

MTL661/2/3/5

IS, Loop-Powered Indicators



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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Health & Safety information

"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 and the National Electrical Code, combined with ANSI/ISA-RP 12.6 in the USA. 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".

For further ATEX information on this component see Section 6.

Safety instructions



Any responsibility lapses if the instructions and procedures described in this manual are not followed.

- ◆ **LIFE SUPPORT APPLICATIONS:** *The MTL661, MTL662, MTL663 or MTL665 are not designed for use in life support appliances, devices, or systems where malfunction of the product can reasonably be expected to result in a personal injury. Customers using or selling these products for use in such applications do so at their own risk and agree to fully indemnify the manufacturer and supplier for any damages resulting from such improper use or sale.*
- ◆ *Electrostatic discharge can inflict irreparable damage to electronic equipment! Before installing or opening the unit, the installer should discharge himself/herself by touching a well-grounded object.*
- ◆ *This unit must be installed in accordance with the EMC guidelines (Electro-Magnetic Compatibility).*

Safety rules and precautionary measures

- ◆ The manufacturer accepts no responsibility whatsoever if the following safety rules and precautions instructions and the procedures as described in this manual are not followed.
- ◆ It is essential to ensure that these units are installed as required by a nationally accepted authority, or as described in IEC 60079-14/EN 60079-14.
- ◆ Modifications of the MTL661/2/3/5 implemented without preceding written consent from the manufacturer, will result in the immediate termination of product liability and warranty period.
- ◆ Installation, use, maintenance and servicing of this equipment must be carried out by authorised technicians.
- ◆ Check all connections, settings and technical specifications of the various peripheral devices with the MTL661/2/3/5 supplied.
- ◆ Never touch the electronic components (ESD sensitivity).
- ◆ Never expose the system to heavier conditions than allowed according to the casing classification (see manufacturer's plate and chapter 4.2.).
- ◆ If the operator detects errors or dangers, or disagrees with the safety precautions taken, then inform the owner or principal responsible.
- ◆ The local labour and safety laws and regulations must be adhered to.

Software version 03.01.xx

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MTL661, MTL662, MTL663 & MTL665 IS, LOOP POWERED INDICATORS



Figure 1 MTL661 and MTL665 indicators

1 ABOUT THIS MANUAL

This manual explains the installation of the IS, field mounting MTL661(B) and MTL663(B); and the panel mounting MTL662(B) and MTL665(B). A model number with a 'B' suffix indicates that it has a backlight.

For Zone 2 mounting the MTL661(B)-NA and MTL662(B)-NA versions must be used.

The manual is divided into two main sections:

The daily use of the unit is described in chapter 2 "Operation." These instructions are meant for users.

The chapters that follow are meant for electricians/technicians. These provide a detailed description of all software settings and hardware installation guidance.

This operation manual describes the standard unit and the options available. For additional information, please contact your supplier.

A hazardous situation may occur if the MTL661/2/3/5 is not used for its designed purpose, or if it is used incorrectly. Please take care to note the information in this operating manual indicated by the pictograms:



A "warning" indicates actions or procedures which, if not performed correctly, may lead to personal injury or a safety hazard.



A "caution" indicates actions or procedures which, if not performed correctly, may lead to damage of the MTL661/2/3/5 or connected instruments.



A "note" indicates actions or procedures which, if not performed correctly, may indirectly affect operation or may lead to an instrument response which is not planned.

2 OPERATION

2.1 General

The MTL661/2/3/5 may only be operated by personnel who are authorised and trained by the operator of the facility. All instructions in this manual are to be observed.

Take careful notice of the "Safety rules, instructions and precautionary measures" in the front of this manual.

This chapter describes the daily use of the MTL661/2/3/5. This instruction is meant for users / operators.

2.2 Control panel

The following keys are provided on each model:



Figure 2: Control panel

Functions of the keys



This key is used to program and save new values or settings. It is also used to gain access to SETUP-level; please read chapter 3.



This key is used to SELECT current and 0% / 100% value. The arrow-key ▲ is used to increase a value after PROG has been pressed or to configure the unit; please read chapter 3.



The CLEAR function has no use at Operator level but the arrow-key ► is used to select a digit after PROG has been pressed or to configure the unit; please read chapter 3.

2.3 Operator information and functions

In general, the MTL661/2/3/5 will always function at Operator level. The information displayed is dependant upon the SETUP-settings.

For the Operator, the following functions are available:

Display value, measuring unit and piegraph

This is the main display information of the MTL661/2/3/5. After selecting any other information, it will always return to this main display automatically. If activated, the 10-segment piegraph gives a quick impression about the actual value in relation to its measuring range in a scale of 0-100%.

Display current

If activated, the actual input current will be displayed after pressing SELECT.

Display 0% / 100%

If activated, the 0% value (=4mA) and 100% value (=20mA) will be displayed after pressing SELECT a few times.

Under range / Over range

If the input current is between 3.5mA and 3.75mA "-----" will be displayed.

If the input current is between 3.75mA and 4mA the value corresponding to 4mA will be displayed.

If the value is above 22mA the value "999999" will be displayed.

3 CONFIGURATION



Here follows a description of all software settings and hardware connections, which are provided for electricians and non-operators.

3.1 Programming SETUP-level

3.1.1 General

Configuration of the MTL661/2/3/5 is carried out at SETUP-level. Enter SETUP-level by pressing the PROG/ENTER key for 7 seconds; after which time, both arrows $\blacktriangle$ and $\blacktriangleright$ are displayed.

To return to operator level, press PROG for three seconds. Alternatively, if no keys are pressed for 2 minutes, the unit will exit SETUP automatically.

SETUP can be reached at all times while the MTL661/2/3/5 remains fully operational.



A pass code may be required to enter SETUP.

Without this pass code access to SETUP is denied.

To enter SETUP-level:

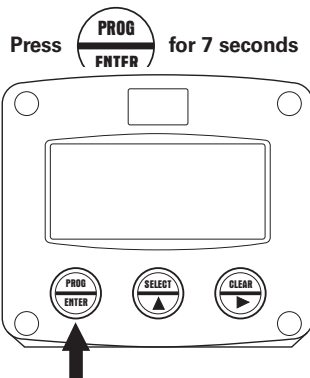


Figure 3

SETUP-level structure

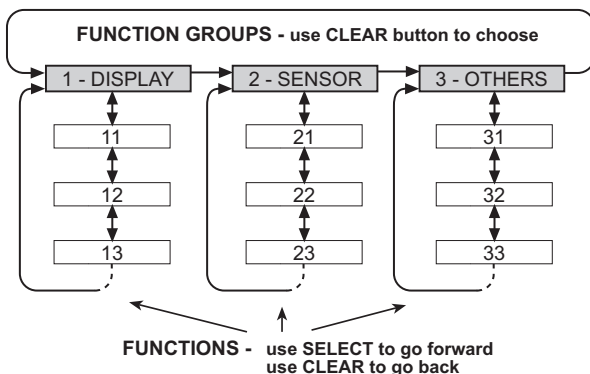


Figure 4 - Scrolling through SETUP-level

Selection of function-group and function:

SETUP is divided into several function groups and functions.

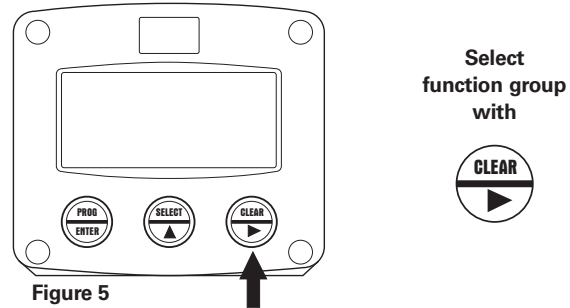


Figure 5

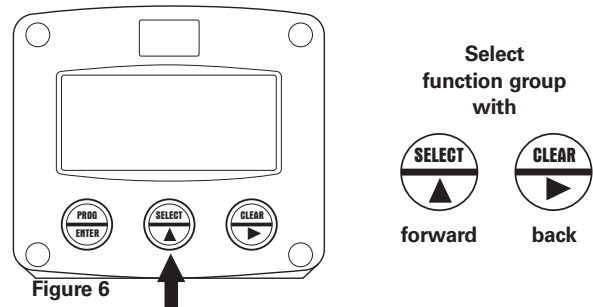


Figure 6

Each function has a unique number, which is displayed below the word "SETUP" at the bottom of the display. The number is a combination of two figures. The first figure indicates the function-group and the second figure the sub-function. Additionally, each function is expressed with a keyword.

To change or select a value:

- Press briefly; **PROGRAM** will start to flash
- Select or enter a value with and/or
- Press to confirm the value / selection

To change a value, use $\blacktriangleright$ to select the digits and $\blacktriangle$ to increase the value.

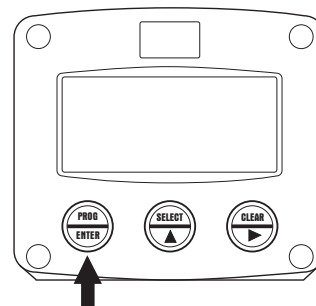
To select a setting, both $\blacktriangle$ and $\blacktriangleright$ can be used.

If the new value is invalid, the increase sign $\blacktriangle$ or the decrease-sign $\blacktriangledown$ will be displayed while you are programming.

If the data is altered but ENTER has not been pressed, the alteration can still be cancelled by waiting for 20 seconds or by pressing ENTER for three seconds: the PROG-procedure will be left automatically and the former value reinstated.

Note: alterations will only be set after ENTER has been pressed!

To return to OPERATOR-level:



Press  for 3 seconds

To return to the operator level, PROG must be pressed for three seconds. If no keys are pressed for 2 minutes, the MTL661/2/3/5 will leave the SETUP mode automatically.



3.1.2 Setup functions and variables

1 DISPLAY		
11	UNIT	no unit - MM - CM - M - MEtER - MIL - IN - Ft - Yd - FAtH - SQFt - ML - L - NL - AL - M3 - NM3 - AM3 - GAL - USGAL - IGAL - bbL - CUft - MG - G - KG - tON - OZ - Lb - ST - QR - CWT - PSI - PDIG - MbAR - MbARG - bAR - bARG - PA - MPA - PAG - KPA - KPAG - MMH2O - MH2O - INH2O - MMHG - INHG - °C - °F - K - P - RPM - % - PPM - MA - A
12	TIME	/SEC - /S - /MIN - /M - /HR - /H - /DAY - /D - no unit
13	DECIMALS	0 - 1 - 2 - 3 - 4 (Ref: displayed value)
14	OFFSET	-99,999 - +99,999
15	SPAN	0.0001 - +99,999 unit/time-unit
16	DIRECTION	reverse - normal
17	CURRENT	enable / disable
18	PERCENTAGE	enable / disable
19	PIEGRAPH	enable / disable
2 SENSOR		
21	FORMULA	interpolation, square root
22	FILTER	00 - 99
23	CALIBRATE LOW	default - calibrate - set
24	CALIBRATE HIGH	default - calibrate - set
3 OTHERS		
31	MODEL	
32	SOFTWARE VERSION	
33	SERIAL NO.	
34	PASSWORD	0000 - 9999
35	TAGNUMBER	0000000 - 9999999

Figure 7

13 DECIMALS

This setting determines the number of digits following the decimal point. The following can be selected:

000000 - 11111.1 - 2222.22 - 333.333

14 OFFSET

The offset is the minimum *displayed* value of the range of measurement. This needs to be programmed into the display.

Example: Setting a temperature range

For a temperature range of 20°C to 120°C, the offset at the minimum signal of 4mA is 20°C. Therefore make offset **20°C**.

The minus for a negative value can be selected by pressing

the  and  button simultaneously.

15 SPAN

The span is the difference between the maximum and minimum *displayed* values for the range of 4 to 20mA inputs.

Example: Setting a temperature range

For a temperature range of 20°C to 120°C, the span is the difference between the top and the bottom values of the range, i.e. 100°C. Therefore set span to **100°C**.

Example: Programming the span for a flowrate

Assume that a sensor generates 20mA at a flowrate of 2,481.3 litres/minute; then select the unit as "Litres", the time unit as "minute" and the number of decimals as "1".

Set the span as 2481.3

Enter for SETUP - 15: "2481.3"

16 DIRECTION

If the display is required to increase in value as the input current increases, select the scale direction "normal". Alternatively, select "reverse" if the display is required to decrease as the input current rises.

17 CURRENT

Select "enable" if you want the actual current value to be displayed for the operator.

18 PERCENTAGE

Select "enable" if you want the 0% value and 100% value to be displayed for the operator.

19 PIEGRAPH

The piegraph (displayed at operator level) displays the input signal as a percentage. The minimum signal (setup 23) corresponds to 0% and the maximum signal (setup 24) to 100%.

With this function, the piegraph can be enabled / disabled.

3.1.3 Details of SETUP functions

1 - DISPLAY

11 UNIT

This determines the measurement unit that will be displayed. A choice can be made from the range of units shown in Section 3.2.2.

Alteration of the measurement unit will have consequences for other SETUP-level values.

Please note that the Span has to be adapted as well; the calculation is not done automatically.

12 TIME

For flowrate calculations, a time unit can be set. The flowrate can be calculated per second (/SEC or /S); minute (/MIN or /M); hour (/HR or /H) or day (/DAY or /D).

Select "—" if no time unit is desired.

2 - SENSORS

21 SIGNAL

The MTL661/2/3/5 can process the 4-20mA signal in two ways:

1) Interpolation: the signal is processed linearly

$$D = S \times I$$

2) Square root: for differential pressure

$$D = S \sqrt{I}$$

where:

D = Value: the displayed value

S = Span: the maximum value at 20mA. The span is programmed with setting 15.

I = Input: the scaled analogue value; in these formulas value 0 (zero) for 4mA and value 1 (one) for 20mA.

22 FILTER

The output signal from the field sensor is measured several times a second. The value measured is therefore a "snap-shot" of the signal and may fluctuate rapidly. This digital filter enables a more stable and accurate reading to be obtained through the choice of a suitable filtering value.



The effect of the filter is based on three variables: the filter value (01-99), the last measured analogue value and the last average value. The higher the filter value, the slower the response to an input change will be. Several filter values and their response times effects are indicated below:

Filter value	Response time on step change of analog value			
	Time in seconds			
	50% effect	75% effect	90% effect	99% effect
01	filter disabled	filter disabled	filter disabled	filter disabled
02	0.3 seconds	0.5 seconds	1.0 seconds	1.8 seconds
03	0.5 seconds	1.0 seconds	1.5 seconds	3 seconds
05	1.0 seconds	1.8 seconds	2.8 seconds	5.3 seconds
10	1.8 seconds	3.5 seconds	5.6 seconds	11 seconds
20	3.5 seconds	7.0 seconds	11 seconds	23 seconds
30	5.3 seconds	10 seconds	17 seconds	34 seconds
50	8.8 seconds	17 seconds	29 seconds	57 seconds
75	13 seconds	26 seconds	43 seconds	86 seconds
99	17 seconds	34 seconds	57 seconds	114 seconds

23 TUNE MIN / 4MA

Be very sure that the offered signal is correct before the calibration is executed as this function has a major influence on the accuracy of the system!



This setting enables the user to calibrate a specific input value as the 4mA point, because the signal from the sensor might not be exact 4.0 mA at zero span. This adjusts the actual input value at zero.

After pressing PROG, three settings can be selected:

CALIBRATE – With this setting, the input will be calibrated with the actual "4mA" value. After pressing ENTER, CAL SET will be displayed as soon as the indicator completes its calibration. From that moment, the analogue input value must be more than the calibrated value before the signal will be processed.

DEFAULT – This resets the calibration to the manufacturer's factory setting.

CAL SET – This selects the value last used for calibration.

24 TUNE MAX / 20MA

This setting enables the user to calibrate a specific input value as the 20 mA point, because the signal from the sensor might not be exact 20.0 mA at the maximum span. This establishes the actual input value at full range.

After pressing PROG, three settings can be selected:

CALIBRATE: with this setting, the input will be calibrated with the actual "20mA" value. After pressing enter, CAL SET will be displayed as soon as the calibration is completed. From that moment, the analogue value must be less than the calibrated value for a reliable measurement.

DEFAULT: with this setting, the manufactures value is re-installed.

CAL SET: to select the last calibrated value.

3 - OTHERS

31 TYPE OF MODEL

For support and maintenance it is important to have information about the characteristics of the MTL661/2/3/5.

Your supplier will ask for this information in the case of a serious breakdown or to assess the suitability of your model for upgrade considerations.

32 VERSION SOFTWARE

For support and maintenance it is important to have information about the characteristics of the MTL661/2/3/5.

Your supplier will ask for this information in the case of a serious breakdown or to assess the suitability of your model for upgrade considerations.

33 SERIAL NUMBER

For support and maintenance it is important to have information about the characteristics of the MTL661/2/3/5.

Your supplier will ask for this information in the case of a serious breakdown or to assess the suitability of your model for upgrade considerations.

34 PASS CODE

All SETUP-values can be pass code protected.

This protection is disabled with value 0000 (zero).

Up to and including 4 digits can be programmed, for example 1234.

35 TAGNUMBER

For identification of the unit, a unique tag number of maximum 7 digits can be entered.

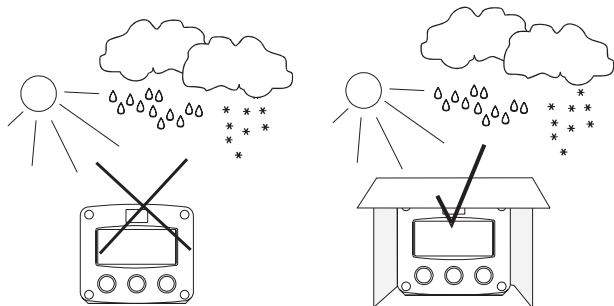
4 INSTALLATION

4.1 General directions

Take careful notice of the "Safety rules, instructions and precautionary measures" at the front of this manual.

4.2 Installation / surrounding conditions

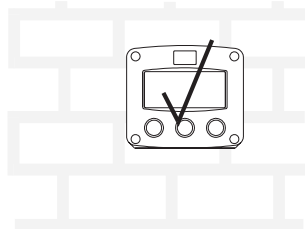
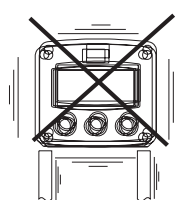
Take the relevant IP classification of the casing into account (see manufacturer's plate). Even an IP67 (NEMA 4X) casing should NEVER be exposed to strongly varying (weather) conditions.



The panel-mounted models, MTL662 and MTL665 are rated IP65 and IP66/67 respectively. The field mounted models MTL661 and MTL663 are rated IP67.

When used in very cold surroundings or varying climatic conditions, take the necessary precautions against moisture by placing a dry sachet of silica gel, for example, inside the instrument case.

Mount the MTL661/2/3/5 on a solid structure to avoid vibrations.



4.3 Enclosure Dimensions

For dimensions of the enclosures and any panel mounting cutouts see Section 8.

4.4 Hardware and connections

4.4.1 Mounting the MTL661(B) & MTL663(B)

Two 8mm diameter holes (see Section 8) are provided through the side flanges to assist with the mounting of the indicator. See also Section 4.5 for details of wall and pipe mounting the MTL661(B).

4.4.2 Mounting the MTL662(B) & MTL665(B)

Cut an aperture in the panel to suit the model, as shown in the Case Details in Section 8 of this manual, and use the hardware provided with the display to secure it to the panel.

4.4.3 Mounting the MTL66x-NA

When used in type of protection 'non sparking', the enclosure shall be installed in such a way that the risk of mechanical damage is low.

WHEN INSTALLING, PAY SPECIFIC ATTENTION TO:

- The use of separate cable glands, with effective IP67 (NEMA4X) seals, for all wires, to maintain the enclosure rating.
- The use of IP67 (NEMA4X) plugs for all unused cable entries: to maintain the enclosure rating.
- Cable shields may be connected together, using terminals 2 and 3, to maintain shield continuity.

4.4.4 Terminal connectors

The following screw-clamp terminal connectors are provided:

Minimum wire size 0.2mm², maximum 2.5mm²

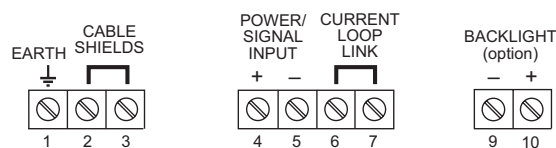


Figure 8 - MTL661/2/3/5 terminal connectors showing standard configuration and backlight options .

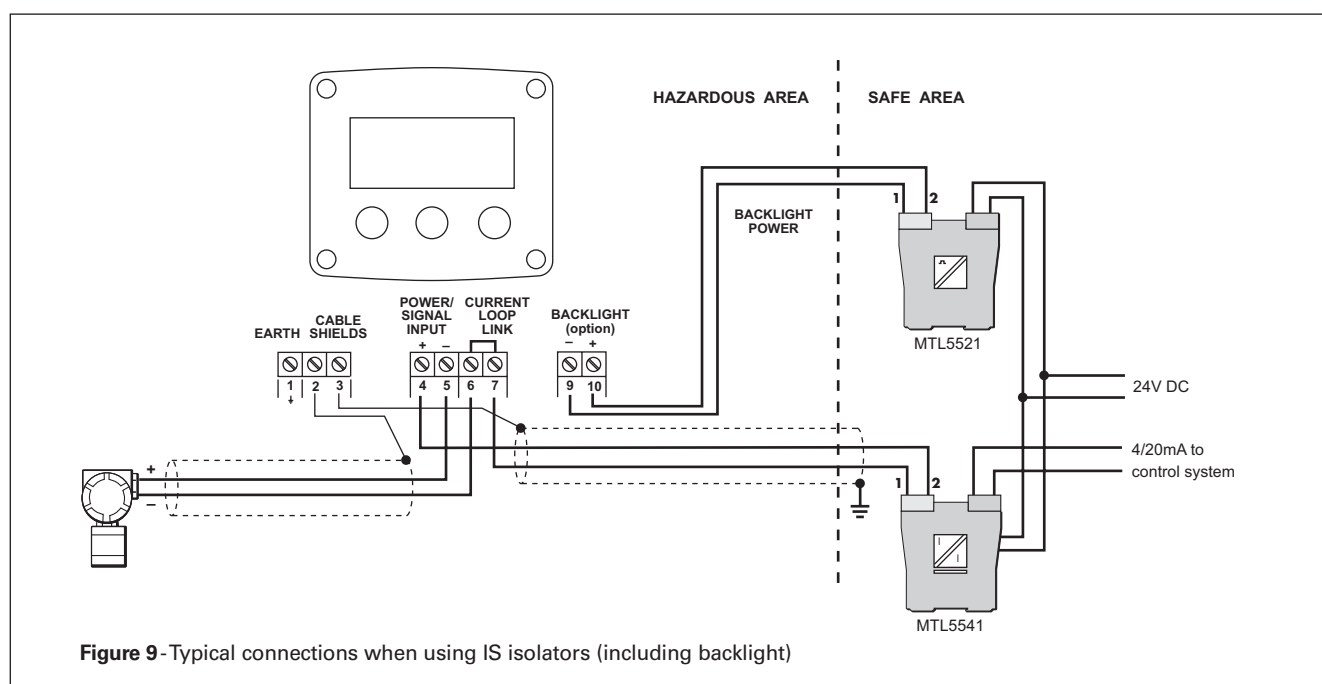


Figure 9 - Typical connections when using IS isolators (including backlight)

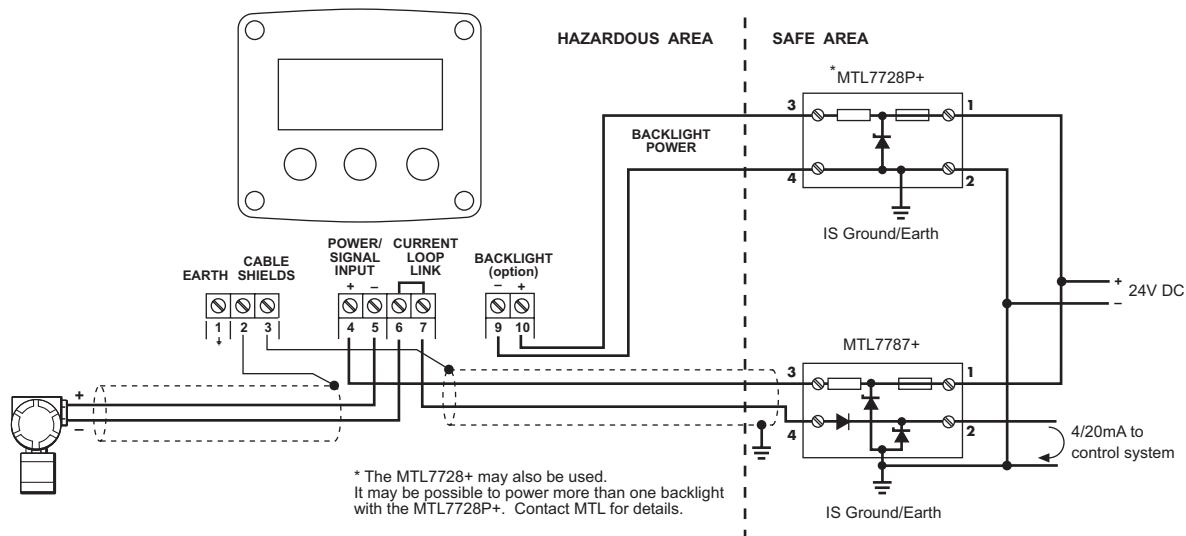


Figure 10-Typical connections when using IS barriers (including backlight)

4.4.5 Grounding

An internal screw is provided inside the rear cover for grounding purposes (see Figure 11). Terminal 1 on the inside of the front panel assembly provides a grounding point for the front panel (see Figure 10).

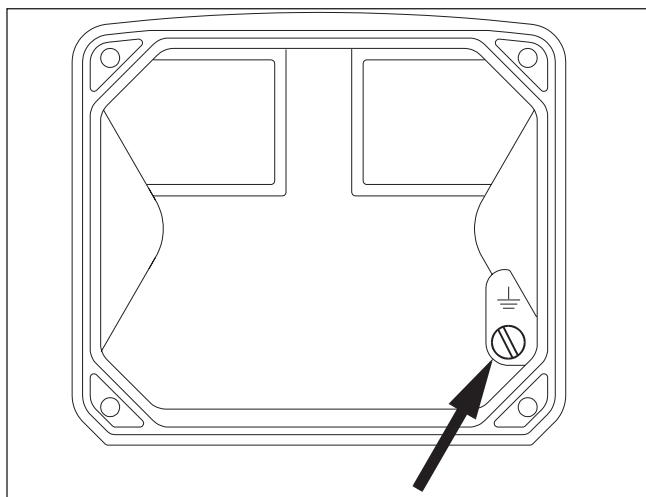


Figure 11 - Grounding aluminium enclosure.

4.5 Accessories for mounting displays

Eaton has produced accessories to enable a user to mount any of these displays on a flat surface (e.g a wall) or on curved surfaces such as pipes or tubular structures.

The following accessories are available to order.

Order code	Description	Used with
WMP66	Wall mounting plate	MTL661/MTL663
PMA66	Pipe mounting adaptor	MTL661/MTL663
PIP66	Pipe mounting kit	MTL661/MTL663
GAS660	Spare gaskets- pk of 10	MTL661/MTL663
GAS665	Spare gaskets- pk of 10	MTL665

4.5.1 Using the WMP66 wall mounting plate



Figure 12 Wall mounting plate

The wall mounting plate is for use with any of the MTL661 or MTL663 display models. Holes are provided in the plate to accommodate bolts or screws up to 5mm diameter and the rear of the display has relief for the heads of the bolts/screws.

- Use the plate as a template on the mounting surface and mark the positions of the holes required (vertical or horizontal) through the holes in the plate.

- b) Drill holes in the surface to suit the fixings.
- c) Mount the wall mounting plate with the chosen fixings.
- d) Fit the display unit onto the two threaded studs and secure it with the two self-locking nuts provided.

4.5.2 Using the PMA66 pipe mounting adaptor

The PMA66 pipe mounting adaptor, shown in Figure 13, has a stainless steel bracket, to enable an MTL661 or MTL663 field display to be mounted on any vertical pipe that has an outside diameter between 50 and 80mm.

The pipe mounting adaptor consists of the following items:

Quantity	Description
1	Pipe mounting bracket
2	Circular hose clips

Wall mounting plate (WMP66) ordered separately.

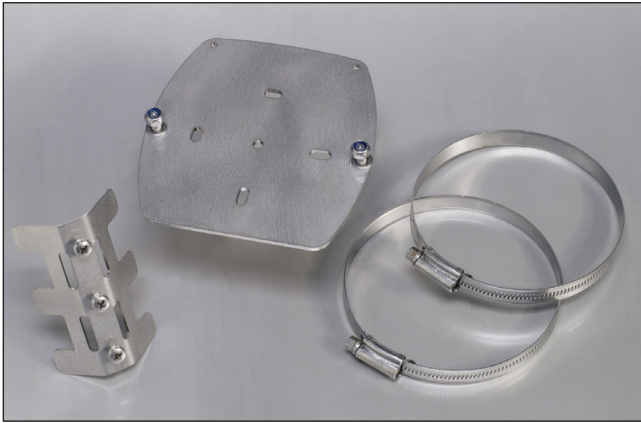


Figure 13 PMA66 Pipe mounting adaptor

This mounting kit can be used for vertical or horizontal pipes.

Each hose clip should be unscrewed, opened and passed through the mounting bracket slots. The clips can then be fitted over the pipe and re-engaged with their screw adjusters. Tighten the clips so that the bracket faces in the direction required for the final display.

Remove the three bracket screws and attach the WMP66 plate so that the studs for mounting the display are positioned horizontally (i.e. left and the right).

Fit the display onto the studs on the plate and secure it with the locking nuts provided.

4.5.3 PIP66 pipe mounting kit

The PIP66 offers an alternative pipe mounting arrangement using a stainless steel bracket and U bolts. This is suitable for use on pipes of 35mm to 75mm diameter.

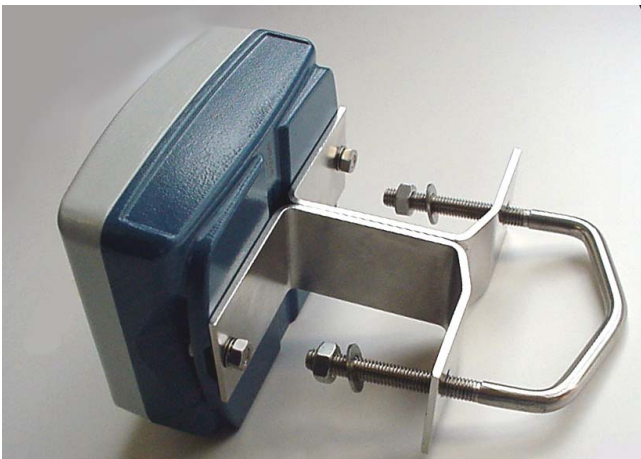


Figure 14 PIP66 kit used on MTL661 or MTL663

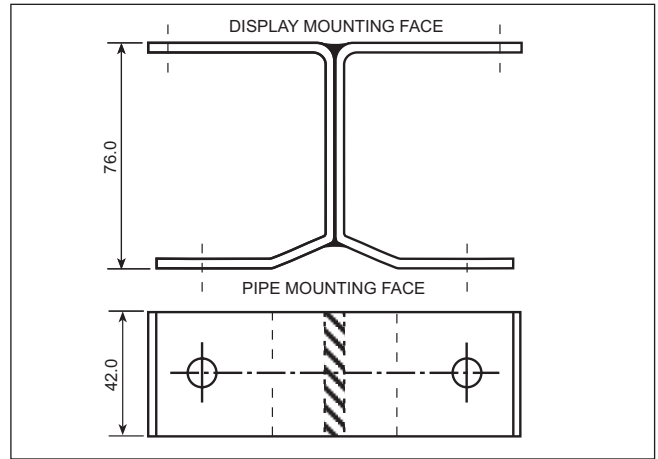


Figure 15 PIP66 kit - dimensions guide

4.5.4 Gas-tight panel mounting - MTL661/662/663

The standard front bexel attachment screws fitted to these displays will accommodate a panel thickness of up to 3mm.

Spare GAS660 gaskets are available if required.

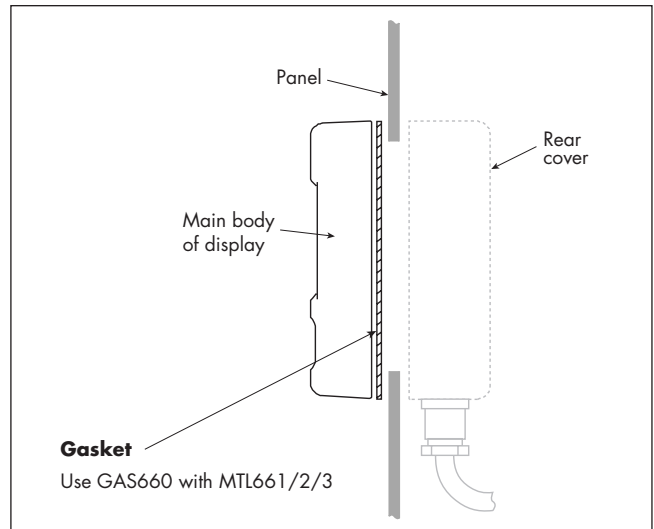


Figure 17 Panel-mounting MTL661/662/663 displays

4.5.5 Gas-tight panel mounting - MTL665

The panel mounting fixtures supplied with the MTL665 will accommodate panel thicknesses from 1mm to 6mm.

Spare GAS665 gaskets are available if required.

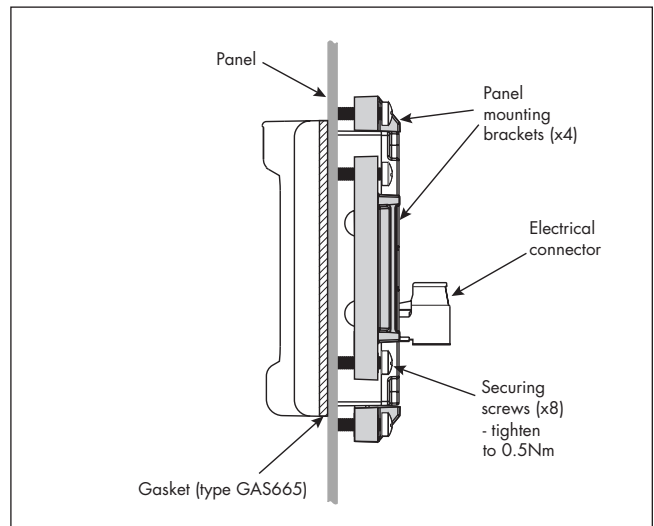


Figure 18 Panel-mounting MTL665 display

5 MAINTENANCE

5.1 General directions

- Mounting, electrical installation, start-up and maintenance of the instrument may only be carried out by trained personnel authorised by the operator of the facility. Personnel must read and understand this Operating Manual before carrying out its instructions.
- The MTL661/2/3/5 displays may only be operated by personnel who are authorised and trained by the operator of the facility. All instructions in this manual are to be observed.
- Ensure that the measuring system is correctly wired up according to the wiring diagrams. Protection against accidental contact is no longer assured when the housing cover is removed or the panel cabinet has been opened (danger from electrical shock). The housing may only be opened by trained personnel.
- Take careful notice of the "Safety rules, instructions and precautionary measures" in the front of this manual.

The MTL661/2/3/5 displays do not require special maintenance unless they are used in low-temperature applications or in surroundings with high humidity (i.e. above 90% of the annual mean). It is the users responsibility to take precautions to dehumidify the internal atmosphere of the MTL661/2/3/5 in such a way that no condensation will occur, for example by placing a sachet of dry silica-gel crystals in the casing just before closing it. Furthermore, it is required that the silica-gel be replaced or dried periodically as advised by the silica-gel supplier.

Check periodically:

- The condition of the casing, cable glands and front panel.
- The input/output wiring for reliability and ageing symptoms.
- The process accuracy. As a result of wear and tear, re-calibration of the sensor might be necessary. Do not forget to re-enter any subsequent Span alterations.
- Clean the casing with soapy-water. Do not use any aggressive solvents as these might damage the coating.

6 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 complements 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.

6.1 General

- This equipment 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 apparatus has been designed to meet the requirements of Intrinsically safe apparatus in accordance with EN 60079-0 and EN 60079-11 and is normally mounted in the hazardous area.
- This apparatus has been designed and manufactured so as to provide protection against all the relevant additional hazards referred to in Annex II of the directive, such as those in clause 1.2.7.

6.2 Installation

- The installation must comply with the appropriate European, national and local regulations, which may include reference to the CENELEC code of practice EN 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.

- This is IS apparatus and is normally mounted in a hazardous area. It meets the requirement of Category 1 apparatus and may be installed in a Zone 0 location, provided that the relevant installation requirements are met.
- Unless already protected by design, this equipment must be protected by a suitable enclosure against:
 - mechanical and thermal stresses in excess of those noted in the certification documentation and the product specification
 - aggressive substances, excessive dust, moisture and other contaminants.

Read also the Special Conditions for Safe Use (below) for any additional or more specific information.

Special Conditions of Safe Use

General

When the enclosure of the indicator is made of aluminium alloy, when used in a potentially explosive atmosphere requiring apparatus of equipment category 1G, the indicator shall be installed so that, even in the event of rare incidents, an ignition source due to impact or friction sparks between the enclosure and iron/steel is excluded.

MTL66x(B)-NA Zone 2

When several apparatus are installed in the same panel or enclosure, care must be taken that the surface temperature of any of those installed apparatus does not rise above the maximum surface temperature stated in the apparatus' certificate. The displays shall also be installed in such a way that the risk of mechanical damage is low.

6.3 Inspection and maintenance

- 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.
- Access to the internal circuitry must not be made during operation.
- 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.

6.4 Repair

- This product 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.

6.5 Marking

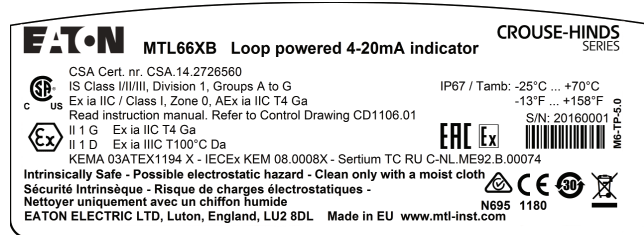
- The products are labelled in a manner reproduced on the following two pages. The serial number and date of manufacture are programmed into the apparatus (see Figure 16) and a printed date-mark is provided inside the unit. This manual applies to products manufactured and date marked during or after the year 2009.



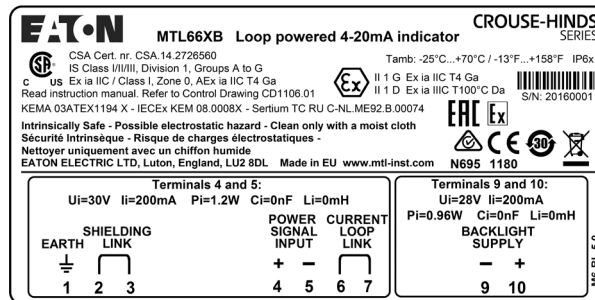
Figure 16: Display showing date and serial number

7 PRODUCT LABELLING

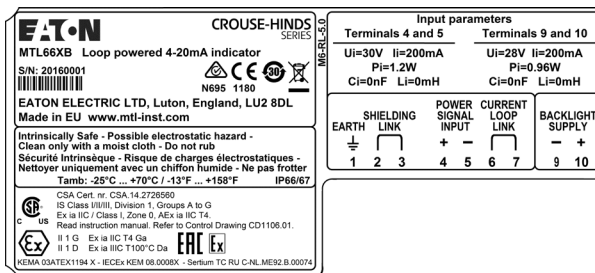
Example of top label for models MTL661(B), MTL662(B) and MTL663(B)



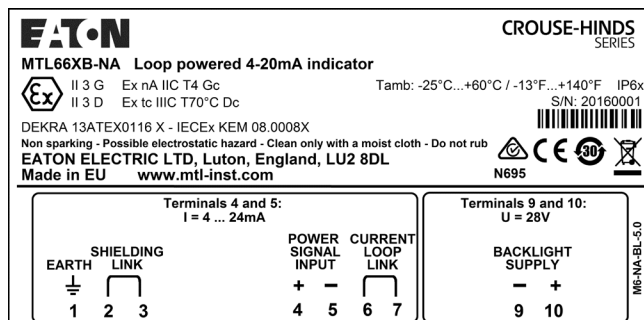
Example of rear label for models MTL661(B), MTL662(B) and MTL663(B)



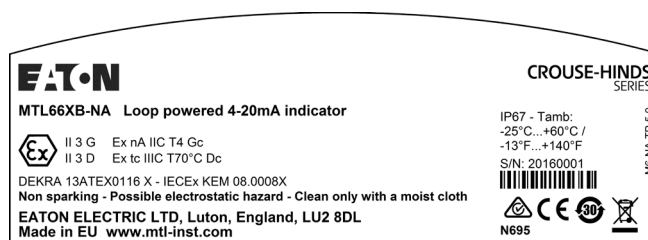
Example of rear label for model MTL665(B)



Example of inside label for model MTL66x(B)-NA



Example of top label for model MTL66x(B)-NA



8 CASE DETAILS

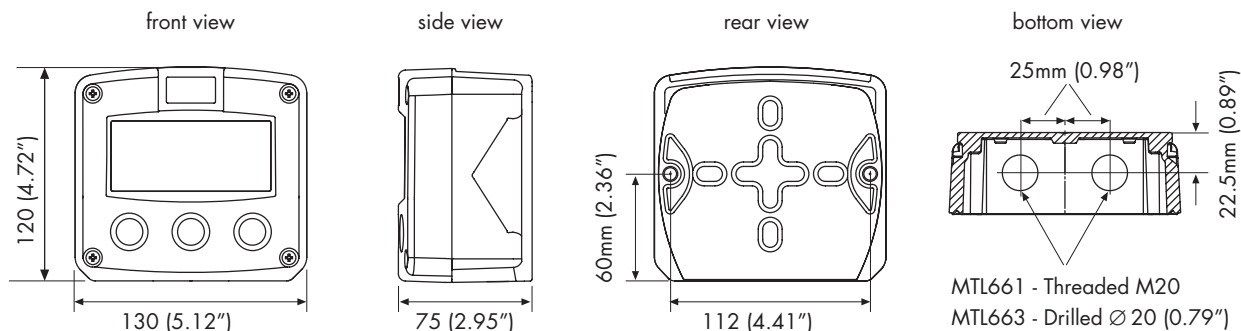
Refer to case outlines and dimensions below.

Order code	Type	Backlight	Case material	Weight (nom.)	Case style
MTL661 (-NA)	Field	No	Aluminium	825g	A
MTL661B (-NA)	Field	Yes	Aluminium	825g	A
MTL663	Field	No	GRP	500g	A
MTL663B	Field	Yes	GRP	500g	A

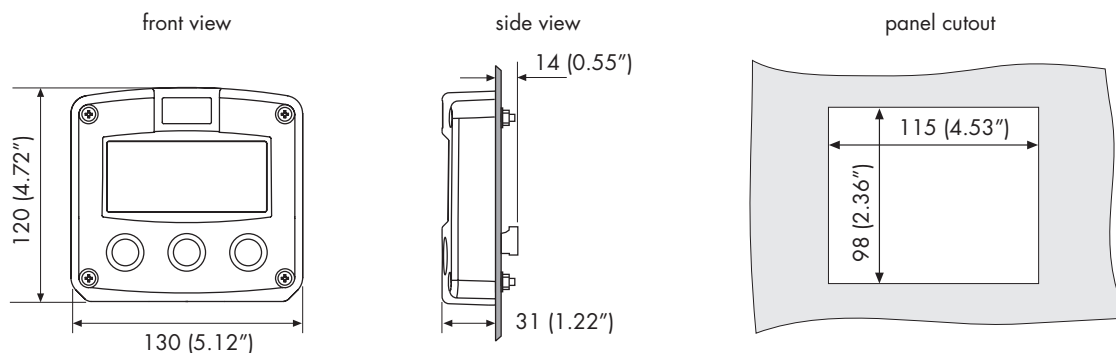
Refer to case outlines and dimensions below.

Order code	Type	Backlight	Case material	Weight (nom.)	Case style
MTL662 (-NA)	Panel	No	Aluminium	425g	B
MTL662B (-NA)	Panel	Yes	Aluminium	425g	B
MTL665	Panel	No	Aluminium	300g	C
MTL665B	Panel	Yes	Aluminium	300g	C

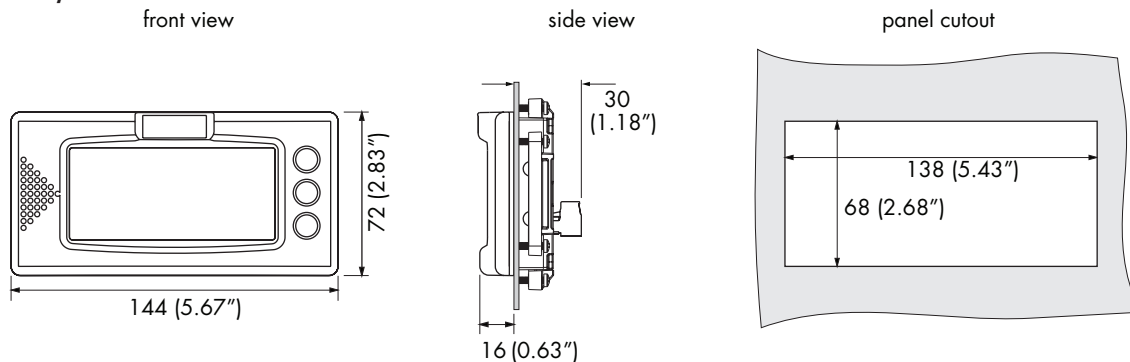
Case style 'A'



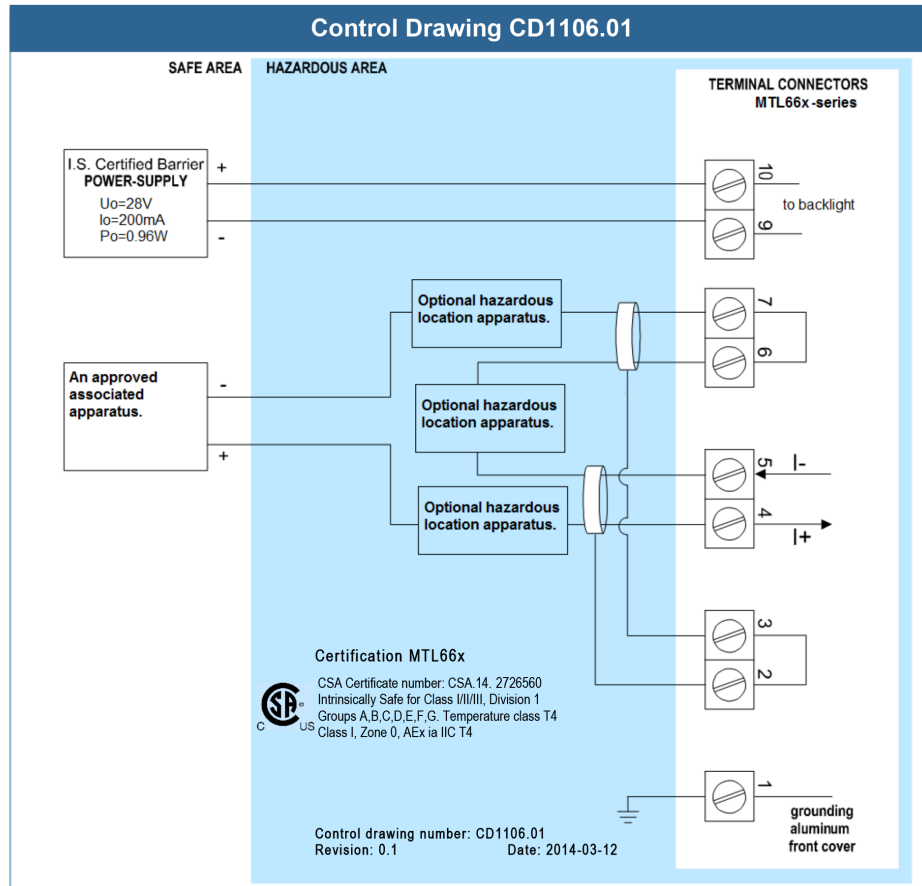
Case style 'B'



Case style 'C'



9 CSA CONTROL DRAWING



Pour plus de détails en français, veuillez vous référer à INM660-FR au www.mtl-inst.com

The installation must comply with national requirements (e.g. in Canada, the Canadian Electrical Code, Part 1 Appendix F and in the USA, the National Electrical Code, NFPA70, Article 504 and ANSI/ISA-RP 12.6)

L'installation doit être conforme aux exigences nationales (telles que le Code canadien de l'électricité, Partie 1, Annexe F au Canada le National Electrical Code aux États-Unis, ainsi que les normes NFPA-70, Article 504 et ANSI/ISA-RP 12.6)

Warning: Substitution of components may impair intrinsic safety

Avertissement: La substitution de composants peut compromettre la sécurité intrinsèque.

For the circuits connected to terminals 4 and 5, 9 and 10, the output parameters of the connected barriers or hazardous location apparatus must meet the following requirements:

- $V_{oc} \leq$ The lowest V_{max} of the CSA Certified apparatus in the circuit
- $I_{sc} \leq$ The lowest I_{max} of the CSA Certified apparatus in the circuit
- $P_{max} \leq$ The lowest P_{max} of the CSA Certified apparatus in the circuit
- $C_a \geq$ The sum of the cable capacitance and the internal capacitance C_i of each CSA Certified apparatus installed in the circuit
- $L_a \geq$ The sum of the cable inductance and the internal inductance L_i of each CSA Certified apparatus installed in the circuit

Hazardous Location Apparatus – switches, thermocouples or non-inductive resistance devices, or CSA - Certified Apparatus – should be connected in accordance with the manufacturer's installation instructions.

The cable parameters are determined by the parameters of the system into which the MTL66x – series General purpose Indicators are to be connected.

Terminals 1-3, 6-7 are passive, classified as 'non-energy storing' simple apparatus and can be inserted into any IS loop without recertification.

The entity parameters for the MTL66x – Series Loop Powered Displays are as follows:

Terminals 4 and 5 - input parameters

$$\begin{aligned} V_{max} &= 30V & C_i &= 0nF \\ I_{max} &= 200mA & L_i &= 0mH \\ P_{max} &= 1.2W \end{aligned}$$

Terminals 9 and 10 - input parameters (backlight)

$$\begin{aligned} V_{max} &= 28V & C_i &= 0nF \\ I_{max} &= 200mA & L_i &= 0mH \\ P_{max} &= 0.96W \end{aligned}$$

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-sales@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: csckperpen@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

Cooper Crouse-Hinds Pte Ltd
No 2 Serangoon North Avenue 5, #06-01 Fu Yu Building
Singapore 554911
Tel: +65 6645 9864 / 6645 9865 Fax: +65 6 487 7997
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: mtl-enquiry@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