INTRINSIC SAFETY BARRIERS
MTL5000, MTL7000, MTL7700 SERIES

DESCRIPTION

The **MTL Instruments MTL7000, MTL7700** and **MTL5000 Series** of ultra-slim intrinsic safety barriers are the worldwide standard in protection and accuracy for intrinsically safe sensing and controlling devices in hazardous locations. The electronic design limits the amount of electrical energy that can be transmitted into the hazardous area to a level below the ignition energy of even the worst-case explosive mixture of fuel and air. This level of protection remains intact even in the event of two simultaneous faults, thus providing the highest possible safety rating for this type of system. All **MTL7000, MTL7700** and **MTL5000 Series** barriers are FM approved for use in intrinsically safe systems under the entity concept and can thus be applied with the widest possible array of intrinsically safe devices.Designed for ease of installation, these barriers provide a positive intrinsic safety ground through the DIN rail. Isolating spacers are available for applications in which the intrinsic safety ground must be separate from the mounting panel's earth ground (ANSI / ISA RP-12.6 specifies grounding requirements).
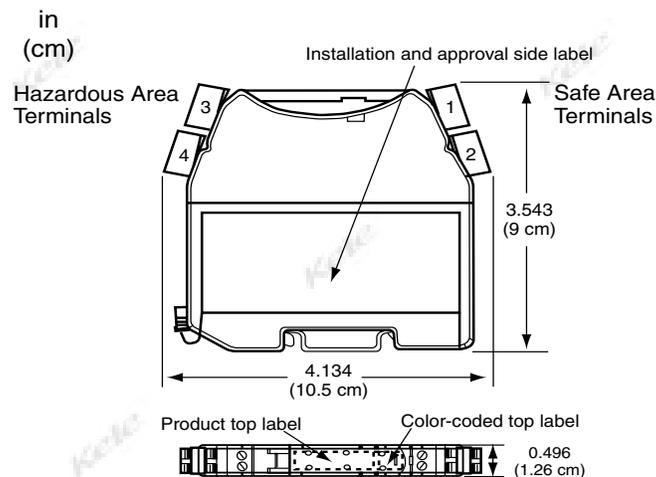
MTL7700 SERIES

FEATURES

- **FM entity approval Class I, II, and III, Division 1, Groups A, B, C, D, E, F, G**
- **BASEEFA approval EEx [ia], IIC**
- **DIN rail mounting with integral intrinsic safety ground**
- **Compact size**

APPLICATION

According to the entity concept, barriers must be selected to limit the available hazardous area voltage (V) and current (I) to levels below the rating of the intrinsically safe device (Vmax, Imax). Also, the combined capacitance (C) and inductance (L) of the intrinsically safe device and cabling must be less than the maximum ratings for the barrier (La, Ca). The great majority of applications can be satisfied with one of the six key barrier types stocked by Kele. Other types are available to suit most every application, contact Kele for assistance. Refer to the Hazardous Location Application Guide in the Technical Reference section for more detailed barrier selection procedures.

DIMENSIONS

in (cm)

Installation and approval side label

Hazardous Area Terminals

Safe Area Terminals

3.543 (9 cm)

4.134 (10.5 cm)

Product top label

Color-coded top label

0.496 (1.26 cm)

MTL7700 SERIES

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HAZARDOUS LOCATIONS

SAFETY SPECIFICATIONS

| Application | Model | Entity Safety Parameters | | | | | Max Voltage | End to End Resistance (Ω) |
		V	I (mA)	Ω	C(max) (μF)	L(max) (mH)		
4-20 mA Two-wire transmitter	**MTL7706+**	28	93	300	0.083	4.2	35	N/A
3 Wire RTD's	**MTL7765ac**	15	150	100	0.58	1.45	12.5	124
Controller output 4-20 mA	**MTL7728+**	28	93	300	0.12	4.2	27	333
Dry contact/Dry contact	**MTL5011B**	10.5	14	800	2.4	165	35	N/A *
Digital output	**MTL7728+**	28	93	300	0.083	4.2	35	333

* The **MTL5011B** is isolated end to end.

ADDITIONAL SPECIFICATIONS

MTL7706+ (for loop-powered 4-20 mA transmitters)
Supply Voltage	20-35 VDC
Current	45 mA typical @ 20 mA with24 VDC supply
	60 mA max @ 20 mA with20 VDC supply
Transmitter voltage	16 VDC min @ 20 mA with 250 load
	11 VDC min @ 20 mA with 500 load
Safe area load	500 max
Accuracy	±2 μA over 4-20 mA range
Max safe area voltage	250 VAC/VDC
Area Class	I, II, III, Div 1, Groups A, B, C,D, E, F, G
Weight	0.3 lb (0.14 Kg)
Agency approvals	FM BASEEFA EEx [ia] IIC

MTL7765ac (3 Wire RTD's)
Working voltage	12.0 VDC @ 10 μA leakage current
Max safe area voltage	250 VAC/VDC
Area	Class I, II, III, Div 1, Groups A, B, C,D, E, F, G
Weight	0.3 lb (0.14 Kg)
Agency approvals	FM BASEEFA EEx [ia] IIC

MTL5011B (dry contact to dry contact isolator)
Supply voltage	20-35 VDC, 40 mA max
Contacts	2A @ 250 VAC, 40 VDC
Max safe area voltage	250 VAC/VDC
Area	Class I, II, III, Div 1, Groups A, B, C, D, E, F, G
Weight	0.3 lb (0.14 Kg)
Agency approvals	FM/UL BASEEFA EEx [ia] IIC

MTL 7728+ (for switched digital outputs)
Supply voltage	10-35 VDC (regulated)
Supply current	1.5 mA plus load current, actively limited to 50 mA totalto protect safety fusing (50 mA)
Output current	(Iout) Up to 50 mA
Max safe area voltage	250 VAC/VDC
Area	Class I, I, III, Div 1, Groups A, B, C, D, E, F, G
Weight	0.3 lb (0.14 Kg)
Agency approvals	FM BASEEFA EEx ia IIC

WARNING: Check compatibility of the electrical safety parameters of the field equipment with those of the barriers to make sure that the combination is safe. If an intrinsically safe device does not have entity approval, it must be paired with a barrier specifically listed in its intrinsic safety drawing (control drawing).
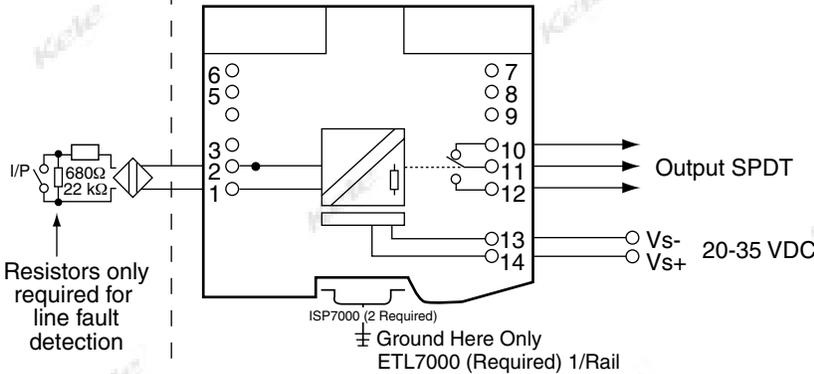
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HAZARDOUS LOCATIONS

WIRING

Hazardous Area | Safe Area

6 5 3 2 1 | 7 8 9 10 11 12

I/P 680Ω 22 kΩ

Output SPDT

13 14 Vs- Vs+ 20-35 VDC

Resistors only required for line fault detection

ISP7000 (2 Required)
⏚ Ground Here Only
ETL7000 (Required) 1/Rail

MTL5011B
**Dry Contact to Dry Contact
Digital Input**

Hazardous Area | Safe Area   Power Bus

Power 20-35 VDC

3 4 4-20 mA   1 2 + 1-5V

4-20 mA 250Ω

Two-wire Transmitter

ISP7000 (2 Required)
⏚ Ground Here Only
ETL7000 (Required) 1/Rail
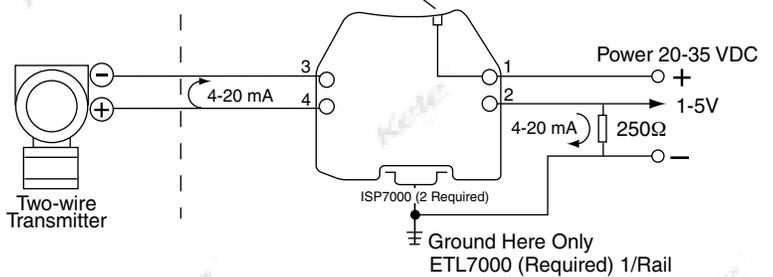
MTL7706+
4-20 mA Input from Hazardous Area

Hazardous Area | Safe Area

4-20 mA Signal to Controlled Device or Display

3 1 4 2

Shield

4-20 mA Signal from Controller

ISP7000 (2 Required)
⏚ Ground Here Only
ETL7000 (Required) 1/Rail
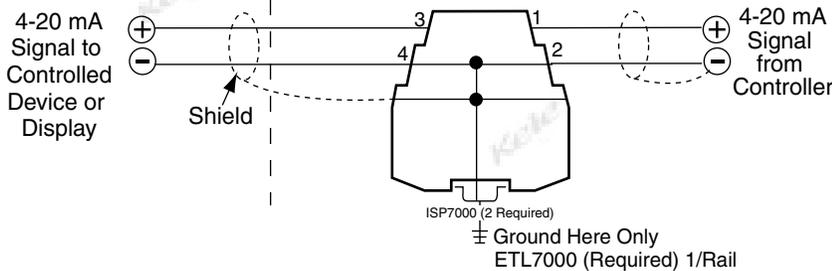
MTL7728+
4-20 mA Output to Hazardous Area

Hazardous Area | Safe Area

LED, Alarm, Solenoid, etc.

Iout
50mA max.

3 4   1 2

Digital Output
0-24.9 VDC (regulated) + −

ISP7000 (2 Required)
⏚ Ground Here Only
ETL7000 (Required) 1/Rail
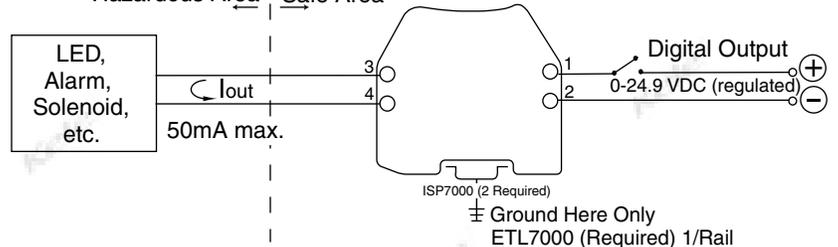
MTL7728+
Digital Output to Hazardous Area

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HAZARDOUS LOCATIONS

HAZARDOUS LOCATIONS

8

WIRING (CONTINUED)

Hazardous Area | Safe Area

RTD Sensor

Transmitter

RED

BLK

Probe

3

4

1

2

⊖ SIG

⊕ COM

ISP7000 (2 Required)

Ground Here Only
ETL7000 (Required) 1/Per Rail
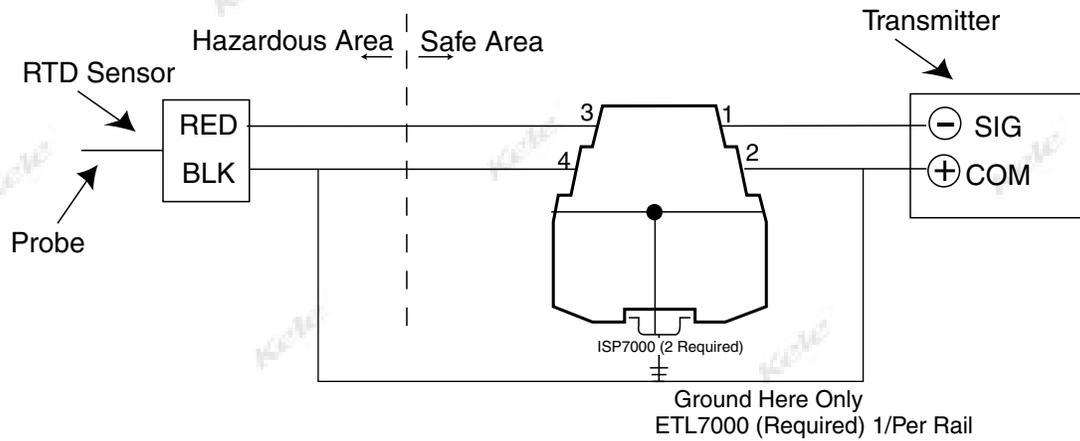
MTL7765ac
3 Wire RTD's

ORDERING INFORMATION

MODEL	DESCRIPTION
MTL5011B	Isolator for digital (dry contact) inputs, SPDT
MTL7706+	Intrinsic safety barrier, 4-20 mA two-wire transmitters
MTL7728+	Active barrier for 4-20 mA output or digital output
MTL7765AC	Intrinsic safety barrier for 3 wire RTDs
ETL7000	Din Rail earth terminal (1 per Din Rail required)
ISP7000	Insulating Din Rail spacer (2-Required per Din Rail)

RELATED PRODUCTS

250R-3-1	250 OHM 3 WATT 1% resistor long leads
DCP-1.5-W	Power supply, 24 VAC IN to 24 VDC OUT
DCPA-1.2	Power supply, 120 VAC IN to 24 VAC/24 VDC OUT
DIN-3F	35 mm DIN rail, steel, 39.4" (1m), RoHS compliant