TPS3 03

Surge Protective Device

User Manual

SIEMENS

⚠ WARNING - Hazardous Voltage & Shock Hazard

Failure to Follow These Instructions Could Result in Death or Serious Injury

- 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 death, serious injury, and/or equipment damage.
- This manual shall be read in entirety prior to installing

Bonding and Grounding Hazard

Verify that the neutral conductor in the service entrance equipment is bonded to ground in accordance with the National Electrical Code (NEC®) 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 NEC® 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 NEC®.

Do Not Hi-Pot Test SPDs

Any factory or on-site testing of power distribution equipment that exceeds normal operating voltage such as high-potential insulation testing, or any other tests where the suppression components will be subjected to higher voltage than their rated Maximum Continuous Operating Voltage (MCOV) must be conducted with the SPD disconnected from the power source. For 4-wire systems, the neutral connection at the SPD must also be disconnected prior to performing high-potential testing and then reconnected after test completion.

Failure to disconnect SPD and associated components during elevated voltage testing will damage the SPD and will void the warranty.

Introduction

Thank you for choosing the Siemens TPS3 03 Surge Protective Device (SPD). TPS3 03 is a high quality, high energy surge suppressor designed to protect sensitive equipment from damaging transient overvoltages. The TPS3 03 is parallel connected such that circuit ampacity is unlimited. Proper installation is important to maximize performance. Please follow steps outlined herein. These instructions are not intended to replace national or local codes. Follow all applicable electrical codes to ensure compliance.

⚠ WARNING - Hazardous Voltage & Shock Hazard

- Only qualified licensed electricians should install or service SPDs
- SPDs should never be installed or serviced when energized or during electrical storms
- Use appropriate safety precautions including Personal Protection Equipment
- Failure to follow these instructions can result in death, serious injury, and/or equipment damage
- When used in outdoor applications, customer must seal the conduit nipple using watertight fittings (not included) to ensure a watertight connection
- Read this manual in entirety prior to installing

Industry standards changes - 2009

UL 1449 Third Edition and 2008 NEC® Article 285 generated substantial changes.

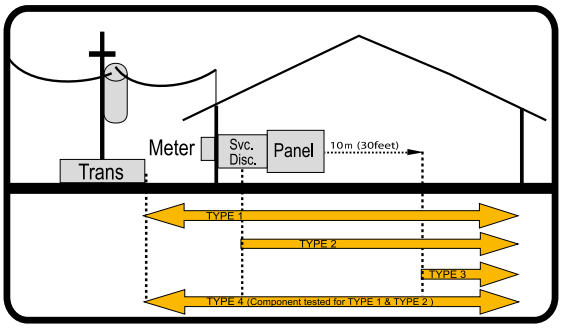
- The term TVSS changed to SPD
- Types 1, 2, 3 & 4 SPDs are created
- UL 1449 clamping voltage performance testing changed from 500A to 3,000A
- UL 1449 added new I nominal testing (In), which consists of more rigorous duty-cycle testing

The SPD Type category is important to understand before installing any SPD. Type 1 and 2 SPDs are fully UL Listed devices whereas Type 4 SPDs are UL Recognized devices.

Type 1 – Installed on line or load side of the Main Overcurrent Protection (OCP), similar to what you knew as SSA, except now includes rigorous safety testing. Includes all OCP & safety disconnectors inside the SPD
Type 2 – Installed on load side of the Main OCP, similar to what you know as hardwired SPD, and it may require external OCP.
Type 3 – Point of Utilization, direct plug in type devices, similar to what you know as surge strips. Theses devices are intended for installation 10 meters from the panel (rational based on IEEE Cat. A location).
Type 4 – Surge suppression components, could be a basic component or a complete module. Type 4 components can be tested for Type 1, Type 2 or Type 3 applications.

Figure 1: SPD Types

2008 NEC Art 285 & UL 1449-3
SPD Types: Types 1, 2, 3, & 4
Based on Location within electrical distribution system
(also coincides with ANSI/IEEE C62.41.2 - 2002 Categories C, B &A)



For further information, please review latest editions of NEC® Art. 285, UL 1449, contact your local Siemens sales office or contact Siemens TPS Tech Support at 1.888.333.3545.

The TPS3 03 is a Type 1 SPD. The TPS3 03 is suitable for use almost anywhere (not as a plug-in SPD). Type 1 SPDs are evaluated more rigorously by UL 1449 for 2008 NEC® Article 285 compliance. Type 1 SPDs and their connecting leads have been evaluated for line side applications without need for supplemental overcurrent protection. Type 1 SPDs include internal overcurrent protection. As a generalization, there are practical maintenance reasons for installing on the load side of the main overcurrent device (i.e. Type 2 installation). When connected on load side of main disconnect, we recommend connecting via a 30A circuit breaker due to 10 AWG conductors. The circuit breaker serves as a disconnect device and provides NEC® imposed short circuit protection to the conductors in Type 2 or 4 applications.

Simplified Explanation of Operation

SPDs sense overvoltage and create a momentary short circuit to redirect harmful surge energy to earth ground. SPD's are not a one time device. They reset automatically and wait for the next surge. SPDs are capable of repeating this function thousands of times.

Parts List and Inspection

Items included in the package consist of the following:
- 1 TPS3 03 SPD including 3' (~1m) conductors
- 1 Mounting L Bracket
- 3/4" conduit nut
- 2 Panhead mounting screws
- 1 User's Manual (this document)

Carefully inspect each item in the package for signs of damage. If damage is found, please contact Siemens TPS Technical Support: 1.888.333.3545. For more information about this product or other Siemens products, visit www.usa.siemens.com.

Figure 2: Dimensions and Weight

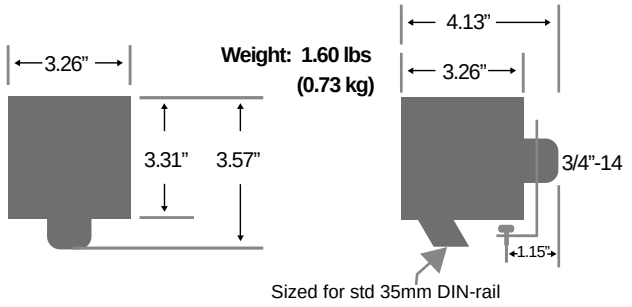


Figure 3: Mounting options

Std. 3/4"-14 Nipple | DIN-rail Mount (rail not incl.) | Bracket Mount for flat surfaces

- 3/4" pipe nipple (conduit nut included)
- Standard 35mm DIN-rail (not included)
  L-bracket tightens onto DIN-rail
- Standard flat mounting surface
  Attach L-bracket to surface via mounting holes

TPS3 03's have demonstrated 200kA Short Circuit Current Ratings (SCCR) including leads (120/240V Split phase models have 100kA SCCRs). See UL Label markings on SPD or see Data Sheet for specs.) Supplemental overcurrent protection is not required to protect this SPD. However, NEC® convention requires that connecting conductors have overcurrent protection in Type 2 or 4 applications. Follow applicable codes.

This device features internal overcurrent and overtemperature protection that will disconnect effected 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 replacing the device. TPS3 03 is ultrasonically welded closed and contains no user serviceable parts.

Table 1: Specifications

Specifications	
Temperature Operating	-40°C (-40°F) to 60°C (+140°F)
Temperature Storage	-55°C (-67°F) to 65°C (+149°F)
Wire Size & Installation Torque	10 AWG; 18 inch-pounds
Appropriate Circuit Breaker based on conductor size	30A (SPD includes internal OCP)
NEMA 250 Enclosure Rating	Type 4X with appropriate sealing & sealing condulets

Voltage Rating & Application

Before installing SPD, verify by nameplate voltage or model number that it has the same voltage rating as the power distribution system. If unsure, call Siemens TPS Tech Support at 1.888.333.3545 before proceeding. The SPDs specifier or user should be familiar with the configuration and arrangement of the power distribution system. The system is defined by how the secondary windings of the transformer supplying the service entrance main or load are configured. This includes whether or not the transformer windings are referenced to earth via a grounding conductor. The system configuration is not based on how any specific load or equipment is connected to a particular power distribution system. SPDs should be installed per the distribution system, not per a load or motor's wiring connection.

For example, suppose a 480V three phase motor appears to be connected as a 480V Delta. In actuality, the serving distribution system might be a 480Y/277V grounded Wye, with or without a neutral pulled to the motor or MCC. The system is still a 480Y/277V Wye, even though the load is connected as a Delta. A grounded Wye has a defined reference to ground (i.e., neutral is bonded to ground). In contrast, some Delta systems are ungrounded, which have no reference to ground.

Table 2: Model Number Decoder

Model	Voltage Code	Service Voltage
TPS3A03	A	240/120V 1Ø, 3W Plus Ground,
TPS3B03	B	240/120V 3Ø, 4W Plus Ground High Leg Delta
TPS3C03	C	208Y/120V 3Ø, 4W Plus Ground
TPS3D03	D	240v 3Ø, 3W Plus Ground
TPS3E03	E	480Y/277V 3Ø, 4W Plus Ground
TPS3F03	F	480v 3Ø, 3W Plus Ground
TPS3G03	G	600v 3Ø, 3W Plus Ground
TPS3K03	K	380Y/220V 3Ø, 4W Plus Ground
TPS3L03	L	600Y/347V 3Ø, 4W Plus Ground
TPS3S03	S	400Y/230V 3Ø, 4W Plus Ground

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.

⚠ CAUTION

CONDUCTING DIELECTRIC AND/OR HI-POTENTIAL TESTING WILL CAUSE INTERNAL DAMAGE TO TPS3 UNIT.

Do not perform dielectric or high potential tests with the TPS3 unit installed.

⚠ DANGER

Hazardous voltage.
Will cause death or serious injury.
Keep Out.
Qualified personnel only.
Disconnect and lock off all power before working on this equipment.

TPS3 03 Installation Instructions

Pre-Plan your installation. You need to accomplish the following:

- **Meet all National and Local codes** (NEC® Article 285 and UL 1449 address SPDs)
- **Confirm System voltage to SPD voltage** (120V SPD will fail instantly on 240V, 277V, etc.)
- **Mount SPD as close to panel or equipment as possible to keep leads short** (long leads hurt performance substantially)
- **Ensure leads are as short and straight as possible, including neutral and ground. If using a breaker, use a breaker position that is close to the SPD and the panel's neutral & ground**
- **If using a breaker, recommended breaker size is 30A due to 10 AWG conductor**
- **Make sure system is grounded per NEC® and clear of faults before energizing SPD** (inadvertent system problem may fail SPD).
- **Never Hi-Pot test Any SPD** (will prematurely fail SPD)
- **Do not install the TPS3 03 through the bottom of a NEMA 3R panel.** Dripping water will prematurely fail the SPD.

1. Use voltmeter to check voltages and ensure correct SPD. See Data Sheet for specs & wire-outs
2. Determine Mounting method (See Figure 2) – weather resistant equipment may be required
3. If SPD has optional Dry Contact, pre-plan its installation
4. Remove power from panel/source. Confirm panel/source is deenergized.
5. Identify breaker location and SPD location. Position SPD such that LED is best visible.
6. Mount SPD – weather resistant applications require additional sealing, o-rings, etc. (not included)
   - Remove an appropriately sized knockout from panel.
   - Connect conductors as appropriate – short and straight as possible (Hi-Legs are Phase B)
7. Label or mark conductors as appropriate (neutral: white, ground: green, energized: black, hi-leg: orange)
8. Make sure system is bonded per NEC® and is clear of hazards or faults before energizing (N-G bonding not per NEC® will fail SPDs: #1 cause of SPD failures)
9. Energize and confirm proper operation of green LED indicator and/or options.

Figure 4: Typical Panel Installation

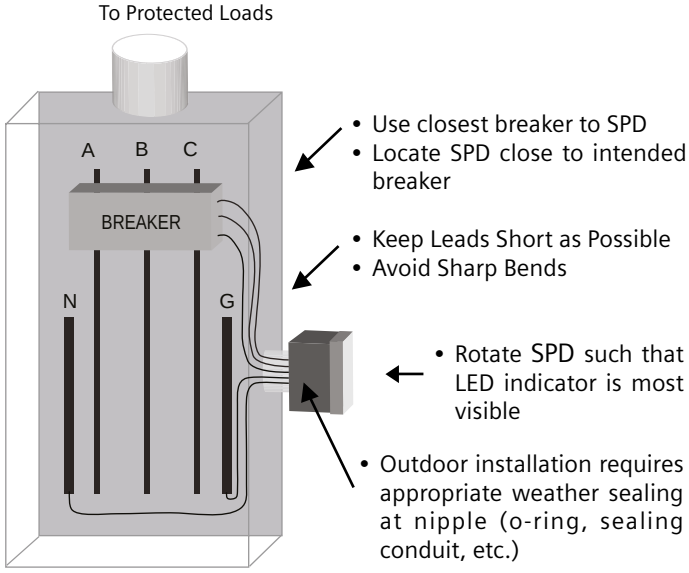


Figure 5: Sealing o-rings

Sealing gasket: two choices
1.) At 3/4" nom. thread: ID is 1.05"
2.) At 0.14" high 'base step': ID is 1.25"

Figure 6: LEAD LENGTHS

LEADS: SHORT & STRAIGHT
CUT EXCESS; DO NOT COIL OR LOOP

Connecting Optional Form C Dry Contact & Audible Alarm
("D" suffix near end of model number)

Three (3) 3' (~1m) 18 AWG wires are included through the nipple with this option. (These are smaller than the 10 AWG SPD conductors.) Gray is Common, Red is Normally Open and Blue is Normally Closed. (We generally recommend the Normally Closed configuration because it detects disconnected or failed wiring whereas normally open does not.)

If the dry contacts are not utilized, insulate lead ends, coil and secure. Audible alarm will still function correctly.

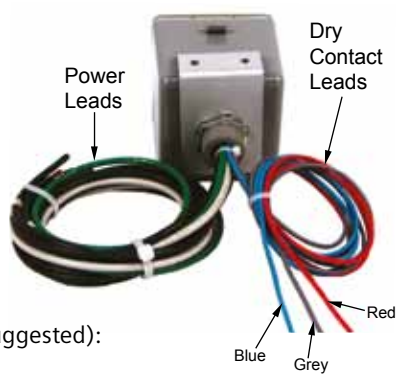
The contact is rated 250V, 5A. Higher energy applications require supplemental relaying. This option monitors suppression element condition and is not intended for use as phase loss or phase detection monitoring.

Normal Operation

Green LED Indicators
Each phase's LED Indicator illuminates when the SPD is energized and operating correctly. Every suppression element is monitored and connected by logic to the LED. Should any suppression element fail, the green LED will extinguish.

Form C Dry Contact and Audible Alarm Option
Similar to the Green LEDs above, the dry contact will change state and the audible alarm will sound upon suppression element failure. The audible alarm may be silenced by removing power to the SPD.

Figure 7: Dry Contacts



- Normally Closed (suggested):
  Use Gray and Blue
- Normally Open:
  Use Gray and Red

Blue	Normally Closed
Gray	Common
Red	Normally Opened

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Maintenance

SPDs require minimal maintenance. Periodic inspection of diagnostic indicators is recommended to ensure proper operation.

Troubleshooting & Service

Please contact us for any service related issues.

Quality SPDs withstand severe duty and attempt to protect their load until failure. There are electrical anomalies that SPDs cannot protect against. 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. A failed SPD is usually a sign of other problems within the electrical distribution system. As a generalization, the single largest cause of SPD failures is reference to ground issues. If the SPD shows problems on startup, there is reasonable chance of bonding/grounding/misapplication issue. This permanently damages the unit. If not corrected, it will happen again.

Warranty and Customer Service

Limited Warranty

Siemens warrants its AC Panel protection products against defective workmanship and materials for 10 years. Liability is limited to the repair or replacement of the defective product at Siemens' option. A Return Material Authorization number (RA#) must be given by the company prior to the return of any product. Returned products must be sent to the factory with the transportation charges prepaid. In addition, the company also warranties unlimited replacement of modular and component parts within the warranty period previously described.

The company specifically disclaims all other warranties, expressed or implied. Additionally, the company is not be responsible for incidental or consequential damages resulting from any defect in any product or component thereof.

The sales contract contains the entire obligation of Siemens. This instruction manual shall not become part of or modify any prior existing agreement, commitment or relationship.

Technical Support

1.888.333.3545

Prior to calling Siemens TPS3 Technical Support for assistance or ordering parts, please have the following information available:

TPS3 model number: _____
Manufacture date: _____
Date of Purchase: _____
Your order number: _____

Return Shipment Address:

Siemens - Attn: RA #_____
14550 58th Street North
Clearwater, FL 33760

Siemens Industry, Inc.
Building Technologies Division
5400 Triangle Parkway
Norcross, GA 30092
1-800-964-4114
info.us@siemens.com

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