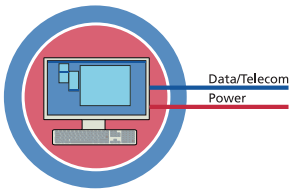
Simplified product selection

All Furse ESP products are designed to provide simple system integration whilst achieving highest levels of effective protection against transients.

Tested in line with the BS EN 61643 standards series, ESP protection can be selected and applied to BS EN 62305 easily using the new SPD product application tables and data sheets. Key product and application features are represented using the following symbols:



WARNING Equipment is **ONLY** protected if **all** incoming lines have protection fitted

LPZ $0_A \rightarrow 3$

Lightning Protection Zone (LPZ) details the boundary (to BS EN 62305-4) or installation point of the SPD. For example, LPZ $0_A \rightarrow 3$ signifies that the SPD can be installed at the service entrance boundary and create an immediate LPZ 3 suitable for protecting electronic equipment close to the SPD installation. Equipment further downstream of this location may require additional protection, against switching transients for example.

MAINS TEST TYPE 1 + 2 + 3

Mains Test Type defines the Type of mains SPD (BS EN 61643 Type 1, 2, 3 or I, II, III to IEC 61643) tested with the respective test Class I (high energy 10/350µs current waveform), II (8/20µs current waveform) or III (combined 8/20µs current and 1.2/50µs voltage waveform) from the BS EN/IEC 61643 series. Where more than one Type is stated (for combined, enhanced Type SPDs), the SPD has been tested to each respective test Class, with the results detailed on its transient performance specification.

SIGNAL/ TELECOM TEST CAT D + C + B

Signal/Telecom Test Category indicates the Test Categories (as defined in BS EN/IEC 61643 series) that SPDs for signal and telecom systems have been subject to, with the results detailed on the transient performance specification. Test Category D is a high-energy test typically using the 10/350µs current waveform. Test Category C is a fast rate of rise test using the 1.2/50µs voltage waveform combined with 8/20µs current waveform. Test Category B is a slow rate of rise test using the 10/700µs waveform, also used within ITU standards. Enhanced SPDs tested with categories D, C and B can offer up to LPZ $0_A \rightarrow 3$ protection.

COMMON MODE Equipotential Bonding

Common Mode signifies that the SPD specifically offers protection on conductors with respect to earth. For a mains system, this would be between phases and earth or neutral and earth. For a data/telecom line this would be between signal line(s) to earth. Common mode surges can result in flashover if the insulation withstand voltage of connected wiring or equipment is exceeded. Flashover could lead to dangerous sparking potentially causing fire or electric shock risks. Equipotentially bonding Type 1 mains SPDs or Test Cat D tested signal/telecom SPDs reduce the risk of flashover by limiting common mode surges.

FULL MODE Bonding + Equipment Protection

Full Mode means that the SPD protects in all possible modes; common mode (live conductors with respect to earth) and differential mode (between live conductors). For example, full mode mains SPDs offer protection between phase(s) to earth, phases(s) to neutral and neutral to earth. Whilst common mode protection ensures flashover is prevented, differential mode protection is critical to ensure sensitive electronics are protected as well as operational during surge activity.

e ENHANCED Low let-through voltage

Enhanced SPDs (SPD* within BS EN 62305 series) have lower (better) let-through voltage or protection levels (U_p) and therefore further reduce the risk of injury to living beings, physical damage and failure of internal electronic systems. Enhanced Type 1 mains SPDs (for a 230V/400V system) should have a protection level U_p of no more than 1600V whilst Type 2 and Type 3 mains SPDs should have a protection level U_p of no more than 600V in all modes when tested in accordance with BS EN 61643 series. Enhanced signal/telecom SPDs should typically have a protection level U_p no more than twice the peak operating voltage of the protected system.

3-WAY + N-E FAULT STATUS INDICATION

Status Indication for mains wire-in power distribution SPDs is essential as they are installed in parallel or shunt with the supply and as such could potentially leave the system unprotected should the SPD fail. 3-way status indication of the SPDs' condition provides simple and clear visual inspection and further provides advanced pre-failure warning such that the system is never unprotected. Furthermore warning of potentially fatal neutral to earth faults due to incorrect earthing and wiring faults for example is provided with additional flashing indication.

REMOTE INDICATION LED DISPLAY

Remote Indication is an innovative feature that further optimizes mains wire-in SPD protection. A parallel or shunt installed SPD has additive let-through voltage because of its connecting leads that need to be kept as short as possible – ideally no more than 25cm. Often an SPD cannot be mounted in its optimum position without compromising the visibility of its status indication. Innovative remote status indication displays overcome this by allowing the SPD to be mounted with short connecting leads with the separate status display being conveniently mounted in a visible position such as the front of a power distribution cabinet providing convenient and effective equipment protection.

ACTIVE VOLT-FREE CONTACT

Active Volt-free Contact is an essential addition to the visual 3-way status indication. The changeover volt-free contact is simply connected or linked to an existing building management system, buzzer or light and should the SPD have a pre-failure condition, this would be remotely indicated – particularly important for remote installations where the building management system would be connected to a telecom modem. Active contacts further enable the SPD to also conveniently warn of phase loss from a power failure or blown fuse.

TSC-0808

Intelligent Display iD is a new innovation from Furse that encompasses existing features of 3-way SPD status indication with Neutral to Earth voltage warning but through clear easy to read text on an illuminated LCD display. Often SPDs should be mounted on their side in order to facilitate short connecting leads for better protection levels but as this compromises the position and appearance of the status indication, it is not widely practiced. Also available in a remote display option, the iD feature enhances mains wire-in SPD installation as the status indication text can easily be rotated (in 90° steps, in either direction) at the push of a button to aid good installation practice.

Current Rating indicates the maximum continuous current rating of in-line SPDs for data communication, signal and telephone lines. The SPD's quoted maximum continuous current rating should always exceed the peak running current of the protected system to ensure normal system operation is not impaired. Damage, through overheating, would result if its quoted current rating were exceeded.

Low Inline Resistance states the resistance value in Ohms (Ω) per line of SPDs for data communication, signal and telephone lines. A low in-line resistance is desirable; particularly for systems with high running currents in order to reduce any voltage drops across the SPD and ensure normal system operation is not impaired. Consideration should be made for additional SPDs installed on the same line to protect connected equipment at each end of the line (e.g. CCTV camera and connected monitoring equipment) as the in-line resistance of each SPD is introduced into the system.

High Bandwidth SPDs ensure the full system frequency range of transmission signals, for protected data communication, signal and telephone lines, is not impaired. Signal frequencies outside the stated SPD bandwidth may potentially be distorted causing information loss or corruption. As the SPD should accommodate the characteristics of the protected system, the stated SPD bandwidth (typically quoted for a 50Ω system) should always exceed the protected system's bandwidth.

BX IP is an International Protection (IP) rating (to BS EN/IEC 60529) for ready-boxed (BX) SPDs typically used in dusty and damp environments. The IP rating system (also interpreted as "Ingress Protection") classifies the degrees of protection provided against the intrusion of solid objects (including body parts like hands and fingers), dust, accidental contact and water in electrical enclosures. For example, an IP66 rated enclosure provides no ingress of dust and therefore complete protection against contact as well as against water projected in powerful jets against the enclosure from any direction with no harmful effects. Unboxed SPDs should be installed within distribution panels/cabinets or within external enclosures to the required IP rating (such as the Furse weatherproof WBX enclosure range).

Common terminology and definitions

The following common terminologies, as recognized by BS EN/IEC 61643, are used throughout SPD specifications in order to aid correct selection and are defined as follows:

Nominal Voltage U_o is the phase to neutral AC RMS voltage of the mains system (derived from the nominal system voltage) for which the SPD is designed. U_o is the voltage by which the power system is designated – e.g. 230V.

Maximum Continuous Operating Voltage U_c is the maximum RMS voltage that may be continuously applied to the SPD's mode of protection e.g. phase to neutral mode. This is equivalent to the SPD's rated peak voltage.

Temporary Overvoltage U_T is the stated test value of momentary voltage increase or overvoltage that the power SPD must withstand safely for a defined time. Temporary overvoltages, typically lasting up to several seconds, usually originate from switching operations or wiring faults (for example, sudden load rejection, single-phase faults) as well as mains abnormalities such as ferro-resonance effects and harmonics.

Impulse Current I_{imp} is defined by three parameters, a current peak with a charge and a specific energy typically simulated with the 10/350µs waveform to represent partial lightning currents. This waveform is used, with peak I_{imp} current value stated, for the mains Type 1 SPD Class I test and typically for data/telecom SPD Test Category D.

Nominal Discharge Current I_n is a defined nominal peak current value through the SPD, with an 8/20µs current waveshape. This is used for classification of mains SPDs (Class II test) and also for preconditioning of SPDs in Class I and Class II tests.

Maximum Discharge Current I_{max} is the peak current value through the SPD, with an 8/20µs waveshape. I_{max} is declared for mains Type 2 SPDs in accordance to the test sequence of the Class II operating duty test. In general, I_{max} is greater than I_n.

Combined Impulse Test with Open Circuit Voltage U_{oc} is a hybrid 1.2/50µs voltage test combined with an 8/20µs current. The test is performed using a combination wave generator where its open circuit voltage is defined as U_{oc}, typically 6kV 1.2/50µs for the mains Class III test and up to 4kV 1.2/50µs for signal/telecom Test Category C. With an impedance of 2 Ω, the generator also produces a peak short circuit current (sometimes referred to as I_{sc}) at half the value of U_{oc} (3kA 8/20µs for the mains Class III test and up to 2kA 8/20µs for signal/telecom Test Category C). With both voltage and current test waveforms, the combined impulse test is designed to stress all technologies used within SPDs.

Voltage Protection Level U_p is the key parameter that characterizes the performance of the SPD in limiting the transient overvoltage across its terminals. A low protection level value (also known as let-through voltage) is therefore particularly critical for the effective protection and continued operation of electronic equipment. The peak voltage protection level U_p is declared when the SPD is tested with its stated nominal discharge current I_n (or the peak current (I_{peak}) of I_{imp}) and is also declared when the SPD is subject to combined impulse test (mains Class III test for Type 3 SPDs) as well as data/telecom Test Categories C and B.