

INSTALLATION, OPERATION AND MAINTENANCE MANUAL

RGWMSP Series

ReliaGear® Wall Mounted Surge Protective Devices (SPD)



Guide to installation and assistance

WARNING

The SPD warranty is voided if the unit is damaged as a result of improper installation. Improper installation or misapplication may result in serious personal injury or damage to the electrical system. Read the complete installation instructions before proceeding with installation.

La garantie du SPD est annulée si l'appareil est endommagé à la suite d'une mauvaise installation. Une mauvaise installation, ou utilisation, peut entraîner des blessures graves ou des dégâts au système électrique. Lisez les instructions d'installation en intégralité avant de procéder à l'installation.

WARNING

The equipment covered by these instructions should be installed and serviced only by competent qualified personnel utilizing proper safety practices and procedures. These instructions are written for such personnel and are not intended as a substitute for adequate training and experience in safe procedures for this type of equipment.

L'équipement couvert par ces instructions doit être installé et entretenu uniquement par un personnel compétent et qualifié, utilisant des pratiques et des procédures de sécurité appropriées. Ces instructions sont rédigées à l'intention de ce personnel et ne sauraient se substituer à une formation adéquate et à une expérience des procédures de sécurité pour ce type d'équipement.

WARNING

Remove all power to the electrical panel before installing or servicing the SPD. All work must be performed by licensed and qualified personnel. Follow applicable electrical codes and regulations for the country/location in which the unit is being used.

Coupez l'alimentation du panneau électrique avant d'installer ou de procéder à l'entretien du SPD. Tous les travaux doivent être effectués par un personnel qualifié et agréé. Respectez les codes et réglementations électriques en vigueur dans le pays / lieu où l'appareil est utilisé.

WARNING

Do not HIPOT the SPD unit or the electrical system to which the SPD unit is connected without disconnecting the SPD unit's conductors, including phases, neutral and ground.

Ne procédez PAS à des ESSAIS DE RIGIDITÉ DIÉLECTRIQUE sur le SPD ou le système électrique auquel il est connecté sans déconnecter les conducteurs des SPD, y compris les phases, le neutre et la terre.

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 or 2-phase SPD devices. If the transformer is not accessible, check the main service disconnect/panel for the NG bond. Lack of a proper bond may damage the SPD and void the warranty. Failure to provide this bond, as required per article 250.30 of the National Electrical Code, can result in elevated phase-to-ground source voltage potentials. These voltages can cause damage to electrical equipment as well as safety hazards including fire, electrical shock, serious injury or death.

Vérifiez qu'une liaison correcte est installée entre le neutre et la terre au niveau du transformateur en amont de tous les SPD triphasés en étoile, triphasés en triangle ou biphasés. Si le transformateur n'est pas accessible, vérifiez la liaison NG sur le sectionneur / panneau de service principal. L'absence d'une liaison appropriée peut endommager le SPD et annuler la garantie. L'absence de cette liaison, telle que requise par l'article 250.30 du Code national de l'électricité, peut entraîner des potentiels de tension élevés entre la phase et la terre. Ces tensions peuvent causer des dégâts aux équipements électriques ainsi que des risques en matière de sécurité, notamment des incendies, des chocs électriques, des blessures graves ou la mort.

WARNING

Installation by person with electrotechnical expertise only.

WARNING!

Installation nur durch elektrotechnische Fachkraft.

AVERTISSEMENT!

Installation uniquement par des personnes qualifiées en électrotechnique.

¡ADVERTENCIA!

La instalación deberá ser realizada únicamente por electricistas especializados.

Pre-installation requirements

The SPD warranty is voided if the unit is damaged as a result of improper installation. Improper installation or misapplication may result in serious personal injury or damage to the electrical system. Read the complete installation instructions before proceeding with installation.

1. System configuration and voltage



Prior to installation, ensure the system configuration and voltage are equivalent to the SPD unit being installed. Avant l'installation, assurez-vous que la configuration et la tension du système sont équivalentes à celles du SPD en cours d'installation.

The SPD model number can be found on the affixed UL label. The SPD selection can be verified by comparing the model number to the correct electrical system described in the "VOLTAGE RATINGS AND POWER SOURCE CONFIGURATIONS" chart.

2. System grounding and bonding

Verify that an NEC (National Electrical Code) compliant X0 bond has been made at the upstream transformer or other separately derived system that feeds the SPD. Per NEC Article 250.30, this bond must be in place on all 3-Phase WYE, 3-Phase Hi-Leg Delta and Single-Phase Split-Systems. Refer to diagram "EXAMPLE OF AN NEC COMPLIANT GROUNDING ARRANGEMENT FOR A SEPARATELY DERIVED SYSTEM" for an example of an installation that complies with these NEC recommendations.

Verify that there have not been multiple instances of neutral-to-ground bonds on the electrical system. These bonds, while either intentional or accidental, result in ground currents that can create differential voltage potentials between neutral and ground. Redundant neutral-to-ground connections can result in damage to the SPD and are in violation of the NEC.

3. SPD installation on ungrounded power systems

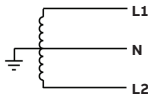
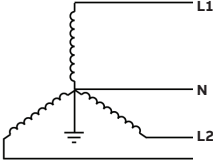
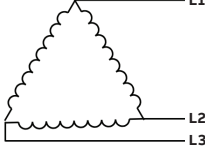
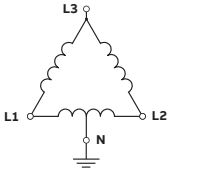
Ungrounded power systems are inherently unstable and can produce excessively high line-to-ground voltages during certain fault conditions. During these fault conditions, any electrical equipment, including an SPD, may be subjected to voltages that exceed their designed ratings. This information is being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

4. SPD location / primary overcurrent protection

Per the National Electrical Code (NEC Article 242, Formerly 285), Type 2 SPDs are allowed to be placed on the load side of the main service breaker/fuse.

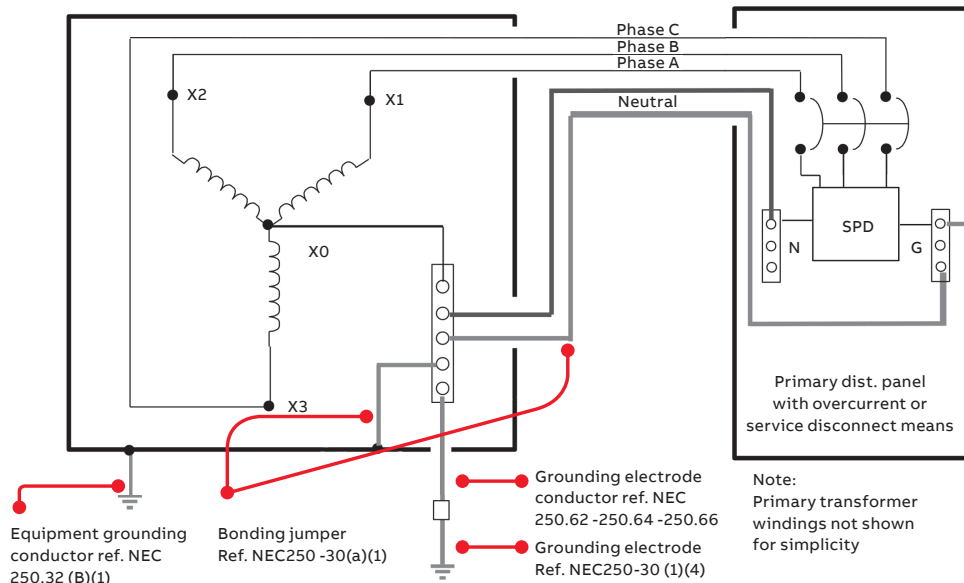
Pre-installation requirements

Table 1: Voltage ratings and power source configurations

Model	Nominal voltage (50/60Hz)	Maximum continuous operating voltage (MCOV)	System type	Source configuration
RGWMSP120S	120/240 V	150 V (L-N/L-G)	Single-phase 3 wire + ground	
RGWMSP120Y RGWMSP277Y RGWMSP347Y	120/208 V 277/480 V 347/600 V	150 V (L-N/L-G) 320 V (L-N/L-G) 420 V (L-N/L-G)	Three-phase 4 wire + ground	
RGWMSP240D RGWMSP480D RGWMSP600D	240 V 480 V 600 V	270 V (L-G) 550 V (L-G) 690 V (L-G)	Three-phase Delta, 3 wire	
RGWMSP240H	120 / 240 V	150 V (L-N / L-G) Phase A & C 270 V (L-N / L-G) Phase B	Three-phase Delta Hi-Leg, 4 wire + ground	

Pre-installation requirements

Example of an NEC compliant grounding arrangement for a separately derived system



The illustration shown provides a recommended method for grounding a separately derived power system, per the National Electrical Code, Article 250.30. Please check with the local municipality or governing authority for additional codes or other approved regulatory requirements before attempting to configure any electrical power distribution system.

Installation



Power must be proven disconnected before starting installation, inspection or maintenance. Failure to do so may cause serious injury, death and/or property damage.

Il doit être prouvé que l'alimentation est déconnectée avant de commencer l'installation, l'inspection ou l'entretien. Le non-respect de cette précaution peut entraîner des blessures graves, la mort et/ou des dégâts matériels.

Before attempting installation, make sure that the pre-installation requirements of this manual have been satisfied. If the status of the pre-installation requirements are not known, do not attempt to continue.

Hi-Pot Testing

Never Hi-Pot test an SPD. Doing so may lead to damage of the SPD. Disconnect the SPD from the system before performing Hi-Pot testing. Failure to do so will void the warranty.

Mounting & wire connections

The wall-mount SPD must be installed as close to the protected circuit as possible. Long connecting cable runs between the SPD and point of attachment will result in significantly reduced performance.

Select a mounting location that will allow for a minimum length of wire between the SPD and the power terminals of the electrical service panel. The SPD should be mounted in an upright orientation; special consideration should be given to allow for periodic inspection of the diagnostic display panel.

The SPD should be mounted to a secure structure or surface.

Note: In order to keep wire impedance to a minimum, wire lengths should be short and have straight runs, if possible.

Installation

Remote alarm contacts

Contacts are provided for remote alarm monitoring on the ABB ReliaGear product series. This is a dry, form C, contact rated for 2A maximum at up to 250VAC / 220VDC. When the SPD is powered and detects no alarm conditions the relay will be in a “normal” state. If the SPD detects an alarm condition or if the SPD loses power, the relay will be in an “alarm” state. This remote alarm does not need to be used for normal operation of the SPD.

Pre-energization check

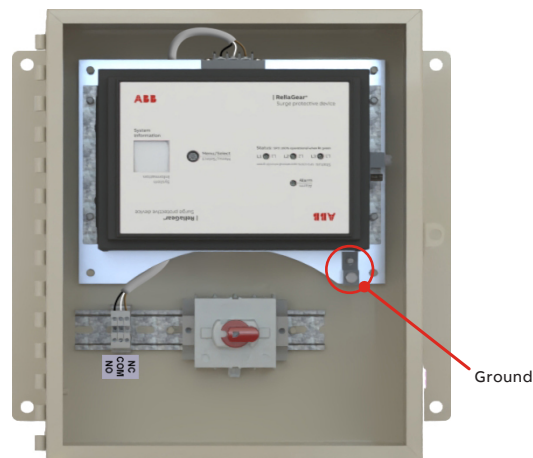
Once all of the pre-installation conditions have been met and the SPD has been installed, the SPD can now be energized. For SPD operational status, refer to Operation and Maintenance sections.



Upon energization of the SPD, if any of the lamps or alarms indicate an abnormal condition, power should be disconnected promptly from the SPD. The electrical system should be inspected and the pre-installation requirements should be validated. Do not attempt to leave power applied to the SPD, or re-energize the SPD in the event of an alarm condition.

Lors de la mise sous tension du SPD, si l’une des lampes ou des alarmes indique une condition anormale, l’alimentation du SPD doit être coupée rapidement. Le système électrique doit être inspecté et les exigences de pré-installation doivent être validées. N’essayez pas de laisser le SPD sous tension, ou de le remettre sous tension en cas d’alarme.

Power terminals and remote alarm locations



NEMA 1D as shown

Normal status indication:
 NC-COM = Closed
 NO-COM = Open



Alarm status indication:
 NC-COM = Open
 NO-COM = Closed



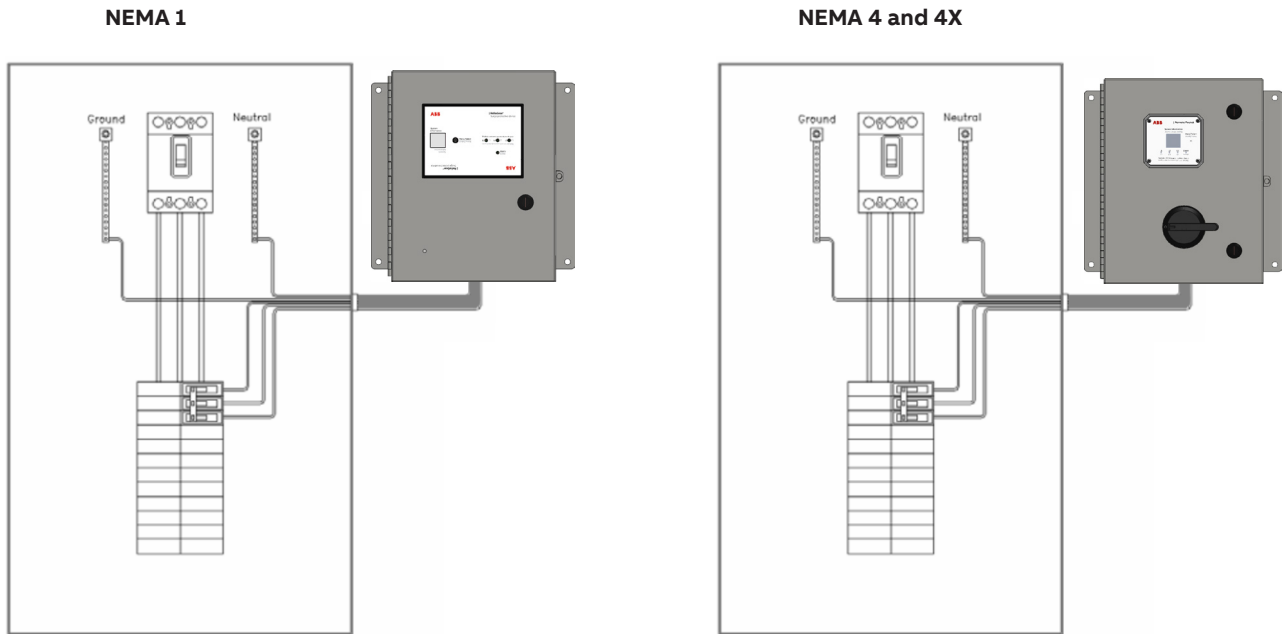
The illustration above represents the SPD installed in the intended orientation

NOTICE

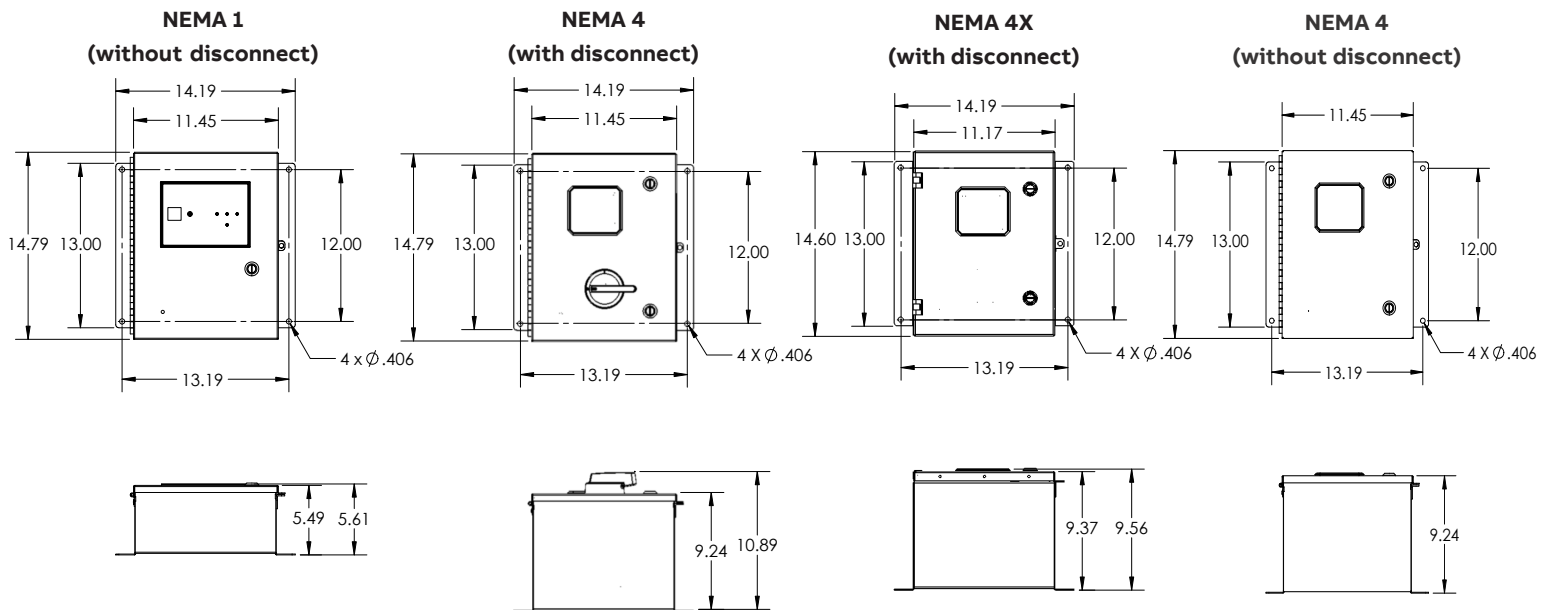
Hi-Leg Delta power systems:

RGWMSP240H SPD model types are intended for Hi-Leg Delta systems and are configured with Phase B as the intended Hi-Leg connection point. Attempting to connect the SPD conductor to the system Hi-Leg will result in immediate SPD failure.

Installation



Dimensions



Installation



Upon energization of the SPD, if any of the lamps or alarms indicates an abnormal condition, power should be disconnected promptly from the SPD. The electrical system should be inspected and the pre-installation requirements should be validated. Do not attempt to leave power applied to the SPD, or re-energize the SPD in the event of an alarm condition.

Lors de la mise sous tension du SPD, si l'une des lampes ou des alarmes indique une condition anormale, l'alimentation du SPD doit être coupée rapidement. Le système électrique doit être inspecté et les exigences de pré-installation doivent être validées. N'essayez pas de laisser le SPD sous tension, ou de le remettre sous tension en cas d'alarme.

Operation

ReliaGear surge protective devices require minimal attention after installation. ReliaGear Series SPDs 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.

ReliaGear SPD Control & Diagnostic Display Panel

ReliaGear SPDs are equipped with a status indicating LED for each phase on the panel. When all LED's are green, the suppressor is on-line and functioning properly. The LED's will indicate orange for a partial protection loss, alerting that there is less than 50% protection remaining. A red LED indicates that there has been a complete protection loss. If a fault condition occurs, the Red service LED will illuminate and the audible alarm will sound. A flashing phase LED indicates a loss of power on that phase. The audible alarm can be silenced through the alarm silence menu.

Display Panel

The Display Panel is intended to give an operator a way to quickly see the state of their SPD system. A simple menu of 5 screens can be cycled through by pressing the button.

1. Main Screen
2. SPD Health
3. Statistics
4. System Information
5. Contact

Each screen will be described in detail below.

All Events that are detected by the system will be recorded into memory. The system is equipped with a large internal memory (2MB EEPROM) that will retain its information even through extended power loss.

The ReliaGear SPD detects the following power system events:

- Surges
- Temporary over Voltages
- Neutral to Ground faults
- Phase Outage
- Protection Loss (MOV disconnection)

A description of each alarm type and the systems reaction to it will be described in detail below.

Operation

Menu / Select Button

The display panel has a single button that will cycle through the various menu screens.

The button can also be used to force a system reset and allow the operator to rotate the orientation of the LCD display.

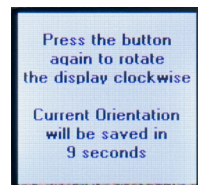
System Reset

To force the system to reset, hold the button down for 10 seconds. This will issue a factory reset. The system's event memory and statistics counter will be reset to zero.

LCD Rotate

From any one of the menu screens. Press the button 3 times. This screen will appear with instructions.

Press the button to rotate the LCD orientation 90 degrees clockwise. Continue until the LCD is oriented to the correct position. After 10 seconds of inactivity the system will reboot with the LCD in its new orientation. This position will be saved in memory.



LED Operation

- Each SPD contains a 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 Orange.
 - Upon full MOV stack failure the LED will change state to Red.
 - During the detection of any event the Red Alarm LED will begin to blink.
 - During a Phase Loss event, the LED for the affected phase will begin to blink.
-

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 by pressing the button on the control panel. If the audio needs to be permanently silenced, pressing the menu button 5 times will open an alarm silence menu.

Dry Contacts

All ReliaGear SPDs 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.

The dry contacts will change state when the system is affected by transitory events. During a Temporary Over Voltage, a Phase loss, or a detected Neutral to Ground Fault, the system will change the dry contact state for the duration of the event. The dry contact will toggle back to normal when the event finishes.

When the system loses MOV protection the dry contacts will change state. Since MOV protection can not be recovered the dry contacts will stay in the off condition.

LCD Panel Operation

Screen Saver

Immediately on power-up of the ReliaGear SPD, the scrolling screen saver will be shown. When the menu button is pressed, the SPD will stop showing the screen saver and advance to the Main Screen. After 2 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.



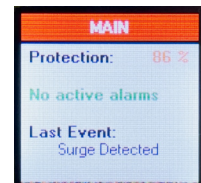
LCD Sleep

After 5 minutes of inactivity the LCD will power down. It can be woken up again by pressing the menu button. The LCD sleep function is necessary to extend the life of the LCD.

Main Screen

The Main Screen is the starting point for navigating through the ReliaGear SPDs menus.

The Main Screen will show a brief description of the SPD protection status, any active events, and the last event detected by the system.



SPD Health Screen

The SPD Health screen will show the exact protection level for each mode of your system. Should your system lose protection this screen will be updated to show the available percentage remaining.

SPD HEALTH		
	N	G
L1	50%	50%
L2	100%	100%
L3	100%	100%
NG	100%	

Statistics Screen

The Statistics Screen shows a count of event type that the system has on memory. A system reset will clear these values.

STATISTICS	
Surges:	16
TOVs:	7
Disconnects:	2
NG Faults:	3
Outages:	5

System Information Screen

The System Information Screen contains all the vital information unique to your system.

This includes:

- Model number
- Voltage system
- SPD surge rating
- Serial number

SYSTEM INFO	
ReliaGear	
RGPPSP120Y15T1	
120/208V Wye	
150kA Surge Rating	
jeepers	

Contact Screen

The Contact Screen will have all the information needed to contact support if needed.

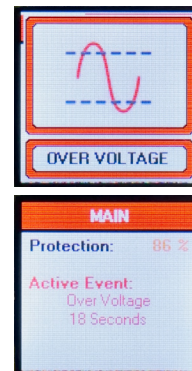
CONTACT	
ABB Inc.	
305 Gregson Dr	
Cary, NC 27511	
USA	
+1 888-437-3765	

System Event Alarms

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 or the event concludes. Any subsequent events that occur while the TOV event animation is on screen will be registered into memory. Along with displaying the TOV animation, the Audio alarm will sound. Pressing the button will acknowledge the event animation and show the Main Screen. You'll see the active event and the duration so far.

A TOV is detected when the SPD's on-board current transformer senses a repeated current flow through the protection MOVs and down the Ground conductor. Any voltage over the MCOV of the SPD will force the MOVs to conduct and reroute the extra energy.



Surge Event

When the SPD detects a Surge Event this animation will be shown for 5 seconds. After that, the system will return to normal operations. A Surge is detected when the SPD's on-board current transformer senses a single pulse of current flow through the protection MOVs and down the Ground conductor. Any voltage over the MCOV of the SPD will force the MOVs to conduct and reroute the extra energy.



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 in memory. 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 the SPD has detected 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 nongreen state. Pressing the menu 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

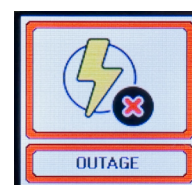
When the SPD detects a Neutral to Ground Fault Event (NGF) this animation will be shown. It will remain on screen until acknowledged by an operator or the event concludes. An NGF is detected when greater than 20 volts has been detected between Neutral and Ground. Any subsequent events that occur while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



Phase Outage

When a Phase Outage is detected the system will show this animation. It will remain on screen until acknowledged by an operator or the event concludes. Any subsequent events that occur while the phase outage event animation is on screen will be registered in memory.

Along with displaying the power outage animation, the Audio alarm will sound, and the dry contacts will change state. Pressing the Menu button will acknowledge the event and clear the alarm state. The Main Screen will be showing the details for the Phase Outage. While a Phase is lost, the corresponding LED will begin to blink.



Maintenance

ABB does not provide a specific schedule for preventative maintenance as conditions will vary based on location and the environmental factors presented at each installation site. However, periodic inspections should be scheduled to verify that the SPD does not indicate a failure mode. Inspections should also be made to check the integrity of the electrical supply connections to the SPD to ensure continued reliable performance.

The unit's heavy-duty construction is designed to provide years of uninterrupted service.

The unit contains no serviceable parts.

L'unité ne contient aucune pièce réparable.

NOTICE

In the event of an SPD alarm condition, do not attempt to disassemble the SPD to replace fusing or other components. The SPD contains thermally protected MOVs that will only open when the SPD has failed in a non-serviceable condition. The entire SPD must be replaced.

En cas de condition d'alarme du SPD, n'essayez pas de démonter le SPD pour remplacer les fusibles ou d'autres composants. Le SPD contient des MOV protégés thermiquement qui ne s'ouvrent que lorsque le SPD tombe en panne et ne fonctionne plus. L'ensemble du SPD doit être remplacé.

Servicing/troubleshooting

Should a condition occur that results in premature failure of the SPD, the SPD's integral thermal fusing will safely interrupt current flow through the SPD without disrupting power to the protected equipment. This will remove the SPD from the power system, and the load equipment will remain unprotected from subsequent surge activity until the SPD is replaced.

If a change in operational status/alarm indication occurs, a qualified (licensed) electrician should inspect the electrical system to verify electrical system integrity. If the SPD remains in alarm after inspection/corrections have been made, the SPD should be replaced.