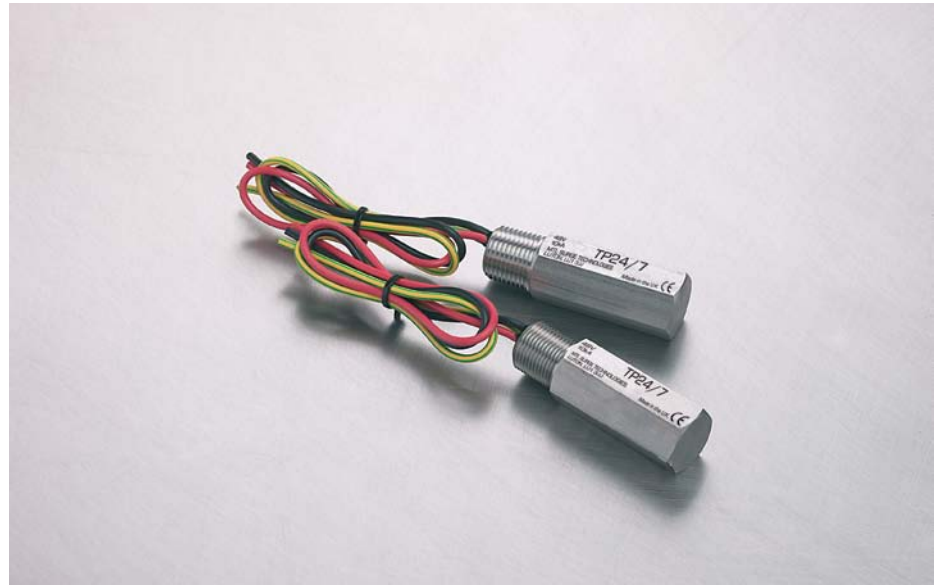




TP24/7

Safeguards 4-wire process transmitters against induced surges and transients from field cabling

- Specifically designed for Multivariable Transmitters and Level Transmitters
- Four wires protected, one pair at 12V to 24V and one pair at 7V (e.g. RS485)
- Easy and direct mounting — simply screws into spare conduit entry
- Intrinsically safe and flameproof to CENELEC standards
- FM for US and Canada and ATEX approved



The **TP24/7 surge protection device** is a unique unit providing a level of protection for 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 **TP24/7 protection network** consists of high-power, solid-state electronics and a gas-filled discharge tube capable of diverting 10kA 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 is very simple and can easily be carried out retrospectively to existing installations. The TP24/7 is screwed into any unused conduit entry on the transmitter case and flying leads are connected to the terminal block (+ve, -ve), RS485 terminals and the internal earth stud. They 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 TP24/7 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, in all gas groups and apparatus temperature classification up to T4. Where transmitters are used in circuits suitable for Div 2/Zone 2 installations, the TP24/7 can be added without adversely affecting the level of safety.

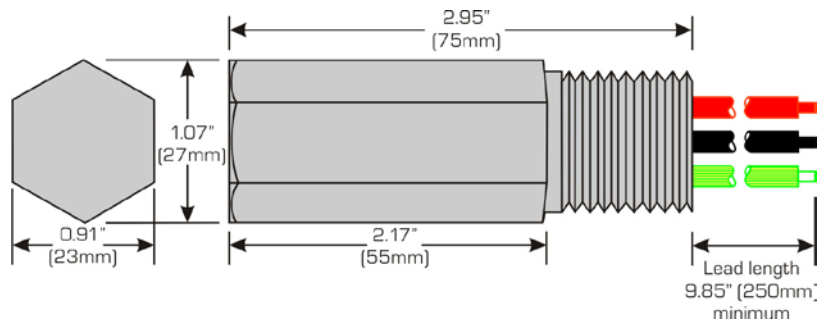


Figure 1 Dimensions

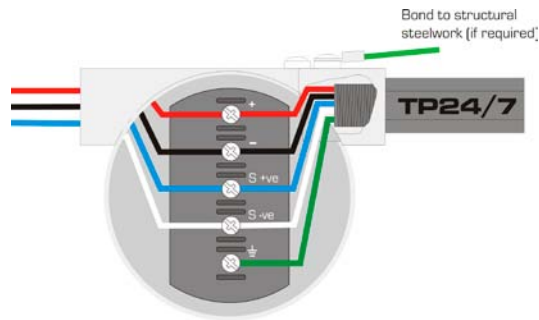


Figure 2 Connection detail for a typical process transmitter

APPROVALS

Country (Authority)	Standard No.	Certificate/File	Approved for	Product
EC (Baseefa)	EN 50014:1997+ Admendments 1 & 2	Baseefa04ATEX0251X EN 50020:1994, EN 50284:1999	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)	TP24/7-N-NDI TP24/7-I-NDI TP24/7-G-NDI
EC (Baseefa)	EN 50014:1997 + Admendments 1 & 2	Baseefa04ATEX0053X EN 50018:2000 + Admendment 1	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)	TP24/7-N-NDI TP24/7-I-NDI TP24/7-G-NDI
Atex Directive 94/9/EC	BS EN 50021:1999	TML02ATEX0032X	Ex n II T6 (-40°C<Tamb<+60°C) EEx n II T5 (-40°C<Tamb<+85°C)	TP24/7-N TP24/7-I TP24/7-G
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-incendive: I/2/A-D, I/2/IIC Dust ignition proof: II, III/1/EFG Special protection: II/2/FG	TP24/7-N-NDI TP24/7-I-NDI TP24/7-G-NDI
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, III/1/A-G, I/O/IIC Explosionproof: I/1/A-D Non-incendive: I/2/A-D, I/2/IIC Dust ignition proof: II, III/1/EFG Special protection: II/2/F	TP24/7 All
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	TP24/7-X-NDI

Note: TP24/7 part numbers ending in NDI are approved for IS, non-incendive and explosion proof installations.

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.



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901-102 Rev I 070410

SPECIFICATION

All figures typical at 77°F (25°C) unless otherwise stated

Maximum surge current

10kA peak current (8/20µs waveform)

Leakage current

Less than 10µA at max. working voltage

Working voltage

12V to 24V dc power

Bandwidth

1MHz

Resistance

No resistance introduced into loop

Ambient temperature limits

-40°C to +60°C

(-40°F to +140°F) (working)

-40°C to +85°C

(-40°F to +185°F) (storage)

Humidity

5% to 95% RH (non-condensing)

Electrical connections

4 flying leads

Wire size 32/0.2 (1.0mm², 18AWG)

Lead length 250mm (9.85") minimum

Casing

ANSI 316 stainless steel hexagonal barstock, male thread

Threads

TP24/7-N 1/2" NPT

TP24/7-I 20mm ISO (M20 x 1.5)

TP24/7-G G 1/2" (BSP 1/2 inch)

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.

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

Model		TP24/7
Nominal voltage	U_n	24V/7V
Rated voltage (MCOV)	U_c	34V/7V
Nominal current	I_n	n/a
Nominal discharge current (8/20µs)	i_{sn}	3kA
Max discharge current (8/20µs)	I_{max}	10kA
Lightning impulse current (10/350µs)	I_{imp}	2.5kA
Residual voltage @ i_{sn}	U_p	43V/19V
Voltage protection level @ 1kV/µs	U_p	<36V/<12V
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		1A _{rms} , 5T
Service conditions		80kPa - 160kPa 5% - 95% RH

TO ORDER SPECIFY -

TP24/7-N-NDI	Certified process transmitter surge protection device - 1/2" NPT thread
TP24/7-I-NDI	Certified process transmitter surge protection device - 20mm ISO thread
TP24/7-G-NDI	Certified process transmitter surge protection device - G 1/2" (BSP 1/2")
TP24/7-N	Non-certified process transmitter surge protection device - 1/2" NPT thread
TP24/7-I	Non-certified process transmitter surge protection device - 20mm ISO thread

SIL INFORMATION

Failure rates according to IEC 61508

	λ_{SD}	λ_{SU}^*	λ_{DD}	λ_{DU}
TP24/7	0 FIT	43 FIT	11 FIT	6 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.

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