

## Modular Distribution Surge Protector MDSP3 - 90, 150 & 300 Series

These modular distribution panel protectors for three phase power systems are designed to prevent damage to electrical distribution systems from mainsborne transient voltages which can occur as the result of nearby lightning strikes or surges derived from the switching of inductive or capacitive loads. They feature exceptionally high surge handling capabilities of 90kA, 150kA or 300kA and are intended for high lightning exposure areas and critical systems where long life and low maintenance are required and far exceed the recommendations of BS6651.

The Modular Distribution Surge Protector (MDSP) should be installed at the point of cable entry to a building containing sensitive electrical or electronic equipment. The MDSP is normally used as part of a totally integrated surge protection system and as such should be considered as the first line of defence. Local distribution panels and equipment connected "downstream" should also be protected in order to achieve a systematic and co-ordinated approach to surge protection.

The MDSP provides suppression from mainsborne voltage spikes and surges that can occur between phases, phase to neutral, phase to earth and neutral to earth, thus ensuring protection in all modes. This protection is achieved by using carefully matched high energy absorbing elements.

The MDSP features exceptionally high surge current handling capabilities which operates in two stages to ensure continuity of transient suppression. Under normal conditions the MDSP will automatically reset after clamping smaller, more commonly occurring surges, and two green lights on each of the Line modules indicate that full protection is present. However, should a surge current in excess of 90kA, 150kA or 300kA (depending on the model selected), appear on the line it will be clamped by the MDSP but the first protection stage may possibly suffer damage and fail safe. In this instance one green light



from each damaged module will be extinguished and although the system will still be adequately protected, affected Line modules should be replaced before a further large surge can remove the second stage.

There is no protection present when the green module lights are not illuminated, although unprotected power is still supplied.

The Neutral/Earth module is provided with a red warning light. Should this light glow at any time it is not a warning of suppressor failure, but, is indicative of potentially hazardous site wiring.

Each MDSP module is fitted with a remote signalling facility where volt free terminals (which can be connected as either normally open or normally closed), open or close

when the first protection stage is lost, (one green light on) and these can be used to activate a remote indicator such as a lamp or audible alarm or notify a building management system (BMS).

The switching contacts are completely isolated from the supply and may be used for AC mains voltage 230V RMS 1 Amp or 30V DC 2 Amp loads.

An alternative version of the MDSP is available which in addition to the above is also provided with Silicon Avalanche Diode (SAD) modules which offer extremely low clamping and exceptionally fast response time.

This makes them ideal for the stringent and demanding requirements of, for instance, mobile telecom applications.

## Features

- ◆ Exceptionally high surge handling capabilities of 90kA, 150kA or 300kA
- ◆ Two stage (redundant) protection
- ◆ Replaceable DIN rail mounted surge protection modules
- ◆ Dual thermal and current overload fusing
- ◆ Full protection status indicators with remote signalling
- ◆ Silicon Avalanche Diode (SAD) and/or Metal Oxide Varistor (MOV) technology
- ◆ SAD models available for extremely low clamping and exceptionally fast response time
- ◆ Flame retardant IP67 rated enclosure
- ◆ Site wiring fault indicator
- ◆ Easy installation and field serviceability

## Applications

- ◆ Front end of building protection for mission critical sites and applications
- ◆ SAD model particularly suited to mobile telecom applications

## Installation

Designed to be installed alongside the incoming electrical supply panel the MDSP is connected in parallel (or in "shunt") across the supply to be protected. The connecting cable does not carry the supply current, only the current associated with suppressing the transient overvoltage.

The MDSP should be installed as close as possible to the supply cables being protected, with as large a conductor as possible (35mm<sup>2</sup> max). The connecting wires should be routed, avoiding looping, and secured together with ties. See installation data sheet instructions. The Modular Distribution Surge Protector must be connected in parallel to supply via an isolating switch if the mains supply cannot be switched off for module replacement. If RCD's are used the MDSP must be fitted in front of such devices to avoid nuisance tripping. Provision should be made for safe replacement of the MDSP and/or modules should this become necessary.



*Silicon Avalanche Diode (SAD) and Metal Oxide Varistor (MOV) replaceable DIN rail mountable modules for MDSP3-90, 150 and 300 series*



*MDSP3/150/12-SAD/MOV model with optional MCB facility*

## Fusing

The MDSP is suitable for direct connection to a line rated up to 100A with 16mm<sup>2</sup> min connecting cables. However it should be remembered that if the unit were to see a surge in excess of its designed capability then the main fuse would be ruptured and the supply disconnected.

Provision of additional inline disconnecting fuses to the unit will overcome the above and also provide isolation for maintenance and exchange.

The MDSP can be connected to a supply greater than 100A providing inline fuses rated 100A max are fitted. In order to discriminate with the supply fuse the inline fuse should be in the ratio of 1:2. The inline fuses can be replaced by MCBs providing they are type C/D.



*Full status is indicated on each suppression module*

## Maintenance

The MDSP requires no maintenance but the lights should be checked regularly, particularly following lightning activity to ensure full protection is present. The remote signalling facility allows the MDSP to be installed in areas that are inaccessible for regular inspection.

## Quality Assurance

Approved to BS EN ISO 9000

## Surge Test

The MDSP complies with or is tested to the requirements of: IEE C62.41.1991, UL1449.1985, BS6651, 1999. The test waveform - 6kV 1.2/50µs O/C, 3kA 8/20µs S/C - applied to the MDSP gives the resultant let through voltage. See tabulation overleaf. (The "let through voltage" will vary due to the parasitic inductance of the associated mains cable.) Values given are at protector terminals.

## MDSP3-90 SERIES

### MDSP3/90

This three phase DIN rail mounted modular surge protector comprises three 90kA Line/Neutral MOV modules and one 150kA Neutral/Earth MOV module all of which are housed in a high impact plastic enclosure with clear cover. All modules have dual thermal and current overload fusing and are so arranged as to provide a redundancy feature should one of the discs be damaged due to excessive energy. Status indication of the modules is by lights and the Neutral/Earth module provides indication of high neutral to earth voltages. All modules have a remote indication facility.



*Pictured - MDSP3/150*

### MDSP3/90/12

The MDSP3/90/12 offers the same features as above but additionally is supplied with three Line/Neutral 12kA SAD modules for improved clamping and response performance. Should the SAD modules be damaged due to excessive energy the MOV modules will continue to provide protection.

## MDSP3-150 SERIES

### MDSP3/150

This three phase DIN rail mounted modular surge protector comprises three 150kA Line/Neutral MOV modules and one 150kA Neutral/Earth MOV module all of which are housed in a high impact plastic enclosure with clear cover. All modules have dual thermal and current overload fusing and are so arranged as to provide a redundancy feature should one of the discs be damaged due to excessive energy. Status indication of the modules is by lights and the Neutral/Earth module provides indication of high neutral to earth voltages. All modules have a remote indication facility.

### MDSP3/150/12

The MDSP3/150/12 offers the same features as above but additionally is supplied with three Line/Neutral 12kA SAD modules for improved clamping and response performance. Should the SAD modules be damaged due to excessive energy the MOV modules will continue to provide protection.

## MDSP3-300 SERIES

### MDSP3/300

This three phase DIN rail mounted modular surge protector comprises six 150kA Line/Neutral MOV modules, paralleled up to provide 300 kA and two 150kA Neutral/Earth MOV modules all of which are housed in a high impact plastic enclosure with clear cover. All modules have dual thermal and current overload fusing and are so arranged as to provide a redundancy feature should one of the discs be damaged due to excessive energy. Status indication of the modules is by lights and the Neutral/Earth module provides indication of high neutral to earth voltages. All modules have a remote indication facility.

### MDSP3/300/12

The MDSP3/300/12 offers the same features as THE MDSP3/300 but additionally is supplied with three Line/Neutral 12kA SAD modules for improved clamping and response performance. Should the SAD modules be damaged due to excessive energy the MOV modules will continue to provide protection.

***Single phase models of the above are available***

### Replacement Suppression Modules

DIN rail mounted with two stage (redundant) protection, on-board monitoring, remote signalling, internal fusing and diagnostics.

Description	Part Number	Technology	Voltage Rating	Max. Current Surge Handling (8/20µs)	Dimensions (mm)	Weight (gms)
90kA Line MOV Module	DSPM/90/230R	MOV	230V	90kA	L: 98 D: 77 W: 35	259
150kA Line MOV Module	DSPM/150/230R	MOV	230V	150kA	L: 98 D: 77 W: 35	259
150kA Neutral / Earth Module	DSPM/150/120R	MOV	120V	150kA	L: 98 D: 77 W: 35	208
12kA Line SAD Module	DSPM/12/230R	SAD	230V	12kA	L: 98 D: 77 W: 35	221



*Alternative voltage ratings of the suppression modules are available.*

## LET THROUGH VOLTAGE

Tests simulating the effects of lightning and switching transients	Phase/Neutral Line MOV Modules	Phase/Neutral Line SAD Modules
6kV 1.2/50µs open circuit voltage 3kA 8/20µs short circuit current	<700V	<500V
4kV 1.2/50µs open circuit voltage 2kA 8/20µs short circuit current to IEC 801-5 (draft)	<600V	<500V
5kA 8/20µs to NFC 61-740	<800V	<600V
6kV 0.5µs 100kHz ring wave 500A	<600V	<500V

### Optional Extras

- Remote Monitoring Module
- Surge Counter Module
- Filter Module
- MCB or fuse switch
- DIN rail mounting kit.

	MDSP3/90, MDSP3/150 MDSP3/300	MDSP3/90/12, MDSP3/150/12 MDSP3/300/12
SPECIFICATION		
Voltage Rating	415V rms - 3 phase 4 wire star & earth	415V rms - 3 phase 4 wire star & earth
Operating Voltage Range	380 - 515V rms Max	380 - 515V rms Max
Maximum Supply Current Rating	Unlimited (Modules Parallel Connected)	Unlimited (Modules Parallel Connected)
Maximum Surge Current Handling (8/20µs)	90kA Line MOV modules (90 Series) 150kA Line MOV modules (150 Series) 300kA Line MOV modules (300 Series) 150kA Neutral/Earth module	90kA Line MOV modules (90 Series) 150kA Line MOV modules (150 Series) 300kA Line MOV modules (300 Series) 150kA Neutral/Earth module 12kA Line SAD modules
Response Time	<10ns	<10ns Line and Neutral/Earth MOV modules 5ns Line SAD modules
Power Consumption	Negligible	Negligible
Leakage Current to Earth	3mA	3mA
Remote Signalling Terminals	Rated at 230V AC 1 Amp or 30V DC 2 Amp	Rated at 230V AC 1 Amp or 30V DC 2 Amp
No System Impairments Auto Reset After Surge Has Occurred	✓	✓
Terminals	35mm <sup>2</sup> max 2.5mm <sup>2</sup> max - Remote Signalling	35mm <sup>2</sup> max 2.5mm <sup>2</sup> max - Remote Signalling
Operating Temperature	-40° to +70° Celsius	-40° to +70° Celsius
Light Emitting Diodes Module Status Indication	2 Green - Full Protection 1 Green - Reduced Protection No Green - No Protection or No Power Red - Warning, high neutral/earth voltage present (Neutral/Earth module only)	2 Green - Full Protection 1 Green - Reduced Protection No Green - No Protection or No Power Red - Warning, high neutral/earth voltage present (Neutral/Earth module only)
Module Case	Light Grey FR ABS	Light Grey FR ABS
Enclosure	Polycarbonate	Polycarbonate
IP Rating (before installation)	67	67
Location Category BS6651:1999 Annex C	C	C
Dimensions (in mm)	90kA 150kA 300kA L 280 280 300 W 190 190 230 D 130 130 110	90kA 150kA 300kA L 300 300 300 W 230 230 230 D 110 110 110
Weight (in kg)	2.8 2.3 4.4	4.3 4.3 5.1
Order Code	90kA - MDSP3/90, 150kA - MDSP3/150 300kA - MDSP3/300	90kA - MDSP3/90/12, 150kA - MDSP3/150/12 300kA - MDSP3/300/12

All of the above information, including drawings, illustrations and graphic designs, reflects our present understanding and is to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances does this constitute an assurance of any particular or performance. Such an assurance is only provided in the context of our product specifications or explicit contractual arrangements. Our liability for these products is set forth in our standard terms and conditions of sale.

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