Installation, Operation
and Maintenance Manual

CS3 Series STABILINE®

Surge Protective Devices

Superior Electric

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Installation Assistance

Today's sophisticated electronic equipment requires superior surge protection. By selecting Superior Electric's devices, you have taken a critical step toward decreasing downtime and ensuring longer product life for your equipment.

The CS3 Series STABILINE® Surge Protective Device is designed to be connected to your electrical distribution system to protect connected sensitive electrical and electronic equipment against the harmful effects of lightning strikes, internally generated transients and high frequency noise.

It combines easy and flexible installation with many special features to deliver more performance than other devices in its class.

Thank you for choosing a CS3 Series STABILINE® Surge Protective Device. We look forward to fulfilling your facility-wide surge suppression filter system needs.

The Importance of Correct Installation

This manual provides guidelines for the proper installation of the CS3 family of devices. Proper product selection and compliance with these guidelines will help your new suppression system provide years of reliable service. If installers are unsure about the facility electrical configuration or have other installation-related questions, it is recommended they consult with a master electrician or other qualified electrical professional.

When shortcuts are taken or installation procedures are not followed, the SPD system may be damaged or may not provide adequate protection. It is extremely important to follow these installation procedures carefully.

WARNINGS!

WARNING! The SPD warranty is voided if the unit is damaged as a result of improper installation or the installer's failure to verify the following conditions prior to installation.

WARNING! HAZARDOUS VOLTAGES PRESENT Improper installation or misapplication may result in serious personnel injury/or damage to the electrical system. Read the complete installation instructions before proceeding with installation. Remove all power to the electrical panel before installing or servicing the surge protective device (SPD).

IMPORTANT SAFETY INSTRUCTIONS All work must be performed by licensed and qualified personnel. The electrical system must be properly grounded in accordance with the U.S. National Electrical Code, state and local codes or other applicable codes for this SPD to function properly. This device is suitable for installation where the available short circuit current is 200,000 rms symmetrical amperes up to 600VAC or less. For countries outside of the US follow applicable electrical specifications for the electrical specifications for the country the unit is being used in.

WARNING! Check to ensure that a proper bond is installed between neutral and ground at the transformer upstream from all 3-phase WYE, 3-phase High Leg DELTA or Split-Phase SPD device (See NEC Article 250). If the transformer is not accessible, check the main service disconnect/panel for the N-G bond. Lack of a proper bond will damage SPD and void the warranty.

Before Installation: System Configuration Verification

Confirm that the voltage(s) and service configuration shown on the SPD product label are consistent with the voltage and service configuration of the facility. A model number is on the right side of the SPD unit. Each model number corresponds to the configurations printed in the table below:

Example of a SPD model number: CS3-150-120/208-3GY-SC-L1

CS3	-	150	-	120/208	-	3GY	-	SC	-	L1
Model		kA Rating		Voltage		Configuration		Surge Counter		Relay Contacts

MODEL	NOMINAL VOLTAGE RANGE	L-N VOLTAGE RANGE	L-L VOLTAGE	CONFIGURATION
CS3-XXX-120-1G-SC-L1	120	90-132	90-132	1-Phase, 2-Wire + Ground
CS3-XXX-240-1G-SC-L1	240	180-264	180-264	1-Phase, 2-Wire + Ground
CS3-XXX-120/240-1G-SC-L1	120/240	108-132	216-264	Split-Phase, 3-Wire + Ground
CS3-XXX-120/208-1G-SC-L1	120/208	108-132	187-229	3-Phase WYE, 4-Wire + Ground
CS3-XXX-220/380-1G-SC-L1	220/380	198-253	342-440	3-Phase WYE, 4-Wire + Ground
CS3-XXX-240/415-1G-SC-L1	240/415	216-264	373-457	3-Phase WYE, 4-Wire + Ground
CS3-XXX-277/480-1G-SC-L1	277/480	249-305	432-528	3-Phase WYE, 4-Wire + Ground
CS3-XXX-347/600-1G-SC-L1	120/240	108-132 (A, C) 187-229 (B)	216-264	3-Phase, High Leg 4-Wire + Ground
CS3-XXX-120/240-3GHD-SC-L1	347/600	313-394	540-660	3-Phase WYE, 4-Wire + Ground
CS3-XXX-240-3DG-SC-L1	240	N/A	216-264	3-Phase DELTA, 3-Wire + Ground
CS3-XXX-380-3DG-SC-L1	380	N/A	342-418	3-Phase DELTA, 3-Wire + Ground
CS3-XXX-480-3DG-SC-L1	480	N/A	432-528	3-Phase DELTA, 3-Wire + Ground
CS3-XXX-600-3DG-SC-L1	600	N/A	540-660	3-Phase DELTA, 3-Wire + Ground

Environmental Condition Verification

Confirm that the environmental conditions are consistent with the following ranges:

- Ambient Temperatures: Between -40° and +158°F (-4.5 to 70° C).
- Relative Humidity: Between 5% and 95% non-condensing.
- Altitude: Less than 13,000 feet (4000m).

Wiring Connection Diagrams

Figures 1-4 show the electrical relationship between the CS3 Series and these 5 basic service TNCS grounded configurations: Single Phase, 2-Wire; Split-Phase, 3-Wire; Three-Phase, 4-Wire WYE; Three-Phase, 3-Wire DELTA and Three-Phase, 4-Wire High-Leg DELTA.

Fig. 1: Single Phase, 2-Wire

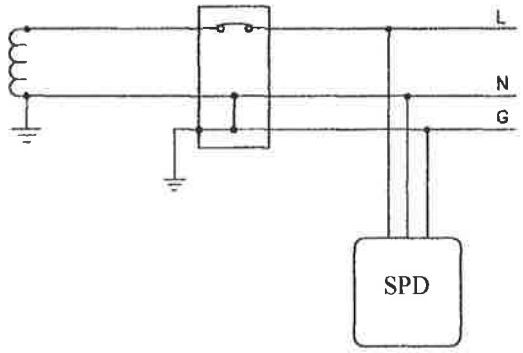


Fig. 2: Split-Phase, 3-Wire

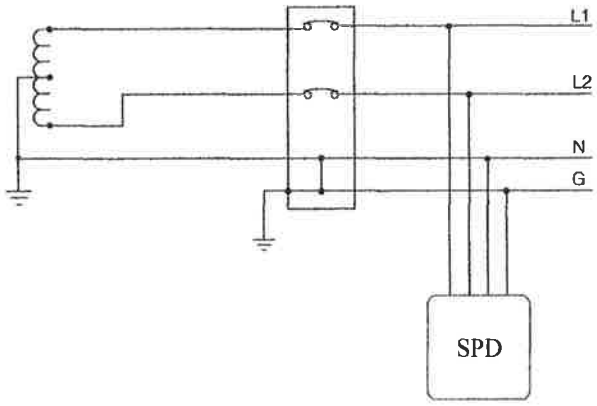


Fig. 3: 3-Phase, 4-Wire WYE

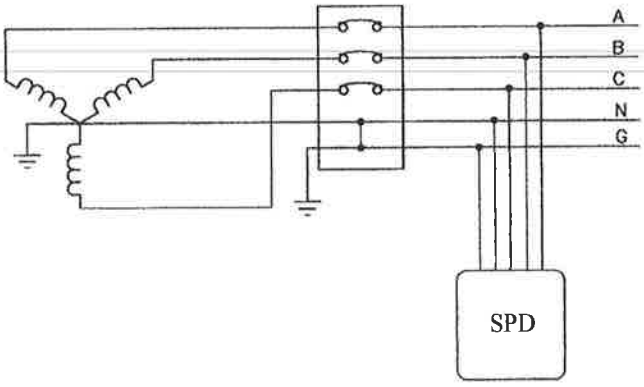


Fig. 4: 3-Phase, 3-Wire DELTA

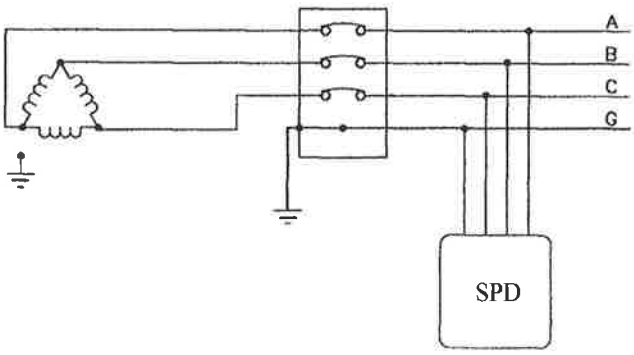
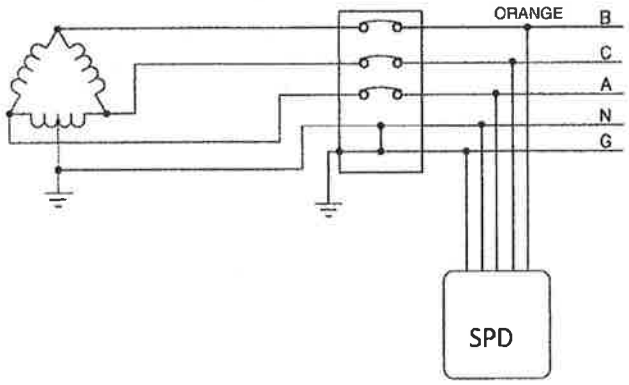


Fig.5: 3-Phase, 4-Wire High-Leg DELTA



Conductor Sizing and Routing

CAUTION: Careful consideration must be made when select- ing an area for conduit entry. There are several components inside the enclosure that may interfere with the conduit entry path, therefore, ensure the path is clear of all objects before drilling. Damages caused by installation errors are not covered under the product warranty

Superior Electric recommends installing a CS3 Series Unit by using the following conductor size for phase, ground and neutral connections. The conductor length should be as short as possible to ensure the maximum level of protection. Use a larger conductor (not to exceed the maximum allowed per a given model) where space and bending radii permit.

The selected mounting location should allow for the shortest possible conductor runs and a direct route with a minimum of bends. If bends are required, they should be sweeping bends (12″ radius). Do not make sharp 90° bends for appearance purposes because they will severely decrease the effectiveness of the SPD unit.

Binding or twisting conductors together using tiewraps or electrical tape increases the protection performance of the device.

Conductor Sizing Recommendation

PRODUCT LABEL DESIGNATION	SURGE CURRENT CAPABILITY	CONDUCTOR SIZE RECOMMENDED	MAXIMUM
CS3-80	80kA/mode – 160kA/phase	#10AWG	#2AWG
CS3-150	150kA/mode – 300kA/phase	#3AWG	#2AWG
CS3-200	200kA/mode – 400kA/phase	#3AWG′	#2AWG

CS3 units are shipped with compression box lugs. Terminals are identified with markers (Phase A, B, C, Line 1, Line2, Neutral or Ground).

The factors listed above should be addressed during the design of an installation to reserve a suitable place for the SPD next to its point of connection to the electrical system.

Mounting

Mount the SPD to the building structure using construction methods and hardware appropriate for your site. Install the conduit and pull the conductors as specified above or according to the engineer's design.

Conduit Openings

If desired, punch holes at this time for the conduit or nipple or wait until the SPD is mounted to the building structure. Punch holes only in the designated areas as shown in the following illustration.

CAUTION: Careful consideration must be made when selecting an area for conduit entry. There are several components inside the enclosure that may interfere with the conduit entry path, therefore, ensure the path is clear of all objects before drilling. Damages caused by installation errors are not covered under the product warranty. See Fig. 5 for conduit openings and enclosure dimensions.

Upstream Over-Current Protection Device

The CS3 Series unit has been listed to UL1449 as a Type 1 SPD. Type 1 SPDs can be used in Type 1 or Type 2 SPD applications, which means that the SPD does not need to be connected behind an upstream over current protection device and can be connected on either the line or load side of the main service disconnect. The SPD must be connnected in parallel with the electrical system. All SPD units come standard with component-level over-current fusing rated at 200,000 rms symmetrical amperes at 600VAC and can be connected directly to the electrical distribution system bus without an upstream over-current protection device (OCPD). If installing as a Type 2 SPD the use of an external OCPD is recommended.

If the SPD is connected to a dedicated OCPD, a 60A breaker is recommended (30A minimum, 200A maximum). The advantage of using a dedicated over-current device for the SPD (even if the upstream breaker is 200A or less) is that it allows the SPD to be de-energized during service without disturbing the electrical service to the rest of the facility.

Electrical Connections

CAUTION: Prior to installation ensure the system configuration and voltage is equivalent to the SPD unit being installed.

Following all applicable National Electrical Code standards as well as state and local codes, connect phase, neutral* and ground to the SPD. The installer must provide the appropiate conductors.

Ensure that the conductor lengths are kept as short and straight as possible. On all High-Leg DELTA systems, the High-Leg (208V L-N) must be connected to the Phase B of the SPD (color-coded orange accord- ing to NEC).

* *The 3-wire plus ground DELTA SPD does not have a neutral conductor*

Connecting Form C Dry Contacts

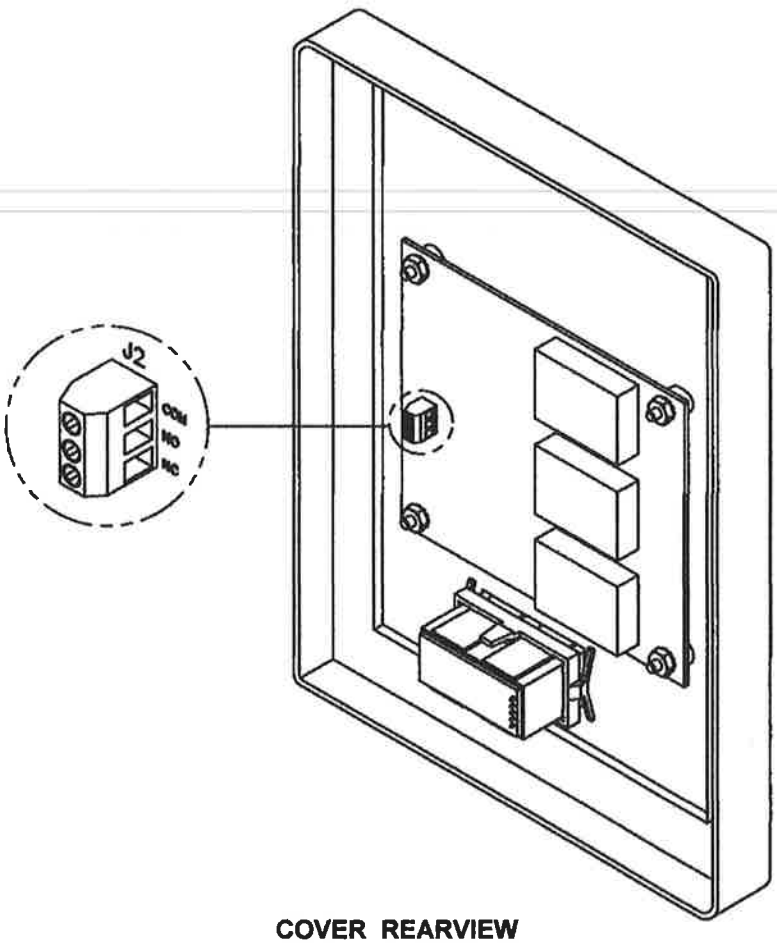
All CS3 Series units come standard with one set of Form "C" dry relay contacts for the surge protective device status. These contacts are for connection to a user-provided remote alarm and monitoring circuit. The relay contacts are rated 150VDC/125VAC with maximum switching power of 30WDC/60VA AC.

See Figure for the form C contact configuration and terminal location on the monitor board. The annotations on the diagram match the markings on the terminal block.

When input power is present on all phases, terminals "NO" and "COM" are an open circuit and terminals "NC" and "COM" are a closed circuit. The contacts change state when the unit has encountered failure to one or more phases.

The installer must provide the appropriate raceway and wiring for the monitoring circuit, observing the restrictions and conduit openings illustrated in an earlier section of this manual. The installer must route the monitoring conductors to the terminal blocks on the door-mounted main monitoring board. Route the wires to allow the door to be opened and closed properly. Tighten screws on terminals to 3.5 in-lbs (0.4 Nm). This terminal block will accept wire sizes #28AWG to #16AWG. #18- #20 AWG is recommended.

Remote Monitoring Terminal Block



COVER REARVIEW

Verification and Power Up

WARNING: It is recommended that the cover of the SPD unit along with its associated cabling be installed prior to applying power. The monitoring harness, which exits the epoxy and connects to J2 on the monitor board, contains line voltage when power is applied to the unit.

CS3 Series Diagnostics

Apply power to the SPD by closing the over-current protection device or switch feeding the suppressor.

Verify that all "Protection Available" indicating lights are illuminated. The "Protection Available" indicating light extingushes only upon failure of one or more phases (indicating an alarm condition).

Audible alarm should not operate under normal conditions. The audible alarm can be "muted" by pressing the "ALARM SILENCE" button, which subsequently will illuminate the "ALARM SILENCED" light. Pressing the "ALARM SILENCE" button again will enable the audible alarm.

CAUTION: Pressing the "ALARM SILENCE" button when the alarm has not triggered will prevent the audible alarm from sounding during a failure.

Troubleshooting

Your SPD system does not require scheduled maintenance. The unit's heavy-duty construction is designed to provide years of uninterrupted service. The unit contains no serviceable parts.

INDICATION	PROCEDURE
One or more phase protection status indicating lights are off, service required indicating light is on, or form C alarm contacts have changed state	Verify that the input power feeding the SPD is energized using a voltage tester. If power is present, contact factory for assistance: 800-787-3532 Ext. 70782

Technical Assistance

Our staff is ready to support you and answer any questions.
Monday through Friday, 8:00 a.m. to 5:00 p.m. (EST) at 800-787-3532 Ext. 70782.

Returns and Warranty Procedures

CS3 Series units are warranted for a period of 7 years from date of purchase. In the event that any module or subassembly within the SPD fails to perform as specified during the warranty period, call our Technical Support at 800-787-3532 Ext. 70782.

A Return Material Authorization (RMA) number must be obtained from the company's Customer Service department before replacement products can be shipped. To help expedite the return procedures, please have the following information at hand when you contact Superior Electric:

INFORMATION	EXAMPLE
Model Number	CS3-100-120/208-3GY-SC-L1
Serial Number	15478-0110-001
Date of Purchase	January 2, 2010 (1st week)
Description of Failure	"Service Required" indicating light illuminated
Desired Action from Superior Electric	Replace

Available Coast-to-Coast and Internationally

Voltage Control Components

VOLT-PAC® Variable Transformers
POWERSTAT® VariableTransformers
LUXTROL® Lighting Controls
5-WAY® Binding Posts
SUPERCON® Electrical Connectors

Voltage Control Components are available worldwide through an extensive Authorized Stocking Distributor network. These Distributors offer literature, technical assistance and a wide range of models off the shelf for fastest possible delivery and service.

Power Quality Solutions

STABILINE® Automatic Voltage Regulators
STABILINE® Surge Protective Devices
STABILINE® Uninterruptible Power Supplies
STABILINE® Power Conditioners

STABILINE Power Quality Solutions are available worldwide through an extensive Authorized Distributor and Resellernetwork which offer literature, technical assistance and a select range of models off-the-shelf for fastest possible delivery and service.

In addition, Superior Electric Manufacturer's Representatives are available to provide prompt attention to customer needs. Call or Fax for ordering and application information or for the address of the closest Manufacturer's Representative, Authorized Distributor or Reseller.

Superior Electric

Telephone and Fax Numbers		Toll-Free (in USA and Canada only)	
Telephone	860-507-2025	Telephone:	1-800-787-3532
Fax	860-507-2050	Fax	1-800-821-1369
Customer Service	860-507-2025, Ext. 70782	Customer Service	1-800-787-3532, Ext. 70782
Product Application	860-507-2025, Ext. 72058	Product Application	1-800-787-3532, Ext. 72058

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