MTL4000 SERIES

isolating IS interface units

For close integration of IS circuits into process-connected systems



- **Compact modular design with 'plug-in' connections**
- **High module/channel packing densities**
- **System backplanes with bussed power and safe-area connections**
- **Custom-designed backplanes for closest integration into process-connected systems**
- **Reduced system engineering and installation costs**
- **Range of standard enclosures protected to IP65**
- **Modules certified internationally for equipment and wiring in all zones and explosive atmospheres**

Telematic Ltd offers a range of mechanically compatible surge protection devices.

Ask for the SP4377 Series data sheet!

The MTL4000 Series of 'third-generation' isolating interface units introduces new concepts for integrating intrinsic safety into large or medium sized process-connected systems. Being exceptionally compact, the units give high packing densities. Units plug into system backplanes with safe-area connections made by multiway connectors – an approach which not only simplifies engineering but also reduces installation and maintenance costs.

Modules handle the majority of applications covering on/off or analogue signals between hazardous-area equipment and safe-area systems. Modules incorporate proven intrinsically safe isolation techniques internationally certified for protecting equipment and wiring in all zones and explosive atmospheres.

Key module design features include a multiway connector on the base of each unit which mates with a connector on the backplane to provide both safe-area and power supply connections. Hazardous-area connections are made by a single connector which plugs into the top of the module. These connectors are available with either screw-clamp terminals or crimp connectors. This use of removable connectors greatly simplifies installation and maintenance, so reducing time, cost, and the risk of errors.

Status LEDs, configuration switches and ports are located on the tops of individual modules for easy access.

The compact design (modules are only 16mm wide) reduces weight and gives exceptionally high packing densities.

Based on proven IS isolation technology, MTL4000 Series modules do not need a high integrity earth and the associated circuits can be left floating or be earthed at any one point in accordance with good earthing practices. MTL4000 Series provides single channel single loop integrity across the range with the addition of dual channel options mainly for the switch/proximity modules.

Line fault detection (LFD) facilities are provided on the MTL4014/4015/4016/4017/4113X switch/proximity detectors, the MTL4023 solenoid/alarm driver and the MTL4045B 4/20mA isolating driver. Analogue input units such as the MTL4041B provide line fault detection by repeating O/C or S/C currents to the safe-area control system.

New for 1998/99

MTL4043 Repeater power supply, 4/20mA, HART current sinking
MTL4044 Repeater power supply, two channel, 4/20mA, for 2-wire transmitters
MTL4099N Non-IS feed-through module
MTL4113X Proximity detector interface unit, fail-safe, TÜV-approved, LFD
MTL4114X Proximity detector interface unit, fail-safe, TÜV-approved,
MTL4401 DE trip amplifier SSI 3000
MTL4421RS Non IS solenoid/alarm driver with 24V logic override facility

System backplanes are located in safe areas and, since the hazardous-area circuits are connected directly to the modules, do not need to be certified. See MTL series backplanes, enclosures and accessories for full details.

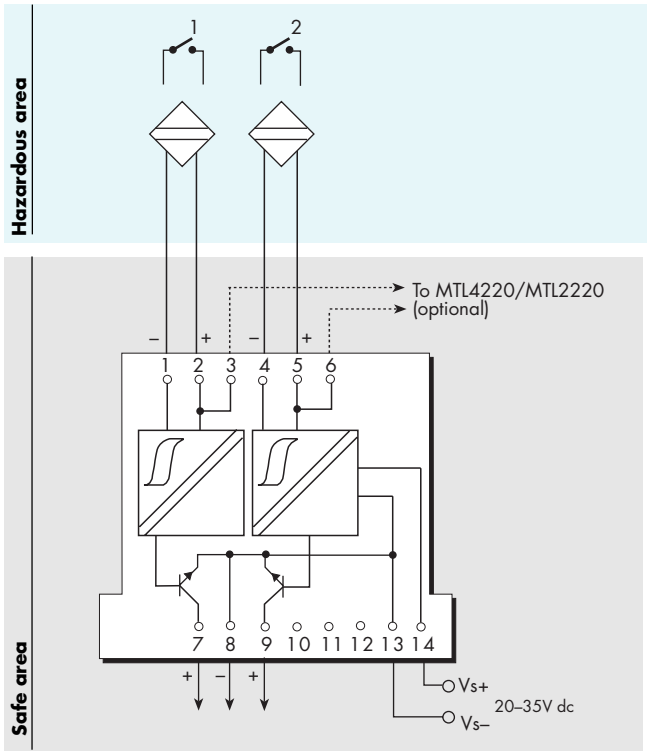
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A member of The MTL Instruments Group plc

MTL4013 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel, solid-state output

CE

The MTL4013 is a two-channel unit enabling safe-area loads to be controlled, through logic compatible solid-state outputs, by switches or proximity detectors located in hazardous areas. It can also be used with positive displacement (PD) flowmeters and some turbine meters. Earth fault detection is available optionally by using the MTL4013 with an MTL4220 or MTL2220 earth leakage detector. Power and switch status is indicated by LEDs located on top of the module.



SPECIFICATION

See also common specification, cable parameters and approvals

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 if suitably certified
Div.1, Group A, hazardous location

Voltage applied to sensor
7.0V – 9.0V dc from 1kΩ

Input/output characteristics
Output on if >2.1mA* (<2kΩ) in sensor circuit
Output off if <1.2mA* (>10kΩ) in sensor circuit
Hysteresis: 200µA (650Ω) nominal
**NAMUR and DIN 19234 standards for proximity detectors*

'No-fail' earth fault protection
Enabled by connecting terminals 3 and 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working
Note: if it is required to maintain isolation between the two channels, separate earth leakage detectors are needed

Output characteristics
Operating frequency: dc to 5kHz
Maximum off-state voltage: 35V
Maximum off-state leakage current: 10µA
Maximum on-state voltage drop: [1+ (0.1 x current in mA)] V
Maximum on-state current: 50mA
Note: each output is Zener-diode protected against inductive loads

LED indicators
Amber: one provided for each channel, ON when output circuit is closed
Green: one provided for power indication

Power requirement, Vs
47.5mA at 24V dc
45mA at 20V dc
50mA at 35V dc

Power dissipation within unit
1.15W at 24V
1.75W at 35V

Isolation
250V ac between safe and hazardous area circuits

Safety description for each channel
10.5V, 800Ω, 14mA

FM entity parameters
V_{oc} = 10.5V dc, I_{sc} = 14mA, C_a = 2.4µF, L_a = 165mH

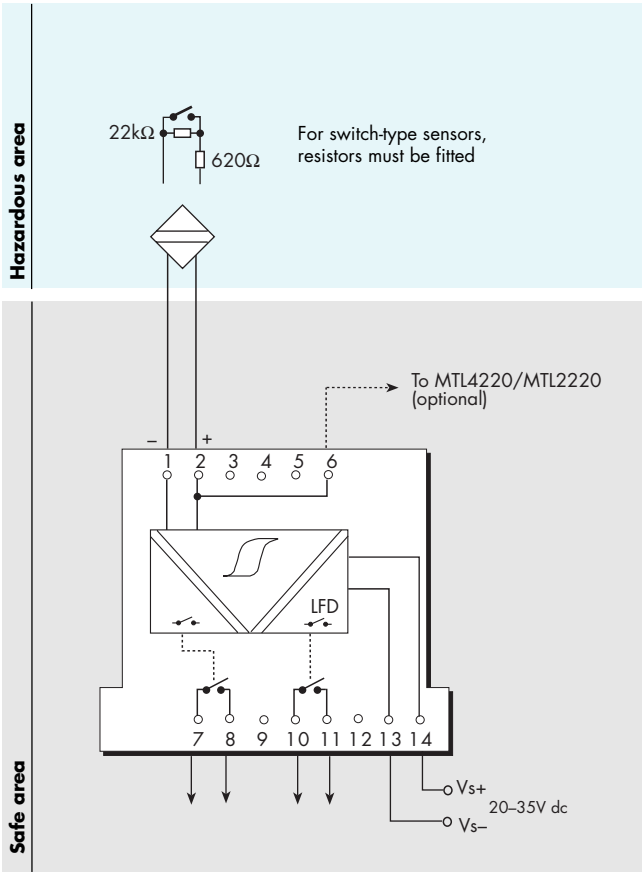
Terminal	Function
1	Input 1 –ve
2	Input 1 +ve
3	Optional link from input 1 to MTL4220/MTL2220
4	Input 2 –ve
5	Input 2 +ve
6	Optional link from input 2 to MTL4220/MTL2220
7	Output 1 +ve
8	Outputs 1/2 –ve
9	Output 2 +ve
13	Supply –ve
14	Supply +ve

MTL4014 SWITCH/ PROXIMITY DETECTOR INTERFACE

with line fault detection

CE

The MTL4014 enables a safe-area load to be controlled by a proximity detector or switch located in a hazardous area through a reed relay. Line faults are signalled through a separate reed relay. The line fault detection (LFD) function can be used with both proximity detectors and switches, provided that for switches suitable resistors are added as shown in the circuit diagram. 'No-fail' earth fault detection on either line can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6.



Terminal	Function
1	Input –ve
2	Input +ve
6	Optional link to MTL4220/MTL2220
7,8	Output
10,11	Line fault signal
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification, cable parameters and approvals

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 if suitably certified
Div.1, Group A, hazardous location

Voltage applied to sensor
7.0V – 9.0V dc from 1kΩ nominal

Input/output characteristics
Output closed if input >2.1mA* (<2kΩ)
Output open if input <1.2mA* (>10kΩ)
Hysteresis: 200µA (650Ω) nominal
**NAMUR and DIN 19234 standards for proximity detectors*

Line fault detection (LFD)
Line fault relay opens if input <50µA (broken line)
or <100Ω (shorted line)
Note: switch-type sensors must be fitted with resistors as shown in the diagram. LFD cannot be disabled.

'No-fail' earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working

Relay output characteristics
Single-pole on/off, open when relay de-energised
Response time: 2ms maximum
Contact rating: 10W, 0.5A, 35V (dc)
Contact life expectancy: 10^7 operations at maximum load
Note: reactive loads must be adequately suppressed

LED indicators
Amber: one provided for input, ON when output circuit is closed
Red: one provided for LFD, ON when line fault is detected
Green: one provided for power indication

Power requirement, Vs
45mA at 24V dc
50mA at 20V dc
36mA at 35V dc

Power dissipation within unit
1.1W at 24V
1.3W at 35V

Isolation
250V ac between safe and hazardous area circuits

Safety description
10.5V, 800Ω, 14mA

FM entity parameters
V_{oc} = 10.5V dc, I_{sc} = 14mA, C_a = 2.4µF, L_a = 165mH

MTL4015 SWITCH/ PROXIMITY DETECTOR INTERFACE UNIT

dual relay output

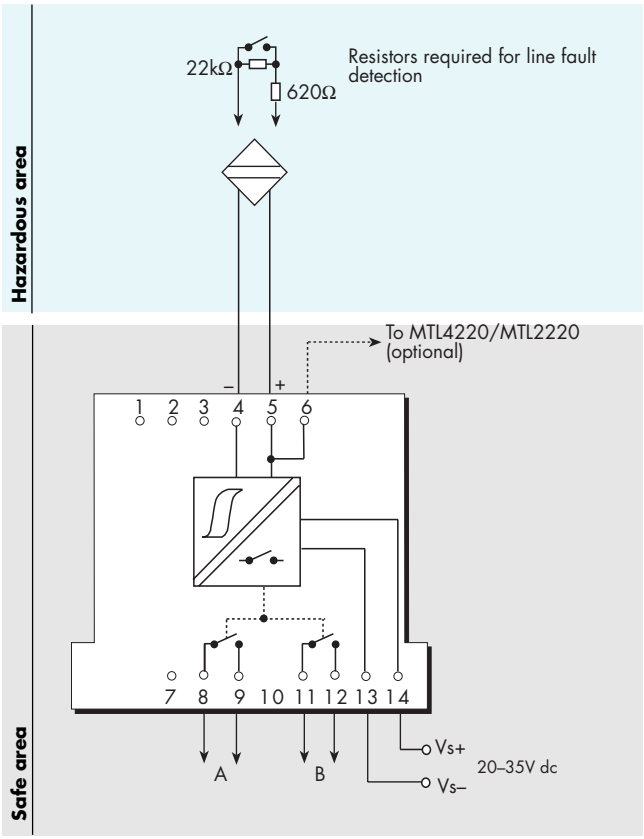
CE

With the MTL4015, a switch or proximity detector located in a hazardous area can control two safe-area loads. The two safe-area outputs are made through relays. It is designed for applications where the status of a sensor needs to be fed to two separate systems (eg, control and shutdown). A phase-reversal switch, located on top of the module, allows an alarm signal to be signalled for either state of the sensors. Line fault detection (LFD) for broken or shorted lines is provided as also are facilities for earth fault detection. Power and switch status is indicated by LEDs located on top of the module.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One
Location of switches
Zone 0, IIC, T6 hazardous area
Div.1, Group A, hazardous location
Location of proximity detector
Zone 0, IIC, T4–6 if suitably certified
Div.1, Group A, hazardous location
Voltage applied to sensor
7.0–9.0V dc from 1kΩ
Input/output characteristics
Outputs closed if >2.1mA* (<2kΩ) in sensor circuit
Outputs open if <1.2mA* (>10kΩ) in sensor circuit
Hysteresis: 200µA (650Ω) nominal
**NAMUR and DIN 19234 standards for proximity detectors*
Phase reversal
The operation of the output can be reversed by a switch on top of the unit
Line fault detection (LFD)
By built-in line-fault detection (LFD)
Output opens if input current <100µA (broken line) or >6.5mA (shorted lines)
Note: to prevent false triggering of LFD, switch-type sensors must be fitted with resistors as shown in the diagram or LFD disabled by the switch on top of the unit
'No-fail' earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line of each channel proclaimed: unit continues working
Relay output characteristics
Double-pole on/off, open when relay de-energised
Response time: 2ms maximum
Contact rating: 10W, 0.5A, 35V (dc)
Contact life expectancy: 10^6 operations at maximum load
Note: reactive loads must be adequately suppressed
LED indicators
Amber: one provided, ON when output circuit is closed
Green: one provided for power indication
Power requirement, Vs
50mA at 24V dc
60mA at 20V dc
45mA at 35V dc
Power dissipation within unit
1.2W at 24V
1.6W at 35V
Isolation
250V ac between safe and hazardous area circuits
Safety description for each channel
10.5V, 800Ω, 14mA
FM entity parameters
V_{oc} = 10.5V dc, I_{sc} = 14mA, C_a = 2.4µF, L_a = 165mH

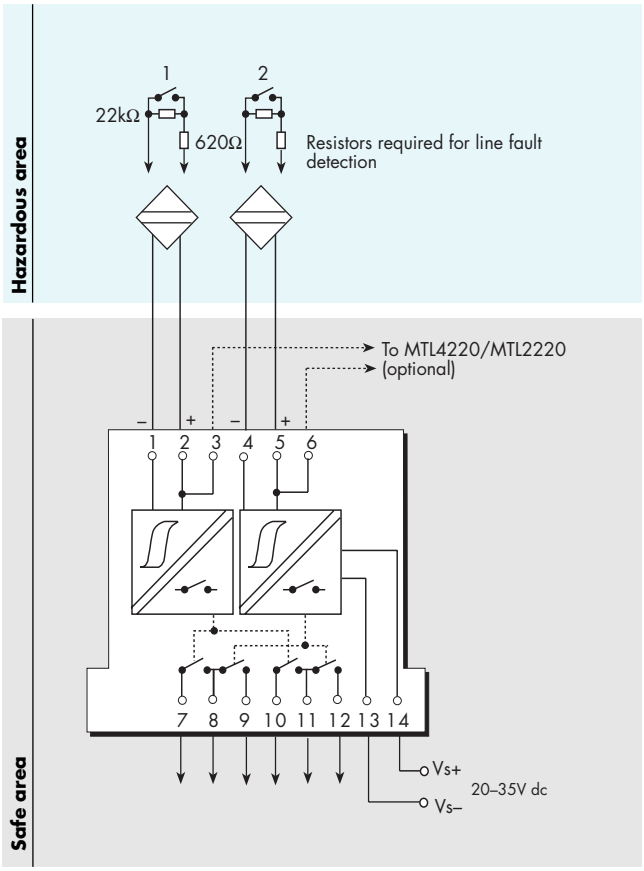


Terminal	Function
4	Input –ve
5	Input +ve
6	Optional link from input to MTL4220/MTL2220
8,9	Output A
11,12	Output B
13	Supply –ve
14	Supply +ve

MTL4016 SWITCH/ PROXIMITY DETECTOR INTERFACE UNIT

two-channel, dual relay output

With the MTL4016, two switches or proximity detectors located in a hazardous area can each control two safe-area loads. The four safe-area outputs are made through reed relays. It is designed for applications where the status of a sensor needs to be fed to two separate systems (eg, control and shutdown). Independent phase-reversal switches for each channel, located on top of the module, allow alarm signals to be signalled for either state of the sensors. Line fault detection (LFD) for broken or shorted lines is provided as also are facilities for earth fault detection. Power and switch status is indicated by LEDs located on top of the module.



SPECIFICATION

See also common specification, cable parameters and approvals

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 if suitably certified
Div.1, Group A, hazardous location

Voltage applied to sensor
7.0V – 9.0V dc from 1kΩ

Input/output characteristics
Outputs closed if >2.1mA* (<2kΩ) in sensor circuit
Outputs open if <1.2mA* (>10kΩ) in sensor circuit
Hysteresis: 200µA (650Ω) nominal
**NAMUR and DIN 19234 standards for proximity detectors*

Phase reversal
The operation of each channel can be reversed by independent switches on top of the unit

Line fault detection (LFD)
By built-in line-fault detection (LFD)
Outputs open if input current <100µA (broken line) or >6.5mA (shorted lines)
Note: to prevent false triggering of LFD, switch-type sensors must be fitted with resistors as shown in the diagram or LFD disabled by switches on top of the unit

'No-fail' earth fault protection
Enabled by connecting terminals 3 and 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line of each channel proclaimed: unit continues working
Note: to maintain isolation between the two channels, separate earth leakage detectors are needed

Relay output characteristics
Double-pole on/off, open when relay de-energised
Response time: 2ms maximum
Contact rating: 10W, 0.5A, 35V (dc)
Contact life expectancy: 10^6 operations at maximum load
Note: reactive loads must be adequately suppressed

LED indicators
Amber: one provided for each channel, ON when output circuit is closed
Green: one provided for power indication

Power requirement, Vs
50mA at 24V dc
60mA at 20V dc
45mA at 35V dc

Power dissipation within unit
1.2W at 24V
1.6W at 35V

Isolation
250V ac between safe and hazardous area circuits

Terminal	Function
1	Input 1 –ve
2	Input 1 +ve
3	Optional link from input 1 to MTL4220/MTL2220
4	Input 2 –ve
5	Input 2 +ve
6	Optional link from input 2 to MTL4220/MTL2220
7,8	Output 1A
8,9	Output 2A
10,11	Output 1B
11,12	Output 2B
13	Supply –ve
14	Supply +ve

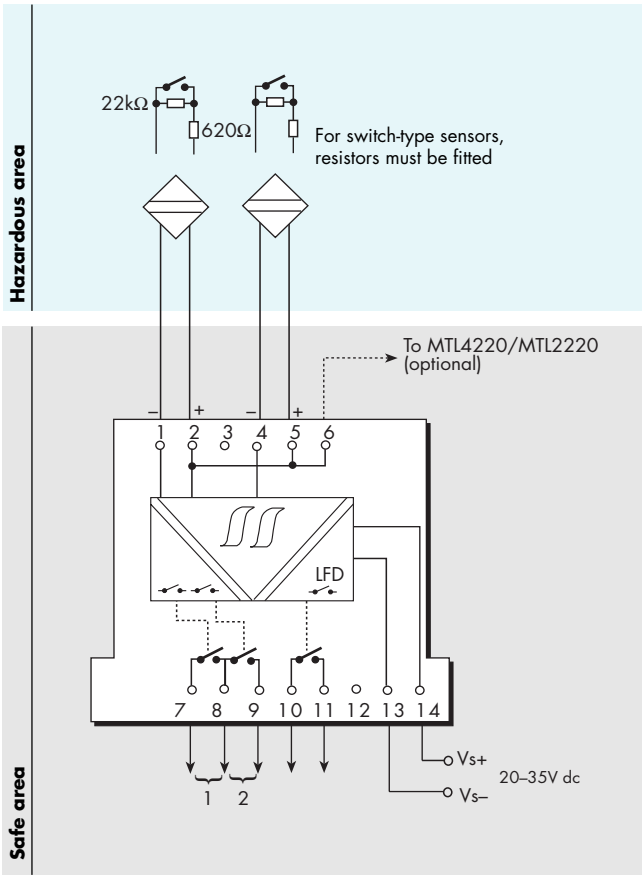
Safety description for each channel
10.5V, 800Ω, 14mA

FM entity parameters
V_{oc} = 10.5V dc, I_{sc} = 14mA, C_a = 2.4µF, L_a = 165mH

MTL4017 SWITCH/ PROXIMITY DETECTOR INTERFACE

two-channel with line fault detection CE

With the MTL4017, two switches or proximity detectors located in a hazardous area can each control a safe-area load through a relay. Line faults are signalled through a separate relay. Line fault detection (LFD) can be used with proximity detectors or switches provided in the latter case suitable resistors are added as shown in the circuit diagram. 'No-fail' earth fault detection on either line of each channel can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6.



Terminal	Function
1	Input 1 –ve
2	Input 1 +ve
4	Input 2 –ve
5	Input 2 +ve
6	Optional link to MTL4220/MTL2220
7,8	Output 1
8,9	Output 2
10,11	Line fault signal
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
Two

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

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

Voltage applied to sensor
7.0V – 9.0V dc from 1kΩ nominal

Input/output characteristics
Output closed if input >2.1mA* (<2kΩ)
Output open if input <1.2mA* (>10kΩ)
Hysteresis: 200µA (650Ω) nominal
**NAMUR and DIN 19234 standards for proximity detectors*

Line fault detection (LFD)
Line fault relay opens if either input <50µA (broken line)
or <100Ω (shorted lines)
Note: switch-type sensors must be fitted with resistors as shown in the diagram. LFD cannot be disabled.

'No-fail' earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line of each channel proclaimed: unit continues working

Relay output characteristics
Single-pole on/off, open when relay de-energised
Response time: 2ms maximum
Contact rating: 10W, 0.5A, 35V (dc)
Contact life expectancy: 10^7 operations at maximum load
Note: reactive loads must be adequately suppressed

LED indicators
Amber: one provided for each channel, ON when output circuit is closed
Red: one provided for each channel, ON when line fault is detected
Green: one provided for power indication

Power requirement, Vs
52mA at 24V dc
62mA at 20V dc
42mA at 35V dc

Power dissipation within unit
1.25W at 24V
1.5W at 35V

Isolation
250V ac between safe and hazardous area circuits

Safety description for each channel
10.5V, 800Ω, 14mA

FM entity parameters
Each channel without line fault detection:
V_{oc} = 10.5 V dc, I_{sc} = 14mA, C_a = 2.4µF, L_a = 165mH
Each channel with earth leakage detection:
V_t = 17.4 V dc, I_t = 14mA, C_a = 0.36µF, L_a = 165mH

MTL4021 SOLENOID/ ALARM DRIVER

CE

The MTL4021 enables an on/off device in a hazardous area to be controlled by a volt-free contact or logic signal in the safe area. It can drive loads such as solenoids, alarms, LEDs and other low power devices that are certified as intrinsically safe or are classified as non-energy storing simple apparatus. By connecting a second safe-area switch or logic signal, the output can be disabled to enable, for example, a safety system to override a control signal. Earth fault detection can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6.

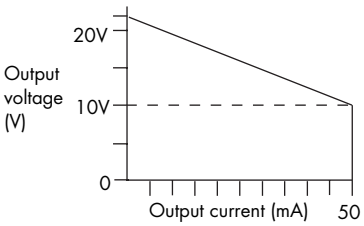
SPECIFICATION

See also common specification, cable parameters and approvals

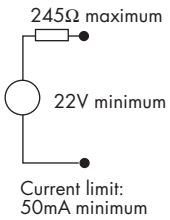
Number of channels
One

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

Minimum output voltage



Equivalent output circuit



Maximum output voltage
25.5V from 232Ω

Output ripple
<0.5% of maximum output, peak-to-peak

Control input
Suitable for switch contacts, an open collector transistor or logic drive
0 = input switch closed, transistor on or <1.4V applied across terminals 10 & 11
1 = input switch open, transistor off or >4.5V applied across terminals 10 & 11

Override input
An open collector transistor or a switch connected across terminals 8 and 9 can be used to turn the output off whatever the state of the control input
0 = transistor on or switch closed
1 = transistor off or switch open

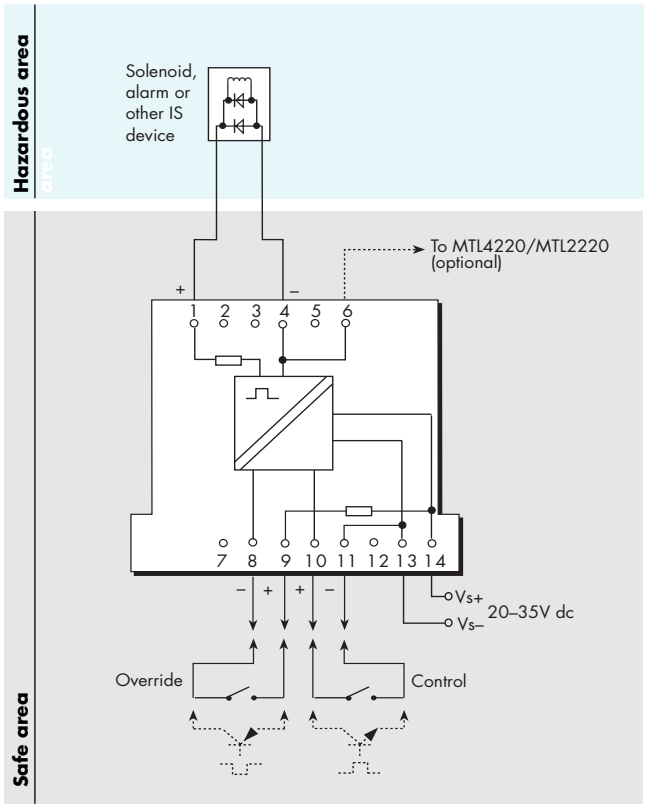
Control and override inputs

Control input	Override input	Output state
0	0	off
0	1	on
1	0	off
1	1	off

Response time
Output within 10% of final value after 100ms

No-fail earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working

LED indicators
Amber: one provided for status, ON when output circuit is active
Green: one provided for power indication



Terminal	Function
1	Output +ve
4	Output –ve
6	Optional link to MTL4220/MTL2220
8	Override –ve
9	Override +ve
10	Control +ve
11	Control –ve
13	Supply –ve
14	Supply +ve

Power requirement, Vs
100mA at 24V dc
120mA at 20V dc
75mA at 35V dc

Power dissipation within unit
1.3W with typical solenoid valve, output on
1.9W worst case

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

Safety description
25.5V, 232Ω, 110mA

FM entity parameters
V_{oc} = 25.5V dc, I_{sc}= 110mA, C_a = 0.17µF, L_a = 3mH

MTL4021S SOLENOID/ ALARM DRIVER

with 24V logic override facility

CE

The MTL4021S enables an on/off device in a hazardous area to be controlled by a volt-free contact or logic signal in the safe area. It can drive loads such as solenoids, alarms, LEDs and other low power devices that are certified as intrinsically safe or are classified as non-energy storing simple apparatus. Provided that 24V dc is applied to the override input, the solenoid/alarm can be operated by the control input. However, if the 24V dc signal is removed, the solenoid/alarm is turned off. Earth fault detection can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6.

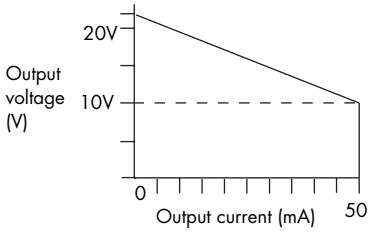
SPECIFICATION

See also common specification, cable parameters and approvals

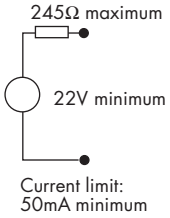
Number of channels
One

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

Minimum output voltage



Equivalent output circuit



Maximum output voltage
25.5V from 232Ω

Output ripple
<0.5% of maximum output, peak-to-peak

Control input
Suitable for switch contacts, an open collector transistor or logic drive
0 = input switch closed, transistor on or <1.4V applied across terminals 10 & 11
1 = input switch open, transistor off or >4.5V applied across terminals 10 & 11

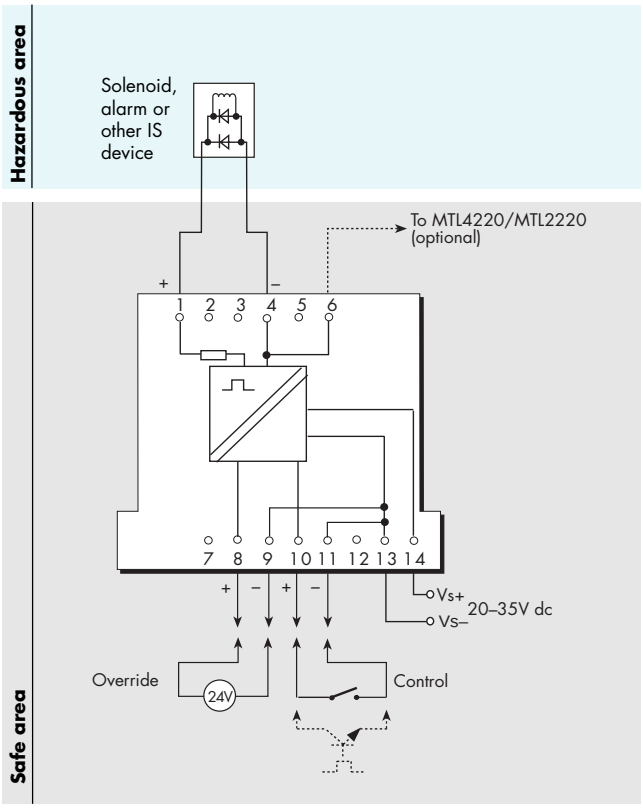
Override input
A 24V logic signal applied across terminals 8 and 9 allows the solenoid/alarm to be operated by the control input. If it is disconnected, the solenoid/alarm is off.
0 = <2.0V applied across terminals 8 & 9
1 = >9.0V applied across terminals 8 & 9 (nominal switching point 4.5V)

Control and override inputs

Control input	Override input	Output state
0	0	off
0	1	on
1	0	off
1	1	off

Response time
Output within 10% of final value within 100ms

No-fail earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working



Terminal	Function
1	Output +ve
4	Output –ve
6	Optional link to MTL4220/MTL2220
8	Override +ve
9	Override –ve
10	Control +ve
11	Control –ve
13	Supply –ve
14	Supply +ve

LED indicators
Amber: one provided for status, ON when output circuit is active
Green: one provided for power indication

Power requirement, Vs
100mA at 24V dc
120mA at 20V dc
75mA at 35V dc

Power dissipation within unit
1.3W with typical solenoid valve, output on
1.9W worst case

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

Safety description
25.5V, 232Ω, 110mA

FM entity parameters
V_{oc} = 25.5V dc, I_{sc} = 110mA, C_a = 0.17µF, L_a = 3mH

MTL4023 SOLENOID DRIVER

with line fault detection

CE

With the MTL4023 interface, an on/off device in a hazardous area can be controlled by a volt-free contact or logic signal in the safe area. It is suitable for driving loads such as solenoids. Line fault detection (LFD), which operates irrespective of the output state, is signalled by a safe-area solid-state switch which de-energises if a field line is open or short-circuited. Earth fault detection can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6.

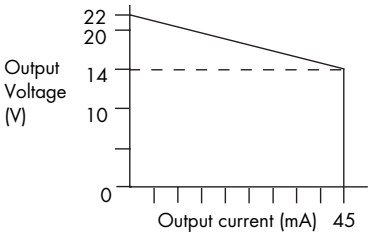
SPECIFICATION

See also common specification, cable parameters and approvals

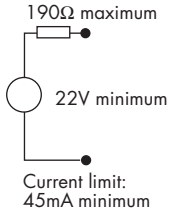
Number of channels
One

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

Minimum output voltage



Equivalent output circuit



Maximum output voltage
25V from 170Ω

Output ripple
< 0.5% of maximum output, peak to peak

Control input
Suitable for switch contacts, an open collector transistor or logic drive
Output turns on if input switch closed, transistor on or <1.4V applied across terminals 10 & 11
Output turns off if input switch open, transistor off or >4.5V applied across terminals 10 & 11

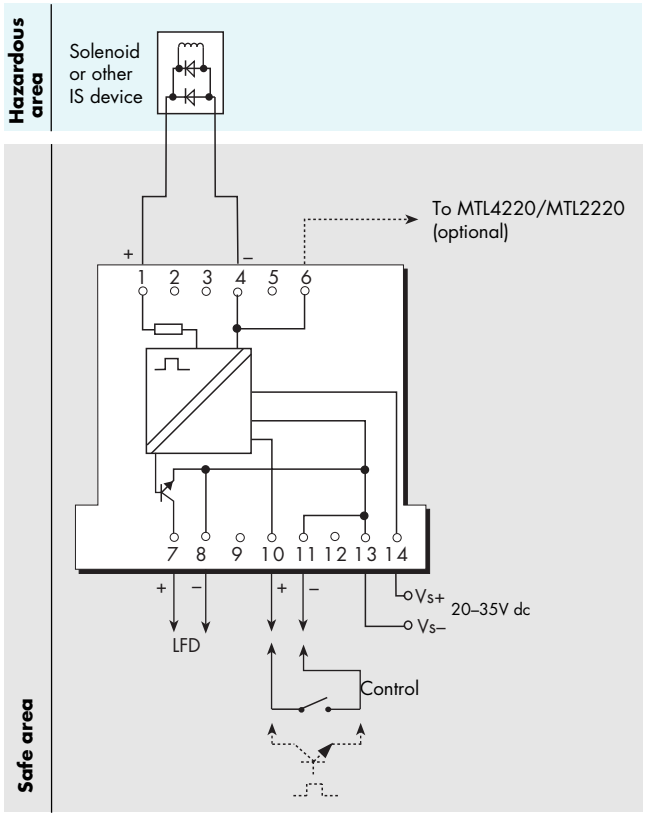
Response time
Output within 10% of final value within 100ms

Line fault detection (LFD)
Open or short circuit in field cabling de-energises solid state line fault signal
LFD is operational irrespective of output state provided that the field circuit impedance is normally >50Ω and <7kΩ. Output off-state LFD current normally <5mA.

Line fault signal characteristics
Maximum off-state voltage: 35V
Maximum off-state leakage current: 10µA
Maximum on-state voltage drop: 2V
Maximum on-state current: 50mA
Note: LFD signal is Zener-diode protected against inductive loads

'No-fail' earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working

LED indicators
Amber: one provided for status, ON when output circuit is active
Red: one provided for line fault detection, ON when line fault is detected
Green: one provided for power indication



Terminal	Function
1	Output +ve
4	Output –ve
6	Optional link to MTL4220/MTL2220
7	Line fault signal +ve
8	Line fault signal –ve
10	Control +ve
11	Control –ve
13	Supply –ve
14	Supply +ve

Power requirements, Vs
100mA at 24V dc
130mA max at 20V dc
90mA at 35V dc

Power dissipation within unit
1.2W with typical solenoid valve, output on
2.0W worst case

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

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

FM entity parameters
Without earth leakage detection:
V_{oc} = 25V dc, I_{sc} = 147mA, C_a = 0.17µF, L_a = 1.6mH
With earth leakage detection:
V_t = 31.9V dc, I_t = 147mA, C_a = 0.09µF, L_a = 1.6mH

MTL4024 SOLENOID/ ALARM DRIVER

for 24V systems, loop powered

CE

The MTL4024 enables an on/off device in a hazardous area to be controlled by a 24V signal in the safe area. It can drive loads such as solenoids, alarms, LEDs and other low-power devices that are certified as intrinsically safe or are classified as non-energy-storing simple apparatus. Provided that 24V dc is applied to the override input, the solenoid/alarm can be operated by a voltage change in the safe area. However, if the 24V dc override signal is removed, the solenoid/alarm is turned off. Earth fault detection can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6. The MTL4024R is functionally identical to the MTL4024, but has pin 11 connected internally to pin 13.

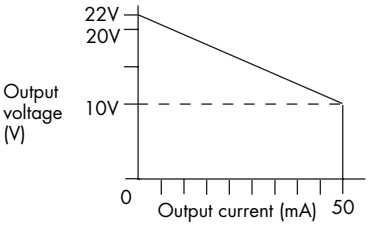
SPECIFICATION

See also common specification, cable parameters and approvals

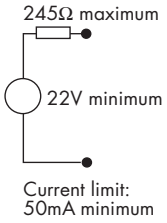
Number of channels
One

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

Minimum output voltage



Equivalent output circuit



Maximum output voltage
25.5V from 232Ω

Output ripple
<0.5% of maximum output, peak-to-peak

Override input
A 24V signal applied across terminals 8 and 9 allows the solenoid/alarm to be operated by the supply across terminals 10 and 11. If the 24V signal is disconnected, the solenoid/alarm is off.

Voltage across terminals 8 and 9	State of solenoid/alarm
<2.0V	Off
>9.0V	Controlled by supply across terminals 10 and 11
>2.0V but <9.0V	Undetermined

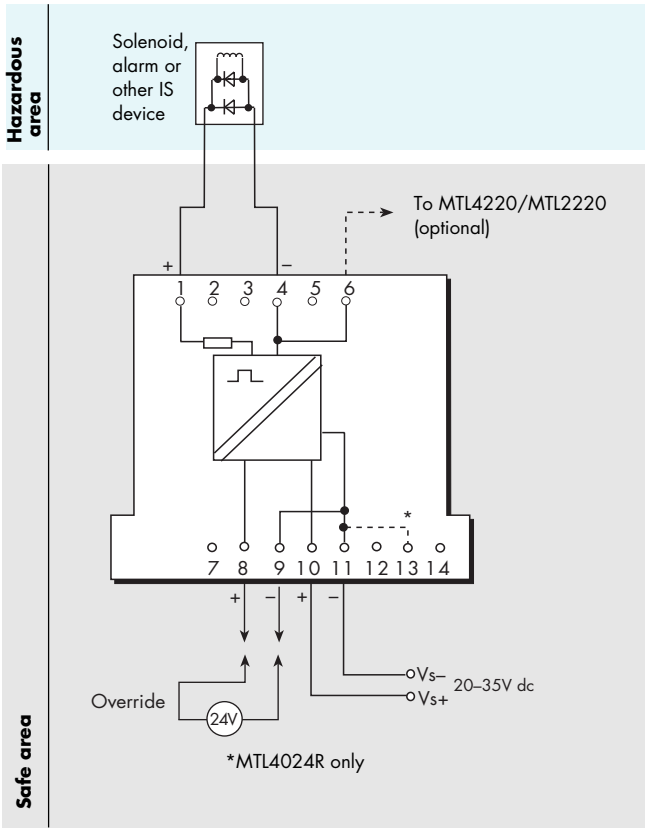
Input impedance at terminal 8
Typically 10kΩ

Response time
Output within 10% of final value within 100ms

'No-fail' earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working

LED indicators
Amber: one provided for status, ON when output circuit is active
Green: one provided for drive status ON when supply is connected

Power requirement, Vs
100mA at 24V dc
120mA at 20V dc
75mA at 35V dc



Terminal	Function
1	Output +ve
4	Output –ve
6	Optional link to MTL4220/MTL2220
8	Override +ve
9	Override –ve
10	Supply +ve
11	Supply –ve

Power dissipation within unit
1.3W at 24V with typical solenoid valve, output on
1.9W worst case

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

Safety description
25.5V, 232Ω, 110mA

FM entity parameters
V_{oc} = 25.5V dc, I_{sc} = 110mA, C_a = 0.17µF, L_a = 3mH

MTL4025 SOLENOID/ ALARM DRIVER

low current output

CE

The MTL4025 enables an on/off device in a hazardous area to be controlled by a volt-free contact or logic signal in the safe area. It can drive any loads such as solenoids, alarms, and LEDs that are certified as intrinsically safe or are classified as non-energy-storing simple apparatus. It also acts as a power supply for PLMS GD4001 and GD4002 gas detectors. For full configuration details please refer to the PLMS installation instructions. Earth fault detection can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 6.

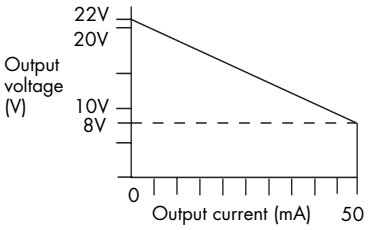
SPECIFICATION

See also common specification, cable parameters and approvals

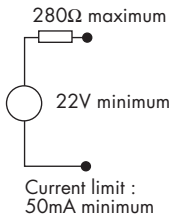
Number of channels
One

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

Minimum output voltage



Equivalent output circuit



Maximum output voltage
25V from 269Ω

Output ripple
<0.5% of maximum output, peak-to-peak

Control input
Suitable for switch contacts, an open collector transistor or logic drive
0 = input switch closed, transistor on or <1.4V applied across terminals 10 & 11
1 = input switch open, transistor off or >4.5V applied across terminals 10 & 11

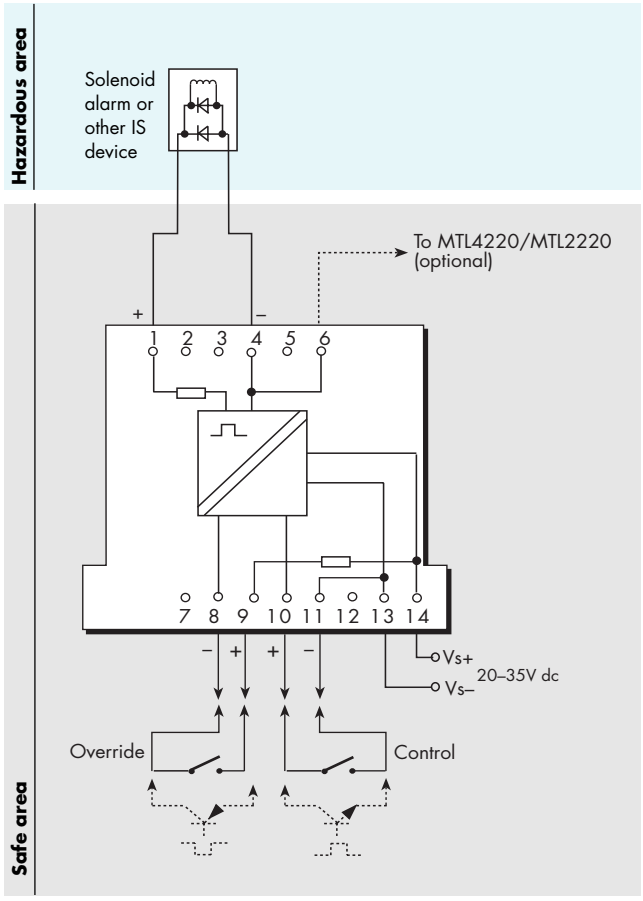
Override input
An open collector transistor or a switch connected across terminals 8 and 9 can be used to turn the output off whatever the state of the control input
0 = transistor on or switch closed
1 = transistor off or switch open

Control and override inputs

Control input	Override input	Output state
0	0	off
0	1	on
1	0	off
1	1	off

Response time
Output within 10% of final value within 100ms

'No-fail' earth fault protection
Enabled by connecting terminal 6 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line proclaimed: unit continues working



Terminal	Function
1	Output +ve
4	Output –ve
6	Optional link to MTL4220/MTL2220
8	Override –ve
9	Override +ve
10	Control +ve
11	Control –ve
13	Supply –ve
14	Supply +ve

LED indicators
Amber: one provided for status, ON when output circuit is active
Green: one provided for power indication

Power requirement, Vs
100mA at 24V dc
120mA at 20V dc
75mA at 35V dc

Power dissipation within unit
1.1W with typical solenoid valve, output on
1.9W worst case

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

Safety description
25V, 269Ω, 93mA

FM entity parameters
V_{oc} = 25V dc, I_{sc} = 93mA, C_a = 0.17µF, L_a = 4.2mH

MTL4031 VIBRATION TRANSDUCER INTERFACE

CE

The MTL4031 is for use with vibration sensors mounted in a hazardous area and connected into monitoring equipment for use with rotating machinery. The interface is compatible with both 3-wire eddy probes and high frequency accelerometers.

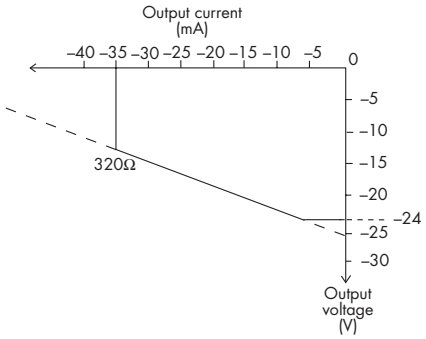
SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

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

Transducer supply voltage (terminals 2 and 6)



Signal range (terminals 5 and 6, 7 and 8)
Minimum: –20V
Maximum: –0.5V
for dc transfer error < ±100mV

Signal input impedance (terminals 5 and 6)
10kΩ –1%, +2%

Signal output impedance (terminals 7 and 8)
<20Ω

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)

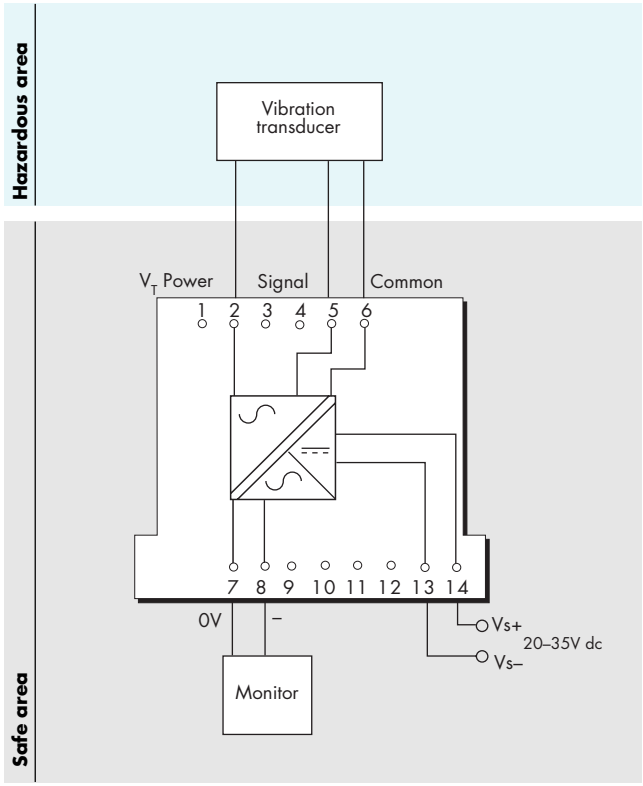
Phase delay
Less than 14µs, equivalent to:

–1°	at	200Hz
–3°	at	600Hz
–5°	at	1kHz
–50°	at	10kHz
–100°	at	20kHz

LED indicator
Green: one provided for power indication

Power requirement, Vs, with 22mA transducer load
80mA at 24V dc
88mA at 20V dc
63mA at 35V dc

Power dissipation within unit
<1.7W



Terminal	Function
2	Supply to hazardous area
5	Signal input
6	Common (0V)
7	Signal (0V)
8	Signal output –ve
13	Supply –ve
14	Supply +ve

Isolation
250V ac between input, power and output circuits

Safety description

Terminals 2 to 6
26.6V, 94mA, 0.66W

Terminals 5 to 6
Non-energy-storing apparatus ≤1.2V, ≤0.1A, ≤20µJ, and ≤25mW

MTL4032 PULSE ISOLATOR

CE

The MTL4032 isolates pulses from a switch, proximity detector, current pulse transmitter or voltage pulse transmitter located in a hazardous area. It is ideal for applications involving high pulse rates and fast response times.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One, fully floating

Sensor type
Switch or proximity detector (NAMUR/DIN 19234)
2- or 3-wire voltage or pulse transmitter

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–T6 if suitably certified
Div.1, Group A, hazardous location

Input

Switch input:
Output ON if switch is closed
Output OFF if switch is open

Proximity detector input:
Excitation: 7.0 to 9.0V dc from 1kΩ nominal
Output ON if input >2.1mA* (<2kΩ)
Output OFF if input <1.2mA* (>10kΩ)
Switching hysteresis: 0.2mA (650Ω) nominal
**NAMUR and DIN19234 standards for proximity detectors*

Current pulse input:
Transmitter supply: 16.5V dc at 20mA
Short circuit current: 24mA
Output ON if input >9.0mA
Output OFF if input <7.0mA
Switching hysteresis: 0.5mA

Voltage pulse input
Input impedance: >10kΩ
Switching point voltage (Vsp): 3, 6, or 12V nominal (selectable by switch on top of unit)
Output ON if input >Vsp
Output OFF if input <Vsp
Switching hysteresis: 100mV + (0.1 x Vsp) typical

Pulse width
High: 10µs min
Low: 10µs min

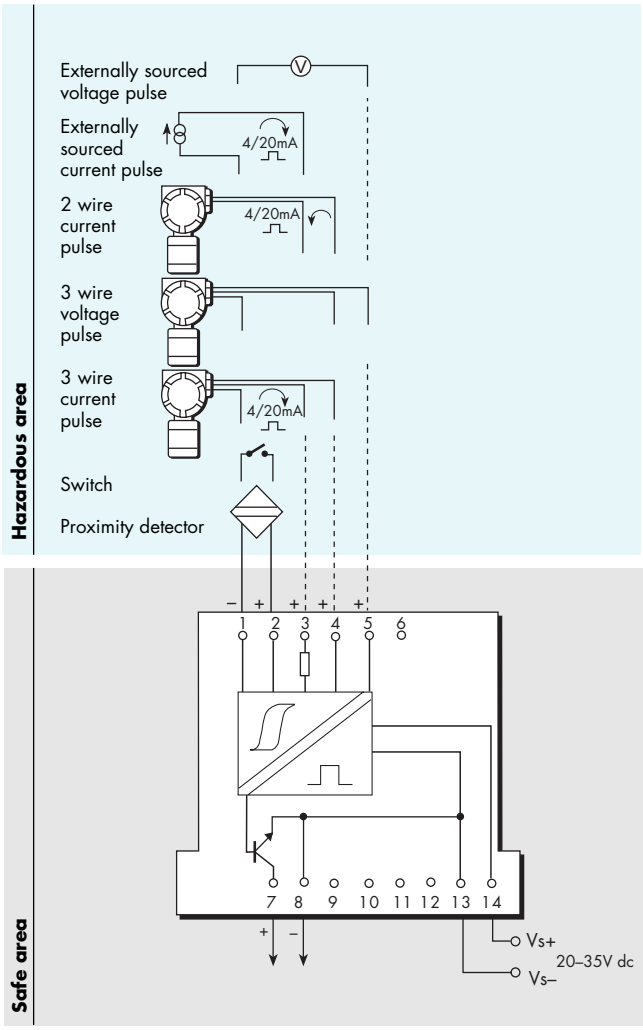
Frequency range
0–50kHz

Output characteristics
Maximum off-state voltage: 35V
Maximum off-state leakage current: 10µA
Maximum on-state voltage drop: 1 + (0.1x current in mA) V
Maximum on-state current: 50mA
Output OFF if supply fails
Note: the output is zener diode protected against inductive loads

LED indicators
Amber: one provided for input, ON when output circuit is ON
Green: one provided for power indication

Power requirement
65mA at 24V dc
70mA at 20V dc
55mA at 35V dc

Power dissipation within unit
1.35W maximum at 24V
1.75W maximum at 35V



Terminal	Function
1	Common input –ve
2	Switch/proximity input +ve
3	Current pulse input +ve
4	Tx supply +ve
5	Voltage pulse input +ve
7	Pulse output +ve
8	Pulse output –ve
13	Supply –ve
14	Supply +ve

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

Safety description

Terminals 2 to 1
10.5V, 800Ω, 14mA

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

Terminals 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 open-circuit voltage not more than 28V

Terminals 5 to 4 and 1
Vmax ≤28V, Imax ≤94mA, Pmax ≤0.66W

FM entity parameters

Terminals 1, 4 and 5
V_t = 27.6V, I_t = 94mA, C_a = 0.12µF, L_a = 4.2mH

Terminals 1, 2
V_{oc} = 10.5V, I_{sc} = 13mA, C_a = 2.4µF, L_a = 200mH

Terminals 1, 3, 4
V_t = 27.6V, I_t = 155mA, C_a = 0.12µF, L_a = 1.57mH

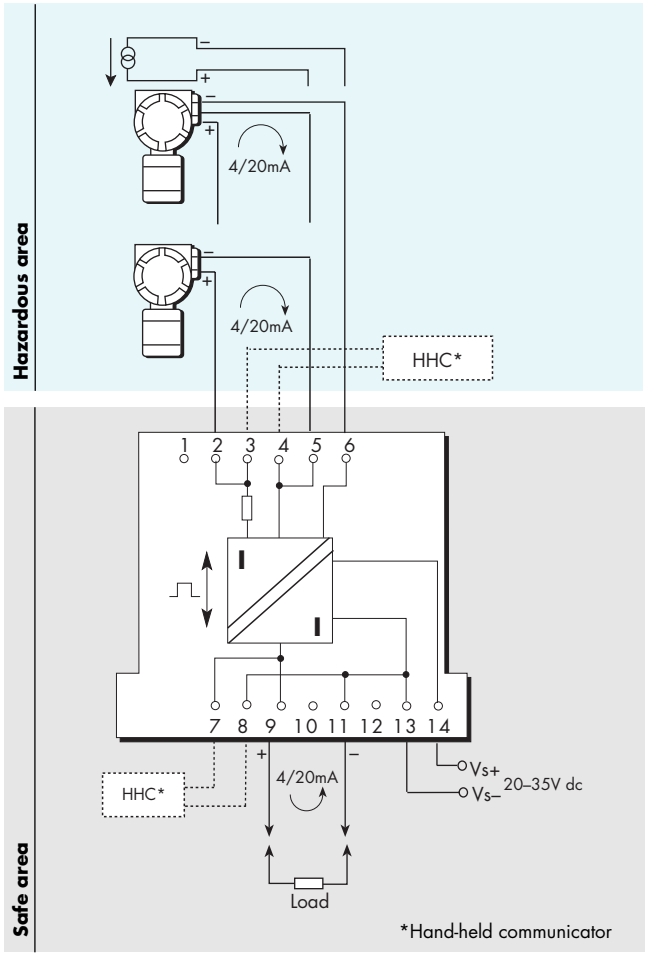
Terminals 1, 3
V_{oc} = 1.1V, I_{sc} = 51mA, C_a = 1000µF, L_a = 13.8mH

MTL4041B REPEATER POWER SUPPLY

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

CE

The MTL4041B provides a fully floating dc supply for energising a conventional 2- or 3-wire 4/20mA transmitter or a 'smart' transmitter located in a hazardous area, and repeats the current in another circuit to drive a safe-area load. For smart transmitters, the unit allows bi-directional transmission of digital communication signals superimposed on the 4/20mA signal so that the transmitter can be interrogated either from the operator station or by a hand-held communicator (HHC). The module can also be used with hazardous-area current sources and some vortex and turbine meters.



SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

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

Voltage available for transmitter and lines
15V minimum at 20mA
Note: maximum open-circuit voltage is 28V

Input and output signal range
4 to 20mA

Over-/under-range
1.0mA to 21.5mA

Digital signal bandwidth
10Hz to 8kHz

Safe-area circuit load resistance
Conventional transmitters: 0 to 650Ω
Smart transmitters: 250Ω ±10%

Safe-area circuit output resistance
>1MΩ

Safe-area circuit ripple
<50µA peak-to-peak up to 80kHz

Transfer accuracy at 20°C
Better than 20µA

Temperature drift
<1µA/°C

Response time
Settles within 200µA of final value within 20ms

LED indicator
Green: one provided for power indication

Power requirement, Vs
65mA at 24V dc
75mA at 20V dc
50mA at 35V dc with 20mA signal

Power dissipation within unit
1.2W at 24V with 20mA signal
1.4W at 35V

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

Safety description

Terminals 2 to 5 and 6
28V, 300Ω, 93mA

Terminals 5 to 6
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 28V
Note: Terminals 5 and 6 only support HART® communications in one direction from field device to safe-area connections 9 and 11.

Terminal	Function
2	Tx supply +ve
3	Optional HHC connection +ve
4	Optional HHC connection –ve
5	Current input –ve
6	Common
7	Optional HHC connection +ve
8	Optional HHC connection –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

FM entity parameters

Terminals 2, 5, 6
V_t = 28V, I_t = 141mA, C_a = 0.13µF, L_a = 1.94mH

Terminals 2, 4, 5
V_t = 28V, I_t = 93mA, C_a = 0.13µF, L_a = 4.2mH

HART® is a registered trademark of HART Communication Foundation

MTL4041P HIGH-POWER REPEATER POWER SUPPLY

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

CE

The MTL4041P provides a fully floating dc supply for energising a conventional 2- or 3-wire 4/20mA transmitter or a 'smart' transmitter located in a hazardous area, and repeats the current in another circuit to drive a safe-area load. For smart transmitters, the unit allows bi-directional transmission of digital communication signals superimposed on the 4/20mA signal so that the transmitter can be interrogated either from the operator station or by a hand-held communicator (HHC). The module can also be used with hazardous-area current sources. The MTL4041P is a high-power version of the MTL4041B, suitable for all gas groups provided that the field equipment is suitably certified.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

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

Voltage available for transmitter and lines
16.3V minimum at 20mA
Note: maximum open-circuit voltage is 28V

Input and output signal range
4 to 20mA

Over-/under-range
1.0mA to 21.5mA

Digital signal bandwidth
10Hz to 8kHz

Safe-area circuit load resistance
Conventional transmitters: 0 to 650Ω
Smart transmitters: 250Ω ±10%

Safe-area circuit output resistance
>1MΩ

Safe-area circuit ripple
<50µA peak-to-peak up to 80kHz

Transfer accuracy at 20°C
Better than 20µA

Temperature drift
<1µA/°C

Response time
Settles within 200µA of final value within 20ms

LED indicator
Green: one provided for power indication

Power requirement, Vs
65mA at 24V dc with 20mA signal
75mA at 20V dc
50mA at 35V dc

Power dissipation within unit
1.2W at 24V with 20mA signal
1.4W at 35V

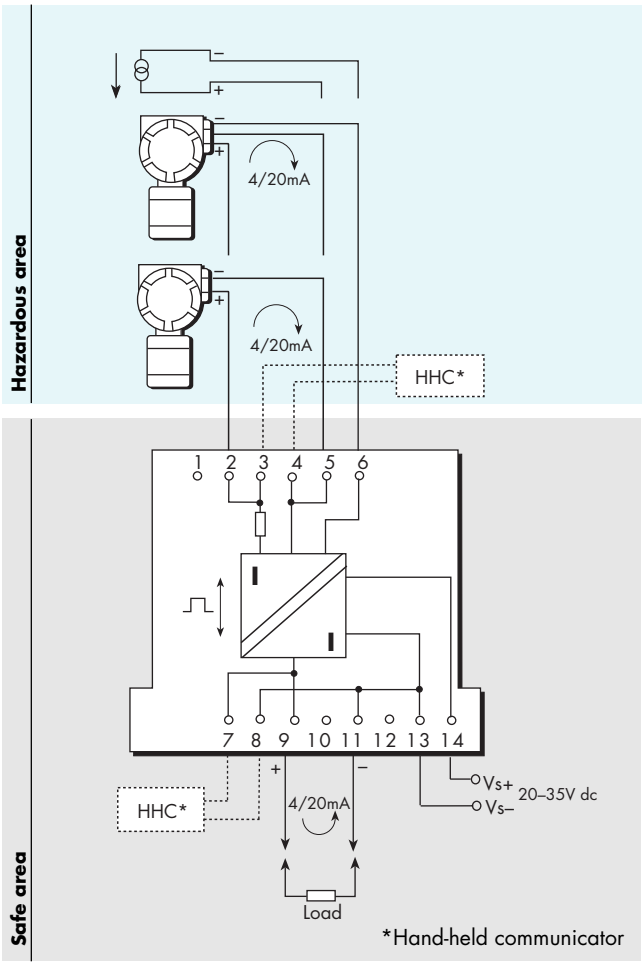
Isolation
250V ac between safe- and hazardous-area circuits

Safety description

Terminals 2 to 5 and 6
28V, 240Ω, 116.6mA

Terminals 5 to 6
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 28V
Note: Terminals 5 and 6 only support HART® communications in one direction from field device to safe-area connections 9 and 11.

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Terminal	Function
2	Tx supply +ve
3	Optional HHC connection +ve
4	Optional HHC connection –ve
5	Current input
6	Common
7	Optional HHC connection +ve
8	Optional HHC connection –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

FM entity parameters

Terminals 2 and 5
V_{oc} = 28V dc, I_{sc} = 118mA, C_a = 0.14µF, L_a = 2.76mH

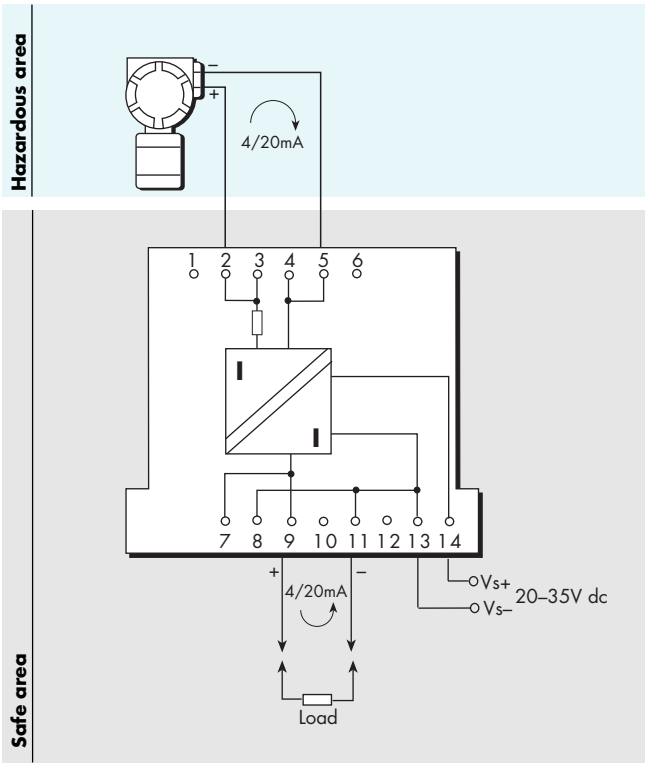
Terminals 2, 3, 4, 5 and 6
V_t = 28V dc, I_t = 166mA, C_a = 0.14µF, L_a = 1.41mH

MTL4042 REPEATER POWER SUPPLY IIB

4/20mA, for 2-wire transmitters

CE

The MTL4042 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 circuit to drive a safe-area load.



SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

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

Voltage available for transmitter and lines
18.0V minimum at 20mA
Note: maximum open-circuit voltage is 28V

Input and output signal range
4 to 20mA

Over-/under-range
1.0mA to 21.5mA

Safe-area circuit load resistance
Conventional transmitters: 0 to 650Ω

Safe-area circuit output resistance
>1MΩ

Safe-area circuit ripple
<50µA peak-to-peak up to 80kHz

Transfer accuracy at 20°C
Better than 20µA

Temperature drift
<1µA/°C

Response time
Settles within 200µA of final value within 20ms

LED indicator
Green: one provided for power indication

Power requirement, Vs
65mA at 24V dc
75mA at 20V dc
50mA at 35V dc

Power dissipation within unit
1.2W at 24V with 20mA signal
1.4W at 35V

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

Safety description
Terminals 2 to 5
28V, 150Ω, 187mA, U_m = 250V rms or dc

FM entity parameters
V_{oc} = 28V dc, I_{sc} = 185.5mA, C_a = 0.39µF, L_a = 4.5mH

Terminal	Function
2	Tx supply +ve
3	Optional connection +ve
4	Optional connection –ve
5	Current input –ve
7	Optional connection +ve
8	Optional connection –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

MTL4043 REPEATER POWER SUPPLY

4/20mA, HART, current sinking

CE

The MTL4043 provides a fully floating dc supply for energising a conventional 2- or 3-wire 4/20mA transmitter or a 'HART' transmitter located in a hazardous area, and controls the current in another safe area circuit. For HART® transmitters, the unit allows bi-directional transmission of digital communication signals superimposed on the 4/20mA signal so that the transmitter can be interrogated either from the operator station or by a hand-held communicator (HHC).

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

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

Voltage available for transmitter and lines
15V minimum at 20mA
Note: maximum open-circuit voltage is 28V

Input and output signal range
4 to 20mA

Over-/under-range
1.0mA to 21.5mA

Digital signal bandwidth
50Hz to 8kHz

Safe-area load
Source voltage: 30V max
Minimum load resistance: 0Ω at up to 20V source voltage
200Ω at up to 24V source voltage
500Ω at up to 30V source voltage
Load resistance for HART operation: 250Ω ±10%

Safe-area circuit output resistance
>1MΩ

Safe-area circuit ripple
<50µA peak-to-peak up to 80kHz

Transfer accuracy at 20°C
Better than 20µA

Temperature drift
<1µA/°C

Response time
Settles within 200µA of final value within 20ms

LED indicator
Green: one provided for power indication

Power requirement, Vs, with 20mA signal
49mA at 24V dc
57mA at 20V dc
36mA at 35V dc

Power dissipation within unit, with 20mA signal
1.2W at 24V
1.4W at 35V

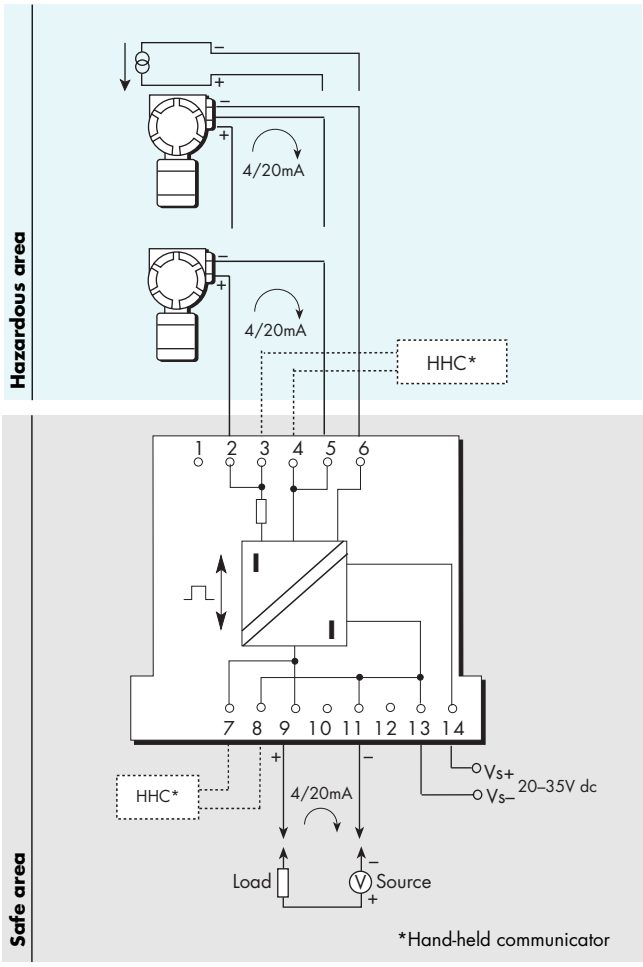
Isolation
250V ac between safe- and hazardous-area circuits

Safety description

Terminals 2 to 5 and 6
28V, 300Ω, 93mA

Terminals 5 to 6
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 28V
Note: terminals 5 to 6 only support HART communications in one direction from field device to safe-area connections 9 and 11.

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Terminal	Function
2	Tx supply +ve
3	Optional HHC connection +ve
4	Optional HHC connection –ve
5	Current input –ve
6	Common
7	Optional HHC connection +ve
8	Optional HHC connection –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

FM entity parameters

Terminals 2, 5 and 6
V_t = 28V dc, I_t = 141mA, C_a = 0.13µF, L_a = 1.9mH

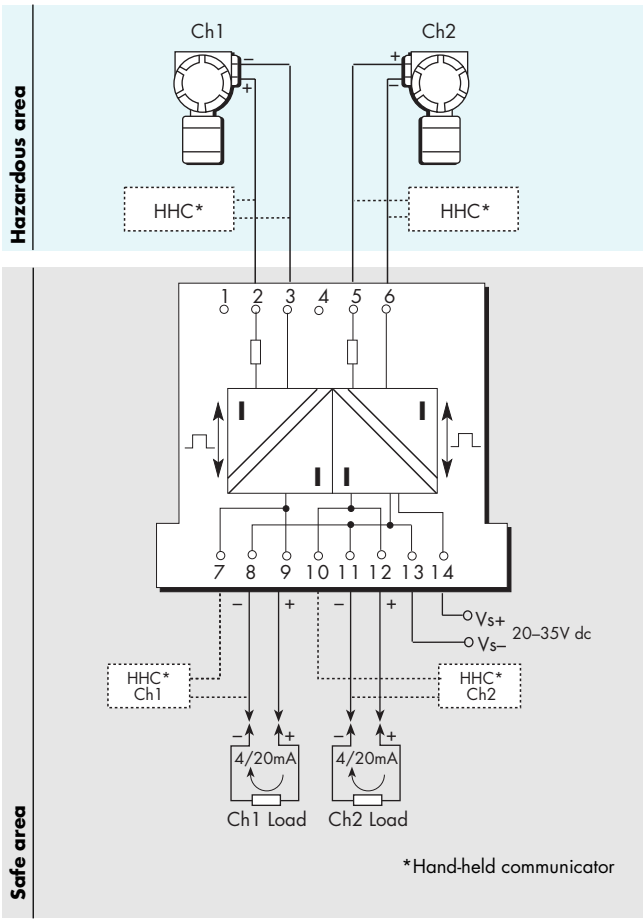
Terminals 2, 4 and 5
V_t = 28V dc, I_t = 93mA, C_a = 0.13µF, L_a = 4.2mH

MTL4044 REPEATER POWER SUPPLY

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

CE

The MTL4044 provides fully floating dc supplies for energising two conventional 2-wire 4/20mA or 'smart' transmitters located in a hazardous area, and repeats the current in other circuits to drive two safe-area loads. For smart transmitters, the unit allows bi-directional transmission of digital communication signals superimposed on the 4/20mA signal so that the transmitter can be interrogated either from the operator station or by a hand-held communicator (HHC).



SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
Two

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

Voltage available for transmitter and lines
15V minimum at 20mA
Note: maximum open-circuit voltage is 28V

Input and output signal range
2.0mA to 22mA

Digital signal bandwidth
Hazardous-to-safe dc to 10kHz
Safe-to-hazardous 2Hz to 10kHz

Safe-area circuit load resistance
Conventional transmitters: 0 to 300Ω
Smart transmitters: 250Ω ±10%

Safe-area circuit output resistance
>1MΩ

Safe-area circuit ripple
<50µA peak-to-peak up to 80kHz

Transfer accuracy at 20°C
Better than 20µA

Temperature drift
<1µA/°C

Response time
Settles within 200µA of final value within 20ms

LED indicator
Green: one provided for power indication

Power requirement, Vs
(with both channels carrying 20mA signal)
90mA at 24V dc
105mA at 20V dc
65mA at 35V dc

Power dissipation within unit
(with both channels carrying 20mA signal)
1.2W at 24V dc

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

Safety description
Terminals 2 to 3 and 5 to 6
28V, 300Ω, 93mA

FM entity parameters
V_{oc} = 28V dc, I_{sc} = 93mA, C_a = 0.13µF, L_a = 4.2mH

Terminal	Function
2	Ch1 tx supply +ve
3	Ch1 tx supply –ve
5	Ch2 tx supply +ve
6	Ch2 tx supply –ve
7	Ch1 optional HHC connection +ve
8	Ch1 output –ve/HHC –ve
9	Ch1 output +ve
10	Ch2 optional HHC connection +ve
11	Ch2 output –ve/HHC –ve
12	Ch2 output +ve
13	Supply –ve (internally connected to terminals 8 and 11)
14	Supply +ve

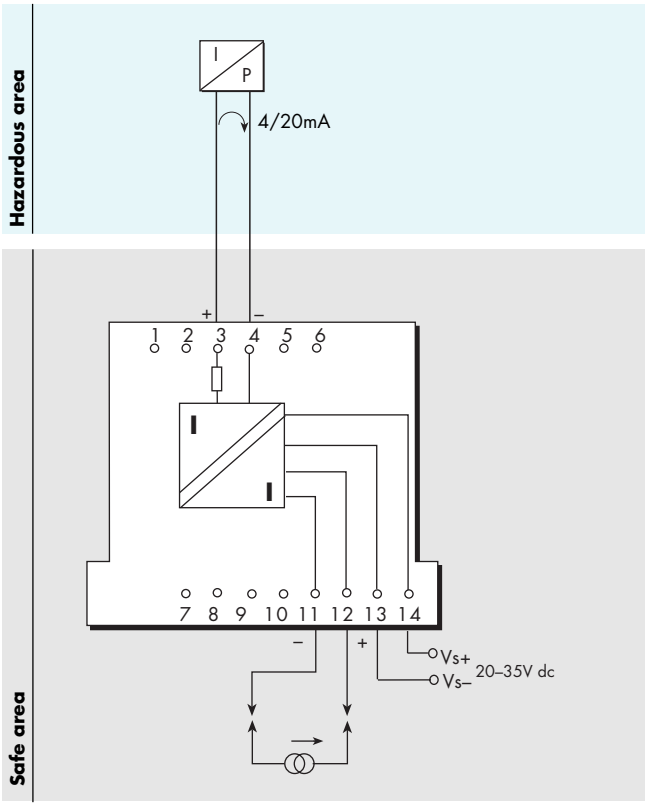
MTL4045B/4045C ISOLATING DRIVERS

4/20mA, with line fault detection

CE

The MTL4045B accepts a 4/20mA signal from a safe-area controller and repeats it to drive a current/pressure (I/P) converter or any other load up to 800Ω in a hazardous area. The output capability is 16V at 20mA and the drop across the input terminals is low (4V). The input and output circuits float independently. Process controllers with a readback facility can detect an open or short circuit in the field wiring since, if this occurs, the resistance across the input terminals will change to a preset high value.

The MTL4045C is identical to the MTL4045B except that it provides open circuit detection only (no short circuit detection). The MTL4045B short circuit detection feature may not be compatible with some I/P positioners which have a high self-inductance. Consult your MTL representative for advice.



Terminal	Function
3	Output +ve
4	Output –ve
11	Input –ve
12	Input +ve
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

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

Working range
4 to 20mA

Maximum load driving capability
16V (800Ω at 20mA)

Minimum load resistance (MTL4045B only)
90Ω (short circuit detection at <50Ω)

Output resistance
>1MΩ

Under/over range capability
1.0 to 21.4mA

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

Input parameters
≤200Ω with the field wiring intact
>47kΩ with the field wiring open-circuit
<0.75mA with the field wiring short-circuit

Transfer accuracy at 20°C
Better than 20µA

Temperature drift
<1.0µA/°C

Response time
Settles within 200µA of final value within 100ms

LED indicator
Green: one provided for power indication

Power requirement, Vs
50mA at 24V dc with 20mA signal
55mA at 20V dc
40mA at 35V dc

Power dissipation within unit
1.0W maximum at 24V with 20mA signal
1.2W at 35V

Isolation
250V ac between safe- and hazardous-area circuits.
Input circuit is floating; clamped to less than 10V above supply –ve permitting the use of a 250Ω current sense resistor in the return path.

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

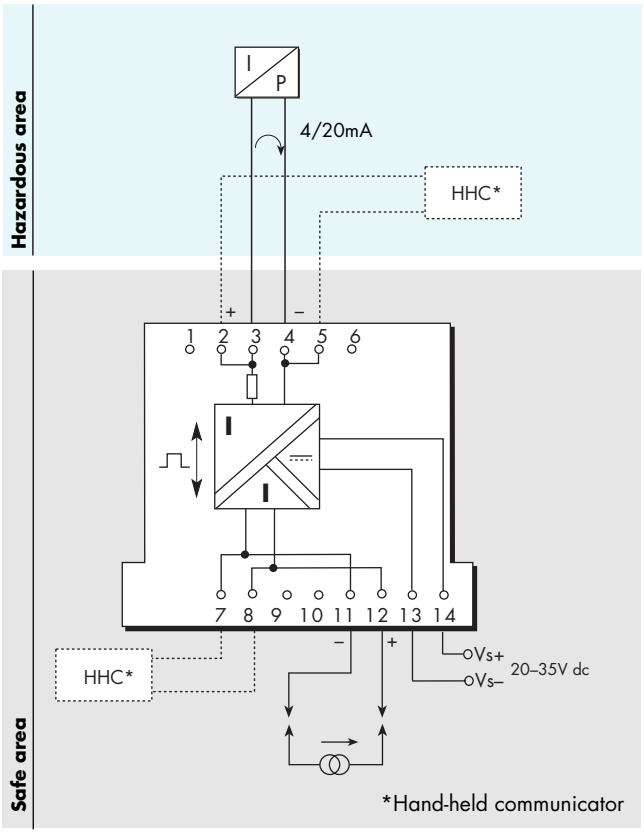
FM entity parameters
V_{oc} = 28V dc, I_{sc} = 93mA, C_a = 0.12µF, L_a = 4.2mH

MTL4046P HIGH POWER ISOLATING DRIVER

for HART® valve positioners

CE

The MTL4046P accepts a 4/20mA floating signal from a safe-area controller to drive a current/pressure converter (or any other floating load up to 870Ω) in a hazardous area. For HART valve positioners, the module also permits bi-directional transmission of digital communication signals so that the device can be interrogated either from the operator station or by a hand-held communicator (HHC). Process controllers with a readback facility can detect open or short circuits in the field wiring: if these occur, the current taken into the terminals drops to a preset level.



SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One
Location of I/P converter
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div. 1, Group A, hazardous location
Working range
4 to 20mA
Digital signal bandwidth
500Hz to 10kHz
Maximum load resistance
870Ω (17.4V at 20mA)
Minimum load resistance
90Ω (short circuit detection at <50Ω)
Output resistance
>1MΩ
Under/over range capability
Under range = 1.0mA
Over range = 26.0mA (load ≤600Ω)
Input and output circuit ripple
<40µA peak-to-peak
Transfer accuracy at 20°C
Better than 20µA
Input characteristics
<4.0V with the field wiring intact
<0.9mA with the field wiring open- or short-circuit
Response time
Settles within 200µA of final value within 100ms
Temperature drift
<1.0µA/°C
LED indicator
Green: one provided for power indication
Power requirement, Vs
58mA at 24V dc
70mA at 20V dc
40mA at 35V dc
Power dissipation within unit
1.2W typical at 24V with 20mA loop current
1.4W worst case
Isolation
250V ac between safe- and hazardous-area circuits
Input circuit is floating
Safety description
28V, 240Ω, 116mA, U_m = 250V rms or dc
FM entity parameters
V_t = 28V dc, I_{sc} = 117mA, C_a = 0.14µF, L_a = 2.6mH

Terminal	Function
2	Optional HHC connection +ve
3	Output +ve
4	Output –ve
5	Optional HHC connection –ve
7	Optional HHC connection –ve
8	Optional HHC connection +ve
11	Input –ve
12	Input +ve
13	Supply –ve
14	Supply +ve

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MTL4047 REPEATER POWER SUPPLY

4/20mA, for Bailey 'smart' transmitters

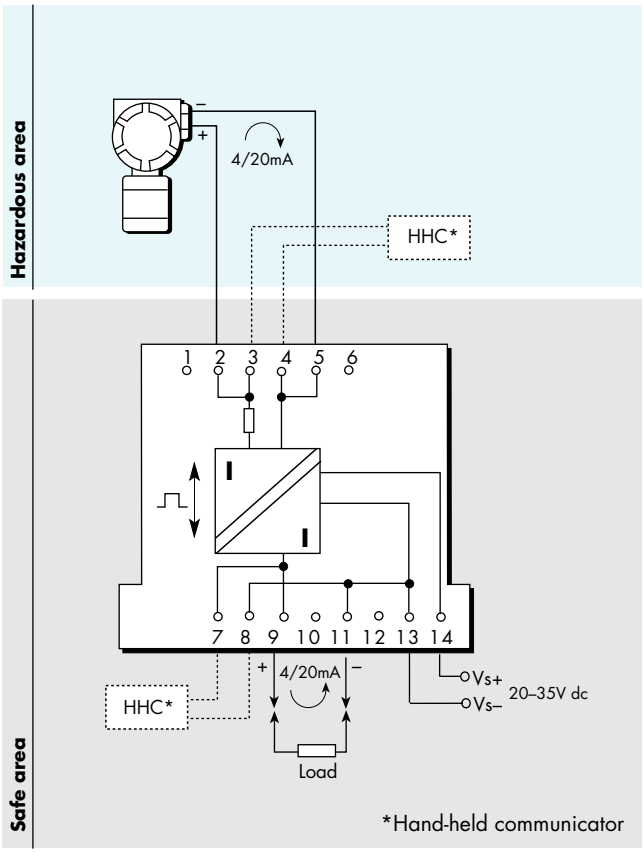
The MTL4047 performs a similar function to the MTL4041B, but is suitable for use with the Bailey BCN/EQN/PTS Series of 'smart' transmitters. The unit provides a minimum of 15.6V at 24mA to energise the transmitter while at the same time repeating the current accurately in a separate circuit to drive a load in the safe area. The Bailey transmitter also operates in multi-drop applications, and in this configuration up to six transmitters (if suitably certified) can be connected in parallel to a single MTL4047 with each transmitter drawing 4mA, thereby using the maximum 24mA supplied by the MTL4047.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One
Location of transmitter
Zone 0, IIC, T4–6 hazardous area if suitably certified
Div 1, Group A, hazardous location
Voltage available for transmitter and lines
15.6V minimum at 24mA
Note: maximum open-circuit voltage is 22.8V
Maximum permitted line resistance
(15.6 minus transmitter voltage requirement) x 50Ω (at 20mA)
(15.6 minus transmitter voltage requirement) x 41.5Ω (at 24mA)
Input and output signal range
0 to 24mA with superimposed digital signal
Digital signal transmission
Compatible with Bailey BCN, EQN and PTS transmitters
Safe-area circuit load resistance
Conventional transmitters: 100Ω to 550Ω
Bailey smart transmitters: 250Ω ±10%
Safe-area circuit output resistance
>1MΩ
Safe-area circuit ripple
<50µA peak-to-peak up to 80kHz
Transfer accuracy at 20°C
<20µA from 4mA to 20mA
Temperature drift
<1µA/°C
Response time
Settles within 200µA of final value within 60ms
LED indicator
Green: one provided for power indication
Power Requirement, Vs
65mA at 24V dc with 20mA signal
75mA at 20V dc
50mA at 35V dc

75mA at 24V dc with 24mA load current
85mA at 20V dc
55mA at 35V dc
Power dissipation within unit
1.2W typical at 24V with 24mA load current
1.4W maximum at 35V with 24mA load current
Isolation
250V ac between safe- and hazardous-area circuits
Safety description
22.8V, 116Ω, 197mA
FM entity parameters
V_{oc} = 23.3V dc, I_{sc} = 197.3mA, P_o = 1.15W



Terminal	Function
2	Tx supply +ve
3	Optional HHC connection +ve
4	Optional HHC connection –ve
5	Tx supply –ve
7	Optional HHC connection +ve
8	Optional HHC connection –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

MTL4048 LOOP-POWERED ISOLATOR

4/20mA, for Foxboro 'intelligent' transmitters

CE

The MTL4048 is designed primarily for use with Foxboro 'intelligent' transmitters operating in the digital mode. It acts like a direct-current transformer. Being powered from the safe-area side, the same current flows in both hazardous and safe-area circuits and can be controlled from either. It provides bi-directional transmission of digital communication signals so that the transmitter can be interrogated either from the operator station or by a hand-held communicator (HHC).

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One, fully floating

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

Input and output signal range
4 to 20mA

Input voltage, Vs
9 to 35V dc

Minimum output voltage

Input voltage V_{in}	Minimum output voltage V_{out}
<24V	V_{in} – (0.4 x current in mA) – 1V
>24V	23V – (0.4 x current in mA)

Input and output ripple
<100µA peak-to-peak

Transfer accuracy at 20°C
Better than 400µA

Temperature drift
<5µA/°C (0 to 60°C)
<8.5µA/°C (–20 to 0°C)

Response time
Settles within 10% of final value within 100ms

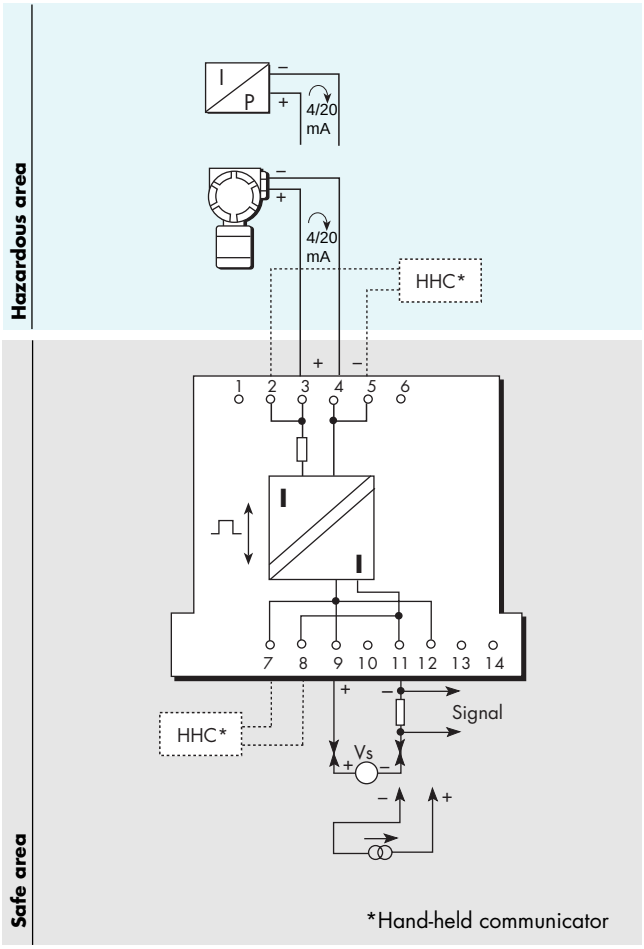
Digital signal bandwidth
3kHz to 15kHz

Power dissipation within unit
0.4W typical at 24V with 20mA signal
0.6W typical at 35V

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

FM entity parameters
Not yet available

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



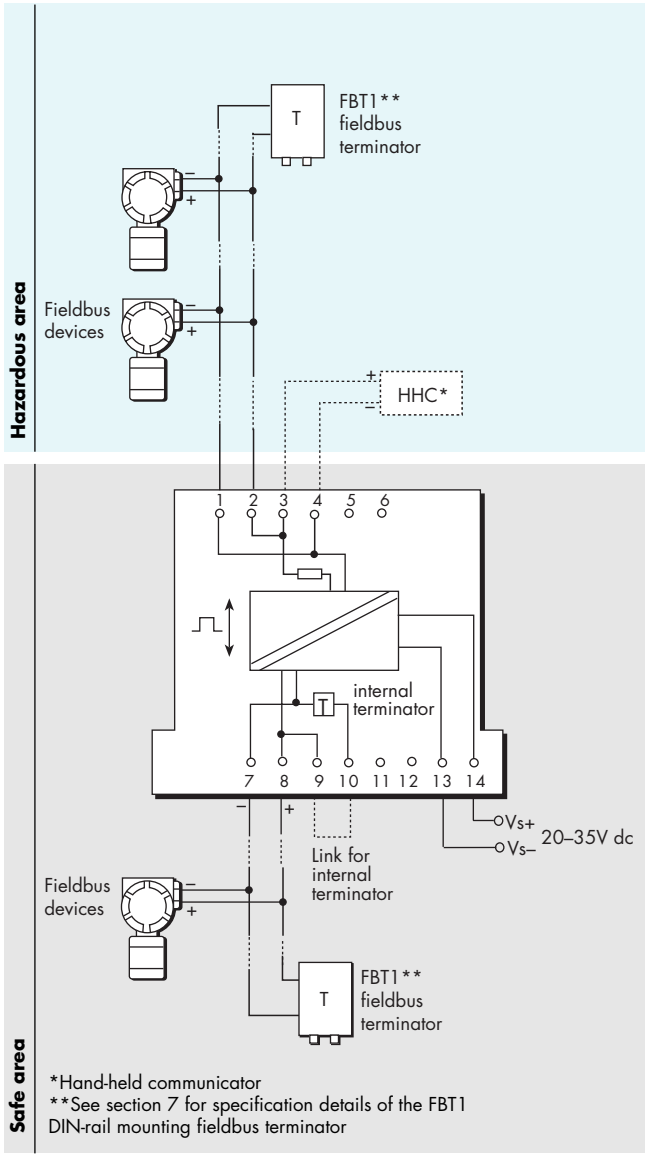
Terminal	Function
2	Optional HHC connection +ve
3	Tx or I/P connection +ve
4	Tx or I/P connection –ve
5	Optional HHC connection –ve
7	Optional HHC connection +ve
8	Optional HHC connection –ve
9	Load connection +ve
11	Controller or load connection –ve
12	Controller connection +ve

MTL4053 ISOLATOR/ POWER SUPPLY

31.25kbit/s Fieldbus

CE

The MTL4053 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 selected by making a link between terminals 9 and 10. The MTL4053 complies with requirements of Fieldbus Foundation™ specified power supply Type 133 (IS power supply).



SPECIFICATION

See also common specification, cable parameters and approvals

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†

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

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.

Terminal	Function
1	Hazardous-area fieldbus device(s) connection –ve
2	Hazardous-area fieldbus device(s) connection +ve
3	Optional HHC connection +ve
4	Optional HHC connection –ve
7	Safe-area fieldbus device(s) connection –ve
8	Safe-area fieldbus device(s) connection +ve
9 & 10	Terminals for internal terminator link
13	Supply –ve
14	Supply +ve

See also 'Bus systems for hazardous areas'

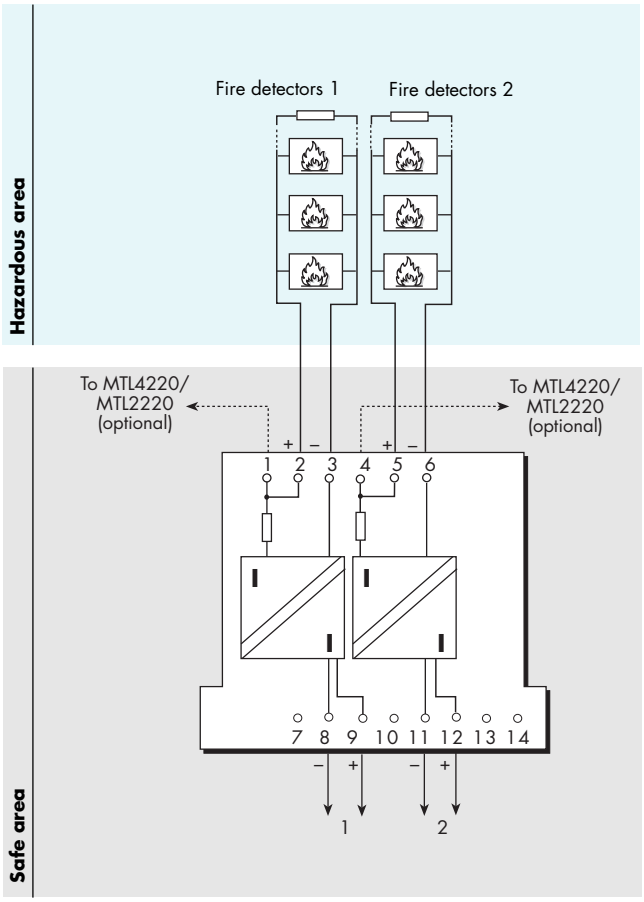
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MTL4061 FIRE AND SMOKE DETECTOR INTERFACE

two-channel

CE

The MTL4061 is a loop-powered 2-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 current. The unit features reverse input polarity protection, while 'no-fail' earth fault detection on either line can be provided by connecting an MTL4220 or MTL2220 earth leakage detector to terminal 1 or 4.



SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
Two, fully floating, loop powered

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

Input voltage
6 to 35V dc

Current range
1 to 40mA, nominal

Quiescent safe-area current at 20°C
(hazardous-area terminals open circuit)
<400µA at V_{in} = 24V per channel

Integral input polarity protection
Input circuit protected against reverse polarity

'No-fail' earth fault protection
Enabled by connecting terminals 1 and 4 to an MTL4220 or MTL2220 earth leakage detector
Fault on either line of each channel proclaimed: unit continues working

Note: 1. To maintain isolation between the two channels, separate earth leakage detectors are needed
2. The earth leakage detectors introduce 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 lower

Maximum output voltage
28V from 300Ω

Transfer accuracy at 20°C
Better than 400µA

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

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

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

Isolation
250Vac between safe- and hazardous-area circuits

Safety description for each channel
28V, 300Ω, 93mA.

Terminal	Function
1	Optional link from input 1 to MTL4220/MTL2220
2	Output 1 +ve
3	Output 1 –ve
4	Optional link from input 2 to MTL4220/MTL2220
5	Output 2 +ve
6	Output 2 –ve
8	Input 1 –ve
9	Input 1 +ve
11	Input 2 –ve
12	Input 2 +ve

MTL4073 TEMPERATURE CONVERTER

THC or RTD input

CE

The MTL4073 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, and 4-wire RTDs. For THC inputs requiring cold-junction compensation, an SCJ01 hazardous-area connector (which is provided with an integral CJC sensor) should be used, refer to page 3-89 for details. Configuration is carried out through a port on top of the module using an MTL611B IS pocket data terminal fitted with a CNF41 interface and CAB73 cable assembly or a personal computer running MTL PCC73 software.

SPECIFICATION

See also common specification, cable parameters and approvals and details of SCJ01 hazardous-area connector, with integral CJC sensor, for thermocouple inputs requiring cold junction compensation, in 'MTL4000 Series Accessories'

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/DIN 43760 (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

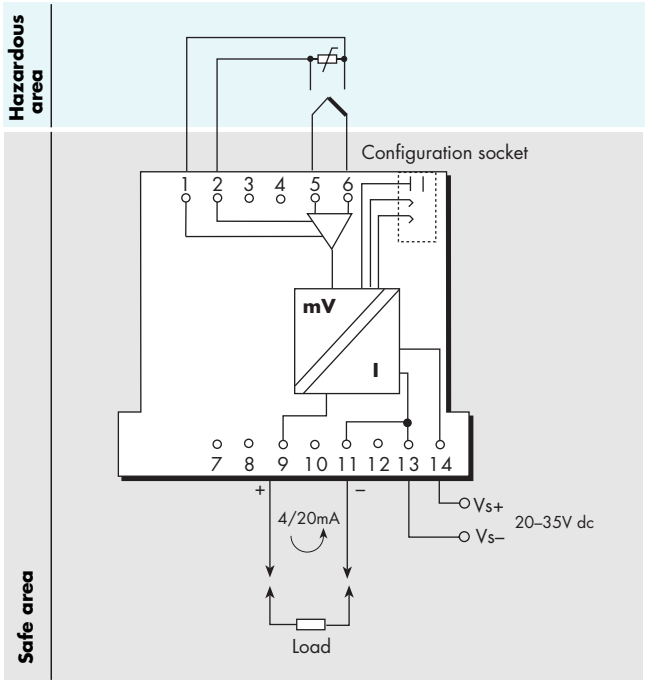
Temperature drift (typical)

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 PC and MTLPCC73
Output range
4 to 20mA nominal (direct or reverse)
Maximum load resistance
600Ω
LED indicator
Green: one provided for power and status indication



Terminal	Function
1	3-wire RTD input –ve
2	4-wire RTD input +ve
5	THC/EMF/RTD input +ve
6	THC/EMF/RTD input –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

Power requirement, Vs
57mA at 24V
55mA at 20V
60mA at 35V with 20mA signal
Power dissipation within unit
1.2W at 24V with 20mA signal
2.0W at 35V
Isolation
250V ac between safe- and hazardous-area circuits
Safety description
Terminals 5 and 6
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.
Terminals 1 and 2
7.2V, 950Ω, 8mA
Configuration socket
U_{max}: in = 11.2V, I_{max}:in = 12mA, W_{max}: in = 280mW
U_{max}: out = 7.2V, I_{max}: out = 8mA, W_{max}: out = 15mW

FM entity parameters
Terminals 1, 2, 5 and 6
$V_t \leq 7.2V$, $I_t \leq 11.5mA$, $C_a \leq 11.0\mu F$, $L_a \leq 245mH$

Terminals 5 and 6 only
$V_t \leq 1.2V$, $I_t \leq 3.8mA$, $C_a \leq 1000\mu F$, $L_a \leq 3.6mH$

Standard configuration

Input type	Type K thermocouple
Linerisaton/CJ Compensation	enabled/enabled
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

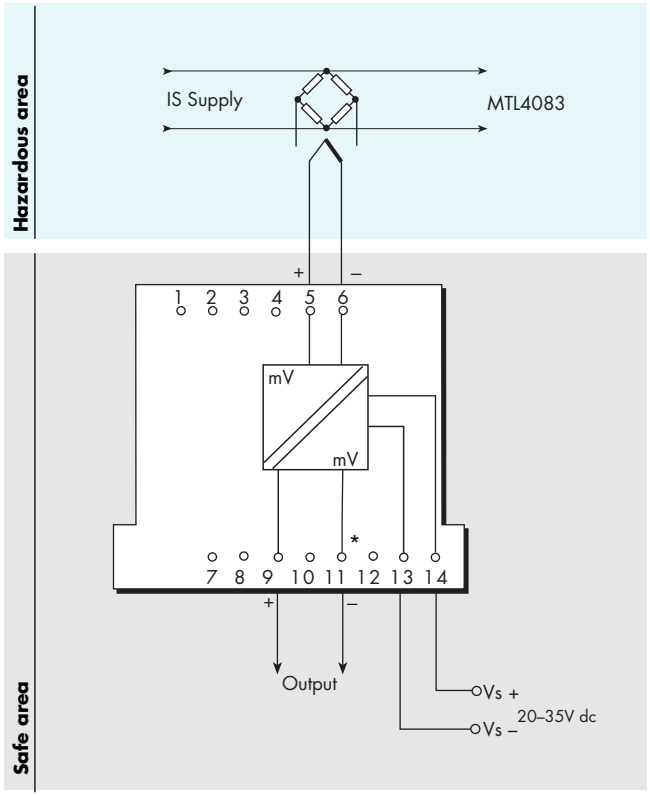
Note: the MTL4073 may be configured either by using an MTL611B pocket data terminal (see 'Displays') and accessories or a personal computer running MTL PCC73 software with interface supplied (see 'PCC73').

MTL4081 MILLIVOLT ISOLATOR

for low-level signals

CE

The MTL4081 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 strain-gauge bridges or 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 operation as appropriate.



* *Note: output negative (terminal 11) is clamped to supply negative (terminal 13) through two series diodes*

Terminal	Function
5	THC/EMF input +ve
6	THC/EMF input –ve
9	Output +ve
11	Output –ve
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification, cable parameters and approvals

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/°C, maximum

Response time
Settles to within 10% of final value within 150µs

Frequency response
DC to 4kHz nominal

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

LED indicator
Green: one provided for power indication

Power requirement, Vs
26mA max, 20V dc to 35V dc

Power dissipation within unit
0.6W typical at 24V
0.9W at 35V

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

Safety description

Terminals 5 and 6
U_{max} out 1.0V
I_{max} out 47.8mA
P_{max} out 0.012W
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 28V.

MTL4083 VOLTAGE ISOLATOR

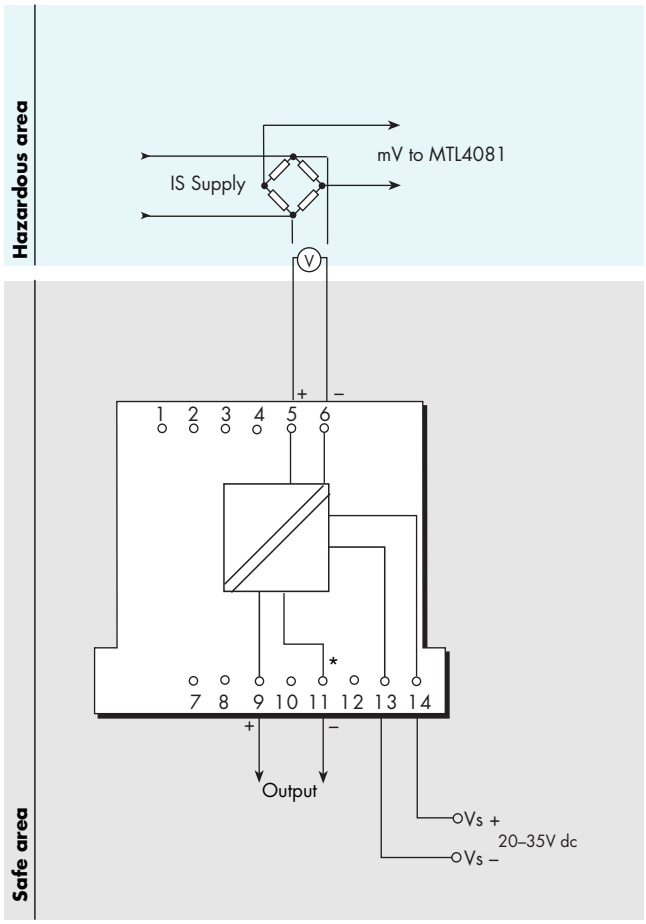
CE

The MTL4083 takes a dc signal from a voltage source in a hazardous area, isolates it, and passes it to a receiving instrument located in the safe area. It is intended for use with strain-gauge bridges, slide-wire transducers and various voltage sources.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One
Location of source
Zone 0, IIC, T4 hazardous area if suitably certified
Div. 1, Group A, hazardous location
Input and output signal range
0 to 12V, over range to +12.5V
Signal input resistance
>10MΩ
Output resistance
<50Ω (recommended load resistance ≥10kΩ)
Transfer accuracy
Linearity and repeatability <0.05% of reading (input ≥1V)
Temperature drift
<600µV/°C
Response time
Settles to within 10% of final value within typically 200µs
Frequency response
DC to 4kHz nominal
LED indicator
Green: one provided for power indication
Power requirement, Vs
31mA max, 20 to 35V dc
Power dissipation within unit
0.7W typical at 24V
1.1W at 35V
Isolation
250V ac between safe- and hazardous-area circuits
Safety description
16V, 950Ω, 17mA



* *Note: output negative (terminal 11) is clamped to supply negative (terminal 13) through two series diodes*

Terminal	Function
5	Voltage input +ve
6	Voltage input –ve
9	Voltage output +ve
11	Voltage output –ve
13	Supply –ve
14	Supply +ve

MTL4113X AND 4114X PROXIMITY DETECTOR INTERFACE UNIT

fail-safe, TÜV-approved, LFD

With the MTL4113x/4114x, a fail-safe proximity switch detector located in the hazardous area can control a fail-safe electronic output. There are two versions of proximity detector. The MTL4113P and MTL4114P are for use with P + F TÜV approved fail-safe sensors; MTL4113T and MTL4114T are for use with Turck TÜV approved fail-safe sensors. The MTL4113x option provides line fault detection also.

SPECIFICATION

For both MTL4113x and MTL4114x unless otherwise indicated.

See also common specification, cable parameters and approvals.

Number of channels
One

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 location
Div 1, Group A, hazardous location

Voltage applied to sensor
8.6V dc max from 1kΩ

Input/output characteristics

Operation	Input value in sensor circuit
Fail-safe output normally ON	MTL4113P, MTL4114P 2.9mA<Is<3.9mA MTL4113T, MTL4114T 3.55mA<Is<4.3mA
Fail-safe output normally OFF	MTL4113P, MTL4114P Is<1.9mA & Is>6.1mA MTL4113T, MTL4114T Is<3.3mA & Is >5.3mA
Broken line	MTL4113P & MTL4113T Is<50µA
Shorted line	MTL4113P & MTL4113T Is>6.6mA

Note: IS = Sensor current

Fail-safe electronic output characteristic
Output floating: 24V ±1.2V dc
L-level: 0V dc, max <5V dc
Load: 2.4kΩ to 10kΩ
Maximum on-state current: 11mA
Short-circuit current: 25mA

Line fault detection (LFD), MTL4113x only
By built-in line fault detection
Relay output for line fault
Switch characteristics: 35V ac/dc, 1A
Note: switch-type sensors must be fitted with resistors as shown

LED indicators
Amber: one provided for output status, ON when output is closed
Green: one provided for power indication
Red: one provided for LFD, ON when line fault is detected (MTL4113x only)

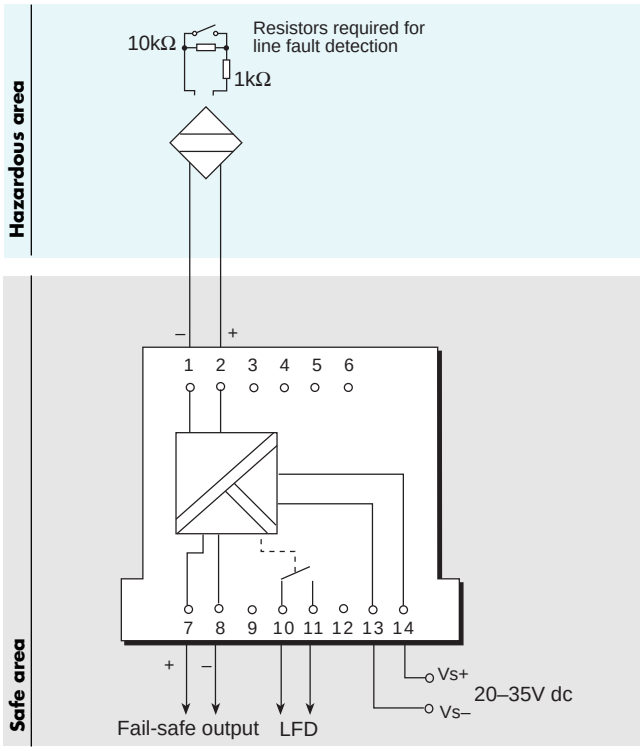
Power requirements, Vs

MTL4113	MTL4114	
80mA	70mA	at 20V dc
70mA	60mA	at 24V dc
65mA	45mA	at 35V dc

Power dissipation within unit

MTL4113	MTL4114	
1.4W	1.2W	at 20V dc
1.5W	1.3W	at 24V dc
2.0W	1.4W	at 35V dc

Isolation
253V ac between safe- and hazardous-area circuits



Terminal	Function
1	Input –ve
2	Input +ve
7	Output +ve
8	Output –ve
10	LFD
11	LFD
13	Supply –ve
14	Supply +ve

Safety description
U_o =8.6V, I_o=26mA, P_o=56mW

Location of unit
Safe area

Mounting
On MTL or user-specific backplanes; please see electrical and installation requirements

TÜV parameters
V_{oc} (U_o) = 8.6V, I_{sc} (I_o) = 26mA, P_o = 56mW, C_a = 6.2µF, L_a = 45mH

MTL4215 SWITCH OPERATED RELAY

IS-output

CE

The MTL4215 enables either one or two separate IS circuits in a hazardous area to be relay-contact controlled by a single on/off switch or logic signal in a safe area. Applications include the calibration of strain-gauge bridges, changing the polarity (and thereby the tone) of an IS sounder, the testing of IS fire alarms, and the transfer of safe-area signals into an annunciator with IS input terminals not segregated from each other. The output-relay contacts are certified as non-energy storing apparatus, and can be connected to any IS circuit without further certification, provided that separate IS circuits are such that they would still remain safe if connected together.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One, fully floating

Location of control circuit
Safe area

Input/output characteristics
Input suitable for switch contacts, an open-collector transistor or logic drive.

Relay energised if	<27kΩ or <1V applied
Relay de-energised if	>54kΩ or >2V applied (50V maximum)
Hysteresis, nominal	15kΩ or 0.5V

Power supply failure protection
Relay de-energised if supply fails

Response time
25ms nominal

Contacts (suitable for connection to IS circuits)
2-pole changeover

Contact rating
100V dc, limited to 30V dc for IS applications, 250mA
5VA (reactive loads must be suppressed)
<150mΩ contact resistance

Contact life expectancy
2 x 10^5 operations at maximum load

LED indicators
Amber: one provided for relay status, ON when relay energised
Green: one provided for power indication

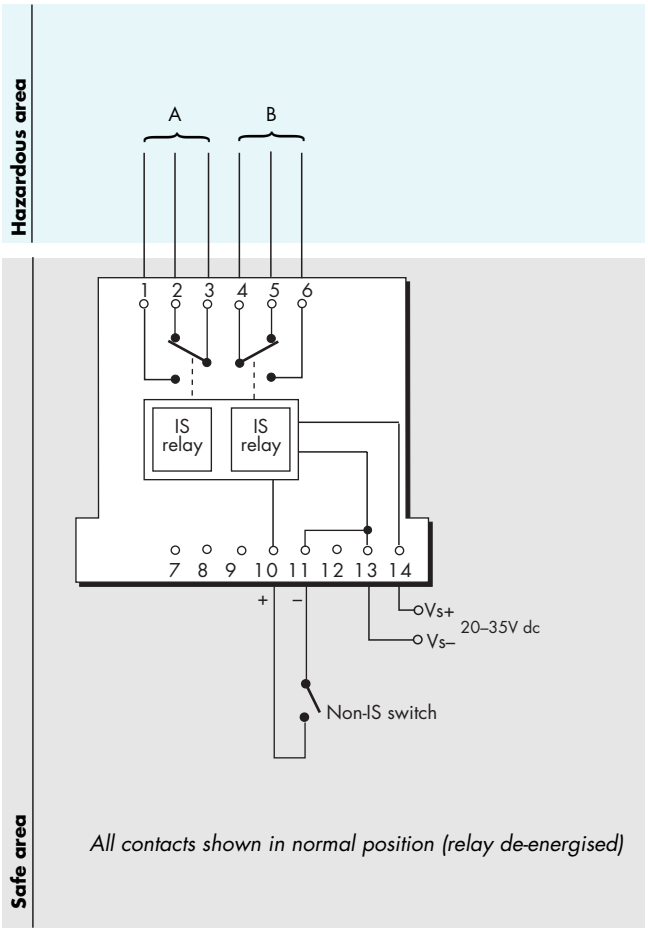
Power requirement, Vs
25mA at 24V dc
20mA at 20V dc
40mA at 35V dc

Power dissipation within unit
0.6W maximum at 24V dc
1.4W maximum at 35V dc

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

Safety description (each channel)
Non-energy storing apparatus: relay contacts may be connected to any IS circuit without further consideration

FM entity parameters
V_{oc} = 0V, I_{sc} = 0mA, C_a = 10,000µF, L_a = 1.0mH



All contacts shown in normal position (relay de-energised)

Terminal	Function
1	IS relay output A (normally open)
2	IS relay output A (normally closed)
3	IS relay output A (common)
4	IS relay output B (common)
5	IS relay output B (normally closed)
6	IS relay output B (normally open)
10	Relay control +ve
11	Relay control –ve
13	Supply –ve
14	Supply +ve

MTL4216 SWITCH OPERATED RELAY

two-channel IS-output

CE

The MTL4216 enables two separate IS circuits in a hazardous area to be relay-contact controlled by two on-off switches or logic signals in a safe area. Applications include the calibration of strain-gauge bridges; changing the polarity (and thereby the tone) of an IS sounder; the testing of IS fire alarms; and the transfer of safe-area signals into an annunciator with IS input terminals not segregated from each other. The output-relay contacts are certified as non-energy-storing apparatus, and can be connected to any IS circuit without further certification, provided that separate IS circuits are such that they would remain safe if connected together.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
Two, fully floating

Location of control circuit
Safe area

Input/output characteristics
Inputs suitable for switch contacts, an open-collector transistor or logic drive

Relay energised if	<27kΩ or <1V applied
Relay de-energised if	>54kΩ or >2V applied (50V maximum)
Hysteresis, nominal	15kΩ or 0.5V

Power supply failure protection
Relays de-energised if supply fails

Response time
25ms nominal

Contacts (suitable for connection to IS circuits)
1-pole changeover per channel

Contact rating
100V dc, limited to 30V dc for IS applications, 250mA
5VA (reactive loads must be suppressed)
<150mΩ contact resistance

Contact life expectancy
2 x 10^5 operations at maximum load

LED indicators
Amber: one provided for each channel, ON when relay is energised
Green: one provided for power indication

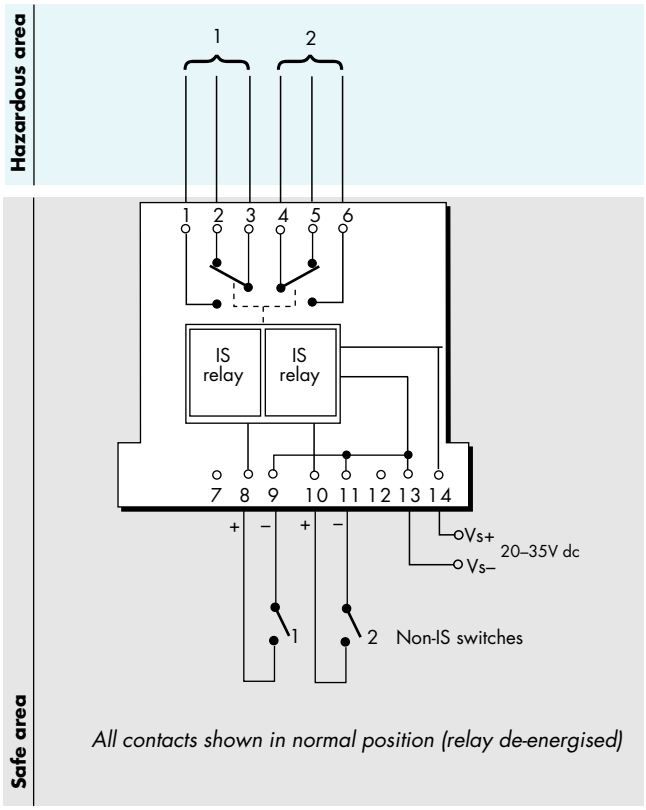
Power requirement, Vs
25mA at 24V dc
20mA at 20V dc
40mA at 35V dc

Power dissipation within unit
0.6W maximum at 24V
1.4W worst case

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

Safety description (each channel)
Non-energy-storing apparatus: relay contacts may be connected to any IS circuit without further consideration

FM entity parameters
V_{oc} = 0V, I_{sc} = 0mA, C_a = 10,000µF, L_a = 1.0H



All contacts shown in normal position (relay de-energised)

Terminal	Function
1	IS relay output 1 (normally open)
2	IS relay output 1 (normally closed)
3	IS relay output 1 (common)
4	IS relay output 2 (common)
5	IS relay output 2 (normally closed)
6	IS relay output 2 (normally open)
8	Relay 1 control +ve
9	Relay 1 control –ve
10	Relay 2 control +ve
11	Relay 2 control –ve
13	Supply –ve
14	Supply +ve

MTL4220 EARTH LEAKAGE DETECTOR

CE

The MTL4220 scans up to eight floating electrical circuits in a hazardous area and warns if the resistance to earth on any input falls below 10kΩ. It enables other MTL4000 Series units to be used in the 'no-fail' mode, whereby earth faults on field lines can be detected and rectified without upsetting control or needing emergency action. Eight LED indicators enable faults to be easily located to any input. A self-test facility enables the unit to be checked automatically or manually to ensure the integrity of the whole system. During test the relay is de-energised and the eight LED indicators are illuminated if the unit is healthy. This has no effect on the monitored circuits.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of inputs
Eight independent inputs

Signal source
MTL4000 Series modules with provision for earth leakage detection
Note: inputs are not isolated from each other

Monitoring signal
5V, 0.1mA, 1Hz, intrinsically safe

Earth fault resistance to de-energise relay (7-8 closed)
<10kΩ, on any input

Earth fault resistance that will not de-energise relay (8-9 closed)
>50kΩ, on all inputs

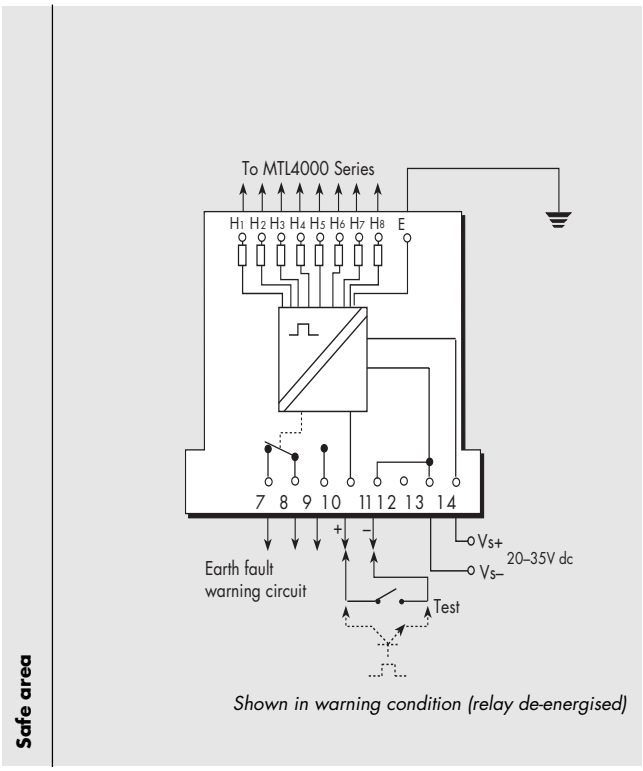
Response time
<50s for 8 input scan

Series mode rejection
60V dc, 10V rms 50Hz

Relay output characteristics
Single pole changeover
Contact rating: 35V dc, 250mA, 5VA
Contact life expectancy: 10^5 operations at maximum load
Note: reactive loads must be adequately suppressed

LED indicators
Red: one provided for each of eight inputs, ON when earth fault detected on the corresponding input
Green: one provided for power indication

Test facility
Terminals 10 and 11 are suitable for switch contacts, an open-collector transistor or logic drive:
TEST = input switch closed, transistor on or <1.4V applied across terminals 10 and 11; relay will de-energise within 1s and all red LED indicators light
OPERATE = input switch open, transistor off or >4.5V applied across terminals 10 and 11; relay will return to normal operating mode within 50s



Shown in warning condition (relay de-energised)

Terminal	Function
$H_1 – H_8$	Connections to MTL4000 Series modules
E	Earth
7	Earth fault signal (normally closed)
8	Earth fault signal (common)
9	Earth fault signal (normally open)
10	Test +ve
11	Test –ve
13	Supply –ve
14	Supply +ve

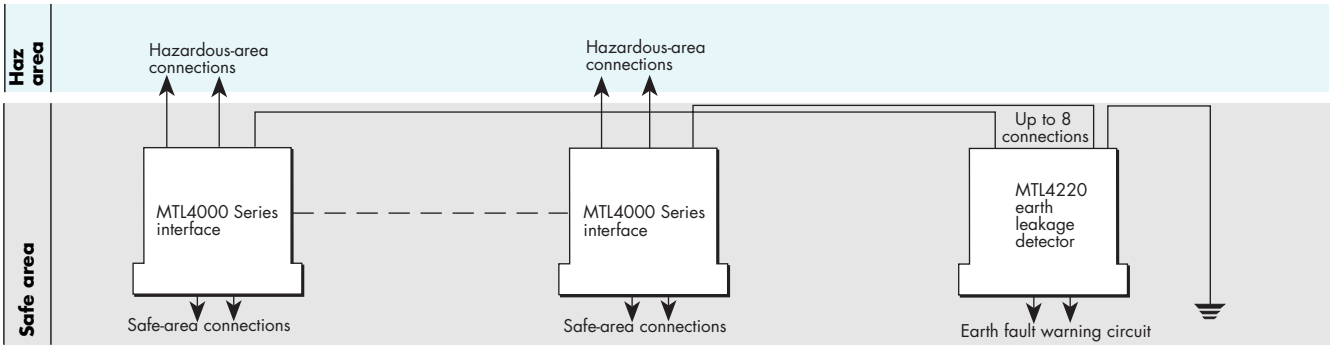
Power requirement, Vs
35mA max at 20 to 35V
18mA typical at 20 to 35V

Power dissipation within unit
0.9W max. at 24V
1.3W max. at 35V
0.45W typical at 24V

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

Safety description
9V, 65kΩ, 0.14mA, U_m=250Vrms or dc

Please note that in addition to typical switch/proximity detector applications, the MTL4220 can also be used with switched outputs (eg, solenoids, alarms and LEDs), and with most analogue signals. For more information, call your local MTL representative.



Note: some MTL4000 Series modules are multichannel and could require one connection for each channel.

MTL4401 DE TRIP AMPLIFIER

SSI 3000

CE

The MTL4401 SSI 3000 operates in a similar manner to that of conventional analogue trip amplifiers by monitoring a critical variable and providing controlled failure handling in case of failures in the primary monitoring control system. The SSI 3000 monitors the digital signal across a safe-area load and switches a relay if the digitally represented value crosses a threshold set by the user.

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

Input signal
1–5V DE data
Input impedance >1MΩ
(Honeywell standard SW-927020-1010)

Power supply failure protection
Relay de-energises if supply fails

Response time
100ms

Relay contacts
Single-pole change-over
Response time: 10ms
Contact rating: 3VA, 30V, 100mA
Contact life expectancy: 10^5 operations at maximum load.
Note: reactive loads must be adequately suppressed.

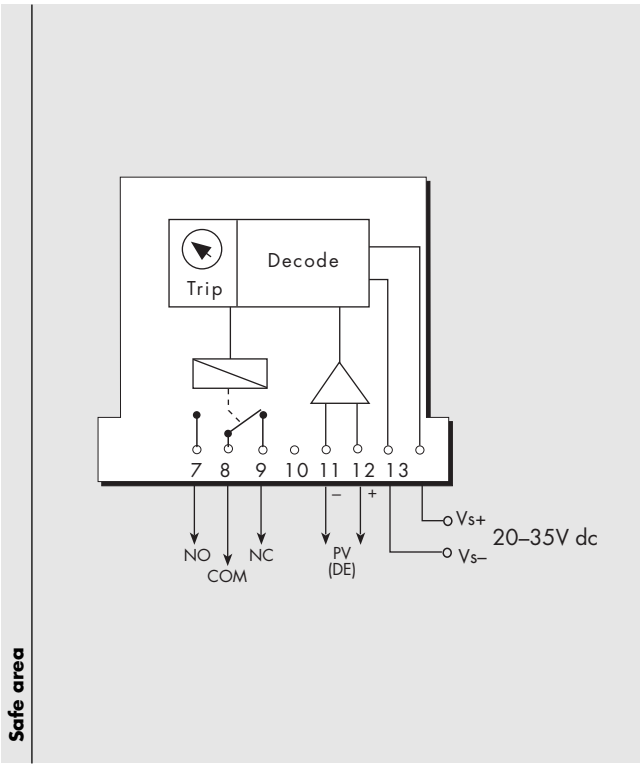
Switch functions
Test: Sets output to trip status
HI/LO: Selects high or low alarm action
Rotary number switches (3 off):
Set alarm level 00.0 to 99.9%

LED indicators
Green: 'POWER' Power on
Amber: 'RELAY' Relay status
Red: 'FAULT' Fault

Power requirements, Vs
35mA max at 20 to 35V dc

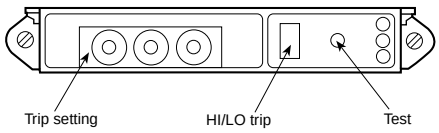
Power dissipation within unit
0.54W at 20V
1.10W at 35V

Long term drift
No recalibration necessary



Terminal	Function
7	Relay (normally open)
8	Relay (common)
9	Relay (normally closed)
11	Input – (DE)
12	Input + (DE)
13	Supply –ve
14	Supply +ve

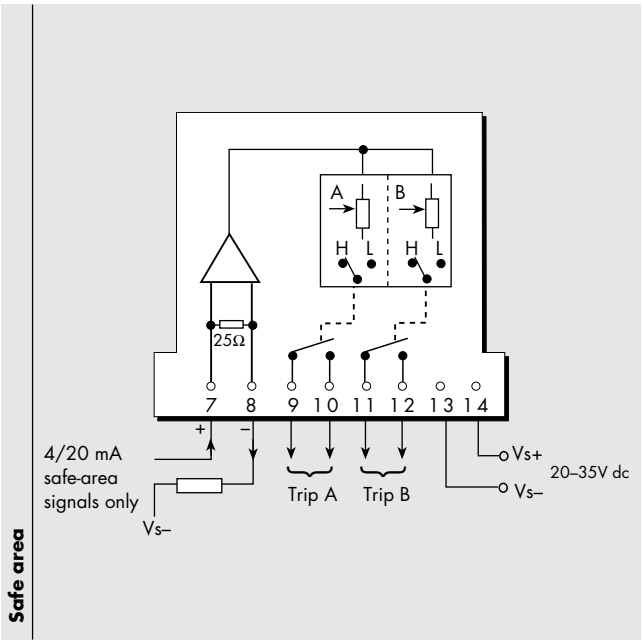
Switch functions



MTL4403 HIGH-LEVEL TRIP AMPLIFIER

CE

This single-channel non-IS unit derives its input from the safe-area output of the MTL4041B or MTL4073 and compares the loop current with a trip level in the range 4 to 20mA. Two trip points are provided and may be set by multiturn potentiometers accessible on the top of the unit. Each trip can be set to indicate a high or low alarm. Test points are provided so that the approximate trip value (1 to 5V) may be measured using a portable voltmeter. A normally-open relay contact and amber LEDs indicate the trip condition.



Terminal	Function
7	Input +ve
8	Input –ve
9	Output trip A (normally open)
10	Output trip A (common)
11	Output trip B (normally open)
12	Output trip B (common)
13	Supply –ve
14	Supply +ve

SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

Location of signal source
Safe area only. Interface to hazardous area via suitable barrier/isolator.

Input range
4 to 20mA into 25Ω
Common-mode input voltage: 8V max
Hysteresis: 1% nominal of input range

Trip-point adjustment
Within 0.1% of input range over whole range

Supply voltage effect on trip point
<0.1% for supply voltage change 20 to 35V dc

Temperature effect on trip point
<0.02% of input range per °C

Response time
20ms nominal

Alarm functions
High alarm: relay energised when input less than trip point
Low alarm: relay energised when input greater than trip point

Power supply failure protection
Relay de-energises if supply fails

Alarm relay contacts
Single pole, normally open

Contact rating
3A at 35V dc (on standard MTL backplanes)
Note that reactive loads must be adequately suppressed.

LED indicators
Amber: one provided for each relay, ON when relay energised (not tripped)
Green: one provided for power indication

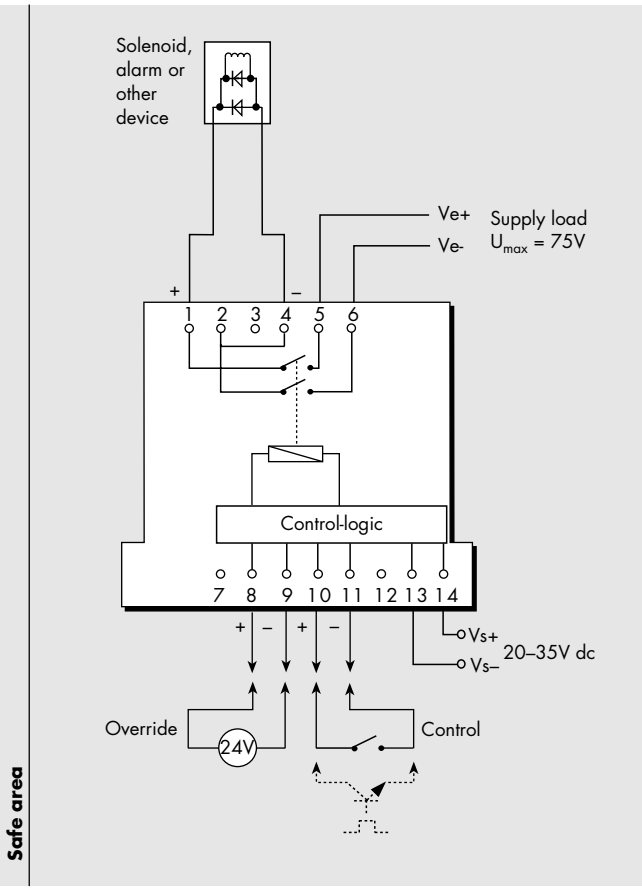
Power requirements
37mA at 24V dc
40mA at 20V dc
30mA at 35V dc

Power dissipation within unit
0.8W at 24V
0.9W at 35V

MTL4421RS NON-IS SOLENOID/ALARM DRIVER

with 24V logic override facility

The MTL4421RS non-IS device enables an on/off device in a non-hazardous area to be controlled by a volt-free contact or logic signal from the control unit. It can drive loads such as solenoids, alarms, LEDs and other devices. Provided that 24V dc is applied to the override input, the solenoid/alarm can be operated by the control input. However, if the 24V dc signal is removed, the solenoid/alarm is turned off.



SPECIFICATION

See also common specification, cable parameters and approvals

Number of channels
One

Location of the load
Safe-area

Control input
Suitable for switch contacts or an open collector of logic drive
0= input switch closed, transistor on or <4V applied across terminals 10 & 11
1= input switch open, transistor off or >15V applied across terminals 10 & 11

Override input
A 24V logic signal applied across terminal 8 and 9 allows the solenoid/alarm to be operated by the control input. If it is disconnected, the solenoid/alarm is off.

Control and override inputs

Override input	Control input	Output state
0V	closed	off
0V	open	on
24V	closed	off
24V	open	off

Relay output characteristic
Normally open contacts
Contact rating: 60W, 125VA
Contact life expectancy: 0.5A, 15W /2A, 60W
1.8×10^7 / 10^6 operations at maximum load

Response time
set-/release-/ reset time
3ms/ 5ms/ 2ms

LED indicators
Green: one provided for power indication
Amber: one provided for status, ON when relay is closed
one provided for status, ON when output circuit is active

Power requirements
28mA at 24V dc
24mA at 20V dc
37mA at 35V dc

Power dissipation within unit
0.7W typical

Terminal	Function
1	Output +ve
4	Output -ve
5	Supply load +ve
6	Supply load -ve
8	Override +ve
9	Override -ve
10	Control +ve
11	Control -ve
13	Supply -ve
14	Supply +ve

MTL4995 FIELDBUS POWER SUPPLY

31.25kbit/s fieldbus

CE

The MTL4995 is a non-IS power supply unit designed to use in 31.25kbit/s (H1) fieldbus systems. It is compatible with both IS applications, for which it should be used with a safety barrier such as MTL791 and non-IS applications. The MTL4995 complies with requirements of Fieldbus Foundation™ specified power supply Type 131 (non-IS supply intended for feeding an IS barrier). Additionally an internal bus terminator can be activated by making a link between terminals for installations where the MTL4995 is connected near one end of the fieldbus.

SPECIFICATION

See also common specification, cable parameters and approvals

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.

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.

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

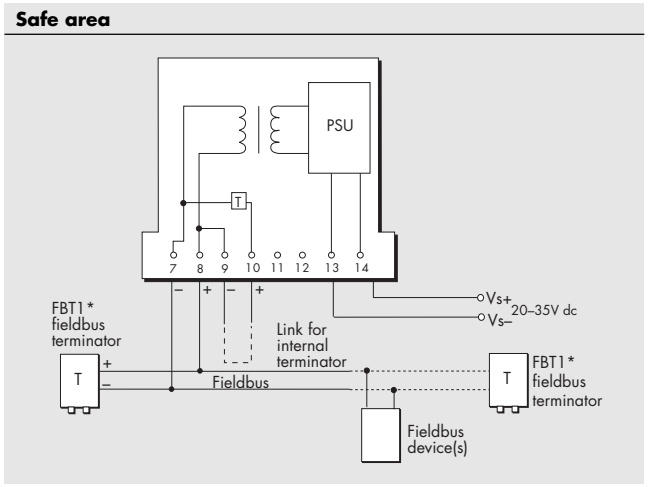
Redundant supplies

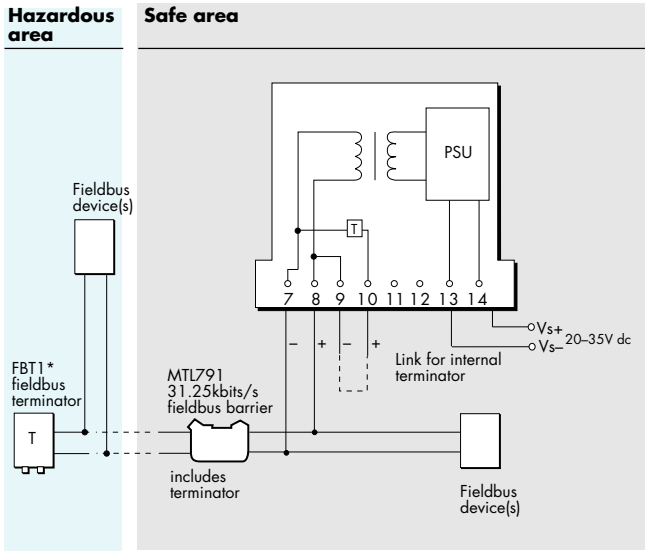
A switch allows the internal impedance of the supply to be modified when additional supplies are connected in parallel using external impedance matching components.

LED indicator

Green: one provided for power indication

†The applicable fieldbus specification and standards are: FOUNDATION™ Fieldbus 31.25kbit/s Physical Layer Profile Specification, document FF-816, IEC 1158-2: 1993 and ISA-550.02 - 1992 for 31.25kbit/s fieldbus systems.





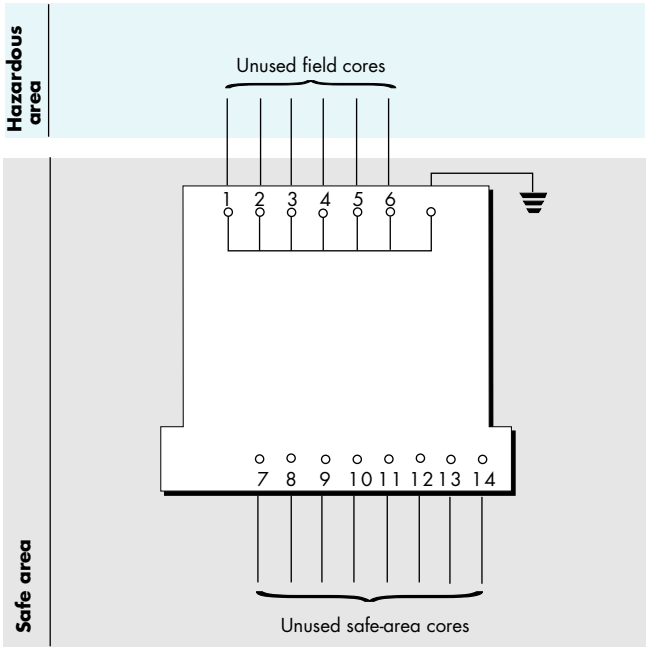
**See also 'Bus systems for hazardous areas' for specification details of the FBT1 DIN-rail mounting fieldbus terminator.*

Terminal	Function
7	Safe-area fieldbus device(s) connection –ve
8	Safe-area fieldbus device(s) connection +ve
9 & 10	Terminals for internal terminator link
11	N/C
12	N/C
13	Supply –ve
14	Supply +ve

See also 'Bus systems for hazardous areas'

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

MTL4099 DUMMY ISOLATOR



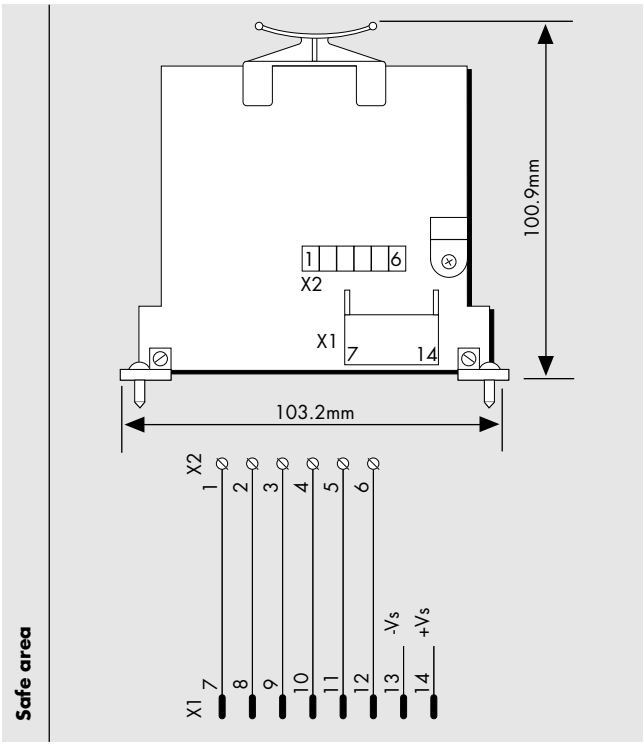
The primary function of the MTL4099, which can be used with all other MTL4000 Series units, is to provide termination and earthing facilities for unused cable cores from hazardous areas. This accords with a draft amendment to the Code of Practice BS 5345: Part 4, which stipulates that unused cores should be connected as if they were a screen, ie, they should be earthed. The unit can also be used to isolate field cabling and hazardous-area connectors which have been removed from modules during maintenance operations.

SPECIFICATION

See also common specification, cable parameters and approvals

Weight
60g

MTL4099N NON-IS FEED THROUGH MODULE



The feed-through termination module allows non-IS connections to the MTL4000 backplanes. The wires from the field are connected using screw terminals. Six terminals are provided for each contact of the multiway connector on the backplane. The terminals and cables conform to IS regulations so that non-IS and IS signals can be mixed on the same backplane.

SPECIFICATION

See also common specification, cable parameters and approvals

Weight
30g

MTL4000 SERIES COMMON SPECIFICATION

Location of units
Safe area

Isolation
250V rms between safe-area and hazardous-area terminals tested at 1500V rms min between safe and hazardous terminals

Long term drift
No recalibration necessary

Maximum safe-area voltage
U_m = 250V rms or dc

Hazardous-area connectors
SCC01: Screw-clamp connector accommodates conductors of 14AWG (2.5mm^2) max.
CCH01: Crimp-contact header accommodates:
CRC01 crimps for conductors of 14–20AWG, or
CRC02 crimps for conductors of 18–24AWG

Ambient temperature limits
–20 to +60°C (–4 to 140°F) continuous working
–40 to +80°C (–40 to 176°F) storage

Humidity
5 to 95% RH

Mounting
On MTL or user-supplied backplanes which in turn can be surface, DIN-rail or 19-inch rack mounted

Weight
100g approximately

EMC compliance
The modules that comply with EMC EN 050 081-2/EN 050 082-2 generic emission/immunity standards (which refer to appropriate IEC/CISPR standards) are marked accordingly.

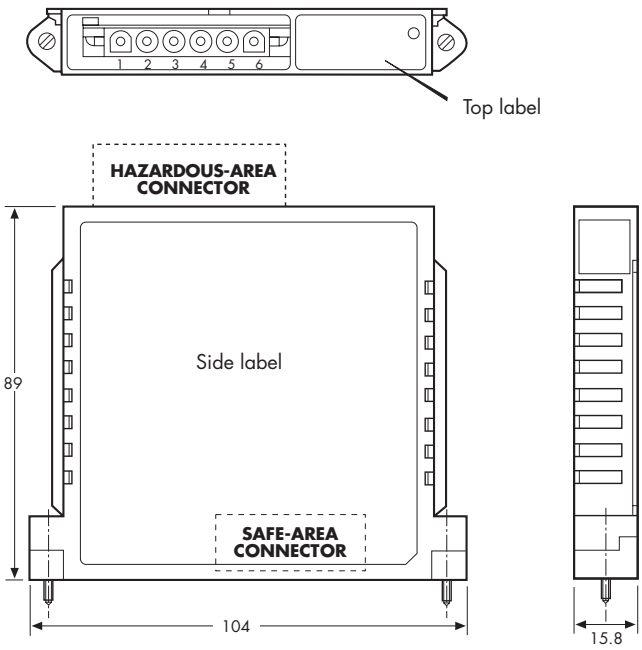
CONDITIONS OF USE

The conditions governing the use of MTL4000 Series interface units are given in the relevant certificates and schedules, copies of which are available from Measurement Technology Ltd.

TO ORDER

See MTL4000 series ordering information

DIMENSIONS (mm)



MAXIMUM CABLE PARAMETERS

Module	BASEEFA Group	µF	mH	or µH/Ω	FM Group	µF	mH
MTL4013/ 4014/4015/ 4016/4017	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
MTL4021/ 4021S/4024	IIC	0.17	3	51	A+B	0.17	3
	IIB	0.51	9	153	C	0.51	9
	IIA	1.36	24	408	D	1.36	24
MTL4023	IIC	0.17	1.32	37	A+B		
	IIB	0.51	3.96	111	C		
	IIA	1.36	10.56	296	D		
MTL4025	IIC	0.17	4.2	60	A+B		
	IIB	0.51	12.6	180	C		
	IIA	1.36	33.6	480	D		
MTL4031	IIC	0.13	4.2	55	A+B		
	IIB	0.39	12.6	165	C		
	IIA	1.04	33.6	440	D		
MTL4032	terminal 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
	terminal 4 to 3 and 1						
	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
MTL4041B/ 4046P	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
MTL4041P	terminals 2, 3, 4, 5 and 6						
	IIC	0.13	2.47	42	A+B	0.4	1.41
	IIB	0.39	7.41	126	C	0.43	5.75
	IIA	1.04	19.76	336	D	1.14	10.8
MTL4042	IIB	0.39	4.5	106			
	IIA	1.04	12.0	282			
MTL4043					terminals 2, 4 and 5		
	IIC	0.083	4.2	55	A+B	0.13	4.2
	IIB	0.249	12.6	165	C	0.39	12.6
	IIA	0.664	33.6	440	D	1.04	33.6
					terminals 2, 5 and 6		
					A+B	0.13	1.94
					C	0.39	7.83
					D	1.04	14.9
MTL4045B/C	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
MTL4047	IIC	0.22	0.45	30	A+B		
	IIB	0.66	1.35	90	C		
	IIA	1.76	3.6	240	D		
MTL4048	terminals 2 and 3 to 4 and 5						
	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
MTL4053	IIC				A+B		
	IIB				C		
	IIA				D		
MTL4061	terminals 1 and 2 to 3 and terminals 4 and 5 to 6						
	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
MTL4081 MTL4083	Consult MTL						
MTL4215 MTL4216	Cable parameters defined by the circuit that is being switched						
MTL4220	For parameters when using modules with MTL4220/2220, refer to MTL						

Module	Grp	BASEEFA µF Con 1	µF Con 2	mH Con 1	mH Con 2	or µH/Ω Con 1	µH/Ω Con 2	FM Grp	Con 1 terms 1&2 µF	Con 1 terms 1&2 mH	Con 1 terms 5&6 µF	Con 1 terms 5&6 mH	Con 2 µF	Con 2 mH
MTL4073	IIC	0.26	0.60	6.0	47.0	164	135	A+B	11.0	500	1000	3.6	0.6	47
	IIB	0.78	1.80	18.0	141	492	405	C	33.0	1500	1000	10.8	1.8	141
	IIA	2.08	4.80	48.0	376	1312	1080	D	88.0	4000	1000	27.8	4.8	376

Module	TÜV Grp	µF	mH
MTL4113X/ MTL4114X	IIC	6.2	45
	IIB	55	150

APPROVALS

Region (Authority)	Australia (NSW M) Mines	Australia (SA)	Canada (CSA)	China (NEPSI)	CIS (VNIIVE)	Czech Republic (FTZU)	Germany (TÜV)	Hungary (BKI)	Poland (KDB)	UK (BASEEFA to CENELEC standards)	UK (BASEEFA) Systems (to CENELEC standards)	USA (FM)
Standard	CMRA67-1982	AS2380.1/7	C22.2 No.157	GB3836.1-83 GB3836.4-83	EN 50 020 GOST22782.5-78	CSN33 0380 EN 50 020	DIN V 19250 SIL3 draft IEC1508	MSZEN 50 014 & 020	PN-83/E-8110 PN-84/E-8107	EN 50 014 EN 50 020 BS 5501: Pts 1&7-1977	EN 50 039 BS 5501: Pt9 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	AK5	[EEx ia] IIC	EEx ia IIC	[EEx ia] IIC	EEx ia IIC T4 or T6*	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
Unit no.	**Certificate/file no.**											

** T6 for switches or if the hazardous-area device is suitably certified*

MTL4013	MDA Ex ia 10084	Ex 1438X	LR36637-63	GYJ 96300	D.94.C.010	J02595		93B2-030		Ex92C2322	Ex92C2323	J.I. 5W3A4.AX
MTL4014			LR36637-131X			J02595				Ex93C2386		
MTL4015		Ex 1438X	LR36637-49							Ex91C2450	Ex91C2451	J.I. 0W2A6.AX
MTL4016	MDA Ex ia 10084	Ex 1438X	LR36637-49	GYJ 96300	D.94.C.011	J02596		93B2-030		Ex91C2450	Ex91C2451	J.I. 0W2A6.AX
MTL4017			LR36637-82		D.94.C.022					Ex93C2386		J.I. 4Y5A6.AX
MTL4021	MDA Ex ia 10084	Ex 1438X	LR36637-49	GYJ 96300	D.94.C.012	J02597		93B2-030		Ex92C2001	Ex92C2002	J.I. 0W2A6.AX
MTL4021S		Ex 1438X		GYJ 96300						Ex92C2001	Ex92C2002	J.I. 5Y7A1.AX
MTL4023			LR36637-87							Ex93C2499		J.I. 4Y5A6.AX
MTL4024				GYJ 96300						Ex92C2001/6		J.I. 5Y7A1.AX
MTL4025				GYJ 96300						Ex92C2001	Ex92C2002/1	J.I. 0Z6A6.AX
MTL4031										Ex94C2265	Ex94C2266	
MTL4032			LR36637-87		D.96.C.172					Ex94C2174		J.I. 4Y5A7.AX
MTL4041B	MDA Ex ia 10084	Ex 1438X	LR36637-68	GYJ 96300	D.96.C.171	J02598		Ex-97.C.300		Ex92C2003		J.I. 1X6A4.AX
MTL4041P										Ex92C2003	Ex92C2004/2	J.I. 4X5A3.AX
MTL4042										Ex94C2306		J.I. 5Y7A1.AX
MTL4043										Ex97D2264		J.I. 4D0A8.AX
MTL4044										BAS99ATEX7061		
MTL4045B/C			LR36637-87	GYJ 96300	D.94.C.013	FTZU98Ex0023		Ex-97.C.300		Ex93C2478		J.I. 4Y5A7.AX
MTL4046P			LR36637-87			FTZU98Ex0070				Ex94C2193		J.I. 4Y5A6.AX
MTL4047										Ex94C2092		
MTL4048						J03140				Ex94C2068		
MTL4053												
MTL4061								Ex-97.C.300		Ex94C2040	Ex94C2041	
MTL4073			LR36637-72	GYJ 96300	D.94.C.014	J02600		Ex-97.C.300	Nr95.078W	Ex93C2173	Ex93C2174	J.I. 2X8A5.AX
MTL4081										Ex94C2502		
MTL4083										EX97D2139	EX97D2140	J.I. 6DIA8.AX
MTL4113X							97ATEX1202					
MTL4114X							08/220/0317					
MTL4215			LR36637-87									Ex94C2015
MTL4216										Ex94C2015		J.I. 5Y7A1.AX
MTL4220												

MTL4000 SERIES BACKPLANES, ENCLOSURES AND ACCESSORIES

for installing, connecting and protecting units

- **Standard 8-, 16- and 24-way backplanes with screw-clamp or multiway safe-area connectors**
- **Backplane mounting accessories for installation on DIN-rail, flat surfaces or in 19-inch racks**
- **Customised backplanes option – designed and produced with no need of IS certification**
- **Standard enclosures for 8-, 16-, or 2 x 16-way backplanes; rated IP65**
- **Hazardous-area plug-in screw-clamp or crimp conectors**



Customised backplanes See 'Custom backplanes' and 'Universal customised backplanes' for more details

The MTL4000 Series backplanes, enclosures and other accessories provide comprehensive, flexible and remarkably compact mounting facilities for system vendors, original equipment manufacturers and end users alike.

Six standard MTL backplanes are available to accommodate 8, 16, or 24 modules with either screw-clamp or multiway connectors for the safe-area circuits. On an individual backplane, any module can be plugged into any position and module types can be mixed.

Primary and secondary 24V dc power supplies are provided by screw-clamp connectors which plug into the backplanes. Power to several 8- or 16-way backplanes can be interconnected to reduce and simplify wiring – see instruction manual INM4000 for details.

Optional accessories include colour coded tagging strip kits for all three sizes of backplane and earth rail kits for 8 and 16-way versions. Mounting accessories are available for surface (all backplanes), T-section and G-section DIN-rail (8- and 16-way versions), and a horizontal plate for mounting 24-way backplanes in 19-inch racks.

Weatherproof enclosures are available for applications where separate safe-area enclosures for the backplanes and modules are required. Available in three sizes to accommodate one 8-way, one 16-way or two 16-way backplanes, they are manufactured from GRP giving protection against dust and water to IEC 529:IP65. The lids are made from transparent high-strength polycarbonate so that LEDs, switches, etc, on the tops of the modules are easy to see. Distribution of both safe- and hazardous-area cabling is taken care of by internal trunking.

Other accessories include screw-clamp and crimp hazardous-area connectors and crimps and crimp tools for the latter.

MTL4000 Series customised backplanes

MTL provides a complete design and/or manufacturing service for customised backplanes. This covers design considerations (including advice and engineering drawings for users who intend to produce their own backplanes) right through to manufacture. Customised backplanes give vendors and users of process control and safety systems the opportunity to integrate MTL4000 (and MTL4840) Series modules directly into their system architecture. Since there are no hazardous-area circuits on the backplanes, customised versions can be designed and produced without the need for IS certification, so simplifying design, reducing lead times and lowering costs.

MTL BPM/BPS BACKPLANES SPECIFICATION AND DIMENSIONS

SPECIFICATION

Power requirements, Vs

21V dc to 35V dc through plug-in connectors

Safe-area connections

BPM: Elco 8016 56-pin male connectors – one connector for each group of 8 modules

BPS: 2.5mm^2 screw-clamp terminals – 6 positions per module

Power sense

BPM: Through Elco 8016 connectors

BPS: Through separate plug-in crimp connector

Weight (without modules or accessories)

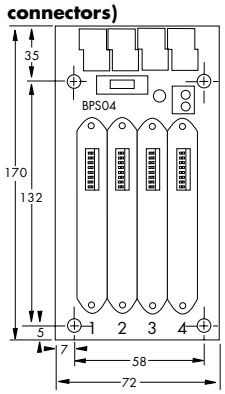
BPS04: 96g
BPM08: 159g
BPS08: 225g
BPM16: 286g
BPS16: 419g
BPM24: 382g
BPS24: 592g

BACKPLANES – FEATURES

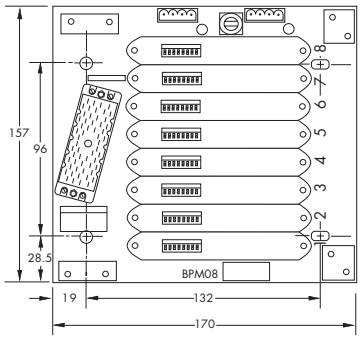
Model no.	No. of modules	Safe-area connections	Mounting: Surface	Mounting: DIN-rail (T or G)	Mounting: 19-inch rack	Accessories: Earth-rail kit	Accessories: Tagging strip kit
BPM08	8	Multiway	Yes	Yes	No	Yes	Yes
BPM16	16	Multiway	Yes	Yes	No	Yes	Yes
BPM24	24	Multiway	Yes	No	Yes	No	Yes
BPS04	4	Screw-clamp	Yes	Yes	No	No	No
BPS08	8	Screw-clamp	Yes	Yes	No	Yes	Yes
BPS16	16	Screw-clamp	Yes	Yes	No	Yes	Yes
BPS24	24	Screw-clamp	Yes	No	Yes	No	Yes

DIMENSIONS (mm)

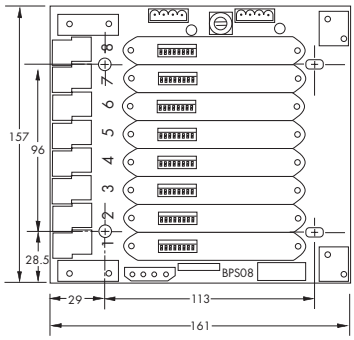
BPS04 4-way backplane (screw-clamp connectors)



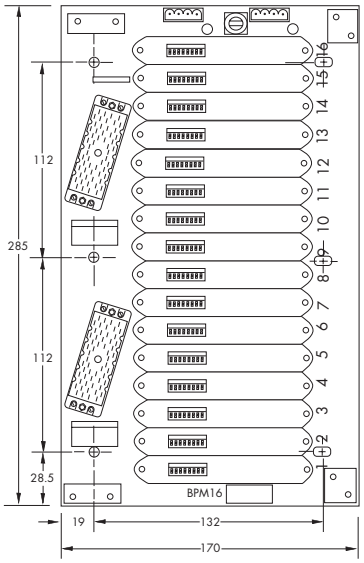
BPM08 8-way backplane (multiway connectors)



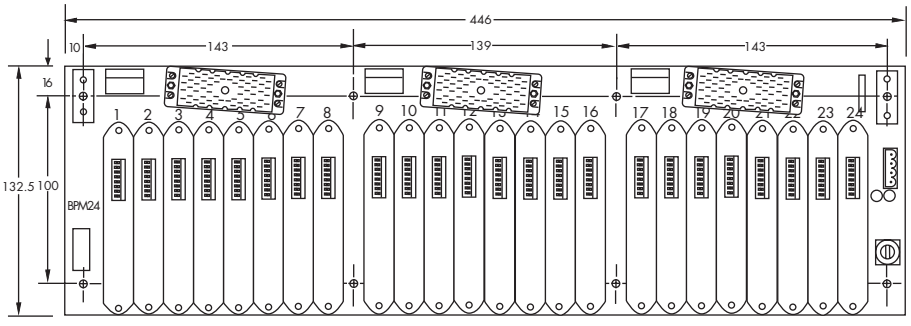
BPS08 8-way backplane (screw-clamp connectors)



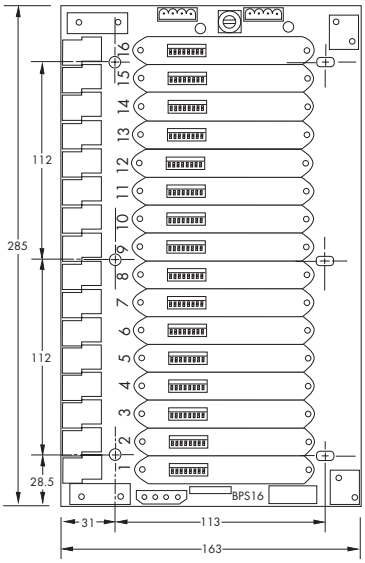
BPM16 16-way backplane (multiway connectors)



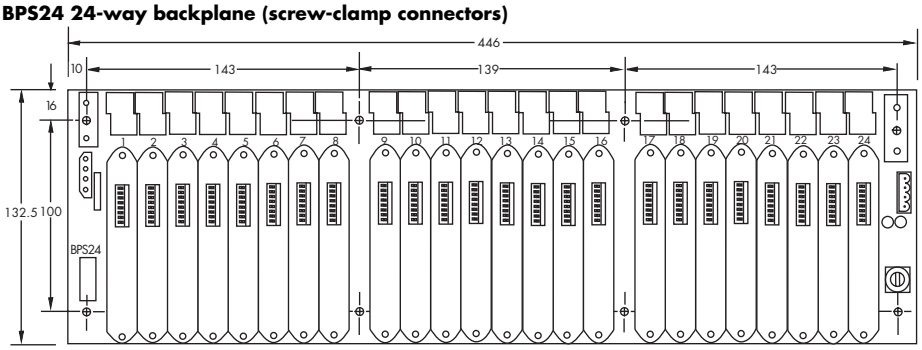
BPM24 24-way backplane (multiway connectors)



BPS16 16-way backplane (screw-clamp connectors)



BPS24 24-way backplane (screw-clamp connectors)



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A member of The MTL Instruments Group plc

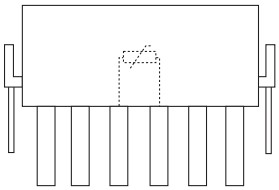
MTL4000 SERIES ACCESSORIES

MTL4000 MODULE ACCESSORIES

CCH01 Hazardous-area crimp connector
SCC01 Hazardous-area screw-clamp connector



SCJ01 Hazardous-area screw-clamp connector with integral CJC sensor



CRC01 Crimps (14–20 AWG), pack of 100
CRC02 Crimps (18–24 AWG), pack of 100
CRT01 Crimp tool for CRC01 crimps
CRT02 Crimp tool for CRC02 crimps and power sense connector
CRR01 Crimp removal tool for CRC01, CRC02 or power sense crimps

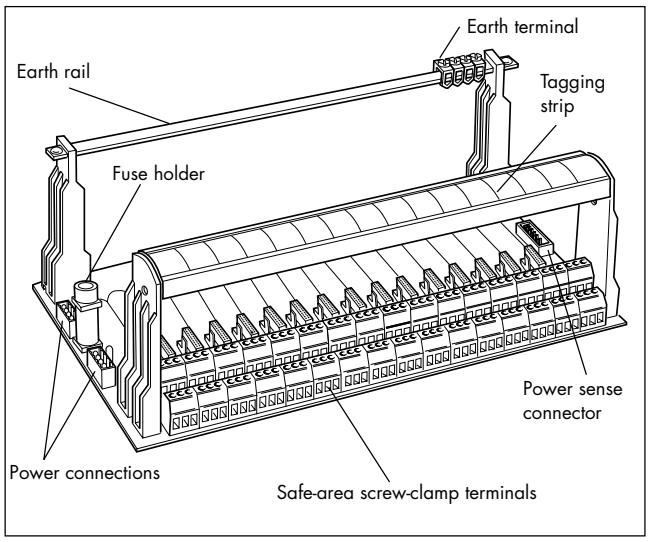
MTL4000 BACKPLANE ACCESSORIES

ERK08 Earth rail kit for BPM/BPS08 backplanes
ERK16 Earth rail kit for BPM/BPS16 backplanes

TSK08 Tagging strip kit for BPM/BPS08 backplanes
TSK16 Tagging strip kit for BPM/BPS16 backplanes
TSK24 Tagging strip kit for BPM/BPS24 backplanes

SMS01 Backplane surface mounting kit, pack of 40

DMK01 Backplane DIN-rail mounting kit, G- or T-section, pack of 40



BMK08 Mounting kit – surface/DIN-rail accessories for one 4- or 8-way backplane
BMK16 Mounting kit – surface/DIN-rail accessories for one 16-way backplane

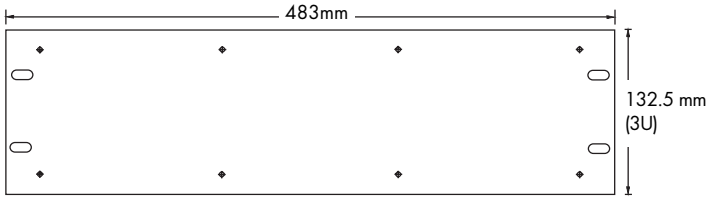
HMP24 Horizontal mounting plate and screws for 19-inch rack, 24-way backplane only,

ELC56 Elco 8016, 56-way cable plug kit

FUS08 Fuse kit, BPM/BPS08 backplanes, pack of 10
FUS16 Fuse kit, BPM/BPS16 backplanes, pack of 10
FUS24 Fuse kit, BPM/BPS24 backplanes, pack of 10

MPL01 Module position labels (blank), pack of 50

HMP24 Horizontal mounting plate for 19-inch rack, 24-way backplane only, (includes mounting screws)



Maximum height from backplane to top of tagging strip: 92mm

MTL BX08/16/32 ENCLOSURES

SPECIFICATION

Capacity
BX08: 1 x BPM08 or BPS08 backplane
BX16: 1 x BPM16 or BPS16 backplane
BX32: 2 x BPM16 or BPS16 backplanes

Construction
Base: GRP (glass-fibre reinforced polyester)
Lid: transparent high-strength polycarbonate

Finish
Base: light grey
Lid: transparent

Lid fixing
Captive fixing screws

Protection
Dust-tight and water-jet proof to IEC 529:IP65

Gland fixing
Side mounted gland plate, detachable for drilling by user

Permitted location
Safe area

Ambient temperature limits
–20 to +60°C, depending upon modules fitted (see instruction manual INM4000 for details)

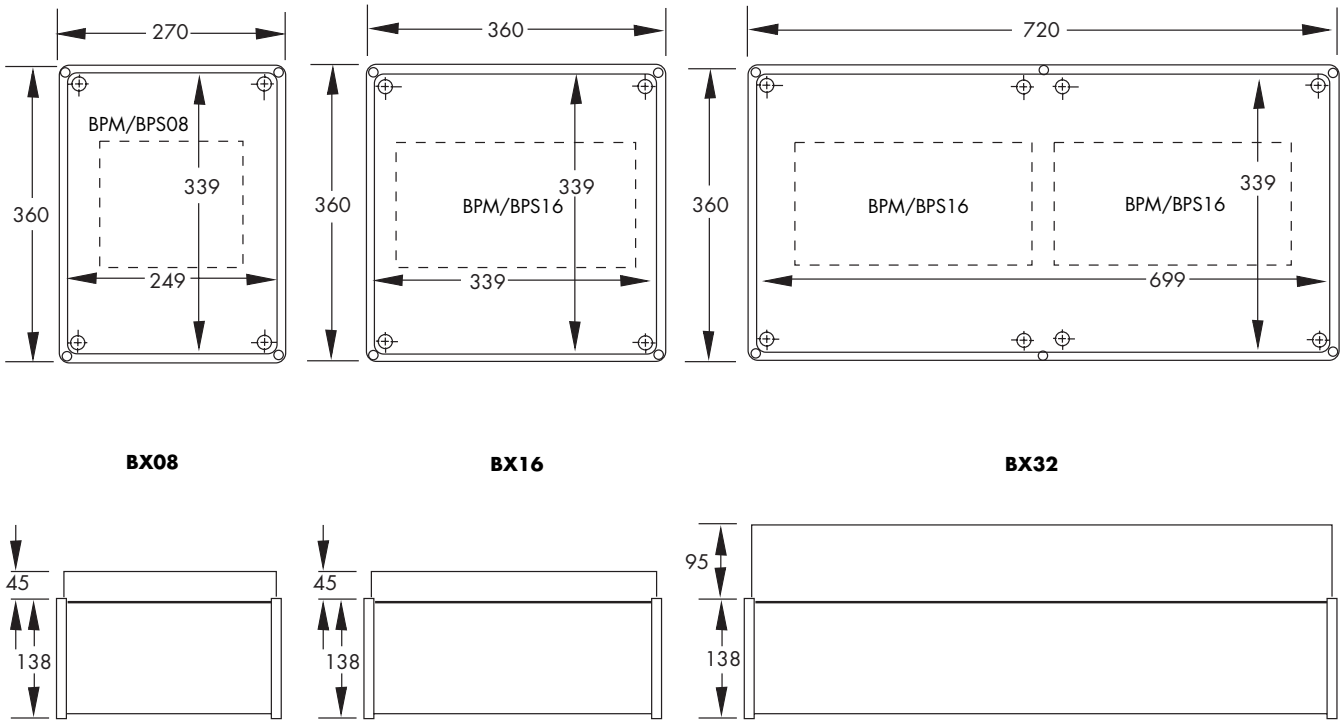
Mounting
By exterior surface-fixing lugs (zinc-passivated steel)

Internal cable trunking
Provided on all enclosures

Backplane mounts
Necessary surface mounting kits (of screws, washers, spacers and retaining washers) are provided with the enclosure

Weight (without backplanes and units)
BX08: 3.7kg
BX16: 4.7kg
BX32: 10.6kg

DIMENSIONS AND MOUNTING (mm)



MTL4000 SERIES ORDERING INFORMATION

Intrinsically safe interface units

Specify module number

Module accessories

CCH01	Hazardous-area crimp connector	
CRC01	Large crimps (14-20 AWG)	100 per pack
CRC02	Small crimps (18-24 AWG)	100 per pack
SCC01	Screw clamp connector	
SCJ01	Hazardous-area screw clamp connector with integral CJC sensor (required for use with MTL4073 with THC inputs requiring CJC)	
MPL01	Module position label (blank)	(50 per pack)

Backplanes

BPM08	8-way backplane multiway connector
BPM16	16-way backplane multiway connector
BPM24	24-way backplane multiway connector
BPS04	4-way backplane screw-clamp connector
BPS08	8-way backplane screw-clamp connector
BPS16	16-way backplane screw-clamp connector
BPS24	24-way backplane screw-clamp connector

Backplane mounting accessories

DMK01	DIN-rail mounting kit, T- or G-section (pack of 40) 8-way backplanes require 4 16-way backplanes require 6
SMS01	Surface mounting kit (pack of 40) 4 and 8-way backplanes require 4 16-way backplanes require 6 24-way backplanes require 8
HMP24	Horizontal mounting plate and screws for 19-inch rack mounting 24-way backplanes only
BMK08	Mounting kit for one 4- or 8-way backplane
BMK16	Mounting kit for one 16-way backplane

Backplane accessories

ERK08	Earth rail kit for 8-way backplanes BPM08 or BPS08
ERK16	Earth rail kit for 16-way backplanes BPM16 or BPS16
TSK08	Tagging strip kit for 8-way backplanes BPM08 or BPS08
TSK16	Tagging strip kit for 16-way backplanes BPM16 or BPS16
TSK24	Tagging strip kit for 24-way backplanes BPM24 or BPS24
ELC56	ELCO 8016, 56-way cable plug kit for use with BPM style backplanes – 1 required per 8 modules
FUS08	Fuse kit for 4 and 8-way backplanes (10 per pack)
FUS16	Fuse kit for 16-way backplanes (10 per pack)
FUS24	Fuse kit for 24-way backplanes (10 per pack)

Enclosures

BX08	8-way enclosure suitable for 1 BPM08 or BPS08
BX16	16-way enclosure suitable for 1 BPM16 or BPS16
BX32	32-way enclosure suitable for 2 BPM16 or BPS16

General Accessories

CRT01	Crimp tool for CRC01 crimps
CRT02	Crimp tool for CRC02 crimps and power sense connector
CRR01	Crimp removal tool for CRC01, CRC02, and power sense connector

Literature

INM4000	MTL4000 Series instruction manual
AN9013	MTL4000 Series application note

MTL4000/4700 SERIES

custom backplanes



- **Design-in high packing densities**
- **Simplify installation**
- **Reduce wiring**
- **Choose from a range of existing backplanes or create a custom design**

Custom backplanes

MTL provides a complete design and manufacturing service for customised backplanes. Customised backplanes give vendors and users of process control and safety systems the opportunity to integrate MTL4000/4700/4800 modules directly into their system architecture. As there are no hazardous-area circuits on the backplanes customised versions can be produced without the need for IS certification, so simplifying design and lowering costs.

New for 1998/99

New to MTL's range of custom backplanes is the BPS16C. This backplane is functionally identical to the standard BPS16 except it has two rows of component holes which interface to the safe-side signal connections. This allows the user to mount components or make connections to condition or re-route signals. MTL can supply these backplanes pre-fitted with components and links to the customers request.

Please contact MTL for backplane prices and availability.

DCS vendors supported:

Elsag Bailey
Foxboro
Moore Products
Yokogawa
Simrad-Norge
Fischer & Porter
Bently-Nevada

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

MTL4000/4700 SERIES

universal customised backplanes



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

- **Total flexibility**
- **Reduce wiring cost**
- **Special functions**
- **Signal conditioning**
- **Choose from a range of existing interfaces or create a custom design**
- **Easy HART® integration**

Universal customised backplanes

The 'Universal' backplane allows a fast and economic approach to providing a custom interface. Where tight time schedules exist the backplane can be installed to allow panel building and wiring to be completed. The customised adaptor card can then be plugged in any time up to integrated test.

Adapter cards

Adapter cards already exist for many of the DCS companies. Please contact MTL with your requirements and we will recommend the best possible solution.

Connections

All the bus powered backplanes have plug-in power connectors and power-supply monitoring. The MTL4700 backplanes also have the high integrity earth connections required for zener barriers.

DCS vendors supported:

ABB
August Systems
Elsag Bailey
Foxboro
Moore Products
Honeywell-SMS
Triconex
Yokogawa

HART® is a registered trademark of HART Communication Foundation

MTL CUSTOM BACKPLANES

Specifications and dimensions

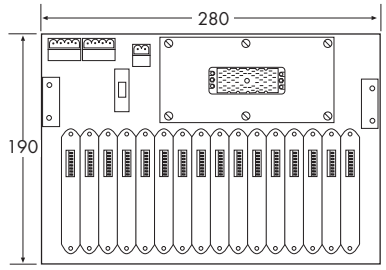
BACKPLANES – FEATURES

Model No.	No. of modules	Mounting			Tagging
		Surface	DIN	19"	
BPM16U	16	Yes	Yes	No	TSK16
BPM716U	16	Yes	Yes	No	TSK16
BGM716U	16	yes	Yes	No	TSK16
BPM32	32	Yes	No	Yes	TSK16*
BPS16C	16	Yes	Yes	no	TSK16

*Extension post required

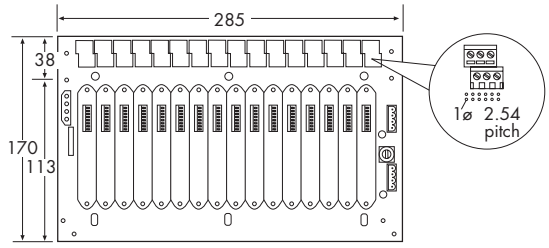
DIMENSIONS (mm)

BPM16U/BGM716U/BPM716U



Adapter Card
BPM16U: 150 x 72
BPM716U: 180 x 72
BGM716U: 180 x 72

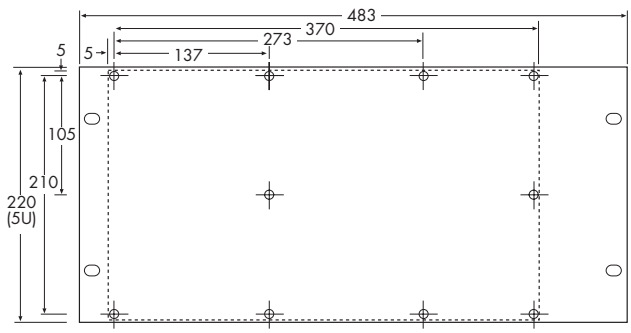
BPS16C



BPM32

Adapter Card 155 x 97mm

HMP32



SPECIFICATION

Power requirements
BPM16U, BPM32: 21-35V dc
BPM716U: 26.8V max.

Safe-area connectors – to customer requirements

Weight
BPS16C: 420g
BPM16U: 308g
BPM716U: 330g
BGM716U: 315g
BPM32: 710g
HMP32: 1300g

Power sense
relay contacts SPNO on both power feeds
BPS16C through crimp connector via 10k resistors

HOW TO ORDER MTL CUSTOM BACKPLANES & ACCESSORIES

Backplanes

BPM16U	MTL4000 Series 16 way
BPM716U	MTL4700 Series buss powered 16 way
BGM716U	MTL4700 Series general purpose 16 way
BPM32	MTL4000 Series 32 way
BPS16C	MTL4000 Series 16 way (screw-clamp connectors)

Accessories

16 way backplanes - the following may be used

DMK01	DIN-rail mounting kit, T- or G-section (pack of 40)
SMS01	Surface mounting kit (pack of 40)
BMK16	Mounting kit for one 16-way backplane
TSK16	Tagging strip kit for 16-way backplanes
FUS16	Fuse kit for 16-way backplanes (10 per pack)
MPL01	Module position label (blank) (50 per pack)

BPM32	32-way universal backplane
HMP32	19" mounting plate
SMS01	Surface mounting kit (pack of 10)
FUS16	Modules fused in 2 groups of 16, pack of 10

Adapter cards
Please contact MTL to discuss your requirements. Each adapter card must be ordered separately to the universal backplane.

BPS16C
Please contact MTL for quotation to supply BPS16C backplanes pre-configured.