MTL4700 SERIES

Shunt-diode safety barriers

For close integration of IS circuits into hazardous-area measurement and control systems



- **Ultra-high packing density provided by compact multi-channel modules**
- **Reduced system engineering/installation costs thanks to 'plug-in' connections**
- **High-integrity earth connections**
- **Customised backplanes need no certification from most certifying authorities**
- **BASEEFA, FM, CSA, ISA and VNIIVE approved**

The MTL4700 Series of 'third-generation' safety barriers are multi-channel devices designed for close integration of intrinsic safety into process systems. Combining the compact 'plug-in' design concept of the MTL4000 Series of isolators with the circuit designs of the well-known MTL700 Series of barriers, the new barriers provide exceptionally high packing densities allied to proven reliability – so reducing space requirements and weight loading without sacrificing performance. MTL4700 Series barrier modules plug into system backplanes to make safe-area connections while hazardous-area connections are made by separate connectors plugged into the tops of modules – an approach that both simplifies system design and reduces installation and maintenance costs.

The range includes five 'key' models, which cover between them the majority of all process control requirements – so simplifying barrier selection for most purposes while still providing additional choices for applications not covered by the 'key' barriers.

Module features include a multiway connector on the base of each unit which mates with a connector on the backplane to bring out safe-area circuits, to provide system earthing and (on some backplanes) to feed bussed power to particular modules. The all-important high-integrity earth connections are made automatically by three pins in parallel on the base connection. Hazardous-area connections are made by a single connector which plugs into the top of the module – simplifying installation and maintenance to reduce time, cost and the risk of errors. These are available with either screw-clamp or crimp terminals. Modules are exceptionally compact (only 16mm in width) and multi-channel – giving the high packing density and low 'weight/channel' ratio.

Backplanes and accessories are described in MTL4700 series backplanes, accessories and enclosures section. Standard backplanes are available in 8-, 16- and 24-way configurations with alternative choices of multiway or screw-clamp safe-area circuit connections and alternative means of providing power to the modules (by 'bussed-power' or 'general-purpose' backplanes). The accessories include a range of enclosures to accomodate 8- and 16-way backplanes.

To maintain maximum system flexibility, modules suited to bussed power can generally also be used on general-purpose backplanes and vice versa.

Custom backplanes

Apart from the standard range, customised backplanes to suit particular system architectures are easy to design, either by MTL or by users, as the backplanes carry no hazardous-area circuits, so avoiding some design constraints and avoiding the need for expensive and time-consuming certification procedures. See MTL4000/4700 series.

References

The following documents are available for further information on MTL4700 Series barriers:

AN9014 *A user's guide to MTL4700 Series safety barriers*

INM4700 *MTL4700 Series shunt-diode safety barriers instruction manual.*

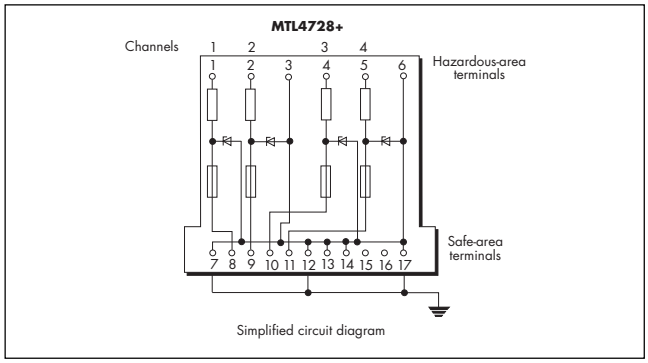
Telematic

Telematic Ltd offers compatible surge protection devices which are mechanically identical to the MTL4700 Series

Ask for the SP4377 Series data sheet!

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MTL4700 SERIES HOW THEY WORK



Simplified circuit diagram

MTL4700 Series barriers are based on the same simple principles as the industry-standard MTL700 and 700P Series. For consistency and to make identification simpler, the same numbering system, prefixed by '4', is used for equivalent units. However, individual MTL4700 Series units include more channels than MTL700 equivalents (see diagram), yet have identical or improved circuit specifications. Additionally, some modules are internally wired to pick up power from 'bussed-power' backplanes (see table of basic data) – pins 15 and 16 being set aside for this purpose. For all modules, earthing is made through pins 7, 12 and 17.

BASIC DATA

'Key' modules shown in blue

Application/Comments		Module MTL...	Bussed power*	Total channels	Channels per loop	Loops
Digital (on/off) inputs switches	Regulated supplies	**4787+**	√	**4**	**2**	**2**
		4787P+	√	4	2	2
	Unregulated supplies (20–27V)	4781+	√	5	1	4†
Digital (on/off) outputs solenoids, alarms, LEDs etc – well regulated supplies	Switch in power leg (earth return)	**4728+**	–	**4**	**1**	**4**
	Control switch on earth (diode return)	**4787+**	√	**4**	**2**	**2**
		4787P+	√	4	2	2
Analogue inputs – high-level	2-wire transmitters – conventional & smart – regulated supplies	**4787+**	√	**4**	**2**	**2**
		4787P+	√	4	2	2
		4788+	√	4	2	2
		4788R+	√	4	2	2
	Vibration probes – regulated supplies	4796–	–	4	2	2
	2-wire transmitters – conventional & smart – unregulated supplies (20–35V)	**4706+**	√	**2**	**1**	**2**
Analogue inputs – low level	THCs	**4760ac**	–	**4**	**2**	**2**
	RTDs – 3-wire	**4755ac**	–	**3**	**3**	**1**
	RTDs – 4-wire – 10V power supplies	4715+	–	4	4	1
	RTDs – 4-wire	**4760ac**	–	**4**	**4**	**1**
	Slidewire displacement transducers	**4760ac**	–	**4**	**2**	**2**
	ac sensors	**4760ac**	–	**4**	**2**	**2**
Strain-gauges	Single or multiple bridges	4763Pac	–	6	6	1
Analogue outputs Controller outputs – I/Ps – well regulated supplies	Output goes to 0V (earth return)	**4728+**	–	**4**	**1**	**4**
	Transistor between controller output and 0V (diode return)	**4787+**	√	**4**	**2**	**2**
		4787P+	√	4	2	2
Negative and floating supplies	Dig.i/p – Switch inputs Dig.o/p – Solenoids, alarms, LEDs etc. An. i/p (high level) – Transmitters	4728–	–	4	1	4
Miscellaneous	12V dc systems	4715+	–	4	1	4
	18V dc systems	4722+	–	4	1	4
	2-wire 24V dc and ac systems	4778ac	–	4	2	2
Securing cable screens and spare cores		4799	–	6 terminals		

* These modules can make use of bussed power on a bussed power backplane

† The MTL4781 includes 1 power output channel and 4 switch return channels

SPECIFICATIONS – TERMINOLOGY

Safety description
The safety description of a barrier, eg, '28V 300Ω 93mA' refers to the maximum voltage of the terminating Zener or forward diode while the fuse is blowing, the minimum value of the terminating resistor and the corresponding maximum short-circuit current. It indicates the fault energy that can be developed in the hazardous area – not the working voltage or end-to-end resistance.

Polarity
Barriers are polarised 'positive' (+), 'negative' (–), or 'non-polarised' (ac). Polarised barriers transmit safe-area signals of the specified polarity (to earth) and act as a low impedance if the polarity is reversed. Non-polarised ac barriers contain additional Zener diodes connected in the opposite direction and will transmit signals of either polarity.

End-to-end resistance
The resistance between the two ends of the barrier, ie, of the two resistors and the fuse. It increases with working voltage. The end-to-end resistances of two channels of the MTL4755 are trimmed to close limits for use with 3-wire RTDs.

Working voltage (Vwkg)
The greatest voltage that can be applied continuously between the safe-area terminal(s) of the barrier and earth at 20°C (with hazardous-area terminals open circuit) for a specified leakage current. For ac barriers, the values are peak rather than rms.

Maximum voltage (Vmax)
The greatest voltage that can be applied continuously between the safe-area terminal(s) of the barrier and earth at 20°C (with hazardous-area terminals open circuit) without blowing the fuse. If current is drawn in the hazardous area, the maximum voltage is reduced.

Fuse rating
The greatest current that can be passed continuously (for 1000 hours at 35°C) through the fuse.

Matched power
The maximum power that can be drawn from a channel under fault conditions. Used to assess the temperature classification of 'simple apparatus'. Matched power occurs when the load resistance is equal to the barrier current limiting resistance.

Channel
The term 'channel' applies specifically to any channel incorporating an infallible current limiting resistor.

Loop
The term 'loop' applies to any channel or multi-channel combination providing the interface for one hazardous-area device.

MTL4706+
FOR TWO TRANSMITTERS
– 2-wire 4/20mA and 'smart'

CE

The MTL4706+ is a 2-channel electronic, over-volt protected barrier. It is designed primarily for energising conventional and smart 2-wire 4/20mA hazardous-area transmitters. As each loop is typically powered by a single channel, the barrier is capable of driving two hazardous-area devices. The novel patented circuit design is notable for extreme accuracy of ±2µA under all conditions. A floating dc power supply is built-in to provide a high voltage output to power the transmitters. The MTL4706+ is capable of operating from bussed power.

SPECIFICATION

Channel numbers
1 and 2

Safety description
28V, 300Ω, 93mA

Polarity
Positive input to safe-area load
Note that the output voltage to the transmitter is negative with respect to earth.

Output current
4/20mA

Voltage for Tx & lines
≥16V at 20mA

Load resistance
250Ω ± 5%

Accuracy
±2µA

Fuse rating
50mA

Matched power
0.65W

Supply current (total)
100mA maximum at 20mA with 20V supply
80mA typical at 20mA with 24V supply

Supply voltage range
20 to 26.8V on bussed-power backplanes limited by on-board protection circuit
20 to 35.0V on general-purpose or custom backplanes

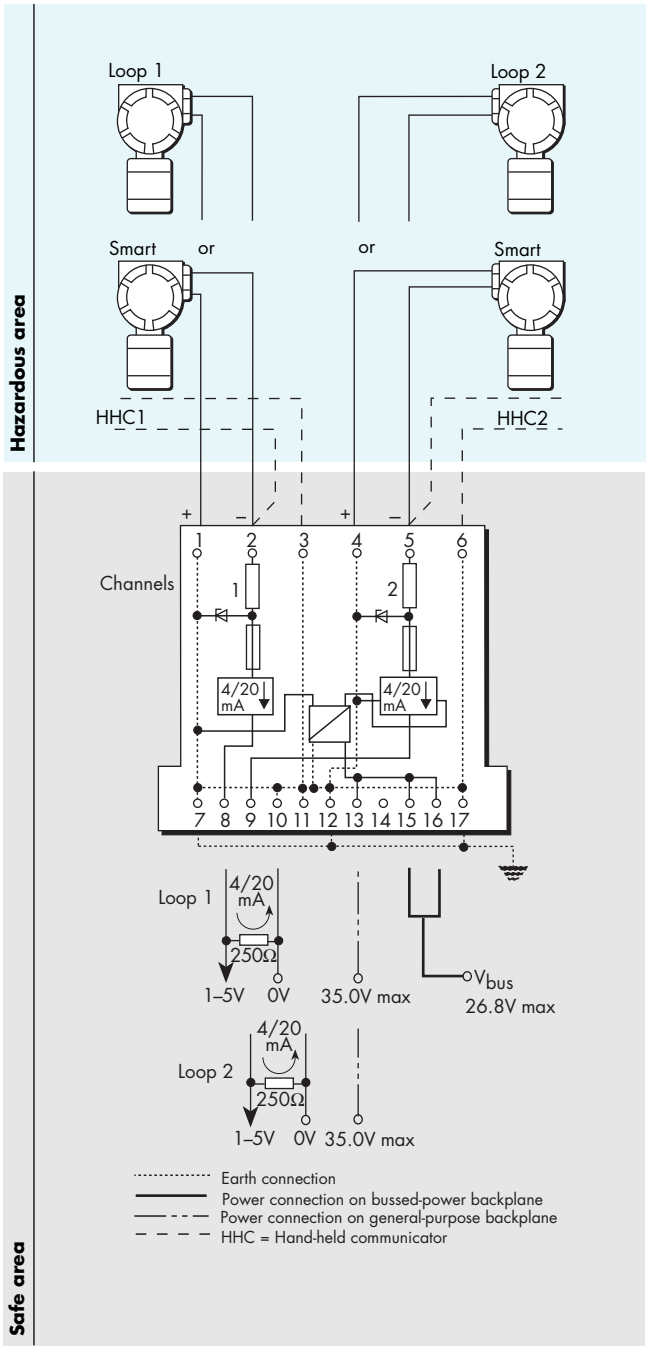
Power supply fuse
250mA

MAXIMUM CABLE PARAMETERS

(for single channel with earth return)

BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (µF)	Inductance (mH)	or L/R ratio (µH/Ω)	Capacitance (µF)	Inductance (mH)
0.13	4.2	55	0.14	4.23

ANALOGUE INPUTS (HIGH LEVEL)



UK Patent No. 2205699
USA Patent No. 4967302
European Patent (Germany, France, Italy) No. EP 0 294 139 BI

See also common specification, approvals and dimensions.

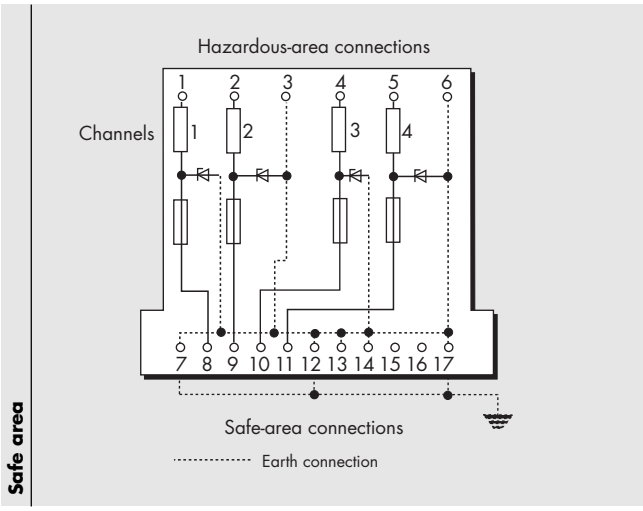
MTL4715+
FOR FOUR 12V dc SYSTEMS

CE

The MTL4715+ is a 4-channel barrier designed for 12V dc applications. It can also be used for 4-wire RTDs that are powered by 10V supplies and which cannot, therefore, be handled by MTL4760ac modules, the recommended barrier for these. The module is not designed to operate with bussed power.

SPECIFICATION

Channel numbers
1 to 4
Safety description
15V, 100Ω, 150mA
Polarity
Positive
Max. end-to-end resistance
118Ω
V_{wkg} at 10μA
12.7V
V_{max}
13.7V
Fuse rating
100mA
Matched power
0.56W



MAXIMUM CABLE PARAMETERS

(for single channel with earth return)

BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.75	1.65	65	0.79	1.37

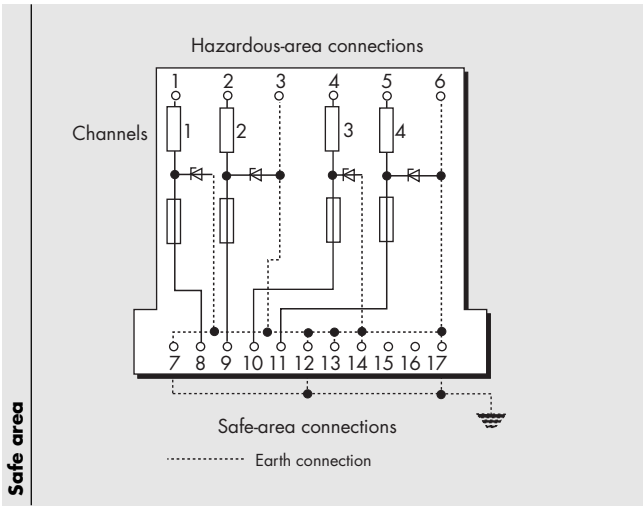
MTL4722+
FOR FOUR 18V dc SYSTEMS

CE

The MTL4722+ is a 4-channel barrier designed for 18V dc applications. The module is not designed to operate with bussed power.

SPECIFICATION

Channel numbers
1 to 4
Safety description
22V, 150Ω, 147mA
Polarity
Positive
Max. end-to-end resistance
185Ω
V_{wkg} at 10μA
19.0V
V_{max}
20.2V
Fuse rating
50mA
Matched power
0.81W



MAXIMUM CABLE PARAMETERS

(for single channel with earth return)

BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.26	1.75	46	0.28	2.08

See also common specification, approvals and dimensions.

MTL4728+
FOR FOUR OUTPUTS
digital (on/off) or 4/20mA controller outputs

CE

The MTL4728+ is a 4-channel barrier designed primarily for controller outputs and for solenoid, alarm and LED driving applications. As each loop is powered, typically, by a single channel, the module can drive four hazardous-area devices. It is not designed to accept bussed power since, for solenoid driving applications, the control switch is often in the power leg of the circuit. The unit incorporates an earth return circuit (as opposed to the MTL4787+ and MTL4787P+ modules which cover a similar range of applications but with a diode return).

SPECIFICATION

Channel numbers
1 to 4
Safety description
28V, 300Ω, 93mA
Polarity
Positive
Max. end-to-end resistance
330Ω
V_{wkg} at 10μA
26.3V
V_{max}
27.0V
Fuse rating
50mA
Matched power
0.65W

MAXIMUM CABLE PARAMETERS

(for single channel with earth return)

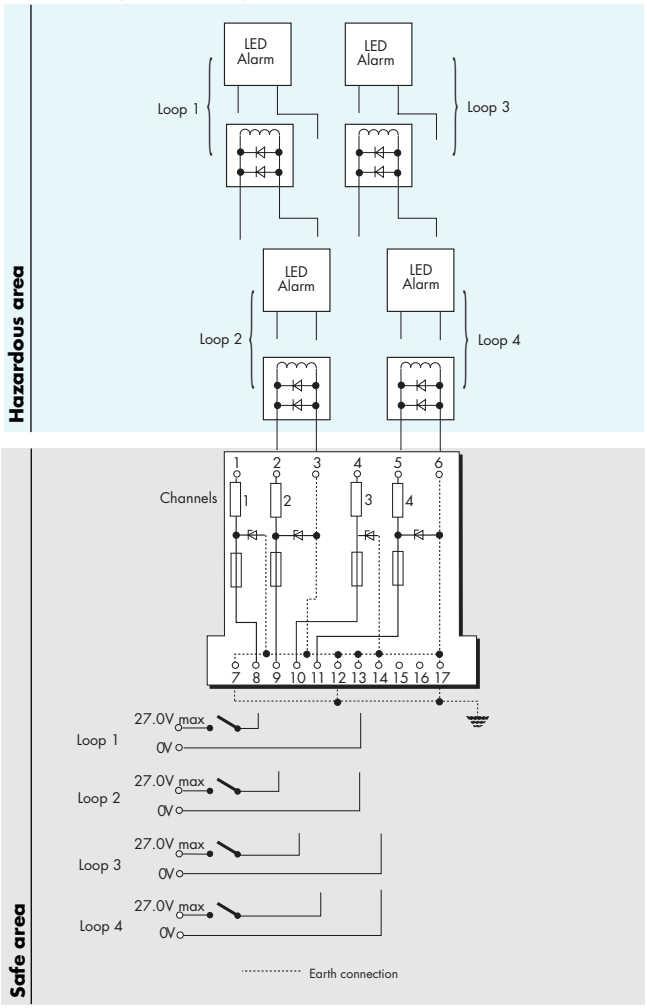
BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.13	4.2	55	0.14	4.23

(for two channels with earth return)

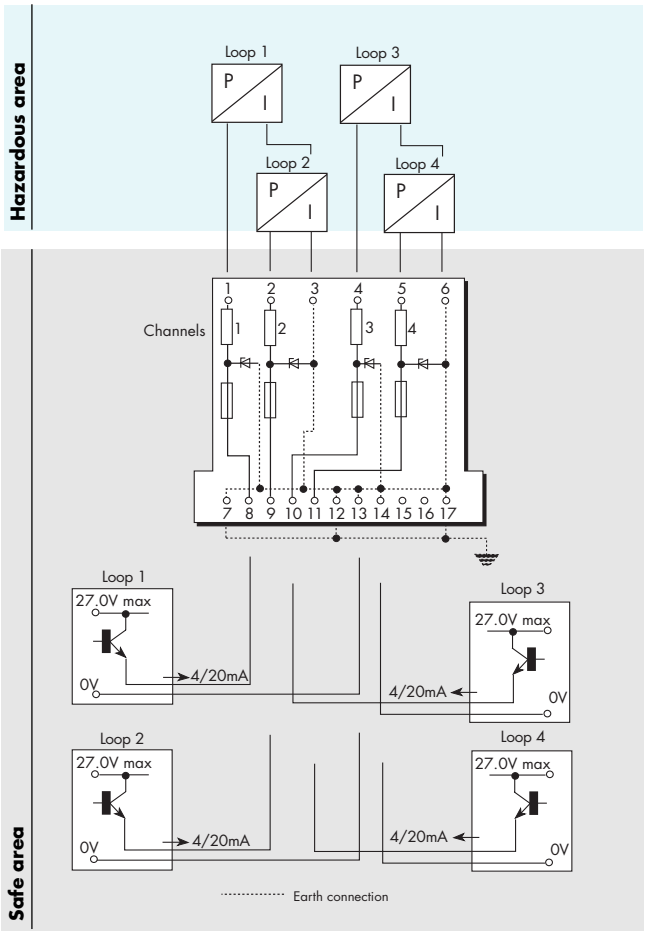
BASEEFA (group IIB)			FM (groups C & E)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.39	4.3	83	0.36	4.73

See also common specification, approvals and dimensions.

DIGITAL (ON/OFF) OUTPUTS



ANALOGUE OUTPUTS



MTL4728–
FOR NEGATIVE AND FLOATING SUPPLIES

– for switches, solenoids, LEDs, 4/20mA, transmitters, etc

CE

The MTL4728– is a 4-channel barrier designed to be used in applications using negative or floating power supplies and positive earths. It is identical to the MTL4728+ barrier except that the safety diodes are reversed. It can also be thought of as an MTL4706+ without the built-in power supply. Used with a floating supply, it provides a positive output wrt 0V to the safe area.

SPECIFICATION

Channels
4 identical
Safety description
28V, 300Ω, 93mA
Polarity
Negative
Max. end-to-end resistance
330Ω
V_{wkg} at 10μA
26.3V
V_{max}
27.0V
Fuse rating
50mA
Matched power
0.65W

MAXIMUM CABLE PARAMETERS

(for single channel with earth return)

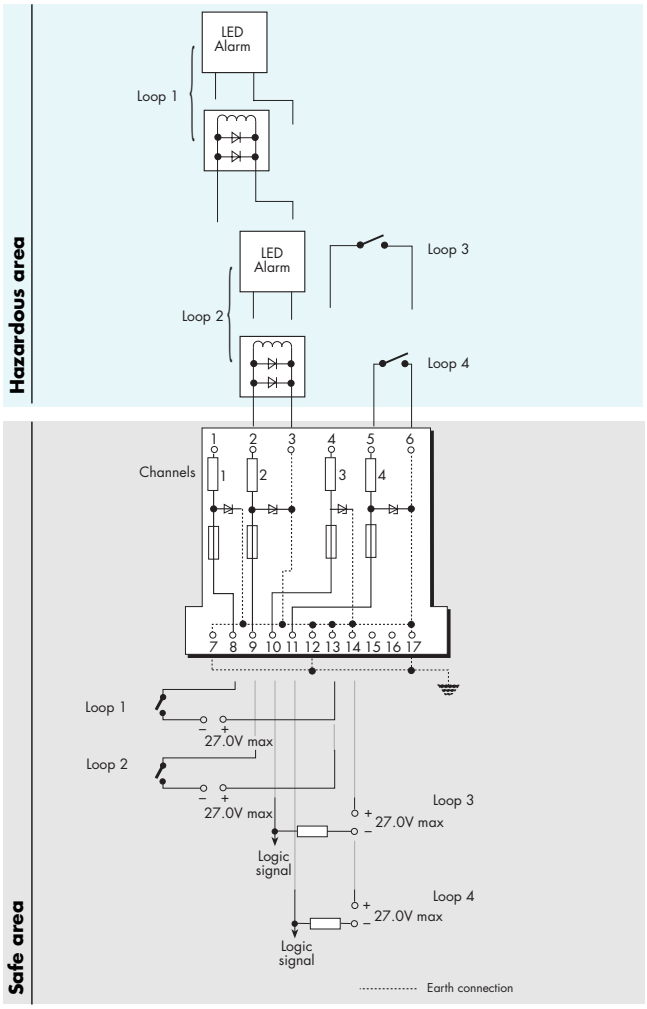
BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.13	4.2	55	0.14	4.23

(for two channels with earth return)

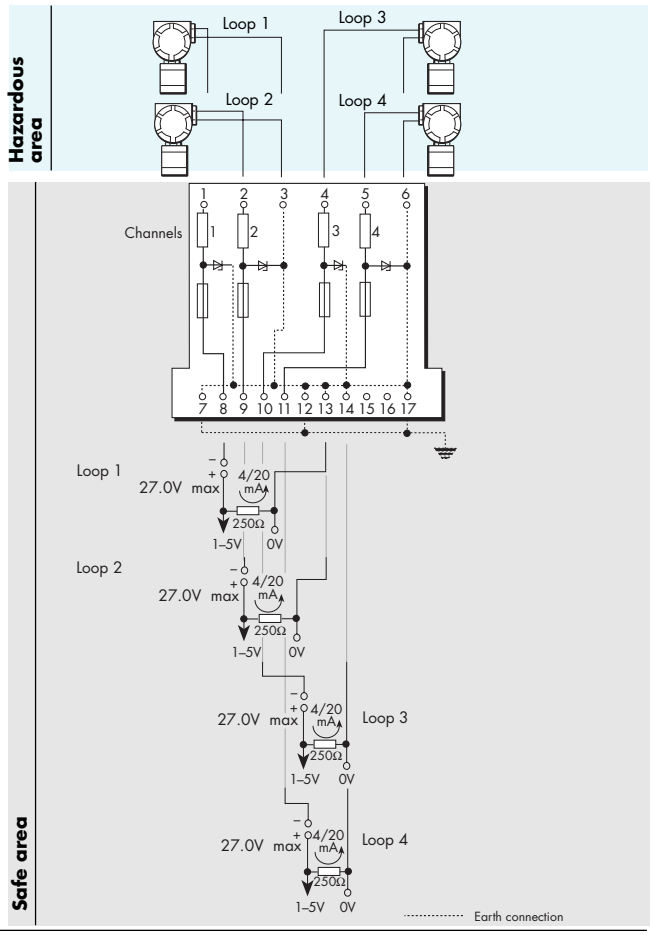
BASEEFA (group IIB)			FM (groups C & E)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.39	4.3	83	0.36	4.73

See also common specification, approvals and dimensions.

DIGITAL (ON/OFF) INPUTS OR OUTPUTS



ANALOGUE INPUTS (HIGH LEVEL)



MTL4755ac
FOR 3-WIRE RTDs

CE

The MTL4755ac is a 3-channel barrier designed particularly for use with 3-wire RTDs with earthed or floating bridges. As each loop generally needs three barrier channels, a single module interfaces with one 3-wire RTD. It has a low end-to-end resistance of only 18Ω/channel to minimise span changes while two of the channels track within 0.15Ω (from –20 to +60°C) to minimise zero shift with temperature. It is not designed to accept bussed power.

SPECIFICATION

Channel numbers
1
Safety description
3V, 10Ω, 300mA
Polarity
ac
Max. end-to-end resistance
18.2Ω
V_{wkg} at 1µA
0.6V
V_{max}
2.3V
Fuse rating
100mA
Matched power
0.23W

Channel numbers
2 and 3
Safety description
3V, 10Ω, 300mA
Polarity
ac
Max. end-to-end resistance
18.5Ω*
V_{wkg} at 1µA
0.6V
V_{max}
2.3V
Fuse rating
100mA
Matched power
0.23W

**Tolerance ±0.15Ω at 20°C, channels track within 0.15Ω from –20 to +60°C*

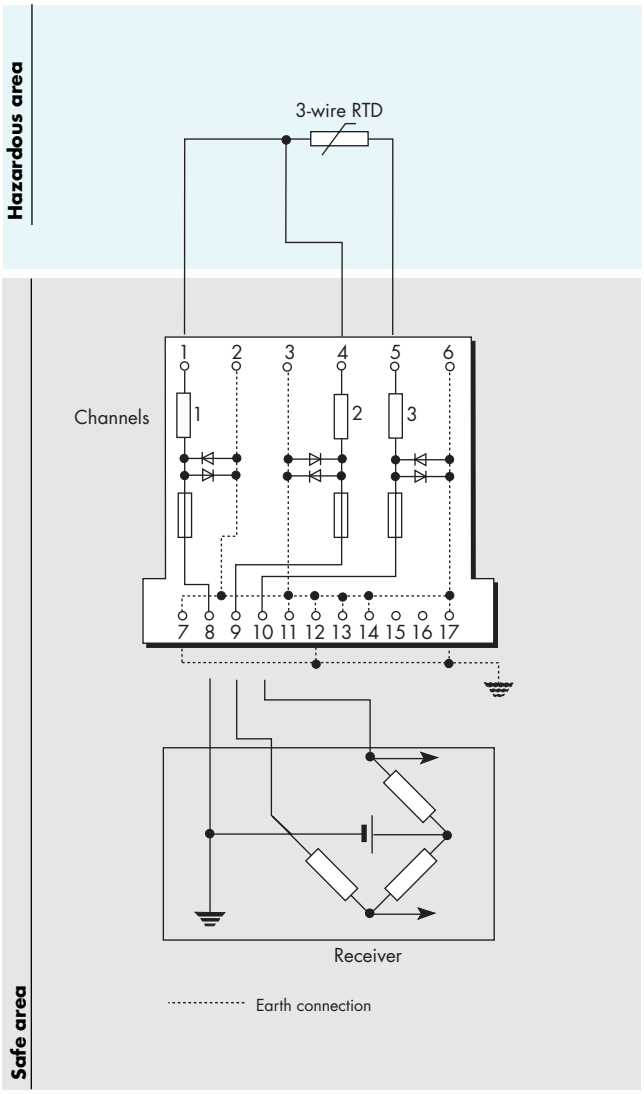
MAXIMUM CABLE PARAMETERS

(for three channels)

	BASEEFA (group IIC)			FM (groups A & B)	
	Capacitance (µF)	Inductance (mH)	or L/R ratio (µH/Ω)	Capacitance (µF)	Inductance (mH)
1	40	0.27	42	-	-
2	-	-	-	19.9	0.02

1: Without earth return
2: With earth return (FM include an earth return in their calculations)

ANALOGUE INPUTS (LOW LEVEL)



See also common specification, approvals and dimensions.

MTL4760ac
FOR TWO THERMOCOUPLES
low-level ac sensors, 4-wire RTDs

CE

The MTL4760ac is a twin 2-channel barrier designed primarily for THCs, low-level ac signals and 4-wire RTDs. THCs and low-level ac sensors are typically powered by two barrier channels and hence the module can interface with two such devices. However, for a 4-wire RTD all four channels are needed so each such device is powered from a separate module. The MTL4760ac is not designed to operate from bussed power.

SPECIFICATION

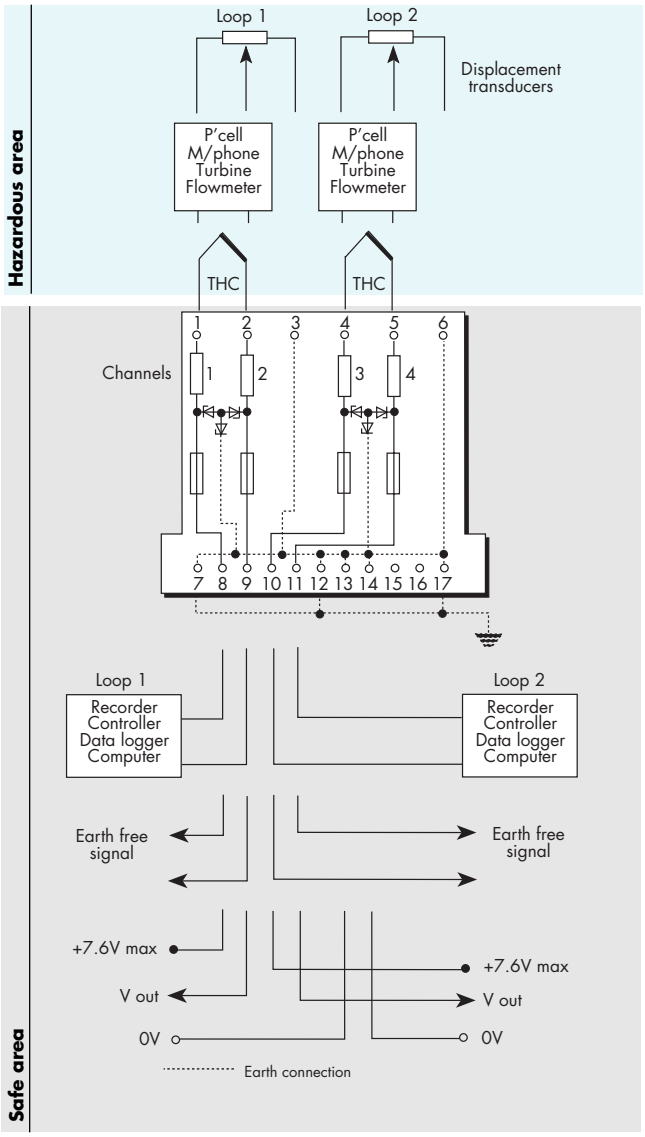
Channel numbers
1 to 4
Safety description
9V, 75Ω, 120mA
Polarity
ac
Max. end-to-end resistance
95Ω
V_{wkg} at 10μA
7.0V
V_{max}
7.6V
Fuse rating
50mA
Matched power
0.27W

MAXIMUM CABLE PARAMETERS

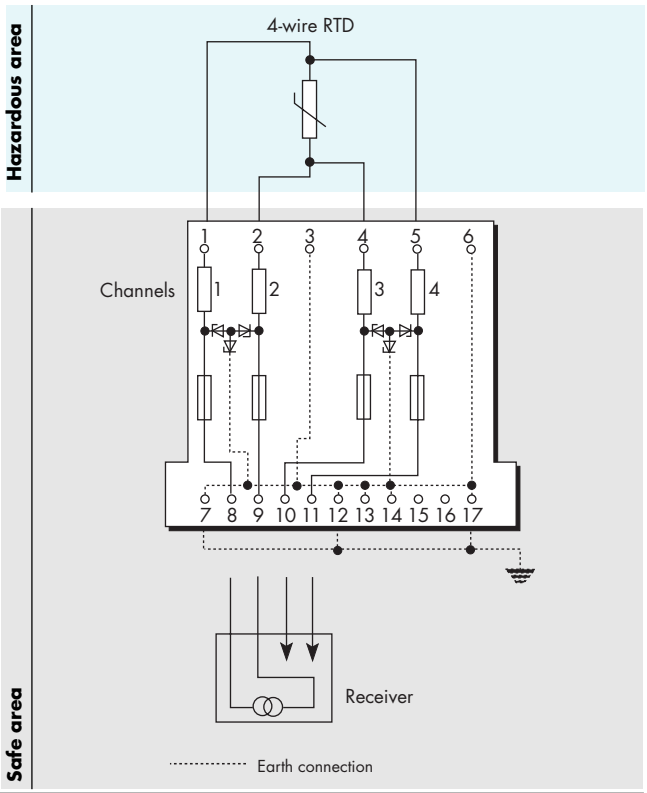
	BASEEFA (group IIC)			FM (groups A & B)	
	Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
1	4.5	0.65	44.4	5.28	0.7
2	4.5	9.8	260	-	-
3	-	-	-	0.46	0.11
4	0.42	0.45	16.6	-	-

1: 2-channel with earth return (for channel pairs 1 & 2 or 3 & 4)
2: 2-channel without earth return (for channel pairs 1 & 2 and 3 & 4)
3: 4-channel with earth return (FM include an earth return in their calculations)
4: 4-channel without earth return

ANALOGUE INPUTS (LOW LEVEL)



ANALOGUE INPUTS (LOW LEVEL)

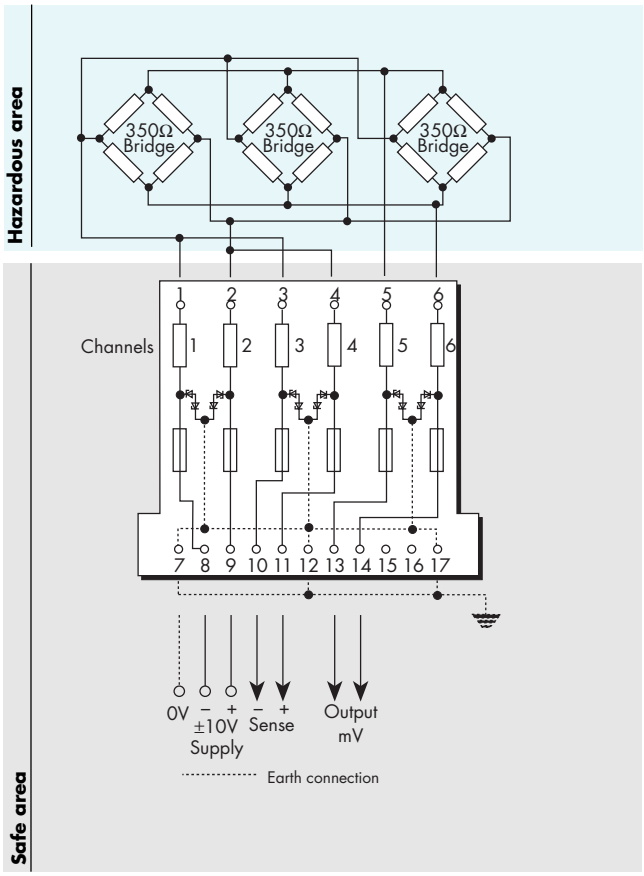


See also common specification, approvals and dimensions.

MTL4763Pac
FOR STRAIN-GAUGE BRIDGES

CE

The MTL4763Pac is a triple 2-channel barrier designed for strain-gauge bridge applications with IIC gas groups, for which function it combines the circuits of one MTL766Pac and two MTL761Pac units. Channels 1 and 2 (equivalent to the MTL766Pac) supply power to the bridge while channels 3 and 4 (equivalent to one MTL761Pac) interface with the sensing circuit and channels 5 and 6 (equivalent to the other MTL761Pac) interface with the pick-off circuit. As channels 3 to 6 are identical in specification, the functions of channel pairs 3 and 4 and 5 and 6 are interchangeable; ie. channels 3 and 4 can be used for the output, while channels 5 and 6 can be used to sense the supply. The MTL4763Pac is normally intended to be used on general-purpose backplanes. If used on a bussed-power backplane, channels 5 and 6 cannot be used, because, on this type of backplane, module base connections pins 13 and 14 are not accessible.



SPECIFICATION

Channel numbers
1 and 2
Safety description
12V, 75Ω, 160mA
Polarity
ac
Max. end-to end resistance
90Ω
V_{wkg} at 1μA
9.8V
V_{max}
10.9V
Fuse rating
100mA
Matched power
1.17W (total)

Channel numbers
3, 4, 5 and 6
Safety description
9V, 350Ω, 26mA
Polarity
ac
Max. end-to-end resistance
375Ω
V_{wkg} at 1μA
7.0V
V_{max}
7.9V
Fuse rating
50mA
Matched power
1.17W (total)

MAXIMUM CABLE PARAMETERS

(for six channels, with earth return)

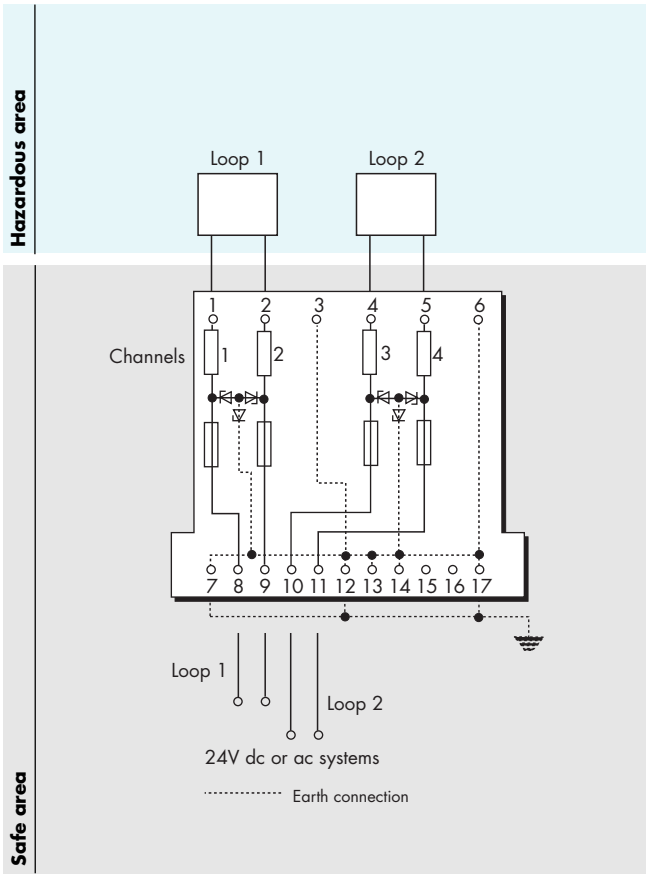
BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.18	0.17	18.4	0.22	0.24

See also common specification, approvals and dimensions.

MTL4778ac
FOR TWO 2-WIRE dc AND ac SYSTEMS

CE

The MTL4778ac is a twin 2-channel barrier designed for 2-wire 24V dc and ac applications. The module is not designed to operate with bussed power.



SPECIFICATION

Channel number
1 to 4
Safety description
28V, 600Ω, 47mA
Polarity
ac
Max. end-to-end resistance
661Ω
V_{wkg} at 10μA
24.7V
V_{max}
26.1V
Fuse rating
32mA
Matched power
0.33W

MAXIMUM CABLE PARAMETERS

(channel pairs 1 & 2 or 3 & 4, plus earth return)

BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.13	4.2	36.7	0.14	4.34

See also common specification, approvals and dimensions.

MTL4781+
FOR FOUR SWITCHES
solid-state output

CE

The MTL4781+ is a barrier with four switch channels plus one supply channel. It has electronic overvolt protection and is designed solely for switch applications. It can interface with up to four hazardous-area switches or two relay/changeover contacts, providing four solid-state open-collector returns to the safe area. The status of all four switches is indicated by a bank of four LEDs on top of the module. The fifth channel is a single power output channel for all switches made available through two hazardous-area terminals. The module includes a current limit circuit which prevents the safety fuse blowing if short-term overvoltages are inadvertently applied to any of the safe-area terminals. It is also reverse polarity protected. The module is capable of operating from bussed power.

SPECIFICATION

Channel numbers 5	**Channel numbers** 1 to 4
Safety description 28V, 300Ω, 93mA	**Safety description** 28V, 11.6kΩ, 2.4mA
Polarity Positive	**Polarity** Positive
Max. end-to-end resistance 394Ω + 0.4V	**Max. end-to-end resistance** –
Supply voltage range 20 to 26.8V using bussed-power backplane connections 20 to 27.0V on general-purpose or custom backplanes	**Supply voltage range** –
Fuse rating 50mA	**Fuse rating** –
Matched power 0.72W (total)	**Matched power** –

COMMON SPECIFICATION

Input characteristics
Output on if <200Ω in sensor circuit
Output off if >30kΩ in sensor circuit

Output characteristics (channels 1 to 4)
Operating frequency: dc to 5kHz
Maximum off-state voltage: V_{supply}
Maximum off-state leakage current: 10µA
Maximum on-state voltage drop: 0.1 x current in mA, (V)
Maximum on-state current: 50mA
Note: all outputs are protected from inductive loads

LED indicators (channels 1 to 4)
Amber: One provided for each return channel
ON when switch closed

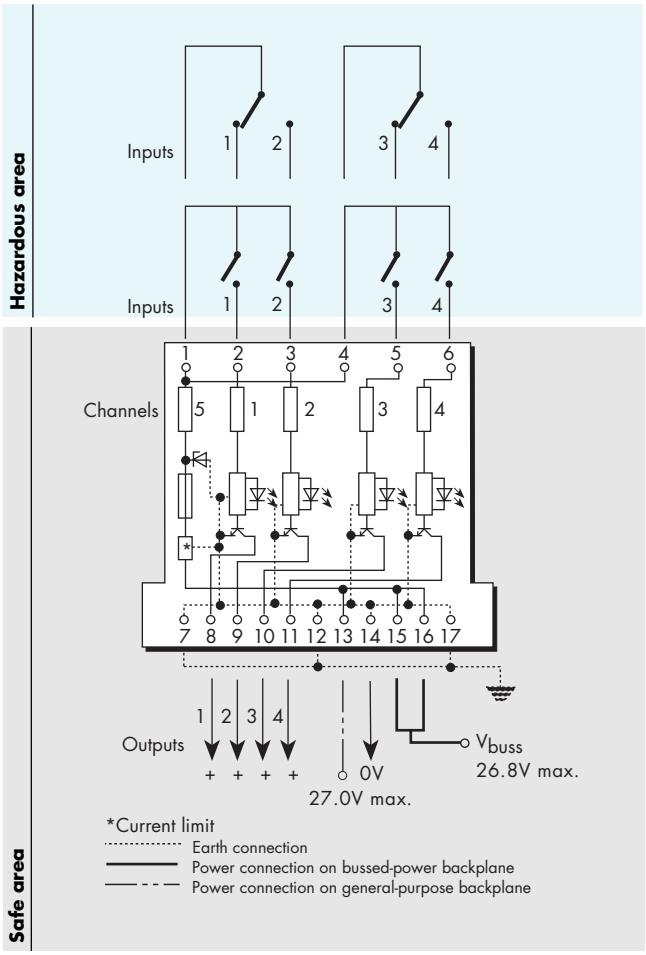
Supply current (channel 5)
33mA typical at 24V dc
40mA maximum at 27V dc

MAXIMUM CABLE PARAMETERS

(for each of channels 1 to 4, when connected to channel 5)

BASEEFA (group IIC)				FM (groups A & B)	
Capacitance (µF)	Inductance (mH)	or	L/R ratio (µH/Ω)	Capacitance (µF)	Inductance (mH)
0.39	4.0		39.0	0.13	4.0

DIGITAL (ON/OFF) INPUTS



See also common specification, approvals and dimensions.

MTL4787+
FOR TWO MULTI-PURPOSE INPUTS/OUTPUTS

4/20mA transmitters, switches, CE
4/20mA outputs, solenoids, alarms, LEDs etc

The MTL4787+ is a twin 2-channel barrier designed for controller outputs, 4/20mA transmitters (including 'smart' versions), switches, solenoid valves, alarms, LEDs, etc., where the control/sense is on the return side (i.e. not the power leg). As each loop generally uses two barrier channels, the module will drive two hazardous-area devices. The MTL4787+ is designed to pick up bussed power if this is available. The unit incorporates a 'Schottky' diode return (as opposed to the MTL4728+ module which uses an earth return). Although the MTL4787+ is not designated 'S' (for 'Schottky') it is a direct equivalent of two MTL787S barriers (which also include Schottky diodes in the return legs). For a 'higher power' version, see the MTL4787P+ module.

SPECIFICATION

Channel numbers
1 and 3
Safety description
28V, 300Ω, 93mA
Polarity
Positive
Max. end-to end resistance
330Ω
V_{wkg} at 10µA
26.3V
V_{max}
27.0V
Fuse rating
50mA
Matched power
0.65W

Channel numbers
2 and 4
Safety description
28V, diode
Polarity
Positive
Max. end-to-end resistance
0.9V+22Ω
V_{wkg} at 1µA
26.3V
V_{max}
27.0V
Fuse rating
50mA
Matched power
–

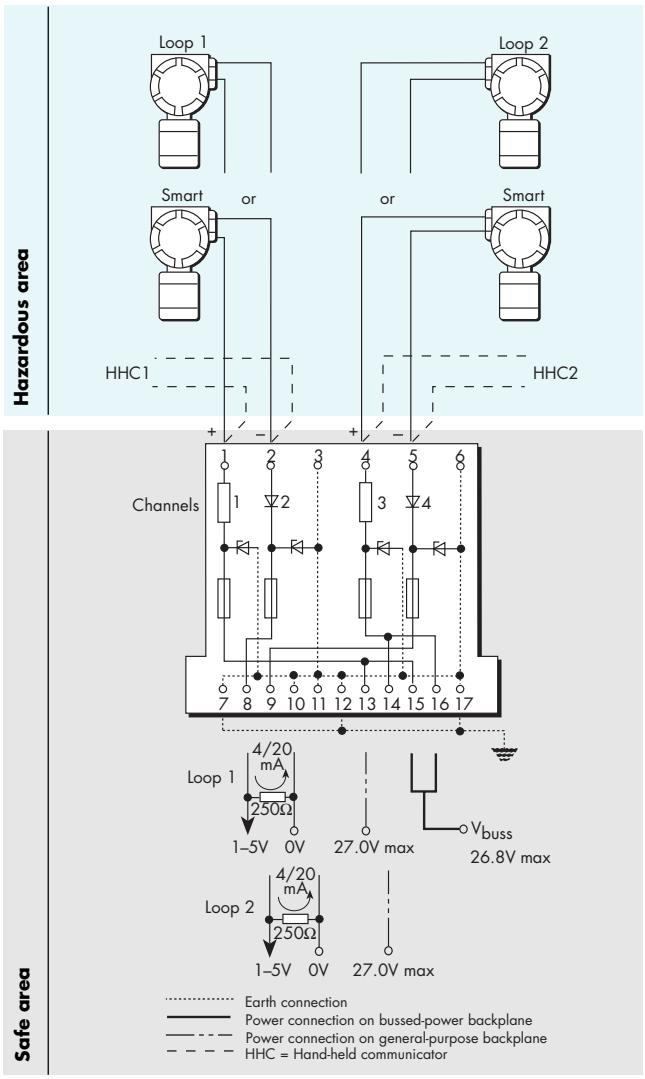
MAXIMUM CABLE PARAMETERS

(for channel pairs 1 & 2 or 3 & 4)

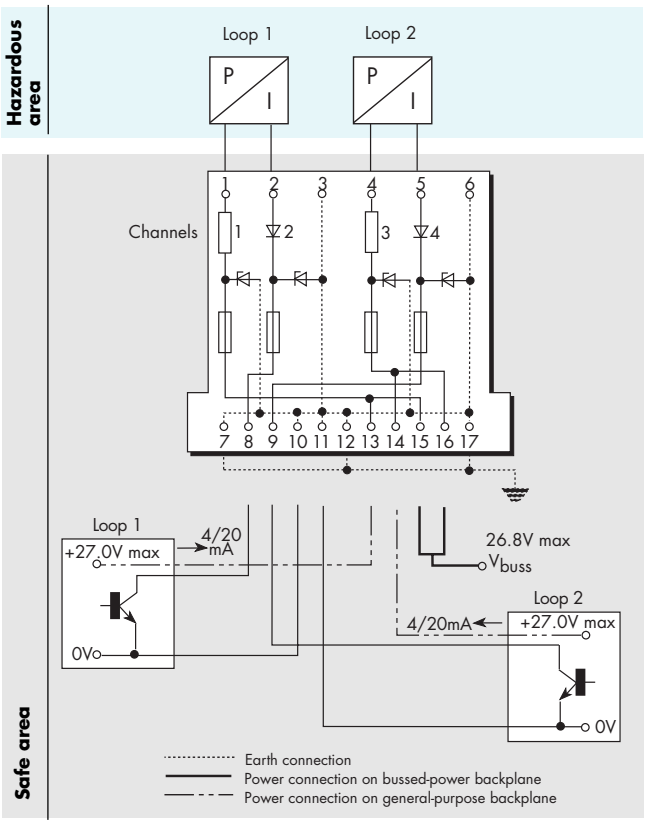
	BASEEFA (group IIC)			FM (groups A & B)	
	Capacitance (µF)	Inductance (mH)	or L/R ratio (µH/Ω)	Capacitance (µF)	Inductance (mH)
1	0.13	4.2	55	-	-
2	-	-	-	0.12	2.31

1: Without earth return
2: With earth return (FM include an earth return in their calculations)

ANALOGUE INPUTS (HIGH-LEVEL)



ANALOGUE OUTPUTS



See also common specification, approvals and dimensions.

For additional application diagrams, see also MTL4787P+

MTL4787P+
HIGHER POWER, FOR TWO MULTI-PURPOSE INPUTS/ OUTPUTS

4/20mA transmitters, switches, 4/20mA outputs, solenoids, alarms, LEDs etc CE

The MTL4787P+ is a twin 2-channel barrier designed for controller outputs, 4/20mA transmitters (including 'smart' versions) and switches. It is similar to the MTL4787+ but with a lower end-to-end resistance to permit more power to be transmitted into the hazardous area. As each loop generally uses two barrier channels, the module will drive two hazardous-area devices. The MTL4787P+ is designed to pick up bussed power if this is available. The unit incorporates a 'Schottky' diode return (as opposed to the MTL4728+ module which uses an earth return). See also the MTL4787+ module.

SPECIFICATION

Channel numbers
1 and 3
Safety description
28V, 234Ω, 120mA
Polarity
Positive
Max. end-to end resistance
251Ω
V_{wkg} at 10µA
25.3V
V_{max}
27.0V
Fuse rating
80mA
Matched power
0.84W

Channel numbers
2 and 4
Safety description
28V, diode
Polarity
Positive
Max. end-to-end resistance
0.9V+20Ω
V_{wkg} at 1µA
23.0V
V_{max}
24.7V
Fuse rating
80mA
Matched power
–

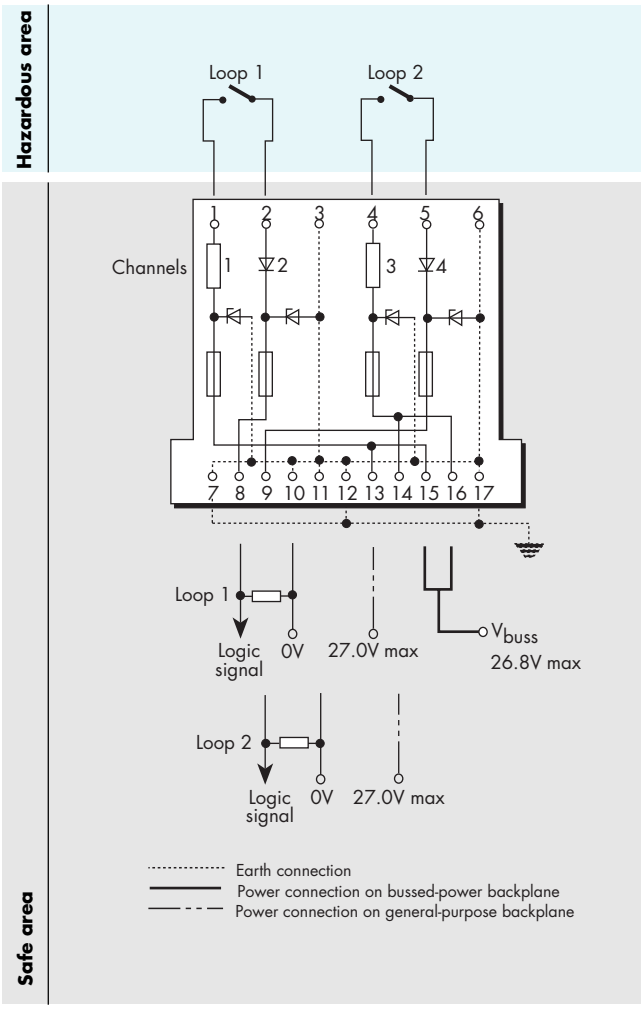
MAXIMUM CABLE PARAMETERS

(for channel pairs 1 & 2 or 3 & 4)

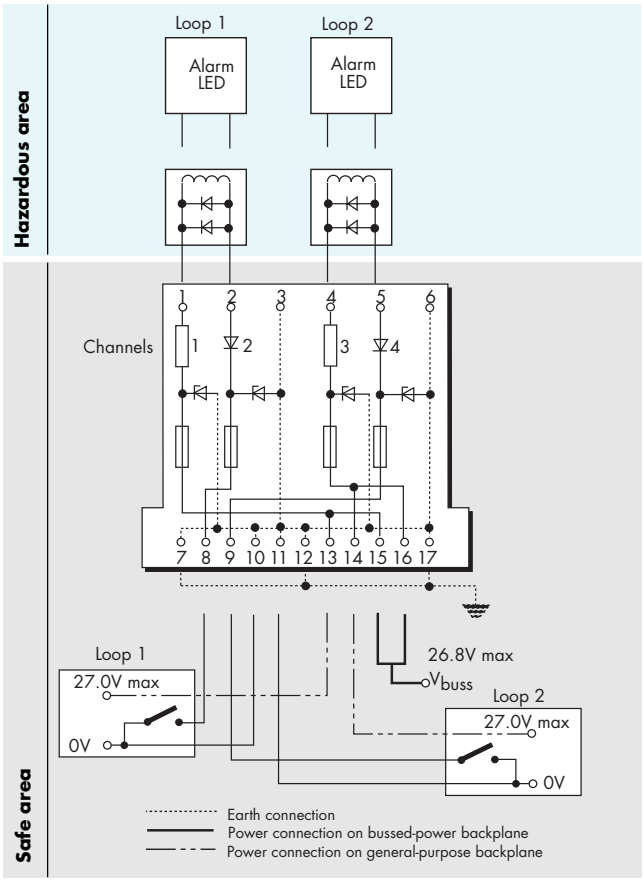
	BASEEFA (group IIC)			FM (groups A & B)	
	Capacitance (µF)	Inductance (mH)	or L/R ratio (µH/Ω)	Capacitance (µF)	Inductance (mH)
1	0.13	2.5	42	-	-
2	-	-	-	0.12	2.31

1: Without earth return
2: With earth return (FM include an earth return in their calculations)

DIGITAL (ON/OFF) INPUTS



DIGITAL (ON/OFF) OUTPUTS



See also common specification, approvals and dimensions.

For additional application diagrams, see also MTL4787+

MTL4788+ and MTL4788R+ FOR TWO 4/20mA TRANSMITTERS

CE

The MTL4788+ and MTL4788R+ are twin 2-channel barriers designed for use with 4/20mA transmitters in IIC gas groups. The MTL4788+ is an alternative to MTL4787/4787P units in installations using closely regulated power supplies. Channels 1 and 3 supply power, with channels 2 and 4 acting as signal returns in each of the two transmitter loops. MTL4788R+ is similar to the MTL4788+ but includes a 250Ω precision resistor on the hazardous side of channels 2 and 4 to provide a 1–5V output to the safe area. The modules will operate with bussed power if this is available.

SPECIFICATION

Channel numbers
1 and 3
Safety description
28V, 300Ω, 93mA
Polarity
Positive
Max. end-to end resistance
330Ω
V_{wkg} at 10μA
26.1V
V_{max}
27.0V
Fuse rating
50mA
Matched power
0.65W

Channel numbers
2 and 4
Safety description
10V, 50Ω, 200mA
Polarity
Positive
Max. end-to-end resistance
84Ω
V_{wkg} at 1μA
6.4V
V_{max}
7.0V
Fuse rating
50mA
Matched power
0.50W

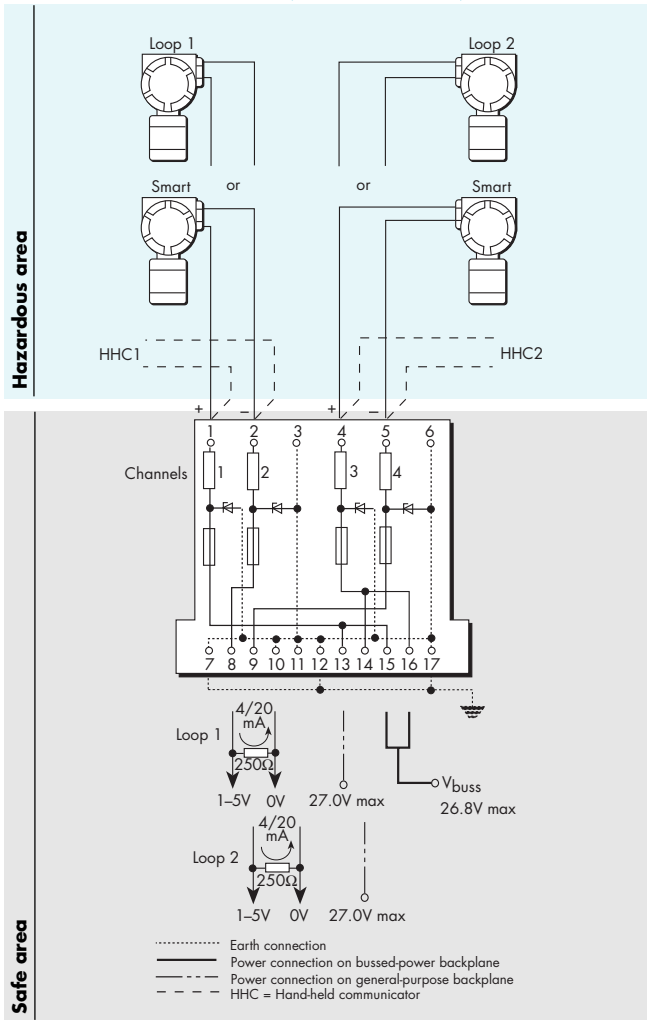
MAXIMUM CABLE PARAMETERS

(for channel pairs 1 & 2 or 3 & 4, plus earth return)

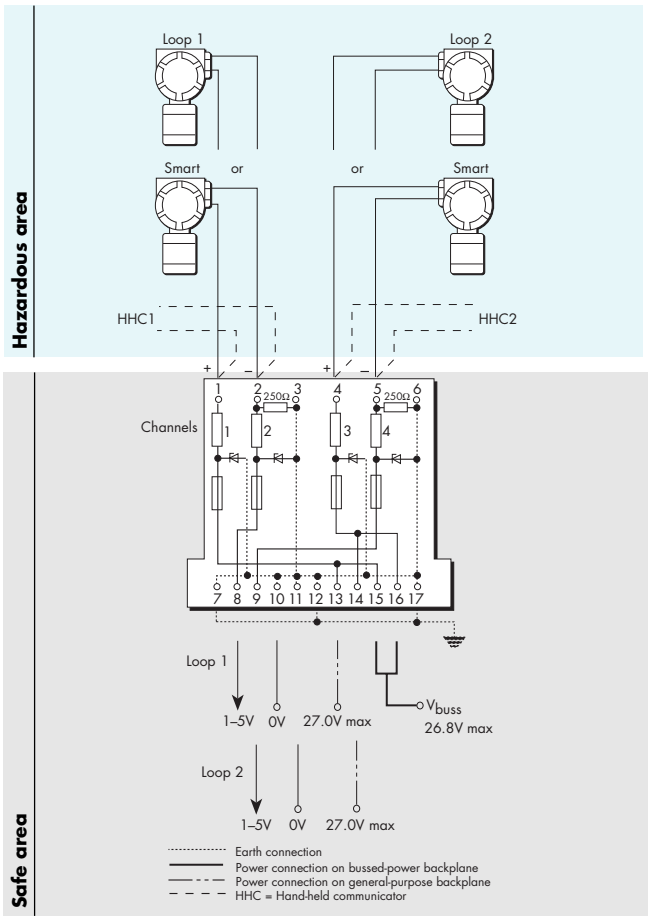
BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.13	0.37	24	0.11	4.34

See also common specification, approvals and dimensions.

ANALOGUE INPUTS (HIGH-LEVEL)



ANALOGUE INPUTS (HIGH-LEVEL)



MTL4796–
FOR TWO VIBRATION PROBES

CE

The MTL4796– is a twin 2-channel barrier designed primarily for use with 3-wire vibration probes. As each probe typically requires two barrier channels and an earth return, the module will interface with two such devices in the hazardous area. The module is not designed to operate with bussed power.

SPECIFICATION

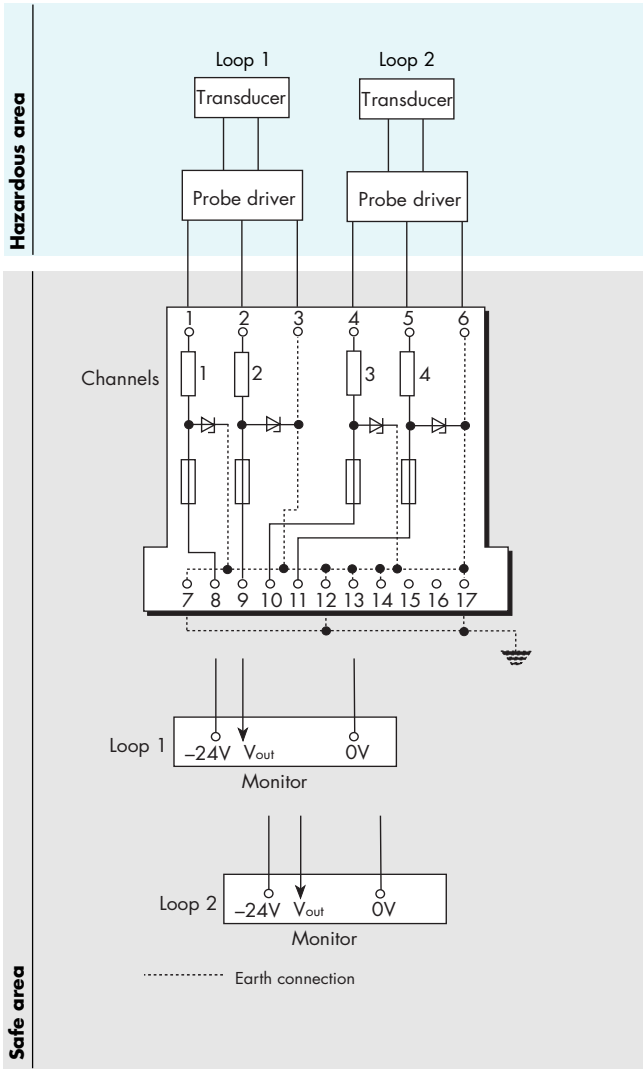
Channel numbers
1 and 3
Safety description
26V, 300Ω, 87mA
Polarity
Negative
Max. end-to end resistance
330Ω
V_{wkg} at 10μA
24.4V
V_{max}
25.2V
Fuse rating
50mA
Matched power
0.56W

Channel numbers
2 and 4
Safety description
20V, 390Ω, 51mA
Polarity
Negative
Max. end-to-end resistance
425Ω
V_{wkg} at 1μA
18.5V
V_{max}
19.6V
Fuse rating
50mA
Matched power
0.26W

MAXIMUM CABLE PARAMETERS

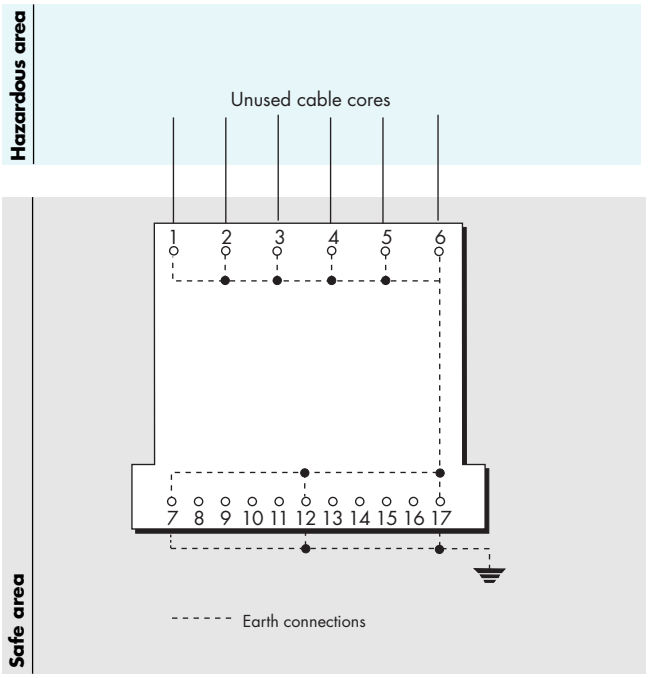
(for channel pairs 1 & 2 or 3 & 4, with earth return)

BASEEFA (group IIC)			FM (groups A & B)	
Capacitance (μF)	Inductance (mH)	or L/R ratio (μH/Ω)	Capacitance (μF)	Inductance (mH)
0.16	1.9	31.5	0.14	1.72



MTL4799
DUMMY BARRIER
for cable screens and spare cable cores

The primary function of the MTL4799, which can be used with all other MTL4700 Series units, is to provide termination and earthing facilities for unused cable cores from hazardous areas. This accords with a recent draft amendment to the Code of Practice BS 5345: Part 4, which stipulates that unused cores should be connected as if they are 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.



See also common specification, approvals and dimensions.

COMMON SPECIFICATION

– for all MTL4700 Series modules

Ambient temperature
–20 to +60°C (continuous working)
–40 to +80°C (storage)

Humidity
5 to 95% RH

Leakage current
For 'basic' barriers with a working voltage of 5V or more, the leakage current decreases by at least one decade/volt reduction in applied voltage below the working voltage over two decades. For the MTL4755ac it decreases by at least one decade for a 0.4V reduction in applied voltage.

Safe-area terminations
Through 11-way base connector onto backplane.
Pins 7, 12 and 17 are earth connections for all modules and are tracked on all backplanes to the heavy-duty earth terminal.
Pins 15 and 16 on bussed-power modules pick up power from bussed-power backplanes.
Pins 15 and 16 on modules which cannot pick up bussed power are not linked internally.

Hazardous-area terminations
By separate 6-way connector into the barrier top

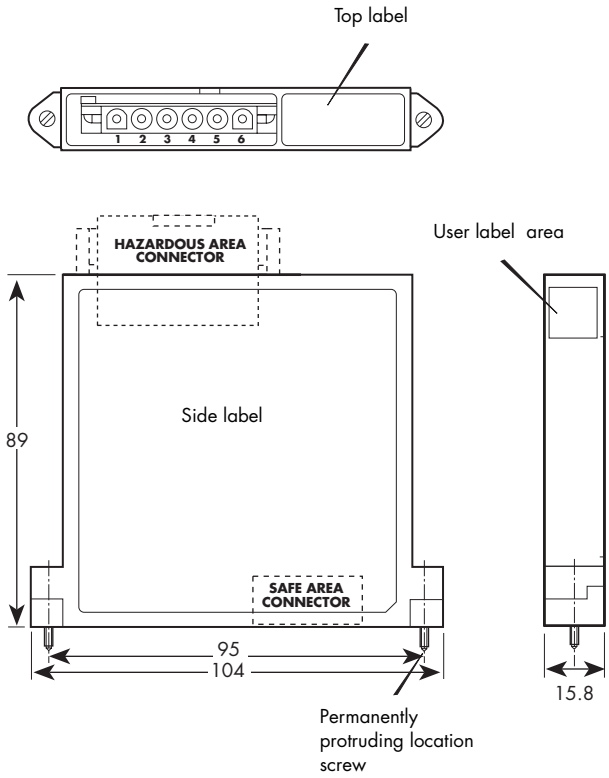
EMC compliance
EN 50 081-2/EN 50 082-2, generic emission/immunity standards. These refer to appropriate IEC/CISPR standards.

Colour coding (barrier top label)

Grey:	non-polarised
Red:	positive polarity
Black:	negative polarity
White:	dummy barrier

Weight
175g approximately (each module)

DIMENSIONS (mm)



APPROVALS

Region (Authority)	Australia (SA)	Canada (CSA)	CIS (VNIIVE)	(CENELEC) UK (BASEEFA) Apparatus	(CENELEC) UK (BASEEFA) Systems	USA (FM)
Standard	AS2380.7	C22.2 No.157	EN 50 020 GOST 22782-5-78	EN 50 014 & 20 BS 5501: Pts. 1&7 1977	EN 50 039 BS 5501: Pt.9 1982	3610 Entity
Approved for	(Ex ia) IIC	Class I, II, III	Ex ia/ib IIC	[EEx ia] IIC	EEx ia IIC T4 or T6	Class I, II, III Div.1,2, Gps A-G. Units can also be sited in Class I,II,III Div.2 in suitable enclosures
Model No. (MTL)	**File No.**	**File No.**	**Certificate No.**	**Certificate No.**	**Certificate No.**	**File No.**
4706+	EX2180X	LR36637-70	D.94.C.015	Ex93C2446	Ex93C2447	J.I.2X3A4.AX
4715+	Pending	LR36637-8		Ex93C2300	Ex93C2434	J.I.1Y5A5.AX
4722+	Pending	LR36637-8		Ex93C2300	Ex93C2434	J.I.1Y5A5.AX
4728+	EX2180X	LR36637-70	D.94.C.016	Ex93C2300	Ex93C2434	J.I.2X3A9.AX
4728–	EX2180X	LR36637-70		Ex93C2300	Ex93C2434	J.I.2X3A9.AX
4755ac	EX2180X	LR36637-70	D.94.C.017	Ex93C2300	Ex93C2434	J.I.2X3A9.AX
4760ac	EX2180X	LR36637-70	D.94.C.018	Ex93C2300	Ex93C2434	J.I.2X3A9.AX
4763Pac	Pending	LR36637-8		Ex93C2300	Ex93C2434	J.I.1Y5A5.AX
4778ac	Pending	LR36637-8		Ex93C2300	Ex93C2434	J.I.1Y5A5.AX
4781+	Pending	LR36637-85		Ex93C2234	Ex93C2235	J.I.3Y9A7.AX
4787+	EX2180X	LR36637-70	D.94.C.019	Ex93C2300	Ex93C2434	J.I.2X3A4.AX
4787P+	EX2180X	LR36637-70	D.94.C.020	Ex93C2300	Ex93C2434	J.I.2X3A4.AX
4788+	Pending	LR36637-8		Ex93C2300	Ex93C2434	J.I.1Y5A5.AX
4788R+	Pending	LR36637-8		Ex93C2300	Ex93C2434	J.I.1Y5A5.AX
4796–	EX2180X	LR36637-70	D.94.C.021	Ex93C2300	Ex93C2434	J.I.2X3A9.AX