



technical datasheet

## TP48 Series

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

- Protects 2, 3 and 4 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 TP Series of surge protection** devices uniquely provide a level of protection for 2, 3 and 4 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 TP Series protection network** consists of high-power, solid-state electronics and a gas-filled discharge tube capable of diverting 20kA impulses. The whole unit is encased in an ANSI 316 stainless steel housing, threaded for the common conduit entries used on process transmitters. Versions are available for 1/2" NPT, 20mm ISO, and G1/2" (BSP 1/2 inch) threaded entries.

**Installation can easily be carried out retrospectively** to existing installations. The TP 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 4 wire TP protects +ve, -ve, signal +ve and -ve. 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 TP makes sure that the transmitter electronics are never exposed to damaging transients between lines or between lines and casing/earth. Any surge current appearing as a series-mode or 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 (explosionproof) operation are available (pending for the TP48 3 & 4 wire), in all gas groups and apparatus temperature classification up to T4 for the TP48 3 & 4 wire and T6 for the TP48. 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.

**For fieldbus applications**, use the TP32 which meets the requirements of IEC61158-2:2004 and ANSI/ISA-50.02-2 1992 for 31.25kbit/s systems as used by FOUNDATION™ fieldbus, PROFIBUS-PA and WorldFIP.

901-100 Rev S 060410

**COOPER** Crouse-Hinds

## SPECIFICATION

### Maximum surge current

20kA peak current (8/20µs waveform)

### Leakage current

Less than 10µA at max. working voltage

### Working voltage

35V dc maximum

### Bandwidth

1MHz

### Resistance

No resistance introduced into loop

### Ambient temperature limits

-40°C to +85°C  
 (-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 (line1, line 2 & earth)

TP48 3 Wire

4 flying leads (+ve, -ve, signal & earth)

TP48 4 Wire

5 flying leads (+ve, -ve, signal +ve, signal -ve, earth)

Wire size: 32/0.2 (1.0mm<sup>2</sup>, 18 AWG)

Lead length: 250mm (minimum)

### Casing

ANSI 316 stainless steel hexagonal bar stock, male thread

### Threads

TP48-3-N & TP48-4-N - 1/2" NPT

TP48-3-I & TP48-4-I - 20mm ISO )

(M20 x 1.5)

TP48-3-G & TP48-4-G - G 1/2" (BSP 1/2")

### Weight

175g (6.2oz)

### Dimensions

See figure 1

### EMC compliance

To Generic Immunity Standards

EN50082, part 2 for industrial environments

### Electrical safety

EEx ia IIC T4, Ceq=0, 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.

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

Model		TP48 Series
Nominal voltage	$U_n$	35V
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
Residual voltage @ $i_{sn}$	$U_p$	95V L-G 500V
Voltage protection level @ 1kV/µs	$U_p$	<76V
Bandwidth	$f_G$	1MHz
Capacitance	C	100pF
Series resistance	R	n/a
Operating Temperature Range		-40°C to +85°C
Category tested		A2, B2, C1, C2, C3, D1
Overstressed fault mode $i_n=3kA$		12kA
Impulse durability (8/20µs)		10kA
Degree of protection		IP66
AC durability		1Arms, 5T
Service conditions		80kPa - 160kPa 5% - 95% RH

## SIL INFORMATION

### Failure rates according to IEC 61508

	ISD	ISU*	IDD	IDU
TP48 2 wire+earth	0 FIT	23 FIT	12 FIT	5 FIT
TP48 3 wire+earth	0 FIT	40 FIT	15 FIT	7 FIT
TP48 4 wire+earth	0 FIT	40 FIT	15 FIT	7 FIT

The user of the TP series 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](http://www.mtl-inst.com).

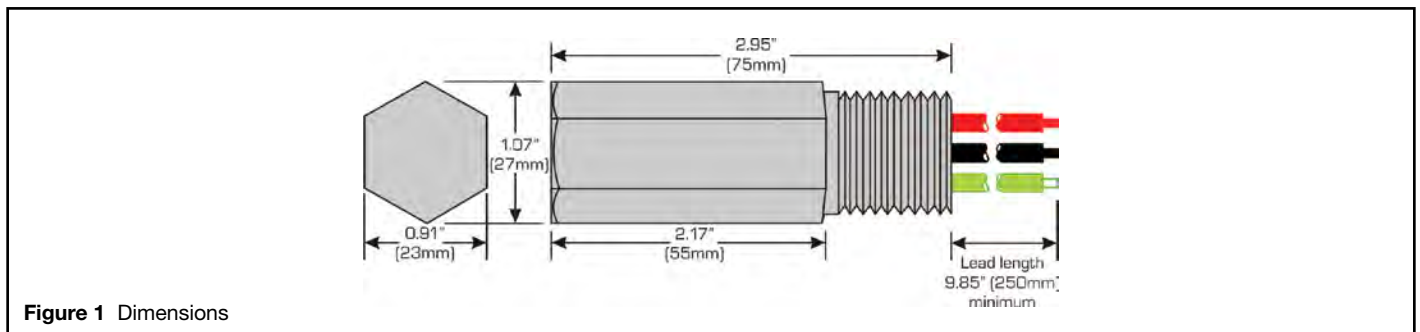
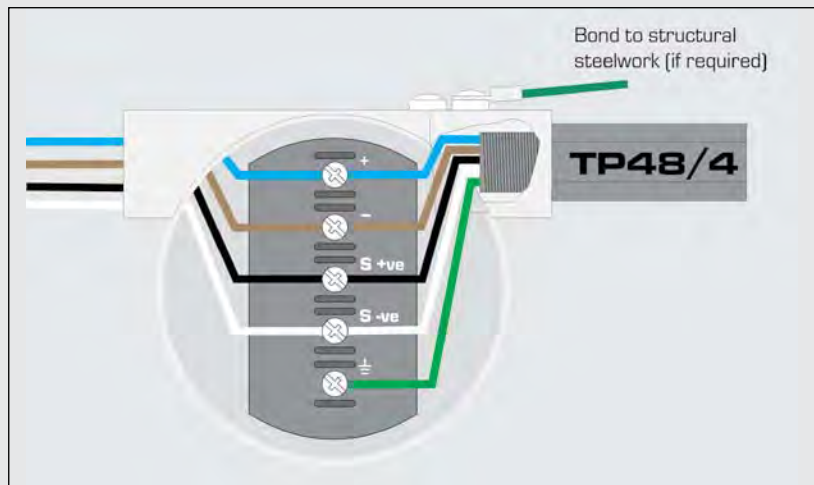
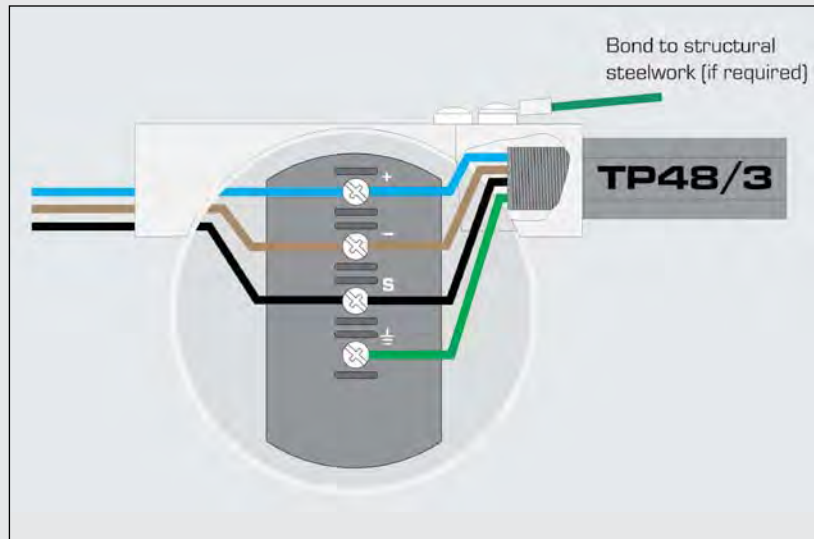
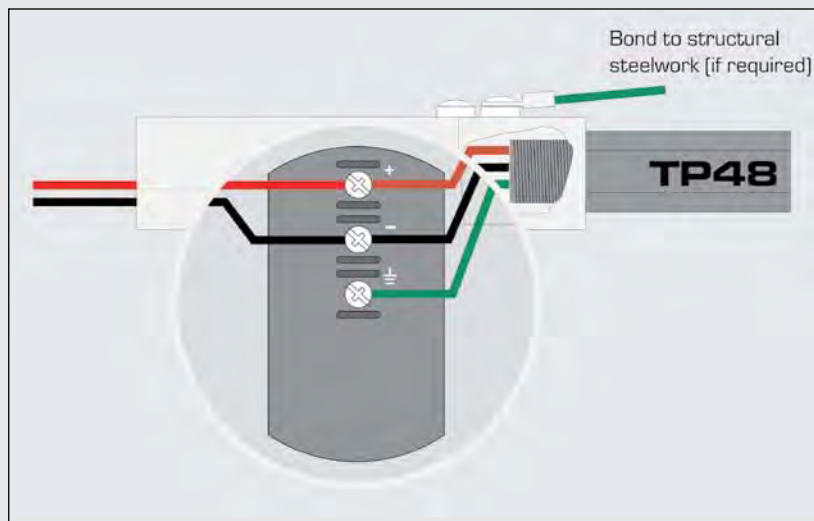


Figure 1 Dimensions

The given data is only intended as a product description and should not be regarded as a legal warranty of properties or guarantee. In the interest of further technical developments, we reserve the right to make design changes.





**Figure 2** Connection detail for process transmitters

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## APPROVALS

Country (Authority)	Standard No.	Certificate/File	Approved for	Product
EC (BASEEFA)	EN 50014:1997 + Amendments 1 & 2 EN 50020:1994, EN 50284:1999	BASEEFA04ATEX0251X	EEx ia IIC T6 (Tamb = -40 to 60°C) EEx ia IIC T5 (Tamb = -40 to 85°C) EEx ia IIC T4 (Tamb = -40 to 60°C)	TP48-X-Y-Z
EC (BASEEFA)	EN 50014:1997 + Amendments 1 & 2 EN 50018:2000 + Amendment 1	BASEEFA04ATEX0053X	EEx d IIC T6 (Tamb = -40 to 60°C) EEx d IIC T5 (Tamb = -40 to 80°C) EEx d IIC T4 (Tamb = -40 to 85°C)	TP48-X-Y-Z
Atex Directive 94/9/EC	BS EN 50021:1999	TML01ATEX0048	Ex n II T6 (-40°C<Tamb<+60°C) EEx n II T5 (-40°C<Tamb<+85°C)	TP48-X-Y-Z
USA (FM)	Class Nos. 3600 (1998), 3610 (1999), 3611 (1999), 3615 (1989), 3810 incl. Supp 1 (1995-07 (1989-03), ANSI/NEMA 250 (1991), ISA-S12.0.01 (1999)	3011208	Intrinsically Safe: I, II, III/1/A-G, I/O/IIC Explosionproof: I/1/A-D Non incensive: 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. 157 C22.2 No. 213 C22.2 No. 142 C22.2 No. 94 C22.2 No. 30	3025374	Intrinsically Safe: I, II, II/1/A-G, I/O/IIC Explosionproof: I/1/A-D Nonincensive: 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 60079-0:2004 IEC 60079-11:2006 IEC 61241-0:2004 IEC 61241-1:2004	IECEx BAS 07.0045X	Ex ia IIC T4/T5/T6 Ex tD A20 IP6X T85°C/T100°C/ T135°C	TP48-X-Y-NDI

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

## TO ORDER SPECIFY -

<b>TP48-N</b>	Non-certified SPD - 1/2" NPT thread
<b>TP48-I</b>	Non-certified SPD - 20mm ISO thread
<b>TP48-G</b>	Non-certified SPD - G 1/2" (BSP 1/2 inch)
<b>TP48-3-N</b>	Non-certified SPD - 1/2" NPT thread
<b>TP48-3-I</b>	Non-certified SPD - 20mm ISO thread
<b>TP48-3-G</b>	Non-certified SPD - G 1/2" BSP 1/2 inch
<b>TP48-4-N</b>	Non-certified SPD - 1/2" NPT thread
<b>TP48-4-I</b>	Non-certified SPD - 20mm ISO thread
<b>TP48-4-G</b>	Non-certified SPD - G 1/2" BSP 1/2 inch
<b>TP48-N-NDI</b>	Certified SPD - 1/2" NPT thread
<b>TP48-I-NDI</b>	Certified SPD - 20mm ISO thread
<b>TP48-G-NDI</b>	Certified SPD - G 1/2" (BSP 1/2 inch)
<b>TP48-3-N-NDI</b>	Certified SPD - 1/2" NPT thread
<b>TP48-3-I-NDI</b>	Certified SPD - 20mm ISO thread
<b>TP48-3-G-NDI</b>	Certified SPD - G 1/2" - BSP 1/2 inch
<b>TP48-4-N-NDI</b>	Certified SPD - 1/2" NPT thread
<b>TP48-4-I-NDI</b>	Certified SPD - 20mm ISO thread
<b>TP48-4-G-NDI</b>	Certified SPD - G 1/2" - BSP 1/2 inch

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