

## TYPE PSI PAD-MOUNTED SWITCHGEAR 15kV • 25kV • 35kV INSPECTION & MAINTENANCE RECOMMENDATIONS

### Qualified Persons

#### **WARNING**

The equipment covered by this publication must be selected for a specific application and it must be operated and maintained by **Qualified Persons** who are thoroughly trained and knowledgeable in the installation, operation, and maintenance of underground power distribution equipment along with the associated hazards that may be involved. This publication is written only for such qualified persons and is not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Proper installation is the responsibility of the operating and construction personnel and the utility performing and authorizing the work. Completion of these instructions implies no further warranty by the manufacturer.

A **Qualified Person** is defined in the National Electrical Code (NEC/NFPA-70) as:

One who has skills and knowledge related to the construction and operation of the electrical equipment and installations and has received safety training to recognize and avoid the hazards involved.

The specific electrical safety training requirements to be considered a qualified person are detailed in **NFPA-70E, Article 110.1(D), Employee Training**. Some of the requirements from the 2012 edition are shown below. For the specific detailed training requirements for a Qualified Person make certain to refer to the most recent applicable edition.

These training requirements would include, but are not limited, to the following key points:

- The skills and techniques necessary to distinguish exposed energized parts from other parts of electrical equipment.
- The skills and techniques necessary to determine the proper approach distances corresponding to the voltages to which the qualified person will be exposed.
- The proper use of the special precautionary techniques, personal protective equipment, insulating and shielding materials, and insulated tools for working on or near exposed energized parts of electrical equipment.
- Tasks performed less often than once per year have additional training requirements.

These instructions are intended only for such qualified persons. They are not intended to be a substitute for adequate training and experience in safety procedures for this type of equipment. Additionally, the recommendations in this instruction bulletin are not intended to supersede or to take the place of established utility safety guidelines and established practices. If there is any question, consult with your foreman or supervisor, as appropriate.

Please refer to OSHA 29 CFR 1910.399 and NFPA 70E Articles 100 and 110.

The procedures required for operation of the Federal Pacific Auto-jet® II Load-Interrupter Switches, the Non-Load-break Fuse Mountings, the doors, the barriers and other accessory components are covered in detail in the Federal Pacific Instruction Bulletin Section IB-1G-500. The inspection and maintenance recommendations covered in this bulletin are expected to be performed in conjunction with a review of IB-1G-500. This bulletin does not cover all the detailed and specific operational procedures and checks. In addition, these instructions are not intended as a substitute for the user's standard operating practices and procedures. A copy of Instruction Bulletin Section IB-1G-500 can be obtained by contacting Federal Pacific at [www.federalpacific.com](http://www.federalpacific.com).



### Maintenance

Federal Pacific switchgear does not require routine mechanical or electrical maintenance. However, the following are some recommendations for enhancing continued service of the equipment.

### Before Opening the Switchgear

#### **WARNING**

When cleaning components, **NEVER** use any industrial strength cleaners. **NEVER** apply lubricants to the probe contact or the tulip contact which are the interrupting contacts. **NEVER** use any solvent-based or flammable products on any components in the pad-mounted switchgear. Solvents and flammable products can attack non-metallic components of the equipment and reduce electrical and mechanical properties.

#### **DANGER**

The following inspection and maintenance procedures must be performed with the unit completely de-energized and isolated from voltage. Any attempt to perform the inspection and maintenance with the unit energized may result in electrical arc flash that can cause equipment damage, personal injury or death.

## 1. Exercising

Yearly mechanical exercising of the switch is recommended. Refer to Instruction Bulletin Section IB-1G-500 for information on operating the switch.



### WARNING

The switchgear must be completely de-energized from all sources before any attempt is made to enter switchgear. Follow normal system operating practices to de-energize the unit, test for voltage and ground the unit before any work is performed.

## 2. Cleanliness

Check for cleanliness generally, but particularly for accumulation of any foreign material on insulators and barriers.



### NOTICE

Barriers and insulators can be cleaned with a non-alcohol and non-solvent based cleaner that does not leave any residue when dry. Residue must be removed.

Clean skirts of cable terminators and surge arrestors in accordance with instructions provided by the manufacturers of those devices.

## 3. Barrier Removal



### DANGER

Fuse and Switch Dual-Purpose Barriers should not be left in the slide-in position for more than one week. Accumulation of contamination on the barrier may cause tracking that can ultimately lead to a flashover. Clean any contaminated barrier per "Maintenance" instructions above.

The use of interphase, phase-to-ground, and dual purpose front barriers enhances the operation of pad-mounted switchgear by field personnel. The standard barrier system for Type PSI pad-mounted switchgear includes a removable barrier assembly that allows removal of phase-to-phase and phase-to-ground barriers from both the switch and fuse compartments during initial installation and cable termination or at any other time when the switchgear is de-energized.



### WARNING

When removing barriers, care must be taken to keep the barrier clean and dry. Contamination on barrier can lead to tracking and arcing. Clean off any contamination with a non-alcoholic and non-solvent based cleaner that does not leave any residue.

Removal of the barriers is readily accomplished as follows:

- Completely disconnect the unit from all power sources.
- Open main door (see "Auto-Latch Features" and "Auto-Latch Operation" on page 11 of Instruction Bulletin IB-1G-500) and secure with door keeper.
- Remove the dual-purpose barriers from their normal hanging position (see instructions on pages 3 and 4 of Instruction Bulletin IB-1G-500). If the optional B4/B5 barrier is provided, it must be opened and secured before dual-purpose barriers may be accessed (see page 4 of Instruction Bulletin IB-1G-500).

- Test for voltage, and ground the unit using the user's standard practice procedures and using grounding clamps suitable for the short-circuit rating of the equipment.
- See "Barrier System Remove!" on pages 3 and 4 of IB-1G-500 for instructions on the procedure to follow when removing the barrier system.
- Barriers may be reinstalled by following the reverse procedure to that described on pages 3 and 4 of IB-1G-500.
- Dual purpose barriers may then be reinstalled.
- Do not leave dual-purpose barriers in the slide-in position for more than one week.

## 4. Switch Operation



### CAUTION

Do not put any lubricant on switch probe or puffer tulip contacts. Refer to section "11. Lubrication". Placing any lubricant on the probe or tulip contacts (in the puffer assembly) will result in a disruptive event that may cause equipment damage.

Check switch for proper operation refer to Instruction Bulletin IB-1G-500. If the switch is closed on a short circuit within the fault closing rating and the short circuit is cleared by circuit breakers or fuses, the switch will not sustain damage which would require major repairs. However, the switch should be inspected before returning to service to determine switch condition. See Lubrication. Slight arcing on switchblades and contacts can be burnished smooth with an emory cloth or paper.

## 5. Fuse Operation

Open and close fuses and insure proper latching. Refer to pages 8 and 9 in IB-1G-500. Inspect fuse contact interfaces for damage and overheating, which will be evidenced by distortion or discoloration of the contacts. Note that contacts are copper and may be silver plated. There will be normal oxidation of these parts. Slight irregularities can be burnished with an emory cloth or paper. See "Lubrication".

## 6. Replacement Parts

If parts or labels are required they may be ordered by contacting Federal Pacific at 276-466-8200 or your local Federal Pacific Sales Territory Manager or Manufacturer's Representative. A directory of the representatives can be found at [www.federalpacific.com](http://www.federalpacific.com). If parts are ordered, the unit serial number and date of manufacture must be provided along with the part description.

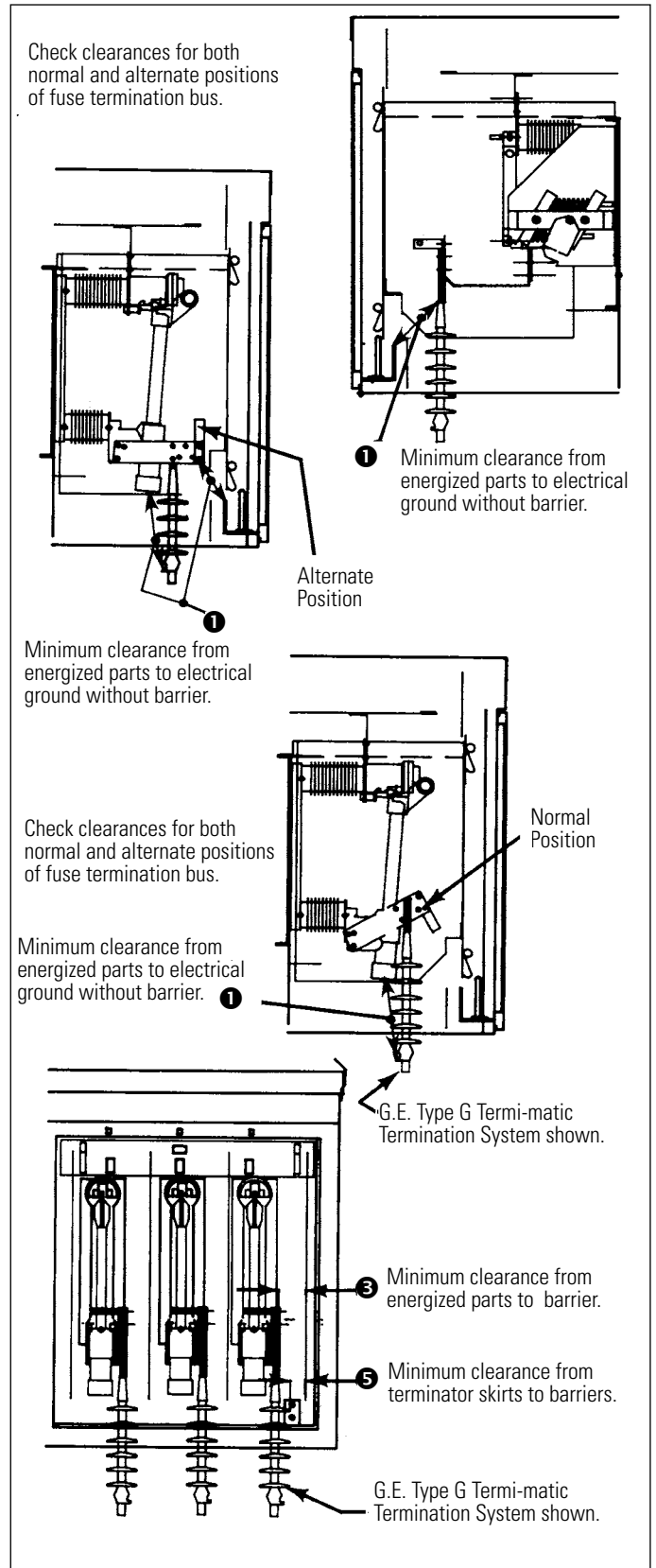
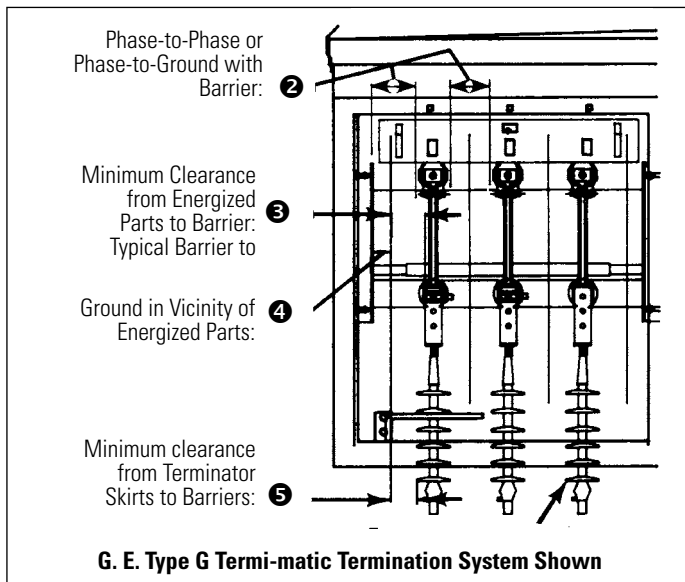
## 7. Electrical Clearances

Check for proper electrical clearances as described in Recommended Clearances.

**⚠ DANGER**  
 Failure to observe the electrical clearances specified in the table and illustrated in the diagrams on this page may result in electrical arc damage, personal injury or death.

**Recommended Clearances**

15kV, 25kV Pad-mounted Unit Rating kV, BIL	Recommended Clearances (Minimum) in Inches				
	Phase-to-Phase or Phase-to-Ground without Barrier NOTE ①	Phase-to-Phase or Phase-to-Ground with Barrier NOTE ②	Energized Bus (or device) to Barrier NOTE ③	Barrier-to-Ground in Vicinity of Energized Bus (or device) NOTE ④	Terminator Skirts to Barriers NOTE ⑤
95	5-1/2	3"	1"	3/4"	1/2"
125	7-1/2	5"	2-1/4"	1"	1-1/4"
150	10	6"	3"	2"	2"



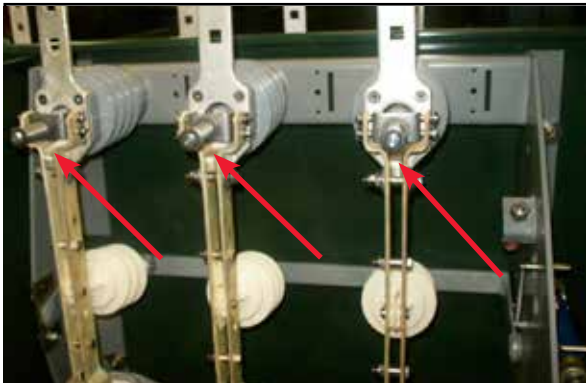


Figure 1. Lubricate only the interface between the main-contact stab and the switch blade marked by arrows.

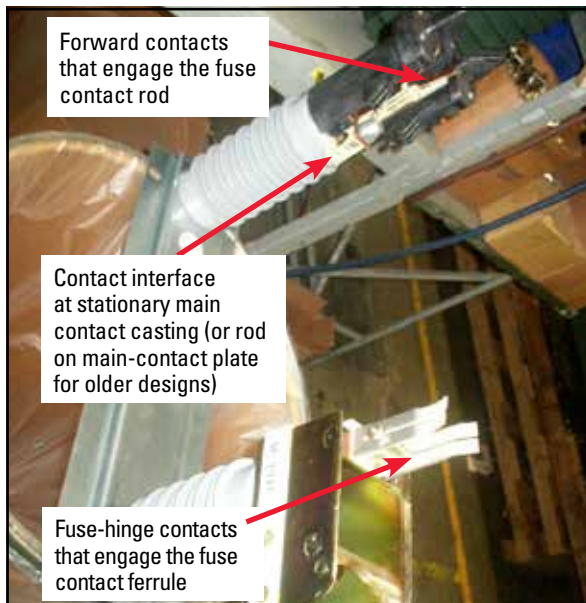


Figure 2. Lubrication points on load-break fuse mounting (at top) include three contact locations, namely, the main contact, forward contact and fuse hinge contacts. Two lubrication points on non-load-break fuse mountings (above).

## 8. Maintaining the Exterior

The exterior finish can be maintained by periodic washing, touch up of any scratches and abrasions, and waxing. For areas to be touched-up, clean the area removing all rust. Feather the paint of areas adjacent to rusted areas to be painted. Apply a red-oxide primer, available in spray cans from a local paint supplier or home improvement store. Spray cans of the topcoat finish are available from Federal Pacific (specify the original color).

## 9. Replacing Labels

Replace any missing, damaged or obscure labels. Replacement labels are available from Federal Pacific.

## 10. Lubrication

When maintenance is performed, check for lubrication at the following locations:



## WARNING

Lubrication is NOT required on any other surfaces than the locations identified below. Applying lubrication in other areas may reduce mechanical and electrical performance. DO NOT OVER LUBRICATE!

### LUBRICATE ONLY:

1. On the switch main-contact stab. See Figure 1.
2. On the contact interface at the fuse-mounting stationary main contact. See Figure 2.
3. Fuse Mountings
  - a. Load-Break Fuse Mountings.
 

On the forward contact that engages the fuse contact rod and on the fuse hinge contacts that engage the fuse contact ferrule. The contact rod on the fuse end fitting and the lower fuse ferrule on the fuse unit of the fuse assembly. Refer to fuse manufacturer's instructions.
  - b. Non-Load-Break Fuse Mountings
 

On the upper main contact of the fuse mounting and the contact-rod of the fuse-unit end fitting or the upper-ferrule contact of the fuse holder, and on the fuse hinge contacts that engage the lower ferrule of the fuse unit or fuse holder.
4. **DO NOT LUBRICATE ANY OTHER AREAS.**
5. If lubrication is required apply a coating of NYE Rheolube 363, which is the only approved lubricant.

## 11. Verify Security Devices

Verify the operational integrity of security devices such as door latches, penta-head bolts, hinges and key-interlock systems. Make certain padlocks are properly installed on all doors and covers.

## 12. Specification

Torque Value: For bus bar connections, apply 50 ft-pounds torque to 1/2-13 UNC 18-8SS (or equivalent) hex bolts. For other bolted connections, refer to factory. High-Pot Test Value: After cleaning and restoring equipment, Per IEEE C37.74 — 75% of 35kV for 1 minute.



Figure 3. View shows present cast fuse main contact at far left and previous main contact, which was a weldment, at right (removed from load-break fuse mounting).