AMETEK®

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DATA SHEET

DC Surge Protection MTL TP48 range

Safeguards electronic process transmitters against induced surges and transients from field cabling

Features

- Protects 2 and 3 wire transmitters
- Easy and direct mounting — screws into spare conduit entry
- Intrinsically safe and flameproof to CENELEC standards
- Parallel connection avoids introduction of any resistance into loop
- ATEX approved
- 10 year product warranty

The TP48 range of surge protection devices uniquely provide a level of protection for 2 and 3 wire field-mounted transmitters that is far in excess of the optional transient protection facilities available from the transmitter manufacturers - without involving any additional wiring, conduit modifications or other expensive extras.

The TP48 range protection network consists of high-power, solidstate electronics and a gas-filled discharge tube capable of diverting 20kA impulses.
The whole unit is encased in a 316 stainless steel housing, threaded for the common conduit entries used on process transmitters. Versions are available for 1/2” NPT, 20mm ISO.

Installation can easily be carried out retrospectively to existing installations. The TP48 is screwed into any unused conduit entry on the transmitter case and flying leads are connected to the terminal block (+ve, -ve) and the internal earth stud. The 3 wire TP protects +ve, -ve and signal. The TPs operate without in any way affecting normal operation - passing ac or dc signals without attenuation while diverting surge currents safely to earth and clamping output voltages to specific levels.

The all-important earthing connection is made to the local casing of the transmitter with no separate earth connection or ground stake at the transmitter being needed. In operation, the TP48 makes sure that the transmitter electronics are never exposed to damaging transients between line and casing/earth. Any surge current appearing as a common-mode transient is converted into a common-mode voltage - whereupon the transmitter electronics are temporarily raised to some higher voltage level before ‘floating’ down automatically (and without damage) to resume normal operation.

For hazardous area use, approvals for both intrinsically safe and flameproof (explosion-proof) operation are available in all gas groups and apparatus temperature classification up to T4 for the TP48 3. Where transmitters are used in circuits suitable for Div 2/Zone 2 installations, the TP can be added without adversely affecting the level of safety.

DC Surge Protection
MTL TP48 Range

Specifications

Maximum surge current
20kA peak current (8/20µs waveform)

Leakage current
Less than 10µA at max. working voltage

Working voltage: 48V dc maximum

Bandwidth: 1MHz

Resistance: No resistance introduced into loop

Ambient temperature limits
-40°C to +85° (-40°F to +185°F) (working)
-40°C to +85°C -(40°F to +185°F) (storage)

Humidity: 5% to 95% RH (non-condensing)

Electrical connections
TP48
3 flying leads (line 1, line 2 & earth)
TP48 3 wire
4 flying leads (+ve, -ve, signal & earth)
Wire size: 32/0.2 (1.0mm2, 18 AWG)
Lead length: 250mm (minimum)

SIL Information

Failure rates according to IEC 61508

	λ_{SD}	λ_{SU}	λ_{DD}	λ_{DU}
TP48 3	0 FIT	40.2 FIT	15.1 FIT	7 FIT
TP48 2	0 FIT	20.1 FIT	7.6 FIT	3.5 FIT

The user of the TP48 range can utilize these failure rates in a probabilistic model of a safety instrumented function (SIF) to determine the suitability in part for safety instrumented system (SIS) usage in a particular safety integrity level. A full table of failure rates is presented in the EXIDA report (section 4.4) along with all assumptions.

*The Residual Effect failures are included in the Safe Undetected failure category according to

IEC 61508. Note that these failures alone will not affect system reliability or safety and should therefore not be included in spurious trip calculations.

Safe Failure Fraction needs to be calculated on (sub)system level.

A complete copy of the EXIDA report can be downloaded at www.mtl-inst.com.

Casing: ANSI 316 stainless steel hexagonal bar stock, male thread

Threads: 1/2" NPT, 20mm ISO

Weight: 204g (7.2oz)

Dimensions: See figure 1

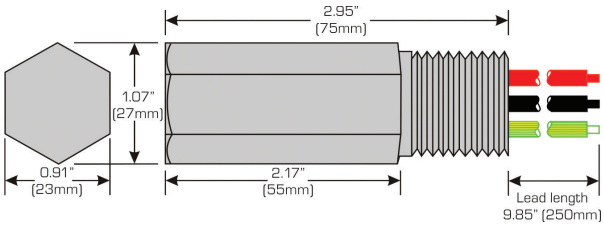
EMC compliance: To Generic Immunity Standards BS EN 61326-1:2013 for industrial environments

Hazardous Area
Ex ia IIC T4, Ceq=O, Leq=0; the unit can be connected without further certification into any intrinsically safe loop with open circuit voltage <60V and input power <1.2W.

Ex d IIC T4; the unit is apparatus approved to flameproof (explosionproof) standards, and can be fitted into a similarly approved housing.

Electrical Safety: To BS EN 61643-21:2001 for surge protection devices

Figure 1 Dimensions



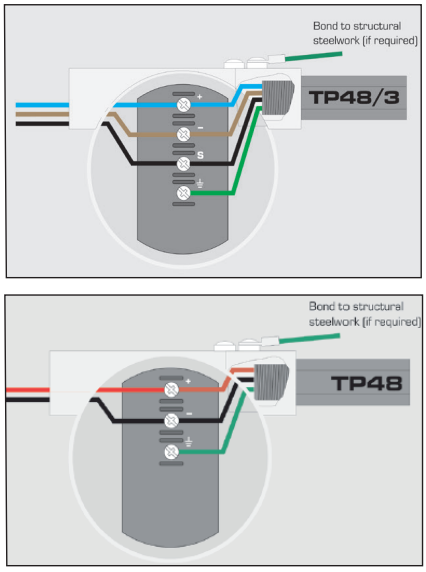


Figure 2
Connection details for a typical process transmitter

DC Surge Protection
MTL TP48 Range

Model		TP48
Maximum Voltage	U_n	48V
Rated Voltage (MCOV)	U_c	58V
Nominal Current	I_n	N/A
Nominal Discharge Current (8/20µs)	i_{sn}	3kA
Max. Discharge Current (8/20µs)	I_{max}	20kA
Lightning impulse current (10/350µs)	I_{imp}	2.5kA
Voltage protection level @ 1kV/µs	Up	<76V
Bandwidth	f_G	1MHz
Capacitance	C	100pF
Series resistance	R	N/A
Operating temperature range		-40°C to +60°C
Category tested		A2, B2, C1, C2, C3, D1
Overstressed fault mode in=3kA		12kA
Impulse durability (8/20µs)		10kA
Degree of protection		IP66
AC durability		$1A_{rms}$, 5T
Service conditions		80kPa - 160kPa 5% - 95% RH

To order specify:

DC Version - 2 wire		DC Version - 3 wire	
1/2" NPT Thread	Ametek Part Number: 377-0006-021 Description: TP48-N-NDI	**1/2" NPT Thread**	Ametek Part Number: 377-0006-011 Description: TP48-3-N-NDI
M20 Thread	Ametek Part Number: 377-0006-022 Description: TP48-I-NDI	**M20 Thread**	Ametek Part Number: 377-0006-012 Description: TP48-3-I-NDI

Approvals

Country (Authority)	Standard No.	Certifcate/File	Approved for	Product
EC (BASEEFA)	EN 60079-0:2012+A11:2013 EN 60079-11:2012	BASEEFA04ATEX0251X	Ex II 1G Ex ia IIC T4/T5/T6 Ga Ex II 1D Ex ia IIIC T135°C/ T100°C/ T85°C Da	TP48-X-Y-Z*
EC (BASEEFA)	EN 60079-0:2012+A11:2013 EN 60079-1:2015	BASEEFA04ATEX0053X	Ex II 2G Ex db IIC T6 Gb (Tamb = -40°C TO +70°C)	TP48-X-Y-Z*
ATEX Directive 2014/34/EU	EN 60079-0:2012 EN 60079-15:2010	TML01ATEX0048	Ex II 3 G Ex nA IIC T6 (-40°C<T_{amb}<+60°C) Ex II 3 G Ex nA IIC T5 (-40°C<T_{amb}<+85°C)	TP48-X-Y-Z*
USA (FM)	Class 3600 (1998), Class 3610 (2010), Class 3611 (1999), Class 3615 (1989), Class 3810 (1989) Incl Suppl #1 (1995) ANSI/NEMA 250 (1991) ISA-S12.0.01 (1998) ANSI/ISA 60079-0 (2009) ANSI/ISA 60079-11 (2009)	3011208	Intrinsically Safe: I, II, III/1/A-G, I/0/IIC Explosion-proof: I/1/A-D Non-incendive: I/2/A-D, I/2/IIC Dust ignition proof: II,III/1/EFG Special protection: II/2/FG	TP48-X-Y-Z*
Canada (FM)	C22.2 No 213 (1987), C22.2 No 142 (1987), C22.2 No 94 (1991), C22.2 No 157 (1992), C22.2 No 30 (1986) ANSI/NEMA 250 (1991) CAN/CSA-E79-0 (2002) CAN/CSA-E79-11 (2002)	3025374	Intrinsically Safe: I, II, II/1/A-G, I/O/IIC Explosion-proof: I/1/A-D Non-incendive: I/2/A-D, I/2/IIC Dust ignition proof: II, III/1/EFG Special protection: II/2/FG	TP48-X-Y-Z*
Global (IEC)	IEC 60079-0:2011, IEC 60079-11:2011	IECEx BAS 07.0045X	Ex ia IIC T4/T5/T6 Ga Ex ia IIIC T135°C/T100°C/T85°C Da	TP48-X-Y-Z*

***KEY:** X = 3 or 4 or blank Y = N, I or G Z = NDI or blank

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