



# POWER CATALOGUE

LIGHTNING AND SURGE PROTECTION

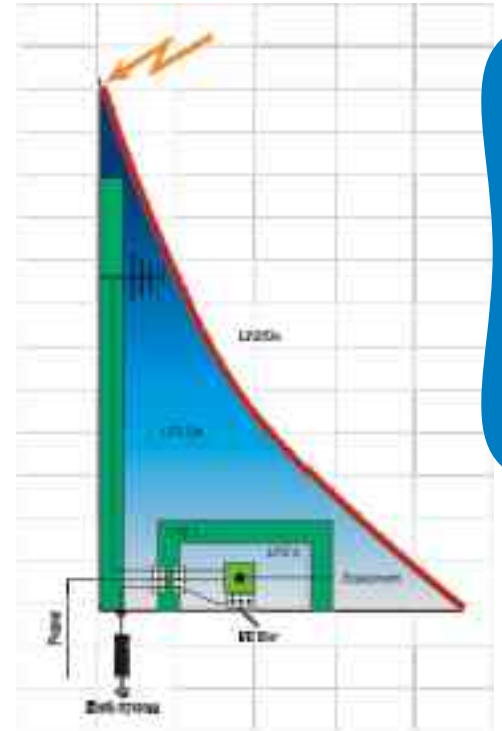
# POWER PROTECTION

The new Clearline range of distribution board and equipment surge protection products is an effective way of controlling dangerous surges that can enter a facility. When strategically placed and correctly installed, the Clearline will effectively reduce harmful over voltage conditions that can damage electrical and electronic equipment.

## Protection Zoning

Correct protection principles may be applied by introducing the international standards IEC 61024-1 (protection of building structures against lightning) and IEC 61312-1 (protection of information systems LEMP). These standards define the correct procedures to be followed to install an effective lightning protection system. It is important that the protection system includes both structural and surge protection equipment.

According to the IEC 61312-1, the entire installation is divided into different lightning protection zones:



Lightning Protection Zones	
LPZ0a:	This zone is an area where a direct hit to the structure is possible. The current may rise to a value of 200,000A (10/350µs) producing extremely high electromagnetic fields. Any conductor system must be capable of carrying the full lightning current.
LPZ0b:	This zone is an area where a direct hit is not possible, but high electromagnetic fields will be present. This zone is determined by the effectiveness of the structural protection system.
LPZ1:	Again, a direct hit in this area is not possible due to the screening measures applied. The electromagnetic field is much lower than LPZ0a and LPZ0b. It is in this zone where appropriate surge arresters may be fitted that will limit the value of surge current entering a facility.
LPZ2:	The value of surge current and electromagnetic field will be lower than that of LPZ1, when correct protection principles have been applied. It is in this area where sensitive electronic equipment may be safely installed.

## HOW SURGE VOLTAGES OCCUR IN ELECTRICAL SYSTEMS

The new Clearline range of distribution board and equipment surge protection products is an effective way of controlling dangerous surges that can enter a facility. When strategically placed and correctly installed, the Clearline will effectively reduce harmful over voltage conditions that can damage electrical and electronic equipment.



## Galvanic Coupling

When a building is struck directly by lightning as indicated in Fig. 1, a large voltage develops across RA and the entire earth arrangement in building A will rise to a very high level, dependant on the amount of current applied. Building B's earth arrangement will be at a much lower potential and the entire difference will be equalized via the communication cables.

## Inductive Coupling

When lightning current passes into the ground via a conductor Fig. 2 (tree trunk) a powerful electromagnetic force is set up due to the fast rise times of the strike. This electromagnetic force then couples into any inductive loops that may be available in nearby buildings. When these currents equalize, damage usually occurs to the equipment.

# SURGE PROTECTION FOR POWER SYSTEMS

Surge arresters are divided into three classes:

- Lightning current arresters for "first line protection" (class 1)
- Surge voltage arresters for medium protection (class 2)
- Surge voltage arresters for fine protection (class 3)

These arresters differ in their design and current handling capacity and are placed in specific locations as per IEC 61312-1 requirements to offer the optimum protection solution. Generally, these devices are located in the following areas:

### Class 1 arresters:



### Class 2 arresters:



### Class 3 arresters:



## SELECTION OF SURGE ARRESTERS

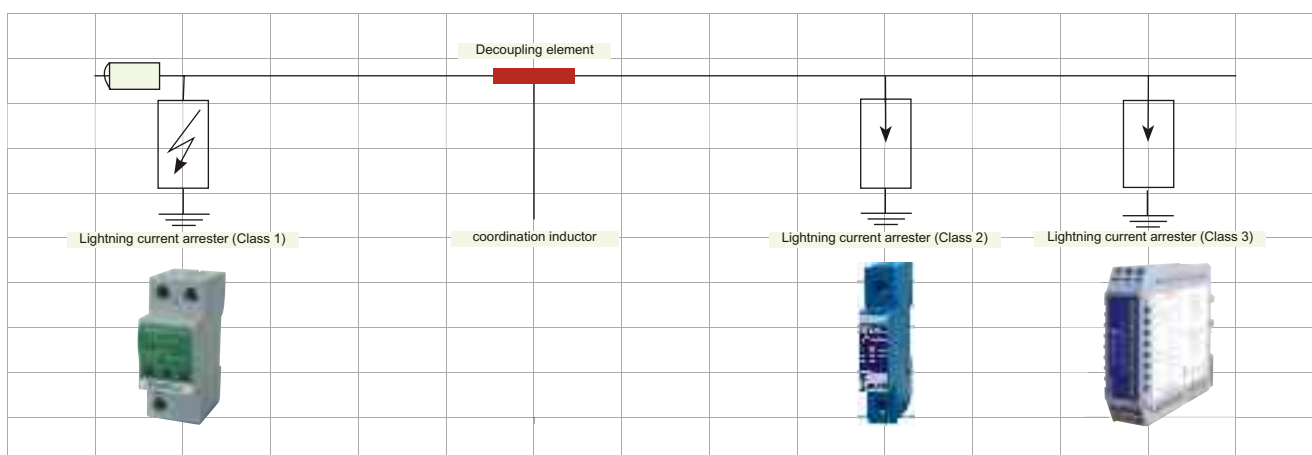
According to the requirements of the insulation co-ordination in power installations (IEC 60664-1) and the surge immunity of equipment to be protected, it is necessary to keep the voltage protection levels of the surge protection devices (SPD) below a maximum value of the surge immunity level of the equipment. Should the immunity against damage not be known, then the following table may be used:

IEC 60664-1	Impulse withstand categories for overvoltage limits			
Voltage line to neutral derived from nominal voltages a.c. or d.c. up to and including  <b>V</b>	Rated impulse voltage			
	Overvoltage category			
	I	II	III	IV
50	330	550	800	1 500
100	500	800	1 500	2 500
150	800	1 500	2 500	4 000
300	1 500	2 500	4 000	6 000
600	2 500	4 000	6 000	8 000
1000	4 000	6 000	8 000	12 000

The overvoltage categories given in this table are

**Category I** which includes equipment such as pluggable devices with electronic circuits,  
**Category II** which includes equipment supplied from a fixed installation, such as pumps, motors, and other appliances,  
**Category III** which includes equipment in fixed installations, such as distribution boards and motor control centres, and  
**Category IV** which includes equipment at the origin of the installation (point of control), such as electricity meters and primary overcurrent protection equipment

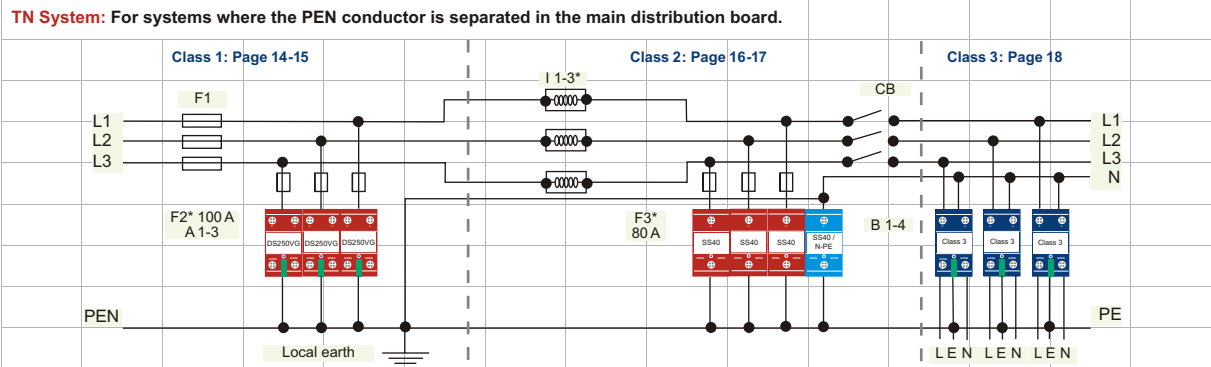
Under the IEC 61312-1 arrangement, a lightning current arrester is fitted at the power entry panel of the facility, followed by a decoupling element, terminating in a class 2 surge arrester at the power distribution board.



### Arrester co-ordination

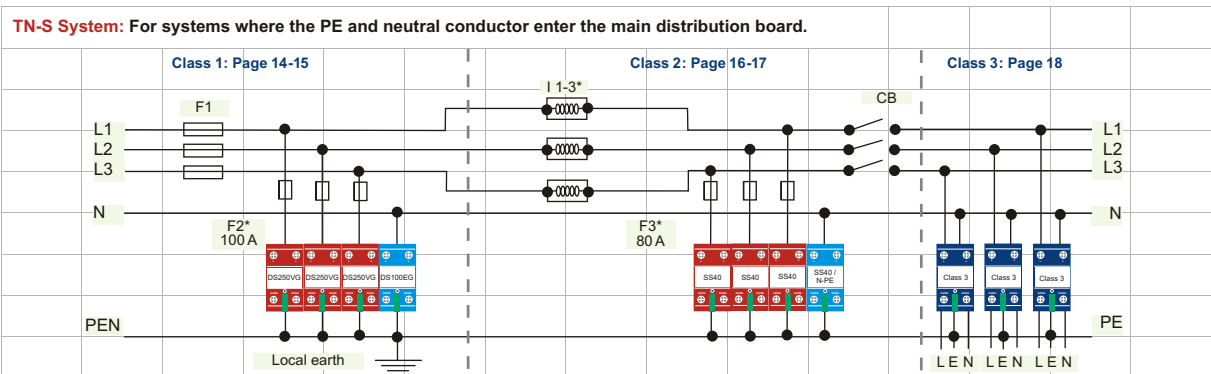
To utilize maximum protection efficiency, it is necessary to create the correct co-ordination between class 1 and class 2 arresters in a protection system. If the class 1 and class 2 arresters are installed side by side in the same location, it is necessary to install a decoupling element of at least 15 $\mu$ H at the full current rating. Should the class 2 arresters be installed in a sub distribution board and the distance between the two locations is more than 10m, then no decoupling element is required.

# QUICK SELECTION GUIDE (Protection of low voltage power systems)



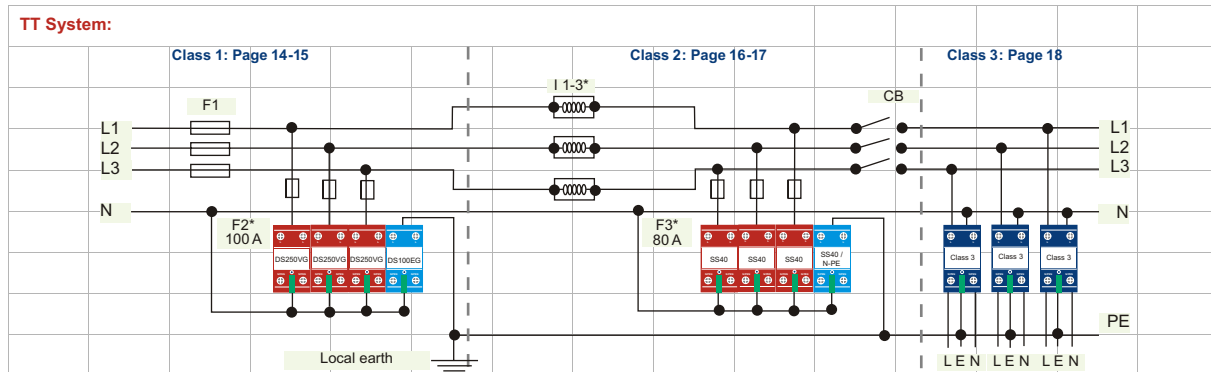
Main distribution board

Sub distribution board



Main distribution board

Sub distribution board



Main distribution board

Sub distribution board

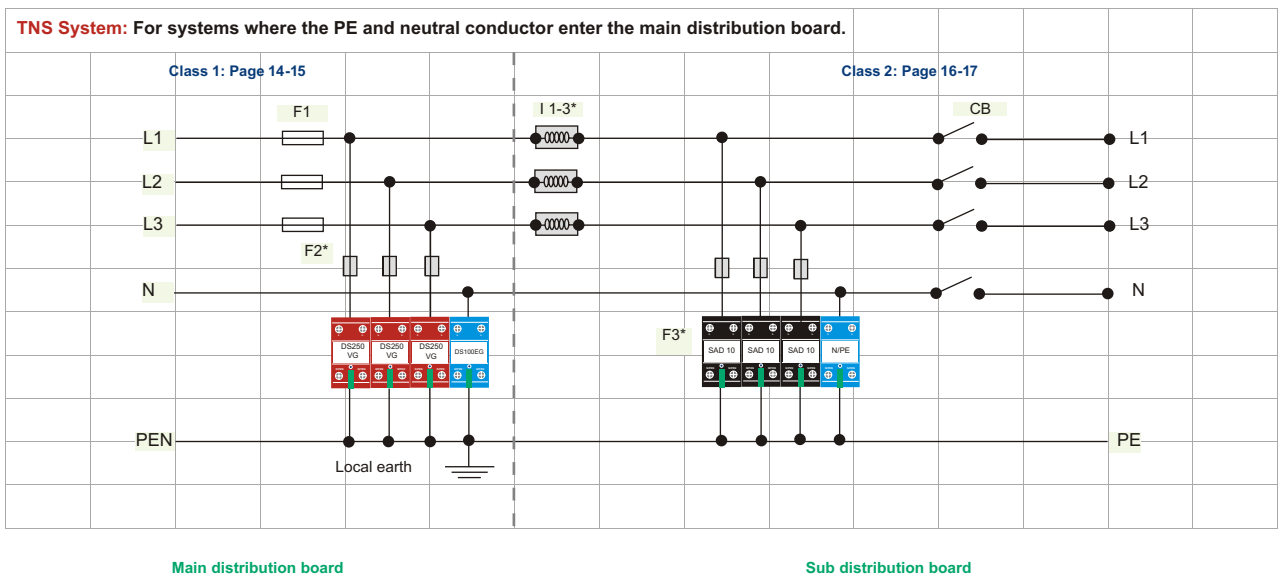
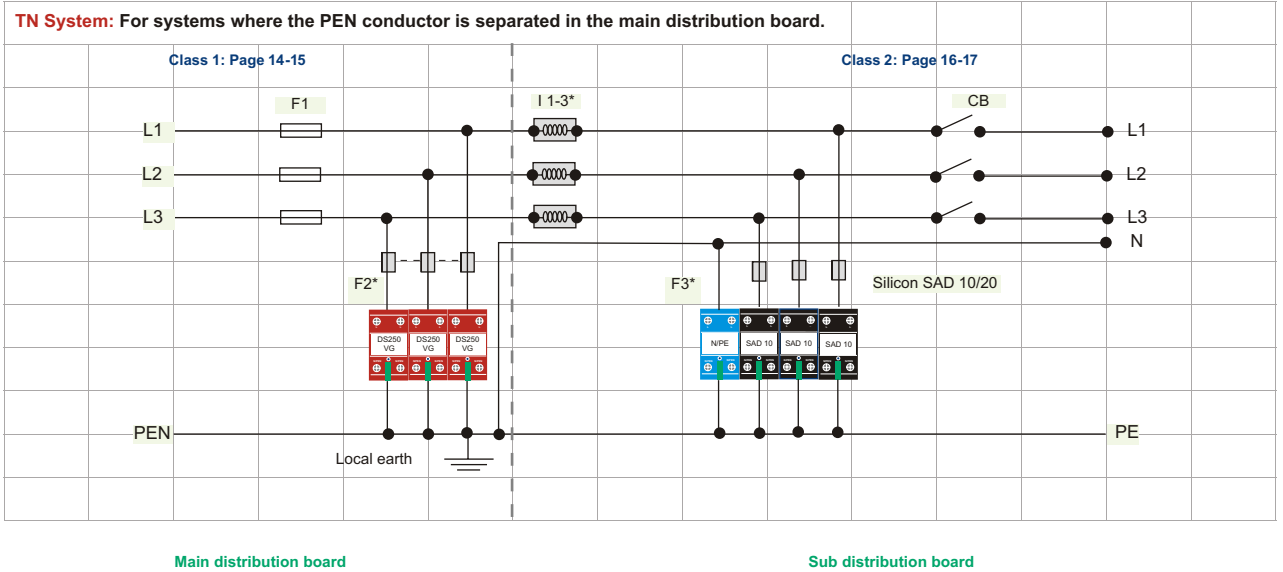
## Fuse Data

Fuse	Size	Arrester installation wire size mm <sup>2</sup>
F1	Existing fuse or circuit breaker as supplied in distribution board	≥10mm <sup>2</sup> flexible, max. length 400mm
F2	160A gI/gG (only required if not already provided in mains board and not exceeding 160A)	≥2,5mm <sup>2</sup> flexible, max. length 400mm
F3	80AgI/gG for SS40 P and SS40 if F1 is greater than 80A	

## Decoupling Unit

Current rating	Model no.	Notes:
35A	12-00391	- Inductor 1 is not required if the distance between class 1 and class 2 arresters is more than 10m apart.
63A	12-00424	
>63A	Approx. 10m of appropriate cable size required.	- Distance between class 2 and class 3 arresters should be 5m min.

# QUICK SELECTION GUIDE (Protection of low voltage power systems) (with silicon class 2 protection for very low residual voltages)



\* Inductor 1 is not required if the distance between class 1 and class 2 arresters is more than 10m apart.

Fuse Data		
Fuse	Size	Arrester installation wire size mm <sup>2</sup>
F1	Existing fuse or circuit breaker as supplied in distribution board	≥10mm <sup>2</sup> flexible, max. length 400mm
F2	160A gI/gG (only required if not already provided for in mains board and not exceeding 160A)	≥2,5mm <sup>2</sup> flexible wire, max. length 400mm
F3	80A gI/gG for SAD10/20 only required if it is greater than 80A	

Decoupling Unit	
Current rating	Model no.
35A	12-00391
63A	12-00424
100A	12-00557
>100A	Approx. 10m of appropriate insulated cable required

## DS250VG - CLASS 1 (Surge arresters for low voltage power systems)

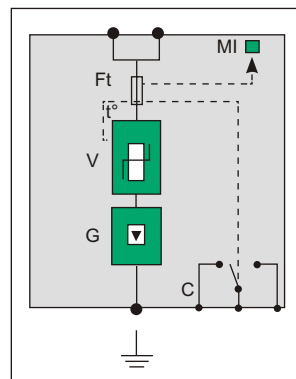
### Features:

- Type 1 surge protector
- 25kA on 10/350µs impulse
- Low residual voltage
- Internal disconnection, status indicator and remote signalling
- IEC 61643-1 and EN 61643-11 compliance UL 1449 ed. 2 recognition

Specifications		
		DS250VG-300
AC network		230/400V
Connection mode		L/N
AC system		TT, TN
Max. operating voltage	UC	330VAC
TOV withstand	UT	330VAC
Operating current (leakage current at Uc)	IC	none
Follow current	If	none
Nominal discharge current (15 x 8/20µs impulses)	In	30kA
Max. discharge current (max. withstand @ 8/20µs)	Imax	70kA
Max. lightning current by pole (max. withstand @ 10/350µs)	Iimp	25kA
Residual voltage (at Iimp)	Ures	0.8kV
Protection level (at In)	Up	1.5kV
Admissible short-circuit current		25000A



Order code: 12-00392



### DS250VG

- V: High energy varistor network
- G: Heavy duty gas tube
- Ft: Thermal fuse
- C: Remote signalling contact
- t°: Thermal disconnect system
- MI: Disconnection indicator



# DS100EG - CLASS 1 (Surge arresters for low voltage power systems)

## Type 1 N/PE AC power surge protector

This type 1 surge protector is designed to be used in association with DS250VG surge protectors to provide common and differential surge protection for AC networks.

The DS100EG is connected between the Neutral (N) and the Protective Earth (PE) wires. The DS100EG is based on a P100 high energy gas tube, which provides much lower residual voltages than the air spark gap technology and a very high discharge current capability on a 10/350µs or 8/20µs impulses.

It is mechanically similar to the DS250VG series, therefore making it easy to use both products jointly.

Specifications		
		DS100EG-600
Network		230/400V
Connection mode		N/PE
AC system		TT, TNS
Max. operating voltage	UC	400VAC
Temporary overvoltage withstand	UT	400VAC
Operating current (leakage current at Uc)	IC	N/A
Follow current	If	Yes
Nominal discharge current (15 x 8/20µs impulses)	In	50kA
Max. discharge current (max. withstand @8/20µs)	I <sub>max</sub>	150kA
Max. lightning current by pole (max. withstand @ 10/350µs)	I <sub>imp</sub>	45kA
Protection level (at In)	Up	1.5kV
Admissible short-circuit current		25000A
Mechanical Specification		
Dimensions		See diagram
Connections		By screw terminals: 6-35m <sup>2</sup> / by bus
Mounting		Symmetrical rail 35mm
Operating temperature		-40°C to 85°C
Protection class		IP20
Housing material		Thermoplastic PEI UL94-5VA
Standards compliance		
NF EN 61643-11	France	Parafoudre Basse Tension – Essais Classe I et II
EC 61643-11	International	Low voltage SPD – Test Class I and II
EN 61643-11	Europe	Low voltage SPD – Test Class I and II
UI 1449 ed.2	USA	Low voltage TVSS

## Type 1 N/PE AC power surge protector

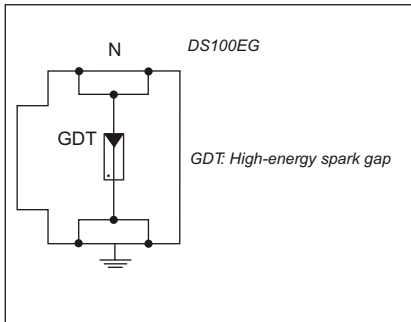
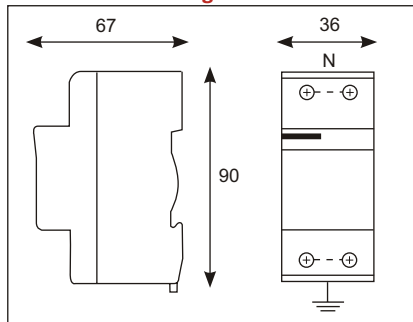
### Features:

- Coordination inductors for surge protectors
- For use with the DS series
- 35A, 63A, 100A and 2 x 16A versions

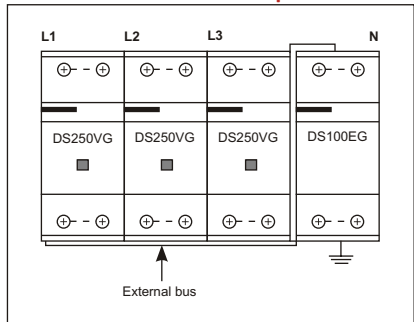


Order code: 12-00396

### Dimensions and diagram



### Association with DS250VG protectors



For example: DS 154VG-300/G



## SS40P, SS40 AND SS25 - CLASS 2 (Single-pole surge arrester)

Class 2 arrester for installation in the LPZ-OB - 1 lightning protection zone in accordance with IEC61643-1

### Features:

- High energy zinc oxide varistor
- Fault indication
- Compact design
- Fault disconnect device
- Fast response time



Order code: 12-00237  
SS40-275  
Non-pluggable surge arrester



Order code: 12-00270  
SS25-275  
Non-pluggable surge arrester



Order code: 12-00238  
SS40N/PE  
Non-pluggable  
neutral potential  
equalization arrester



Order code: 12-00232  
SS40PRC  
Surge arrester with  
replaceable module and  
remote contacts



Order code: 12-00233  
SS40N/PE  
N/PE surge arrester  
with replaceable module and  
remote contacts

Specifications	12-00237	12-00270	12-00238	12-00232	12-00233
Max. continuous operating voltage	275VAC	275VAC	275VAC	275VAC	275VAC
Nom. discharge current	20kA	10kA	20kA	20kA	20kA
Max. discharge current 8/20	40kA	25kA	40kA	40kA	40kA
Voltage protection level at 5kA 8/20	≤ 1kV	≤ 1kV	≤ 1kV	≤ 1kV	≤ 1kV
Voltage protection level at I <sub>sn</sub>	≤ 1.5kV	≤ 1.5kV	≤ 1.5kV	≤ 1.5kV	≤ 1.5kV
Response time	<25nS	<25nS	<100nS	<25nS	<100nS
Backup fuse (only required if not already provided in mains)	80A gL/gG	80A gL/gG	-	80A gL/gG	-
Short circuit withstand capability with maximum backup fuse	25kA / 50Hz	25kA / 50Hz	-	25kA / 50Hz	25kA / 50Hz
Operating temperature range	-40°C to +80°C	-40°C to +80°C	-40°C to +80°C	-40°C to +80°C	-40°C to +80°C
Mounting on	25mm Din-rail	25mm Din-rail	25mm Din-rail	25mm Din-rail	25mm Din-rail
Enclosure material	Red thermoplastic	Green thermoplastic	Blue thermoplastic	Grey thermoplastic	Grey thermoplastic
Degree of protection	IP20	IP20	IP20	IP20	IP20
Installation width	18mm	18mm	18mm	18mm	18mm
Tested to	SABS/IEC 61643-1	SABS/IEC 61643-1	SABS/IEC 61643-1	SABS/IEC 61643-1	SABS/IEC 61643-1

## SS40 TT230 - CLASS 2 SURGE ARRESTER

Suitable for inclusion in single phase and TT systems between neutral/PE conductors.  
For use in lightning protection zone boundary LPZOB - 1

### Features:

- Very high discharge capacity
- Replaceable surge module
- Fast response time
- Compact design



Order code: 12-00417

Specifications	L - N	N - PE
Rated voltage (maximum continuous operating voltage at 50Hz)	275VAC / 50Hz	275VAC / 50Hz
Nom. discharge current 8/20	20kA	20kA
Max. discharge current 8/20	40kA	40kA
Follow current extinguishing capability at Uc	100Arms	100Arms
Lightning impulse current 10/350	-	12kA
Voltage protection level lightning impulse spark-over voltage 1.2/50	-	<1.5kV
Response time	<25nS	<100nS
Operating temperature range	-40°C to +80°C	-40°C to +80°C
Mounting on	35mm Din-rail	35mm Din-rail
Enclosure material	Grey thermoplastic	
Degree of protection	IP20	
Installation width	18mm	
Tested to	SABS/IEC 61643-1	

## SS40 TT - CLASS 2 SURGE ARRESTER FOR THREE-PHASE INSTALLATIONS

A compact surge arrester for three-phase installations. A potential equalisation gap device has been included for neutral/PE connections to comply with the requirements of SABS/IEC 61643-1. Remote signalling contacts have been included. All modules are pluggable.

### Features:

- Very low clamping voltage
- High discharge capacity
- Fast response time
- Compact design
- Replaceable module



Order code: 12-00418  
SS40 TT

3 phase surge arrester N/PE arrester  
replaceable modules with remote contacts

Specifications	L - N	N - PE
Nom. voltage	230/400V / 50Hz	230/400V / 50Hz
Rated voltage	275V / 50Hz	275V / 50Hz
Nom. discharge current 8/20 per pole	20kA	20kA
Max. discharge current 8/20 per pole	40kA	40kA
Voltage protection level at 10kA 8/20	-	100Arms
Lightning impulse current 10/350	-	12kA
Voltage protection level at Isn	≤1kV	-
Lightning impulse spark-over 1.2/50	-	<1.5kV
Response time	<25nS	<100nS
Backup fuse (only required if not already provided in mains)	80AgL/gG	-
Short circuit withstand capability with maximum backup fuse	25kA / 50Hz	-
Operating temperature range	-40°C to +80°C	-
Enclosure material	Grey thermoplastic	
Degree of protection	IP20	
Installation width	72mm (4 modules)	
Tested to	SABS/IEC 61643-1	

# FILTERPAC MAINS FILTRATION AND SURGE PROTECTION

## - CLASS 3 (Surge arresters for low voltage power systems)

An ideal mains protection device for sensitive electronics such as process control and programmable logic controllers. Fits onto a standard Din-rail and provides up to 40dB of filtration and 4.5kA Amps surge capability.

### Features:

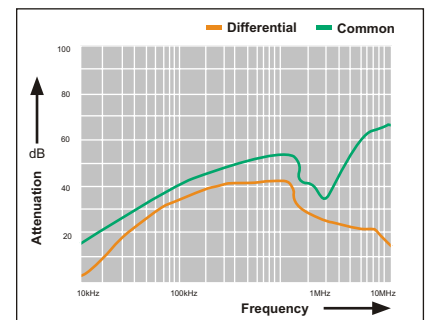
- High surge capability
- Effective filtration
- Compact design
- Din-rail or 'G' rail mount



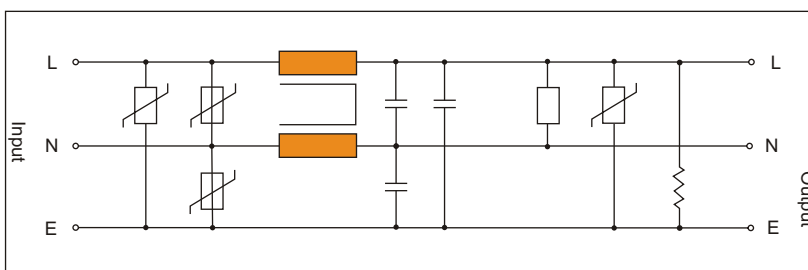
Order code: 12-00224

Specifications	12-00224
Max. voltage input	230VAC 50Hz
Max. load current	5A
Nominal discharge current 8/20	1.5kA
Max. discharge current ismax 8/20	4.5kA
Temperature range	-20°C to +70°C
Filtration dB/10kHz	15dB
Filtration dB/100kHz	40dB
Filtration dB/1MHz	40dB
Standards compliance	IEC 61643-1 ANSI C62.42

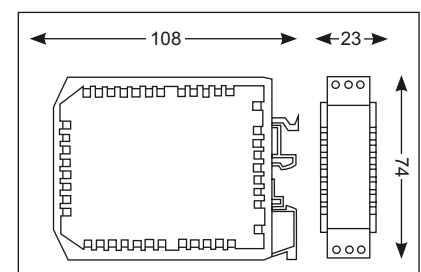
### Filter response



### Circuit diagram



### Dimensions



## PROTECTED PLUGS - CLASS 3

(Surge arresters for low voltage power systems)

Protected plugs in various formats for transient protection of terminals, video monitors, VCR's, alarm systems and other electronic equipment. Each protected plug incorporates three high energy metal oxide varistors giving protection in differential and common modes. Thermal and overload fusing has been provided.

### Features:

- Economical secondary protection
- Fault indication
- Differential and common mode protection



Specifications		Order codes
Max. voltage input	275VAC 50Hz	16A round in with LED: 12-00760 16A keyed round pin with LED: 12-00815
Max. load current	16A	
Max. discharge current Ismax 8/20	8kA	
Temperature range	-10°C to +70°C	
Filtration dB/1MHz	none	
Standards compliance	IEC 61643-1, ANSI C62.41	

## OFFICE-LITE 2000 SERIES - CLASS 3

(Surge arresters for low voltage power systems)

Plug-and-play protection for sensitive electronic equipment. Available with three 16A outlet socket. The Office-Lite 2000 automatically disconnects the power to the equipment in the event of damage to the protection element of power overload. Suitable for electronic and electrical equipment. This unit has an ON/OFF switch incorporating a circuit breaker and power on indicator. EMI/RFI filtration has been included.

### Features:

- Easy installation
- Surge protection and filtration
- Fail-safe protection
- Economical protection solution

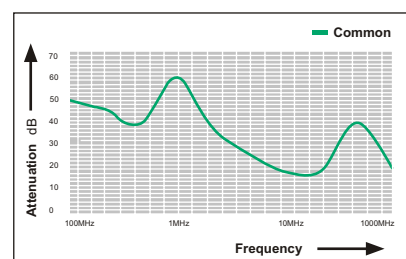


Order code: 12-00822

Specifications	
Max continuous voltage	275VAC 50Hz
Max continuous current Isn (8/20)	2.5kA
Max discharge current Ismax (8/20)	8kA
Residual voltage at Ismax	Approx 900V
Response time	<25ns
Temperature range	-10°C +70°C
Standards compliance	IEC 99.44, IEC 61643-1, ANSI C62.41

Order codes	
Model	SA
Office-Lite 2000 Series	12-00822

### Filter response



# PROFESSIONAL 2000 RANGE - CLASS 3

## (Surge arresters for low voltage power systems)

These new high performance line filters offer surge and transient suppression for sensitive electronic equipment resulting from mains borne noise and induced lightning. These units have extended filtering characteristics and are suitable for use in high noise environments. Use of silicon high-energy surge protection devices give low residual voltage values even under extreme conditions.

Available in different plug standards and variation in number of sockets, each unit has an integral circuit breaker and fault indicator. The professional range is equipped with a thermal disconnect device which disconnects the high capacity metal oxide varistors from the mains of over-stressed due to frequent high energy surges or long over voltage conditions. If the thermal disconnect triggers, it will also automatically disconnect the power as a further precaution. The professional 2000 has increased filtration and full status indication.

### Features:

- High performance line filter
- Integral circuit breaker
- Thermal disconnect protection
- Visual fault indication
- Earth connected indication
- Single or multiple sockets

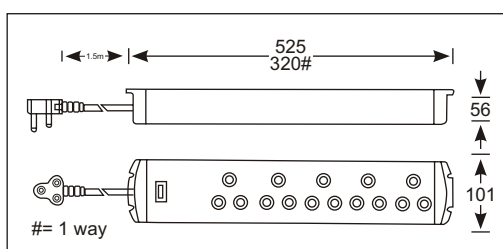


Order code: 12-00695

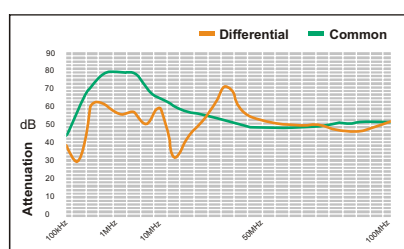
Specifications	5 way	1 way
Nom. input voltage	230VAC 50Hz	230VAC 50Hz
Max. continuous current	16A	16A
Max. discharge current 8/20	8kA	8kA
Earth leakage current	<2.0mA	<2.0mA
Residual voltage at 5kA 8/20	Approx. 600V	Approx. 600V
Response time	<5nS	<5nS
Temperature range	-20°C to + 70°C	-20°C to + 70°C
Filtration dB/10kHz	10dB	10dB
Filtration dB/100kHz	45dB	45dB
Filtration dB/1MHz	80dB	80dB
Standards compliance	IEC 61643-1, ANSI C62.41	IEC 61643-1, ANSI C62.41

Order codes		
Model	SA	Dedicated
5 way	12-00695	12-00032
1 way	12-00777	12-00217

### Dimensions



### Filter response



### Indication

Protection faulty    Red LED  
 Power available    ON/OFF switch  
 Earth connected    Green LED on

## OFFICE RANGE - CLASS 3 (Surge arresters for low voltage power systems)

The Office range of filtered protection outlets provide surge and transient suppression for computer and office related equipment resulting from mains borne noise and induced lightning. Available in different plug and socket standards, these units have an integral EMI/RFI filter, heavy duty surge arrester, thermal circuit breaker and fault indicator. Fail-safe protection is provided by the inclusion of Clearline's new "thermo-trip" technology.

### Features:

- Slimline design
- Effective filter system
- Integral circuit breaker
- Fault indication
- Thermal disconnect protection



Order code: 12-00696

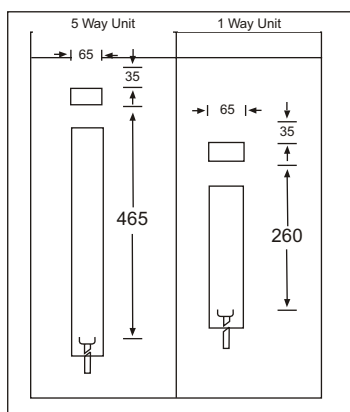


Order code: 12-00608

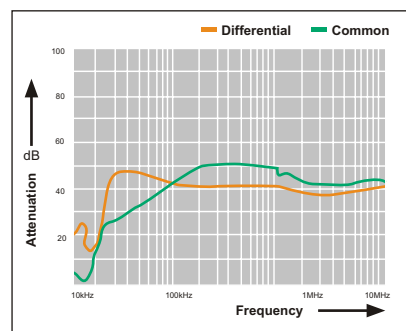
Specifications	5 way	1 way
Nom. input voltage	230VAC 50Hz	230VAC 50Hz
Max. continuous current	16A	16A
Max. discharge current 8/20	8kA	8kA
Earth leakage current	<1.5mA	<1.5mA
Residual voltage at 5kA 8/20	Approx. 900V	Approx. 900V
Response time	<25nS	<25nS
Temperature range	-20°C to + 70°C	-20°C to + 70°C
Filtration dB/100kHz	45dB	45dB
Filtration dB/1MHz	40dB	40dB
Standards compliance	IEC 61643-1, ANSI C62.41	IEC 61643-1, ANSI C62.41

Order codes	
Model	SA
5 way	12-00608
1 way	12-00696

### Dimensions



### Filter response



# RACKPOWER 2000 AND RACKSTRIP 2000 - CLASS 3

(Surge arresters for low voltage power systems)

A power strip with surge protection for communication and modem racks. Utilises a “2U” slot on a 483mm (19 inch) rack system and provides six socket outlets to power equipment. The Rackpower and Rackstrip 2000 automatically disconnects the power to the equipment in the case of damage to the protection element or power overload. An integral ON/OFF switch with circuit breaker and indicator has been provided. EMI/RFI filtration is included. The Rackpower 2000 mounts horizontally while the Rackstrip 2000 is intended for side mounting in an equipment cabinet (and can accommodate up to 15 socket outlets).

**Features:**

- Compact design
- Surge protection and filtration
- Fail-safe protection



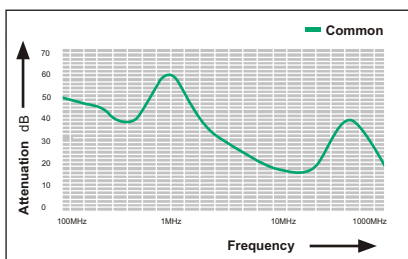
Order code: 12-00841



Order code: 12-00846

Specifications	Rackpower 2000	Rackstrip 2000
Nom. input voltage	230VAC 30Hz	230VAC 50Hz
Max. continuous current	16A	16A
Max. discharge current 8/20	8kA	8kA
Earth leakage current	<1.5mA	<1.5mA
Response time	<25nS	<25nS
Temperature range	10°C to +70°C	10°C to +70°C
Filtration dB/100kHz	50dB	50dB
Filtration dB/1MHz	60dB	60dB
Dimensions	490 x 60 x 65mm	1000 x 40 x 65mm
Standards compliance	IEC 61643-1, ANSI C62.41	IEC 61643-1, ANSI C62.41

Order codes	
Model	SA
Rackpower 2000	12-00841
Rackstrip 2000	12-00846





# FEEDTHROUGH FILTERS - CLASS 3

(Surge arresters for low voltage power systems)

The in-line feedthrough range of surge suppression filters are designed to be 'hard-wired' in single and three phase, fixed equipment applications or in applications where multiple equipment is used in one area. They offer a cost effective solution, yet provide effective filtration and transient protection. The single phase unit has a replaceable heavy duty surge arrester and is fitted with thermal circuit breaker and fault indication. 20mm conduit holes have been provided and termination is by means of screw terminals on all units. Connection is by 8mm studs inside the unit.

**Features:**

- High performance filtration
- Compact design
- Easy installation
- Cost effective protection



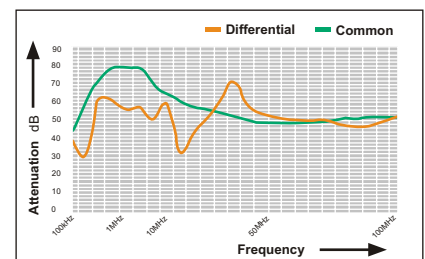
Order code: 12-00046  
30A single phase filter



Order code: 12-00214  
3 phase 60A filter

Specifications	Single phase	3 phase and neutral
Nom. input voltage	230VAC 50Hz	380/440VAC 50Hz
Max. continuous current	30A	30A - 120A
Nom. discharge current 8/20	8kA	8kA
Earth leakage current	2,5mA typ.	5mA typ.
Residual voltage at 5kA 8/20	Approx. 900V	See note 1
Response time	<25nS	See note
Temperature range	-20°C to +70°C	-20°C to +70°C
Filtration dB/10kHz	10dB	10dB
Filtration dB/100kHz	45dB	45dB
Filtration dB/1MHz	80dB	80dB
Connections	2,5mm <sup>2</sup> Screw terminals	8mm studs
Standards compliance	IEC 61643-1, ANSI C62.41	IEC 61643-1, ANSI C62.41

**Filter response**



Note 1: The three phase units must be installed with primary surge arresters, type SS40 or SS40 TT.

Order codes					
Model	Current rating	Phase	Order for single phase	Order for 3 phase	Dimensions
30FT	30A	1	12-00046		341 x 104 x 60mm
100FT	100A	1	12-00130		341 x 104 x 60mm
3P30	30A/Phase	3		12-00213	450 x 300 x 100mm
3P60	60A/Phase	3		12-00214	450 x 300 x 100mm
3P120	120A/Phase	3		12-00511	450 x 300 x 100mm

# EQUIPMENT LINE FILTERS - CLASS 3

(Surge arresters for low voltage power systems)

A range of line filters with surge suppression for effective protection against induced lightning transient and mains borne noise. Intended for OEM applications, the filtertube is a single stud mounting with wire leads on the input and output. The Metalcan units have screw terminations on the input and output and four mounting holes have been provided.

**Features:**

- Built-in surge suppression
- High surge capability
- Effective filtration



Order code: 12-00206



Order code: 12-00208



Order code: 12-00138

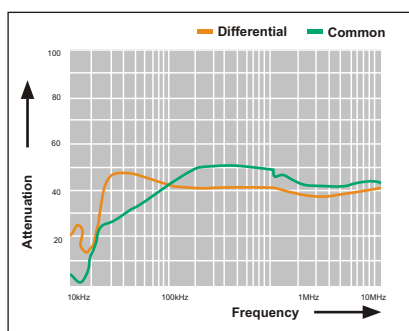


Order code: 12-00370

Specifications	Filtertube 12-00138	Metalcan 12-00206	Metalcan 12-00208	Metalcan 12-00211	Metalcan 12-00209 (15A) 12-00210 (30A)	Max-Surge 12-00370
Filter type	Normal	Hi Grade	Normal	Hi Grade	Normal	Normal
Nom. input voltage	230VAC 50Hz	230VAC 50Hz	230VAC 50Hz	230VAC 50Hz	230VAC 50Hz	230VAC 50Hz
Max. continuous current	10A	1A	10A	10A	15A/30A	
Max. discharge current 8/20	8kA	4.5kA	8kA	8kA	8kA	40kA
Earth leakage current	<1,5mA	3,5mA	1,5mA	3,5mA	1,5mA	
Response time	<25nS	<25nS	<25nS	<25nS	<25nS	<25ns
Temperature range	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C	-20°C to +70°C
Filtration	Fig 1	Fig 2	Fig 1	Fig 2	Fig 1	Fig 1
Connections	Wire leads	Screw Term	Screw Term	Screw Term	Screw Term	Wire leads
Dimensions	89 x 45mm	140 x 77 x 30mm	140 x 77 x 30mm	190 x 100 x 40mm	190 x 100 x 40mm	59 x 22 x 60mm
Standards compliance	IEC 61643-1, ANSI C62.41	IEC 61643-1, ANSI C62.41				IEC 61643-1-1

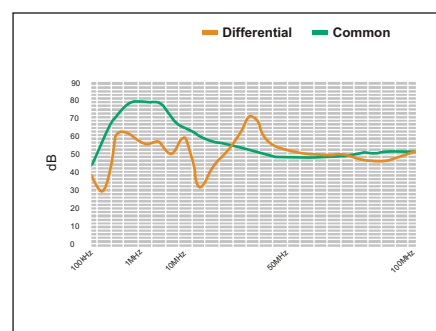
Filter response

Fig 1



Filter response

Fig 2



## CLEARPACK LINE FILTER PROTECTOR - CLASS 3

(Surge arresters for low voltage power systems)

A range of in-line models for effective power protection and filtration for sensitive electronic equipment. These models have the standard plug and sockets configuration to allow for easy installation. These units incorporate Clearline's new "thermo-trip" fail-safe technology.

### Features:

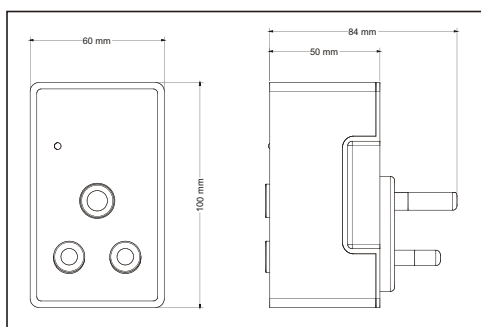
- Effective protection and filtration
- Easy installation
- Fail-safe technology
- Fault indication

Specifications	
Order codes	12-00025
Nom. input voltage	230VAC 50Hz
Max. continuous current	16A
Max. discharge current 8/20	8kA
Residual voltage at ismax	Approx. 900V
Earth leakage current	1,5mA
Response time	<25nS
Temperature range	-20°C to +70°C
Filtration dB/100kHz	35dB
Filtration dB/1MHz	50dB
Output termination	16A socket
Input connection	16A keyed plug
Standards compliance	IEC 61643-1, ANSI C62.41

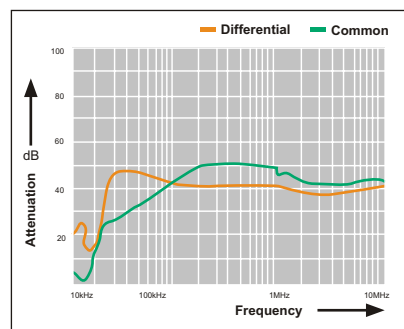


Order code: 12-00025

### Dimension



### Filter Response



# AUTOMATIC VOLTAGE REGULATORS

The Clearline range of Electronic Voltage Stabilisers offer a cost effective method of voltage regulation especially in areas where the electricity grid is not stable. The single phase units are of the plug and play type where the user simply connects the device in line with the equipment to be stabilised, while the larger units (>5kVA) are hard wired into the electrical systems. Digital voltage monitoring has been provided.

**Features:**

- High efficiency
- Low distortion
- Easy to use
- Wide voltage range



Order code: 12-00627



Order code: 12-00919



Order code: 12-00935



Order code: 12-00920



Order code: 12-00880



Order code: 12-00936



Order code: 12-00938

VA rating	Phase	Socket type	Size	Weight	Added Protection	Order Code
10 000	Single	Hardwired	485 x 300 x 264	32 Kg	-	12-00627
10 000	Three	Hardwired	785 x 400 x 450	95 Kg	-	12-00880
2 000	Single	IEC	200 x 150 x 165	4.4 Kg	Telecom + Network	12-00919
2 000	Single	16A	200 x 150 x 165	4.4 Kg	Telecom + Network	12-00920
2 000	Single	16A	200 x 150 x 165	4.4 Kg	-	12-00921
2 000	Single	3 x 2 pin 3 x 16	450 x 250 x 100	7.9 Kg	Satellite	12-00936
5 000	Single	16A	230 x 335 x 190	14.8 Kg	-	12-00935
5 000	Single	2 x 16A	230 x 335 x 190	14.8 Kg	Telecom + Network	12-00937
5 000	Single	6 x 16A 4 x 2pin	230 x 335 x 190	17.3 Kg	Satellite	12-00938

## TRIP-CONNECT SYSTEMS

There are many installations in rural areas where the quality of supply is unpredictable. Even when UPS equipment is installed, large fluctuations in supply voltage can damage electronic equipment. In non-critical installations, the Trip-Connect unit will simply remove power from the equipment in the event of over or under voltage conditions and automatically restore power when the supply falls within preset limits. Surge protection and full status monitoring has been included.

The single phase unit is simply inserted between the wall socket and the equipment power plug. Zero-crossing has been included for smooth operation.

### Features:

- Economical protection
- Compact design
- Status monitoring
- Automatic operation

Two versions of Trip-Connects are available for different applications. The refrigeration range is intended for equipment that has cooling compressors such as air conditioners and refrigeration equipment. The reconnect time has been extended to 5 minutes to allow the compressor to exhaust before applying power thus reducing additional stress on the motor. The appliance range has a reconnect time of 10 seconds. All units have zero-crossing detection to ensure orderly power connection.



**SA 16A**  
Order code: 12-00603



**SA 16A**  
Order code: 12-00602



**SA 16A**  
Order code: 12-00333

### Specifications

Phase	Single
Low voltage trip	180VAC
Low voltage connect	190VAC
Nom. voltage	230VAC
High voltage trip	260VAC
High voltage connect	250VAC
Connect delay	See below

### Order codes

Part no.	12-00603	12-00602	12-00333
Plug/skt	SA 16A	SA 16A	SA 16A
Nom. voltage	230VAC	230VAC	230VAC
Load current	16A	16A	16A
Delay	10 sec.	5 min	10 sec

## EVT40 COMPACT AND EVT40R

An effective protection system for the protection of single phase motors, air conditioning and refrigeration equipment. Wired in-line with the equipment to be protected, these units offer continuous voltage measurements and will disconnect the power when the voltage falls outside specified limits. Automatic re-connection takes place after a predetermined delay. The EVT40 are intended for use inside OEM equipment such as air conditioners and motor panels. The EVT40R has a random timing delay programmed in it to allow multiple units to be used on a single phase supply.

### Features:

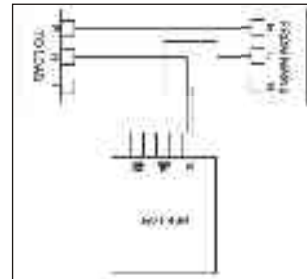
- Performs Cycle-by-Cycle RMS voltage measurements
- Provides protection against:
  - Over voltage
  - Under voltage
- Based on AVR technology
- Enclosed in a convenient screw-mounted enclosure



Order code: 12-00286

Specifications	
Phase	Single
Low voltage trip	180VAC
Low voltage connect	190VAC
Nom. voltage	230VAC
High voltage trip	260VAC
High voltage connect	250VAC
Connect delay	3-5 minutes, randomly defined (EVT 40 R only)

### Connection diagram of EVT40R



Order codes				
Model	Voltage	Current	Delay	Part no
EVT40	230VAC 50Hz	40A	10 sec. or 5 min. (selectable)	12-00129
EVT40R	230VAC 50Hz	40A	2-5 min. randomly defined (2 min. minimum)	12-00286

## SINGLE & THREE PHASE TRIP-CONNECT

The Single and Three Phase Trip-connect Lightning and Surge Protection unit with programmable delay is used to protect any electrical installation from damage due to lightning or large fluctuations in supply voltages. When the supply voltage goes too low or high, the unit will disconnect power to the equipment. It will then automatically restore power at a pre-set delay when the supply returns to an acceptable limit. These units are supplied with internal contactors up to 65A.



ORDER CODE: 12-00192 Three Phase  
12-00263 Single Phase

# THE POWERLINE SERIES

## TRIP-CONNECT 100 ACTIVE POWER MONITOR

### Features:

- Compact design
- Status monitoring
- Automatic operation
- 100A capacity, single phase
- Din Rail Mountable
- Provides protection against:
  - Over Voltage
  - Under Voltage



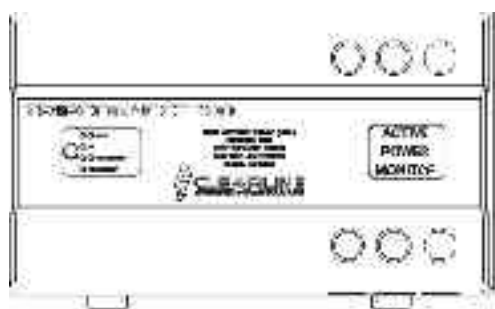
Order code: 12-00853

The new 100A Trip-connect system can be included in domestic and small business distribution boards to eliminate power surges emanating from load shedding. In the case of load shedding, the unit will keep the supply to the installation off until all pre-set parameters have been complied with and after a short delay, reconnect the supply automatically. The unit will protect against neutral loss and phase failure.

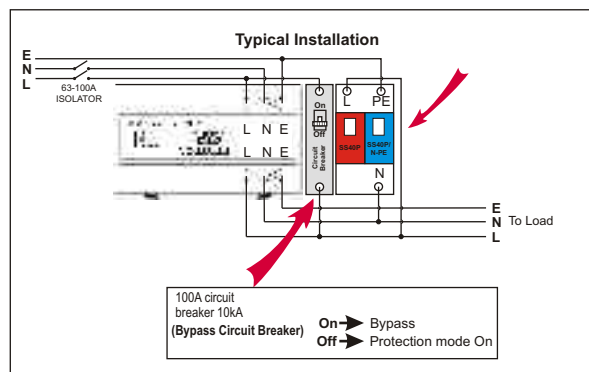
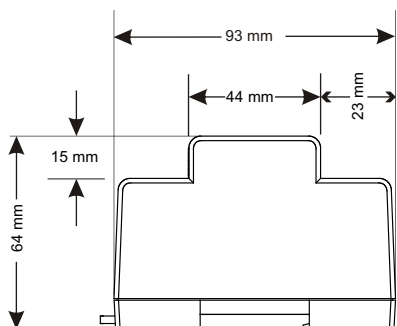
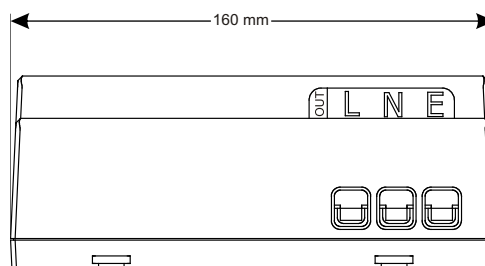
Specifications	
Phase	Single
Nominal input voltage	230VAC 50Hz
Max load current	100A
High voltage trip limit	260V
High voltage connect	250V
Low voltage trip limit	180V
Low voltage connect	190V
Connect delay	10 seconds

Status:		Operation	
Red/Green flash	-	Delay before connect	
Red flash	-	Operation OK	
Green flash	-	Voltage low	
Double green Flash	-	Voltage high	

Upon power-up, a delay will be initiated, after which the power will be connected to the output. Should the supply voltage exceed the upper or lower limits, the power will be disconnected from the output. When the supply voltage returns to within the limits, the same delay will be initiated, after which the power will be connected to the output.



### DIMENSIONS (Not to Scale)





## TRIP-CONNECT 1F

The Trip-connect 1F is a single-phase protection system with fixed delay timing utilising an external contactor to suit load conditions.

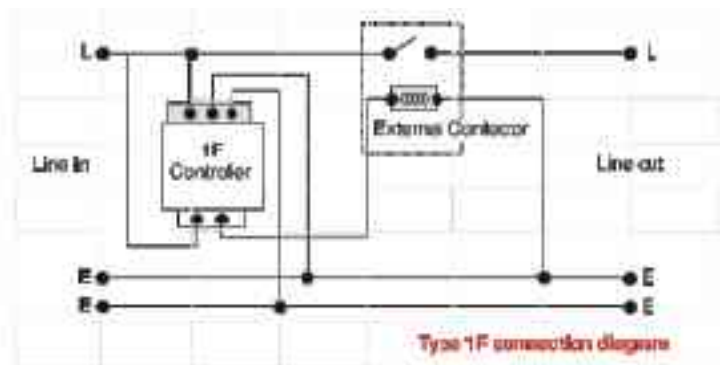
### Features:

- Performs Cycle-by-Cycle RMS voltage measurements
- Provides protection against:
  - Over Voltage
  - Under Voltage
- Based on AVR technology
- Enclosed in a 4mm wide Din-rail mounted housing
- All connections are performed by means of simple pluggable connectors
- Bypass facility



Order Code: 12-00407  
 Contactor details  
 supplied on request

Specifications	
Phase	Single
Low voltage trip	180VAC
Low voltage connect	190VAC
Nom. voltage	230VAC
High voltage trip	250VAC
High voltage connect	250VAC
Connect delay	10 seconds



## TRIP-CONNECT 3F

The Trip-connect 3F is a 3 phase protection system with fixed delay timing utilizing an external contactor to suit load conditions.

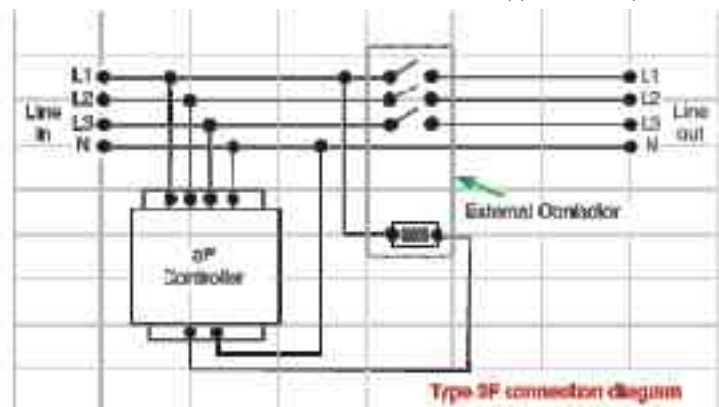
### Features:

- Performs Cycle-by-Cycle RMS voltage measurements
- Provides protection against:
  - Over Voltage
  - Under Voltage
- Based on AVR technology
- Enclosed in a 110mm wide Din-rail mounted housing
- All connections are performed by means of simple pluggable connectors
- Bypass facility



Order Code: 12-00408  
 Contactor details  
 supplied on request

Specifications	
Phase	Three
Low voltage trip	180VAC
Low voltage connect	190VAC
Nom. voltage	230VAC
High voltage trip	250VAC
High voltage connect	250VAC
Connect delay	10 seconds



## TRIP-CONNECT 3P

The Trip-Connect 3P is an advanced, 3 phase programmable, line protection system that offers an extensive range of customisation via a wide selection of programmable quantities.

### Features:

- Event logger
- Calibration facility
- Fully programmable
- LED status indicator
- Independent or combined contactor control
- Real time clock and calendar

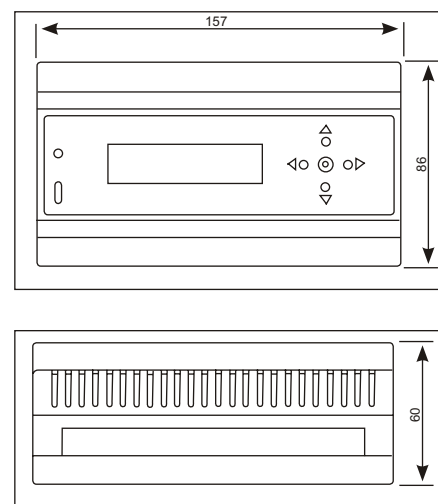
### Product highlights

- Performs Cycle-by-Cycle RMS voltage measurements on all input channels namely:
  - 3 phase voltage inputs.
  - 3 phase current input.
  - Earth leakage current input.
- In addition, the Trip-Connect 3P is provided with external temperature monitor.
- All measured quantities can be displayed on a 2X16 alphanumeric LCD with back illumination.
- Provides protection against:
  - Over Voltage
  - Under Voltage
  - Over Current
  - Over Temperature
  - Excessive Earth Leakage
- Equipped with 4 potential free relay outputs, one per phase and a general fault relay.
- Bypass switch.
- Easy to use, self-explanatory menu system enables quick set-up and calibration of all parameters.
- Event logger - logs up to 100 events.
- The Trip-Connect 3P is based on AVR technology.
- Enclosed in a 155mm standard Din-rail mount enclosure.
- All the connections are done via a pluggable terminal systems.



Order code: 12-00409

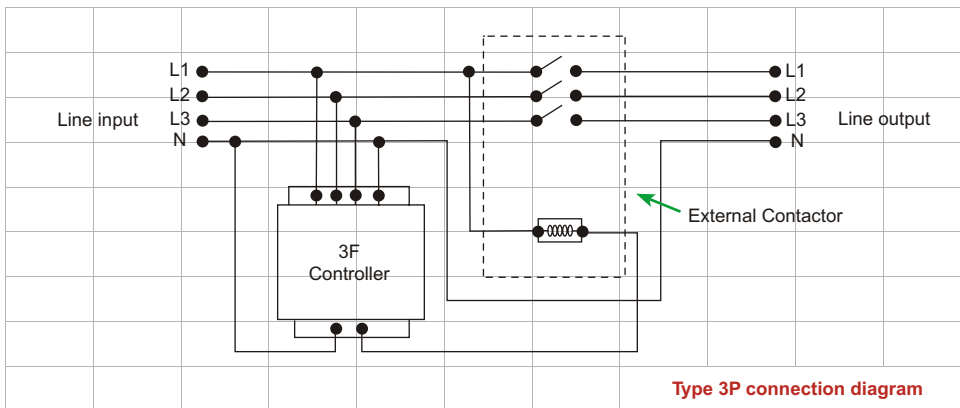
### Dimensions



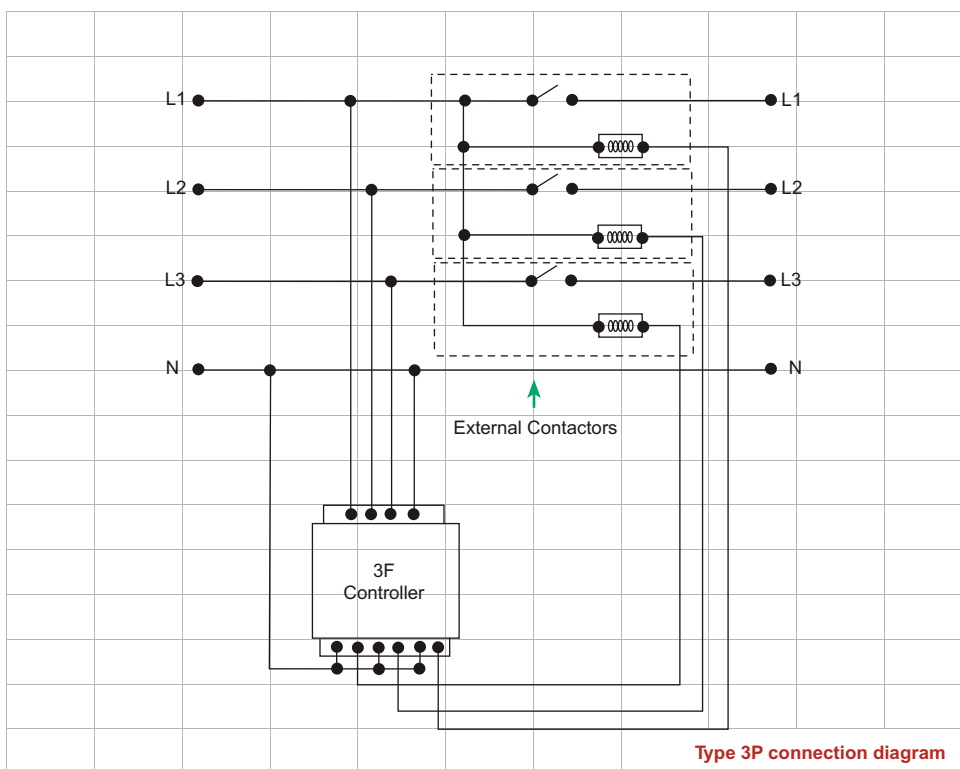
Specifications		
Phase	Three	
Low voltage trip	Programmable	180VAC - 210VAC (180VAC)
Low voltage connect	Programmable	190VAC - 220VAC (190VAC)
Nominal voltage	230VAC	
High voltage trip	Programmable	240VAC - 260VAC (260VAC)
High voltage connect	Programmable	230VAC - 250VAC (250VAC)
High current trip	Programmable	1A - 300A (20A)
Earth leakage current trip	Programmable	10mA - 50mA (25mA)*
Temperature trip	Programmable	50°C - 80°C (60°C)*
Temperature connect	Programmable	20°C - 70°C (50°C)*
Current transformer ratio	Programmable	1 - 5000 (50)*
Load resistor value	Programmable	0.1 Ohm - 50 Ohm (1 Ohm)*
Connect delay	Programmable	2 sec. - 2 min. (5 sec.)*
Fault time-out	Programmable	1 min. - 1 hr (2 min.)*
Maximum re-connects	Programmable	1 - 100 (10)*
Date and time	Programmable	

(\*)Defaults

## APPLICATION INFORMATION



**Fig 1:**  
Connection of controller 3P with single contactor for voltage monitoring only.



**Fig 2:**  
Connection of controller 3P with individual contactors for voltage monitoring only.