



# **NOVARIS**

Application Note  
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## **SURGE PROTECTION FOR UPS SYSTEMS**

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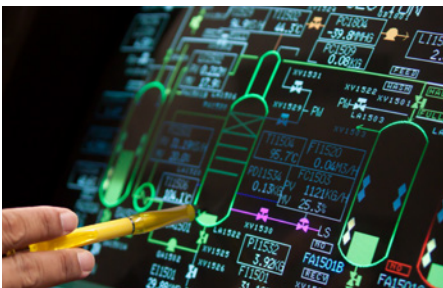
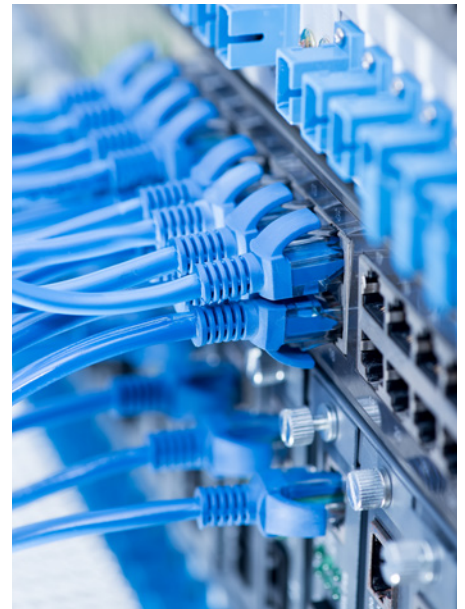
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# SURGE PROTECTION FOR UNINTERRUPTIBLE POWER SUPPLY SYSTEMS

UPS systems are often used for mission critical applications; these include telecommunications, medical, process control, signalling and data centres. Often the need for surge protection for the mains power input is overlooked, thinking that the UPS itself will have some internal surge protection, but failure of the UPS due to surges can have severe consequences, both loss of service and financial.

Whilst some UPS have internal surge protection it is usually limited in scope and capacity, most often just some simple shunt connected voltage clamping metal oxide varistors. If this surge protection is damaged by a surge, it can be difficult to replace and often requires the UPS to be taken out of service, not very convenient for mission critical applications.



**The solution.** To prevent damage to the UPS itself it is essential to use an external surge protection device that can be rated to deal with the largest surges without damage.

**Surge filters.** Only series filter type protectors provide the necessary level of attenuation of the rapidly rising high frequency voltages that can occur during a surge event to ensure the input of the UPS is adequately protected. They also providing filtering of higher frequency events. This protects the sensitive control electronics within the UPS from disturbances and damage.

In the event of a UPS failure causing a switch to static bypass the surge filter provides the necessary protection for the now directly connected load equipment.

A shunt type surge protector only limits the peak voltage, it does not provide any high frequency filtering.

## **Selecting an Appropriate Filter**

The tables on the next page show a list of the common filters manufactured by Novaris; these cover both single and three-phase power connections.

Selecting the most suitable model is straightforward:

### **KVA Rating:**

The first column in the tables gives an indication of the maximum UPS KVA rating that the filter will support given the listed maximum phase current of the filter at nominal supply voltage. This assumes that the UPS has a power factor of 1.0, lower power factors will require a larger filter or deliver a lower UPS KVA.

### **Connection Type:**

The power connection to the UPS must match that of the filter, it can be single phase, three-phase star (4 wires with neutral) or three-phase delta (3 wires)

### **Rated Current:**

Novaris filters are available in multiple current ratings from 10 amps right up to 2000 amps. The filter should be selected to have a current rating at least as high as the maximum phase current draw of the UPS. This data will be available from the UPS manufacturer's datasheets or on the product labelling.

### **Supply Voltage:**

This must match the input connection to the UPS, most commonly it will be 220-240 volts for single phase and 380-415 volts for three-phase.

### **Surge Rating:**

This should be selected based on the exposure of the incoming power supply connections, for high lightning areas and aerial cables use the highest rating available for others then lower ratings are available.

When this data is determined use the tables to select the most suitable product.

**Single Phase Filters 220-240 Volts**

Maximum UPS KVA Supported	Current Rating (A)	Surge Rating (kA)	Mounting Method	Part Number
2.31	0	50kAP	lug In	<b>PP10 Series</b>
2.3	10	50kA	Din Rail	<b>SFD1-10-50-275</b>
4.6	20	100kA	Din Rail	<b>SFD1-20-100-275</b>
7.3	32	100kA	Din Rail	<b>SFD1-32-100-275</b>
9.2	40	200kA	Wall / Cabinet Mount	<b>SFM1-40-200-275</b>
14.4	63	200kA	Wall / Cabinet Mount	<b>SFM1-63-200-275</b>
28.7	125	200kA	Wall / Cabinet Mount	<b>SFM1-125-200-275</b>

**Three-Phase Filters 380-415 Volts Star Connection 4 Wire**

Maximum UPS KVA Supported	Phase Current Rating (A)	Surge Rating (kA)	Mounting Method	Part Number
6.9	10	50kA	Din Rail	<b>SFD3-10-50-275</b>
13.8	20	50kA	Din Rail	<b>SFD3-20-50-275</b>
22.0	32	50kA	Din Rail	<b>SFD3-32-50-275</b>
27.6	40	200kA	Wall / Cabinet Mount	<b>SFM3-40-200-275</b>
43.4	63	200kA	Wall / Cabinet Mount	<b>SFM3-63-200-275</b>
28.7	125	200kA	Wall / Cabinet Mount	<b>SFM3-125-200-275</b>
86.3	250	200kA	Wall / Cabinet Mount	<b>SFH3-160-200-275</b>
276	400	200kA	Wall / Cabinet Mount	<b>SFH3-400-200-275</b>
434	630	200kA	Wall / Cabinet Mount	<b>SFH3-630-200-275</b>
552	800	200kA	Wall / Cabinet Mount	<b>SFH3-800-200-275</b>
828	1200	200kA	Wall / Cabinet Mount	<b>SFH3-1200-200-275</b>
1104	1600	200kA	Wall / Cabinet Mount	<b>SFH3-1600-200-275</b>
1380	2000	200kA	Wall / Cabinet Mount	<b>SFH3-2000-200-275</b>

**Three-Phase Filters 380-415 Volts Delta Connection 3 Wire**

Maximum UPS KVA Supported	Phase Current Rating (A)	Surge Rating (kA)	Mounting Method	Part Number
6.9	10	50kA	Din Rail	<b>IFD3-10-50-D480</b>
13.8	20	50kA	Din Rail	<b>IFD3-20-50-D480</b>
22.0	32	50kA	Din Rail	<b>IFD3-32-50-D480</b>

Note: Novaris also manufactures higher current Delta connected filters in panel and wall cabinet formats. These are built to special order, please contact Novaris for details.



### **Where Should the Filter be Installed**

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

If an internal or external automatic or manual bypass system is installed, ensure that the filter is also supplying the power to this as well as the UPS itself. This has the often-overlooked advantage of still providing surge protection and filtering to the critical loads connected to the UPS when it is in bypass mode.

For more detailed guidance on installation there are Novaris installation instructions and manuals available.

### **More Information**

This flyer only covers a subset of the full range of Novaris filters, more information can be found at: [www.novaris.com.au](http://www.novaris.com.au)

For any special applications or more detailed advice on the products please contact Novaris via: [sales@novaris.com.au](mailto:sales@novaris.com.au) or call +61 3 6229 7233

