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# TPS3 Design Guide

## Wind Farm

## 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.

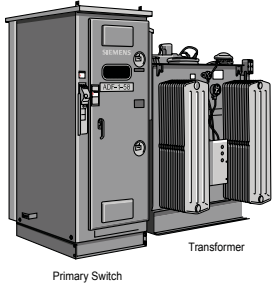
Following these practices, five common SPD electrical systems installation points can be identified. Applying surge protection at these points will maximize a facility's surge immunity. These locations can easily be remembered by using the following acronym, "The best surge protection installation is 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 Wind Farm'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 Wind Farm



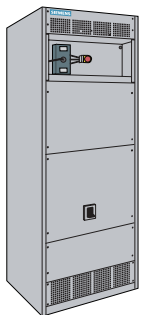
### Service Entrance

Applying surge protection at the service interconnect “Stops Surges Before They Get In” from the utility grid. The best location to apply surge protection is on the low voltage side of the 690/20000 V step up transformer. SPDs installed at this location are recommended to include integral disconnects for ease of servicing.



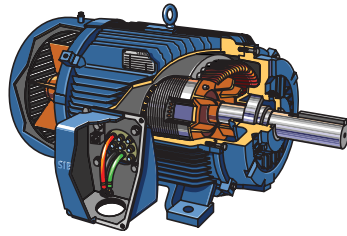
### Outside Loads

SPDs should be installed at distribution panels feeding nacelle control cabinets, inverters, etc. to prevent back feeding surges from entering the main building.



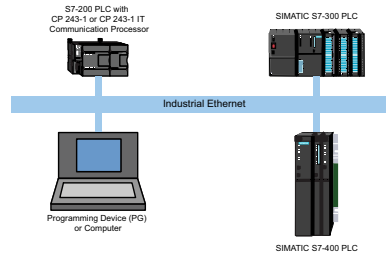
### Lower Voltage Panels

120V circuits need SPDs to condition residual surges leaving the service entrance SPD as well as any internally generated surges. Examples could be motor controllers, control panels, or any other panel powering sensitive electronics.



### Individual Equipment

If surge protection is applied at the previous locations, redundant protection maybe warranted for sensitive, costly equipment. This may include anemometer, obstruction lighting, etc.



### Data Lines

Security, fire alarm, and telephone systems using copper communications lines need protection especially for communication circuits running to and from separate buildings as well as runway signal controls.

### Siemens TPS3 SOLID Solutions

#### Service Entrance

Internal SPD	External SPD
TPS30630	TPS31230
Increased Redundancy	
TPS3L630	TPS3L1230

#### Outside Loads

External SPD	
TPS31220	TPS31110
Increased Redundancy	
TPS3L1220	

#### Lower Voltage Panels

Internal SPD	External SPD
TPS30630	TPS31230
Increased Redundancy	
TPS3L630	TPS3L1230

#### Individual Equipment

External SPD	
TPS30910	TPS30350

#### Data Lines

External SPD	
TPS30350	



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Order No. PDFL-SPDWF-0417  
Printed in USA  
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