

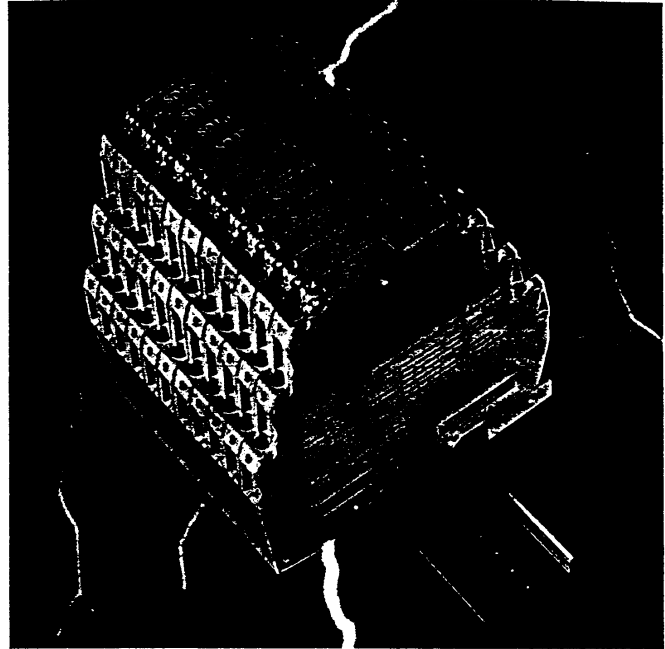
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# SD Series surge protection devices

 **Telematic**

Ultra-slim user-friendly devices for protecting electronic equipment and systems against surges on signal and I/O cabling

- ◆ Easy installation – automatic earthing with simple DIN-rail mounting
- ◆ Ultra-slim space-saving design – 7mm width
- ◆ Multifunctional versatility – a 'feedthrough' terminal with surge protection, replaceable fuse and 'disconnect' features
- ◆ Multistage hybrid protection circuitry – 10kA capability
- ◆ Fully autoresetting – maintenance-free
- ◆ Range of voltage ratings – to suit all process I/O applications



The Telematic SD Series is a range of surge protection devices combining unparalleled packing densities, application versatility, proven reliable hybrid circuitry, simple installation and optional 'loop disconnect' facilities – features which make the series the ultimate surge protection solution for the needs of process equipment and systems I/O in particular.

The exceptionally high packing densities are the consequence of a 7mm 'footprint' for individual modules which can thus 'double-up' as feedthrough terminals. Each module provides full hybrid surge protection for one 2-wire loop with an optional 'loop disconnect' facility provided by a replaceable fuse – a feature which avoids the necessity for additional 'knife-edge' terminals or other loop disconnect arrangements during instal-

lation, commissioning and maintenance. In addition, a 'third' terminal on each side provides facilities for terminating cable screens, etc, safely.

Modules with a comprehensive range of voltage ratings cover all process-related signals such as RTDs, THC's, 4 to 20mA loops, discrete systems, shut-down systems and fire and gas detectors. Modules for protecting higher voltage I/O sub-systems with working voltages up to 240V ac rms are also available.

The circuit designs are based on Telematic's proven hybrid technology. This combines a gas-filled discharge tube (GDT) with surge diodes to provide accurate voltage clamping and high current diversion. For higher voltage applications, metal oxide

varistors (MOVs) are used to provide good power absorption without power supply follow-through problems. In operation, SD Series units react to surges automatically and virtually instantaneously (within a matter of nanoseconds).

One simple manual operation clamps modules securely onto DIN-rail, an action that also automatically provides the essential high-integrity earth connection. Where a number of SD Series modules are mounted on one rail, any that are incorrectly mounted (and therefore not securely earthed) are very obvious and can easily be remounted correctly.

Standard 'top-hat' (T-section) DIN-rail is generally suitable for mounting SD Series modules – although, for adverse environments, a specially-plated version is available from Telematic.

## Surge protection – the facts

Instrumentation and communication networks used for industrial process control and commercial data processing can be destroyed by voltage surges on power lines, signal lines and telecom lines – with consequential expensive downtime. Surges can be caused by heavy electrical load switching, electrical faults and by electrical 'noise' from arc welding, etc; as well as induced by lightning (currently on the increase globally). It is recognized by British and international standards that lightning need not strike a building to induce voltage surges of more than 10kV on equipment cables. Even a 'near miss' can inject more than 5kA of current through electronic circuitry.

The only efficient way to prevent such damage is to equip all networks with surge protection devices (SPDs). These incorporate circuitry designed to divert voltage surges safely to earth. The Telematic range includes SPDs for virtually all applications including mains power supplies, process instrumentation, public and private telephone installations and computer networking – so providing 'all-round' protection from one source. Products are available directly from Telematic and from distributors throughout the world.

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# SD SERIES

## - GUIDE TO APPLICATIONS AND SELECTION

The SD Series of SPDs includes models for almost all possible applications operating at voltages up to 250V ac. The optional 'fuse/disconnect' package provides both fused protection against fault currents and a convenient method of isolating field circuitry from protected circuitry without needing additional disconnect terminals. The standard fuse (which is replaceable) is rated 250mA with 50mA fuses also being available by special request.

As an example, this feature is of particular value in applications in which an SPD is used with a bulk power supply feeding multiple loops. The individual module fuse prevents a fault on one loop disrupting the power supply to the others. Also, loops can be removed from the circuit for maintenance reasons or added without needing additional disconnect terminals.

The following guide to selection suggests the most suitable SPDs for a number of specific applications. For technical information, see the detailed specifications on the back page of this publication.

### ANALOGUE INPUTS (HIGH-LEVEL)

#### 2-wire transmitters, 4 to 20mA, conventional and smart

The SPDs recommended for use with 'conventional' and 'smart' 4 to 20mA transmitters (fed by a well-regulated supply) are the SD32 and SD55, the choice depending upon the maximum working voltage of the system (32V and 55V respectively). The diagram illustrates a prime example of an application for which the fuse/disconnect facility is particularly useful, however, both models are available in 'X' versions without the optional fuse/disconnect feature.

#### Vibration probes

The 3-wire transmitters used with vibration monitoring equipment are invariably supplied by a -24V dc power supply - so the recommended SPD choice is the SD32 or SD32X.

### ANALOGUE INPUTS (LOW-LEVEL)

#### Thermocouples, mV sources and RTDs

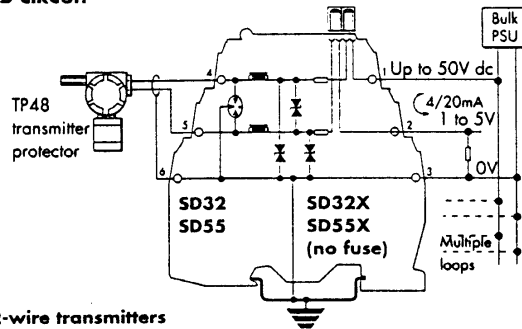
THCs, mV sources and RTDs are low-voltage sensors for which the SD07 and SD07X modules are the recommended choices.

#### ac sensors, photocells, microphones and turbine flowmeters

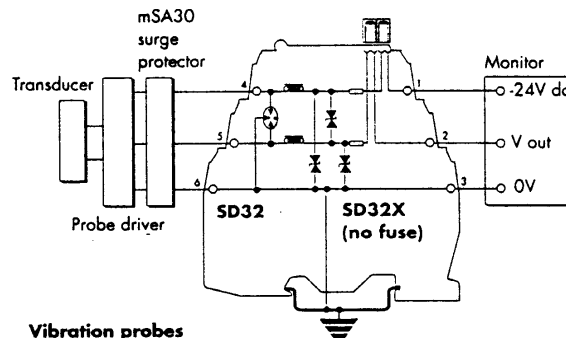
The SD07 or SD16 (depending upon the operational voltage) are the favoured choices for this application. SD07X and SD16X are also suitable.

FIELD CIRCUIT

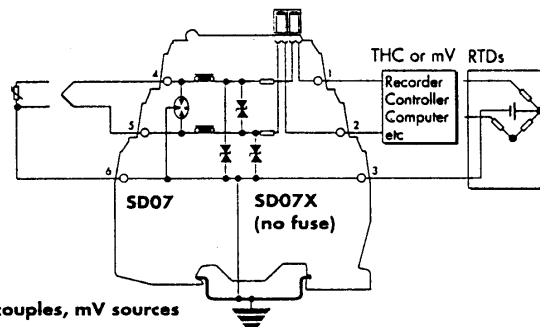
PROTECTED CIRCUIT



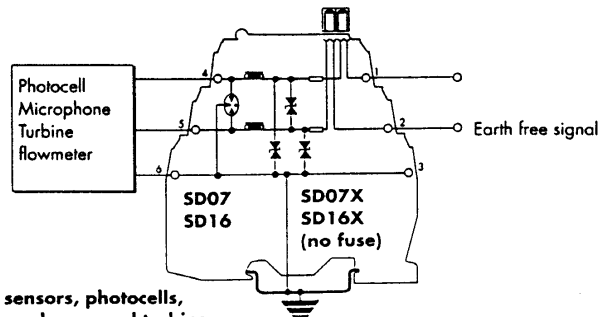
2-wire transmitters



Vibration probes



Thermocouples, mV sources and RTDs



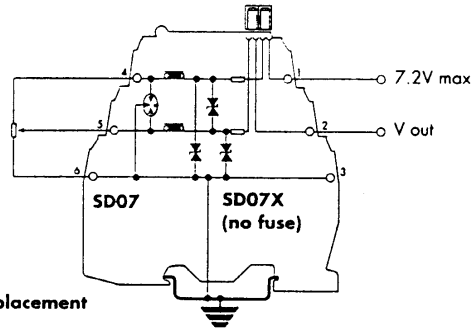
ac sensors, photocells, microphones and turbine flowmeters

## Slidewire displacement transducers

The recommended choices for this application are the SD07 and SD07X.

FIELD CIRCUIT

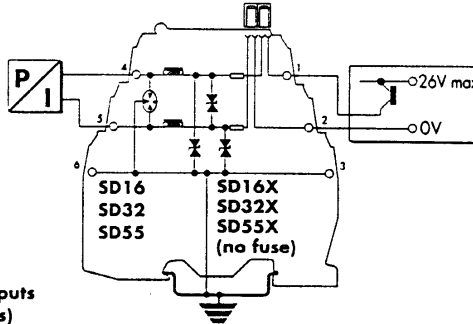
PROTECTED CIRCUIT



Slidewire displacement transducers

## ANALOGUE OUTPUTS Controller outputs (I/P converters)

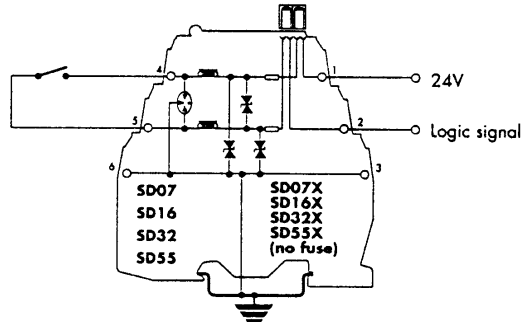
For this application, the recommendations are the SD16, SD32 and SD55 (and the equivalent 'X' versions), the final choice depending upon the operating voltage.



Controller outputs (I/P converters)

## DIGITAL (ON/OFF) INPUTS Switches

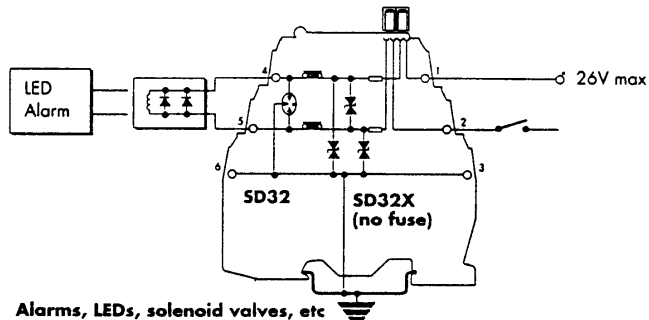
Suitable SPDs for switches include the SD07, SD16, SD32 and SD55 modules – the choice depending upon the operating voltage of the system. The 'X' versions of these are also suitable.



Switches

## DIGITAL (ON/OFF) OUTPUTS Alarms, LEDs, solenoid valves, etc

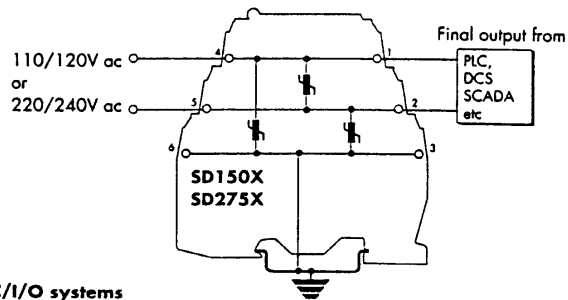
The recommended choice for this application is the SD32 or SD32X.



Alarms, LEDs, solenoid valves, etc

## AC MAINS-SUPPLIED EQUIPMENT PLC/IO systems

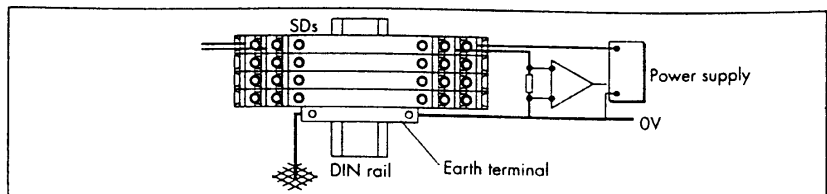
For systems on 110-120V ac, the SD150X is the recommended choice and for 220-240V ac systems, the SD275X is recommended.



PLC/IO systems

## SUGGESTED EARTH SYSTEM

In general applications, the best protection is given by connecting all the 0V lines as shown in the diagram.



# SD SERIES

## - SPECIFICATIONS

### Protection

Full hybrid line to line  
Each line to screen/ground

### GDT rating

10kA (8/20 $\mu$ s), (not applicable to SD150X and SD275X)

### MOV rating

6.5kA (8/20 $\mu$ s), single-shot, (SD150X and SD275X only)

### Reaction time

Within nanoseconds (10<sup>-9</sup>s)

### Ambient temperature

-30°C to +75°C (working)  
-40°C to +80°C (storage)

### Humidity

5 to 95% RH (non-condensing)

### Terminals

2.5mm<sup>2</sup> (12 AWG)

### Mounting

Top-hat section DIN-rail (35 x 7.5 or 35 x 15mm rail)

### Weight

70g approximately

### Case flammability

UL94 V-2

### EMC compliance

To Generic Immunity Standards, EN50 082, part 2 for industrial environments

### Accessories (mounting)

SD-ETL earth terminals  
SD-ISP insulating spacers  
SD-THR plated DIN-rail

### Accessories (tagging-group)

SD-IMB mounting blocks (two needed)  
SD-TAG tagging strip (1m length, with one TGL-SD strip)  
SD-TGL spare labelling strip for TAG-SD (1m length)

### Accessories (tagging-individual)

SD-BRI module identifier  
SD-BIL labels, supplied as A4-size sheet for pre-printing by user

### Accessories (replacement)

SD-F25 replaceable fuse pack (250mA standard)  
SD-F05 replaceable fuse pack (50mA special)

### TO ORDER:-

order by module and/or accessory part numbers

### Hazardous-area applications

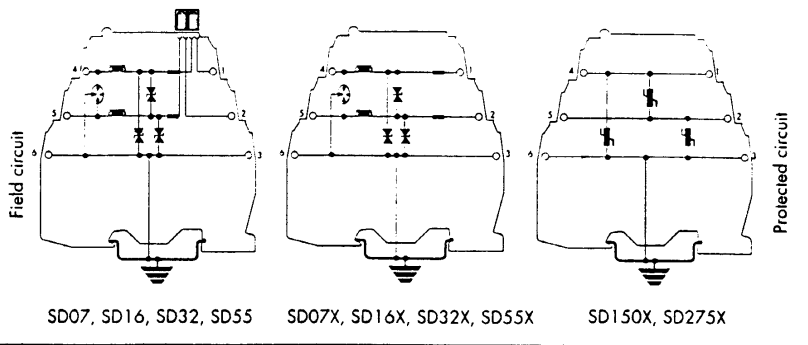
The SD07X, SD16X, SD32X, SD55X, SD07, SD16, SD32 and SD55 are all classified as 'simple apparatus' (with a maximum inductance of 220 $\mu$ H) and can therefore be used in intrinsically safe (IS) circuits without further certification. In addition, the units suffixed 'X' can be located in Zones 0, 1 and 2 as well as safe areas while the remainder, because their replaceable fuses are not fully encapsulated, can only be used in safe areas.

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## SCHEMATIC DIAGRAMS



Model	1	Rated load current (mA)	Max. resistance ( $\Omega$ /line)	2	Max. continuous operating voltage (V)	4	5	Application
	Working voltage+ (V)			Max. leakage current+ ( $\mu$ A)		Limiting voltage (V)	Bandwidth (kHz)	
SD07	7	50 or 250*	4.2†	500	7	30	25	THCs, RTDs, etc
SD16	16	50 or 250*	4.2†	5	17	40	25	Process loops
SD32	32	50 or 250*	4.2†	5	36	60	25	Process loops
SD55	55	50 or 250*	4.2†	5	62	100	25	Process loops
SD07X	7	400	2.2	500	7	30	25	THCs, RTDs, etc
SD16X	16	400	2.2	5	17	40	25	Process loops
SD32X	32	400	2.2	5	36	60	25	Process loops
SD55X	55	400	2.2	5	62	100	25	Process loops
	ac rms			ac rms	ac rms			
SD150X	120	3A‡	0.1	250	150	420	-	PLCs, I/O networks
SD275X	240	3A‡	0.1	250	275	850	-	PLCs, I/O networks

Note: all figures are typical at +25°C unless otherwise stated; \*standard fuse; +over full working temperature range; †at 20mA with a 250mA standard fuse; ‡these units need external 3A fuses

### Definitions of terminology used in table

- Working voltage**  
Maximum voltage between lines or lines/ground for the specified leakage current
- Maximum leakage current**  
Maximum current drawn by the SPD at the working voltage
- Maximum continuous operating voltage**  
Maximum voltage that can be applied to the protected terminals without damage
- Limiting voltage**  
Peak output voltage after injection of test impulse from 6kV/3kA combination waveform generator (often known as 'let-through' voltage)
- Bandwidth**  
Frequency range up to which ac signals can be transmitted without undue attenuation (-3dB into 50 $\Omega$ )

## DIMENSIONS (mm)

