

The Siemens logo is displayed in a bold, teal, sans-serif font.

*Ingenuity for life*

A photograph of a water treatment plant. Two workers in blue uniforms and hard hats (one red, one yellow) are walking away from the camera on a concrete walkway with yellow railings. The walkway runs alongside a large concrete channel filled with dark, turbulent water. In the background, there are buildings and trees under a clear sky.

# TPS3 Design Guide

## Water Treatment Plant Surge Protection Solutions

[usa.siemens.com/surge](http://usa.siemens.com/surge)

In today's electronic world, electrical systems for the home or business just aren't complete unless they incorporate surge protection. The most effective way to defend and safeguard this environment against damaging surges is by hardwiring surge protective devices (SPDs) throughout the electrical distribution system.

Ideally, every electrical panel should be surge protected, however, this may not be practical or feasible. Proven surge protection practices do not have to be complicated or costly. All that is required to effectively surge protect your facility is to answer the following questions:

1. Where should hard wired SPDs be installed on the electrical system?
2. What size and type SPD should be used?

Government studies suggest that the most efficient way to surge protect an electrical system is by applying hardwired surge protective devices at the main incoming electrical and communications services. Additional hardwired suppressors were recommended to prevent backfed surges that could bypass the primary electrical service SPD. Also, localized equipment SPDs are recommended to protect against residual and internally generated surges.

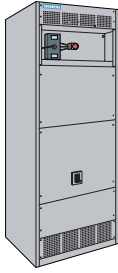
Following these practices, five common SPD electrical systems installation points can be identified. Applying surge protection at these points will maximize a facility's surge immunity. These locations can easily be remembered by using the following acronym, "The best surge protection installation is a S.O.L.I.D. one." Where S.O.L.I.D. stands for the following:

- S** Service Entrance
- O** Outside Loads Powered From Distribution Panels
- L** Lower Voltage Distribution Panels
- I** Individual Critical Equipment
- D** Data, Telephone and Coaxial Cables

The following example applies S.O.L.I.D. SPD protection to a Water Treatment Plant's electrical system. Listed on the back are SPDs with appropriately sized redundancies that we have found over the years to provide years of uninterrupted protection.

# TPS3 Design Guide

## Surge Protecting a Water Treatment Plant



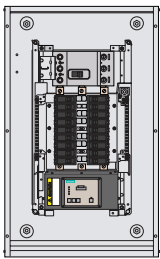
### Service Entrance

Applying surge protection at the incoming electrical service “Stops Surges Before They Get In.” These types of surges contain the largest surge energy warranting 300 kA or more of surge current redundancy.



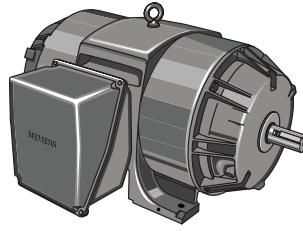
### Outside Loads

SPDs should be installed at distribution panels feeding remote circular clarifiers, remote storage, etc. to prevent back feeding surges entering the main plant.



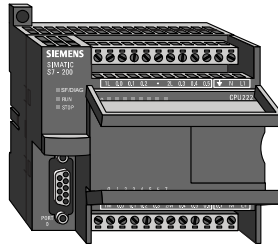
### Lower Voltage Panels

If the plant is supplied with a higher system voltage (i.e. a 277/480V service), 120V panels need SPDs to condition residual surges leaving the service entrance SPD as well as any internally generated surges. Examples could be panels powering dry polymer feed systems, odor control systems, or any other panels powering sensitive electronic-rich rooms.



### Individual Equipment

Even if surge protection is applied at the previous locations, redundant protection maybe warranted for sensitive, costly equipment. This may include pump and process controllers.



### Data Lines

Security, fire alarm, and telephone systems using copper communications lines need protection especially for telemetry and SCADA circuits running between locations across the plant.

### Siemens TPS3 SOLID Solutions

#### Service Entrance

| Internal SPD         | External SPD |
|----------------------|--------------|
| TPS30630             | TPS31230     |
| Increased Redundancy |              |
| TPS3L630             | TPS3L1230    |

#### Outside Loads

| Internal SPD         | External SPD |
|----------------------|--------------|
| TPS30520             | TPS31220     |
| Increased Redundancy |              |
| TPS3L520             | TPS3L1220    |

#### Lower Voltage Panels

| Internal SPD         | External SPD |
|----------------------|--------------|
| TPS30215             | TPS31115     |
| Increased Redundancy |              |
| TPS3L215             |              |

#### Individual Equipment

| External SPD |          |
|--------------|----------|
| TPS31110     | TPS30910 |

#### Data Lines

| External SPD |  |
|--------------|--|
| TPS30350     |  |



TPS3 06



TPS3 12



TPS3 05



TPS3 02



TPS3 11



TPS3 09



TPS3 03

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