

Surge Protection Devices



hager

the success is in the system

Why bother with surge protection?

With electronic equipment becoming more susceptible to electrical spikes and insurance companies reluctant to pay claims without physical evidence, it is a wise investment to protect your valuable equipment with hager surge protection devices (SPD's). Hager SPD's will direct a lightning surge or electrical switching spike to earth, away from your electrical installation.

Choosing a suitable SPD system

Hager SPD's protect valuable electric and electronic equipment against transients, mainly originating from lightning but also from switching transient sources.

These transients can cause damage ranging from the premature aging of equipment, logic failures and down time, to the complete destruction of equipment within the entire electrical distribution system. Surge Protective Devices are strongly recommended in sites that are exposed to lightning, to protect sensitive equipment such as TV's, washing machines, Hi-fi, PC's, videos, alarms etc...

The Hager system prevents damage to this sensitive equipment by diverting transient overvoltages to earth and maintaining the residual voltage (U_p) at 800V.

In the majority of cases this will eliminate your equipment failures and eliminate downtime.

The choice of a Surge Protective Device depends upon 3 criteria:

- The exposure of the building to lightning transients
- The sensitivity and value of the equipment that requires protection (it is recommended that the contractor should discuss the installations requirements with the customer).
- Exposure level of the installation, refer hager thunder day map (figure 3)



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Cascading

Cascading is the term used to describe the method of combining several levels of SPD's into the one installation. This takes advantage of the best features of each device to make your installation highly secure.

Hager recommends using a high current carrying capacity device to divert the bulk of the transient overvoltage. In the case of a Class I & II installation this would be either the spark gap arrester or a high current capacity MOV.



Without the appropriate protection, transient overvoltages can easily destroy sensitive equipment

Figure 1: Surge current is allowed to flow through to sensitive equipment.



The residual voltage of these individual devices are still too high for sensitive equipment so the next step is to limit this voltage to 800V. This is achieved with the use of the Class II Fine devices (SPN208S and SPN408S) which have a lower current carrying capacity, but in combination or cascade will limit the voltage to 800V.

Cascading increases the current diverting capacity of our SPD system whilst maintaining a low voltage to ensure the best protection for valuable equipment.

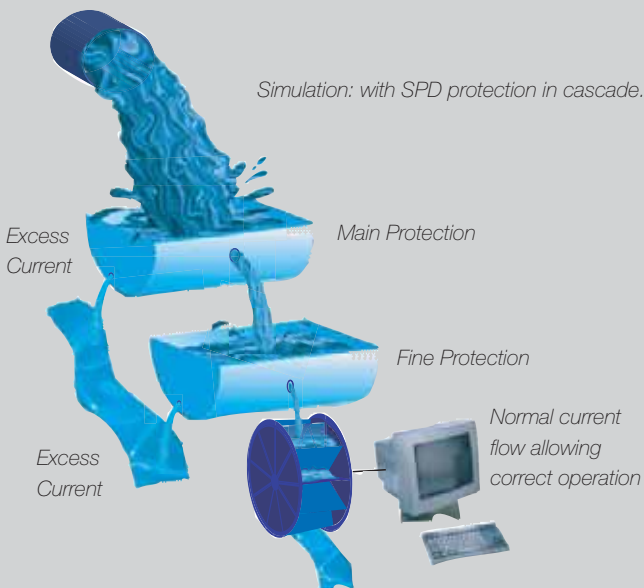


Figure 2: During transient overvoltage the protective devices divert current



SPD selection for residential, rural and commercial areas

Direct lightning protection

The criteria for installing a lightning protective product.

- Does the installation contain a lightning rod?
- Is the installation adjacent to tall structures, tall trees or near a hill top in a lightning prone area?

If the answer is YES to any of the above, it is recommended to install the SPA212A (3 phase = SPA412A) spark gap device. This will provide protection against direct lightning strikes.

Both references, SPA212A & SPA412A (single & three phase respectively) have dual earth and phase / neutral terminals. This connection method reduces any additional voltage drop in the connecting cables to virtually zero thereby obtaining the best possible Up to the installation. Further installation protection is provided by the fact that the devices are connected in both common and differential modes (L-E/N-E/L-N) together with inbuilt auto protection up to 12kA.



If the answer is NO to the above, then a spark gap device is not required.

Tip: If maximum demand of the installation is 125A or less then use both terminal screws per pole for through connection. This will minimise the residual current. If the maximum demand is greater than 125A then tap off each phase for parallel connection. Refer to user instructions provided with the product for a wiring diagram.

The next step is the selection of the Transient Protective device.

Indirect Transient Protection

To ensure protection of the installation it is vital to have adequate protection from the harmful effect of transients.

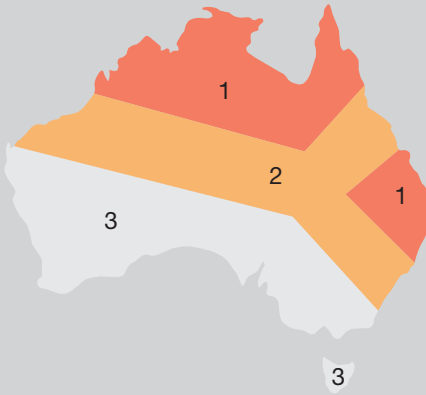


Figure 3: Hager Thunder Day Map

This regional map illustrates the lightning activity across Australia and is based upon the 'Thunder Day Map' that appears in AS/NZS 1768 (Int): 2003. This map is compiled by the Bureau of Meteorology.

As indicated, the country is split into three zones of activity. The orange zone is maximum exposure, the yellow zone is high exposure and the grey zone is moderate exposure to lightning activity. The process of selecting the correct SPD for protection against transients is a simple one.

In what region is the installation located?

- 1** Install SPN165R; the installation is protected from indirect transients up to 65kA.
- 2** Install SPN140D/R; the installation is protected from indirect transients up to 40kA.
- 3** Install SPN115D/R; the installation is protected from indirect transients up to 15kA.

Tip: For three phase installations, you will require three of the selected SPDs E.g: 3 x SPN165R

Equipment Protection

To ensure that your sensitive and valuable electronic devices continue to provide entertainment and service, it is vital to bring the residual voltage below 800V. This will minimise the chance of damage to microchips within these devices.

Answering the question below will allow you to ascertain which Hager device best suits the needs of the installation.

- Does the installation contain electronic appliances? Eg. TV's, VCR's, microwave ovens, Hi-Fi system, computers, fax machines, DVD players, etc...

If the answer is YES, install SPN208S. By installing this device the residual voltage (Up) remaining in the system will be less than 800V. If the installation is 3 phase then install an SPN408S.

If the answer is NO, the installation requires no further protection.

For quick selection of the best SPD product while in the field, please refer to the Hager 'pocket size SPD selection guide'.

Benefits of using Hager SPD's

- All applications are covered with a full range of compatible devices. Protection for high rise towers; commercial buildings with essential computer data and expensive office machinery; domestic dwellings with entertainment and computer systems.
- Premium configuration has the option of reserve indication. Advanced warning that the device needs replacing. Remote indication option means an audible or visible alarm can warn the user that the cartridge needs replacing.

Premium configuration

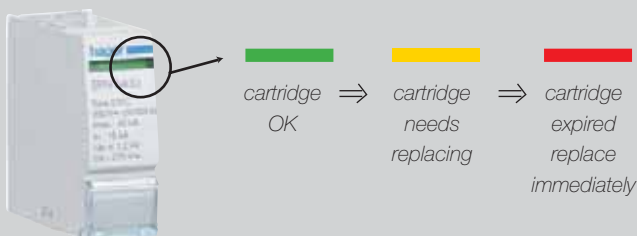


Figure 4 : Reserve Indication

- The largest diverting of any replaceable cartridge device; 65kA. Replaceable cartridge to reduce maintenance time.
- Replaceable cartridges for SPN115D/R, SPN140D/R and SPN165R devices.
- Cascading devices (SPN140R/D + SPN208S) offers greater protection for the price. The Cascade system reduces the residual voltage level to 800V.
- Thermal and dynamic disconnection.
- Increases equipment life (by providing clean power).
- Eliminates the risk of logic failures
- DIN mounted devices
- Removable tabs on replaceable cartridges to give the contractor the option of allowing the consumer to replace the cartridge.
- IP20.
- Does not disconnect your installation from supply when experiencing a transient overvoltage.
- Conforms to IEC61643-11, AS/NZS 1768 (Int) : 2003 and IEC61643-21 : 2000
- Traditionally, between spark gap devices and cartridge products the use of an inductor is necessary, to allow the spark gap device time to start operating before the cartridge product starts to operate. The Hager spark gap devices are associated with an electronic trigger system that allows them to operate alongside the cartridge products without the use of an inductor.

Standard configuration

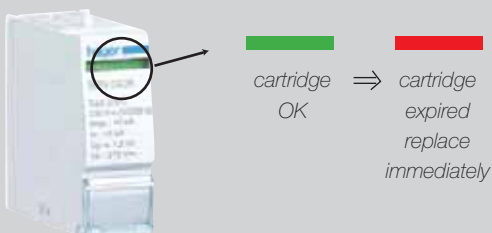


Figure 5 : Standard Indication

Designation	Poles	I_{imp} kA	I_n kA	U_p kV	U_c V	width in 17.5mm	cat ref.
Class I							
Spark gap arrester	2	12.5	-	≤ 2.5	255	4	SPA212A
for areas where risk of lightning is prevalent.	4	12.5	-	≤ 2.5	255	8	SPA412A

Designation	Poles	I_{max} kA	I_n kA	U_p kV	U_c V	width in 17.5mm	cat ref.
Class II							
Medium Protection	1	65	20	≤ 1.5	275	1	SPN165R
■ replaceable	1	40	15	≤ 1.2	275	1	SPN140R
cartridge	1	40	15	≤ 1.2	275	1	SPN140D
■ reserve option	1	15	5	≤ 1.0	275	1	SPN115R
indication	1	15	5	≤ 1.0	275	1	SPN115D
and changeover contact							
on 'R' catalogue reference							

Designation	Poles	I_{max} kA	I_n kA	U_p kV	U_c V	width in 17.5mm	cat ref.
Class II							
Fine Protection	2	8	2	1.2	255	1	SPN208S
to be used in	4	8	2	1.25	255	3	SPN408S
cascade with medium protection devices							
Refer to cascade table for U_p values							

Designation	Poles	reserve status ind.	standard status ind.	width in 17.5mm	cat ref.
Class II					
replacement	1	Yes	-	1	SPN065R
cartridge for	1	Yes	-	1	SPN040R
SPN1XXX	1	-	Yes	1	SPN040D
	1	Yes	-	1	SPN015R
	1	-	Yes	1	SPN015D

Designation	Line	charateristics	width in 17.5mm	cat ref.
Protection for those devices connected to the telephone network.	digital	U_n : 40vd.c U_c : 60vd.c	1.5	SPN504
Protection is assured in both common & differential modes.	analog	U_n : 130vd.c U_c : 170vd.c	1.5	SPN505



HEAD OFFICE

Hager B&R Pty Ltd
Unit 14-17 Riverside Centre
148 James Ruse Drive
Parramatta NSW 2150

Ph: (02) 9687 0077
Fx: (02) 9687 0022

www.hagerbr.com.au

SALES OFFICES

NEW SOUTH WALES

Hager B&R Pty Ltd
Unit 14-17 Riverside Centre
148 James Ruse Drive
Parramatta NSW 2150

Ph: (02) 9687 0077
Fx: (02) 9687 0011

NEW SOUTH WALES

(Newcastle)
Ross Joice Agencies Pty Ltd
109-111 Broadmeadow Rd
Broadmeadow NSW 2292

Ph: (02) 4961 4433
Fx: (02) 4961 2498

QUEENSLAND

(Brisbane)
Hager B&R Pty Ltd
Brisbane South Industrial Park
51 Stradbroke St
Heathwood QLD 4110

Ph: (07) 3714 1111
Fx: (07) 3714 1091

QUEENSLAND

(Townsville)
Hager B&R Pty Ltd
Unit 1, 11-13 Corporate Cres
Garbutt QLD 4814

Ph: (07) 4775 6255
Fx: (07) 4779 6736

VICTORIA

Hager B&R Pty Ltd
50-52 Sunmore Close
Heatherton VIC 3202

Ph: (03) 8588 8400
Fx: (03) 8588 8401

TASMANIA

(Launceston)
W.P. Martin Pty Ltd
85 Elizabeth St
Launceston TAS 7250

Ph: (03) 6331 5545
Fx: (03) 6331 4256

WESTERN AUSTRALIA

Hager B&R Pty Ltd
20 Millrose Drive
Malaga WA 6090

Ph: (08) 9248 9744
Fx: (08) 9248 2033

SOUTH AUSTRALIA

B&R Enclosures Pty Ltd
505 Grand Junction Rd
Wingfield SA 5013

Ph: (08) 8243 1166
Fx: (08) 8268 3675

NORTHERN TERRITORY

Jewell Distributors Pty Ltd
Cnr Hidden Valley & Beaton Rds
Berrimah NT 0828

Ph: (08) 8947 0870
Fx: (08) 8947 0764