June 1999

Compact and easily installed: the low cost per channel solution

MTL5000 SERIES

isolating IS interface units



Ex STOCK
Intrinsically safe products – **FAST**

Selected items within this Series are available in the UK through MTL's new express service

NEW RELEASES ON THE WEB SITE
REMEMBER check our website for the latest information
http://www.mtl-inst.com

CE

- **Straightforward 'clip-on' DIN-rail mounting**
- **Low cost per channel**
- **High packing densities**
- **Simplified installation and maintenance using plug-in connectors**

MTL5000 Series – the latest IS isolator range from MTL – makes system planning and installation as simple as possible.

The MTL5000 Series provides all common functions, so that most installations can be designed easily around MTL5000.

The MTL5000 clips quickly onto DIN rail, so it is compatible with the industry-standard mounting system. Wiring is simplified by plug-in safe- and hazardous-area connectors, and a power plug which accepts a power bus; it all leads to quicker insertion, fewer wiring errors and trouble-free, tidier installations.

Where space is at a premium, especially offshore, isolation must be discreet. With a unit width of 16mm, and with many units providing multiple channels (and hence a lower cost per channel), the MTL5000 Series takes up a minimum of space – which leaves more for other process control equipment.

Where older installations are being updated, there may be a need for more channels – but within the existing space. The MTL5000 Series can provide the answer, fitting extra units and channels into a space formerly occupied by bulkier isolators.

The MTL5000 Series is designed for reliability. It builds on the proven success of the MTL2000, 3000 and 4000 Series to bring the benefits of new developments in galvanic isolation. It is designed from the outset to meet all relevant European Directives.

New products for 1998 are:

MTL5011B Switch proximity detector interface
MTL5012 Switch proximity detector interface
MTL5014 Switch proximity detector interface
MTL5015 Switch proximity detector interface
MTL5018 Switch proximity detector interface
MTL5040 Loop isolator
MTL5043 Repeater power supply
MTL5051 Serial-data comms isolator
MTL5074 Temperature converter
MTL5081 Millivolt isolator
MTL5118 Switch proximity detector interface
MTL5314 Trip amplifier
MTL5000 Series accessories
MTL5000 Series enclosures

Telematic Ltd offers a range of surge protection devices which is compatible with these isolators.

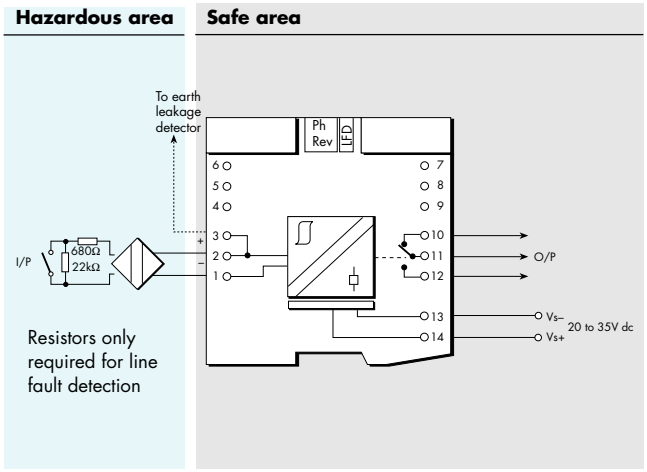
Ask for the SD Series data sheet!

Measurement Technology Limited Power Court, Luton, Bedfordshire, England LU1 3JJ
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283 E-mail: enquiry@mtl-inst.com Web site: http://www.mtl-inst.com
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MTL5011B SWITCH/ PROXIMITY DETECTOR INTERFACE

single-channel, with line fault detection and phase reversal

The MTL5011B enables a safe-area load to be controlled by a switch or proximity detector located in a hazardous area. A relay output is provided. Phase reversal control allows an alarm condition to be signalled for either state of the sensor. A selectable line fault detect (LFD) facility detects an open or short circuit in the field circuit.



Terminal	Function
1	Input –ve
2	Input +ve
3	Earth leakage detection
10	Normally-closed contact
11	Common
12	Normally-open contact
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One

Location of switch
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detector
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
One relay with changeover contacts

Hazardous-area input
Input conforming to NAMUR/DIN 19234 standards for proximity detectors

Voltage applied to sensor
7 to 9V from 1kΩ ±10%

Input/output characteristics
Normal (reverse) phase:
output energised (de-energised) if I_{in} >2.1mA or R_{in} <2kΩ
output de-energised (energised) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 200µA, typical

Line fault detection (LFD)
User-selectable, via switches on the top of unit. Line faults are indicated by an LED. A detected line fault de-energises the relay.
Open-circuit alarm on if I_{in}<100µA
Open-circuit alarm off if I_{in}>250µA
Short-circuit alarm on if R_{in}<100Ω
Short-circuit alarm off if R_{in}>360Ω
Note: Resistors must be fitted when using the LFD facility; with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch

Phase reversal
User-selectable, via switches on the top of unit.

Relay type
Single-pole changeover relay
Note: reactive loads must be adequately suppressed

Relay characteristics

Response time:	10ms maximum
Contact rating:	250V ac, 2A, cosø >0.7
	40V dc, 2A, resistive load

LED indicators
Green: power indication
Yellow: status of channel (on when outputs are energised)
Red: LFD indication (on when line fault detected)

Maximum current consumption
40mA at 20V
35mA at 24V
25mA at 35V

Maximum power dissipation
0.75W at 24V
0.8W at 35V

Isolation
250V ac or dc between power supply, hazardous-area circuits and relay outputs

Safety description (each channel)
10.5V, 800Ω, 14mA, U_m = 250V rms or dc

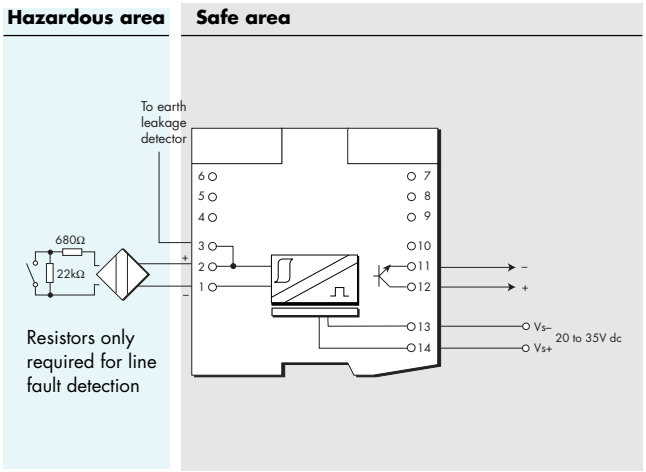
See also MTL5000 Series common specification, cable parameters and approvals

Measurement Technology Limited Power Court, Luton, Bedfordshire, England LU1 3JJ
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283 E-mail: enquiry@mtl-inst.com Web site: http://www.mtl-inst.com
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MTL5012 SWITCH/ PROXIMITY DETECTOR INTERFACE

single-channel, with line fault detection and phase reversal

The MTL5012 enables a solid-state output in the safe area to be controlled by a switch or proximity detector located in the hazardous area. Independent output phase reversal and line fault detection are provided.



Terminal	Function
1	Input –ve
2	Input +ve
3	Earth leakage detection
11	Output –ve
12	Output +ve
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One

Location of switch
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detector
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Floating solid-state output compatible with logic circuits

Hazardous-area input
Input conforming to NAMUR/DIN 19234 standards for proximity detectors

Voltage applied to sensor
7 to 9V from 1kΩ ±10%

Input/output characteristics
Normal (reverse) phase:
output on (off) if I_{in} >2.1mA or R_{in} <2kΩ
output off (on) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 200µA, typical

Line fault detection (LFD)
User-selectable. Line faults are indicated by an LED. A detected line fault switches off the output.
Open-circuit alarm on if I_{in}<50µA
Open-circuit alarm off if I_{in}>150µA
Short-circuit alarm on if R_{in}<100Ω
Short-circuit alarm off if R_{in}>360Ω
Note: Resistors must be fitted when using the LFD facility with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch

Phase reversal
User-selectable

Output characteristics

Operating frequency:	dc to 5kHz
Max. off-state voltage:	35V
Max. off-state leakage current:	10µA
Max. on-state voltage drop:	1 + (0.13 x current in mA) V
Max. on-state current:	50mA

LED indicators
Green: power indication
Yellow: status (on when output is on)
Red: LFD indication (on when line fault detected)

Maximum current consumption
28mA at 20V
30mA at 24V
32mA at 35V

Maximum power dissipation
0.8W at 24V
1.2W at 35V

Isolation
250V ac or dc between power supply, input and output

Safety description
10.5V, 800Ω, 14mA, U_m = 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

MTL5014 SWITCH/ PROXIMITY DETECTOR INTERFACE

single-channel, dual-output, with phase reversal and line fault detection

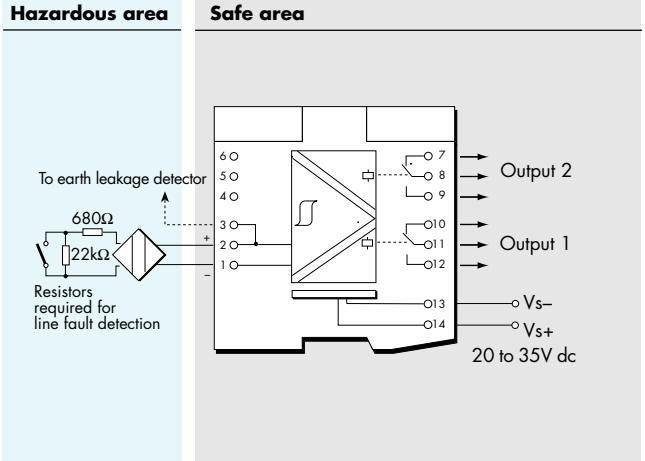
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The MTL5014 enables two safe-area loads to be controlled by a single switch or proximity detector located in the hazardous area. The safe-area interface has two changeover relays: output 1 and output 2. The output 1 relay reflects the status of the input and may be configured to operate in reverse phase. The output 2 relay may be configured either to repeat (slave) the output 1 relay, or to act as a line integrity monitor. A selectable line-fault-detect (LFD) facility enables an open- or short-circuit fault to be detected in the field wiring.

SPECIFICATION

See also common specification

Number of channels
One
Location of switches
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location
Location of proximity detectors
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location
Safe-area output
Two relays with changeover contacts
Hazardous-area input
One input conforming to NAMUR/DIN 19234 standards for proximity detectors
Voltage applied to sensor
7.0 to 9.0V from 1kΩ ±10%
Input/output characteristics
Normal (reverse) phase:
output relay energised (de-energised) if I_{in} >2.1mA or R_{in} <2kΩ
output relay de-energised (energised) if I_{in} <1.2mA or R_{in} <10kΩ
Hysteresis: 250µA typical
Phase reversal
User selectable
Relay type
Single pole, changeover contacts
Note: reactive loads must be adequately suppressed
Relay characteristics
Response time: 10ms maximum
Contact rating: 250V ac, 2A, cosø >0.7
40V dc, 2A, resistive load
Contact life expectancy: 3 x 10^5 operations at maximum load
Line fault detection (LFD)
User selectable: Off or On
A detected line fault de-energises Output 1 relay
Open circuit alarm on if I_{in} < 100µA
Short circuit alarm on if I_{in} > 6.5mA
Note: Resistors must be fitted when using the LFD facility with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch
Output 2 mode
User selectable: Slave or LFD mode
In LFD mode, a line fault de-energises Output 2 relay
Open circuit alarm on if I_{in} < 100µA
Short circuit alarm on if I_{in} > 6.5mA
See note above on use of resistors
In Slave mode output 2 repeats output 1
Power supply failure protection
Relays de-energised if supply fails



Terminal	Function
1	Input –ve
2	Input +ve
3	Earth leakage detection
7	Normally closed (output 2)
8	Common (output 2)
9	Normally open (output 2)
10	Normally closed (output 1)
11	Common (output 1)
12	Normally open (output 1)
13	Supply –ve
14	Supply +ve

LED indicators
Green: power indication
Yellow: illuminated when output 1 is energised
Red: illuminated when LFD is selected and there is an open or short circuit in the field wiring
Supply voltage
20 to 35V dc
Maximum current consumption
45mA at 24V
50mA at 20V
35mA at 35V
Maximum power dissipation within unit
1.1W at 24V
1.3W at 35V
Safety description
10.5V, 800Ω, 14mA, U_m= 250V rms or dc

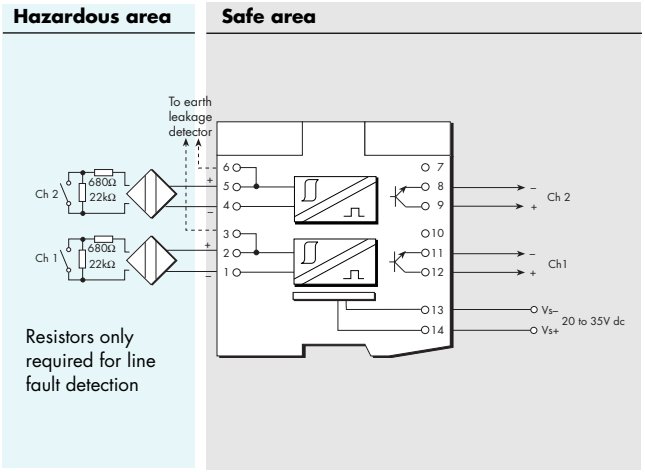
See also MTL5000 Series common specification, cable parameters and approvals

MTL5015 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel, with line fault detection and phase reversal

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The MTL5015 enables two solid-state outputs in the safe area to be controlled by two switches or proximity detectors located in the hazardous area. Independent output phase reversal and line fault detection are provided for each output.



Terminal	Function
1	Input –ve (Ch 1)
2	Input +ve (Ch 1)
3	Earth leakage detection
4	Input –ve (Ch 2)
5	Input +ve (Ch 2)
6	Earth leakage detection
8	Output –ve (Ch 2)
9	Output +ve (Ch 2)
11	Output –ve (Ch 1)
12	Output +ve (Ch 1)
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
Two

Location of switches
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detectors
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area outputs
Floating solid-state outputs compatible with logic circuits

Hazardous-area inputs
Inputs conforming to NAMUR/DIN 19234 standards for proximity detectors

Voltage applied to sensor
7 to 9V from 1kΩ ±10%

Input/output characteristics
Normal (reverse) phase:
output on (off) if I_{in} >2.1mA or R_{in} <2kΩ
output off (on) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 200µA, typical

Line fault detection (LFD)
User-selectable. Line faults are indicated by an LED for each channel. A detected line fault switches off the output.
Open-circuit alarm on if I_{in}<50µA
Open-circuit alarm off if I_{in}>150µA
Short-circuit alarm on if R_{in}<100Ω
Short-circuit alarm off if R_{in}>360Ω
Note: Resistors must be fitted when using the LFD facility with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch

Phase reversal
Independent for each channel, user-selectable

Output characteristics

Operating frequency:	dc to 5kHz
Max. off-state voltage:	35V
Max. off-state leakage current:	10µA
Max. on-state voltage drop:	1 + (0.13 x current in mA) V
Max. on-state current:	50mA

LED indicators
Green: power indication
Yellow: two: status of each channel (on when outputs are on)
Red: two: LFD indication for each channel (on when line fault detected)

Maximum current consumption
42mA at 20V
44mA at 24V
46mA at 35V

Maximum power dissipation
1.1W at 24V
1.6W at 35V

Isolation
250V ac or dc between power supply, hazardous-area circuits and each output. 30V between hazardous-area circuits.

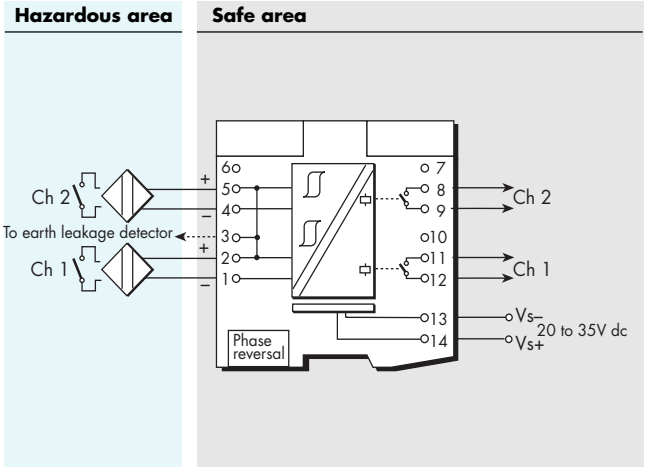
Safety description (each channel)
10.5V, 800Ω, 14mA, U_m = 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

MTL5016 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel with phase reversal

The MTL5016 enables two safe-area loads to be controlled by two switches or proximity detectors located in a hazardous area. Two single-pole relay outputs are provided. Independent phase reversal control is available on each channel, allowing an alarm condition (output open) to be signalled for either state of the sensor.



Terminal	Function
1	Input –ve (channel 1)
2	Input +ve (channel 1)
3	Earth leakage detection
4	Input –ve (channel 2)
5	Input +ve (channel 2)
8	Output (channel 2)
9	Output (channel 2)
11	Output (channel 1)
12	Output (channel 1)
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
Two

Location of switches
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detectors
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Two relays with normally-open contacts signal status of inputs

Hazardous-area input
Two inputs conforming to NAMUR/DIN 19234 standards for proximity detectors

Voltage applied to sensor
7.0 to 9.0V from 1kΩ ±10%

Output characteristics
Normal (reverse) phase: output relay closed (open) if I_{in} >2.1mA or R_{in} <2kΩ
output relay open (closed) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 250µA typical

Phase reversal
Independent for each channel, selected by switches on the base of the module

Relay type
Single pole, normally-open contacts.
Note: reactive loads must be adequately suppressed.

Relay characteristics
Response time: 2ms maximum
Contact rating: 10VA, 45mA, 250V ac
10W, 0.5A, 220V dc
Contact life expectancy: 10^7 operations at maximum load

LED indicators
Green: power indication
Yellow: two: status of each channel (on when relevant output relay is closed)

Supply voltage
20 to 35V dc

Maximum current consumption
40mA at 24V
45mA at 20V
35mA at 35V

Maximum power dissipation within unit
0.9W at 24V
1.1W at 35V

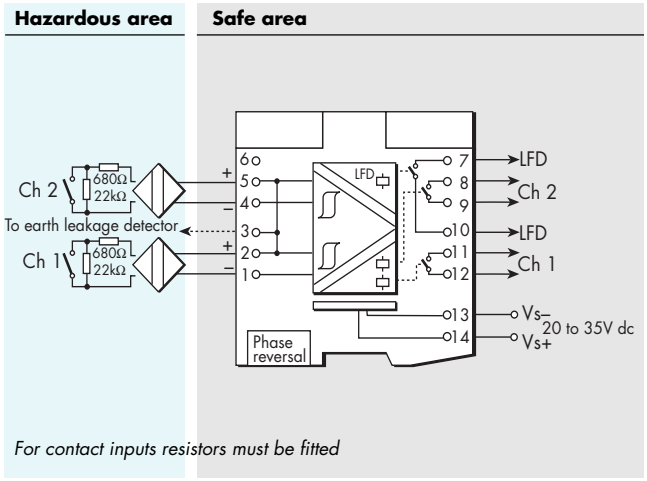
Safety description (each channel)
10.5V, 800Ω, 14mA, U_m= 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

MTL5017 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel, with line fault detection and phase reversal

The MTL5017 enables two safe-area loads to be controlled by two switches or proximity detectors located in a hazardous area. Two single-pole relay outputs are provided. Independent phase reversal control is available on each channel, allowing an alarm condition (output open) to be signalled for either state of the sensor. The automatic line fault detect (LFD) facility detects an open or short circuit in either field circuit.



For contact inputs resistors must be fitted

SPECIFICATION

See also common specification

Number of channels
Two

Location of switches
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detectors
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Two relays with normally-open contacts signal status of input
An additional relay signals line faults

Hazardous-area input
Two inputs conforming to NAMUR/DIN 19234 standards for proximity detectors
Resistors must be fitted externally to contact inputs: 500Ω to 1kΩ in series with the switch, 20kΩ to 25kΩ in parallel with the switch.

Voltage applied to sensor
7.0 to 9.0V from 1kΩ ±10%

Output characteristics
Normal (reverse) phase: output relay closed (open) if I_{in} >2.1mA or R_{in} <2kΩ
output relay open (closed) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 250µA typical

Line fault detection (LFD)
Line faults are indicated by an LED and a safe-area relay. When a line fault is detected, the relay opens and the LED lights.
Open-circuit alarm on if I_{in}<100µA
Open-circuit alarm off if I_{in}>250µA
Short-circuit alarm on if R_{in}<100Ω
Short-circuit alarm off if R_{in}>360Ω
Note: Resistors must be fitted when using the LFD facility; with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch

Phase reversal
Independent on each channel, selected by switches on the base of the unit

Relay type
Single-pole, normally-open contacts.
Note: reactive loads must be adequately suppressed.

Relay characteristics
Response time: 2ms maximum
Contact rating: 10VA, 45mA, 250V ac
10W, 0.5A, 220V dc
Contact life expectancy: 10^7 operations at maximum load

LED indicators
Green: power indication
Yellow: two: status of each channel, on when output relay is closed
Red: two: line fault detected in channel 1/channel 2

Supply voltage
20 to 35V dc

Maximum current consumption
50mA at 24V
55mA at 20V
40mA at 35V

Terminal	Function
1	Input –ve (channel 1)
2	Input +ve (channel 1)
3	Earth leakage detection
4	Input –ve (channel 2)
5	Input +ve (channel 2)
7	Line fault detection
8	Output (channel 2)
9	Output (channel 2)
10	Line fault detection
11	Output (channel 1)
12	Output (channel 1)
13	Supply –ve
14	Supply +ve

Maximum power dissipation within unit
1.1W at 24V
1.25W at 35V

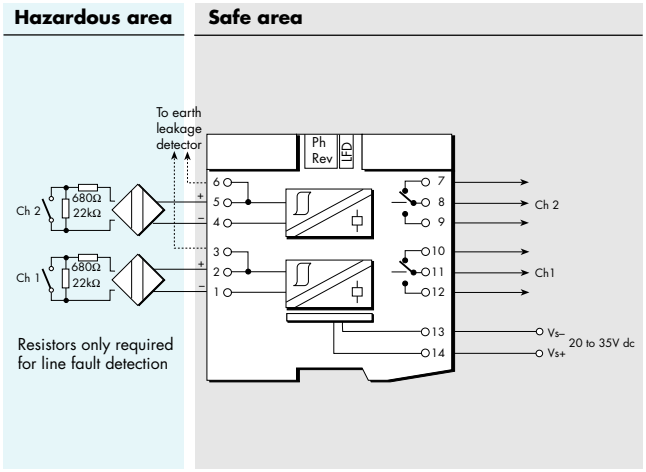
Safety description (each channel)
10.5V, 800Ω, 14mA, U_m = 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

MTL5018 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel, with line fault detection and phase reversal

The MTL5018 enables two safe-area loads to be controlled by two switches or proximity detectors located in a hazardous area. Two relay outputs are provided. Independent phase reversal control allows an alarm condition to be signalled for either state of the sensor. A selectable line fault detect (LFD) facility detects an open or short circuit in either field circuit.



SPECIFICATION

See also common specification

Number of channels
Two

Location of switches
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detector
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Two relays with changeover contacts

Hazardous-area inputs
Inputs conforming to NAMUR/DIN 19234 standards for proximity detectors

Voltage applied to sensor
7 to 9V from 1kΩ ±10%

Input/output characteristics
Normal (reverse) phase:
output energised (de-energised) if I_{in} >2.1mA or R_{in} <2kΩ
output de-energised (energised) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 200µA, typical

Line fault detection (LFD)
User-selectable. Line faults are indicated by an LED for each channel. A detected line fault de-energises the relay.
Open-circuit alarm on if I_{in}<100µA
Open-circuit alarm off if I_{in}>250µA
Short-circuit alarm on if R_{in}<100Ω
Short-circuit alarm off if R_{in}>360Ω
Note: Resistors must be fitted when using the LFD facility; with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch

Phase reversal
Independent for each channel, user-selectable

Relay type
Single pole, changeover contacts
Note: reactive loads must be adequately suppressed

Relay characteristics

Response time:	10ms maximum
Contact rating:	250V ac, 2A, cosø >0.7
	40V dc, 2A, resistive load

LED indicators
Green: power indication
Yellow: two: status of each channel (on when outputs are energised)
Red: two: LFD indication for each channel (on when line fault detected)

Maximum current consumption
60mA at 20V
60mA at 24V
40mA at 35V

Maximum power dissipation
1.4W at 24V
1.5W at 35V

Isolation
250V ac or dc between power supply, hazardous-area circuits and relay outputs

Safety description (each channel)
10.5V, 800Ω, 14mA, U_m= 250V rms or dc

Terminal	Function
1	Input –ve (Ch 1)
2	Input +ve (Ch 1)
3	Earth leakage detection
4	Input –ve (Ch 2)
5	Input +ve (Ch 2)
6	Earth leakage detection
7	Normally-closed contact (Ch 2)
8	Common (Ch 2)
9	Normally-open contact (Ch 2)
10	Normally-closed contact (Ch 1)
11	Common (Ch 1)
12	Normally-open contact (Ch 1)
13	Supply –ve
14	Supply +ve

See also MTL5000 Series common specification, cable parameters and approvals

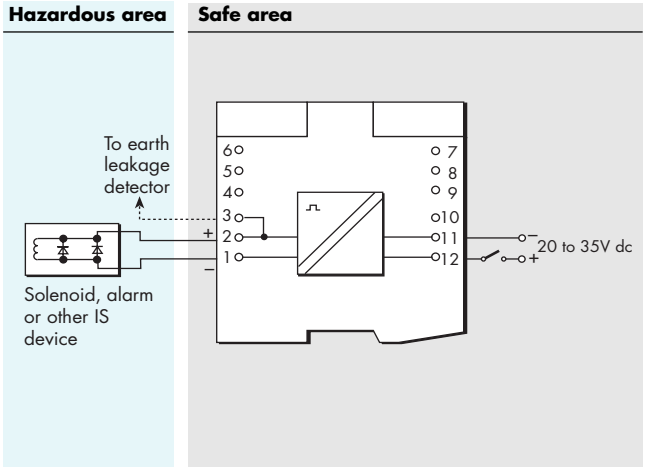
Measurement Technology Limited Power Court, Luton, Bedfordshire, England LU1 3JJ
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283 E-mail: enquiry@mtl-inst.com Web site: http://www.mtl-inst.com
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MTL5021 SOLENOID/ ALARM DRIVER

loop-powered, IIC

CE

The MTL5021 enables a device located in the hazardous area to be controlled by a switch in the safe area. The MTL5021 can drive a certified intrinsically safe low-power load, as well as non-energy-storing simple apparatus such as an LED. The unit's input/output isolation allows the control switch to be connected into either side of the 24V dc supply circuit.



Terminal	Function
1	Output –ve
2	Output +ve
3	Earth leakage detection
11	Supply –ve
12	Supply +ve

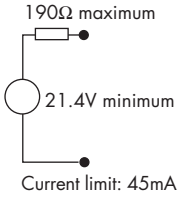
SPECIFICATION

See also common specification

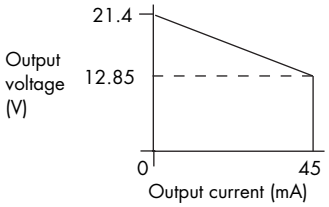
Number of channels
One

Location of load
Zone 0, IIC, T4—6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Equivalent circuit



Minimum output voltage



LED indicator
Yellow: status

Input voltage
20 to 35V dc

Hazardous-area output
Minimum output voltage: 12.85V at 45mA
Maximum output voltage: 24V from 170Ω
Current limit: 45mA

Maximum current consumption (with 45mA output)
90mA at 24V
110mA at 20 to 35V dc

Maximum power dissipation within unit
1.4W at 24V typical
1.8W at 35V maximum

Safety description
25V, 170Ω, 147mA, U_m = 250V rms or dc

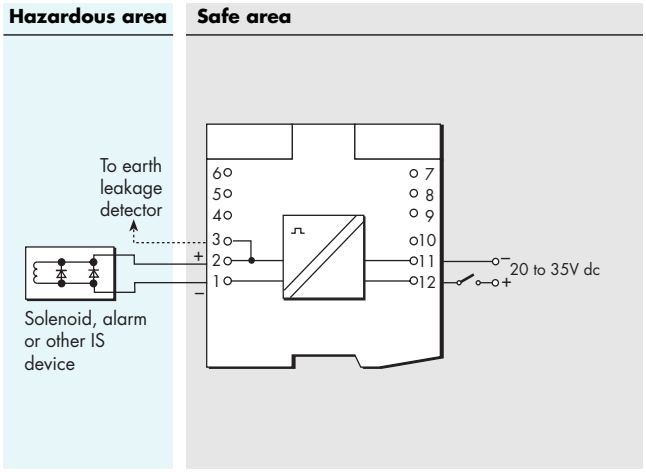
See also MTL5000 Series common specification, cable parameters and approvals

MTL5022 SOLENOID/ ALARM DRIVER

loop-powered, IIB

CE

The MTL5022 enables a device located in the hazardous area to be controlled by a switch or voltage change in the safe area. The MTL5022 can drive any certified intrinsically safe low-power load, as well as non-energy-storing simple apparatus such as an LED. The unit's input/ output isolation allows the control switch to be connected into either side of the 24V dc supply circuit.



Terminal	Function
1	Output –ve
2	Output +ve
3	Earth leakage detection
11	Supply –ve
12	Supply +ve

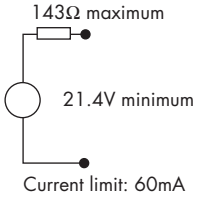
SPECIFICATION

See also common specification

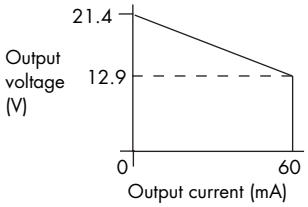
Number of channels
One

Location of load
Zone 0, IIB, T4–6 hazardous area if suitably certified
Div. 1, Group C hazardous location

Equivalent circuit



Minimum output voltage



LED indicator
Yellow: status

Input voltage
20 to 35V dc

Hazardous-area output
Minimum output voltage: 12.9V at 60mA
Maximum output voltage: 24V from 133Ω
Current limit: 60mA

Maximum current consumption (with 60mA output)
115mA at 24V, typical
135mA at 20 to 35V dc, maximum

Maximum power dissipation within unit
1.5W at 24V
2.1W at 35V

Safety description
25V, 135Ω, 185mA, U_m = 250V rms or dc

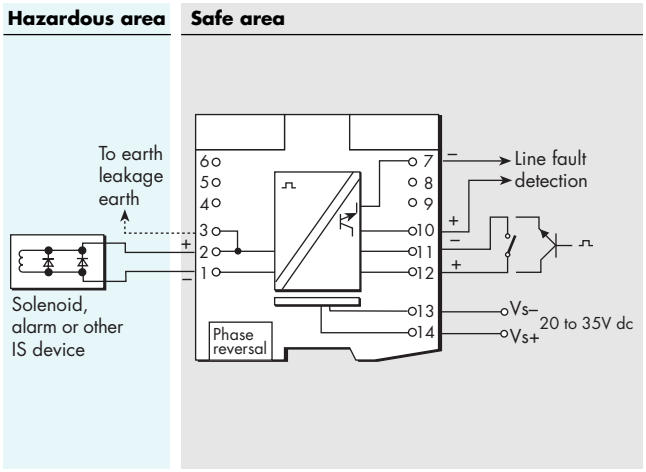
See also MTL5000 Series common specification, cable parameters and approvals

MTL5023 SOLENOID/ ALARM DRIVER

powered, with line fault detection and phase reversal

CE

The MTL5023 enables a device located in the hazardous area to be controlled by a volt-free contact or logic signal in the safe area. It is suitable for driving loads such as solenoids, alarms and other low-powered devices. A line fault is signalled in the safe area by a solid-state switch which de-energises if a field line is open- or short-circuited.



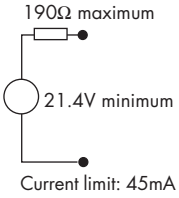
SPECIFICATION

See also common specification

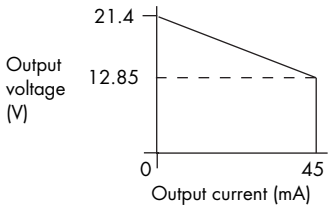
Number of channels
One

Location of load
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Equivalent circuit



Minimum output voltage



Hazardous-area output
Minimum voltage: 12.85V at 45mA
Maximum voltage: 25V
Current limit: 45mA

Output ripple
100mV peak-to-peak maximum

Control input
Normal (reverse) phase: Output turns on (off) if input switch closed, transistor on or <1.4V applied across terminals 12 and 11
Output turns off (on) if input switch open, transistor off or >4.5V applied across terminals 12 and 11

Output response time
Within 10% of final value within 50ms

Line fault detection
Open or short circuit in the field de-energises solid-state line-fault signal.
No line fault will be signalled while the field-circuit impedance stays within the range 50Ω to 7kΩ.

Line fault signal characteristics
Maximum off-state voltage: 35V
Maximum off-state leakage current: 10µA
Maximum on-state voltage drop: [1 + (0.08 x current in mA)] V
Maximum on-state current: 50mA

Phase reversal
Selected via a switch on the base of the module

Terminal	Function
1	Output –ve
2	Output +ve
3	Earth leakage detection
7	Line fault signal –ve
10	Line fault signal +ve
11	Control –ve
12	Control +ve
13	Supply –ve
14	Supply +ve

LED indicator
Green: power indication
Yellow: status, on when output circuit is active
Red: line fault detected

Supply voltage
20 to 35V dc

Maximum current consumption
100mA at 24V
120mA at 20V
80mA at 35V

Maximum power dissipation within unit
1.4W with typical solenoid valve, output on
2.0W worst case

Safety description
25V, 170Ω, 147mA, U_m = 250V rms or dc

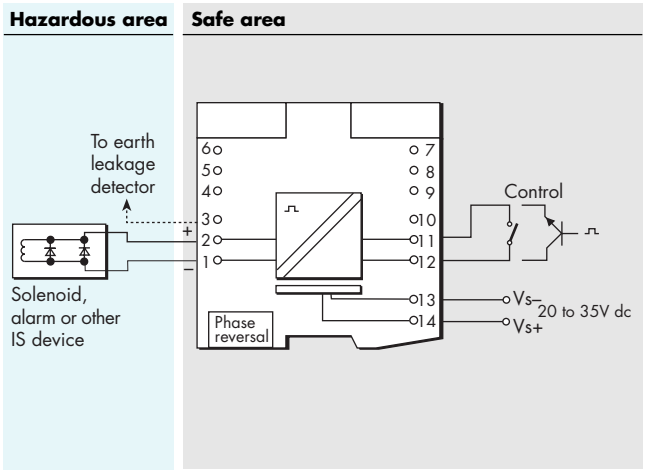
See also MTL5000 Series common specification, cable parameters and approvals

MTL5024 SOLENOID/ ALARM DRIVER

powered, logic drive with phase reversal

CE

The MTL5024 allows an on/off device in a hazardous area to be controlled by a volt-free contact or logic signal in the safe area. The MTL5024 is suitable for driving loads such as solenoids, alarms, LEDs and other low-powered devices certified as intrinsically safe or classified as non-energy-storing simple apparatus. A phase reversal switch enables the user to select which phase of input signal will drive the output on.



Terminal	Function
1	Output –ve
2	Output +ve
3	Earth leakage detection
11	Control –ve
12	Control +ve
13	Supply –ve
14	Supply +ve

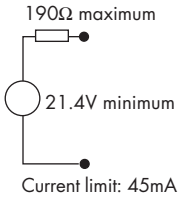
SPECIFICATION

See also common specification

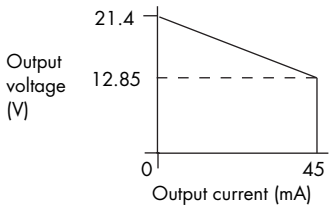
Number of channels
One

Location of load
Zone 0, IIC, T4–6 hazardous location if suitably certified
Div. 1, Group A hazardous location

Equivalent circuit



Minimum output voltage



Safe-area input
Suitable for switch contacts, an open-collector transistor or logic drive.
Normal (reverse) phase: output on (off) if switch closed, transistor on or <1.4V applied to input
output off (on) if switch open, transistor off or >4.5V applied to input

Hazardous-area output
Minimum output voltage: 12.85V at 45mA
Maximum output voltage: 25V
Current limit: 45mA

Phase reversal
Selected by a switch on the base of the module

LED indicators
Green: power indication
Yellow: status

Supply voltage
20 to 35V dc

Maximum current consumption
100mA at 24V
120mA at 20V dc
75mA at 35V dc

Maximum power dissipation within unit
1.4W with typical solenoid valve, output on
2.0W worst case

Safety description
25V, 170Ω, 147mA, U_m = 250V rms or dc

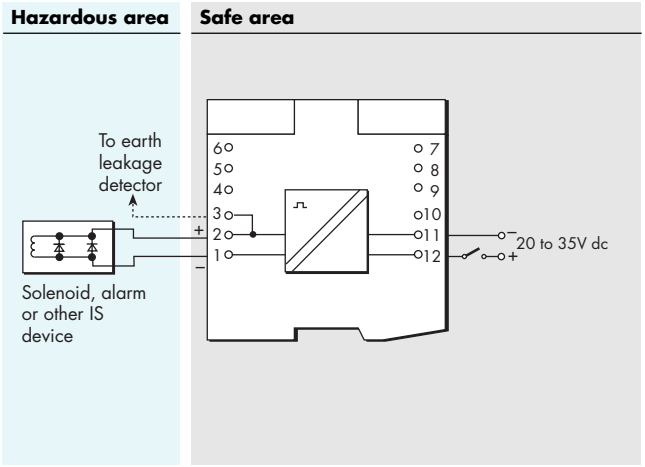
See also MTL5000 Series common specification, cable parameters and approvals

MTL5025 SOLENOID/ ALARM DRIVER

low-current loop-powered, IIC

CE

The MTL5025 enables an on/off device located in the hazardous area to be controlled by a switch or voltage change in the safe area. It can drive any certified intrinsically safe low-power load, as well as non-energy-storing simple apparatus such as an LED.



Terminal	Function
1	Output –ve
2	Output +ve
3	Earth leakage detection
11	Supply –ve
12	Supply +ve

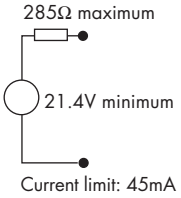
SPECIFICATION

See also common specification

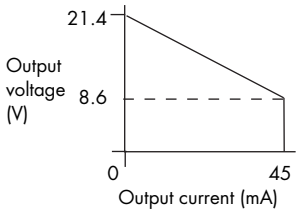
Number of channels
One

Location of load
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Equivalent circuit



Minimum output voltage



LED indicator
Yellow: status

Hazardous-area output

Minimum output voltage:	8.6V at 45mA
Maximum output voltage:	24V from 269Ω
Current limit:	45mA

Input voltage
20 to 35V dc

Maximum current consumption (with 45mA output)
90mA at 24V
110mA, 20 to 35V dc

Maximum power dissipation within unit
1.6W at 24V
2.0W at 35V

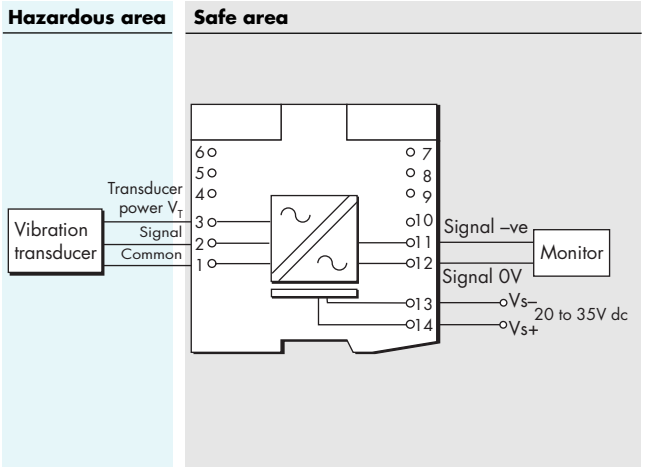
Safety description
25V, 269Ω, 93mA, U_m = 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

MTL5031 VIBRATION TRANSDUCER INTERFACE

CE

The MTL5031 repeats a signal from a vibration sensor in a hazardous area, providing an output for a monitoring system in the safe area. The interface is compatible with 3-wire eddy-current probes and accelerometers.



SPECIFICATION

See also common specification

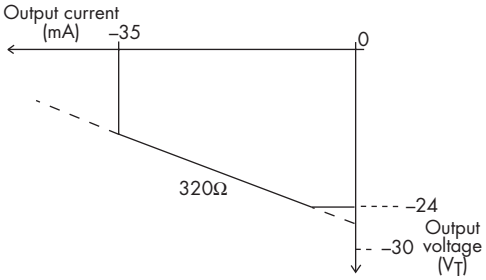
Number of channels
One

Location of signal source
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Output impedance
(terminals 11 and 12): <20Ω

Hazardous-area input
Input impedance
(terminals 1 and 2): 10kΩ –1%, +2%

Transducer supply voltage (terminals 3 and 1)



Signal range (terminals 1 and 2, 11 and 12)
Minimum –20V, maximum –0.5V, for dc transfer error <±100mV

DC transfer accuracy at 20°C
<±100mV

AC transfer accuracy at 20°C
0Hz to 1kHz: ±1%
1kHz to 10kHz: –5% to +1%
10kHz to 20kHz: –10% to +1%

Temperature coefficient
±50ppm/°C (10 to 65°C)
±100ppm/°C (–20 to 10°C)

Voltage bandwidth
–3dB at 43kHz (typical)

Phase response
<14µs, equivalent to:
–1° at 200Hz
–3° at 600Hz
–5° at 1kHz
–50° at 10kHz
–100° at 20kHz

LED indicator
Green: power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with 22mA transducer load)
80mA at 24V
88mA at 20V
63mA at 35V

Terminal	Function
1	Common
2	Signal
3	Transducer power V_T
11	Signal –ve
12	Signal 0V
13	Supply –ve
14	Supply +ve

Maximum power dissipation within unit
<1.7W

Safety description

Terminals 3 to 1
26.6V, 94mA, 0.66W

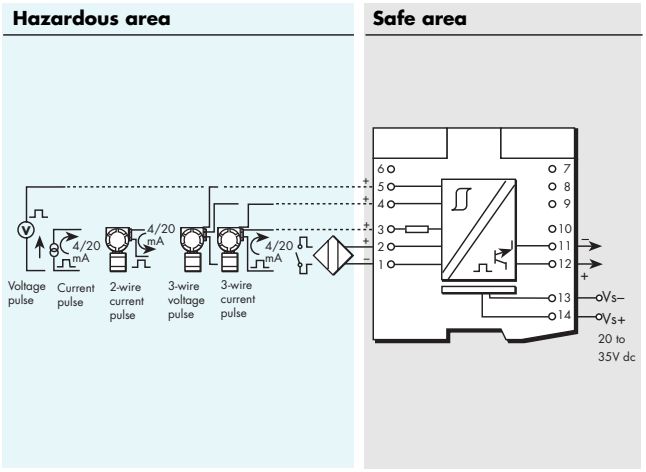
Terminals 2 to 1
Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ and ≤25mW

See also MTL5000 Series common specification, cable parameters and approvals

MTL5032 PULSE ISOLATOR

CE

The MTL5032 isolates pulses from a switch, proximity detector, current pulse transmitter or voltage pulse transmitter located in a hazardous area.



Terminal	Function
1	Common –ve
2	Proximity detector +ve
3	Current +ve
4	Transmitter +ve
5	Voltage +ve
11	Output –ve
12	Output +ve
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One

Location of switch
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detector or transmitter
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Maximum off-state values: V = 35V, I = 10µA
Maximum on-state current: 50mA
Voltage drop: [1 + (0.1 x current in mA)] V
Output off if supply fails

Hazardous-area input
Switch: output-on (off) if switch closed (open)
Proximity detector: meets NAMUR and DIN 19234 standards
Pulse (I): Supply 16.5V dc at 20mA,
Short-circuit current 24mA
Output on (off) >8.9mA (<6.8mA)
Switching hysteresis: 0.5mA typical
Pulse (V): Input impedance >10kΩ
Switching point voltage (V_{sp}): 3, 6 or 12V (selectable)
Output on (off) if input >1.2 x V_{sp} (<0.8 x V_{sp})
Switching hysteresis: 0.11 x V_{sp} typical

Pulse width
High: 10µs minimum
Low: 10µs minimum

Frequency range
0 to 50kHz

LED indicators
Green: power indication
Yellow: status

Supply voltage
20 to 35V dc

Maximum current consumption
65mA at 24V dc
70mA at 20V dc
55mA at 35V dc

Maximum power dissipation within unit
1.35W at 24V
1.75W at 35V

Safety description

Terminals 2 to 1
10.5V, 800Ω, 14mA

Terminals 5 to 4 and 1
28V, 94mA, 0.65W

Terminals 4 to 3 and 1
28V, 300Ω, 93mA

Terminal 3 to 1
Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ and ≤25mW; can be connected without further certification into any IS loop with an open-circuit voltage <28V

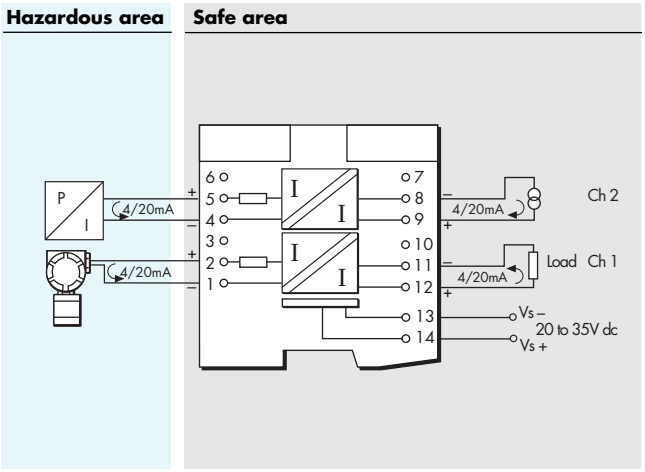
See also MTL5000 Series common specification, cable parameters and approvals

MTL5040 LOOP ISOLATOR

Two channel 4/20 mA

CE

MTL5040 provides a fully floating dc supply for energising a conventional 2-wire 4/20mA transmitter located in a hazardous-area and repeats the current in another floating circuit to drive a safe-area load. It also passes on a 4/20mA or 0/20mA signal from a controller located in the safe-area to a load in the hazardous-area.



Terminal	Function
1	Input –ve (transmitter), ch1
2	Input +ve (transmitter), ch 1
4	Output –ve (driver), ch2
5	Output +ve (driver, ch2
8	Input –ve (driver), ch2
9	Input +ve (driver), ch2
11	Output –ve (transmitter), ch1
12	Output +ve (transmitter), ch1
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
Two

Location of tranmitter and load
Zone 0, IIC, T4-T6 hazardous area if suitably certified
Div 1, Group A, hazardous location

Channel 1- Transmitter (analogue input)

Safe-area output

Signal range:	4 to 20mA
Over/under range:	0 to 24mA
Safe-area load resistance:	0 to 550Ω
Safe-area circuit output resistance:	>2MΩ

Hazardous-area input

Signal range:	0 to 24mA (including over-range)
Transmitter voltage:	16.5V at 20mA

Channel 2- Driver (analogue output)

Safe-area input

Signal range:	4 to 20mA
Over/under range:	0 to 24mA

Hazardous-area output

Maximum load resistance:	550Ω (11V at 20mA)

Hazardous-area circuit output resistance:
>2MΩ

Input voltage drop
<4V at 20 mA

Input and output circuit ripple
<40µA peak-to-peak

Transfer accuracy at 20°C
Better than 20µA (typically 5µA)

Temperature drift
<1µA/°C (4 to 20mA)

Response time
Settles to within 10% of final value within typically 250µs

LED indicator
Green: provided for power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with 20mA signal)
95mA at 24V
110mA at 20V
70mA at 35V

Maximum power dissipation within unit (with 20mA signal)
1.6W at 24V
1.8W at 35V

Isolation
250V ac between safe circuits, hazardous circuits and power supply circuits

Safety description
28V, 300Ω, 93mA; U_m=250V rms or dc

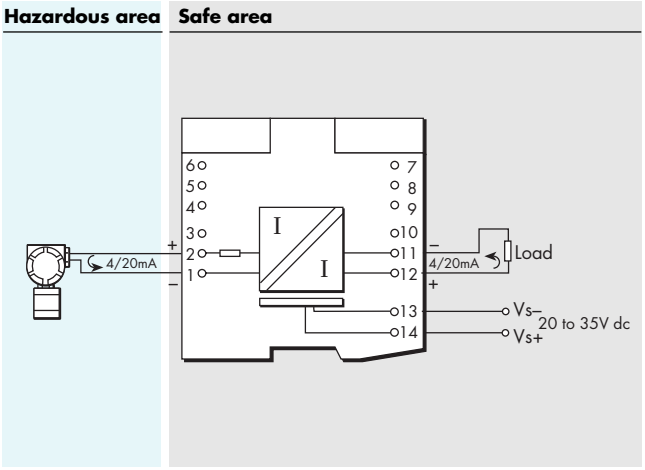
See also MTL5000 Series common specification, cable parameters and approvals

MTL5041 REPEATER POWER SUPPLY

4/20mA, for 2-wire transmitters

CE

The MTL5041 provides a fully-floating dc supply for energising a conventional 2-wire 4/20mA transmitter which is located in a hazardous area and repeats the current in another floating circuit to drive a safe-area load.



Terminal	Function
1	Input –ve
2	Input +ve
11	Output –ve
12	Output +ve
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One

Location of transmitter
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output
Signal range: 4 to 20mA
Over/under-range: 0 to 24mA
Safe-area load resistance: 0 to 1kΩ
Safe-area circuit output resistance: >2MΩ

Safe-area circuit ripple
<125µA peak-to-peak

Hazardous-area input
Signal range: 0 to 24mA (including over-range)
Transmitter voltage: 16.5V at 20mA

Transfer accuracy at 20°C
Better than 20µA (typically 5µA)

Temperature drift
<1µA/°C

Response time
Settles to within 10% of final value within 250µs

LED indicator
Green: power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with 20mA signal)
70mA at 24V
85mA at 20V
55mA at 35V

Maximum power dissipation within unit (with 20mA signal)
1.2W at 24V

Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

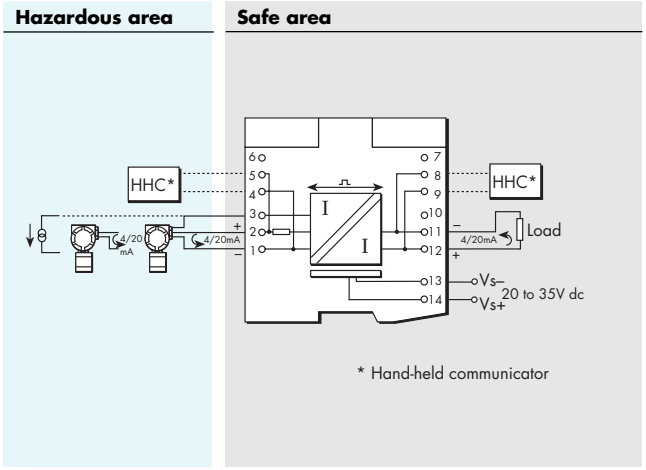
See also MTL5000 Series common specification, cable parameters and approvals

MTL5042 REPEATER POWER SUPPLY

4/20mA, for 2- or 3-wire transmitters (with smart communications)

CE

The MTL5042 provides a fully-floating dc supply for energising a conventional 2- or 3-wire 4/20mA transmitter which is located in a hazardous area, and repeats the current in another floating circuit to drive a safe-area load. For smart transmitters, the unit allows bi-directional communications signals to be superimposed on the 4/20mA signal.



SPECIFICATION

See also common specification

Number of channels
One

Location of transmitter
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output

Signal range:	4 to 20mA
Under/over-range:	0 to 24mA
Safe-area load resistance:	0 to 600Ω
Safe-area circuit output resistance:	>2MΩ

Safe-area circuit ripple
<40µA peak-to-peak

Hazardous-area input
Signal range: 0 to 24mA (including over-range)
Transmitter voltage: 16.5V at 20mA

Transfer accuracy at 20°C
Better than 10µA

Temperature drift
<0.5µA/°C

Response time
Settles to within 10% of final value within 40µs

Digital signal bandwidth
10Hz to 12kHz

Communications supported
HART®
Honeywell DE
Foxboro
Yokogawa Brain

LED indicator
Green: power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with 20mA signal)
75mA at 24V
85mA at 20V
55mA at 35V

Maximum power dissipation within unit (with 20mA signal)
1.3W at 24V

Safety description

Terminals 2 to 1 and 3:
28V, 300Ω, 93mA; U_m = 250V rms or dc

Terminals 1 to 3:
Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ and ≤25mW; can be connected without further certification into any IS loop with an open-circuit voltage <28V

Note: Terminals 1 and 3 do not support bi-directional transmissions for HART® devices

Terminal	Function
1	Current input
2	Transmitter supply +ve
3	Common
4	Optional HHC –ve
5	Optional HHC +ve
8	Optional HHC –ve
9	Optional HHC +ve
11	Output –ve
12	Output +ve
13	Supply –ve
14	Supply +ve

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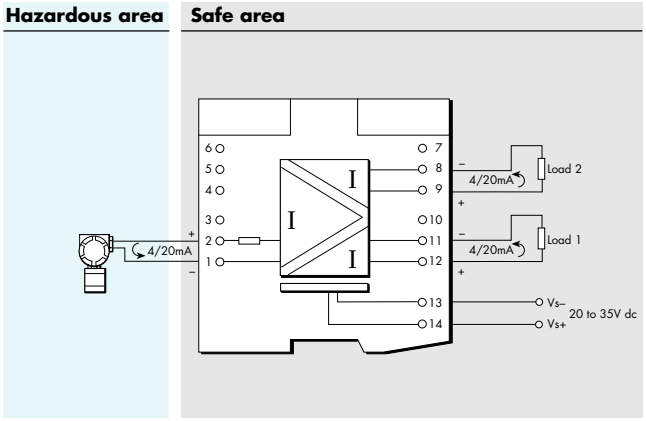
See also MTL5000 Series common specification, cable parameters and approvals

MTL5043 REPEATER POWER SUPPLY

Dual output, 4/20mA, for 2-wire transmitters

CE

The MTL5043 provides a fully floating dc supply for engergising a conventional 2-wire 4/20mA transmitter which is located in a hazardous area, and repeats the current in two floating circuits to drive two safe-area loads.



Terminal	Function
1	Input –ve
2	Input +ve
8	Output –ve (ch2)
9	Output +ve (ch2)
11	Output –ve (ch1)
12	Output +ve (ch1)
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One
Location of transmitter
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location
Safe-area outputs
Signal range: 4 to 20mA
Over/under-range: 0 to 24mA
Safe-area load resistance: 0 to 550Ω
Safe-area circuit output resistance: >2MΩ
Safe-area circuit ripple
<125µA peak-to-peak
Hazardous-area input
Signal range: 0 to 24mA (including over-range)
Transmitter voltage: 16.5V at 20mA
Transfer accuracy at 20°C
Better than 20µA (typically <5µA)
Temperature drift
<0.5µA/°C
Response time
Both outputs settle to within 10% of final value within 250µs
LED indicator
Green: power indication
Supply voltage
20 to 35V dc
Maximum current consumption (with two 20mA signals)
110mA at 24V
130mA at 20V
80mA at 35V
Maximum power dissipation within unit (with two 20mA signals)
1.5W at 24V
Isolation
250V ac or dc between power supply, input and outputs
Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

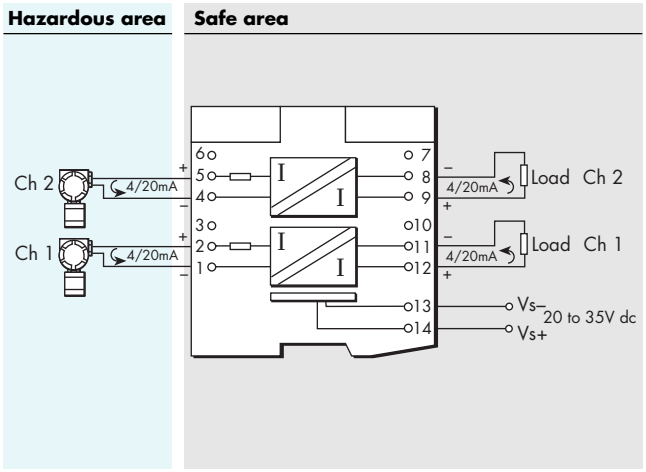
Measurement Technology Limited Power Court, Luton, Bedfordshire, England LU1 3JJ
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283 E-mail: enquiry@mtl-inst.com Web site: http://www.mtl-inst.com
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MTL5044 REPEATER POWER SUPPLY

two-channel, 4/20mA, for 2-wire transmitters

CE

The MTL5044 provides a fully-floating dc supply for energising two conventional 2-wire 4/20mA transmitters which are located in a hazardous area, and repeats the current in two floating circuits to drive two safe-area loads.



SPECIFICATION

See also common specification

Number of channels
Two

Location of transmitters
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area output

Signal range:	4 to 20mA
Over/under range:	0 to 24mA
Safe-area load resistance:	0 to 550Ω
Safe-area circuit output resistance:	>2MΩ

Safe-area circuit ripple
<125µA peak-to-peak

Hazardous-area input
Signal range: 0 to 24mA (including over-range)
Transmitter voltage: 16.5V at 20mA

Transfer accuracy at 20°C
Better than 20µA (typically 5µA)

Temperature drift
<1µA/°C

Response time
Settles to within 10% of final value within 250µs

LED indicator
Green: power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with two 20mA signals)
110mA at 24V
130mA at 20V
80mA at 35V

Maximum power dissipation within unit (with two 20mA signals)
1.5W at 24V

Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

Terminal	Function
1	Input –ve (channel 1)
2	Input +ve (channel 1)
4	Input –ve (channel 2)
5	Input +ve (channel 2)
8	Output –ve (channel 2)
9	Output +ve channel 2)
11	Output –ve (channel 1)
12	Output +ve (channel 1)
13	Supply –ve
14	Supply +ve

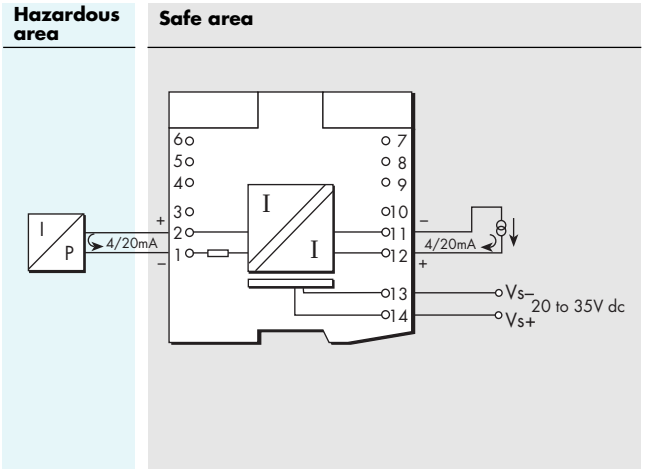
See also MTL5000 Series common specification, cable parameters and approvals

MTL5045 ISOLATING DRIVER

4/20mA

CE

The MTL5045 isolates and passes on a 4/20mA signal from a controller located in the safe area to a load of up to 800Ω in the hazardous area. It has a high output capacity of 16V at 20mA combined with a low (4V) drop across its input terminals and excellent accuracy.



Terminal	Function
1	Output –ve
2	Output +ve
11	Input –ve
12	Input +ve
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One
Location of load
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location
Safe-area input
Signal range: 4 to 20mA
Under/over range: 0 to 24mA
Hazardous-area output
Maximum load resistance: 800Ω (16V at 20mA)
Output resistance
>2MΩ
Input voltage drop
<4V at 20mA
Input and output circuit ripple
<40µA peak-to-peak
Transfer accuracy at 20°C
Better than 20µA
Temperature drift
<1µA/°C
Response time
Settles to within 10% of final value within 250µs
LED indicator
Green: power indication
Supply voltage
20 to 35V dc
Maximum current consumption
50mA at 24V
60mA at 20V
40mA at 35V
Maximum power dissipation within unit (with 20mA signal)
1.0W at 24V
1.1W at 35V
Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

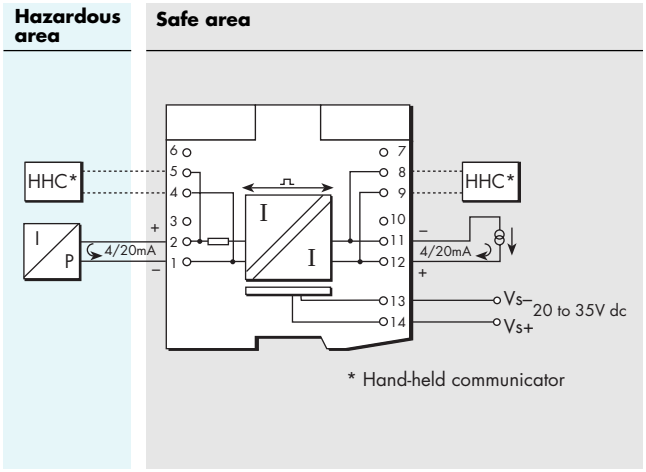
See also MTL5000 Series common specification, cable parameters and approvals

MTL5046 ISOLATING DRIVER

4/20mA, smart, with line fault detection

CE

The MTL5046 accepts a 4/20mA signal from a controller located in the safe area to drive a load in the hazardous area. It permits bi-directional transmission of digital signals to and from an operator station or hand-held communicator. A line fault detection (LFD) facility is also provided.



SPECIFICATION

See also common specification

Number of channels
One

Location of load
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area input
Signal range: 4 to 20mA
Under/over-range: 1 to 24mA

Hazardous-area output
Load resistance: minimum 100Ω
maximum 800Ω (16V at 20mA)

Digital signal bandwidth
500Hz to 10kHz

Output resistance
>2MΩ

Input and output circuit ripple
<40µA peak-to-peak

Transfer accuracy at 20°C
Better than 10µA

Input voltage drop
<4V at 20mA

Response time
Settles to within 10% of final value within 100µs

Temperature drift
<0.5µA/°C

Line fault detection (LFD)
Signalled by an impedance change in the safe-area loop.
When a line fault occurs, the impedance between pins 11 and 12 is >100kΩ.

LED indicator
Green: power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with 20mA signal)
65mA at 24V
75mA at 20V
50mA at 35V

Maximum power dissipation within unit (with 20mA signal)
1.5W at 24V
1.6W at 35V

Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

Terminal	Function
1	Output –ve
2	Output +ve
4	Optional HHC –ve
5	Optional HHC +ve
8	Optional HHC –ve
9	Optional HHC +ve
11	Input –ve
12	Input +ve
13	Supply –ve
14	Supply +ve

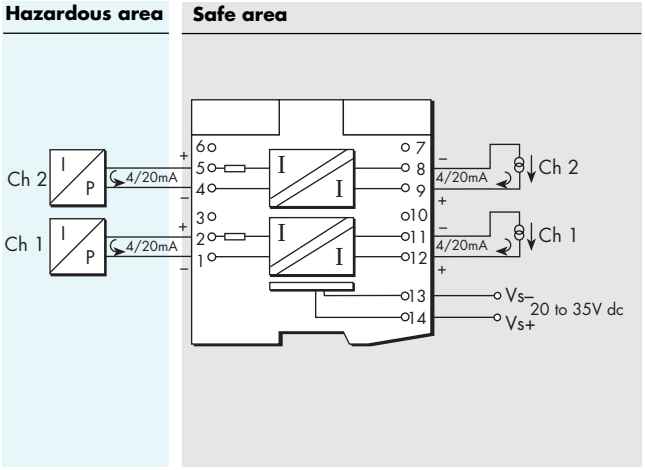
See also MTL5000 Series common specification, cable parameters and approvals

MTL5049 ISOLATING DRIVER

two-channel, 4/20mA

CE

The MTL5049 isolates and passes on two 4/20mA signals from a controller located in the safe area to two loads located in the hazardous area.



Terminal	Function
1	Output –ve (channel 1)
2	Output +ve (channel 1)
4	Output –ve (channel 2)
5	Output +ve (channel 2)
8	Input –ve (channel 2)
9	Input +ve (channel 2)
11	Input –ve (channel 1)
12	Input +ve (channel 1)
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
Two

Location of loads
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area input
Signal range: 4 to 20mA
Under/over range: 0 to 24mA

Hazardous-area output
Load resistance: maximum 550Ω (11V at 20mA)

Output resistance
>2MΩ

Input and output circuit ripple
<40µA peak-to-peak

Transfer accuracy at 20°C
Better than 20µA

Input voltage drop
<4V at 20mA

Response time
Settles to within 10% of final value within 250µs

Temperature drift
<1µA/°C

LED indicator
Green: power indication

Supply voltage
20 to 35V dc

Maximum current consumption (with two 20mA signals)
65mA at 24V
75mA at 20V
50mA at 35V

Maximum power dissipation within unit (with two 20mA signals)
1.4W at 24V
1.5W at 35V

Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

See also MTL5000 Series common specification, cable parameters and approvals

MTL5051 SERIAL-DATA COMMS ISOLATOR

CE

The MTL5051 provides bi-directional serial data communication from a computer system in safe area to instrumentation in a hazardous area. It is used to provide a fully floating dc supply for, and serial data communications to: MTL643 and MTL644 IS text displays, MTL650 Series and MTL645 text/graphics displays, or other IS instrumentation keyboards or mouse. It can also be used for data communications across a hazardous area.

SPECIFICATION

See also common specification

Location of field equipment
Zone 0, IIC, T4-6 hazardous area
Div 1, Group A hazardous location

Safe-area signal
RS232 or RS422

Hazardous-area signal

MTL640 Series mode:
To hazardous area: 3V signal superimposed on 12V (nominal) supply
From hazardous area: 5mA signal superimposed on quiescent current

MTL650 Series mode:
To hazardous area: 10mA current source
From hazardous area: > 8mA signal

Across hazardous area communications mode:
To hazardous area: 10mA current source
From hazardous area: 10mA current source

IS RS232/TTL devices mode:
To hazardous area: RS232-compatible signal levels
From hazardous area: TTL/RS232 signals

LED Indicators
Green: power indication

Max. power dissipation within unit
1.7W at 24V, 25mA load

Maximum power consumption (25mA load)
At Vs=20V, 105mA
At Vs=24V, 90mA
At Vs=35V, 70mA

Comms bandwidth
643/4 mode 1200 to 9600 baud
Other modes up to 19.2 kbaud

Safety description

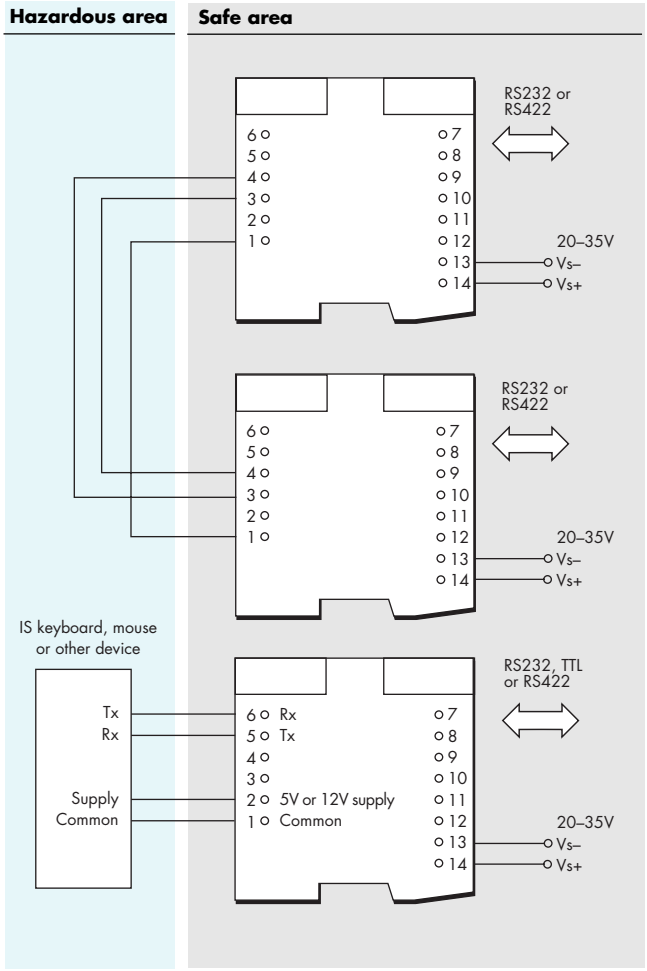
Terminals 1,2,3,4 only	14V,	800mW,	192mA
Terminals 1,3,4 only	14V,	350mW,	88mA
Terminals 1,2,3 only	14V,	450mW,	108mA
Terminals 1,5,6 only	15V,	70mW,	35mA
Terminals 1,2,5,6 only	20V,	460mW,	139mA
Terminals 1,2,3,4,5,6 only	20V,	810mW,	227mA

Hazardous area suppy terminal 2
+12V mode 12.0V ± 5% (load <23mA)
+12V mode 8.0V min (load >23 to <50mA)
+5V 5.6V ± 5% (load >23 to <50mA)

Hazardous Interfacing
See MTL640 Series for details of interfacing with MTL643 and MTL644 IS text displays.
See MTL650 Series for details of interfacing with MTL650 Series and MTL 645 IS operator terminals.

Across hazardous areas communications mode
The MTL5051 is used in pairs to transfer bi-directional full-duplex data across hazardous areas, as shown above. Current switching is used to minimise the bandwidth-limiting effects of long cables.

Interfacing to an IS keyboard, mouse or other device
Communicating with RS232-level interfaces, such as IS keyboard, mouse, etc. is achieved by using one or more MTL5051 units as required by the device. (TTL level interfaces are also accommodated by the TTL-compatibility feature of RS232 receivers.) The supply to the IS equipment may be selected to be either 5V or 12V by switch on top of unit.
Note: the normal RS232 limitations of bandwidth versus cable length are applicable. As a rule of thumb, speed(baud) x length(metres) < 150,000.



MTL5051 Terminals	MTL640 mode	MTL650 mode	Comms mode	Other IS devices
1	Common	Common	Common	Common
2	V signal	12 V	-	5V/12V
3	I return	Rx	Rx	-
4	-	Tx	Tx	-
5	-	-	-	Tx
6	-	-	-	Rx
Switch				
1a	ON	OFF	OFF	OFF
1b	ON	ON	ON	OFF/ON

Terminals	RS232 mode	TTL mode	RS422 mode
7	-	-	Rx –
8	-	-	Rx +
9	-	Tx	Tx +
10	Tx	-	Tx –
11	Common	Common	Common
12	Rx	Rx	-
13	Supply – ve	Supply – ve	Supply –ve
14	Supply +ve	Supply +ve	Supply +ve
Switch			
2a	OFF	ON	ON
2b	ON	OFF	OFF

See also MTL5000 Series common specification, cable parameters and approvals

MTL5053 ISOLATOR/ POWER SUPPLY

31.25kbit/s fieldbus

CE

The MTL5053 has been specifically developed to extend 31.25kbit/s (H1) fieldbus networks into hazardous areas. It provides power and communication to devices powered through the signal conductors. For installations in which the safe-area bus length is small an internal terminator can be enabled by a switch on top of the module.
The MTL5053 complies with requirements of Fieldbus Foundation™ specified power supply Type 133 (IS power supply).

SPECIFICATION

See also common specification

Location of fieldbus device(s)
Zone 0, IIC, T4–6 hazardous area if suitably certified

Hazardous-area fieldbus power supply
18.4V ± 2%
Note: this complies to sub-clause 22.6.1 of IEC/ISA fieldbus standards† for intrinsically safe power supplies.
105Ω ±3% dc impedance
Note: this meets the requirements of sub-clause 22.6.3.1b of IEC/ISA fieldbus standards.†
80mA maximum current
Note: this meets the requirements of sub-clause 22.2.2 Rule 1c of IEC/ISA fieldbus standards.†

Maximum cable length
Determined by IS requirements, depending on other devices attached and maximum acceptable voltage drop along cable

Digital signal transmission
Compatible with 31.25kbit/s fieldbus systems and complies with fieldbus standards†

Supply voltage
20 to 35Vdc

LED indicator
Green: one provided for power indication

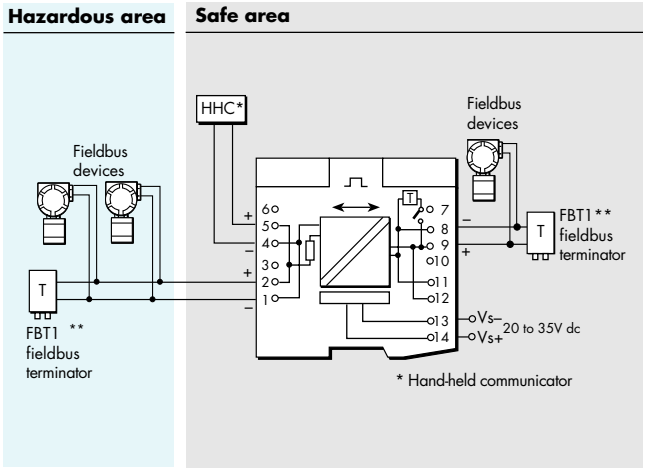
Power requirement, Vs, with 80mA output load
135mA typical at 24V
105mA at 35V

Power dissipation within unit, with 80mA output load
2.3W typical at 24V
2.6W maximum at 35V

Isolation
250V ac between safe- and hazardous-area circuits and power supply

Safety description
Terminals 1 and 2
22V, 102Ω, 216mA; U_m = 250V rms or dc

† *The applicable fieldbus specifications and standards are: FOUNDATION™ Fieldbus 31.25kbit/s Physical Layer Profile Specification, document FF-816, IEC 61158-2: 1993 and ISA-S50.02-1992 for 31.25kbit/s fieldbus systems*



** *See section 7 for specification details of FBT1 DIN-rail mounting fieldbus terminator*

Terminal	Function
1	Hazardous-area fieldbus device(s) connection –ve
2	Hazardous-area fieldbus device(s) connection +ve
4	Optional HHC connection –ve
5	Optional HHC connection +ve
8 & 11	Safe-area fieldbus device(s) connection –ve
9 & 12	Safe-area fieldbus device(s) connection +ve
13	Supply –ve
14	Supply +ve

Note: To assist the process of terminating cable screens, screw terminals have been provided in terminals 3, 6, 7 and 10. Please note, however, that there is no internal connection for these terminals so they are not earthed.

See also 'Bus systems for hazardous areas'

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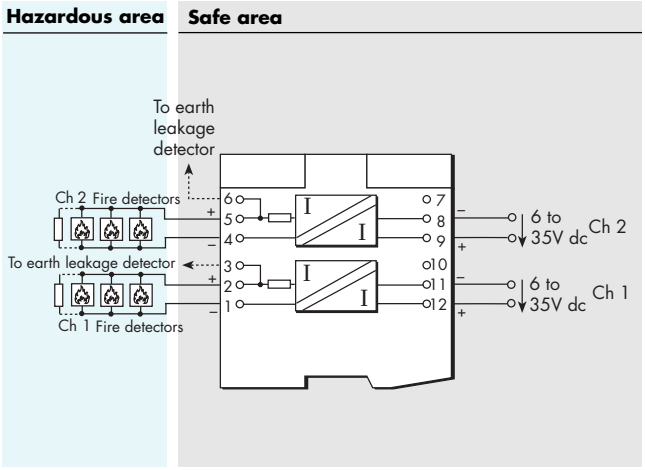
See also MTL5000 Series common specification, cable parameters and approvals

MTL5061 FIRE/SMOKE DETECTOR INTERFACE

two-channel, loop-powered

CE

The MTL5061 is a loop-powered two-channel interface for use with conventional fire and smoke detectors located in hazardous areas. In operation, the triggering of a detector causes a corresponding change in the safe-area circuit. The unit has reverse input polarity protection, while 'non-fail' earth fault detection on either line can be provided by connecting an earth leakage detector to terminals 3 or 6.



SPECIFICATION

See also common specification

Number of channels
Two

Location of detectors
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Current range
1 to 40mA, nominal

Integral input polarity protection
Input circuit protected against reverse polarity

'No-fail' earth fault protection
Enabled by connecting terminals 3 and 6 to MTL2220 earth leakage detector (not CE marked). If a fault on either line of each channel is proclaimed: unit continues working

Notes: 1. To maintain isolation between the two channels, separate earth leakage detectors are needed
2. The MTL2220 earth leakage detector introduces a 100µA, 1Hz ripple to the field circuit

Minimum output voltage V_{out} at 20°C
V_{in} – (0.38 x current in mA) – 2V
21V – (0.35 x current in mA)
whichever is the lower

Response time to step input
Settles to within 500µA of final value within 30ms

Hazardous-area output
Maximum output voltage 28V from 300Ω

Transfer accuracy at 20°C
Better than 400µA

Temperature drift
<10µA/°C (–20 to 60°C)

Loop supply voltage
6 to 35V dc

Quiescent safe-area current at 20°C
(hazardous-area terminals open-circuit)
<400µA/ channel, Vin = 24V dc

Maximum power dissipation within unit
0.7W at 24V with 40mA signal (each channel)
1.2W at 35V with 40mA signal (each channel)

Safety description
28V, 300Ω, 93mA; U_m = 250V rms or dc

Terminal	Function
1	Output –ve (channel 1)
2	Output +ve (channel 1)
3	Earth leakage detection (channel 1)
4	Output –ve (channel 2)
5	Output +ve (channel 2)
6	Earth leakage detection (channel 2)
8	Input –ve (channel 2)
9	Input +ve (channel 2)
11	Input –ve (channel 1)
12	Input +ve (channel 1)

See also MTL5000 Series common specification, cable parameters and approvals

MTL5073 TEMPERATURE CONVERTER

THC or RTD input

CE

The MTL5073 converts a low-level dc signal from a temperature sensor mounted in a hazardous area into a 4/20mA current for driving a safe-area load. Software selectable features include linearisation, ranging, monitoring, testing and tagging for eight thermocouple types and 2-, 3- or 4-wire RTDs. For thermocouples requiring cold-junction compensation, the HAZ-CJC plug can be ordered with the product, and includes an integral CJC sensor.

SPECIFICATION

See also common specification

Number of channels
One
Signal source
Types J, K, T, E, R, S, B or N THCs to BS 4937
EMF input
2/3/4-wire platinum RTDs to BS 1904/DIN43760 (100Ω at 0°C)
Location of signal source
Zone 0, IIC, T4 hazardous area
Div.1, Group A, hazardous location
Input signal range
–75 to +75mV, or 0 to 400Ω
Input signal span
3 to 150mV, or 10 to 400Ω
RTD excitation current
200µA nominal
Cold junction compensation
Automatic or selectable
Cold junction compensation error
≤1.0°C
Common mode rejection
120dB for 240V at 50Hz or 60Hz
Series mode rejection
40dB for 50Hz or 60Hz
Calibration accuracy (at 20°C)
(includes hysteresis, non-linearity and repeatability)

Inputs:	
mV/THC:	±15µV or ±0.05% of input value (whichever is greater)
RTD:	±80mΩ
Output:	±11µA

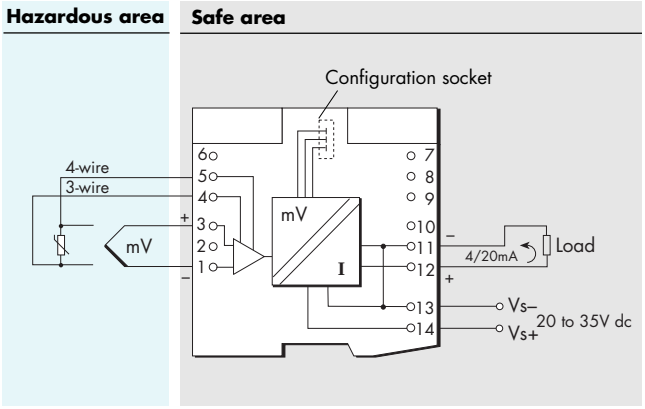
Temperature drift (typical)

Inputs:	
mV/THC:	±0.003% of input value/°C
RTD:	±7mΩ/°C
Output:	±0.6µA/°C

Example of calibration accuracy and temperature drift (RTD input)

Span:	250Ω
Accuracy:	± (0.08/250 + 11/16000) x 100% =0.1% of span
Temperature drift:	± (0.007/250 x 16000 + 0.6) µA/°C = ±1.0µA/°C

Safety drive on sensor burnout
Upscale, downscale, or off
Configurator
MTL611B IS pocket data terminal fitted with a CNF41 interface and CAB73 cable assembly or PCC73 software/connection package
Output range
4 to 20mA nominal (direct or reverse)
Maximum load resistance
600Ω
LED indicator
Green: one provided for power and status indication
Supply voltage
20-35Vdc
Power requirement, Vs with 20mA signal
57mA at 24V
55mA at 20V
60mA at 35V



Terminal	Function
1	THC/EMF/RTD input –ve
3	THC/EMF/RTD input +ve
4	3-wire RTD input –ve
5	4-wire RTD input +ve
11	Output –ve
12	Output +ve
13	Supply –ve
14	Supply +ve

Power dissipation within unit with 20mA signal
1.2W at 24V
2.0W at 35V
Isolation
250V ac between safe- and hazardous-area circuits
Safety description
Terminals 1 and 3
i) Without CJ plug
Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ and ≤25mW. Can be connected without further certification into any IS loop with open-circuit voltage not more than 10V.
ii) With CJ plug
V_{out} = 21V (capacitive)
V_{out} = 6.6V (long term), I_{out} = 10mA
P_{out} = 17mW
Terminals 1 and 3, 4 and 5
V_{out} = 21V (capacitive)
V_{out} = 6.6V (long term), I_{out} = 76mA
P_{out} = 0.13W
Configuration socket
V_{out} = 7.2V, I_{out} = 14.6mA
P_{out} = 26mW
Standard configuration

Input type	RTD, 3-wire
Linearisation	enabled
CJ Compensation	disabled
Units	°C
Damping/Smoothing value	0 seconds/0 seconds
Output zero	0°C
Output span	250°C
Tag and description fields	blank
Open circuit alarm	set high (upscale)
Transmitter failure alarm	set low (downscale)
CJ failure alarm	set low (downscale)
Line frequency	50Hz

Note: the MTL5073 may be configured, either by using an MTL611B pocket data terminal (see page 4-4) and accessories or a personal computer running MTL PCC73 software with interface supplied (see PCC73).

TO ORDER, specify:

MTL5073	Includes HAZ-CJC signal plug (with internal CJC sensor). For use with thermocouple, mV or RTD inputs.
MTL5073-RTD	Includes standard HAZ1-3 signal plug. For use with mV or RTD inputs. (Can be used with thermocouples with cold-junction compensation if HAZ-CJC plug is fitted.)
HAZ-CJC	Hazardous-area signal plug for terminals 1 to 3 including cold-junction compensation sensor.

See also MTL5000 Series common specification, cable parameters and approvals

MTL5074 TEMPERATURE CONVERTER

THC or RTD input

CE

The MTL5074 converts a low-level dc signal from a temperature sensor mounted in a hazardous area into a 4/20mA current for driving a safe-area load. Software selectable features include linearisation, ranging, monitoring, testing and tagging for eight thermocouple types and 2-, 3- or 4-wire RTDs. For thermocouples requiring cold-junction compensation, the HAZ-CJC plug can be ordered with the product, and includes an integral CJC sensor.

SPECIFICATION

See also common specification

Number of channels
One
Signal source
Types J, K, T, E, R, S, B or N THCs to BS 4937
EMF input
2/3/4-wire platinum RTDs to BS 1904/DIN43760 (100Ω at 0°C)
Location of signal source
Zone 0, IIC, T4 hazardous area
Div.1, Group A, hazardous location
Input signal range
–75 to +75mV, or 0 to 400Ω
Input signal span
3 to 150mV, or 10 to 400Ω
RTD excitation current
200µA nominal
Cold junction compensation
Automatic or selectable
Cold junction compensation error
≤1.0°C
Common mode rejection
120dB for 240V at 50Hz or 60Hz
Series mode rejection
40dB for 50Hz or 60Hz
Calibration accuracy (at 20°C)
(includes hysteresis, non-linearity and repeatability)

Inputs:	
mV/THC:	±15µV or ±0.05% of input value (whichever is greater)
RTD:	±80mΩ
Output:	±11µA

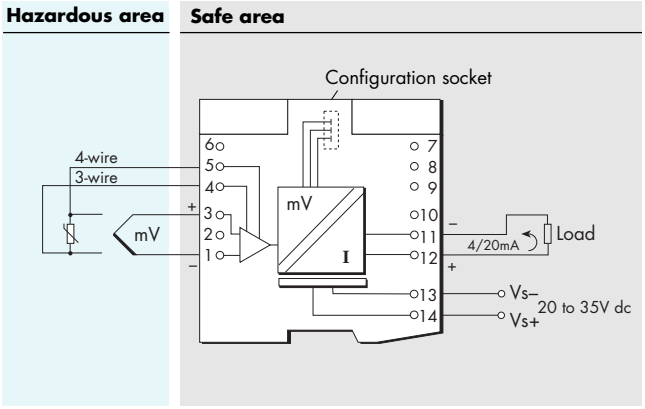
Temperature drift (typical)

Inputs:	
mV/THC:	±0.003% of input value/°C
RTD:	±7mΩ/°C
Output:	±0.6µA/°C

Example of calibration accuracy and temperature drift (RTD input)

Span:	250Ω
Accuracy:	± (0.08/250 + 11/16000) x 100% =0.1% of span
Temperature drift:	± (0.007/250 x 16000 + 0.6) µA/°C = ±1.0µA/°C

Safety drive on sensor burnout
Upscale, downscale, or off
Configurator
MTL611B IS pocket data terminal fitted with a CNF41 interface and CAB73 cable assembly or PCC73 software/connector package
Output range
4 to 20mA nominal (direct or reverse)
Maximum load resistance
600Ω
LED indicator
Green: one provided for power and status indication
Power requirement, Vs with 20mA signal
68mA at 24V
82mA at 20V
52mA at 35V
Power dissipation within unit with 20mA signal
1.5W at 24V
1.6W at 35V



Terminal	Function
1	THC/EMF/RTD input –ve
3	THC/EMF/RTD input +ve
4	3-wire RTD input –ve
5	4-wire RTD input +ve
11	Output –ve
12	Output +ve
13	Supply –ve
14	Supply +ve

Isolation
250V ac between safe- and hazardous-area circuits and power supply
Safety description
Terminals 1 and 3
i) Without CJ plug
Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ and ≤25mW. Can be connected without further certification into any IS loop with open-circuit voltage not more than 10V.
ii) With CJ plug
V_{out} = 21V (capacitive)
V_{out} = 6.6V (long term), I_{out} = 10mA
P_{out} = 17mW
Terminals 1 and 3, 4 and 5
V_{out} = 21V (capacitive)
V_{out} = 6.6V (long term), I_{out} = 76mA
P_{out} = 0.13W
Configuration socket (CON6)
V_{out} = 8.3V, I_{out} = 15mA
P_{out} = 26mW
Standard configuration

Input type	RTD, 3-wire
Linearisation	enabled
CJ Compensation	disabled
Units	°C
Damping/Smoothing value	0 seconds/0 seconds
Output zero	0°C
Output span	250°C
Tag and description fields	blank
Open circuit alarm	set high (upscale)
Transmitter failure alarm	set low (downscale)
CJ failure alarm	set low (downscale)
Line frequency	50Hz

Note: the MTL5074 may be configured, either by using an MTL611B pocket data terminal (see page 4-4) and accessories or a personal computer running MTL PCC73 software with interface supplied (see page 3-48).

TO ORDER, specify:

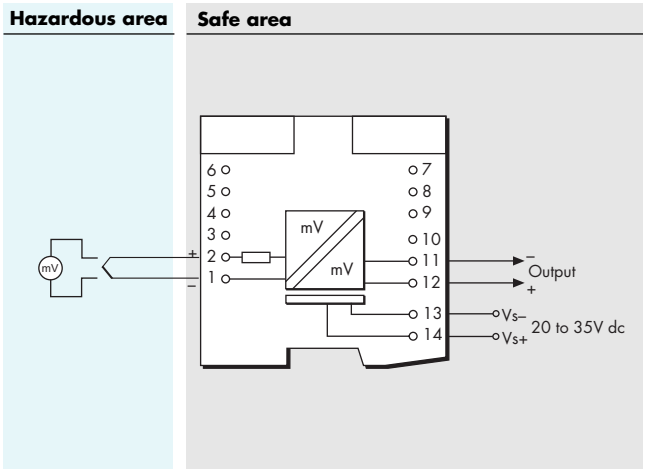
MTL5074	Includes HAZ-CJC signal plug (with internal CJC sensor). For use with thermocouple, mV or RTD inputs.
MTL5074-RTD	Includes standard HAZ1-3 signal plug. For use with mV or RTD inputs. (Can be used with thermocouples with cold-junction compensation if HAZ-CJC plug is fitted.)
HAZ-CJC	Hazardous-area signal plug for terminals 1 to 3 including cold-junction compensation sensor.

See also MTL5000 Series common specification, cable parameters and approvals

MTL5081 MILLIVOLT ISOLATOR

CE

MTL5081 takes a low-level dc signal from a voltage source in a hazardous area, isolates it and passes it to a receiving instrument located in the safe area. The module is intended for use with thermocouples utilising external cold junction compensation. A switch located on top of the module enables or disables the safety drive in the event of thermocouple burnout or cable breakage; a second switch permits the selection of upscale or downscale drive as required.



Terminal	Function
1	THC/mV input -ve
2	THC/mV input +ve
11	Output -ve
12	Output +ve
13	Supply -ve
14	Supply +ve

SPECIFICATION

See also common specification

Number of channels
One

Signal source
Any dc millivolt source

Location of millivolt source
Zone 0, IIC, T4-T6 hazardous area if suitably certified
Div 1, Group A, hazardous location

Input and output signal range
0 to ±50mV, overrange to ±55mV

Output resistance
60Ω nominal

Transfer accuracy
Linearity and repeatability <0.05% of reading or ±5µV, whichever is the greater

Temperature drift
±(2µV + 0.002% of input) per °C

Response time
Settles to within 10% of final value within typically150µs

Frequency response
DC to 4kHz

Safety drive on THC burnout
Two switches on top of the module enable or disable the safety drive and select upscale or downscale drive

LED indicator
Green: provided for power indication

Power requirement, Vs
20mA max, 20 to 35V dc

Maximum power dissipation within unit
0.5W at 24V
0.7W at 35V

Isolation
250V ac between safe circuits, hazardous circuits and power supply circuits

Safety description

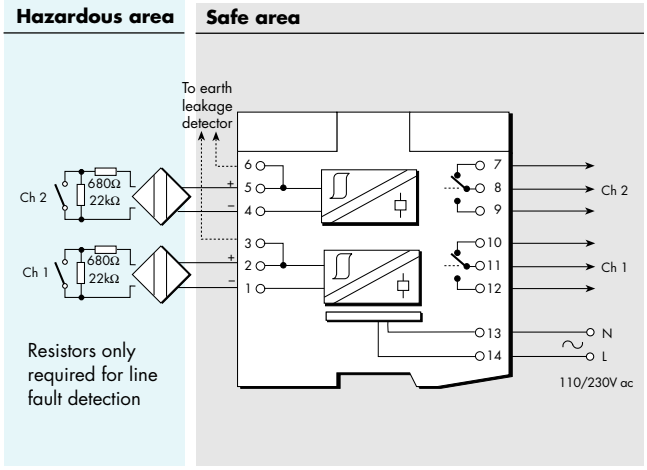
Terminals 1 and 2
Non-energy-storing apparatus (≤1.2V, ≤0.1A, ≤20µA and ≤25mW). Can be connected without further certification into any IS loop with an open circuit voltage <28V.

See also MTL5000 Series common specification, cable parameters and approvals

MTL5118 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel, ac powered with line fault detection and phase reversal CE

The MTL5118 enables two safe-area loads to be controlled by two switches or proximity detectors located in the hazardous area. The safe area interface has two changeover relays for outputs 1 and 2. Independent phase reversal control allows an alarm condition to be signalled for either state of the sensor. A selectable line fault detect (LFD) facility detects an open or short circuit in either field circuit.



SPECIFICATION

See also common specification

Number of channels
Two

Location of switches
Zone 0, IIC, T6 hazardous area
Div. 1, Group A hazardous location

Location of proximity detector
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A hazardous location

Safe-area outputs
Two relays with changeover contacts

Hazardous-area inputs
Inputs conforming to NAMUR/DIN 19234 standards for proximity detectors

Voltage applied to sensor
7 to 9V from 1kΩ ±10%

Input/output characteristics
Normal (reverse) phase:
output energised (de-energised) if I_{in} >2.1mA or R_{in} <2kΩ
output de-energised (energised) if I_{in} <1.2mA or R_{in} >10kΩ
Hysteresis: 200µA, typical

Line fault detection (LFD)
User-selectable. Line faults are indicated by an LED for each channel. A detected line fault de-energises the relay.
Open-circuit alarm on if I_{in}<100µA
Open-circuit alarm off if I_{in}>250µA
Short-circuit alarm on if R_{in}<100Ω
Short-circuit alarm off if R_{in}>360Ω
Note: Resistors must be fitted when using the LFD facility; with a contact input
500Ω to 1kΩ in series with switch
20kΩ to 25kΩ in parallel with switch

Phase reversal
Independent for each channel, user-selectable

Relay type
Single-pole changeover relay
Note: reactive loads must be adequately suppressed

Relay characteristics

Response time:	10ms maximum
Contact rating:	250V ac, 2A, cosø >0.7
	40V dc, 2A, resistive load

LED indicators
Green: power indication
Yellow: two: status of each channel (on when outputs are energised)
Red: two: LFD indication for each channel (on when line fault detected)

Terminal	Function
1	Input –ve (Ch 1)
2	Input +ve (Ch 1)
3	Earth leakage detection
4	Input –ve (Ch 2)
5	Input +ve (Ch 2)
6	Earth leakage detection
7	Normally-closed contact (Ch 2)
8	Common (Ch 2)
9	Normally-open contact (Ch 2)
10	Normally-closed contact (Ch 1)
11	Common (Ch 1)
12	Normally-open contact (Ch 1)
13	Supply N
14	Supply L

Supply voltage ac powered
65 to 265V ac

Isolation
250V ac or dc between power supply, hazardous-area circuits and relay outputs

Safety description (each channel)
10.5V, 800Ω, 14mA, U_m = 250V rms or dc

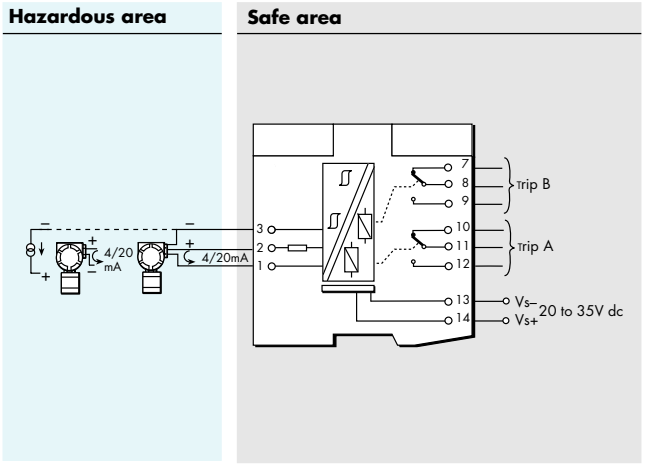
See also MTL5000 Series common specification, cable parameters and approvals

MTL5314 TRIP AMPLIFIER

4/20mA, for 2- or 3-wire transmitters

CE

The MTL5314 connects to a 2- or 3-wire 4 to 20mA transmitter or current source located in the hazardous area. It supplies one or two configurable alarm signals to the safe area via changeover relays. Each relay may be configured individually to signal an alarm condition (relay de-energised) when the input signal is greater than or less than a pre-set value.



SPECIFICATION

See also common specification

Number of channels
One, with two configurable alarms

Location of field equipment
Zone 0, IIC, T4-T6 hazardous area, if suitably certified
Div 1, Group A, hazardous location

Safe-area output
Two relays with changeover contacts

Hazardous-area input
Signal range: 0 to 24mA
(including over-range)

Voltage available for transmitter (terminals 1 and 2)
>17V at 20mA

Current input (terminals 1 to 3)
Input resistance 25Ω maximum

Response time
<75ms

Trip-points
Trip-points can be adjusted by the user via multiturn potentiometers accessible on the top of the unit.

Trip-point range	0.5 to 22mA
Effective resolution	20µA
Trip-point drift with temperature	1.5µA/°C max.
Hysteresis	min 1% of trip-point range max 1.7% of trip-point range

Relay type
Single pole, changeover contacts
Note: reactive loads must be adequately suppressed

Relay characteristics

Contact rating	250V ac, 2A, cosø >0.7 40V dc, 2A, resistive load
Contact life expectancy	3.3×10^5 operations

LED indicators
Power LED green, illuminated when the power is connected to the module
Status LED yellow, one per trip, illuminated when relay is energised (not tripped)

Supply voltage
20 to 35V dc

Maximum current consumption (with 20mA signal)
85mA at 24V
100mA at 20V
60mA at 35V

Maximum power dissipation within the unit (with 20mA signal)
1.7W at 24V
1.8W at 35V

Safety description

Terminals 2 to 1 and 3	28V, 300Ω, 93mA
Terminals 1 to 3	Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ and ≤25mW; can be connected to an IS loop with an open-circuit voltage <28V

Terminal	Function
1	Current input
2	Transmitter supply +ve
3	Common
7	Trip B (NC)
8	Trip B (COM)
9	Trip B (NO)
10	Trip A (NC)
11	Trip A (COM)
12	Trip A (NO)
13	Supply –ve
14	Supply +ve

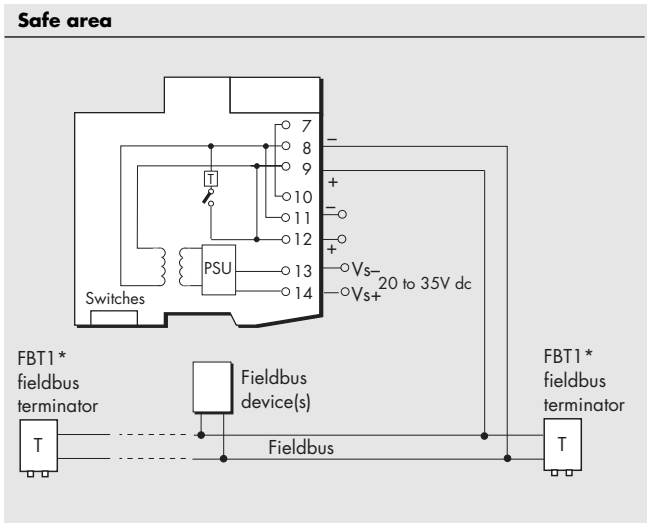
See also MTL5000 Series common specification, cable parameters and approvals

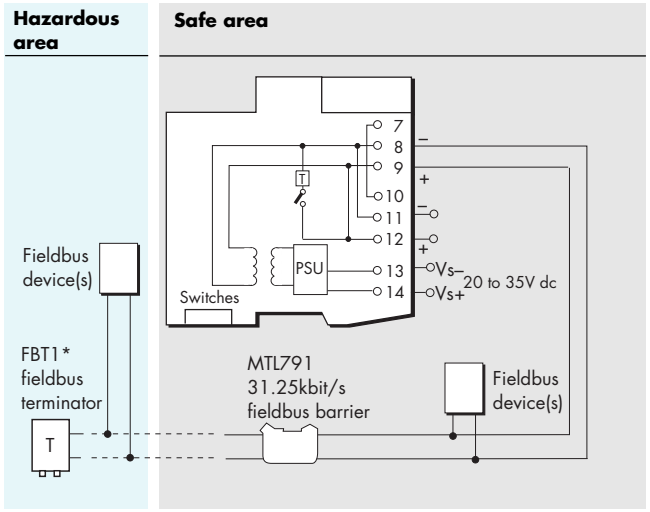
MTL5995 FIELDBUS POWER SUPPLY

31.25kbit/s fieldbus

CE

The MTL5995 is a non-IS power supply unit designed for use in 31.25kbit/s (H1) fieldbus systems. It is compatible with both IS applications and non-IS applications. For IS applications it must be used with a safety barrier such as MTL791. The MTL5995 complies with the requirements of Fieldbus Foundation™ power supply Type 131 (non-IS supply intended for feeding an IS barrier).
To comply with fieldbus standards, each bus must be terminated at both ends. MTL's FBT1 fieldbus terminators can be supplied for this purpose or, for installations in which the safe-area bus length is small, the MTL5995 includes an internal safe-area terminator which is switch enabled. A second switch is provided to allow two MTL5995s to be parallelled for dual redundancy.





* *See Bus systems for hazardous areas for specification details of FBT1 DIN-rail mounting fieldbus terminator.*

SPECIFICATION

See also common specification

Output
19V±2%
Note: this complies with sub-clause 22.6.1 of IEC and ISA fieldbus standards† for power supplies.
<2Ω dc impedance
Note: this meets the requirements of sub-clause 22.6.3.1a of IEC and ISA fieldbus standards.†
350mA maximum current
Note: this meets the requirements of sub-clause 22.2.2b of IEC and ISA fieldbus standards.†

Output ripple
Complies with clause 22.6.2 of the fieldbus standards† for output current >5mA.

Minimum load current
5mA (required to minimise output ripple)

Maximum cable length
1900m Type 'A' cable as defined in clause 22.7.2 of the fieldbus standards†, other cables as indicated in annex B.

Internal termination
Selected by the yellow switch in the base of the unit.

Supply voltage
20 to 35Vdc

Power requirement, with 350mA output load
390mA typical at 24V
280mA at 35V
450mA at 20V

Power dissipation within unit, with 350mA output load
2.6W typical at 24V
3.0W maximum at 35V

Note: To allow adequate heat dissipation under all likely thermal conditions, it is recommended that MTL5995s are installed on DIN-rail with a 10mm space between adjacent units. MTL MS010 10mm DIN-rail module spacers are avaliable for this purpose.

Redundant supplies
The red switch in the base of the unit allows the internal impedance of the supply to be modified when additional supplies are connected in parallel using external impedance matching components.

LED indicator
Green: one provided for power indication

Terminal	Function
7	Internally linked to 10
8 & 11	Safe-area fieldbus device(s) connection –ve
9 & 12	Safe-area fieldbus device(s) connection +ve
10	Internally linked to 7
13	Supply –ve
14	Supply +ve

Note: Terminals 7 and 10 are linked internally to assist in the process of terminating cable screens.

† *The applicable fieldbus specifications and standards are: FOUNDATION™ Fieldbus 31.25kbit/s Physical Layer Profile Specification, document FF-816, IEC 61158-2: 1993 and ISA-S50.02-1992 for 31.25kbit/s fieldbus systems.*

See also 'Bus systems for hazardous areas'

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FOUNDATION™ is a trademark of Fieldbus Foundation, Austin, Texas, USA

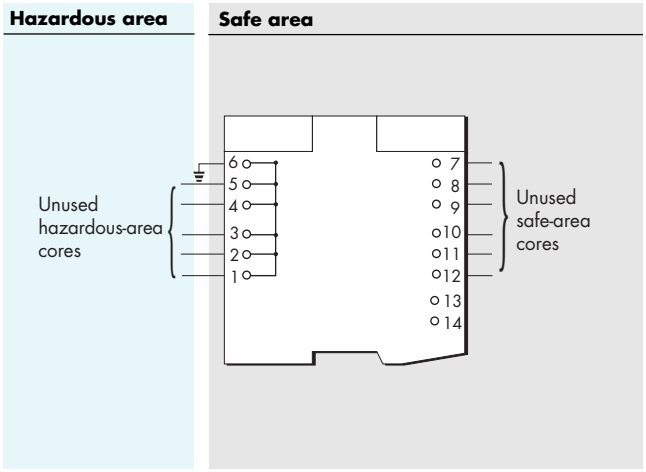
See also MTL5000 Series common specification, cable parameters and approvals

MTL5099 DUMMY ISOLATOR

The MTL5099 is used with other MTL5000 Series units to provide termination and earthing facilities for unused cable cores from hazardous areas.

SPECIFICATION

See common specification below



Terminal	Function
1	Hazardous-area core
2	Hazardous-area core
3	Hazardous-area core
4	Hazardous-area core
5	Hazardous-area core
6	Earth
7	Safe-area core
8	Safe-area core
9	Safe-area core
10	Safe-area core
11	Safe-area core
12	Safe-area core

MTL5000 SERIES COMMON SPECIFICATION

CE

Connectors

Each MTL5000 unit is supplied with signal and power connectors, as applicable.

When using crimp ferrules for the hazardous and non-hazardous (safe) signal connectors the metal tube length should be 12mm and the wire trim length 14mm. For the power connectors the metal tube length should be 10mm and the wire trim length 12mm.

See INM5000 for recommended ferrules.

Isolation

250V rms between input, output and power supply terminals, tested at 1500V rms minimum between safe- and hazardous-area terminals. MTL5073, output and power supply not isolated.

Location of units

Safe area

Terminals

Accommodate conductors of up to 2.5mm^2 stranded or single-core

Mounting

On 35mm (top hat) rail to
EN 50022–35 x 7.5; BS 5584;
35 x 27 x 7.3 DIN 46277

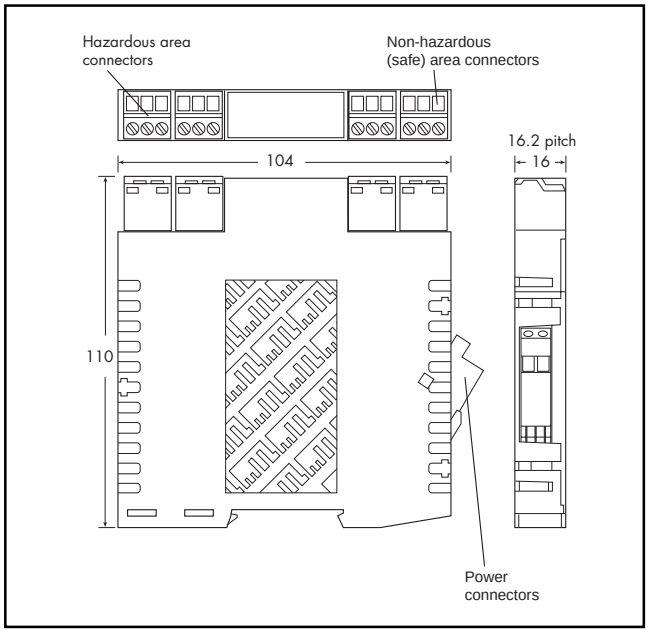
Ambient temperature limits

–20 to +60°C (–6 to +140°F) operating
–40 to +80°C (–40 to +176°F) storage

Humidity

5 to 95% relative humidity

DIMENSIONS (mm)



EMC compliance

The modules that comply with EMC EN 050081-2/EN 050082-2 generic emission and immunity standards (which refer to appropriate IEC/CISPR standards) are marked accordingly

MTL5000 Series isolators comply with the standards of BASEEFA (CENELEC), CSA (Canada) and FM (USA) and those of other certifying authorities, to provide worldwide certification – approval/certification pending.

CABLE PARAMETERS

Module	BASEEFA Group	µF	mH	or	µH/Ω	FM Group	µF	mH
MTL5011B/5012/ 5015/5016/ 5017/5018	IIC	2.4	165		825	A+B	2.4	165
	IIB	7.2	495		2475	C	7.2	495
	IIA	19.2	1320		6600	D	19.2	1320
MTL5014	IIC	2.41	170		681	A+B	2.41	170
	IIB	16.8	510		2045	C	16.8	510
	IIA	75	1360		5454	D	75	5454
MTL5021/5023/ 5024	IIC	0.17	1.32		37	A+B	0.17	1.32
	IIB	0.51	3.96		111	C	0.51	3.96
	IIA	1.36	10.56		296	D	1.36	10.56
MTL5022	IIB	0.51	3.96		90	C	0.51	3.96
	IIA	1.36	10.56		240	D	1.36	10.56
MTL5025	IIC	0.17	4.2		60	A+B	0.17	4.2
	IIB	0.51	12.6		180	C	0.51	12.6
	IIA	1.36	33.6		480	D	1.36	33.6
MTL5031/5051	Consult MTL							
MTL5032	terminals 2 to 1							
	IIC	2.4	165		825	A+B	2.4	165
	IIB	7.2	495		2475	C	7.2	495
	IIA	19.2	1320		6600	D	19.2	1320
	terminals 4 to 3 and 1							
	IIC	0.13	1.57		55	A+B	0.13	4.2
	IIB	0.39	4.71		165	C	0.39	12.6
	IIA	1.04	12.56		440	D	1.04	33.6
	terminals 5 to 4 and							
	IIC	0.13	4.2		55	A+B	0.13	4.2
	IIB	0.39	12.6		165	C	0.39	12.6
	IIA	1.04	33.6		440	D	1.04	33.6
MTL5040	IIC	–	–		–	A+B	–	–
	IIB	–	–		–	C	–	–
	IIA	–	–		–	D	–	–
MTL5041/5042/ 5044/5046/ 5061	IIC	0.13	4.2		55	A+B	0.13	4.2
	IIB	0.39	12.6		165	C	0.39	12.6
	IIA	1.04	33.6		440	D	1.04	33.6
MTL5043	IIC	0.083	4.3		56	A+B	0.083	4.3
	IIB	0.650	17.7		216	C	0.650	210
	IIA	2.150	36.0		444	D	2.150	444
MTL5045/5049	I	3.8	52		700			
	IIC	0.13	4.2		55	A+B	0.13	4.2
	IIB	0.39	12.6		165	C	0.39	12.6
	IIA	1.04	33.6		440	D	1.04	33.6
MTL5053	IIC	0.165	0.32		31	A+B	–	–
	IIB	1.14	3.00		126	C	–	–
	IIA	4.20	7.00		242	D	–	–
MTL5073/5074	Terminals 1&3 and 4&5							
	IIC	0.26	6.0		164	A+B	0.26	6.0
	IIB	0.78	18.0		492	C	0.78	18.0
	IIA	2.08	48.0		1312	D	2.08	48.0
	Config. Socket							
	IIC	0.6	47		135	A+B	0.60	47
	IIB	1.80	141		405	C	1.30	141
	IIA	4.8	376		1080	D	4.8	376
MTL5081	IIC	100	15		2,972	A+B	–	–
	IIB	1,000	60		11,889	C	–	–
	IIA	1,000	120		23,779	D	–	–
MTL5118	IIC	–	–		–	A+B	–	–
	IIB	–	–		–	C	–	–
	IIA	–	–		–	D	–	–
MTL5314	IIC	–	–		–	A+B	–	–
	IIB	–	–		–	C	–	–
	IIA	–	–		–	D	–	–

APPROVALS

Region (Authority)	Australia (NSW M) Mines	Australia (SA)	Canada (CSA)	China (NEPSI)	CIS (VNIIVE)	Czech Republic (FTZU)	Poland (KDB)	UK (BASEEFA to CENELEC/ATEX standards)	UK (BASEEFA) Systems (to CENELEC standards)	UK (MECS) Mines	UK (MECS) Mines System	USA (FM)	Lloyds Register
Standard	CMRA67-1982	AS2380.1/7	C22.2 No.157	GB3836-1/-7	EN 50 020 GOST22782.5-78	EN 50 020	PN-83/E-08110 PN-84/E-08107	EN 50 014 EN 50 020 BS 5501: Pts 1&7-1977	EN 50 039 BS 5501: Pt 9 1982	EN 50 014 EN 50 020 BS 5501: Pts 1&7-1977	EN 50 039 BS 5501: Pt 9 1982	3610 Entity	
Approved for	Coal mines	Ex (ia) IIC	Class I, II, III Div.1 Gps A–G	(ia) IIC T6	Ex ia IIC	Ex ia IIC II1G [EEx ia] IIC	EExia IIC	[EEx ia] IIC Ex ia IIB (for MTL5022)	Ex ia IIC T4 or T6*	[EEx ia] I (Tamb 65°C)	EEx ia I	Class I, II, III, Div.1, 2, Gps A–G IS circuits. Units can also be sited in Class I, II, III, Div.2 in appropriate enclosures	
Model no. (MTL)	**Certificate/file no.**							** T6 for switches or if the hazardous-area device is suitably certified*					
MTL5011B		Ex3499X				J03142		Ex96D2410	Ex96D2411			J.I.1D8A9.AX	97/00134
MTL5012						FTZU98Ex0238		Ex97D2266	Ex97D2267				
MTL5014						FTZU98Ex0239		Ex97D2285	Ex97D2293				
MTL5015						FTZU98Ex0238		Ex97D2266	Ex97D2267				
MTL5016		Ex2247X	LR 36637-96	GYJ97138		J01342	No.96.470W	Ex95C2231	Ex95C2232			J.I.2Z7A9.AX	97/00134
MTL5017		Ex2247X	LR 36637-96	GYJ97138		J01342	No.96.470W	Ex95C2231	Ex95C2232			J.I.2Z7A9.AX	97/00134
MTL5018		Ex3499X				J03142		Ex96D2410	Ex96D2411			J.I.1D8A9.AX	97/00134
MTL5021		Ex2265X	LR 36637-99	GYJ97138		J03143	No.96.466W	Ex95D2426	Ex95D2427			J.I.3Z9A8.AX	97/00134
MTL5022		Ex2265X	LR 36637-99	GYJ97138		J03143	No.96.465W	Ex95D2428	Ex95D2429			J.I.3Z9A8.AX	97/00134
MTL5023		Ex2265X						Ex96D2315	Ex96D2316			J.I.3Z1A8.AX	97/00134
MTL5024		Ex2265X						Ex96D2315	Ex96D2316			J.I.3Z1A8.AX	97/00134
MTL5025		Ex2265X	LR 36637-99	GYJ97138		J03143	No.96.466W	Ex95D2426	Ex95D2427			J.I.3Z9A8.AX	97/00134
MTL5031		Ex2350X					No.96.480W	Ex96D2132	Ex96D2133			J.I.3Z1A8.AX	97/00134
MTL5032				GYJ97138		J03144	No.96.481W	Ex95D2416	Ex95D2417			J.I.3Z1A8.AX	97/00134
MTL5040													
MTL5041		Ex2264X	LR 36637-97	GYJ97138		J03145	No.96.468W	Ex95D2339	Ex95D2340			J.I.3Z9A8.AX	97/00134
MTL5042		Ex2264X	LR 36637-97	GYJ97138		J03146	No.96.467W	Ex95D2341	Ex95D2342			J.I.3Z9A8.AX	97/00134
MTL5043								Ex97D2248	Ex97D2249				
MTL5044		Ex2264X	LR 36637-97	GYJ97138		J03145	No.96.468W	Ex95D2339	Ex95D2340			J.I.3Z9A8.AX	97/00134
MTL5045		Ex2254X	LR 36637-98	GYJ97138		J03147	No.96.469W	Ex95C2289	Ex95C2290	Ex96D7059	Ex96D7060	J.I.3Z9A8.AX	97/00134
MTL5046								Ex96D2483	Ex96D2484			J.I.1D8A9.AX	97/00134
MTL5049		Ex2254X	LR 36637-98	GYJ97138		J03147	No.96.469W	Ex95C2289	Ex95C2290	Ex96D7059	Ex96D7060	J.I.3Z9A8.AX	97/00134
MTL5051								Ex98D2009					
MTL5053								Ex97D2193	Ex97D2307				
MTL5061						FTZU98Ex0071		Ex96D2426	Ex96D2427			J.I.1D8A9.AX	97/00134
MTL5073		Ex2323X				JO3281	No.96.471W	Ex96D2234	Ex96D2235			J.I.3Z1A8.AX	97/00134
MTL5074								Ex96D2234					
MTL5081								BAS99ATEX7069					
MTL5118													
MTL5314								BAS98ATEX7136	EX98E2137				

MTL5000 SERIES ACCESSORIES

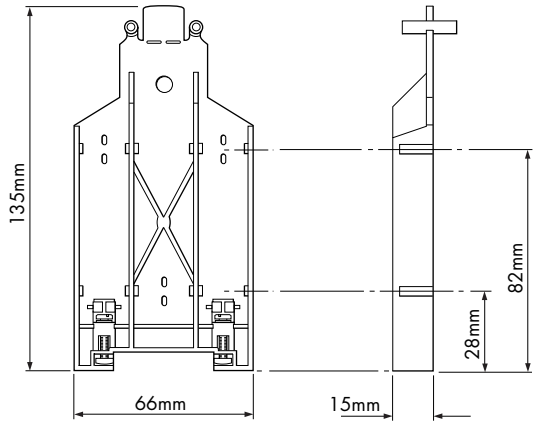
MTL5000 Series isolators mount quickly and easily onto standard DIN rail. A comprehensive range of accessories simplifies earthing and tagging arrangements.

MOUNTING

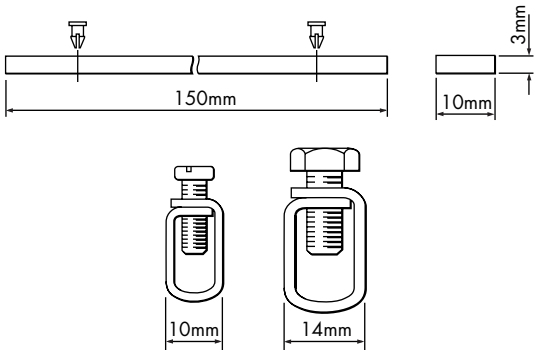
THR2 DIN rail,1m length
DIN rail to EN50022; BS5584; DIN46277

EARTH RAIL AND TAG STRIP

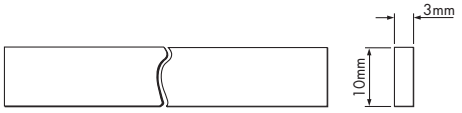
IMB57 Insulating mounting block
One required at each end of a tagging strip/earth rail. Suitable for low-profile (7.5mm) and high-profile (15mm) symmetrical DIN rail.



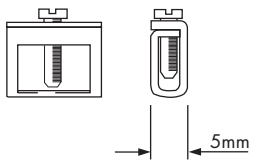
ERB57S Earth-rail bracket, straight
Nickel-plated; supplied with two push fasteners, one (14mm, 35mm²) earth-rail clamp and one (10mm, 16mm²) earth clamp.



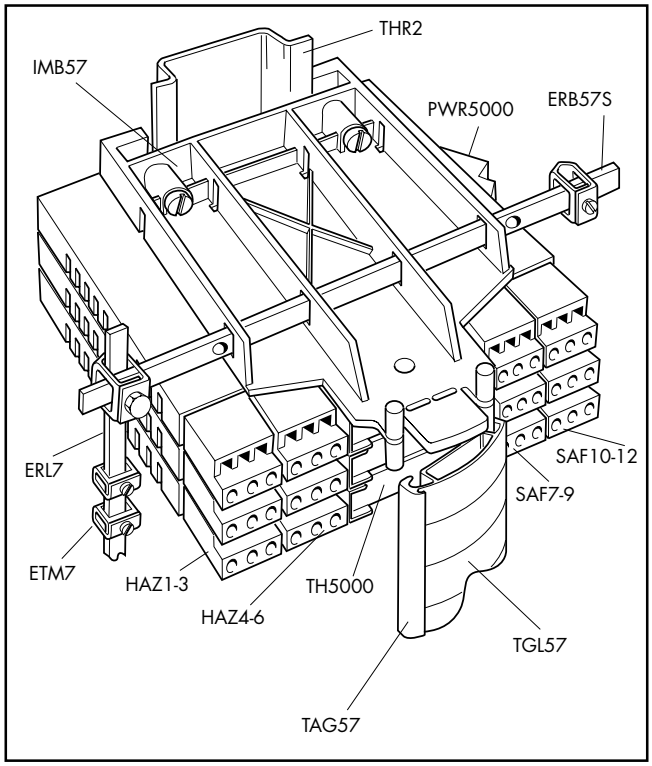
ERL7 Earth rail, 1m length
Nickel-plated; may be cut to length.



ETM7 Earth terminal, bag of 50
For terminating cable screens and 0V returns on the ERL7 earth rail. For cables ≤ 4mm².



MOUNTING DETAILS



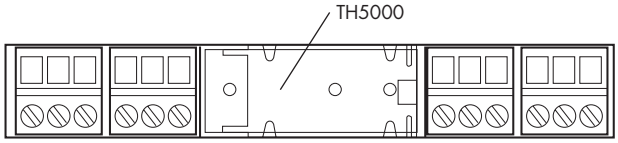
TAG57 Tagging strip, 1m length
Cut to size. Supplied with reversible tagging strip label suitable for either MTL5000 or MTL7000 Series module spacing.



TGL57 Tagging strip labels, set of 10 x 0.5m
Spares replacement, for use with TAG57 tagging strip. Labels are reversible - one side for MTL5000, the other for MTL7000.

INDIVIDUAL ISOLATOR IDENTIFICATION

TH5000 tag holders
Each isolator is supplied with a tag holder mounted, as shown below. Spares replacement TH5000.



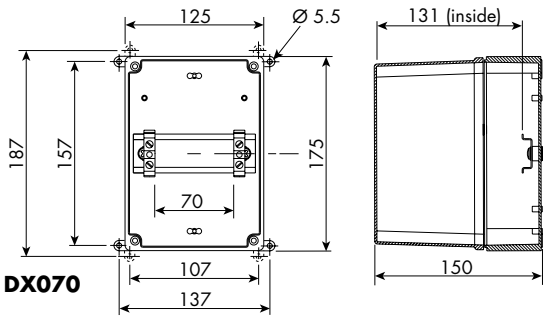
CONNECTORS

Each MTL5000 unit is supplied with signal and power connectors, as applicable.
Spares replacement connectors are available separately; see ordering information.

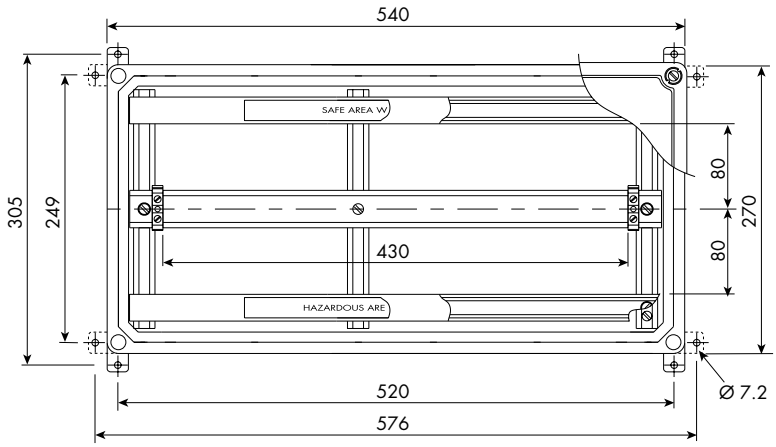
See also 'MTL5000 series Powerbus kits'

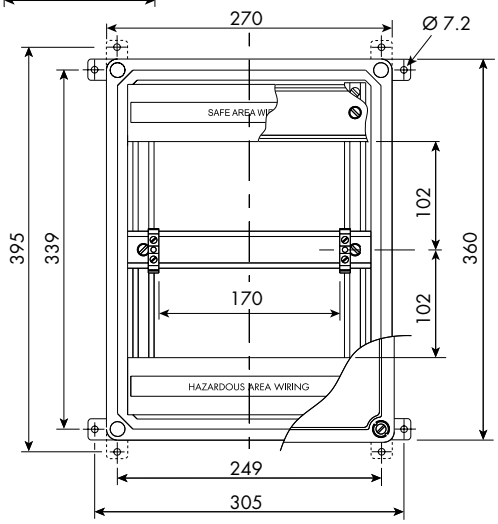
MTL5000 SERIES ENCLOSURES

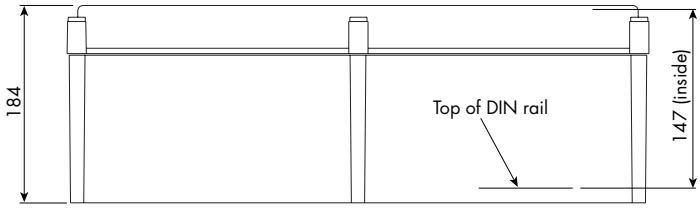
DIMENSIONS (mm) AND MOUNTING



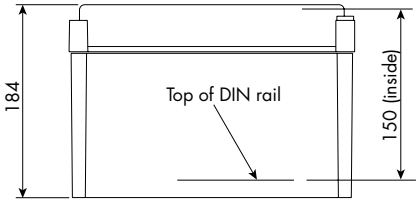
DX070







DX430



DX170

SPECIFICATION

Construction
Glass reinforced polycarbonate base - DX070
Glass reinforced polyester base - DX170, DX430
Transparent polycarbonate lid

Protection
Dust-tight and water-jet proof to IEC529:IP65

Lid fixing
Captive fixing screws

Weight (excluding barriers/isolators) kg
DX070 0.8
DX170 2.6
DX430 4.1

Items provided
DIN rail - fitted
ETL7000 Earth terminals (2 x) - fitted
"Take care IS" front adhesive label
Cable trunking (except DX070)
Note: Barriers or isolators are not included.

Mounting
Wall fixing lugs provided. For mounting arrangement drawing refer to INM57ENC.

Tagging and earth rail
Accommodates MTL5000 Series accessories.

Permitted location
Safe area
FM and CSA Div. 2, Class I (gases)
Not Div. 2, Class II (dust ignition proof)

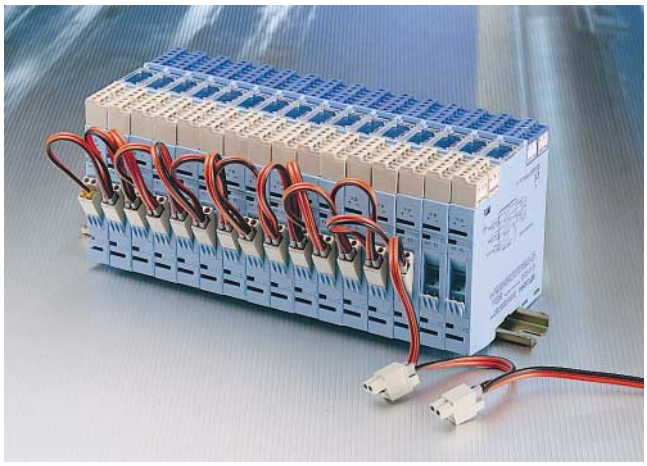
	MTL5000 isolators	
DX070	4	(2)*
DX170	10	(8)*
DX430	26	(24)*

Approximate capacities (on DIN rail between earth terminals)
** Use these figures when IMB57 mounting brackets for tagging/earth are included.*

Ambient temperature limits
Dependent on units fitted. See instruction manual INM5000.

MTL5000 SERIES POWERBUS KITS

PB - 8T,16T,24T,32T



The MTL5000 Series power bus kit enables quick and easy wiring to power up to 32 MTL 5000 Series modules using a standard 24V power supply.

SPECIFICATION

Available in 4 different lengths:

PB - 8T	= 8 connectors and loops
PB - 16T	= 16 connectors and loops
PB - 24T	= 24 connectors and loops
PB - 32T	= 32 connectors and loops

CABLE PARAMETERS

Insulation material :
PVC

Conductor :
24 strands of 0.2mm dia (0.75mm^2) standard copper

Insulation thickness :
0.5 to 0.8 mm

Current rating :
12A max

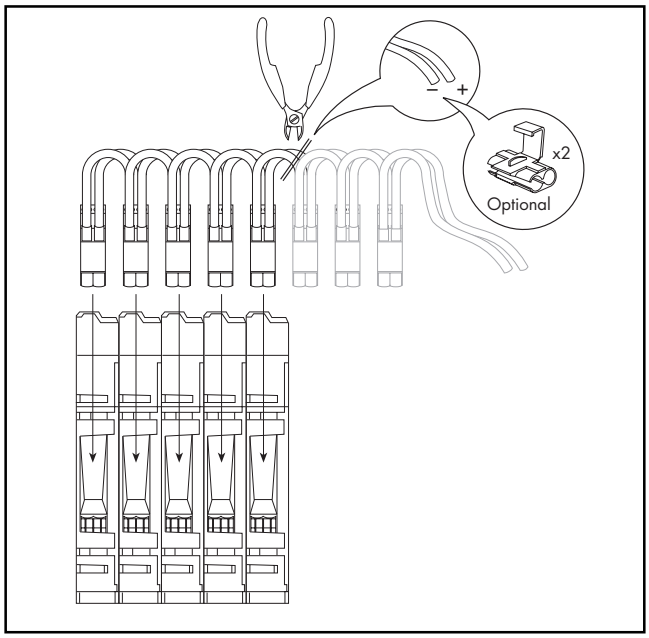
Operating temperature range :
- 20^{0}C to +60^{0}C

Max voltage drop on 32 modules drawing 130mA max :
0.5V

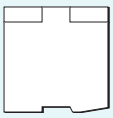
CHOOSING A POWER BUS

Choose a power bus where the number of power plugs is greater than or equal to the number of isolators to be powered and if necessary cut the power bus to the required number of terminations.

Note: To reduce the risk of excessive voltage drop or overcurrent do not connect power buses in series.



ORDERING INFORMATION



MTL5000 Series isolators
Specify part number: eg, **MTL5011B**
MTL5073/4: see data sheet for specific ordering instructions

FBT1	Fieldbus terminator

Mounting accessory

THR2	1m length of DIN rail to EN 50022; BS 5584; DIN 46277
MS010	DIN-rail module spacer, 10mm (pack of 5)

Earth-rail and tag strip accessories

IMB57	Insulating mounting block
ERB57S	Earth-rail bracket, straight
ERL7	Earth-rail, 1m length
ETM7	Earth terminal, bag of 50
TAG57	Tagging strip, 1m length
TGL57	Tagging strip labels, set of 10 x 0.5m

Enclosures

DX070	Enclosure for MTL5000 x 4
DX170	Enclosure for MTL5000 x 10
DX430	Enclosure for MTL5000 x 26

Individual isolator identification

TH5000	Tag holder

Connectors

HAZ1-3	Hazardous-area plug, terminals 1, 2 and 3
HAZ4-6	Hazardous-area plug, terminals 4, 5 and 6
HAZ-CJC	Hazardous-area plug, terminals 1 and 3 with cold-junction sensor
PWR5000	Power connector, terminals 13 and 14
SAF7-9	Safe-area plug, terminals 7, 8 and 9
SAF10-12	Safe-area plug, terminals 10, 11 and 12
PB - 8T	Powerbus Kit for isolators 1 to 8
PB - 16T	Powerbus Kit for isolators 9 to 16
PB - 24T	Powerbus Kit for isolators 17 to 24
PB - 32T	Powerbus Kit for isolators 25 to 32

Note: Each kit includes 4 single ferrules, 4 twin ferrules and 2 insulation displacement connectors (Scotchlok).

Configuration software (MTL5073/4)

PCC73	Configurator (PC interface and software)

Literature

INM5000	MTL5000 Series instruction manual
INM57ENC	Instruction manual, MTL5000/7000 Series Enclosures

Measurement Technology Limited Power Court, Luton, Bedfordshire, England LU1 3JJ
Tel: +44 (0)1582 723633 Fax: +44 (0)1582 422283 E-mail: enquiry@mtl-inst.com Web site: http://www.mtl-inst.com
A member of The MTL Instruments Group plc