Surge Protective Devices

STV100K Series

SOLAHD™

EMERSON™

Safety Information

Important Information

Read these instructions carefully and look at the equipment to become familiar with the device before trying to install, operate, service or maintain it. The following special messages may appear throughout this bulletin or on the equipment to warn of potential hazards or to call attention to information that clarifies or simplifies a procedure.

The addition of either symbol to a “Danger” or “Warning” safety label indicates that an electrical hazard exists which will result in personal injury if the instructions are not followed.

This is the safety alert symbol. It is used to alert you to potential personal injury hazards. Obey all safety messages that follow this symbol to avoid possible injury or death.

⚠ DANGER

DANGER indicates a hazardous situation which, if not avoided, **will result in** death or serious injury.

⚠ WARNING

WARNING indicates a hazardous situation which, if not avoided, **could result in** death or serious injury.

⚠ CAUTION

CAUTION indicates a hazardous situation which, if not avoided, **could result in** minor or moderate injury.

NOTICE

NOTICE is used to address practices not related to physical injury. The safety alert symbol shall not be used with this signal word.

Please Note

Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. No responsibility is assumed by Appleton Grp LLC d/b/a Appleton Group for any consequences arising out of the use of this material.

A qualified person is one who has skills and knowledge related to the construction, installation, and operation of electrical equipment and has received safety training to recognize and avoid the hazards involved.

Precautions

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- This equipment must be effectively grounded per all applicable codes. Use an equipment-grounding conductor to connect this equipment to the power system ground.
- Do not install in areas with excessive dust, corrosive vapors, flammable materials, or explosive atmospheres.

Failure to follow these instructions will result in death or serious injury.

⚠ **WARNING:** This product can expose you to chemicals including DINP, which is known to the State of California to cause cancer, and DIDP which is known to the State of California to cause birth defects or other reproductive harm. For more information go to: www.P65Warnings.ca.gov.

NOTICE

LOSS OF BRANCH CIRCUIT POWER / LOSS OF SURGE SUPPRESSION

- Perform periodic inspection of the surge protective device status indicator lights as part of the preventative maintenance schedule.
- Promptly replace the surge protective device when an alarm state exists.
- Use dry contacts to signal an alarm state to the central supervisory system for unmanned, inaccessible, or critical installations.
- Use multiple surge protective devices to achieve redundancy for critical applications.

Failure to follow these instructions can result in equipment damage.

At end-of-life conditions, Surge Protective Devices (SPDs) can lose their ability to suppress power system transient voltage spikes and attempt to draw excessive current from the line. This SPD is equipped with overcurrent and overtemperature components that will automatically disconnect the surge suppression elements from the mains should the surge suppression elements reach end of life. Tripping of the branch circuit breaker or fuse feeding the SPD can occur. Mitigate the tripping of the branch circuit breaker or fuse feeding the SPD by coordinating the surge suppression elements with the branch circuits.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not energize the surge protective device until the electrical system is completely installed, inspected and tested.
- Ensure all conductors are connected and functional.
- Verify the voltage rating of the device and system prior to energizing.
- Perform high-potential insulation testing, or any other tests where surge protective device components will be subjected to voltages higher than their rated turn-on voltage, with the neutral and surge protective device disconnected from the power source

Failure to follow these instructions will result in death or serious injury.

Introduction

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment.
- This equipment must be effectively grounded per all applicable codes. Use an equipment-grounding conductor to connect this equipment to the power system ground.

Failure to follow these instructions will result in death or serious injury.

The SolaHD STV100K surge protective device is a surge current diversion system designed for use with equipment that is sensitive to damaging transient voltage surges.

Installation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E, NOM-029-STPS or CSA Z462.
- This equipment must only be installed and serviced by qualified electrical personnel.
- Turn off all power supplying this equipment before working on or inside equipment.
- Always use a properly rated voltage sensing device to confirm power is off.
- Replace all devices, doors and covers before turning on power to this equipment. All wiring must comply with the National Electrical Code (NEC) and applicable local codes.
- This equipment must be effectively grounded per all applicable codes. Use an equipment-grounding conductor to connect this equipment to the power system ground.
- For proper operation, neutral and ground must be reliably connected. Improper grounding will reduce or impede operation, and may result in damage to the SPD.
- Confirm that the Surge Protective Device voltage rating on the module or nameplate label is not less than the operating voltage.

Failure to follow these instructions will result in death or serious injury.

Read all instructions before starting the installation of this product. These instructions do not replace national or electrical codes.

The SolaHD STV100K Series Surge Protective Device is a high-quality, high-energy surge current diversion system designed to help protect sensitive equipment from damaging transient voltage surges resulting from load switching, lightning strikes, and other sources.

The installer should perform the following steps to ensure a quality installation. Please read all instructions before starting the installation of this product.

Environment

The unit is designed for operation indoors in an ambient temperature range of -40°C to +50°C (-40°F to +122°F), with a relative humidity of 0% to 95% non-condensing.

The unit is provided in a NEMA 12 metallic industrial enclosure. Do not install in areas with excessive dust, corrosive vapors, flammable materials, or explosive atmospheres.

NOTICE

LOSS OF SURGE SUPPRESSION

- Do not install in areas with excessive dust, corrosive vapors, flammable materials, or explosive atmospheres.

Failure to follow these instructions can result in equipment damage.

Mounting

Mount the unit as close as possible to the service panel. The unit should be positioned so that the length of the wiring to the surge protective device (SPD) is minimized. Use #10 (NEMA 12) mounting hardware.

SPD Type

The STV 100K series are Type 2 SPDs.

Mechanical Dimensions

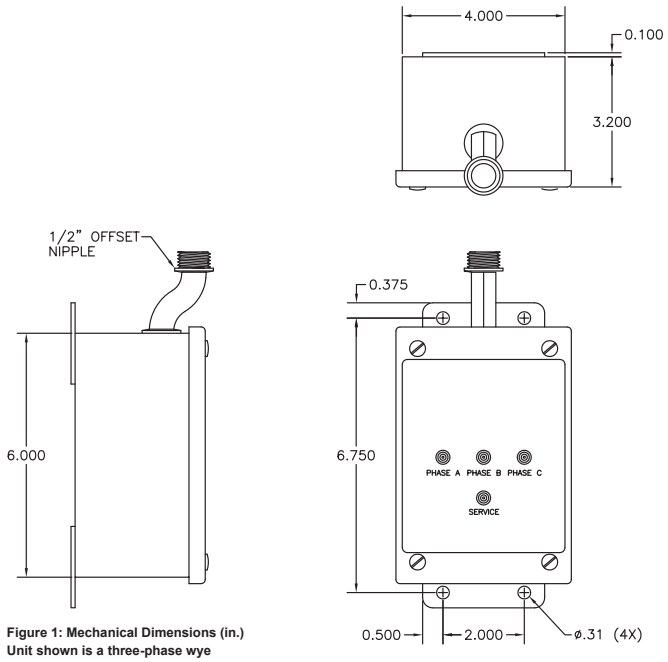


Figure 1: Mechanical Dimensions (in.)
Unit shown is a three-phase wye

Voltage Protection Ratings (VPRs)

To maintain the voltage protection ratings, #12 AWG wire must be utilized to connect the STV100K Series to your facility's power grid.

Wire Sizing/Routing

Phase, N, and GND wires are #12 AWG. NO, NC, and COM relay wires are #18 AWG. To reduce the wiring impedance to surge currents, we recommend the phase, neutral (if required), and ground conductors to be twisted together and routed in the same raceway (conduit). Avoid any sharp bends in the conductors. All wiring must comply with the National Electrical® Code (NEC®), Canadian Electrical Code (CEC) and applicable local codes.

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Do not supply more than 24VDC / 24VAC and no more than a current of 2 A to contacts.
- Confirm that the Surge Protective Device voltage rating on the module or nameplate label is not less than the operating voltage.

Failure to follow these instructions will result in death or serious injury.

Wiring Connections

Before making connections to the unit, verify that the unit model number and nameplate voltage rating are appropriate for connection to the intended power source. See **Table 1** for voltage rating applications with typical power source configurations.

1. Turn off all power supplying this equipment before working on or inside equipment.
2. It is recommended that a 20A circuit breaker be used for installation and connection to the service panel.
3. Connect the white neutral wire of the SPD (if provided) to the neutral of the supply. Connect the green ground wire of the SPD to source ground.
4. Connect each Black Phase Wire to corresponding phase on the service panel. For delta high leg units, ensure the high leg is connected to phase B of the SPD so they do not interfere with proper operation.
5. If you are not using the relay contacts for remote sensing, cut and insulate the orange COM wire, the blue NC wire, and the yellow NO wire in the conduit. For remote sensing, wires are connected to COM, NC, and NO respectively.
6. Replace the barrier, cover/door and/or trim to the equipment.
7. Equipment may be re-energized after all the above steps are complete.

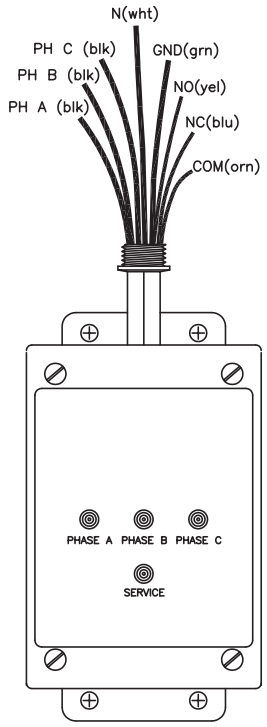


Figure 2: Wiring connections

NOTES:

- Figure 2 is a three-phase wye. A three-phase delta will have no neutral wire. For a three-phase delta high leg, Phase B will be the high leg. A split phase unit will have no Phase C and can be labeled Line 1 and Line 2.
- A single-phase L-N unit will have one black phase wire, a white neutral wire, and a green ground wire. A single-phase L-L unit will have two black phase wires and the green ground wire.
- Summary alarm Form C (1 NO and 1 NC) relay contacts may be provided for remote indication of a loss of surge protection. This indication may also consist of a phase loss or undervoltage condition.
- Summary alarm Form C relay contacts are rated 5 A at 125 VAC maximum with a power factor of 1.0. For units with Summary Alarm Contacts, access to the contacts are provided via #18 AWG wires (yellow NO, orange COM, and blue NC).

Applying Power

Apply power to the SPD and ensure status indications are normal. Under normal conditions, the green LEDs are illuminated and the red “Service” LED is extinguished. If normal status indication does not exist, see “Troubleshooting.”

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- The high-leg of the power system must connect to the B phase lug of the SPD.

Failure to follow these instructions will result in death or serious injury.

Table 1: Voltage Ratings & Power Source Configurations

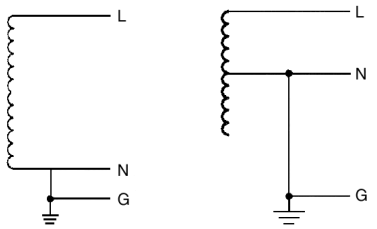
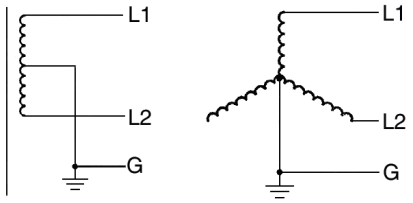
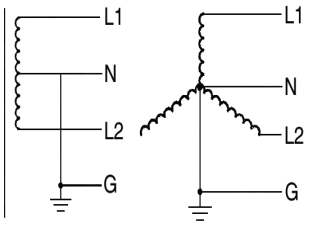
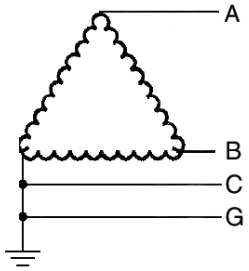
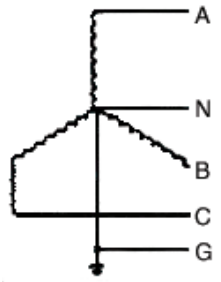
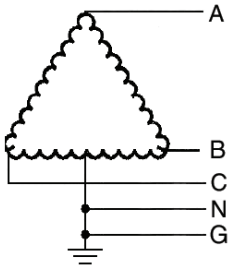
Model: STV100K-10N Nominal Voltage: 120 V	Single-phase, 2W + G 
Model: STV100K-24L Nominal Voltage: 240 V	Single-phase, 2W + G 
Model: STV100K-10S Nominal Voltage: 120/208–240 V	Single-phase, 3W + G 
Model: STV100K-24D Nominal Voltage: 240 V Model: STV 100K-48D Nominal Voltage: 480 V	Three-phase delta, 3W + G 

Table 1: Voltage Ratings & Power Source Configurations	
Model: STV100K-10Y Nominal Voltage: 120/208 V Model: STV100K-23Y Nominal Voltage: 230/400 V Model: STV100K-27Y Nominal Voltage: 277/480 V	**Three-phase wye, 4W + G** 
Model: STV 100K-10D4 Nominal Voltage: 120/240 V Model: STV 100K-24D4 Nominal Voltage: 240/480 V	**Three-phase delta high leg, 4W + G** 

Troubleshooting

If any of the diagnostic indicators indicate a problem (e.g., red “Service” LED on and/or green LEDs off), check all connections and voltages to the unit.

If all connections are made and reliable, and proper voltages are supplied to the unit, contact SolaHD Technical Support at (800) 377-4384/(847) 268-6651 or by e-mail at solahd.technicalservices@emerson.com.

Warranty

Please refer to the “Terms & Conditions of Sale” document or visit www.solahd.com.

Technical Support

Website: www.solahd.com

Technical Support E-Mail: solahd.technicalservices@emerson.com

Toll-Free: (800) 377-4384

USA: (847) 268-6651

While every precaution has been taken to ensure accuracy and completeness in this manual, Appleton Grp LLC d/b/a Appleton Group assumes no responsibility, and disclaims all liability for damages resulting from use of this information or for any errors or omissions.

Specifications

Table 2: Technical Specifications					
Parameters	**Model**				
	STV100K10N	**STV100K24L**	**STV100K10S**	**STV100K10Y**	**STV100K23Y**
Nominal Input Voltage	120 V	240 V	120/208–240 V	120/208 V	230/400 V
System Configuration	1-phase 2W + G	1-phase 2W + G	1-phase 3W + G	3-phase wye 4W + G	3-phase wye 4W + G
Maximum Continuous Operating Voltage (MCOV)	150Vpk	320Vpk	150Vpk	150Vpk	320Vpk
Line Frequency	47–63 Hz				
Response Time	<0.5 ns				
SCCR Rating	100 kA				
Fusing	Thermal and fault current				
Nominal Discharge Current Rating	20 kA				
Operating Temperature	-40°C to +50°C (-40°F to +122°F)				
Operating Humidity	0 to 95% non-condensing				
Noise Attenuation	40 dBA maximum				
Dimensions, W x D x H	6.00 in. x 4.00 in. x 3.20 in. (152.4 mm x 101.6 mm x 81.28 mm)				
Net Weight	8.0 lb. (3.63 kg)				
Enclosure	Metal, NEMA 12 enclosure				
Connection/Mounting Type	Parallel/Flange				
Status Indication	Red and green LED status indicators, audible alarm, Form C contacts				
Standard Certifications	cULus Listed: UL 1449, CSA C22.2 No. 269.2				
Warranty	10 years				
Type 2 Voltage Protection Ratings					
Line to Neutral	600 V	N/A	600 V	600 V	1200 V
Line to Line	N/A	1000 V	1000 V	1000 V	1800 V
Line to Ground	700 V	1200 V	700 V	700 V	1200 V
Neutral to Ground	600 V	N/A	600 V	600 V	1200 V
High Leg to Neutral	N/A	N/A	N/A	N/A	N/A
High Leg to Line	N/A	N/A	N/A	N/A	N/A
High Leg to Ground	N/A	N/A	N/A	N/A	N/A
Peak Surge Current Capability					
Per Phase	100 kA	100 kA	100 kA	100 kA	100 kA
Line to Neutral	50 kA	N/A	50 kA	50 kA	50 kA
Line to Line	N/A	50 kA	50 kA	50 kA	50 kA
Line to Ground	50 kA	50 kA	50 kA	50 kA	50 kA
Neutral to Ground	50 kA	N/A	50 kA	50 kA	50 kA

Table 2: Technical Specifications

Parameters	Model				
	STV100K27Y	**STV100K24D**	**STV100K48D**	**STV100K10D4**	**STV100K24D4**
Nominal Input Voltage	277/480 V	240 V	480 V	120/240 V	240/480 V
System Configuration	3-phase wye 4W + G	3-phase delta 3W + G	3-phase delta 3W + G	3-phase delta high leg 4W + G	3-phase delta high leg 4W + G
Maximum Continuous Operating Voltage (MCOV)	320Vpk	320Vpk	550Vpk	150/320Vpk	320/550Vpk
Line Frequency	47–63 Hz				
Response Time	<0.5 ns				
SCCR Rating	100 kA				
Fusing	Thermal and fault current				
Nominal Discharge Current Rating	20 kA				
Operating Temperature	-40°C to +50°C (-40°F to +122°F)				
Operating Humidity	0 to 95% non-condensing				
Noise Attenuation	40 dBA maximum				
Dimensions, W x D x H	6.00 in. x 4.00 in. x 3.20 in. (152.4 mm x 101.6 mm x 81.28 mm)				
Net Weight	8.0 lb. (3.63 kg)				
Enclosure	Metal, NEMA 12 enclosure				
Connection/Mounting Type	Parallel/Flange				
Status Indication	Red and green LED status indicators, audible alarm, Form C contacts				
Standard Certifications	cULus Listed: UL 1449, CSA C22.2 No. 269.2, ABS Type Approval				
Warranty	10 years				
Type 2 Voltage Protection Ratings					
Line to Neutral	1200 V	N/A	N/A	600 V	1200 V
Line to Line	1800 V	1000 V	2000 V	1000 V	1800 V
Line to Ground	1200 V	1200 V	1800 V	700 V	1200 V
Neutral to Ground	1000 V	N/A	N/A	600 V	1200 V
High Leg to Neutral	N/A	N/A	N/A	1200 V	1800 V
High Leg to Line	N/A	N/A	N/A	1200 V	1800 V
High Leg to Ground	N/A	N/A	N/A	1800 V	3000 V
Peak Surge Current Capability					
Per Phase	100 kA	100 kA	100 kA	100 kA	100 kA
Line to Neutral	50 kA	N/A	N/A	50 kA	50 kA
Line to Line	50 kA	50 kA	50 kA	50 kA	50 kA
Line to Ground	50 kA	50 kA	50 kA	50 kA	50 kA
Neutral to Ground	50 kA	N/A	N/A	50 kA	50 kA

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