

**When performing a full facility site assessment, there are many locations and factors to consider.** Ideally an up-to-date one line electrical drawing of the building to be protected facilitates the selection of the proper surge protective devices (SPDs) and helps verify the correct line voltages (Wye/Delta) are identified. Regardless, a complete walk through site survey of the facility is recommended to ensure all critical locations are identified and targeted for surge protection.



## Notable UL and Code Changes

<b>UL 1449</b>
<b>1998 – 2nd Edition</b>
<ul style="list-style-type: none"> <li>Added limited current “slow burn” – 5 amps</li> </ul>
<b>2007 – 2.5 Edition</b>
<ul style="list-style-type: none"> <li>Added additional low amp testing</li> <li>Limited current – 10 amps</li> <li>Intermediate levels fault currents: 50, 100, 500 and 1000 amps</li> </ul>
<b>2009 – 3rd Edition</b>
<ul style="list-style-type: none"> <li>Changed SVR to VPR (clamping voltages appear to be higher – driven by kA increase)</li> <li>Added iNominal ratings – basic performance rating for classifications</li> <li>20kA iNominal Devices certified for UL96A Master Label – lightning protection systems</li> </ul>
<b>2014 – 4th Edition</b>
<ul style="list-style-type: none"> <li>Addition of categories (photovoltaic)</li> </ul>
<b>National Electric Code (NEC)</b>
<b>2002 – Article 285</b>
<ul style="list-style-type: none"> <li>Required SCCR rating on surge devices (previously not required)</li> </ul>
<b>2008 – Article 708</b>
<ul style="list-style-type: none"> <li>Critical Operating Power Systems required surge at all voltages</li> </ul>
<b>2014 – Article 700.8</b>
<ul style="list-style-type: none"> <li>SPD required for all Emergency systems</li> </ul>
<b>2017 – Articles 620.51(E), 645.18, 670.6, 695.15</b>
<ul style="list-style-type: none"> <li>Elevator, dumbwaiter, escalator, moving walk, platform lift, or stairway chairlift</li> <li>Critical Operations Data Systems</li> <li>Industrial machinery safety interlock</li> <li>Fire pump controller</li> </ul>
<b>2020 - Article 230.76</b>
<ul style="list-style-type: none"> <li>All services supplying dwelling units</li> <li>Integral part of service or immediately adjacent</li> <li>Shall be Type 1 or Type 2</li> <li>Applies where service equipment is replaced</li> </ul>

## NFPA/NEC Requirements

- Emergency Systems
- Data Centers
- Critical Operating Power Systems
- Elevators, Escalators, Moving Walkways
- Critical Operations Data Systems
- Fire pump controllers
- Industrial Machines with Safety Interlocks

## IEEE Emerald Book Recommended Locations

- Service Entrance (8.6.3)
- Distribution Panels (8.6.4)
- Critical Branch Panels (8.6.4)

## IEEE Key Point of Use Locations

- UPS input & bypass (8.6.5)
- Industrial & Factory Automation Electronic Equipment (8.6.6)
- Automatic Transfer Switch input (8.6.8)
- AC units including condensers & dry coolers (8.6.8)
- Each electrical conductor penetrating a structure (8.6) (includes power, voice, data, security, communications)

## Other Panels/Point-of-Use Location Examples

- UPS input & bypass: Voltage (Wye/Delta)
- Automatic Transfer Switch (ATS)
- Generator Start Signal Line (at both GenSet & ATS)
- Industrial & Factory Automation Equipment Panels
- HVAC Units Including Condensers & Dry coolers
- Security Cameras
- Security Recording Devices/Head End Units
- Fire Alarm Panels & Zone Loop Circuits
- Network Closets/Racks
- Telecom Panel
- Lighting panels - indoor and outdoor lighting, including parking lot
- Key Processes or Other Mission Critical Equipment
- Other Copper Conductors that Penetrate the Building Structure

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