Buyers Guide

SURGE PROTECTION

2020

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Surge protection devices (SPD) are a requirement under the 18th Edition of the Wiring Regulations and essential in protecting equipment from damage. It is important to select the right type of device for the application and to install it correctly.

WHY IS SURGE PROTECTION NEEDED?

Commercial, industrial, public sector and residential buildings increasingly contain large amounts of electrical and electronic equipment. These devices and appliances are now central to our lives, and crucial to business operations and the provision of public services. However, transient over-voltages, also known as power surges, can seriously damage these pieces of equipment. While the high voltage spikes of a transient over-voltage can last just a fraction of a second, they can degrade, damage or even destroy equipment attached to the power supply. Damaged equipment not only incurs the expense of repair or replacement, but also further, long term costs such as lost data if storage devices are damaged – something that can be very harmful to business and individuals.

WHAT CAUSES SURGES?

Transient over-voltages have a number of possible causes from both inside and outside the building. Around 35% are caused by external events such as lightning strikes, utility grid switching or electrical accidents. The remaining 65% are from sources within the building, most commonly electrical switching within appliances and equipment. This is where the energy stored in the magnetic field generated by electrical equipment, is suddenly released when the current is interrupted and dissipates as a high voltage transient.

OCPDS

The Institution of Engineering and Technology (IET) Wiring Regulations (BS 7671) has updated the guidance on surge protection devices (SPD) in successive editions. The current 18th Edition, released in July 2018 and applicable from January 2019, outlined new criteria for where SPDs should be installed and provided revised advice for contractors.

The new regulations introduced a simplified assessment for when SPDs are required. It states that:

"Protection against transient over-voltages shall be provided where the consequence caused by over-voltage effects:

1. *Results in serious injury to, or loss of, human life or;*
2. *Results in interruption of public services and/or damage to cultural heritage or;*
3. *Results in interruption of commercial or industrial activity, or;*
4. *Affects a large number of co-located individuals."*

Furthermore, any commercial, industrial or public building that is supplied by overhead lines requires surge protection. This means that the majority of buildings will require surge protection because one or more of the criteria apply. Although residential properties are not included in these categories, apartment buildings may fall under the category of affecting a large number of co-located individuals.

For non-residential properties that do not fit into these categories, a risk assessment must be carried out. This process has been simplified in the 18th Edition and details of how to calculate the level of risk can be found in section 443.4 of the IET Wiring Regulations. Where this risk assessment is not conducted the regulations require that surge protection is implemented.

Under the regulations, surge protection is not required for single residential properties if the value of the equipment does not justify the protection. Therefore, it is up to the homeowner to decide if they want to take preventative measures in these situations and installers have a role in advising the homeowner on the best course of action. Often the deciding factor will be the level of risk and the value of the equipment that the SPDs would be protecting.

TYPES OF SURGE PROTECTION

All SPDs work by diverting surge currents to earth to reduce the over-voltage to a level that will not damage the components of the system or equipment connected to it. There are three types of surge protection device.

TYPE 1: A Type 1 SPD is designed to provide protection against surges caused by direct lightning strikes. These often feature spark gap technology, which can handle very high voltages by creating a short to ground when a level of current is reached.

TYPE 2: A Type 2 device offers protection against over-voltages from switching and indirect lightning strikes. This type more commonly uses a metal oxide varistor (MOV) to divert the current away. At **Electrical*Direct*** we stock a range of high-quality Type 2 devices from Schneider Electric, Danson, British General (BG) and Contactum.

TYPE 3: Type 3 SPDs provide local protection for sensitive equipment. As these have a relatively low discharge capacity, they should always be installed in addition to a Type 1 or 2 device. These are available as hard-wired components, but are also commonly found in surge protected sockets, adapters and extension leads.

DIFFERENCE BETWEEN SPDS AND OCPD

Overcurrent Protective Devices (OCPDs), such as circuit breakers and fuses are not intended to provide over-voltage protection. They are designed to protect homes, businesses and human life from the dangers of a short circuit or overload and serve a different function to SPDs in the electrical installation. In short, circuit breakers protect people while SPDs are primarily designed to protect hard-wired components, but are also commonly found in surge protected sockets, adapters and extension leads.

PRODUCT SELECTION AND INSTALLATION

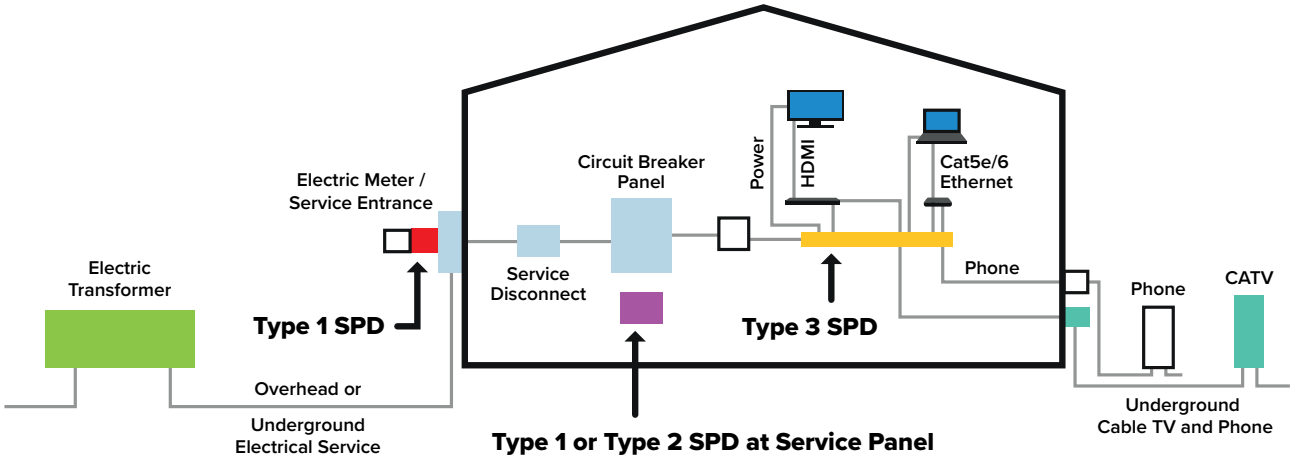
A Type 1 or 2 SPD must be installed at the origin of the installation, where the power supply enters the building. However, determining which type is required depends on whether there is a structural lightning protection system (LPS) installed. A Type 1 should always be installed where there is an LPS, as it forms part of the system, and a Type 2 can be fitted where there is not.

Further Type 2 and Type 3 devices should be installed as appropriate throughout the building. To determine the location of other SPDs, the lightning protection zones (LPZ) have to be considered. External zones (LPZ 0a and 0b) are areas where there is a threat of full lightning voltage or electromagnetic field. The internal zone (LPZ 1) are sections protected from full lightning surge voltages by an SPD at the boundary. LPZ 2 is an area deeper inside the installation that is protected by additional layers of surge protection. A surge protection device should be installed whenever a cable crosses to an internal zone from the external LPZ. SPDs are also required where a cable crosses

an internal zone boundary. Therefore Type 2 devices can be used where the internal and external zones meet as well as at the boundary between internal zones. Type 3 devices can be used to provide protection within LPZ 1 and 2 areas.

Combining these different stages of surge protection is known as ‘cascading’ and will maximise protection by improving the system’s diversion capacity, whilst maintaining a low voltage. For example, a Type 1 or 2 will provide broad protection against the highest voltage spikes while further Type 2 or Type 3s installed close to the equipment will provide an additional buffer. These secondary or tertiary levels also provide protection against electrical switching from within that zone.

Type 2 modules can be easily fitted into distribution boards or consumer units. In fact, there are a range of populated and unpopulated consumer units available that include SPDs. For example, the unpopulated Schneider Electric Easy9 3+5+5 Way consumer unit provides surge protection for three groups of circuits with the flexibility to fit Miniature Circuit Breakers (MCB), Residual Current Devices (RCD) and Residual Current Breakers with Overcurrent protection (RCBO) as required. Alternatively, the populated BG 14 Way 22 Module Consumer Unit contains two RCDs and 13 MCBs alongside surge protection modules. There are also mains switch and SPD only consumer units, such as the Danson 4 module consumer unit with Type 2 SPD, which are ideal for smaller separate buildings such as garages and workshops.



Type 1 or Type 2 SPD at Service Panel

- Type 1 SPD for Line or Load Side
- Type 2 SPD for Load Side Only Connection

The Type 3 devices included in surge protected adapters and extension leads can be used to provide simple to implement fine protection for key pieces of equipment or devices. For example, a surge protected extension lead such as the 10 Socket Extension Lead is ideal for use in offices. It provides easily accessible power to a bank of desks with surge protection for up to 12 pieces of electrical equipment, such as computers, as well as telephones. Alternatively, the BG Surge Adapter with USB ports provides protection for equipment connected to a single socket as well as devices charging or powered from the two USB ports.

INSTALLATION CONSIDERATIONS

The correct installation is crucial to ensure the effectiveness of the devices. Variables including the location of the SPD, the length and diameter of conductors used to connect it to the electrical system, the effectiveness of the Earth conductors and even bends in cables can affect the level of real protection provided to equipment downstream of the device.

At **Electrical*Direct*** we have surge protection kits from Schneider Electric, BG and Contactum that include the devices and suitable cables to make correct installation simple and convenient.

Furthermore, it is important to install the SPD in the correct place in the circuit. If installed downstream of an RCD, transient over-voltages could cause the RCDs to operate and cut supply to the circuit, in effect increasing nuisance tripping. Wherever possible SPDs should be fitted upstream of RCDs to prevent surges interfering with the correct operation of the circuit breakers.

Surge protection is essential to protect equipment in all types of building from the dangers of transient over-voltages. This is especially important in the modern world where so much depends on the use of electronic equipment. This is reflected in the evolving guidance given in successive editions of the Wiring Regulations. Choosing the correct type of device and installing it in line with the regulations and best practice will help ensure effective protection.

To find out more about the wide range of surge protection devices we offer visit: **www.electricaldirect.co.uk**

ABOUT Electrical Direct

Starting out as a traditional electrical wholesaler, we have expanded to now providing electricians with over quality products, all of which are in stock ready for next day of delivery as standard.

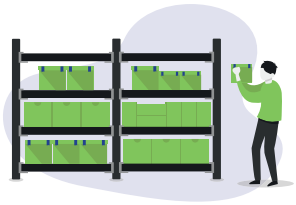
We offer a truly multichannel service with our excellent trade counter in Basildon, Essex, website and call centre to ensure we can meet and exceed our customer's expectations.

"It all comes down to our passion for customers, and making sure that they get the service and the product that they want"

Marco Verdonkschot,
Managing Director

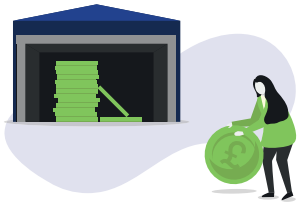
REASONS TO SHOP WITH US

HUGE RANGE



FREE DELIVERY

LOW TRADE PRICES



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