# SIEMENS

## SAFETY SWITCH MAINTENANCE INSTRUCTIONS

### For use with: 30-1200 Amp Type VBII Safety Switches



| ⚠ Danger | ⚠ Peligro | ⚠ Danger |
|---|---|---|
| **Hazardous Voltage. Will cause death or serious injury.** Turn off and lock out all power supplying this equipment before working on this device. Replace all covers before power supplying this device is turned on. | **Tensión peligrosa. Puede causar la muerte o lesiones graves.** Desenergice totalmente el equipo antes de instalar o darle servicio. Reemplace todas las barreras y cubierta antes de energizar el interruptor. | **Tension dangereuse. Danger de mort ou risque de blessures graves.** Mettre hors tension et cadenasser l'alimentation avant d'intervenir sur cet appareil. Remettre tous les couvercles en place avant de remettre cet appareil sous tension. |

**Use only with Siemens certified components.**

**NOTE:** - These instructions do not claim to cover all details or variations in equipment, or to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise, which are not covered sufficiently for the purchaser's purposes, the matter should be referred to the local Siemens sales office. The contents of this instruction manual shall not become part of or modify any prior or existing agreement, commitment or relationship. The sales contract contains the entire obligation of Siemens. The warranty contained in the contract between the parties is the sole warranty of Siemens. Any statements contained herein do not create new warranties or modify the existing warranty.

## 1. Introduction

When appropriately maintained, safety switches can provide reliable electrical protection for many years. The exact lifetime of a safety switch, however, is determined by the switch's operational duty and by its environment. Good practice includes periodic switch maintenance during plant shutdowns or during a regular maintenance period as specified, for example, in NFPA 70B. The maximum maintenance interval should not exceed one year for mechanical or current-carrying parts. More frequent maintenance is recommended for unusual conditions as described in Table 1. The following instructions are a guideline for maintaining Siemens Safety Switches.

## 2. Additional Guidelines

In addition to this guideline, refer to the latest edition of the following standards for more information and best practices for switch maintenance.

- NEMA KS-3: *Guidelines for Inspection and Preventive Maintenance of Switches Used in Commercial and Industrial Applications* (available online at www.nema.org)
- NFPA 70B: *Recommended Practice for Electrical Equipment Maintenance* (available online at www.nfpa.org)

## 3. Unusual Performance Conditions

Contact Siemens Customer Service for more information regarding performance under unusual service conditions. Examples of these conditions are included in Table 1 below.

| Table 1: Unusual Performance Conditions |
|---|
| Ambient temperatures below -22 °F (-30 °C) or above 104 °F (40 °C) |
| Operating duties - Solar (PV), Compressors, Cyclic loading |
| Corrosive or explosive environments |
| Abnormal vibration, shock, or tilting |
| Altitudes over 6,600 ft (2,012 m) |
| Frequencies other than 60 hz or DC |

## 4. Safety Precautions

The inspection and preventive maintenance of switches in service require the user to take all necessary precautions to avoid being injured. Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. Work practices described in NFPA 70E must be followed at all times.

**4.1** Operate the switch to the OFF position.

**4.2** Turn OFF and lock out all power supplying the switch to electrically isolate it from all other circuits before performing any work on or inside the switch.

**4.3** Open the enclosure door and verify that there is no voltage on the incoming and load conductors (including control power conductors, if present) and between these conductors and ground to confirm that the equipment is de-energized.

**4.4** Always use a properly rated voltage sensing device on all line side and load side terminals to confirm the switch is OFF.

**4.5** If disconnection of power and accessory leads, cables, or bus bars is required, be sure to properly identify all connections to ensure safe and accurate reconnection.

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## 5. Annual Switch Inspection

Under normal operating conditions, it is recommended to inspect switches at least once a year or after any short circuit event. This inspection should only be performed on a properly isolated switch. The inspection should include the following:

- Check switch for dust, corrosion, or moisture. Excessive dust, corrosion, or moisture will shorten the life of the switch and may indicate a different type of enclosure is required for the application.
- Check switch bases for cracks. The integrity of the base is important in withstanding the stresses imposed during operation. The switch should be replaced if cracks are found.
- Check switch for overheating. Overheating can be indicated by discoloration or cracks of the switch bases, discoloration or flaking of external metal parts, or melting or blistering of adjacent wire insulation. The switch should be replaced if any sign of overheating is found.
- Check all electrical connections to the switch to be certain that such connections are clean and secure. Loose or contaminated connections increase electrical resistance, which can damage insulation and conductors and interfere with proper switch operation. Increased electrical resistance causes overheating of a connection.
- Check switch grease. Safety switches are properly lubricated at the factory. Periodic cleaning and lubrication may be required depending on the amount of usage and the operating conditions of the switch.
- Check switch for missing hardware.
- For switches with cover gasketing and sealant, check to ensure that the gasket has not separated from the cover.
- Check switch for water damage. If the switch shows signs of water damage, it should be replaced.

## 6. Clean Switch

With the switch still properly isolated from the rest of the circuit, loose hardware, dust, debris, and moisture should be removed from the inside of enclosure. Wipe with a clean, dry, lint-free cloth or soft brush.

If the amount of dust or debris is excessive, steps should be taken to eliminate the source of the contamination or to provide an appropriate enclosure that will protect against the future entry of contaminants.

**NOTE**—Commercial cleaners and lubricants may attack and damage the plastic insulating materials of the switch. Such cleaners should not be used.

## 7. Tighten Connections

Verify that all wire connection torques conform to the values provided in the Terminal and Wire Information Table found on the interior label of the switch. **Do not exceed the torque values on the interior label.** Over-torqued connections can lead to the switch overheating.

## 8. Lubricate Components

The lubricant applied at the factory is intended to last the life of the switch. Additional lubrication may be applied if required by the usage or operating conditions of the switch.

- Line and Load contact grease: Rheolube 716CP
- Mechanism grease: Lubriplate Aero
- Fuse clip grease: Nyogel 760G

***NOTICE*** **ONLY use the approved lubricants in the indicated locations listed.** Other lubricants may not be suitable for electrical applications and could be a detriment to the performance of the switch.

## 9. Cycle Switch

Before restoring power to the switch, close the door and operate the switch ON and OFF five times. The switch handle should operate smoothly without binding.

## 10. To Re-Energize Switch

With the switch handle in the OFF position:

**10.1** Reconnect any cables or accessory leads disconnected in step 4, **Safety Precautions**.

**10.2** Replace all covers and shields.

**10.3** Close and latch the door.

**10.4** Turn OFF all downstream loads.

**10.5** Turn ON power supplying the switch.

**10.6** Turn ON the switch.

**10.7** Turn ON all downstream loads.

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## Special Lubrication Instructions for Unusual Operating Duties

### 1. Introduction

Safety Switches used in some operating duties require additional maintenance or more frequent inspections to ensure the full life of the product is achieved. Switches used in solar (PV), compressor, or other cyclic loading conditions are examples of these unusual operating duties. In addition to the maintenance guidelines listed above, these switches may also require lubrication of the fuse connections.

### 2. Safety Precautions

The inspection and preventive maintenance of switches in service require the user to take all necessary precautions to avoid being injured. Electrical equipment should be installed, operated, serviced, and maintained only by qualified personnel. Work practices described in NFPA 70E must be followed at all times.

**2.1** Operate the switch to the OFF position.

**2.2** Turn OFF and lock out all power supplying the switch to electrically isolate it from all other circuits before performing any work on or inside the switch.

**2.3** Open the enclosure door and verify that there is no voltage on the incoming and load conductors (including control power conductors, if present) and between these conductors and ground to confirm that the equipment is de-energized.

**2.4** Always use a properly rated voltage sensing device on all line side and load side terminals to confirm the switch is OFF.

**2.5** If disconnection of power and accessory leads, cables, or bus bars is required, be sure to properly identify all connections to ensure safe and accurate reconnection.

### 3. Inspection

**3.1.** Remove the installed fuses.

**3.2.** Visually check the fuse connections for evidence of overheating or arcing on the fuse clips or mounting arrangements for the fuse.

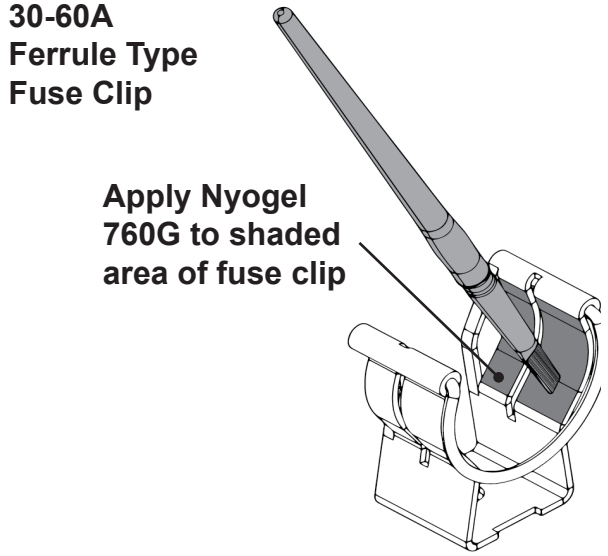
**3.3.** If the connecting surfaces show evidence of overheating, the affected parts of the switch (line base and/or load base) and any discolored fuses should be replaced.

### 4. Clean and Lubricate Fuse Clips

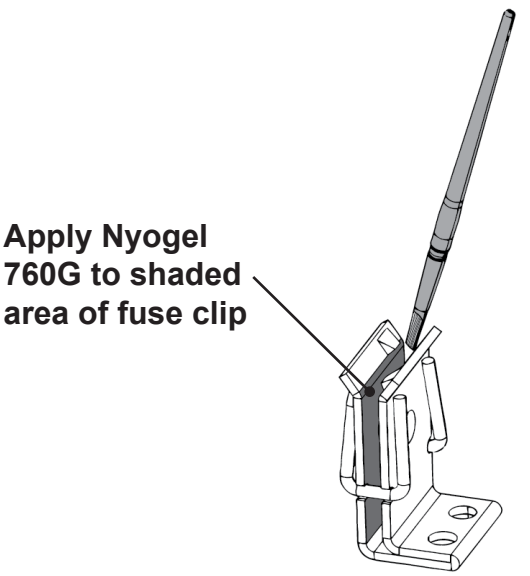
**4.1.** Clean the fuse clips with a clean, dry, lint-free cloth.

**4.2.** Using a small brush or putty knife, apply a thin coat of Nyogel 760G across the entire inside surface of both sides the fuse clip as shown below.

**30-60A Ferrule Type Fuse Clip**




**100-200A Blade Type Fuse Clip**



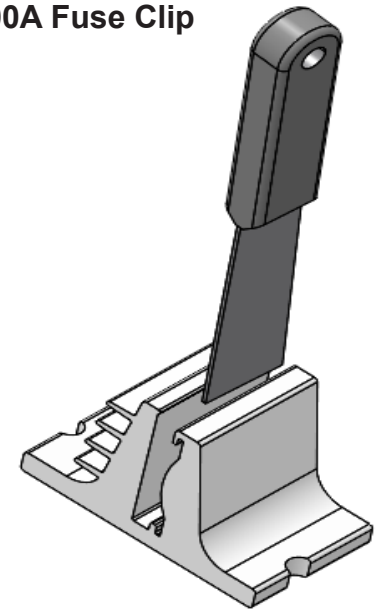
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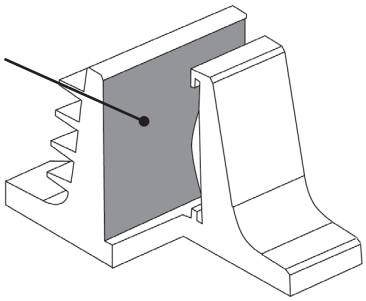
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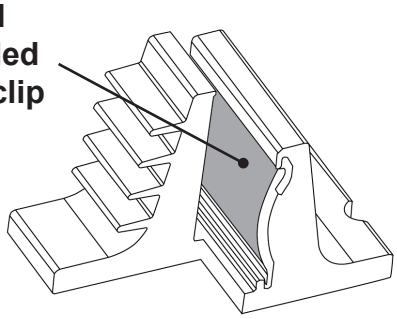
**400-600A Fuse Clip**



**Apply Nyogel 760G to shaded area of fuse clip**

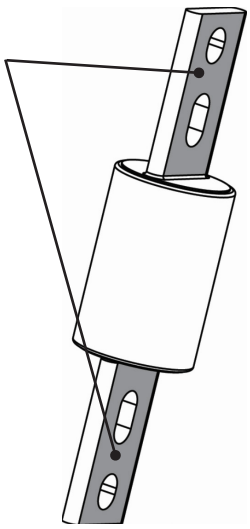


**Apply Nyogel 760G to shaded area of fuse clip spring**



**800-1200A Bolt-On Type Fuse Clip**

**Apply thin coat of Nyogel 760G to shaded area of fuse**



### 5. To Re-Energize Switch

With the switch handle in the OFF position:

**15.1** Reconnect any cables or accessory leads disconnected in step 2, **Safety Precautions**.

**15.2** Replace all covers and shields.

**15.3** Close and latch the door.

**15.4** Turn OFF all downstream loads.

**15.5** Turn ON power supplying the switch.

**15.6** Turn ON the switch.

**15.7** Turn ON all downstream loads.

**Technical Support: Toll Free: 1-800-241-4453** **Internet: www.usa.siemens.com/powerdistribution**


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