LIGHTNING PROTECTION INTERNATIONAL PTY LTD

SURGE PROTECTION OF UNINTERRUPTIBLE POWER SUPPLY SYSTEMS

Should I include surge protection for my UPS?

Yes.

Whilst some UPS manufacturers include surge protection at the input of their larger model UPS products, this is often not of a suitable type or rating to provide the optimum level of protection for the UPS.

Also, in the event that the internal surge protection is damaged, the entire UPS needs to be taken out of service for repair. With external surge protection, it is much easier to monitor the status of the protection and replace it when it has reached its end-of-life.

What type of protection should I use?

The input of a UPS should be protected using a series filter type device.

Only series filter type protectors provide the necessary level of filtering of the rapidly rising voltages that can occur during a surge event to ensure the input of the UPS is adequately protected. A shunt type surge protector only limits the peak voltage – it cannot provide any attenuation of the rapidly rising voltage, or dV/dt. The high levels of dV/dt interact with the AC input circuitry of the UPS and can result in significant damage even though the voltage has been limited to supposedly safe levels.

What type of series filter should I choose?

The table on the following page provides a quick and easy selection guide. Simply match the rating of the UPS you need to protect to the list of options on the left hand side, and then read off the model number of the series filter that you need.

Note that this Selection Guide assumes that only the UPS will be connected to the output of the filter. If you intend to include other loads on the output of the filter, then you may need to select a filter with a higher load current rating than the one suggested by the Selection Guide. Contact your local LPI representative to discuss your requirements.

Where should I install the filter?

The filter should be installed at the sub-distribution board that feeds power to the input of the UPS. All LPI surge filters are designed to be hard-wired into the existing electrical distribution network.

Please refer to chart on the following page for correct product selection.

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SELECTION GUIDE

UPS RATING kVA	SINGLE PHASE	
14-25 kVA	**SF1125-385-100+50-AIMCB**	**125 A** (Max. Load Current)
9-14 kVA	**SF163-385-100+50-AIMCB**	**63 A** (Max. Load Current)
7-9 kVA	**SF140-385-100+50-AIMCB**	**40 A** (Max. Load Current)
4-7 kVA	**SF132-385-100+50-AIMCB**	**32 A** (Max. Load Current)
3-4 kVA	**DLSF-20A-385V**	**20 A** (Max. Load Current)
1.5-3 kVA	**DLSF-16A-385V**	**16 A** (Max. Load Current)
0-1.5 kVA	**DLSF-8A-385V**	**8 A** (Max. Load Current)

UPS RATING kVA	THREE PHASE	
120-200 kVA	**SF3315-385-135+50-AIMCB**	**315 A** (Max. Load Current)
80-120 kVA	**SF3200-385-135+50-AIMCB**	**200 A** (Max. Load Current)
80-120 kVA	**SF3125-385-100+50-AIMCB**	**125 A** (Max. Load Current)
25-40 kVA	**SF363-385-100+50-AIMCB**	**63 A** (Max. Load Current)
20-25 kVA	**SF340-385-100+50-AIMCB**	**40 A** (Max. Load Current)
0-20 kVA	**SF332-385-100+50-AIMCB**	**32 A** (Max. Load Current)

Calculating maximum load current per phase given the kVA rating

For single phase applications:

$$kVA = \frac{V \times I}{1000}$$

For three phase applications:

$$kVA = \frac{3 \times V \times I}{1000}$$

Where:

kVA = kVA rating of the UPS
V = Phase-Neutral voltage, in volts
I = Maximum phase current, in amps

Example: A 50 kVA 3 phase UPS operating on a nominal 230/400 V 3 phase supply will have a maximum per phase current of: $I = \frac{50 \times 1000}{3 \times 230} = 72.4$ A *(These calculations assume unity power factor)*

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