

## SURGE PROTECTIVE DEVICES

### Surge Protective Devices (SPDs)

UL 1449 is Underwriters Laboratories' safety and performance standard for surge protection equipment. In 2009, this standard was revised to the 3rd Edition. In addition to some nomenclature changes, there were two very important objectives for revising the UL 1449 standard: to harmonize with the international standards for surge protective equipment (IEC 61643-1) and to modify performance tests to better simulate real world exposure.

**Changes incorporated within UL 1449 3rd Edition provide three significant enhancements for customers of surge products.**

- The first enhancement to the standard is the addition of secondary surge arresters, which are typically mounted outdoors and prior to service entrance equipment. The addition of surge arresters to UL 1449 ensures that line side devices (surge arresters) will be manufactured with safety related protection similar to load side devices.
- The second enhancement includes the addition of a Nominal Discharge Current Rating ( $I_N$ ). The nominal discharge current test allows users to compare a surge protective device's durability (or ability to survive a lightning strike) under a UL regulated test. The UL regulated test provides for a fair and accurate competitive environment.
- The third change is related to the Voltage Protection Rating (VPR). The past test was called surge voltage rating (SVR). The requirements of the SVR test were too weak to exercise many of the surge products in a way that would show how well they are performing. The new VPR test is performed at 3000 amps as opposed to 500 amps and surge products must show improved performance to obtain recommended VPR levels of surge protection.



Type 1 SPDs



Type 2 SPDs



Type 3 SPDs



Type 4 SPDs

### New Descriptive Terminology

Article 285 of the NEC title has been updated to be consistent with UL and IEEE. The term Transient Voltage Surge Suppressor (TVSS) is being replaced by Surge Protective Devices (SPDs). The requirements for SPDs were changed and they are now identified by Type 1, 2, 3 or 4 depending upon where the SPD will be incorporated within the power distribution system.

**Type 1 SPDs:** These devices are referred to as a Type 1 SPD due to their location within the power distribution system. This is typically on the supply side of the service disconnect overcurrent device (main service panel).

**Type 2 SPDs:** Typically service entrance SPD panels or branch circuit SPD panels that are connected on the load side of the service disconnect overcurrent device (main service panel).

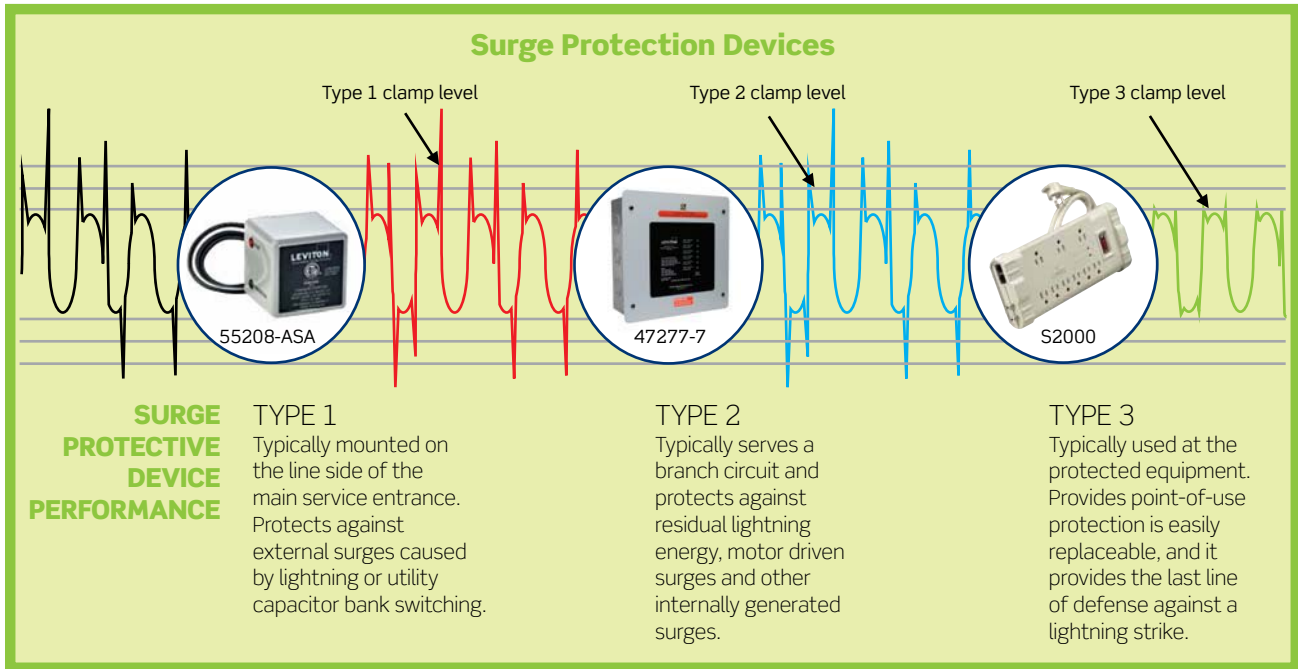
**Type 3 SPDs:** Typically surge receptacles or cord-connected point-of-use devices. They are permitted to be installed anywhere on the load side of a branch circuit up to the equipment served, provided the connection is a minimum of 10m (30ft.) from the service panel. Note: If the distance is less than 10m, a Type 2 SPD (or a Type 3 SPD tested to Type 2 requirements) must be used.

**Type 4 SPDs:** Component assembly consisting of one or more Type 5 components together (i.e. MOV, GDT, SAD, etc.) with a disconnect (integral or external) or a means of complying with the limited current tests in UL 1449.

## SURGE PROTECTIVE DEVICES

### How to Implement an Effective Surge Protection Network

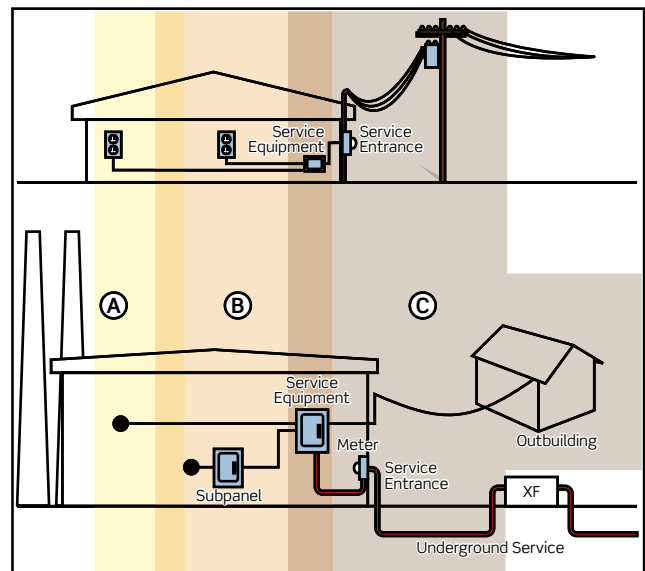
In order to achieve optimum protection for your equipment, it is essential to utilize a distributed approach to surge suppression. That is, you'll need to install surge protective devices (SPDs) that knock down high-energy transients at the building entrance and/or sub-panel so that they're manageable for the smaller SPDs that protect PCs and other equipment at point-of-use. Leviton offers a comprehensive selection of devices that will allow you to implement the most effective surge protection network possible.



### Standardization

The SPD Types (Type 1, 2, 3, 4) are the UL, NEC and IEEE attempt to harmonize with the IEC 61643-1 standard that uses Class 1, 2 and 3 designators. The sole reason that UL did not use Class 1, 2 and 3 is that North, Central and South America lean towards the IEEE documents, which use an 8 x 20µs surge waveform instead of the 10x350µs surge waveform, as it more accurately reflects the conditions experienced during a lightning strike. Since the test is different, the name had to be different. The drawing to the right identifies category A, B and C as defined in the IEEE Trilogy of Standards. Category C ranges from the transformer secondary to just inside the building entrance. Category B includes all of the branch or sub-panels and Category A includes the receptacles and point-of-use devices such as cord-connected or plug-in surge devices.

**Note:** There is purposeful overlap between the categories as it is not a demarcation line but a transition. The figure to the right is from IEEE C62.41.2, which is the Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits.



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Type 2 Surge Protective Devices						
V/Phase Cat. No.	Max Surge Current Per Mode (Per Phase)	Nominal Discharge Current ( $I_N$ )	Replaceable Modules	NEMA Enclosure	Surge Counter	Noise Filtering
<b>120/208V, Three-Phase WYE</b>						
75120-7M3	320kA (640kA)	10kA	Yes	Type 12	Yes	Yes
74120-7M3	200kA (400kA)	10kA	Yes	Type 12	Yes	Yes
47120-7	200kA (400kA)	10kA	No	Type 1	No	Yes
47120-4X7	200kA (400kA)	10kA	No	Type 4X	No	Yes
57120-M3	150kA (150kA)	20kA	Yes	Type 12	No	Yes
57120-CM3	150kA (150kA)	20kA	Yes	Type 12	Yes	Yes
52120-7MS	100kA (200kA)	20kA	Yes	Type 12	No	Yes
52120-7CS	100kA (200kA)	20kA	Yes	Type 12	Yes	Yes
52120-7M3	100kA (200kA)	20kA	Yes	Type 12	No	Yes
52120-7C3	100kA (200kA)	20kA	Yes	Type 12	Yes	Yes
52120-M3	100kA (100kA)	20kA	Yes	Type 12	No	Yes
52120-CM3	100kA (100kA)	20kA	Yes	Type 12	Yes	Yes
37120-7	100kA (200kA)	5kA	No	Type 1	No	Yes
51120-3	50kA (50kA)	3kA	No	Type 1	No	Yes
<b>120/208V, Three-Phase WYE or 208V, Three-Phase Delta or 220V, Three-Phase Delta</b>						
32120-DY3	80kA (80kA)	3kA	No	Type 3R	No	Yes
42120-DY3	80kA (80kA)	3kA	No	Type 3R	No	Yes
<b>120/240/120V, Three-Phase Hi-leg Split Phase Delta</b>						
52412-DS3	100kA (100kA)	20kA	Yes	Type 12	No	Yes
32412-DS3	80kA (80kA)	3kA	No	Type 3R	No	Yes
42412-DS3	80kA (80kA)	3kA	No	Type 3R	No	Yes
<b>220/380V, Three-Phase WYE or 277/480V, Three-Phase WYE or 240V, Three-Phase Delta or 480V, Three-Phase Delta</b>						
32277-DY3	80kA (80kA)	3kA	No	Type 3R	No	Yes
42277-DY3	80kA (80kA)	3kA	No	Type 3R	No	Yes
<b>240V, Three-Phase Delta</b>						
57240-DM3	150kA (150kA)	20kA	Yes	Type 12	No	Yes
52240-DM3	100kA (100kA)	20kA	Yes	Type 12	No	Yes
<b>277/480V, Three-Phase WYE</b>						
75277-7M3	320kA (640kA)	10kA	Yes	Type 12	Yes	Yes
74277-7M3	200kA (400kA)	10kA	Yes	Type 12	Yes	Yes
47277-7	200kA (400kA)	10kA	No	Type 1	No	Yes
47277-4X7	200kA (400kA)	10kA	No	Type 4X	No	Yes
57277-M3	150kA (150kA)	20kA	Yes	Type 12	No	Yes
57277-CM3	150kA (150kA)	20kA	Yes	Type 12	Yes	Yes
52277-7MS	100kA (200kA)	20kA	Yes	Type 12	No	Yes
52277-7CS	100kA (200kA)	20kA	Yes	Type 12	Yes	Yes
52277-7M3	100kA (200kA)	20kA	Yes	Type 12	No	Yes
52277-7C3	100kA (200kA)	20kA	Yes	Type 12	Yes	Yes
52277-M3	100kA (100kA)	20kA	Yes	Type 12	No	Yes
52277-CM3	100kA (100kA)	20kA	Yes	Type 12	Yes	Yes
37277-7	100kA (200kA)	5kA	No	Type 1	No	Yes
<b>480V, Three-Phase Delta</b>						
57480-DM3	150kA (150kA)	20kA	Yes	Type 12	No	Yes
52480-DM3	100kA (100kA)	20kA	Yes	Type 12	No	Yes
<b>347/600V, Three-Phase WYE or 600V, Three-Phase Delta</b>						
32347-DY3	80kA (80kA)	---	No	Type 3R	No	Yes
42347-DY3	80kA (80kA)	---	No	Type 3R	No	Yes
<b>347/600V, Three-Phase WYE</b>						
57347-M3	150kA (150kA)	---	Yes	Type 12	No	Yes
<b>600V, Three-Phase Delta</b>						
57600-DM3	150kA (150kA)	---	Yes	Type 12	No	Yes

N/A: Not applicable as these units do not have line-to-ground (L-G) surge protection

## SURGE PANELS | 37000 and 47000 Series

### 37000 and 47000 Series Type 2 Surge Panels

Leviton's 37000 and 47000 Series panel mounted surge protective devices provide seven-mode protection in WYE-configured, 3-phase AC systems. These devices are designed for installation at the service entrance, at branch panels, or as dedicated transient surge protection for critical equipment.

#### Features and Benefits

##### 37000 and 47000 Series for Commercial and Industrial Applications

- Protection for up to 100,000A (37000 Series) or 200,000A (47000 Series) of surge current per mode
- Models available in NEMA Type 1 enclosures for indoor applications and Type 4X enclosures (47000 series only) for outdoor applications
- Seven-mode protection (each phase to neutral, each phase to ground and neutral to ground)
- Real-time diagnostics monitor power and suppression status for each phase and provide both LED indicators and audible alarm
- Equipped with dry contacts for remote monitoring
- Limited lifetime product warranty



37120-7



47277-7

#### 37000 and 47000 Series Type 2 Surge Panels

Cat. No.	Description	Voltage (VAC) Configuration	Max Surge Current, Per Mode (Per Phase)
37120-7	7-Mode Surge Protection Panel	120/208 3Ø WYE, 4-wire + gnd	100kA (200kA)
37277-7	7-Mode Surge Protection Panel	277/480 3Ø WYE, 4-wire + gnd	100kA (200kA)
47120-7	7-Mode Surge Protection Panel	120/208 3Ø WYE, 4-wire + gnd	200kA (400kA)
47120-4X7	7-Mode Surge Protection Panel in Type 4X enclosure	120/208 3Ø WYE, 4-wire + gnd	200kA (400kA)
47277-7	7-Mode Surge Protection Panel	277/480 3Ø WYE, 4-wire + gnd	200kA (400kA)
47277-4X7	7-Mode Surge Protection Panel in Type 4X enclosure	277/480 3Ø WYE, 4-wire + gnd	200kA (400kA)