



Innovative Technology
TVSS Products

Technical Document

**Surge Current Per Phase (Industry
Definition)**

SURGE CURRENT PER PHASE (INDUSTRY DEFINITION)

Engineers/specifiers routinely install Transient Voltage Surge Suppressors (TVSS) at the service entrance and key branch panels to protect sensitive microprocessor loads such as computers or industrial control devices from damaging surges and noise. These devices are available in a wide range of sizes to meet different application requirements. Suppressors located at the facility’s service entrance must handle higher energy surges than those located at branch panels.

TVSS devices are classified by the unit’s maximum “surge current” measured on a per phase basis. Surge current per phase (expressed as kA/phase) is the maximum amount of surge current that can be shunted (through each phase of the device) without failure and is based on the IEEE standard 8x20 microsecond test waveform.

When designing a protection system for a commercial or industrial facility, engineers usually select a TVSS with one of the following performance levels:

Application	Surge Current Rating (kA/phase)
service entrance (or high exposure rooftop locations)	200-400 *
distribution panelboards	80-160
branch panelboards	90-120

* ratings above 400 kA/phase are also available.

As per NEMA LS-1 (1992), TVSS manufacturers are required to publish the level of surge protection on each mode. A Delta system can employ suppression components in two modes (L-L or L-G). For WYE systems, shunt components are connected L-G, L-N and/or N-G.

How to calculate “surge current per phase”

The per phase rating is the total surge current capacity connected to a given phase conductor. For example in a WYE system, L1-N and L1-G modes are added together since surge current can flow on either parallel path. If the device has only one mode (e.g. L1-G), then the “per phase” rating is equal to the “per mode” rating because there is no protection on the L1-N mode.

Note: N-G mode is not included in the surge current per phase calculation.

Almost all suppressor manufacturers follow this convention. However, there are some companies who attempt to cause confusion by inflating their surge current ratings using a non-standard method for calculating surge current per phase. As shown below, the correct mode and phase ratings are displayed.

Example of WYE System: Modes of Protection Per Phase (kA/Ø):

Model	L-N	L-G	NG	(L-N + L-G)
Innovative Technology (PTX160)	80	80	80	160

Note: Innovative Technology, Siemens and Square D calculate surge current ratings based on the industry standard methodology (i.e.: per phase and per mode basis).

Summary

Surge current per phase (kA/phase) has become the standard parameter for comparing suppression devices. Most reputable manufacturers publish surge current ratings on a per mode and per phase basis. Some suppression manufacturers may hide surge current ratings or make up their own method to calculate surge ratings. Avoid manufacturers who do not clearly publish these industry standards-per phase and per mode surge capabilities.

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