the wiring on the "+" and "-" terminals is correct. A shielded twisted-pair wire is recommended. The "S" terminal is wired to the cable shield. It is not internally connected in the MTL831C.

5.9 Transmission distances

The maximum data highway length will depend upon two key factors: the type and quality of the cable used, and the level of electrical interference present in the environment.

Typically a user might expect: IS applications- 1km

Non-IS applications- 2km.

The reduced distance for IS applications is due to the voltage drop from the current limiting resistor in the MTL5553 IS isolator and may also be limited by the inductance and capacitance of the data highway cable that is required for the IS cable parameter calculations. (See IEC/EN 60079-14 for further details).

We recommend using 16 gauge Foundation Fieldbus cable that has been checkmarked as meeting the FF standard for data highway cables. This will help ensure that the maximum lengths can be achieved with successful communication in the presence of noise.

Also, do not run the data highway cable near or in parallel with high voltage lines, VFDs, or motors driven with a VFD as these can create noise that would interfere with communication.

5.10 IS applications

For IS applications, the data highway connection must be via a galvanic isolator and so an MTL5553 isolator is connected in-line in the safe area (see ATEX and IECEx Information section.).

The - and + terminals of the data highway should be connected to the corresponding -ve and +ve terminals of the MTL5553 (13 & 14 respectively) located in the safe area. See the section on ATEX and IECEx information for detailed instructions.

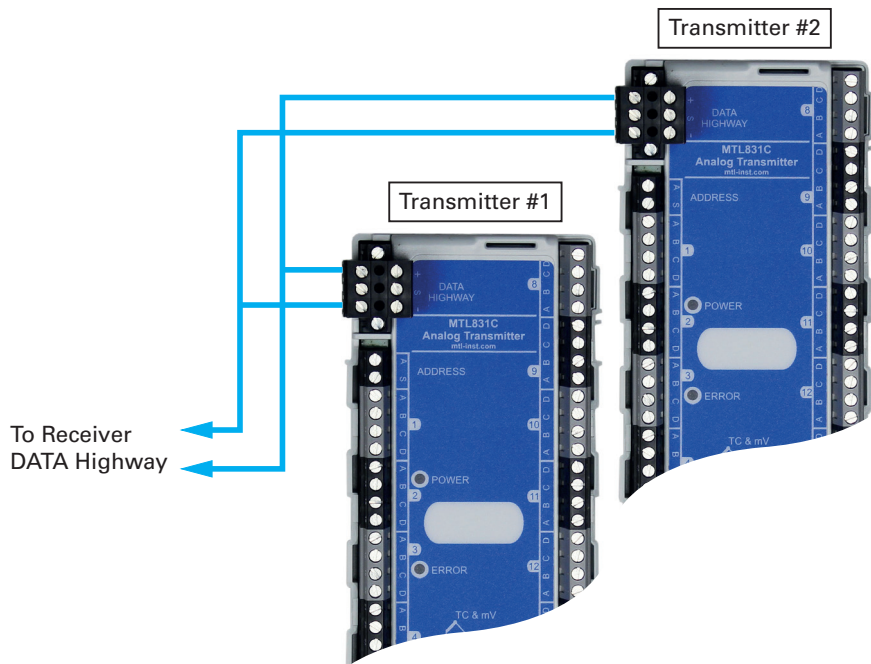
5.11 Multi-transmitter connections

Connect the data highway to a receiver for MTL831C Transmitter #1 as in diagram below. Connect the MTL831C Transmitter #1 data highway (+, S, and – terminal) to the equivalent terminals on a MTL831C Transmitter #2. Install a jumper wire between the Address terminals (A and S) on MTL831C Transmitter #2.

NOTE

The MTL831C is supplied with a double sided data highway connector to facilitate linking two MTL831C Transmitters.

Up to two MTL831C Analog Transmitters may be connected on a single data highway to the MTL838C/MTL5553.



5.12 Cable screens

Each cable screen should be earthed in only one location.

5.12.1 Sensor screens

Generally, screens of sensor cables are tied to earth using an earth bar tied to local instrument earth in the MTL831C enclosure. If a sensor cable screen is earthed at the sensor, then it should not be earthed or connected to other screens at the MTL831C.

5.12.2 Data Highway screen with an MTL5553

Hazardous area installation of the sensors or MTL831C require the use of an isolator/ power supply such as the MTL5553.

The screen of a Data Highway cable between the MTL831C transmitter and MTL5553 isolator is earthed to a local instrument earth in the MTL831C's field enclosure or the at the MTL5553's enclosure.

The screen of a Data Highway cable between the MTL5553 isolator and the MTL838C is tied to the "S" terminal of the Data Highway port on the MTL838C. The "S" terminal is internally connected to the GROUND terminals of the MTL838C. The GROUND terminals of the MTL838C must be earthed at a local instrument earth.

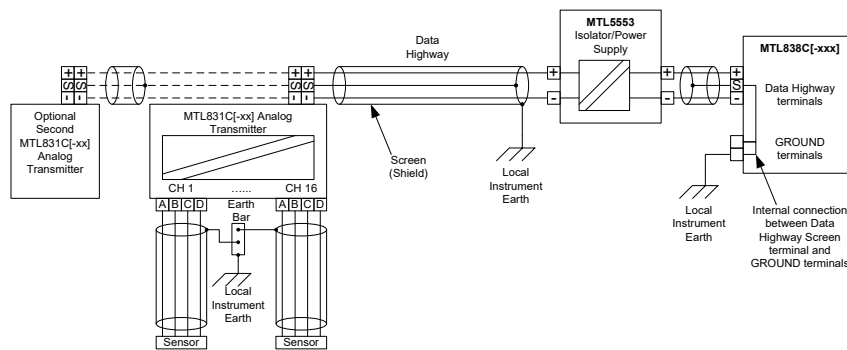


Figure 1 - Recommended Screen Earthing for MTL830C System when Using an MTL5553 Isolator

5.12.3 Data Highway screen with no MTL5553

The screen of a Data Highway cable between the MTL831C transmitter and the MTL838C is tied to the "S" terminal of the Data Highway port on the MTL838C. The "S" terminal is internally connected to the GROUND terminals of the MTL838C. The GROUND terminals of the MTL838C must be earthed at a local instrument earth.

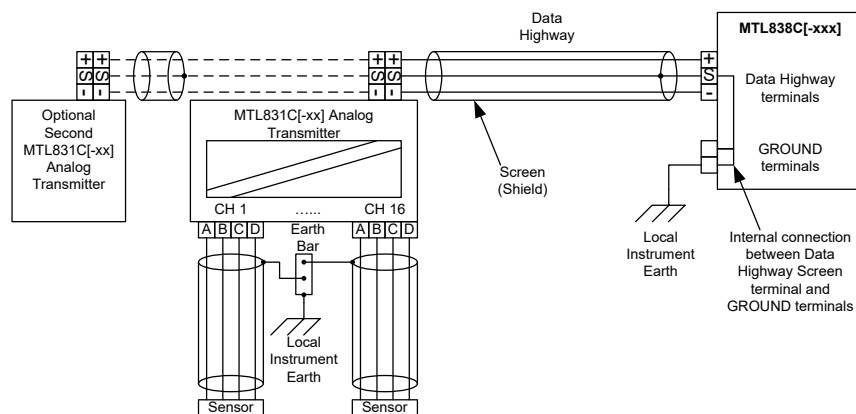


Figure 2 - Recommended Screen Earthing for MTL830C System when using an MTL5553 Isolator

6 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 blinking
- the red ERROR LED is not 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.

7 CONFIGURATION

The only hardware configuration is the setting of the unit's address – see section 4.1. The remaining configuration comes from the MTL838C.

7.1 Sensor configuration

All sensor configurations are done through the MTL838C PC software or via Modbus. Note that the configuration data is actually held in the MTL838C for one or two MTL831C Transmitters – depending on how many are connected. If an MTL831C must be replaced for some reason, its configuration is automatically transmitted from the MTL838C to the MTL831C when it is powered up. See the PC software or Modbus manuals for information on configuring sensors.

8 LED INDICATORS

There are 2 LEDs to indicate the health and status of the unit. The following are their meanings:

POWER: When illuminated (green), this indicates that power is available to the unit. When it blinks it means that at least one good packet was received from the MTL838C in the last 1/4sec. This LED should normally be blinking.

ERROR: Red illumination means that there was a CRC error in a packet received from the MTL838C. This LED goes off after 1/4sec without an error. The more it is on the more errored packets are being received.

8.1 Power up

When the unit first powers up, both LEDs come on for about 1 second and then go off. The POWER LED should then come back on. It is normal for the red LED to blink once or twice during the first 10 seconds or so after applying power.

8.2 Firmware Update

During the first phase of the Firmware update which is initiated from the PC software, the POWER and ERROR LEDs alternately blink. When the first processor is updated, the unit restarts. During the remaining update process for the other two processors, the POWER LED either blinks normally or is on steady while the internal update process is taking place. The PC software provides status information during the update process.

9 START UP AND INFREQUENT MEASUREMENTS

The MTL831C enters a startup process after power is applied. Normal operation begins about 60 seconds after power is applied. Thermocouple resistances (for burnout detection) and CJC (Cold Junction Compensation) temperatures are being measured frequently during startup. Afterwards these measurements are made infrequently (on the order of minutes). See section 4.5 for information on Thermocouple Burnout Detection.

10 FAULT-FINDING IN THE MTL831C

The following are some tips when the system does not seem to be functioning correctly. If you are still unable to solve the issue, please contact Eaton Technical Support for help.

The POWER light is not ON or blinking

- There is not adequate power for the unit to function. Using a Voltmeter, measure the voltage at the data highway “+” and “-” terminals and verify that it meets the minimum voltage specification. A margin of at least 1 volt over the minimum is recommended.
- The unit is faulty. Please contact Eaton for further assistance.

The COMM light comes on and does not blink

- Two MTL831Cs are at the same address. If there is more than one MTL831C (there should never be more than 2), one and only one of them should have a jumper wire between the two ADDRESS pins (A, S). When two MTL831Cs are at the same address whichever one powers up first will be communicating with the MTL838C. The other unit recognizes its address already being used and remains idle.
- No communication signal is getting to the MTL831C. There can be multiple reasons for this:
 - In an IS installation, power for the MTL831C is coming from the MTL5553.
If the MTL838C is not powered or not connected properly no signal will get to the MTL5553 to be passed to the MTL831C is.
 - For non-IS installations, power comes from the MTL838C, so it is possible the MTL838C has stopped communicating. Investigate by connecting to the MTL838C with a USB cable, PC, and the PC Software. It may be necessary to repower the MTL838C.
 - The MTL831C has stopped receiving communication. Try disconnecting it and reconnecting it to reboot it. The data highway cable is too noisy for the MTL831C to communicate with the MTL838C. Inspect the data highway cable run and make sure it is not near power cables, VFDs, VFD controllers, or other high current noise producing cables and equipment.
- The unit is faulty. Please contact Eaton for further assistance.

The ERROR light comes on periodically

- The light flashes regularly every one or two seconds. If this persists, you may see the unit reboot – see section 6.1. Power cycle the unit by disconnecting and reconnecting the data highway cable if this happens and keeps recurring. The failure of a firmware update process which would have been initiated from the PC software could also cause this. The solution would be to try the firmware update process again. If that fails to remedy the issue, the unit could be faulty. Contact Eaton for assistance.
- The light flashes randomly or often. This is likely a CRC error on packet receipt (bad packet). The following are the potential causes:
 - Extreme noise source is affecting the data highway cable. This could include VFDs, welders, etc.
 - Check all wiring terminations to see that they are tight and there are no unintended shorts.
 - Verify that the data highway shield is earthed at one location only.
 - Verify the integrity of the data highway cable.

- Use the PC software to check the diagnostic information.
- Try rebooting each device connected to the data highway one at a time.
- Contact Eaton for assistance if the source of the issue cannot be found.

The POWER and ERROR lights alternately turn on and off

- This is an indication that the unit is being updated with new firmware. If a firmware update fails to complete properly, the unit can get stuck in this mode. Perform the firmware update again. If this does not fix the issue, contact Eaton for assistance.

**MTL831C[-xx] Analog Transmitter Ex Safety Instructions
(Relcom Doc. No. 503-215 Rev E.0 30 JUN 2021)**

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

The following information is also provided for safe product use in accordance with IECEx, Canadian, and US standards.

Description

The MTL831C[-xx] Analog Transmitter is part of a multi-component system that aggregates temperature or mV measurements from field sensors and provides them to the control system (DCS, PLC, etc.). The system consists of the MTL831C[-xx], which can connect to 16 sensors, and a Receiver (MTL838C[-xxx]) that makes the data from the sensors available to the control system. Up to 2 Analog Transmitters can be connected on the bus to a single Receiver – providing a total of up to 32 sensors per system.

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 IEC/EN 60079-0 and IEC/EN 60079-11.
- c) This apparatus provides protection against all the relevant additional hazards referred to in Annex II of the ATEX directive, such as those in clause 1.2.7.
- d) This apparatus satisfies the dielectric strength requirements of IEC/EN 60079-11 clause 6.3.13.

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 European installations the Directive 2014/34/EU [the ATEX Directive - safety of installations] is also applicable. For Canadian installations CEC Part 1 is applicable. For US installations, National Electrical Code (NFPA 70, Article 504), and ANSI/ISA-RP12.6 are applicable.
- b) This apparatus must not be subjected to mechanical and thermal stresses in excess of those permitted in the certification documentation, this document and the product specification.
- 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 contaminants.
- d) If necessary in the end use application, the product must be installed in an enclosure to protect it from excessive dust, moisture, and mechanical damage.
- e) Mount on 7.5mm x 35mm 'top hat' DIN Rail according to the instructions on the device cover. Use of DIN Rail end stops is recommended for vertical DIN Rail installations.
- f) Connect per the Control Drawing provided in this document.
- g) Fusing of the power source is recommended.
- h) Power for the MTL831C[-xx] is provided via the Data Highway connection to the Receiver.
 - Nominal Power Input: 10-24VDC, 25-35mA.
 - Data Highway terminals are rated for 24VDC. All other terminals are rated for 3.3VDC.

Inspection and maintenance

- a) Inspection and maintenance should be carried out in accordance with applicable European, Canadian, and US 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.

Repair

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

Marking

Each MTL831C[-xx] is marked with the following information:

General Information

- a) Company Name, and Address – **Relcom Inc. Forest Grove, OR USA**
- b) Product Type Identification – **MTL831C, or MTL831C-PS**
- c) Ambient Temperature range - **-40°C ≤ Tamb ≤ 70°C**

IECEX

- a) Certificate number – **IECEX FMG 20.0038X**
- b) Ex classification – **Ex ia IIC T4 Ga**

ATEX

- a) Certificate number – **FM20ATEX0048X**
- b) Ex classification – **II 1 G Ex ia IIC T4 Ga**
- c) CE mark and Notified Body Number – **0081**

FMCUS

- a) Certificate numbers – **FM20US0142X, FM20CA0071X**
- b) Ex classification – **CL I Zone 0 AEx/Ex ia IIC T4 Ga**
IS CL I DIV 1 GP ABCD T4

Specific Conditions of Use

The surface of the equipment may cause risk of electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.

WARNINGS (AVERTISSEMENTS)

- a) SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY (LE SUBSTITUTION DE COMPOSANTS PEUT NUIRE À LA SÉCURITÉ INTRINSÈQUE)
- b) TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, READ, UNDERSTAND AND ADHERE TO THE MANUFACTURER'S LIVE MAINTENANCE PROCEDURES (POUR ÉVITER L'ALLUMAGE D'ATMOSPHÈRES INFLAMMABLES OU COMBUSTIBLES, LIRE, COMPRENDRE ET RESPECTER LES PROCÉDURES DE MAINTENANCE EN DIRECT DU FABRICANT)
- c) POTENTIAL ELECTROSTATIC CHARGING HAZARD – SEE SPECIFIC CONDITIONS OF USE (RISQUE POTENTIEL DE CHARGE ÉLECTROSTATIQUE - VOIR LES SPECIFIC CONDITIONS OF USE)

Standards

This product complies with the following standards:

FM Class 3600:2018, FM Class 3610:2018, FM Class 3810:2018,
ANSI/UL 60079-0:2019, ANSI/UL 60079-11:2014, ANSI/UL 61010-1:2016
IEC 60079-0:2017, IEC 60079-11:2011
EN IEC 60079-0:2018, EN 60079-11:2012
CSA C22.2 NO. 60079-0:19, CAN/CSA-C22.2 NO. 60079-11:14 (R2018)

HAZARDOUS
(CLASSIFIED)
LOCATION



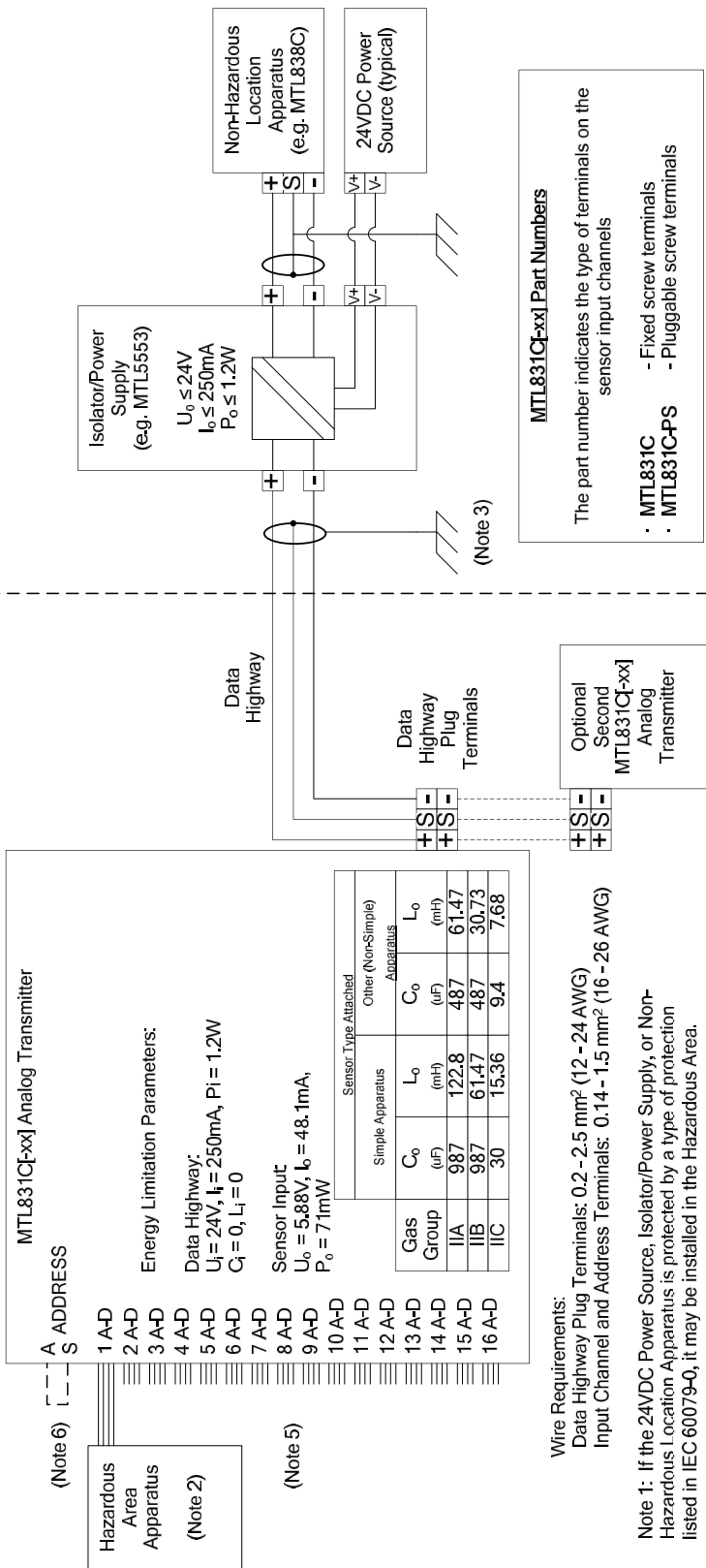
Ex ia IIC T4 Ga



II 1 G Ex ia IIC T4 Ga

NON-HAZARDOUS
LOCATION

-40°C ≤ T_{amb} ≤ 70°C



Wire Requirements:

Data Highway Plug Terminals: 0.2 - 2.5 mm² (12 - 24 AWG)
Input Channel and Address Terminals: 0.14 - 1.5 mm² (16 - 26 AWG)

Note 1: If the 24VDC Power Source, Isolator/Power Supply, or Non-Hazardous Location Apparatus is protected by a type of protection listed in IEC 60079-0, it may be installed in the Hazardous Area.

Note 2: The Hazardous Area Apparatus may be switches. Other sensors such as TCs, RTDs, and non-inductive resistors may be used if the auto-ignition temperature of the hazardous location is T₄ (135C) or greater. Certified devices with the correct Entity parameters may also be used.

Note 3: Screen grounding is for reasons other than electrical safety. The screen of the Data Highway cable is either connected to an earth rail by the IS Isolator/Power Supply or connected to an earth rail in the MTL831C's field enclosure.

Note 4: Fusing of the power source is recommended.

Note 5: Each input channel is numbered (1-16). Each channel has 4 terminals (A, B, C, and D).

Note 6: Address terminals (A and S) are left unconnected on the first MTL831C[-xx] attached to the Data Highway. A and S are shorted together with a user-installed jumper wire on the second MTL831C[-xx] attached to the Data Highway.

Drawing changes are not allowed without prior written permission from the certifying agency.



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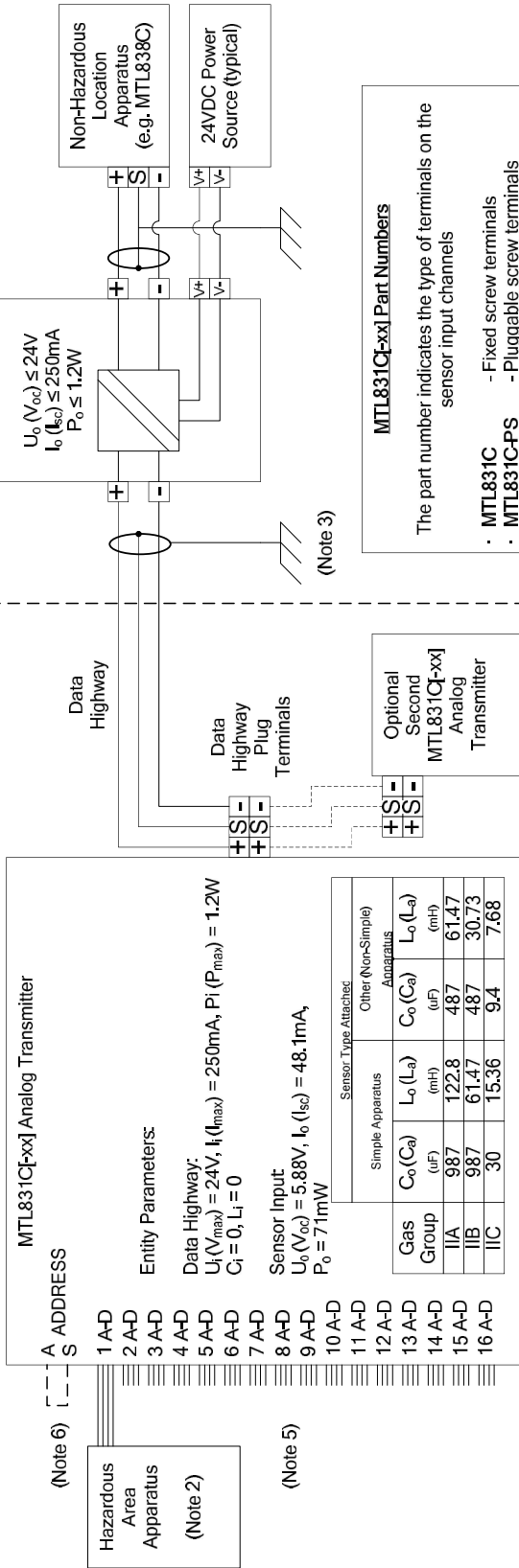
ATEX and IECEx CONTROL DRAWING
FOR MTL831C[-xx] ANALOG
TRANSMITTERS



IS Class I Div 1 Groups ABCD T4
Class I Zone 0 AEx/Ex ia IIC T4 Ga

-40°C ≤ T_{amb} ≤ 70°C

HAZARDOUS (CLASSIFIED) LOCATION



Wire Requirements:
Pluggable Screw Terminals: 0.2 - 2.5 mm² (12 - 24 AWG)
Fixed Screw Terminals: 0.14 - 1.5 mm² (16 - 26 AWG)

Specific conditions of use

- The surface of the equipment may cause risk of electrostatic discharge. Avoid installation that could cause electrostatic build-up, and only clean with a damp cloth.

WARNINGS (AVERTISSEMENTS)

- SUBSTITUTION OF COMPONENTS MAY IMPAIR INTRINSIC SAFETY (LE SUBSTITUTION DE COMPOSANTS PEUT NUIRE À LA SÉCURITÉ INTRINSÈQUE)
- TO PREVENT IGNITION OF FLAMMABLE OR COMBUSTIBLE ATMOSPHERES, READ, UNDERSTAND AND ADHERE TO THE MANUFACTURER'S LIVE MAINTENANCE PROCEDURES (POUR ÉVITER L'ALLUMAGE D'ATMOSPHÈRES INFLAMMABLES OU COMBUSTIBLES, LIRE, COMPRENDRE ET RESPECTER LES PROCÉDURES DE MAINTENANCE EN DIRECT DU FABRICANT)
- POTENTIAL ELECTROSTATIC CHARGING HAZARD - SEE SPECIFIC CONDITIONS OF USE (RISQUE POTENTIEL DE CHARGE ÉLECTROSTATIQUE - VOIR LES SPECIFIC CONDITIONS OF USE)



Relcom Inc.

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FMCUS CONTROL DRAWING FOR
MTL831C[-xx] ANALOG TRANSMITTERS
(Sheet 1 of 2)

NOTES:

- 1: If the 24VDC Power Source, Isolator/Power Supply, or Non-Hazardous Location Apparatus is certified for installation in Hazardous Locations, it may be installed in the Hazardous Area.
- 2: The Hazardous Area Apparatus may be switches. Other sensors such as TCs, RTDs, and non-inductive resistors may be used if the auto-ignition temperature of the hazardous location is T4 (135C) or greater. Certified devices with the correct Entity parameters may also be used.
- 3: Screen grounding is for reasons other than electrical safety. The screen of the Data Highway cable is either connected to an earth rail by the IS Isolator/Power Supply or connected to an earth rail in the MTL831C's field enclosure.
- 4: Each input channel is numbered (1-16). Each channel has 4 terminals (A, B, C, and D).
- 5: Address terminals (A and S) are left unconnected on the first MTL831C[-xx] attached to the Data Highway. A and S are shorted together with a user-installed jumper wire on the second MTL831C[-xx] attached to the Data Highway.
- 6: All connections are energy limited and may be live worked without gas clearance where allowed by local code.
- 7: No revision to drawing without prior FM Approval.
- 8: The Associated Apparatus shall be appropriately certified for installations in the U.S.
- 9: The Associated Apparatus shall be Canadian Approved for installations in Canada.
- 10: The Associated Apparatus shall be ATEX Certified for installations in Europe.
- 11: The Associated Apparatus shall be IECEx Certified for IECEx installations.
- 12: Associated apparatus manufacturer's installation drawing shall be followed when installing this equipment.
- 13: The control room equipment connected to Associated Apparatus shall not generate more than 250 Vrms or Vdc, or the marked U_m on the associated apparatus, whichever is less.

- 14: Resistance between Intrinsically Safe Ground of the associated apparatus and earth ground shall be less than 1.0 Ohm. Earth grounding is not required for galvanically isolated associated apparatus.
- 15: Installations in the U.S. should be in accordance with ANSI/ISA RP12.06.01 "Installation of Intrinsically Safe Systems for Hazardous (Classified) Locations" and the latest edition of the National Electrical Code (ANSI/NFPA 70).
- 16: Installation in Canada shall be in accordance with the latest edition of the C22.1 Canadian Electrical Code, Part I.
- 17: Installations in Europe shall comply with the relevant requirements of EN 60079-14 and applicable National regulations.
- 18: Installations for IECEx certification shall be in accordance with IEC 60079-14 and the wiring practices for the country of origin.
- 19: Field wiring shall be rated for 75°C.
- 20: The Entity Concept allows interconnection of associated apparatus and intrinsically safe apparatus when the following is true:
 $U_o(V_{oc}) \leq U_i(V_{max}), I_o(I_{sc}) \leq I_i(I_{max}), P_o \leq P_i(P_{max}),$
 $C_o(C_a) \geq C_i + C_{cable}, L_o(L_a) \geq L_i + L_{cable}$



Relcom Inc.

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FMCUS CONTROL DRAWING FOR
MTL831C[-xx] ANALOG TRANSMITTERS
(Sheet 2 of 2)

MTL831C[-xx] 模拟发讯机 CCC 防爆安全指南
(Relcom Doc. No. 503-548 Rev B.0 06 AUG 2021)

根据 CCC 要求，为安全使用本产品提供以下信息。

总则：

- a) 与安装在危险区域的所有其他电气设备一样，本设备只能由合格人员安装、操作和维护。这些人员应接受过培训，包括各种类型的保护和安装做法、相关规则和条例以及区域分类的一般原则。应定期进行适当的进修培训。[见 IEC 60079-17 第 4.2 条]。
- b) 本设备符合 IEC 60079-0, IEC 60079-11, GB3836.1-2010, GB3836.4-2010 的电气设备要求。
- c) 本设备满足 IEC 60079-11 第 6.3.13 条、GB3836.4-2010 第 6.3.12 条的绝缘强度要求。
- d) 产品的安装、使用和维护应同时遵守产品说明书及下列相关标准、规范的要求：
GB 3836.13 – 2013 爆炸性环境 第 13 部分：设备的修理、检修、修复和改造。
GB/T 3836.15 – 2017 爆炸性环境 第 15 部分：电气装置的设计、选型和安装。
GB/T 3836.16 – 2017 爆炸性环境 第 16 部分：电气装置的检查与维护。
GB/T 3836.18 – 2017 爆炸性环境 第 18 部分：本质安全电气系统。
GB 50257 – 2014 电气装置安装工程爆炸和火灾危险环境 电气装置施工及验收规范。

安装：

- a) 安装必须符合适当的国家和地方法规，其中可能包括参考 IEC 实施规程 IEC 60079-14。此外，特定行业或最终用户可能对其安装的安全性有具体要求，这些要求也应得到满足。
- b) 本设备所承受的机械和热应力不得超过认证文件、本文件和产品规范中允许的范围。
- c) 设备不得安装在可能受到侵蚀性物质侵蚀的位置，并且必须保护其免受过量灰尘、湿气和其他污染物的影响。
- d) 如果需要应用在现场，产品必须安装在外壳中，以防止灰尘、湿气和机械损坏。
- e) 根据设备面板上的说明，安装在 7.5mm x 35mm“顶帽”DIN 导轨上。对于垂直 DIN 导轨安装，建议使用 DIN 导轨端部止动块。
- f) 按照本文件提供的控制图进行连接。

检查和维护：

- a) 检查和维护应按照国家 and 地方法规进行，可参考 IEC 标准 IEC 60079-17。此外，特定行业或最终用户可能有特定的要求，这些要求也应得到满足。
- b) 在操作过程中或任何其他时间不得接近内部电路。
- c) 如果需要清洁设备的外壳，则应使用一块被水稀释的洗涤剂混合物稍微弄湿的布进行清洁。

维修：

此产品不得修理。必须用同等认证产品代替。

标记：

每个 MTL831C 标有以下信息：

- a) 公司名称和地址 – **Relcom Inc. Forest Grove, OR USA**
- b) 产品类型标识 – **MTL831C 或 MTL831C-PS**
- c) 防爆分类 – **Ex ia IIC T4 Ga**
- d) 环境温度范围 – **-40C ≤ Tamb ≤ 70C**

具体使用条件：

- a) 设备表面可能会导致静电放电风险。避免可能导致静电积聚的安装，只能用湿布清洁。

危险(分类)场所



Ex ia IIC T4 Ga

-40°C ≤ T_{amb} ≤ 70°C

MTL831C[-xx] 模拟发讯机

(注 6) A 地址 S

危险区域设备 (注 2)

实体参数:

数据链路:

U_i = 24V, I_i = 250mA, P_i = 1.2W
C_i = 0, L_i = 0

传感器输入:

U_o = 5.88V, I_o = 48.1mA,
P_o = 71mW

气体 组别	防爆传感器类型			
	简单设备	C ₀ (μF)	L ₀ (mH)	其他(非简单)设备
IIA	987	122.8	487	61.47
IIB	987	61.47	487	30.73
IIC	30	15.36	9.4	7.68

电线要求:

可插拔螺丝端子: 0.2 – 2.5 mm² (12-24 AWG)
输入通道和地址端子: 0.14 – 1.5 mm² (16-26 AWG)

注1: 如果24VDC电源, 隔离栅/电源或非危险场所设备受到IEC 60079-0中列出的一种保护类型的保护, 则可以将安装在危险区域中。

注2: 危险区域设备可能是开关。如果危险场所的自然温度为T₄ (135C) 或更高, 则可以使用其他传感器, 例如TC, RTD和无感电阻器。也可以使用带有正确实体参数的认证设备。

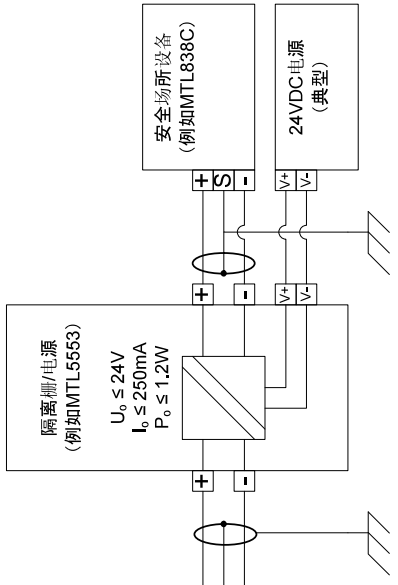
注3: 屏蔽接地是出于电气安全以外的原因。数据链路电缆的屏蔽层通过本安隔离栅/电源连接到接地线, 或者连接到MTL831C现场机箱中的接地线。

注4: 建议使用电源保险丝。

注5: 每个输入通道均已编号 (1-16)。每个通道有4个端子 (A, B, C和D)。

注6: 地址端子 (A和S) 在连接到数据链路的第一个MTL831C [-xx] 上未连接。A和S通过用户安装的跨接线短接起来, 该跳线在连接到数据链路的第二个MTL831C [-xx] 上。

安全场所



MTL831C[-xx] 部件号

部件号指示传感器输入通道上的端子类型

- MTL831C – 固定螺丝端子
- MTL831C-PS – 可插拔螺丝端子



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CCC MTL831C [-xx]模拟发讯机的控制图

未经认证机构的事先书面许可, 不得更改图纸。

13 APPENDIX A

13.1 Maintenance

It is advisable to check the general condition of the installation from time to time to make sure no deterioration has occurred, and that no unauthorized modifications have been made. The following should be checked at intervals of not more than two years, and more frequently for systems used in particularly harsh environments.

Check that

- a. units are of the types specified in the relevant documentation.
- b. unit labelling and tagging is clearly legible, and the details given comply with the relevant documentation.
- c. units and enclosures are securely mounted.
- d. there are no signs of damage or corrosion affecting the installation.
- e. interconnecting cables are of the specified type and ratings, correctly routed and segregated, and not frayed or otherwise damaged.
- f. all connections are properly made.
- g. the locations in which the units are mounted have not been degraded by the introduction of harmful materials.
- h. access lids and doors to protective enclosures and cabinets are correctly secured.

13.2 Disposal

Product - End of Life

Eaton's MTL product line sells products world-wide that must meet the environmental and regulatory requirements of different countries and regions.

European directives on Waste Electronic and Electronic Equipment (WEEE) define the requirements on a producer to provide for the end-of-life recovery and recycling of electronic products when they become waste at the end of their life.



Eaton's MTL831C is marked with the 'crossed out wheellie-bin' symbol which indicates that the item is electronic or electronic equipment, and must be disposed of in the appropriate manner.

Other countries and regions may have their own environmental regulatory requirements regarding recovery and recycling of electronic products at the end of their life.

For more detailed information about take-back and equipment recycling please contact your local Eaton MTL representative.

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