

## TECHNICAL DATA SHEET HIGH CURRENT POWER SURGE FILTERS

### Features

- High performance surge protector for an operating voltage of 200 - 277Vac
- Encapsulated spark gap and SS480 technology capable of operation under fault /overvoltage conditions up to 480Vac.
- Three stage protection provides highest level of protection for sensitive electronic equipment

### Product Description



- Designed to suit TT, TN-C, TN-S, TN-C-S & IT distribution systems
- Ferro cored inductors – dv/dt and di/dt of the incoming surge will be reduced by 1000 times
- Primary (135kA 8/20 $\mu$ s) and secondary (40kA 8/20 $\mu$ s) surge protection (Total of 175kA 8/20 $\mu$ s per phase).
- High N - E protection rating– 100kA 10/350 $\mu$ s, 150kA 8/20 $\mu$ s
- Status indicator, remote alarm contact and optional surge counter

Electronic equipment is highly susceptible to damage from lightning and other transient pulses (including man made switching transients), which arrive via the powerlines through direct strike, or inductive and capacitive coupling. Efficient filtering and clamping at the point of entry of power feeds to sensitive electronic equipment is essential to mitigate physical equipment damage, loss of operations and economic loss.

The SG+SS480 Series Surge Filter provides multiple stage protection against incoming surges & transients and shall be installed in series with the incoming mains power supply to the equipment or building. Shunt-only clamping alone is not sufficient, as it does not limit the excessive wavefront characteristic of the pre-clamped waveform. The Surge Filter will reduce the rate of rise of voltage (dv/dt) to below 15V/ $\mu$ s as per AS1768 Cat B 3kA (8/20 $\mu$ s) applied impulse and to below 30V/ $\mu$ s for AS 1768 Cat C 20kA (8/20 $\mu$ s) applied impulse.

The SG+SS480 series filter is designed for multistroke lightning events and is supplied with spark gaps as the primary protection between Phase and Neutral rated at 50kA 10/350 $\mu$ s (135kA 8/20 $\mu$ s).

The second stage consists of ferro-cored inductors and capacitors (L-C Filtering) which further attenuates the let-through voltage already clamped by the primary stage. Ferro-cored inductors are used as they are much smaller than non-saturating air-cored inductors. Unlike primary MOV protection, the let through voltage of Spark Gaps remain high for only a few microseconds and hence ferro-cored inductors are a practical alternative.

The filter attenuates noise and any harmonics present on the power system and is designed to attenuate transverse and common mode noise. The third stage consists of SS480 diverters connected across the load side, these are designed to suppress surges generated by load side equipment.

SG+SS480 filter limits the voltage differential due to a lightning induced impulse between phase and neutral as well as from neutral to ground. Thus providing both common mode and differential (transverse) mode protection. Neutral to earth protection rated at 100kA 10/350 $\mu$ s (150kA 8/20 $\mu$ s) is provided to limit feedback currents if the site earth goes high potential with respect to the sub-station or transformer earth. This is a common occurrence due to a near-by direct strike.

Description	Medium Current Power Surge Filter
Rated voltage:	200 – 277Vac Ph - N @ 50/60Hz
Max continuous fault voltages @ 50/60Hz:	480Vac
Operating time:	< 1ns
Power distribution systems:	TT, TN-S, TN-C, TN-C-S (MEN)
Primary surge protection rating per phase:	135kA 8/20µs single shot surge capacity between Phase and Neutral
Secondary surge protection rating per phase:	40kA 8/20µs single shot surge capacity between Phase and Neutral
Total surge protection per phase:	175kA 8/20µs
N – E protection:	100kA 10/350µs, 150kA 8/20µs
Protection Modes:	Transverse and common mode
Inductor:	Ferro cored, low pass, power and noise filtering
Capacitor type:	Self healing polypropylene
Surge counter (Optional**):	7 Digit electro mechanical display
Current crest factor:	> 3:1
Voltage drop:	< 2V at full load
Efficiency:	99%
Frequency response:	3dB point below 3000Hz
Performance:	Typical let-through voltage for all models < 2 x mains peak voltage
Standards (Primary and secondary):	IEC 61643-1
Standards (N - E):	IEC 61643-1
Surge withstand:	ANSI/IEEE C62.41 and AS 1768 Cat. A, B and C surge tests
Protection status indication:	Status monitor & remote alarm contacts
Environmental rating:	IP 55
Enclosure:	Metal enclosure with durable polyester powder coat finish
Colour:	Oyster grey
Mounting:	Wall mount
Operating temperatures:	-35 to +50°C, 0 – 95% humidity
Warranty:	5 Years manufacturer's warranty

Ordering Code	Description	Phase	Rated Voltage Ph - N (50/60 Hz)	Dimensions (mm)	Weight (Kg)
LSF1125A-NE	Surge Filter, 1Ph, 125A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	1	200 – 277V	300W x 400Hx150D	12
LSF1200A-NE	Surge Filter, 1Ph, 200A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	1	200 – 277V	300W x 400Hx200D	18
LSF3125A-NE	Surge Filter, 3Ph, 125A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	600W x 500Hx200D	32
LSF3200A-NE	Surge Filter, 3Ph, 200A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	600W x 700Hx200D	50
LSF3315A-NE	Surge Filter, 3Ph, 315A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	600W x 700Hx200D	70
LSF3400A-NE	Surge Filter, 3Ph, 400A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	600W x 700Hx200D	70
LSF3630A-NE	Surge Filter, 3Ph, 630A, 480V Uc, with Class I protection applied P-N, 50kA 10/350µs, 135kA 8/20µs line side protection, 40kA 8/20µs load side protection per phase. 100kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	600W x 1000Hx250D	110
LSF3800A-NE	Surge Filter, 3Ph, 800A, 480V Uc, with Class I protection applied P-N, 110kA 10/350µs line side protection, 40kA 8/20µs load side protection per phase. 110kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	1200W x 850Hx200D	180
LSF31000A-NE	Surge Filter, 3Ph, 1000A, 480V Uc, with Class I protection applied P-N, 110kA 10/350µs line side protection, 40kA 8/20µs load side protection per phase. 110kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	1300W x 860Hx210D	190
LSF31250A-NE	Surge Filter, 3Ph, 1250A, 480V Uc, with Class I protection applied P-N, 110kA 10/350µs line side protection, 40kA 8/20µs load side protection per phase. 110kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	1300W x 860Hx210D	195
LSF31500A-NE	Surge Filter, 3Ph, 1500A, 480V Uc, with Class I protection applied P-N, 110kA 10/350µs line side protection, 40kA 8/20µs load side protection per phase. 110kA 10/350µs N-E, Status Indication, LED, Alarm Contacts	3	200 – 277V	1300W x 860Hx210D	195

Add "C" to the part number for Counter.

Add "BP" to part number for Backplane version. BP version have the same footprint as shown for the enclosure version

## Installation

All installation work ***must*** be carried out by licensed electrical personnel.

The power ***must*** be disconnected. Ensure no dangerous neutral to earth voltages exist prior to commencing installation work.

1. The Surge Filter should be installed as close as practical to the Power Distribution Panel. Filters rated at 315A and above are fitted with two mounting rails (refer to Figure 1) to assist with mounting the unit to the wall.
2. The input and output power cables that connect to the Surge Filter must have a current rating at least equal to that of the unit being installed.
3. All cables are routed through the bottom of the cabinet. Suitable cable glands should be fitted to the gland plates. All connection points are clearly labelled on the backplane.
4. Connect the input and output power lines as illustrated in Figure 2 and Figure 3. Input cables are considered "dirty" and must be physically separate by at least 300mm from the "clean" output cables. This will prevent any over voltage carried by the incoming cables from being induced onto the outgoing or "clean" cables.
5. The earthing impedance of the electrical system should be less than  $10\Omega$ , with  $5\Omega$  recommended.
6. Connect the Earth terminal on the SF unit to the nearest electrical main earth using the shortest possible route. Earthing cable should be a minimum  $16\text{ mm}^2$  with  $25\text{ mm}^2$  recommended.
7. All connections must be rechecked to confirm that they are securely connected.
8. Connect power to the surge filter and confirm that power is being delivered to the load and that all status indicators are green. The surge filter is in series with the load and turning off the filter's internal circuit protection will disconnect power to the load.



Figure 1 - Installation mounting rails

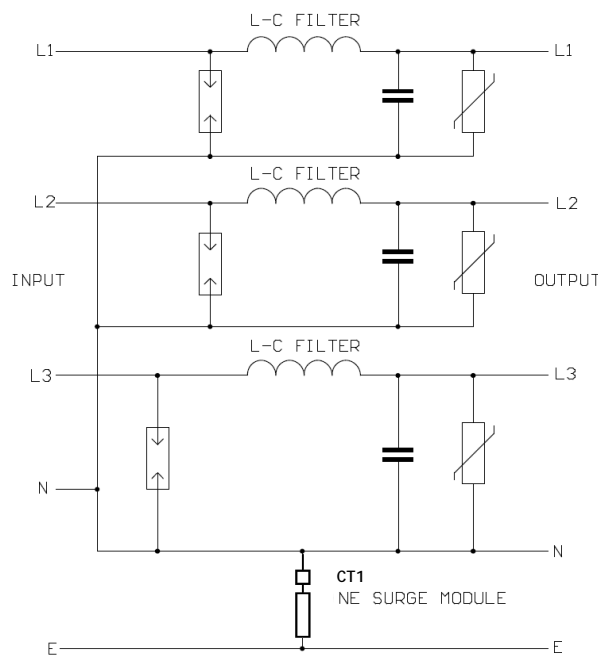


Figure 2 – Schematic of 3Ø Surge Filter (< 400A)

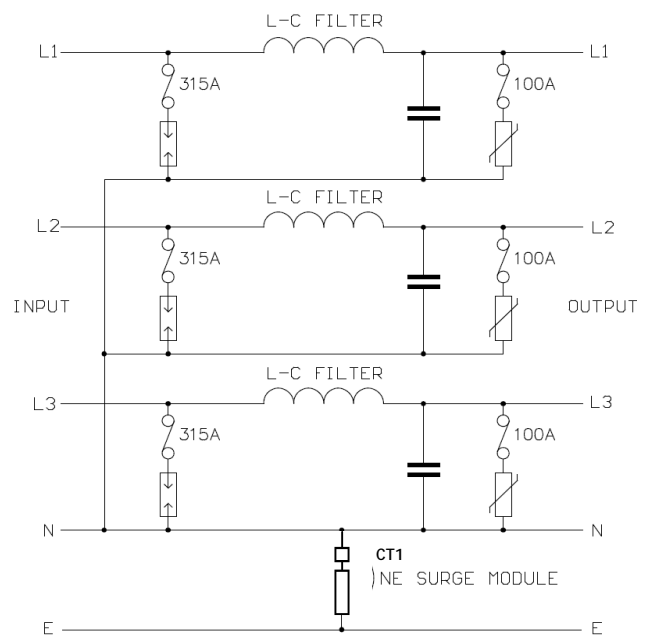


Figure 3 – Schematic of 3Ø Surge Filter (400A & above)

## Maintenance

1. The status indicators on all SS protection modules should always be green.
2. Replace any surge diverter when the corresponding indicator has changed to red or the remote status monitoring is indicating failure of the diverter.
3. Do not perform maintenance work until power to the surge filter has been disconnected.
4. All surge protection devices will degrade and must be replaced at the end of their life cycle. The frequency of replacement is subject to the magnitude and number of incident surges applied to the device – therefore status indication is very important.

## Remote Status Indication

A set of voltage-free contacts integral to each of the SS protection modules (primary and secondary) provides the facility to monitor the protection status of the SF Filter remotely. With the protection module fully operational, the status indicator will be green and terminals 1 & 2 on the remote monitoring terminals will be connected. When the SS protection module MOV material degrades to a point where replacement is necessary, the status indicator will change to red and the voltage free contacts will change state so that terminals 2 & 3 are connected

## Alarm Relays

Additionally an alarm relay is connected within these model filters. When power is applied, and all modules are operating correctly, the terminals of the relay Com and NO will be connected, and the LED indicator is lit. In case of power failure, or if any of the protection modules fail, the alarm relay will change state, and the terminals of the relay Com and NC will be connected, and the LED indicator will be extinguished.

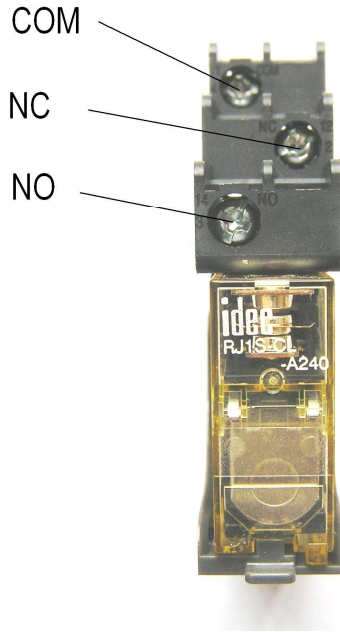


Figure 5. Alarm Relay (type 1)

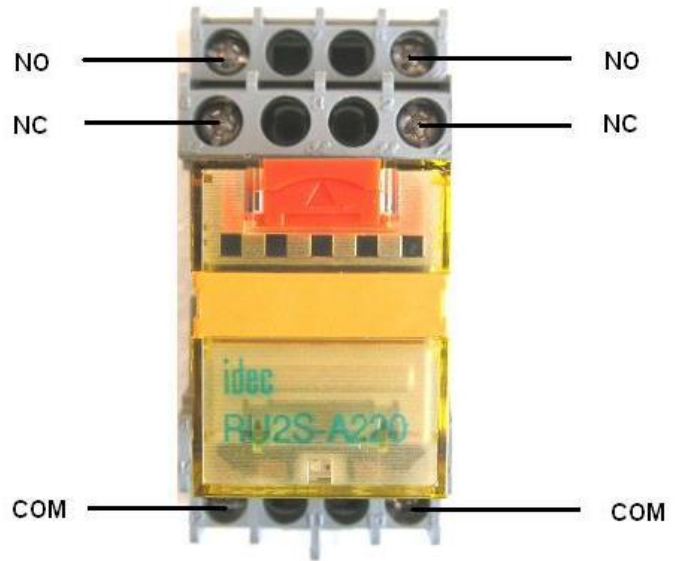


Figure 6. Alarm Relay (type 2)

## Notes and Remarks