

SurgeLogic™

Modular Surge Protective Device (SPD)

Supplement for OEM Applications

Dispositivo de protección contra sobretensiones transitorias (SPD) modular
Suplemento para aplicaciones de fabricantes del equipo original (OEM)

Dispositif modulaire de protection contre les surtensions transitoires (SPD)
Supplément pour les applications d'équipementiers (OEM)

Instruction Bulletin

8222-0049, Rev. 01, 06/2016

Retain for future use.



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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 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.

CAUTION

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 service 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 injury or equipment damage.

At end-of-life conditions, Surge Protective Devices (SPDs) can lose their ability to block power system voltage and attempt to draw excessive current from the line. This SPD is equipped with overcurrent and overtemperature components that disconnect the surge suppression elements from the electrical supply should the surge suppression elements reach end of life. Tripping of the branch circuit breaker or fuse feeding the SPD can occur when the surge suppression elements reach end of life.

⚠ CAUTION

LOSS OF SURGE SUPPRESSION

- Do not energize the Surge Protective Devices until the electrical system is completely installed, inspected, tested, and all conductors have been connected and functional, including the neutral.
- Verify the voltage rating of the device and system before energizing the Surge Protective Device.
- 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 can result in injury or equipment damage.

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 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.

Note: For troubleshooting, call the Surgelogic Technical Assistance Group at 1-800-577-7353.

Proper installation is imperative to maximize the IMA SPD's effectiveness and performance. Follow the steps outlined in this instruction bulletin to ensure proper installation. Read the entire instruction bulletin before beginning the installation. These instructions are not intended to replace national or local electrical codes. Check all applicable electrical codes to verify compliance. Installation of IMA surge suppressors should only be performed by qualified electrical personnel.

Unpacking and Preliminary Inspection

Inspect the entire shipping container for damage or signs of mishandling before unpacking the device. Remove the packing material and further inspect the device for any obvious shipping damage. If any damage is found and is a result of shipping or handling, immediately file a claim with the shipping company.

Storage

The device should be stored in a clean, dry environment. Storage temperature is -40 °F to + 149 °F (-40°C to + 65°C). All of the packaging materials should be left intact until the device is ready for installation.

Safety Labels

English, Spanish, and French versions of all safety labels, (Danger, Warning, and Caution), are provided.

Location Considerations

Environment

The device is designed to operate in an ambient temperature range of -4 °F to + 149 °F (-20°C to + 65°C) with a relative humidity of 0 to 95% non-condensing. The operating temperature of the LCD on the diagnostic display panel is +14 °F to + 140 °F (-10°C to + 60°C). Refer to the product catalog for further details on enclosures. All IMA devices operate normally without reduction in performance when subjected to shock and vibrations described in IEC 60721-3-3, Class 3M4.

Audible Noise

The device background noise is negligible and does not restrict the location of the installation.

Mounting

Refer to page 13 for typical mounting dimensions.

Service Clearance

The service clearance should meet all applicable code requirements.

Equipment Performance

To obtain the maximum system performance, locate the device as close to the circuit being addressed as possible, to minimize the interconnecting wiring length. For every foot of wire length, approximately 160 Volts, (6 kV1 / 3 kA, 8/20 microsecond), is added to the suppressed voltage. The Voltage Protection Rating (VPR) is located on the device nameplate and is measured six inches from the enclosure sidewall, according to UL® 1449.

Electrical

Voltage Rating

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Confirm the Surge Protective Device voltage rating on the module or nameplate label is the same as the operating voltage.

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

Prior to mounting the SPD, verify that the device has the same voltage rating as the power distribution system in which it is installed. Compare the nameplate voltage on the SPD with the nameplate voltage of the electrical distribution equipment.

The specifier or user of the device must be familiar with the configuration and arrangement of the power distribution system in which any SPD is to be installed. The system configuration of any power distribution system is based strictly on 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. See Table 1 for the service voltage of each SPD.

Table 1: Voltage Ratings for OEM / Assembler Kits

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ¹
120/240 V, 1-phase, 3-wire + ground	120	TVS11MA120_
	160	TVS11MA160_
	240	TVS11MA240_
208Y/120 V, 3-phase, 4-wire + ground Wye ²	120	TVS21MA120_
	160	TVS21MA160_
	240	TVS21MA240_
240/120 V, 3-phase, 4-wire + ground High-Leg Delta	120	TVS31MA120_
	160	TVS31MA160_
	240	TVS31MA240_
480Y/277 V, 3-phase, 4-wire + ground Wye ³	120	TVS41MA120_
	160	TVS41MA160_
	240	TVS41MA240_
480 V, 3-phase, 3-wire + ground Delta ⁴	100	TVS51MA100_
	120	TVS51MA120_
	160	TVS51MA160_
	200	TVS51MA200_
	240	TVS51MA240_
240 V, 3-phase, 3-wire + ground Delta	100	TVS61MA100_
	120	TVS61MA120_
	160	TVS61MA160_
	200	TVS61MA200_
	240	TVS61MA240_

Continued—

Table 1: Voltage Ratings for OEM / Assembler Kits

Service Voltage	Peak Surge Current Rating Per Phase	Catalog Number ¹
600Y/347 V, 3-phase, 4-wire + ground Wye	120	TVS8IMA12O_
	160	TVS8IMA16O_
	240	TVS8IMA24O_
600 V, 3-phase, 3-wire + ground Delta ⁵	100	TVS9IMA10O_
	120	TVS9IMA12O_
	160	TVS9IMA16O_
	180	TVS9IMA18O_

¹ Catalog numbers are representational. Actual catalog numbers require a suffix to indicate enclosure, UL Type and options.

² 208Y/120 series also applies to the following voltage 220Y/127.

³ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230 and 415Y/240.

⁴ 480 V Delta series also applies to the following voltages: 480Y/277V HRG.

⁵ 600 V Delta series also applies to the following voltages: 600Y/347V HRG.

Terminals, Wire Size, and Installation Torque

Terminals are provided for phase (line), neutral and equipment ground connections. The IMA terminals accept a range of 12 AWG to 2 AWG copper wire for phase, neutral and ground connectors.

Table 2: Terminal Torque

Power Connection	Torque
AØ, BØ, CØ and N	35 lb-in. (4 N•m)
Ground	

Branch Circuit Overcurrent Protection

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Use conductors rated for the Overcurrent Protection Device (OCPD) per applicable codes.
- Use conductors rated for the application per applicable codes.

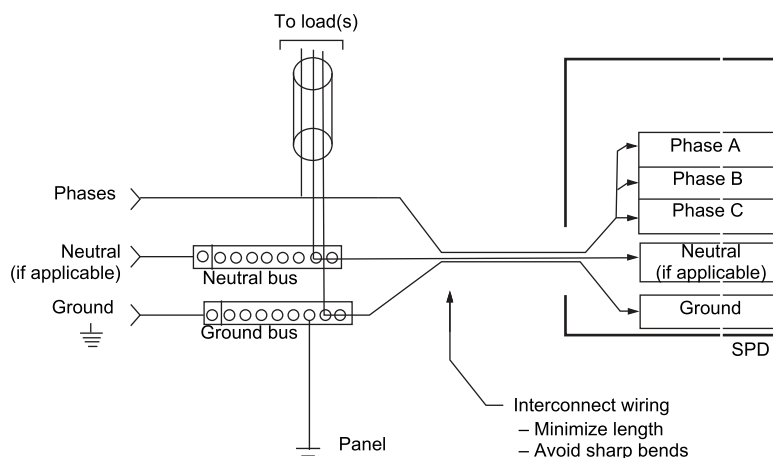
Failure to follow these instructions will result in death or serious injury.

UL 1449 Type 1 SPDs have been designed and approved for line side applications prior to the main service disconnect without supplemental overcurrent protection. Type 2 SPDs must be installed on the load side of the main Overcurrent Protection Device (OCPD). All installations should either provide or include a disconnecting means.

Location of Surge Protective Device (SPD)

Locate the SPD as close as possible to the circuit being addressed to minimize the wire length and optimize SPD performance. Avoid long wire runs so that the device will perform as intended. To reduce the impedance that the wire displays to surge currents, the phase, neutral, and ground conductors must be routed within the same conduit and tightly bundled or twisted together to optimize device performance. Avoid sharp bends in the conductors. See Figure 1.

Figure 1: Surge Protective Device Wiring Practice



Grounding

⚠ WARNING

HAZARDOUS TOUCH VOLTAGE

- Connect the Surge Protective Device ground terminal to the building grounding grid structure.
- Use an appropriately sized equipment grounding conductor.
- When using metallic raceway or conduit:
 - Do not use isolation bushings to interrupt the metallic raceway or conduit.
 - Maintain electrical continuity at all raceway and conduit connections using appropriate bonding devices.
- Do not use a separate isolated ground for the Internal Modular Assembly device.
- Verify proper equipment connection to the grounding system.
- Verify ground grid continuity by performing regularly scheduled inspections and testing as part of a comprehensive electrical maintenance program.

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

General

The IMA has SPD elements connected from phase to ground. It is critical that there be a robust and effective connection to the building grounding structure. The grounding connection must utilize an equipment grounding conductor run with the phase and neutral connection of the power system. Do not connect the SPD to a separate isolated ground.

For best overvoltage suppression by the IMA SPD, use a single-point ground system where the service entrance grounding electrode system is connected to, and bonded to, all other available electrodes, building steel, metal water pipes, driven rods, etc. (for reference, see NEC Art 250). The ground impedance measurement of the electrical system should be as low as possible and in compliance with all applicable codes.

Power System Grounding

In addition to the power system configuration and voltage, the power system grounding method must be considered when selecting the appropriate IMA device. Refer to the following chart for information concerning the suitability of IMA device to specific power system grounding method.

Table 3: Grounding Methods

IMA Device Catalog Number	Power System Grounding Method
TVS1IMA__	Solidly-Grounded
TVS2IMA__	
TVS3IMA__	
TVS4IMA__	
TVS8IMA__	
TVS5IMA__	Ungrounded / HRG
TVS6IMA__	
TVS9IMA__	

Solidly-Grounded Power Systems

NOTICE

SURGE PROTECTIVE DEVICE DAMAGE AND POWER SYSTEM OVERVOLTAGE

- Do not connect devices rated for use on solidly-grounded power systems to resistance-grounded (for example, High Resistance Ground) or ungrounded power systems.
- Verify that the service entrance equipment is bonded to ground in accordance with all applicable codes.
- Verify that the neutral terminal of the power system transformer feeding the device is bonded to system ground in accordance with all applicable codes.

Failure to follow these instructions can result in equipment damage.

SPDs rated for use on solidly-grounded power systems must not be connected to resistance-grounded or ungrounded power systems. Such a connection can result in damage to the SPD.

Always verify the power system grounding configuration prior to application of power to the device. Confirm that all ground bonds are installed at both the service entrance equipment and power system transformer prior to application of power.

Delta and Resistance-Grounded Power Systems

NOTICE

SURGE PROTECTIVE DEVICE DAMAGE AND POWER SYSTEM OVERVOLTAGE

- Ungrounded power 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.
- Resistance-grounded power systems must be maintained in an over-damped state to limit voltage overshoot and duration during operation.
- Verification and adjustment of correct power system damping should be done:
 - Periodically as part of normal system maintenance.
 - Following power system modifications.

Failure to follow these instructions can result in equipment damage.

The IMA product is intended for use on resistance-grounded power systems where the power system has been set for, and is maintained in, an over-damped state. For the power system to be over-damped, the current through the grounding resistor during a bolted phase-to-ground fault must be significantly greater than the total charging current of the system.

Periodic engineering evaluation of the power system is required to determine the worst-case charging current of the system and to adjust the grounding resistance accordingly. As the power system is modified, the value of the grounding resistor must be evaluated and adjusted to maintain the system in the over-damped state.

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 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.

UL Conditions of Acceptability

For use only in equipment where the acceptability of the combination is determined by Underwriters Laboratories®. When installed in the end-use equipment, the following are among the considerations to be made:

1. A suitable electrical enclosure shall be provided in the end-use product.
2. The device is intended for factory wiring only with the suitability of the connections (including spacings between factory connectors) determined in the end-use application.
3. Voltage Protection Rating (VPR) shall be determined in the end-product where applicable.
4. The SPD unit has been subjected to the following tests of UL1449:
 - a. Surge Testing (VPR)
 - b. Nominal Discharge Test (20 kA)
 - c. Operational Voltage Test
 - d. Dielectric Voltage Withstand
 - e. Current Tests (Short Circuit Current, Intermediate Currents, Limited Currents)
5. The component SPD has been evaluated to Short Circuit Rating tests (SCCR), per UL 1449, Section 39 at 200 kA rms available fault current, without external Overcurrent Protective Devices (OCPD) or external enclosures.

Wiring

DANGER

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- 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.

DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

Confirm the Surge Protective Device voltage rating on the module or nameplate label is the same as the operating voltage.

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

Follow the steps listed below when making wiring connections:

1. Turn off all power supplying this equipment before working on or inside any enclosure containing this equipment.
2. Confirm the SPD voltage rating and configuration is the same as the system voltage and power system configuration to which it will be connected.
3. Identify proper location for surge protective device. Locate as close as possible to the panel being addressed so the wires are as short as possible. Mount unit securely.

Note: The surge protective device must be installed in an accessible location as described in the NEC.

4. Install in accordance with national and local electrical codes for overcurrent protection recommendations and wire ampacity considerations.

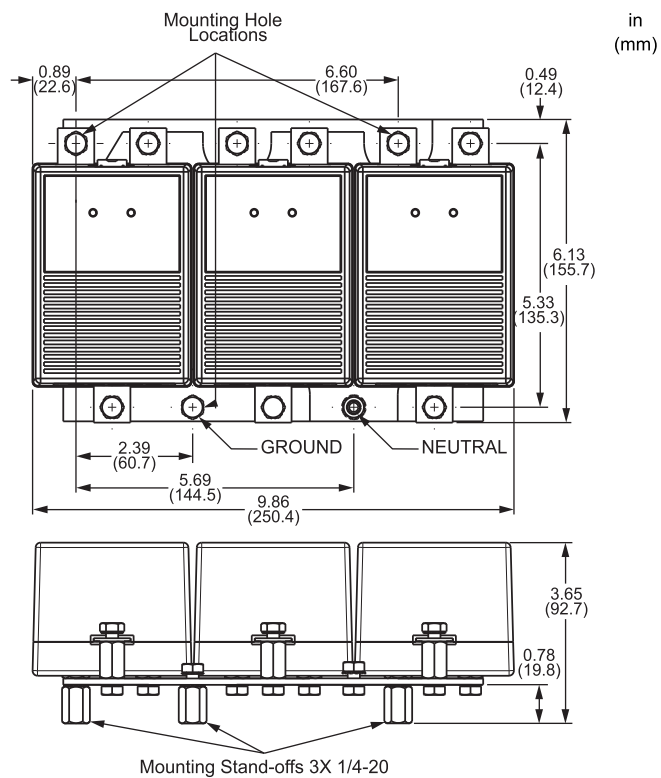
Note: The neutral connection is not present on three-wire, three-phase Wye ground or two-wire single-phase mid-point ground power systems. For these systems, bond the neutral and ground lugs together in the SPD. For a High Resistance Ground (HRG) or Delta SPD, no neutral connection exists. For installation wiring see Figures 6 and 7.

Note: See Terminals, Wire Size, and Installation Torque and Table 2 on page 7 for acceptable wire size and installation torque.

5. Twist conductors $\frac{1}{2}$ turn or more for every twelve-inches of length. Do not loop or coil wires. Be sure to maintain adequate wire bending space per NEC.
6. If the remote signaling contacts of the diagnostic display panel are to be used, refer to the section, "Dry Contacts", on page 18 for wiring instructions.
7. On a High-Leg Delta installation, note the high leg connection per wiring diagram. See Figure 5.
8. Replace all devices, doors and covers before turning on power to the equipment. If the SPD is properly installed and functioning, the green LED indicators on the display will be lit.

For questions pertaining to the installation of this device, contact the Surgelogic Technical Assistance Group at 1-800-577-7353.

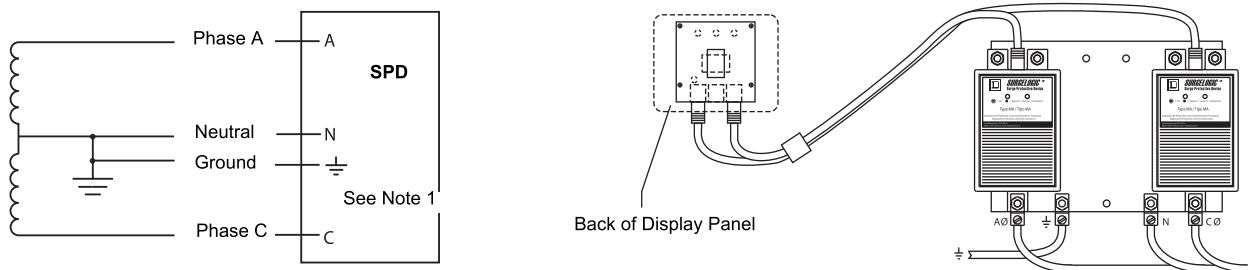
Figure 2: Dimensions and Mounting



Note: The neutral connection will not be present on Delta and HRG configurations.

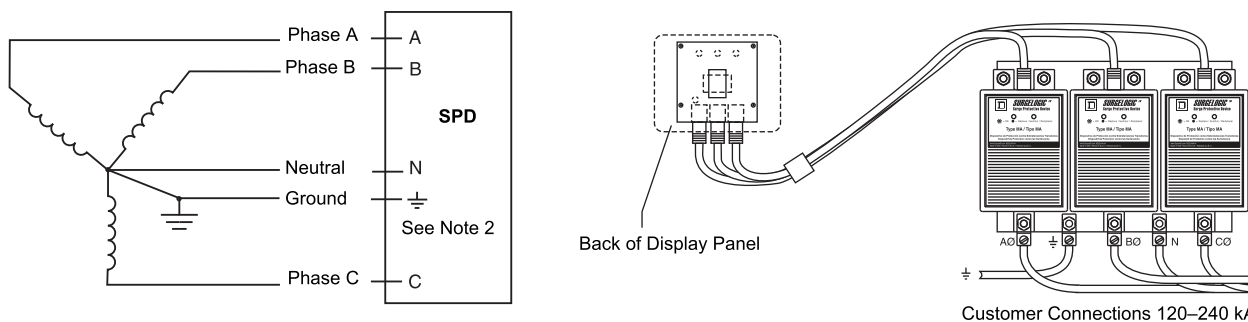
Wiring Diagrams

Figure 3: Single-Phase, Three-Wire, Grounded Installation Integral Switch



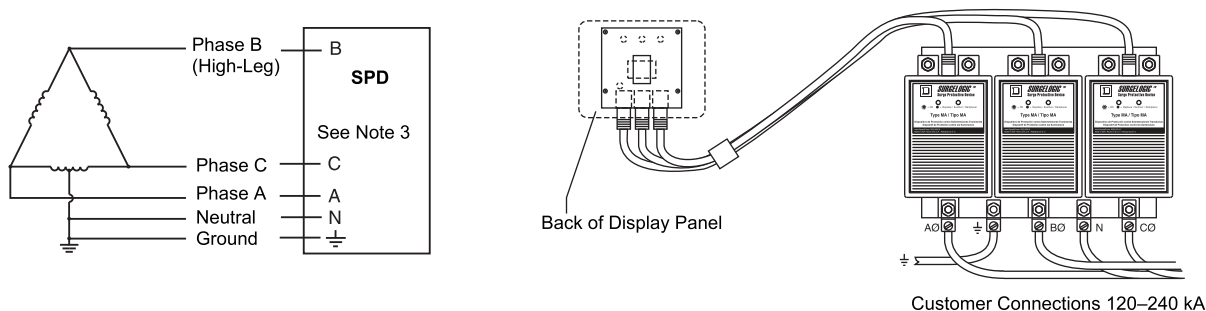
Note 1: The neutral conductor may not be present on three-wire, grounded neutral power systems. For these systems, tie the neutral and ground lugs on the SPD together.

Figure 4: Three-Phase, Three- or Four-Wire, Grounded Wye Installation



Note 2: The neutral conductor is not present on three-wire, grounded neutral power systems. For these systems tie the neutral and ground lugs of the SPD together.

Figure 5: Three-Phase, Three- or Four-Wire, High-Leg Delta Installation



Note 3: The high-leg of the power system must connect to phase B of the SPD. The neutral conductor is not present on three-wire, grounded neutral power systems. For these systems tie the neutral and ground lugs on the SPD together.

Wiring Diagrams for HRG and Delta Systems

Figure 6: High Resistance Ground (HRG) Wye Installation

Note 4: The neutral conductor is not present on HRG wye grounded power systems.

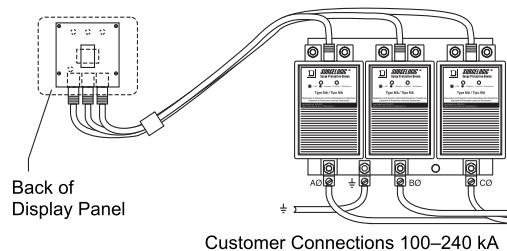
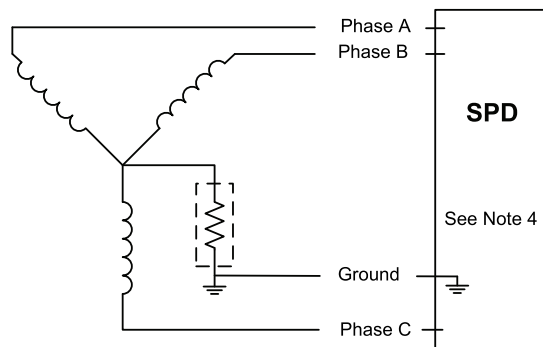
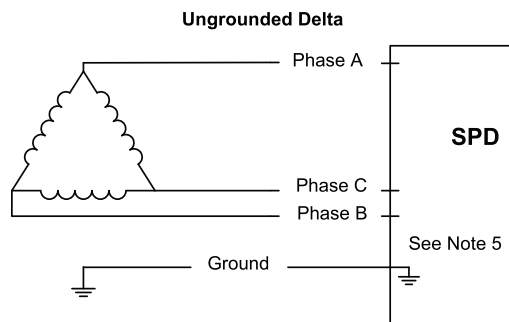
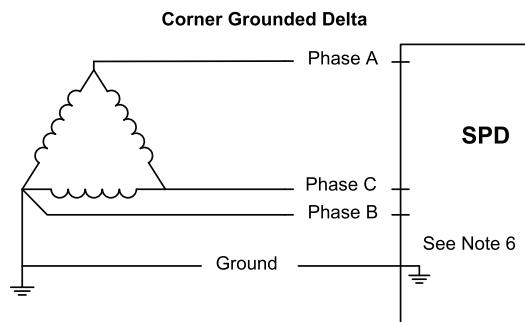
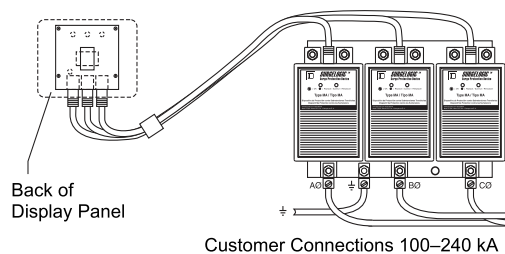


Figure 7: Three-Phase Three-Wire + Ground, Delta Installation

Note 5: The ground connection of the Delta SPD shall be connected to the system ground conductor. The neutral conductor is not present on Delta systems.



Note 6: The ground connection of the Delta SPD shall be connected to the system ground conductor. The neutral conductor is not present on Delta systems. Phase B of the electrical system is typically the grounded phase.



Operation

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E 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.

LED Status Indicators

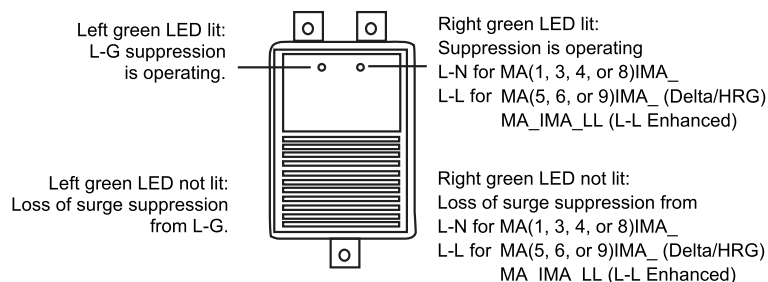
The SPD diagnostic display panel shows the status of each MA module with diagnostically controlled green/red LEDs (see Figure 8). If a unit is operating correctly, all of the phase LEDs will be illuminated green. To test the integrity of the diagnostics for each phase, push the button below the phase LEDs on the diagnostic display panel. The green LED will turn red and the alarm will sound, if the alarm is enabled. Releasing the test button will complete the test; the red LED will turn green and the alarm will shut off.

If an inoperable condition occurs on any phase, the audible alarm sounds and the corresponding phase LED on the diagnostic display panel is illuminated red. This indicates that the device needs service by qualified electrical personnel. The audible alarm can be silenced, until a qualified person is able to evaluate and service the SPD, by pressing the alarm enable/disable button. The alarm will silence and the green alarm LED will not be lit. The red phase LED will continue to be illuminated until the inoperative condition had been cleared.

On an MA module (see Figure 8), if either LED is not lit, the module should be replaced. If both green LEDs are not lit and the diagnostic display panel has power, then power has been lost to that phase or the module should be replaced (refer to Table 1 on page 6). Refer to the final equipment instruction bulletin for MA module disconnection and access instructions.

When power is applied to the SPD and one or more of the diagnostic display panel LEDs are red, and one or more MA module LEDs are out, the appropriate MA module should be replaced. Refer to "Maintenance and Troubleshooting" on page 20 for proper troubleshooting procedures and Table 5 for replacement modules. If the module LEDs are green and the diagnostic display LEDs are red, contact the SurgeLogic Technical Assistance Group at 1-800-577-7353.

Figure 8: MA Module LEDs



Replacement Modules

Table 4: IMA Replacement Modules

System Voltage	Peak Surge Current Rating (kA)	Catalog Numbers ¹		
		Phase A	Phase B	Phase C
120/240 V, 1-phase, 3-wire + ground	120	MA1IMA12_	—	MA1IMA12_
	160	MA1IMA16_	—	MA1IMA16_
	240	MA1IMA24_	—	MA1IMA24_
208Y/120 V, 3-phase, 4-wire + ground Wye ²	120	MA1IMA12_	MA1IMA12_	MA1IMA12_
	160	MA1IMA16_	MA1IMA16_	MA1IMA16_
	240	MA1IMA24_	MA1IMA24_	MA1IMA24_
120/240 V, 3-phase, 4-wire + ground High-Leg Delta ³	120	MA1IMA12_	MA3IMA12_	MA1IMA12_
	160	MA1IMA16_	MA3IMA16_	MA1IMA16_
	240	MA1IMA24_	MA3IMA24_	MA1IMA24_
240 V, 3-phase, 3-wire + ground Delta	120	MA6IMA12_	MA6IMA12_	MA6IMA12_
	160	MA6IMA16_	MA6IMA16_	MA6IMA16_
	240	MA6IMA24_	MA6IMA24_	MA6IMA24_
480Y/277 V, 3-phase, 4-wire + ground Wye ⁴	120	MA4IMA12_	MA4IMA12_	MA4IMA12_
	160	MA4IMA16_	MA4IMA16_	MA4IMA16_
	240	MA4IMA24_	MA4IMA24_	MA4IMA24_
480 V, 3-phase, 3-wire + ground Delta ⁵	120	MA5IMA12_	MA5IMA12_	MA5IMA12_
	160	MA5IMA16_	MA5IMA16_	MA5IMA16_
	240	MA5IMA24_	MA5IMA24_	MA5IMA24_
600Y/347 V, 3-phase, 4-wire + ground Wye	120	MA8IMA12_	MA8IMA12_	MA8IMA12_
	160	MA8IMA16_	MA8IMA16_	MA8IMA16_
	240	MA8IMA24_	MA8IMA24_	MA8IMA24_
600 V, 3-phase, 3-wire + ground Delta ⁶	120	MA9IMA12_	MA9IMA12_	MA9IMA12_
	160	MA9IMA16_	MA9IMA16_	MA9IMA16_
	180	MA9IMA18_	MA9IMA18_	MA9IMA18_

¹ Catalog numbers are representational. Actual catalog numbers require a suffix to indicate UL Type.

² 208Y/120 series also applies to the following voltage 220Y/127.

³ High-Leg Delta (Phase B modules are different than Phase A and Phase C modules).

⁴ 480Y/277 series applies to the following voltages 380Y/220, 400Y/230 and 415Y/240.

⁵ 480 V Delta series also applies to the following voltages: 480Y/277V HRG.

⁶ 600 V Delta series also applies to the following voltages: 600Y/347V HRG.

Table 5: Replacement Diagnostic Cables

TVS19PCK	Three 19 in. (48.3 cm) cables
TVS36PCK	Three 36 in. (91.4 cm) cables
TVS60PCK	Three 60 in. (152.4 cm) cables
TVS192PCK	Three 192 in. (487.7 cm) cables

Audible Alarm

Push the alarm enable/disable button to enable or disable the alarm (see Figure 9). If the green alarm LED is lit the alarm is enabled. If the green alarm LED is not lit the alarm is disabled.

Surge Counter

The surge counter displays the number of transient voltage surges since the counter was last reset. The counter is battery powered to retain memory in the event of a power loss to the IMA module. To reset the surge counter, remove all power and press the small switch located inside the unit on the underside of the diagnostic circuit board near the diagnostic display connectors (also refer to Figure 10). This will reset the counter to zero.

Dry Contacts

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Use 600 V ac rated dry contact wiring.
- Dry contact wiring must have less than 1/16 in. (1.6 mm) exposed wire from the dry contact block.
- Maintain at least 1.0 inch (25 mm) separation between dry contact wiring and the power wiring in the enclosure.

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

The IMA series SPD is provided with dry contacts. The connection for the dry contacts is located on the back of the diagnostic display panel, (lower right corner, refer to Figure 10), and will accept 22 AWG (0.33 mm²) to 14 AWG (2.1 mm²) stranded or solid wire. The dry contacts are three-position, Form "C" type with Normally Open, Normally Closed, and Common connections.

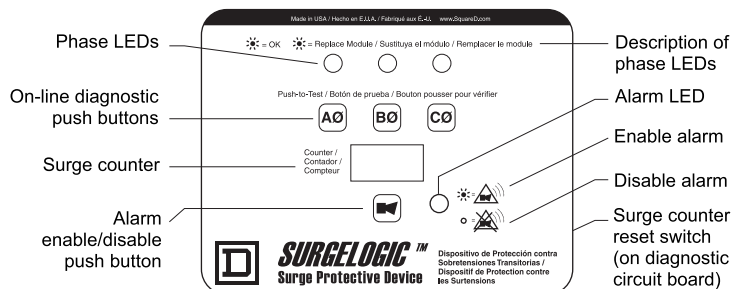
In the unpowered state the contact is closed between terminals NC and COM. This is also the alarm condition. The opposite state, closed between terminals NO and COM, indicates that power is on to the unit and that no alarm condition exists (See Table 6).

These contacts can be used for remote indication of the SPD's operating status to a computer interface board or emergency management system. Also, these contacts are designed to work with the SPD remote monitor option described in the next section.

Table 6: Dry Contact Configuration

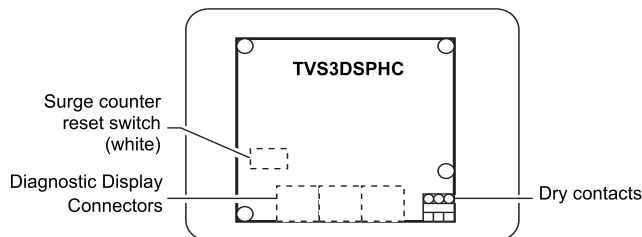
Alarm Contact Terminals	Contact State with Power Applied
NO to COM	Closed
NC to COM	Open

Figure 9: Three-Phase Diagnostic Display Panel with Surge Counter



Note: Phase B is not present on single-phase applications.

Figure 10: Rear of Diagnostic Circuit Board



Care must be taken when installing the dry contact wiring because the terminals are on a moving door. Avoid the door hinge, any switches, and the high voltage areas of the enclosure when routing the wiring. To avoid the door hinge, tie wrap any dry contact wiring to the existing cable harness which crosses the hinge. Once the dry contact wiring is secured on a non-moving point of the enclosure, it is the user's responsibility to maintain at least 1.0 inch (25 mm) separation between 600 V ac rated dry contact wiring and the power wiring in the enclosure.

The dry contacts are designed for a maximum voltage of 24 V dc / 24 V ac and a maximum current of 2 A. Higher energy applications may require additional relay implementation outside the SPD. Damage to the SPD relay caused by use with energy levels in excess of those discussed in this instruction bulletin are not covered by warranty. For application questions, contact the SurgeLogic Technical Assistance Group at 1-800-577-7353.

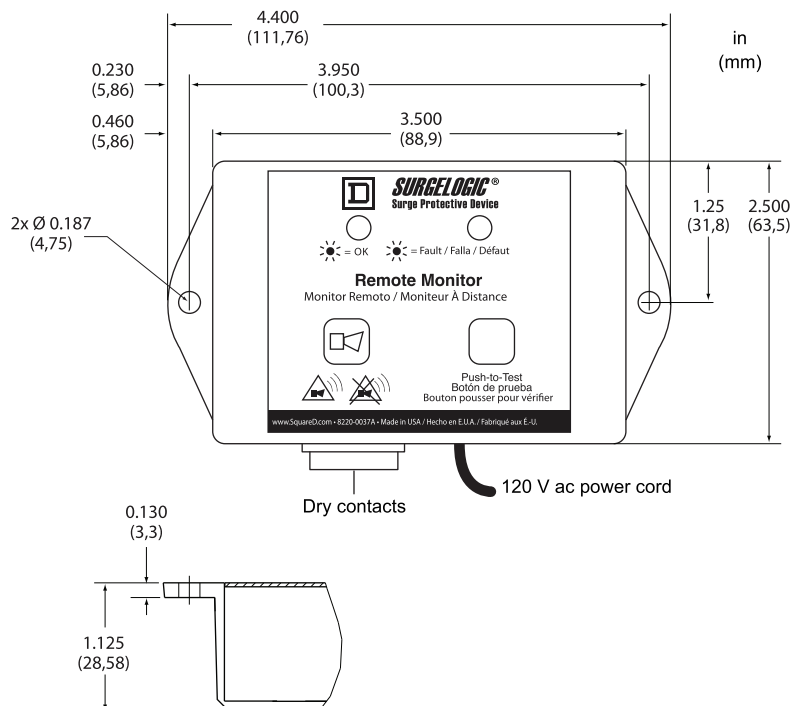
Remote Monitor Option

The remote monitor option has two LEDs, one red and one green, and an audible alarm with an enable/disable switch. Normal status is a lit green LED, and no audible alarm. To test the integrity of the remote monitor, press the push-to-test switch. If the alarm is enabled, the green LED will turn off, the red LED will turn on, and the alarm will sound. Releasing the switch will complete the test; the red LED will turn off, the green LED will turn on and the alarm will shut off.

If suppression on any phase is lost, the green LED will turn off, the red LED will turn on and an alarm will sound. The audible alarm can be silenced by pushing the alarm enable/disable button. The alarm will silence and the green alarm LED will not be lit. The red LED will continue to be illuminated until the inoperative condition has been cleared.

The remote monitor includes a 120 V ac to 12 V dc adapter with a six-foot power cord. Connections are made to the SPD diagnostic panel with Form “C”, 3-position dry contacts (provided) and the appropriate length of solid or stranded 22 AWG (0.33 mm²) to 14 AWG (2.1 mm²) not provided.

Figure 11: Remote Monitor Option (TVS12RMU)



Maintenance and Troubleshooting

⚠ DANGER

HAZARD OF ELECTRIC SHOCK, EXPLOSION, OR ARC FLASH

- Apply appropriate personal protective equipment (PPE) and follow safe electrical work practices. See NFPA 70E 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.

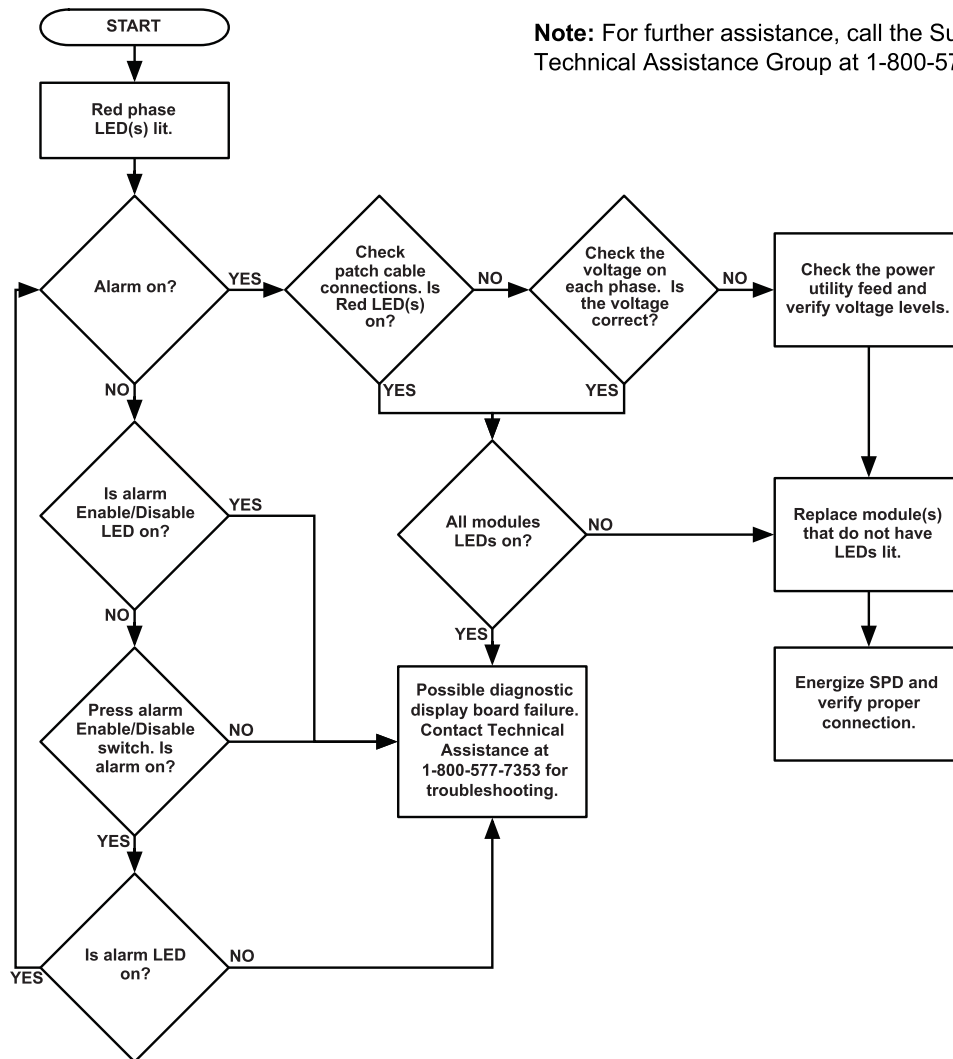
Preventative Maintenance

Inspect the SPD periodically to maintain reliable system performance and continued transient voltage surge suppression. Periodically check the state of the diagnostic display panel LED status indicators. Routinely use the built-in diagnostics to inspect for inoperative modules.

Troubleshooting

If a module shows two green indicator lights and the display panel shows a red phase indicator light, follow the Troubleshooting Flow Chart in Figure 12 below.

Figure 12: Troubleshooting Flow Chart



Replacement Parts

The following replacement parts are available. For ordering information please contact your local distributor or refer to the product catalog.

- MA modules. Replacement instructions are included with the replacement parts.
- Diagnostic display panel assemblies. Replacement instructions are included with the replacement parts.

SurgeLogic™ Modular Surge Protective Device (SPD)
Instruction Bulletin

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