

Powerware® – The ultimate in Surge and Power Filtering

Maximum Surge Rating Per Phase
 Aggregate Surge Rating (kA)
 Maximum Load Current Per Phase
 Status Indicators Mimic/Indicator/LED
 Remote Status
 Mounting
 Power Filtering
 Protective Modes Transverse (T)/Common Mode (CM)
 Categories as per AS1768
 Phone/Fax/Modem
 Coaxial/Aerial Protection
 Network Protection

INDUSTRIAL POWER FILTERS												
SPF Series												
3 Phase (Series Connected)												
PWSPF323-E > PWSPF20003-E	< 360kA	< 880kA	2000A	Mimic	Dry Cont.	Surface	Yes	T+CM	B > E	-	-	N/A
PWSPF323-GT > PWSPF20003-GT	< 360kA	< 880kA	2000A	Mimic	Dry Cont.	Geartray	Yes	T+CM	B > E	-	-	N/A
MSF Series												
3 Phase (Series Connected)												
PWMSF203 > PWMSF633	< 160kA	< 840kA	< 63A	Indicator	Dry Cont.	Surface	Yes	T+CM	B > E	-	-	-
1 Phase (Series Connected)												
PWMSF201 > PWMSF631	< 160kA	< 280kA	< 63A	Indicator	Dry Cont.	Surface	Yes	T+CM	B > E	-	-	-
HSS - Series												
1 Phase (Series Connected)												
PWHSS 5 > PWHSS 32	40kA	120kA	< 32A	Indicator	Dry Cont. 20/32	Surface	Yes	T+CM	B > C	-	-	-
Din Series												
1 Phase (Series Connected)												
PWDIN 03 > PWDIN 20	25kA	43kA	< 20A	Indicator	Live	Din Rail	Yes	T+CM	B > C	-	-	-
Voltage Surge Diverters												
3 Phase (Shunt Connected)												
PWMSD 200	200kA	< 840kA	N/A	LED	Dry Cont.	Surface	No	T+CM	> E	-	-	-
PWVSD 3	40kA	160kA	N/A	Indicator	Nil	Din Rail	No	T+CM	B > C	-	-	-
PWVSD 120 (1 unit Per Phase)	120kA	120kA	N/A	Indicator	Nil	Din Rail	No	T	B > D	-	-	-
PWVSD 120R (1 unit per Phase)	120kA	120kA	N/A	Indicator	SSR	Din Rail	No	T	B > D	-	-	-
PWVSD 3R	40kA	160kA	N/A	Indicator	SSR	Din Rail	No	T+CM	B > C	-	-	-
1 Phase (Shunt Connected)												
PWVSD 1	40kA	120kA	N/A	Indicator	Nil	Din Rail	No	T+CM	B > C	-	-	-
PWVSD 120	120kA	120kA	N/A	Indicator	Nil	Din Rail	No	T	B > D	-	-	-
PWVSD 120 R	120kA	120kA	N/A	Indicator	SSR	Din Rail	No	T	B > D	-	-	-
PORTABLE POWER FILTERS												
POD Series (Plug-in)												
POD 1	13.5kA	22.5kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	-*	-*	-*
POD 2	13.5kA	22.5kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	Yes*	-*	-*
POD 3	13.5kA	22.5kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	-*	-*	Yes*
POD 4	13.5kA	22.5kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	-	Yes*	-*
Universal Series (Plug-in)												
PWUS4	22.5kA	45kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	-	-	-
PWFS3	22.5kA	45kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	Yes	-	-
PWNS3	22.5kA	45kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	-	-	Yes
PWVS3	22.5kA	45kA	10A	Indicator	Nil	Portable	Yes	T+CM	A	-	Yes	-
PWDS3	18kA	27kA	10A	LED	Nil	Portable	Yes	T+CM	A	-	-	-
PWSF8RU Rackmount	22.5kA	40kA	10A	Indicator	Nil	RM	Yes	T+CM	A	-	-	-
PWSF1510i Rackmount	22.5kA	40kA	15A	Indicator	Nil	RM	Yes	T+CM	A	-	-	-
PW600 Voltage Stabiliser	18kA	31.5kA	2.5A	Mimic	Nil	Portable	Yes	T+CM	A	-	-	-
Network Protection												
PWCAT 5 NTP	-	-	-	-	-	Flylead	-	T+CM	-	-	-	Yes
PWNTP 24 RM	-	-	-	-	-	RM	-	T+CM	-	-	-	Yes

*POD can have all 3 modules added to POD 1. Up to six modules can be added to one POD.

Powerware® Surge / Power Filters

Selecting Protection Equipment

While the key issues in selecting appropriate protection equipment vary according to the specific needs of the installation, the following guidelines apply to most instances:

1. Protect the point-of-entry. This protects the switchboards and building wiring from externally generated surges and also provides a degree of protection against internally generated surges and spikes from equipment at the site.
2. Protect submains. Protection at this level usually involves filtering and surge protection to further reduce surges and spikes to acceptable levels for medium-sized non-critical loads.
3. Protect equipment. This involves protecting individual items of equipment against surges, spikes and other electrical noise. In the case of operation-critical equipment such as computers, process control, medical equipment and security equipment, protection against power failure is usually required in the form of an Uninterruptible Power System (UPS). See from page 2 for selection.

Protection Categories

Powerware manufactures a complete range of power protection components. These components fall into a number of categories, depending upon where they are utilised in an electrical installation. The 3 main categories are, according to AS/NZS1768-1991:

Category A: Long final subcircuits and power outlets

Category B: Major submains & short final subcircuits

Category C: Point of entry

In addition to these categories, there are 2 more categories which simply extend the Category C rating:

Category D: Point of entry, high exposure

Category E: Point of entry, very high exposure, critical load

Equipment listed in this catalogue is referenced by category to make the selection of correct components easier.

Selecting protection equipment for commercial & industrial applications

Point of Entry – Category C

Basically, all installations should at least be protected at the point of entry. The starting point for protection is the surge diverter. Surge diverters effectively clamp the incoming lines to neutral or earth, protecting switchboards, contactors, transformers and motors from burnout due to extreme voltages. A properly installed surge diverter can limit surges to below 2000V.

If the main load in an installation is critical of high voltages (computers, communications systems, test equipment etc), or generates electrical noise (variable speed motor drives, high-frequency welders etc), a Surge/Power Filter (SPF) should be used. In an SPF, surge diverters are

utilised in conjunction with low-pass filtering to reduce the surge voltage and remove noise. In normal operation, an SPF can be expected to reduce surge potentials to less than 1000V whilst providing up to 40dB of noise attenuation.

Method

Firstly determine whether or not you require filtering or just surge diversion. If selecting a surge diverter, select a device appropriate for the protection category. The PW-VSD1 and PW-VSD3 are suitable for category B & C whilst the PW-VSD120 is designed for exposed or critical sites. In extremely exposed, situations, multiple PW-VSD120's may be connected in parallel to increase surge lifetime.

If the site requires filtering at the point of entry, select an SPF with the appropriate current rating for the load, then select the model appropriate for the protection category. SPF's are available to suit categories A to E depending upon current rating. Options available include surge counters, alarms and extra shunt protection.

Minor submains and short final subcircuits –

Category B

Once past the main board, most protection involves both surge diversion and filtering. Non-critical loads such as lighting and general-purpose power circuits don't necessarily require protection.

Method

For large 3-phase loads such as mainframe computers or computer-controlled machinery, select an SPF appropriate for the load. In this case the protection level required is usually taken as 'one step' below the protection level applied to the point of entry. For single-phase loads up to 50A, the HSS range of filters is suitable (for current < 20A, the PWDIN-16/20 filter also provides installation compatibility with modular switchboards). Generally, filters should be mounted as close as possible to the equipment being protected.

Long Final Subcircuits and Power Outlets -

Category A

When protecting final subcircuits and power points there are 2 options. Either fit hard-wired filters to the circuit or use plug-in filters on the equipment to be protected. This choice will be determined by the load (plug-in filters are only rated up to 10A), and whether or not there is space for a plug-in filter adjacent to the equipment. With large computer networks, many administrators prefer not to use plug-in filters as they can be accidentally unplugged by the operator's foot, causing network problems. For small servers however, a plug-in filter provides extra protection at the computer for 'insurance'.

Selecting Protection Equipment (continued)

Method

Firstly select whether a hard-wired or plug-in filter is to be used. If selecting a hard-wired filter, the HSS range is suitable for currents up to 32A (for currents < 20A, the PWDIN-16/20 filter also provides installation compatibility with modular switchboards). For plug-in filters, the US4 provides high levels of protection with moderate filtering. The FS3 provides similar performance to the US4 but includes protection for 2 communications lines as well. If you are protecting a fax machine or a computer that is connected to a modem, the FS3 provides unprecedented protection. Many companies use 2 fax machines, one for sending, one for receiving. In this case, one FS3 will provide both power and line protection for both machines. The VS3 also offers similar protection and filtering performance to the US4 but provides protection for one TV/video connection as well - ideal for protecting multi-outlet video distribution systems in office buildings and medium/high density domestic applications. Note also that 'cable TV' systems are far from immune to lightning surges! In fact, most cable systems are electrically referred to mains neutral which only increases the potential of damage from electrical faults. If high levels of filtering are required such as for audio-visual systems, test facilities or other noise-critical equipment, the DS3 provides very high levels of protection in conjunction with 2 stages of filtering.

Selecting Protection Equipment for Domestic & Home-office Applications

Point of Entry – Category B & C

As with commercial and industrial applications, all installation should at least be protected at the point of entry. Again, this usually involves the use of surge diverters. Surge diverters effectively clamp the incoming lines to neutral or earth, protecting the switchboard and wiring from damage due to extreme voltages.

Surge diverters are a 'must' if the building is located in an exposed position or fed by long aerial cables, as in rural installations. If the building is part of a medium or high-density development and is fed by an underground cable, the risk of high-energy surges is quite low. In these cases, a surge diverter may not be necessary.

In most domestic buildings, the main switchboard is the only switchboard and therefore, if it is desired to provide filtered power for critical applications such as computers, office equipment or entertainment systems, this should be done on the main switchboard. Few domestic applications use 3-phase power and those that do usually only use it for heating or air-conditioning. For this reason, only the phase supplying power to critical equipment is actually filtered. The remaining phases are simply fitted with shunt diverters.

Method

Firstly determine whether or not you require filtering or just surge diversion. If selecting a shunt diverter, select a device appropriate for the installation. The PW-VSD1 and PW-VSD3 are suitable for 'normal' domestic installation whilst the PW-VSD120 is ideal for very exposed sites (on hilltops or with long aerial cables).

If the site requires filtering at the point of entry, select an HSS filter with the appropriate current rating for the load. HSS filters are available in 5,10,15,20 and 32A versions (for current < 20A, the PWDIN-16/20 filter also provides installation compatibility with modular switchboards).

Final Subcircuits and Power Outlets –

Category A

When protecting final subcircuits and power points there are 2 options. Either fit hard-wired filters to the circuit or use plug-in filters on the equipment to be protected. This choice will be determined by the load (plug-in filters are only rated up to 10A), and whether or not there is space for a plug-in filter adjacent to the equipment. Generally, a plug-in filter, used in conjunction with protection at the switchboard, gives the best protection.

Method

Firstly select whether a hard-wired or plug-in filter is to be used.

If selecting a hard-wired filter, the HSS range is suitable for currents up to 32A (for currents < 20A, the PWDIN16/20 filter also provides installation compatibility with modular switchboards).

For plug-in filters, the US4 provides high levels of protection with moderate filtering. The FS3 provides similar performance to the US4 but includes protection for 2 communications lines as well. If you are protecting a fax machine or a computer that is connected to a modem, the FS3 provides unprecedented protection. Many home offices use a fax machine and a computer with a modem. In this case, one FS3 will provide both power and line protection for both machines. The VS3 also offers similar performance to the US4 but provides protection for one TV/Video connection as well and should be considered if the TV aerial is highly exposed or if connected to a Video distribution system. Note: cable systems are electrically referred to mains neutral which only increases the potential of damage from electrical faults. If high levels of filtering are required such as for entertainment systems or other noise-critical equipment, the DS3 provides very high levels of protection in conjunction with 2 stages of filtering.

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