








INSTALLATION GUIDE / USER MANUAL

# Surge Protection Devices TPS4 12 and TPS4 15

TPS4 Series Products for Panels and External Equipment

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**SIEMENS**

 	 <b>Danger</b>	 <b>Peligro</b>	 <b>Danger</b>
	<b>Hazardous Voltage.</b> <b>Will cause death or serious injury.</b>	<b>Tensión peligrosa.</b> <b>Puede causar la muerte o lesiones graves.</b>	<b>Tension dangereuse.</b> <b>Danger de mort ou risque de blessures graves.</b>
	Turn off and lock out all power supplying this device before working on this device. Replace all covers before power supplying this device is turned on.	Desenergice totalmente antes de instalar o darle servicio. Reemplace todas las barreras y cubiertas antes de energizar el interruptor.	Couper l'alimentation de l'appareil et barrer avant de travailler. Remplacez tous les couverts avant que l'approvisionnement de pouvoir soit alimenté.

### This manual shall be read in entirety prior to installing

- Only qualified licensed electricians should install or service SPDs
- Hazardous voltages exist within SPDs
- SPDs should never be installed or serviced when energized
- Use appropriate safety precautions including Personal Protection Equipment
- Failure to follow these instructions can result in equipment damage, serious injury and/or death.

### Bonding and Grounding Hazard

Verify that the neutral conductor in the service entrance equipment is bonded to ground in accordance with the Canadian Electrical Code (CEC) and all applicable codes.

Verify that the neutral terminal (XO) on the secondary side of distribution transformers are grounded to the system ground in accordance with the CEC and all applicable codes.

During installation into an electrical system the SPD must not be energized until the electrical system is completely installed, inspected and tested. All conductors must be connected and functional including the neutral (if required). The voltage rating of the SPD and system must be verified before energizing the SPD.

Failure to follow these guidelines can lead to abnormally high voltages at the SPD. This may cause the SPD to fail. The warranty is voided if the SPD is incorrectly installed and/or if the neutral conductor in the service entrance equipment or downstream of separately derived systems is not bonded to ground in accordance with the CEC.

### Do Not Hi-Pot Test SPDs

The TPS4 unit needs to be fully disconnected during Hi-Pot testing. Failure to disconnect SPD and associated components during elevated voltage testing will damage the SPD and will void the warranty.

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**Siemens TPS4 SPDs have the following Type designations:**

Table 1: Type Designations

Siemens TPS4 Series	Type Rating
TPS4 12	Type 1 & 2
TPS4 15	Type 1 & 2

For further information, please review latest editions of national and local codes, UL 1449 and CSA C22.2 No. 269, contact your local Siemens sales office or contact Siemens Customer Interaction Centre +1 888 303-3353.

**Equipment Performance**

As SPDs sense overvoltage, they create a momentary internal short circuit, thereby redirecting harmful surge energy to earth ground. SPDs are capable of repeating this function thousands of times. For optimum protection, staged surge suppression should be implemented at the service entrance and all other distribution or panelboard locations feeding sensitive equipment.

**Voltage Rating**

Prior to installing the TPS4 SPD, verify that the unit has the correct voltage rating for the equipment installed by checking the nameplates of both the equipment and TPS4 module. The service type should match the intended power source.

# Introduction

Thank you for choosing Siemens TPS4 Surge Protective Device (SPD). This is a high quality, high energy surge suppressor designed to protect sensitive equipment from damaging transient overvoltage events.

Proper installation is important to maximize performance. Please follow the steps outlined herein.

This entire user manual should be read prior to beginning installation. These instructions are not intended to replace national or local codes. Follow all applicable electrical codes to ensure compliance. Installation of this SPD should only be performed by qualified electrical personnel.

All Siemens SPDs are extensively tested in accordance with industry standards such as CSA C22.2 No 269.1 & .2, ANSI/IEEE C62.41.1, C62.41.2, C62.45, C62.62, C62.72, UL 1449, UL 1283, IEC 61643, etc.

## Warning & Safety Information

This equipment contains hazardous voltages. Property damage, serious injury or death can result if safety instructions are not followed. Only qualified personnel should work on or around this equipment after becoming thoroughly familiar with all warnings, safety notices, and maintenance procedures contained herein.

The successful and safe operation of this equipment is dependent upon proper handling, installation, operation, and maintenance.

## Qualified Person

For the purposes of this manual and product labels, a QUALIFIED PERSON is one who is familiar with the installation, construction, and operation of this equipment, and the hazards involved. In addition, he or she has the following qualifications:

- (a) Is trained and authorized to energize, deenergize, clear, ground and tag circuits and equipment in accordance with established safety practices.
- (b) Is trained in the proper care and use of personal protective equipment (PPE) such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc. in accordance with established safety practices.
- (c) Is trained in rendering first aid.

## Danger

For the purposes of this manual and product labels, DANGER indicates an imminently hazardous situation, which, if not avoided, will result in serious injury or death.

## Notice

For the purposes of this manual and product labels, NOTICE indicates a potentially hazardous situation which, if not avoided, could result in damage to the equipment but does not create a potential for personal injury.

These instructions do not purport to cover all details or variations in equipment, nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales office.

## Do Not Hi-Pot Test SPDs

The TPS4 unit needs to be fully disconnected during Hi-Pot testing. Failure to disconnect SPD and associated components during elevated voltage testing will damage the SPD and will void the warranty.

### **Unpacking & Preliminary Inspection**

Inspect the entire shipping container for damage or signs of mishandling before unpacking the unit. Remove the packing material and further inspect the unit for any obvious shipping damages. If any damage was found and is a result of shipping or handling, immediately file a claim with the shipping company and forward a copy to your local Siemens sales office.

### **Storage**

The unit should be stored in a clean, dry environment. Storage temperature is -55°C (-67°F) to +85°C (+185°F).

Avoid exposing the unit to areas of high condensation.

All of the packaging materials should be left intact until the unit is ready for installation. If the unit has been stored for an extended period of time, it may be necessary to clean the unit and make a complete inspection of the unit prior to installing and placing into service.

# General Information

This device features internal overcurrent and overtemperature protection that will disconnect affected surge suppression components at the end of their useful life, but will maintain power to the load – now unprotected. If this situation is undesirable for the application, follow these instructions for servicing or replacing the device.

Service of this unit consists of replacing the entire module and/or display assembly.

There are no user-serviceable parts inside the replaceable module. Do not attempt to disassemble the module as it may have high voltage energy stored and can be hazardous if not handled properly.

## Precautionary Statement Regarding SPDs on Ungrounded Systems

**Caution** – Ungrounded systems are inherently unstable and can produce excessively high line-to-ground voltages during certain fault conditions. During these fault conditions, any electrical equipment including an SPD, may be subjected to voltages which exceed their designed ratings. This information is being provided to the user so that an informed decision can be made before installing any electrical equipment on an ungrounded power system.

## Overcurrent Protection

The TPS4 SPD unit draws very little current under normal operation and will only conduct current for a very brief duration upon encountering a transient surge. The TPS4 unit contains overcurrent and thermal protection to protect against abnormal overvoltage conditions.

## System Grounding

An equipment grounding conductor must be used on all electrical circuits connected to the SPD.

For the best performance, use a single point ground system where the service entrance grounding electrode system is connected to and bonded to building steel, metallic piping, driven rods, etc. (NEC® and IEEE Std 142-2007 are appropriate standards).

For sensitive electronics and computer systems, ground impedance should be as low as possible. When metallic raceway is used as an additional grounding conductor, an insulated grounding conductor should be run inside the raceway and sized per the NEC®. Adequate electrical continuity must be maintained at all raceway connections. Do not use isolating bushings to interrupt a metallic raceway run.

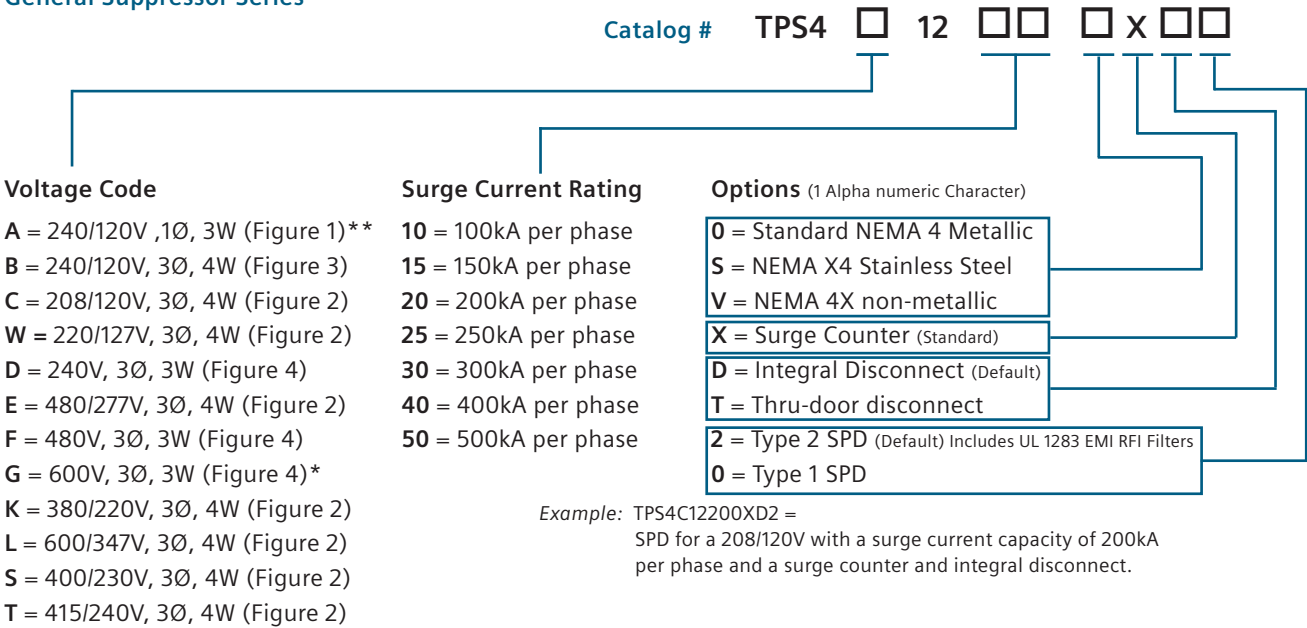
A separate isolated ground for the SPD is NOT recommended because it may isolate the SPD from the rest of the electrical system, thus decreasing performance. Proper equipment connections to grounding system and ground grid continuity should be verified via inspections and tested on a regular basis as part of a comprehensive electrical maintenance program.

## Environment

The TPS4 is designed to operate in an environment ranging from: -35°C (-31°F) to +75°C (+167°F) and with relative humidity of 0%-95% (non-condensing).

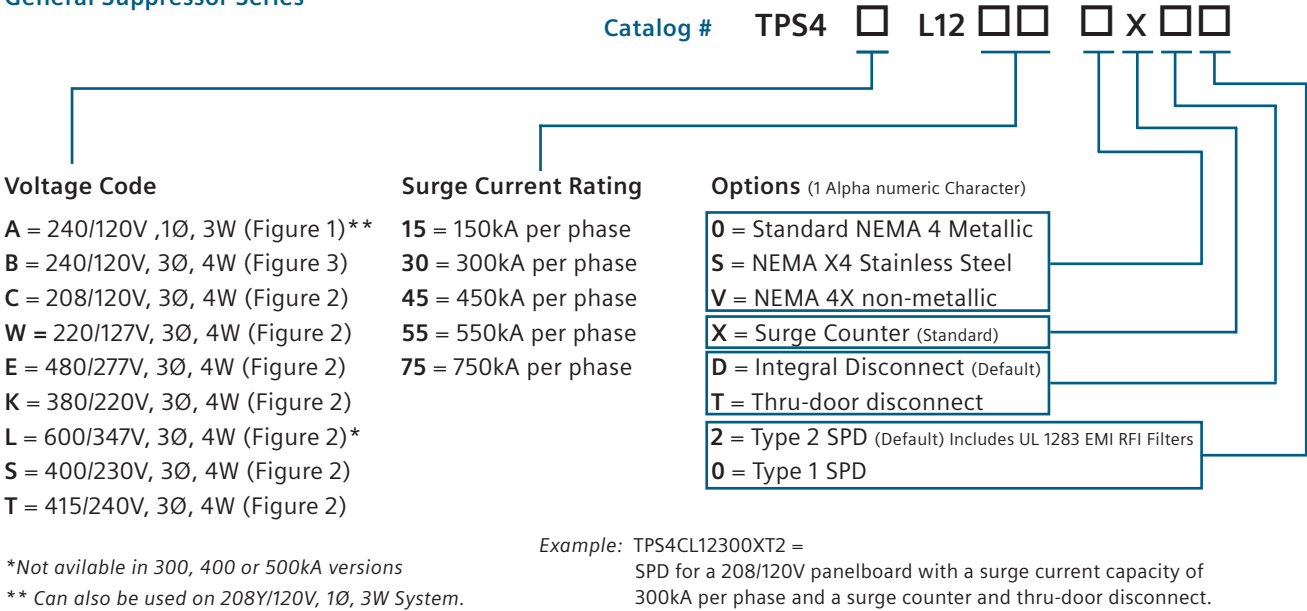
# Model Number Catalog Logic

## TPS4 12 SPD for External Mounting General Suppressor Series



\*Not available in 300, 400 or 500kA versions  
\*\* Can also be used on 208Y/120V, 1Ø, 3W System.

## TPS4 L12 10 Mode SPD External Mounting General Suppressor Series



\*Not available in 300, 400 or 500kA versions  
\*\* Can also be used on 208Y/120V, 1Ø, 3W System.

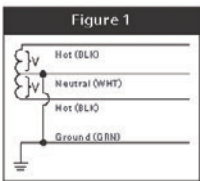


Figure 1: SPLIT  
2 Hots, 1 Neu, 1 Grnd

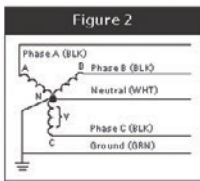


Figure 2: WYE  
3 Hots, 1 Neu, 1 Grnd

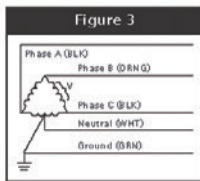


Figure 3: HI-LEG DELTA  
(B High)  
3 Hots, (B HIGH),  
1 Neu, 1 Grnd

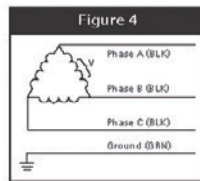
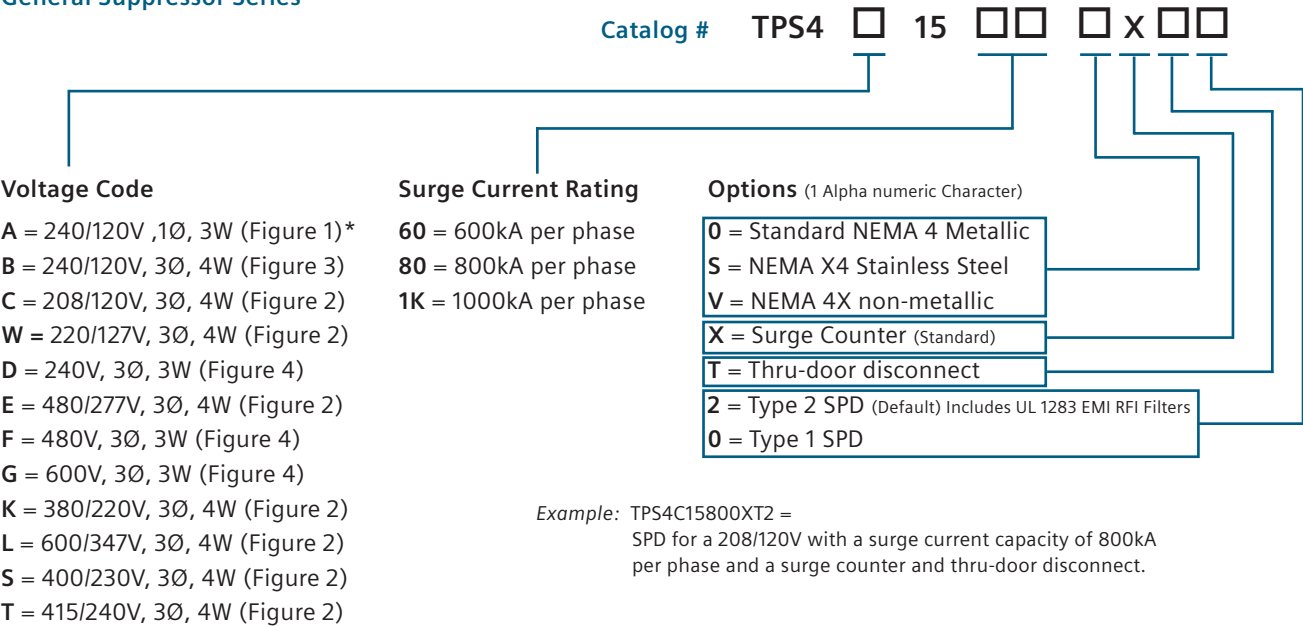


Figure 4: DELTA &  
HRG WYE  
3 Hots, 1 Grnd



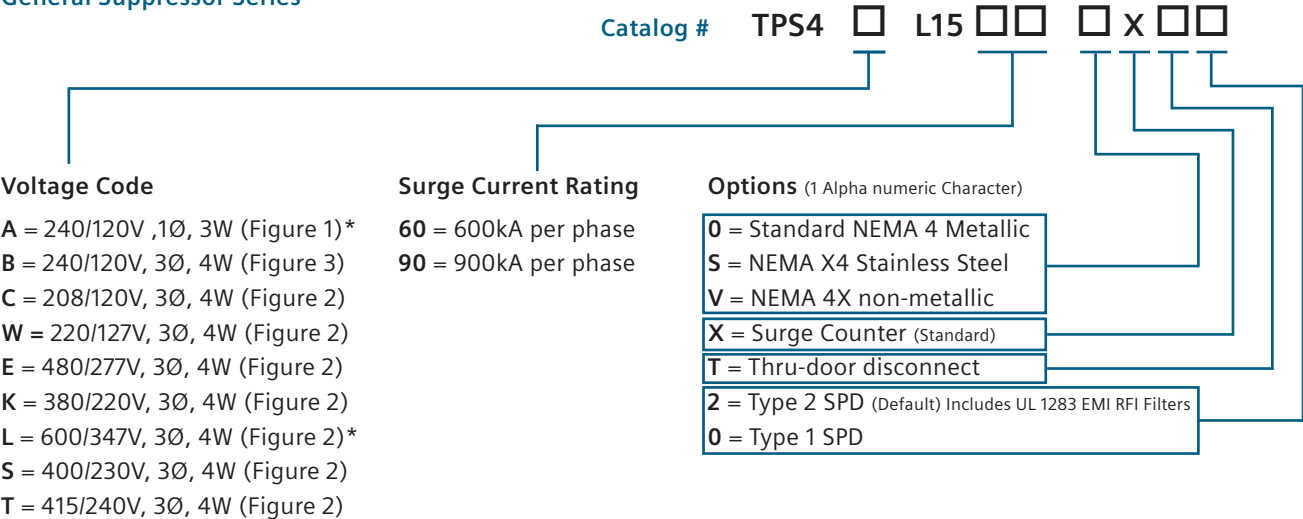
# Model Number Catalog Logic

## TPS4 15 SPD for External Mounting General Suppressor Series



\* Can also be used on 208Y/120V, 1Ø, 3W System.

## TPS4 L15 10 Mode SPD External Mounting General Suppressor Series



\* Can also be used on 208Y/120V, 1Ø, 3W System.

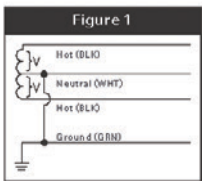


Figure 1: SPLIT  
2 Hots, 1 Neu, 1 Grnd

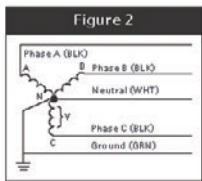


Figure 2: WYE  
3 Hots, 1 Neu, 1 Grnd

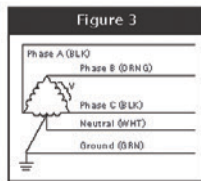


Figure 3: HI-LEG DELTA  
(B High)  
3 Hots, (B HIGH),  
1 Neu, 1 Grnd

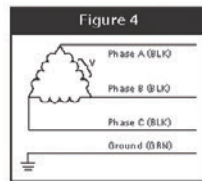
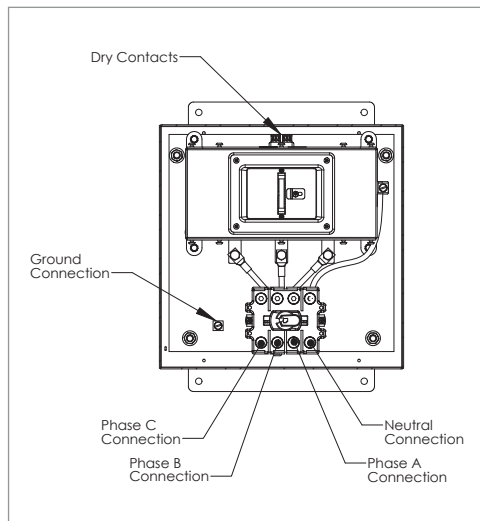


Figure 4: DELTA &  
HRG WYE  
3 Hots, 1 Grnd

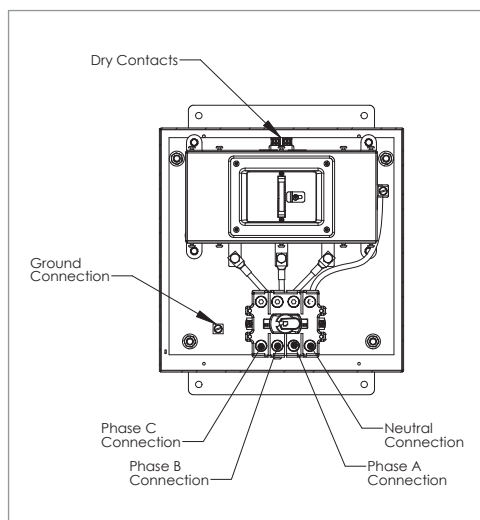
## TPS4 12/L12/15/L15: Pre-Plan

The following general observations should be noted concerning installation of both the TPS4 12 and TPS4 15.

- Install as to meet National and Local electrical codes.
- Mount TPS4 12 and 15 SPDs as close as possible to equipment or panel to be protected.
- Ensure leads are as short and straight as possible, including neutral and ground.
- Consider a breaker position that is closest to the SPD and the panel's neutral and ground.
- Because units include an integral or thru-door disconnect it is recommended to direct bus the unit. If an additional breaker is used/suggested, match breaker and conductor size, i.e. 60-30A, #6 AWG.
- Make sure system is grounded per CEC and clear of faults before energizing SPD.



**Figure 1:** TPS4 12 3 Phase connections



**Figure 2:** TPS4 15 3 Phase connections

## TPS4 12/L12/15/L15: Installation Steps

1. Use a voltmeter to check all voltages to ensure correct SPD.
2. If desired, dry contacts may be installed. Refer to Figure 6 and following "Operation" section for more information.
3. Remove power for panel. Confirm panel is deenergized.
4. Identify connection/breaker location and SPD location.
  - a) SPD recommended to be installed on a solid flat surface, capable of supporting 30 lbs. (TPS4 12) or 40 lbs. (TPS4 15).
5. If required, remove an appropriately sized knockout from panel.
6. Mount SPD. Connect to equipment using an approved wiring method, including seals appropriate for the enclosure rating.
7. Connect conductors as appropriate:
  - a) Neutral (not present on Delta configurations)
  - b) Phase A, B & C = Line 1, Line 2, Line 3 (Depending on configuration, Phase B/Line 2 may not be present.)
  - c) G = Ground
8. Label or mark conductors as appropriate:
 

**Energized:** Black

**Neutral:** White

**Ground:** Green

**Hi-Leg (Delta units only):** Orange
9. Make sure system is bonded per CEC and is clear of hazards or faults before energizing (N-G bonding not per CEC will fail SPDs: #1 cause of SPD failures).
10. Energize and confirm proper operation of indicators and/or options. If Red LED flashes & Audible Alarm cycles, deenergize immediately and contact Siemens.

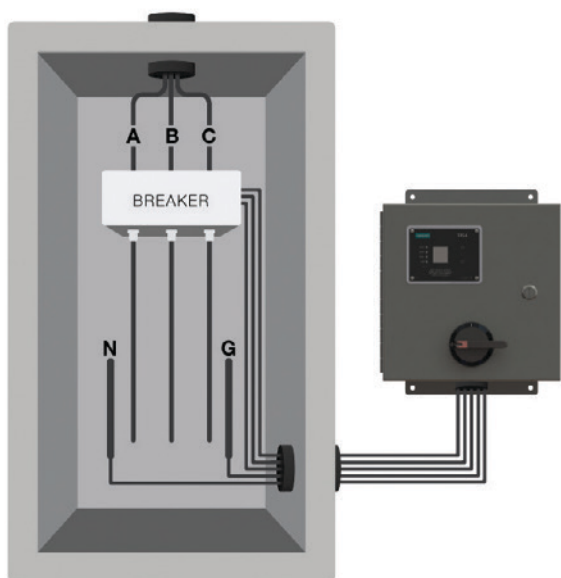


Figure 3: TPS4 12 Panel installation

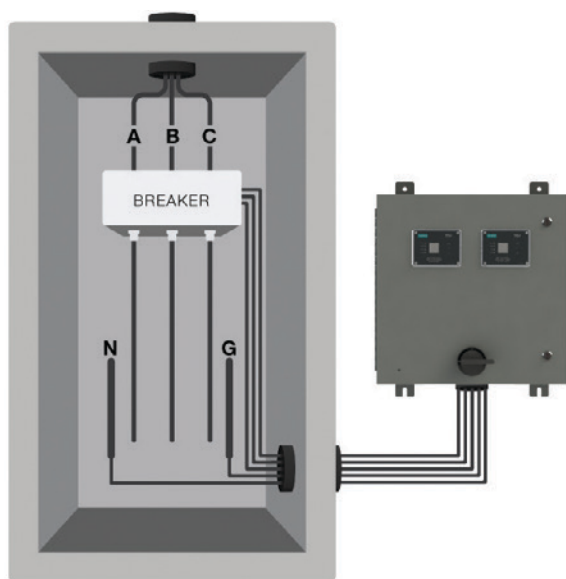


Figure 4: TPS4 15 Panel installation

The following instructions are for the replacement of Siemens TPS4 SPD module in Siemens TPS4 12/15 units.

**NOTE:** TPS4 internal module may be replaced provided all power sources are locked out.

**NOTE:** Following replacement of a TPS4 internal module, the LCD display will now reflect the new serial number for that module.

Step 1) Lock OFF all power supplying this equipment before working on it. Open unit door and turn the internal disconnect to the OFF position.

Step 2) Un-bolt the phase wire compression lugs from the phase connectors on the TPS4 module.

Step 3) If present, remove neutral wire from mechanical lug on side of TPS4 module.

Step 4) Remove the TPS4 module from back panel by removing the (4) Hex Head mounting screws located at corners of the TPS unit.

Step 5) Remove (2) mounting brackets from bottom of TPS4 module. Note orientation of bracket. Each mounting bracket is attached via (2) hex head screws (4 total).

Step 6) Replace unit with the new TPS4 module.

Step 7) Reattach mounting brackets to bottom of TPS4 module. Torque screws to 29.5 in-lbs.

Step 8) Re-install TPS4 module onto back plate using the original (4) hex head screws. Torque to 29.5 in-lbs.

Step 9) Reattach line wire compression lugs to phase connections on TPS4 module. Torque to 45 in-lbs.

Step 10) If present, reattach neutral wire to mechanical lug on side of TPS4 module. Torque to 35 in-lbs.

Step 11) Turn the internal disconnect back to the ON position.

Step 12) Close all doors before reenergizing.

# Operation

TPS4 surge protective devices require minimal attention after installation. TPS4's contain diagnostic circuits which monitor the suppressor's status continuously and automatically. All phase indicators and controls are located on the display panel of the unit. Display panels are formatted for horizontal mounting orientation.

## TPS4 Control and Diagnostic Display Panel

TPS4s are equipped with a status indicating LED for each phase on the panel. When all LEDs are green, the suppressor is on-line and functioning properly. If a fault condition occurs, the audible alarm will sound, the Red Service LED will illuminate and the LED representing the affected phase will extinguish, indicating that the unit needs service. The audible alarm can be silenced by pressing ALARM SILENCE on the touchpad. The audible alarm and dry contact can be tested by depressing the UP arrow for approximately 5 seconds. If a fault alarm occurs, see Corrective Maintenance (Testing and Repair) for further information.

## Display Panel with Event Counter

Phase A, B & C: Green LED indicators—one per phase. Green is good. Extinguished green LED indicates loss of protection. Every suppression element in this SPD is monitored. N-G suppression element monitoring is logic-connected to Phase A.

- Service LED (red): LED illuminates in the event of problems. This indicator is logic-connected to the Phase LEDs. Should a Phase LED go out, the Service LED will illuminate and the Audible Alarm will sound.
- Test: Tests red Service LED and Audible Alarm, and changes state of Dry Contacts.
- Alarm Silence: Turns Audible Alarm off. (Alarm is deactivated when the Silence LED is illuminated.)
- Surge Counter Count: (if equipped) Increments optional surge counter by one (+1).
- Surge Counter Reset: (if equipped) Resets optional surge counter to zero (0).

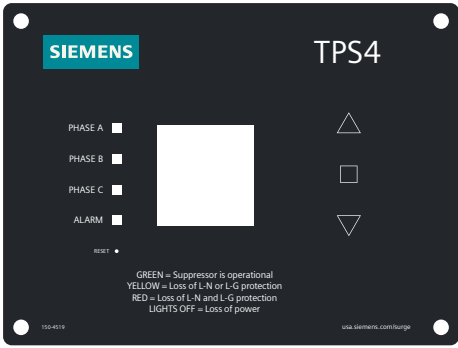


Figure 5: Display – Horizontal

## Dry Contacts Feature

TPS4-12/15 units are equipped with dry contacts. This feature provides Normally Open (N.O.) and Normally Closed (N.C.) circuits, which can be used for remote indication of a failed transient voltage surge suppressor. There is only one dry contact output consisting of two electrically isolated sets of NC- C-NO contacts. This dry contact output changes from “normal” to “alarm” if any problem occurs inside the SPD (i.e.: loss of power to any phase, any thermal protector inside the SPD opens, or any fuse inside the SPD opens). The dry contact terminal block is located on the back of the module, opposite side of bus tabs. This connector is designed for low voltage or control signals only. Maximum voltage should not exceed 240 volts and maximum current should not exceed

2 amperes. 18 AWG wire is recommended. These contacts may be used to provide a signal to an emergency management system or computer interface board. The relay contact pin arrangement is outlined in the table below.

The Normally Closed (N.C.) configuration is recommended because it will detect a wiring defect, such as a cut wire(s), where Normally Open (N.O.) will not.

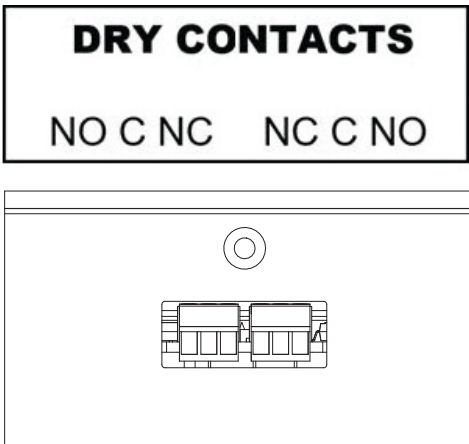


Figure 6: Dry Contact Connection Configuration

## LED Operation

- Each SPD contains 1 dual color LED per phase shown in the appropriate voltage configuration.
- The SPD also includes a Red Alarm LED. When the LEDs are green complete protection is present.
- During partial MOV stack failure the LED will change state to Amber.
- Upon full MOV stack failure the LED will change state to Red.
- During the detection of any event the Red Alarm LED will illuminate.

## Audible Alarm

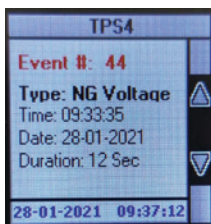
Similar to the Red Alarm LED, the Audible Alarm will sound upon the detection of a power system event. The Audible Alarm may be silenced by acknowledging the event from the control panel.

## LCD Panel Operation



### Screen Saver

Immediately on power-up of the SPD the scrolling screen saver will be shown. When any of the buttons are pressed the SPD will stop showing the screen saver and advance to the Main Screen. After 5 minutes without user activity the screen saver will be displayed again. When the SPD experiences an event, the screen saver will be dismissed and will not be displayed again until the event is acknowledged by an operator.



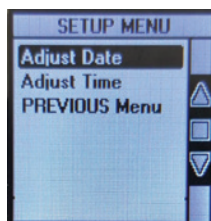
### Main Screen

The Main Screen is the starting point for navigating through the SPDs menus. The Main Screen will show the logged data for the most recent event as well as the current time and date. Pressing the UP or DOWN buttons will move to the Main Menu Screen.



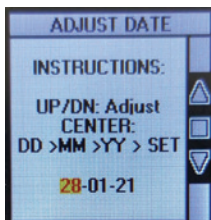
### Main Menu Screen

The Main Menu Screen will allow you to navigate to the Setup Menu, Event Menu, About Screen, System Screen, System Memory Screen, and a return to Previous Menu option. Use the UP/DOWN buttons to select the menu or screen of interest. Pressing the center button will advance you to the menu or screen you have selected.



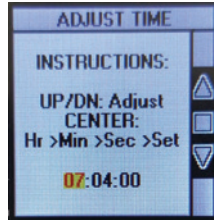
### Setup Menu Screen

The Setup Menu Screen will allow you to set the time and date of the SPD. Accurately setting the date and time is very important for this SPD. All events are recorded with a timestamp. Use the UP/DOWN buttons to select whether to adjust the time, adjust the date or return to the previous menu. Pressing the CENTER button will move the screen to the selected menu.



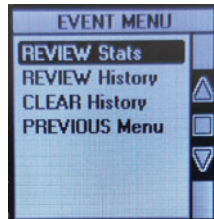
### Adjust Date Screen

The Adjust Date Screen will allow you to set the date of the SPD. Use the UP/DOWN buttons to adjust the value in the selected field until you have the correct value. Pressing the CENTER button will advance the cursor to the next date field. Once the "Year" has been set, pressing the CENTER button will finalize your changes and save them to the SPD memory. You will automatically be brought back to the Setup Menu.



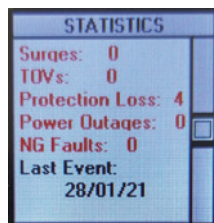
### Adjust Time Screen

The Adjust Time Screen will allow you to set the time of the SPD. Use the UP/DOWN buttons to adjust the value in the selected field until you have the correct value. Pressing the CENTER button will advance the cursor to the next time field. Once the "Seconds" have been set, pressing the CENTER button will finalize your changes and save them to the SPD memory. You will automatically be brought back to the Setup Menu.



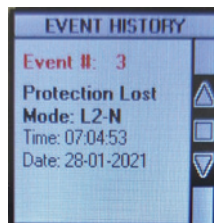
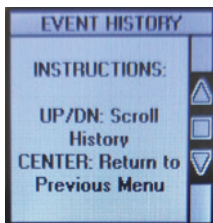
### Event Menu Screen

The Event Menu Screen will allow you to view the SPD's statistics and event history. You are also able to clear the history if need be. Use the UP/DOWN buttons to select which operation to do. Pressing the CENTER button will advance you to the screen you have selected.



### Statistics Screen

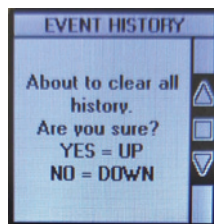
The Statistics Screen shows the number of events that the SPD has experienced. The total number of each event type will be shown here. The date of the last recorded event will also be shown here. Unlike the Event Log, this data cannot be cleared from memory. Pressing the left button (BACK) will return you to the Main Screen.



### Event History Screen

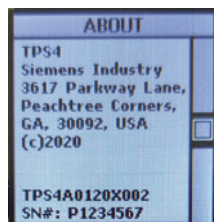
The Event History Screen will allow you to review each event the SPD has on record. Use the UP/DOWN buttons to scroll through the event log.

Pressing the CENTER button will return you to the Event Menu Screen.



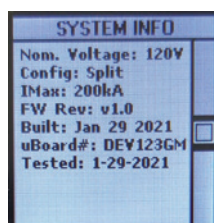
### Clear Event History Screen

The Clear Event History Screen will allow you to clear the SPD's event log. Pressing the UP button (YES) will clear the event log. Pressing the DOWN button (NO) will keep the current event log intact. Either operation will return you to the Event History Screen.



### About Screen

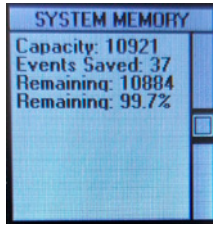
The About Screen displays the manufacturer's information, the model number and the serial number for this specific SPD. Pressing the CENTER button will return you to the Main Menu Screen.



### System Info Screen

The System Screen displays the important electrical information for this system. This includes the nominal operating voltage, System configuration (ie. Wye, Delta, Single Phase) and maximum current rating for each mode of the SPD. The processor serial number, firmware edition, build and test dates are also shown on this page. Pressing the CENTER button will return you to the Main Menu Screen.





### System Memory Screen

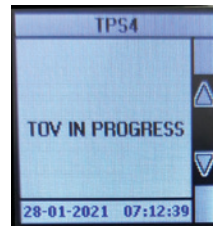
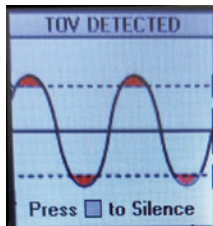
The System Memory Screen displays the current state of the electronic memory for this system. This includes the nominal operating voltage, System configuration (ie. Wye, Delta, Single Phase) and maximum current rating for each mode of the SPD. The processor serial number, firmware edition, build and test dates are also shown on this page. Pressing the CENTER button will return you to the Main Menu Screen.

## System Event Alarms



### Surge Event Screen

When the SPD detects a surge event this animation will be shown. It will remain on screen until acknowledged by an operator. Any subsequent events that occur while the Surge event animation is on screen will be registered and queued for acknowledgment. Along with displaying the Surge animation, the Audio alarm will sound. Pressing the CENTER button will acknowledge the event and clear the alarm state. The Main Screen will be showing the details for the surge.



### Temporary Over Voltage Event

When the SPD detects a Temporary Over Voltage Event (TOV) this animation will be shown. It will remain on screen until acknowledged by an operator. Any subsequent events that occur while the TOV event animation is on screen will be registered and queued for acknowledgment. Along with displaying the TOV animation, the Audio alarm will sound. Pressing the CENTER button will acknowledge the event and clear the alarm state. The Main Screen will be showing the details for the TOV.

The SPD may be exposed to a TOV for several minutes. On rare occasions a TOV can exist for hours. The TOV animation will be displayed as soon as a TOV has been detected. If an operator is able to acknowledge the event while a TOV condition still exists, the screen below will be displayed.



### Protection Loss

When the SPD detects a Protection Loss this animation will be shown. It will remain on screen until acknowledged by an operator. Any subsequent events that occur while the disconnection event animation is on screen will be registered and queued for acknowledgment. Along with displaying the disconnection animation, the Audio alarm will sound, and the dry contacts will change state. A corresponding LED will also change state during a Protection Loss. A loss of protection means that either the SPD has detected the loss of a system phase or that one of the protection modes has permanently disconnected and requires attention. As long as a fault state exists the dry contacts will remain disengaged and the corresponding LEDs will be in a non-green state. If the Protection Loss event was caused by a phase loss, returning the phase will return the system to a GOOD state.

However, if the Protection Loss event was caused by a Mode disconnection, the SPD will stay in the faulted state indefinitely. Pressing the CENTER button will acknowledge the event and clear the alarm state. The Main Screen will be showing the details for the Protection Loss.



### Neutral to Ground Fault Event

When the SPD detects a Neutral to Ground Fault Event (NGF) this animation will be shown. It will remain on screen until acknowledged by an operator. An NGF is detected when more than 20 volts have been detected between Neutral and Ground. Any subsequent events that occur while the NGF event animation is on screen will be registered and queued for acknowledgment. Along with displaying the NGF animation, the Audio alarm will sound. Pressing the CENTER button will acknowledge the event and clear the alarm state. The Main Screen will be showing the details for the NGF.

The SPD may be exposed to a NGF for several minutes. The NGF animation will be displayed as soon as a NGF has been detected. If an operator is able to acknowledge the event while a NGF condition still exists, the screen to the left will be displayed.



### Power Outage

Should the SPD be subjected to a full power outage this animation will be shown once power is restored. It will remain on screen until acknowledged by an operator. Any subsequent events that occur while the power outage event animation is on screen will be registered and queued for acknowledgment. Along with displaying the power outage animation, the Audio alarm will sound, and the dry contacts will change state. Pressing the CENTER button will acknowledge the event and clear the alarm state. The Main Screen will be showing the details for the Power Outage.

This SPD's timekeeping is equipped to survive several days of a power outage. When power returns the SPD will record the date and time of the power loss and when power was restored. Should the SPD be exposed to an extended power outage the SPD's timekeeping may have been affected. It is highly recommended that the time and date be updated.

Due to the nature of installations, where power may be cycled several times. The Power Outage alarm is suspended. It is automatically engaged after the SPD has been continually powered for 1 hour



# Maintenance

SPDs require minimal maintenance. Periodic inspection of diagnostic LED indicators ensures proper operation. Clean SPD as appropriate.

## Troubleshooting and Service

Please contact Siemens Customer Interaction Centre +1 888 303-3353 for service related issues.

Quality SPDs are designed and tested to withstand severe duty. However, there are various electrical anomalies against which SPDs cannot protect. These are generally Sustained Overvoltages also known as Temporary Overvoltages (TOVs). In this context, Sustained Overvoltages may be only a few cycles. Failed SPDs tend to be symptoms, not root causes.

There may be larger issues at play. Regardless of cause, SPDs attempt to protect their load until failure.

Bonding or reference to ground problems are the root cause of many SPD problems. If the SPD shows problems on startup, there is reasonable chance of bonding/grounding/misapplication issue. Such problems permanently damage the SPD. If not corrected, SPD problems will reoccur.

Tip: Visually confirm N-G bonding. Be aware that a voltmeter measuring N-G can be misleading. For example, N-G voltage could read 0V because neutral and ground are at the same potential purely by happenstance, not because they are bonded. Visually confirm bonding.

Tip: Experience indicates that regulation-challenged generators can cause Sustained Overvoltages, as well as ungrounded generators, and/or usual load transfer systems.

## Abnormal N-G Voltage Indicators

This SPD include N-G voltage indicators. If the SPD detects excessive N-G voltage, the Red Service LED will blink and the Audible Alarm will cycle. This condition requires immediate attention as the SPD will fail.

Incorrectly bonded distribution systems damage SPDs. If the XO or N-G bonding jumper is not installed, the electrical system has no reference to ground. It becomes an ungrounded system. Please see previous section regarding SPDs on ungrounded systems. Such systems are known to eventually produce abnormally high L-G voltages. SPDs will attempt to

chase this system-level overvoltage abnormality until the SPD fails. This effect is accelerated on Wye systems where SPDs are designed for grounded systems. (SPDs for ungrounded systems generally have higher MCOV to allow for L-G voltage fluctuations.) Failures of this nature are not defects in the SPDs workmanship or material. This is an installation error and is not covered by warranty.

A differential voltage circuit monitors neutral to ground voltage. When N-G voltage becomes excessive, an amplifier energizes a resistor. Eventually, that resistor will overheat and cause thermally sensitive shrink wrap to shrink around the resistor. This does not occur on transient or instantaneous N-G overvoltages. When the SPD is deenergized, the shrink wrap covered resistor can be accessed by qualified personnel under the display plate cover.

## Module Replacement and Service

The module is field replaceable. Service should only be performed by qualified persons. Deenergize SPD, confirm with appropriate measurement equipment and discharge internal capacitance to ground. Mark locations and carefully disconnect diagnostic cables, contacts, connecting conductors, etc. Remove entire TPS4 unit from the Panel. Reinstall in reverse.

There are no user serviceable parts inside the module. Disassembly is not permitted.

Modules may be returned to the factory for factory service, qualification and return. Please contact Siemens Customer Interaction Centre +1 888 303-3353.

## Display Replacement

The display is field replaceable. Service should only be performed by qualified persons. Deenergize SPD, confirm with appropriate measurement equipment and discharge internal capacitance to ground. Mark locations and carefully disconnect diagnostic cables, contacts, connecting conductors, etc. Unbolt display and replace. Reinstall in reverse.

Note that a sealing gasket between the display and the enclosure is a key component ensuring weather resistance. Replace the gasket whenever the display is removed.

#### Preventive Maintenance (Inspection and Testing)

Inspection of the TPS4 SPD unit should be performed periodically, to maintain reliable system performance and continued transient voltage surge protection. The large variations in operating conditions encountered by units in the field make it difficult to set a fixed maintenance interval, but inspections utilizing the built-in diagnostics should be performed at least on a weekly or monthly basis.

#### Corrective Maintenance (Repair)

The Siemens TPS4 unit is designed for years of reliable, trouble-free operation. Unfortunately, in an extreme case, you may experience an alarm condition. In this event, no attempt should be made to repair the TPS4 itself. There are no serviceable parts within the unit. Any SPD that requires service should be appropriately removed from the electrical distribution equipment, and replaced by a new SPD of the same model.

#### Technical Support

Customer Interaction Centre +1 888 303-3353

Prior to calling Siemens TPS4 Technical Support for assistance or ordering parts, please have the following information available:

TPS4 model number: \_\_\_\_\_

Manufacture date: \_\_\_\_\_

Date of Purchase: \_\_\_\_\_

Your order number: \_\_\_\_\_

Return Shipment: \_\_\_\_\_

Contact Siemens Customer Interaction Centre +1 888 303-3353 to setup an RMA.

# Notes

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