

METAL-ENCLOSED SWITCHGEAR 15kV • 25kV • 38kV INSPECTION & MAINTENANCE RECOMMENDATIONS

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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.

SAFETY INFORMATION

Understanding Safety-Alert Messages

There are several types of safety-alert messages which may appear throughout this instruction bulletin as well as on labels attached to the pad-mounted switchgear. Familiarize yourself with these types of messages and the importance of the various signal words, as explained below.

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.

SAFETY INSTRUCTIONS

Safety Instructions (or equivalent) signs indicate specific safety-related instructions or procedures.

SAFETY PRECAUTION

DANGER

Federal Pacific Fuse Mountings in conjunction with appropriate fuses are designed to protect equipment and to disconnect faulted equipment from the system. The fuses cannot protect personnel from injury or electrocution if contact is made with energized circuits or hardware.

FOLLOWING SAFETY INSTRUCTIONS

NOTICE



Thoroughly and carefully read this instruction bulletin before installation of the metal-enclosed switchgear, before switching or operating the switches or fuse mountings in this equipment, and before performing any maintenance on the equipment.

If you do not understand any portion of this instruction bulletin and need assistance, contact Federal Pacific at 276-466-8200.

Replacement Instructions & Labels

If you need additional copies of this instruction bulletin, contact Federal Pacific at 276-466-8200.

It is important that any missing, damaged, or faded labels on the equipment be replaced immediately. Replacement labels are available by contacting Federal Pacific.

Introduction

The procedures required for operation of the Federal Pacific Auto-jet® II Load-Interrupter Switches, the Fuse Mountings, the doors, the barriers and other accessory components are covered in detail in the Federal Pacific Instruction Bulletin Section IB-3A-310. The inspection and maintenance recommendations covered in this bulletin are expected to be performed in conjunction with a review of IB-3A-310. 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-3A-310 can be printed from the internet at www.federalpacific.com.

⚠ CAUTION

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 metal-enclosed switchgear. Solvents and flammable products can attack non-metallic components of the equipment and reduce electrical and mechanical properties.

Maintenance

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



Figure 1. Federal Pacific Metal-Enclosed Switchgear

Before Opening the Switchgear

⚠ WARNING

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. Verify Security Devices

Verify the operational integrity of security devices such as door latches, penta-head bolts, hinges and key-interlock and mechanical interlock systems. Mechanical interlocks on doors to bays containing switches must keep the door secured closed until the switch is open.

2. Replacing Labels

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

3. 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. 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).

4. Exercising

Yearly mechanical exercising of the switch is recommended. Refer to Instruction Bulletin Section IB-3A-310 for information on operating the switch.

⚠ DANGER

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.

5. Switch Operation

Check switch for proper operation refer to Instruction Bulletin IB-3A-310. 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 irregularities on the contacts can be burnished with an emory cloth or paper.

⚠ CAUTION

Accumulation of contamination on the barrier may cause tracking that can ultimately lead tgo a flashover. Clean any contaminated barrier per "Maintenance" instructions above. After cleaning, if a barrier remains discolored, it must be replaced.

6. Electrical Clearances

Check for proper electrical clearances as described in Recommended Clearances.

⚠ WARNING

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 too Barriers NOTE ⑤
95	5-1/2	3"	1"	3/4"	1/2"
125	7-1/2	5"	2-1/4"	2"	1-1/4"

- ① Minimum clearance from energized parts to electrical ground without barrier.
- ② Phase-to-Phase or Phase-to-Ground with Barrier.
- ③ Minimum Clearance from Energized Parts to Barrier.
- ④ Typical Barrier to Ground in Vicinity of Energized Parts.
- ⑤ Minimum clearance from Terminator Skirts to Barriers.

Check clearances for both normal and alternate positions of fuse termination bus.

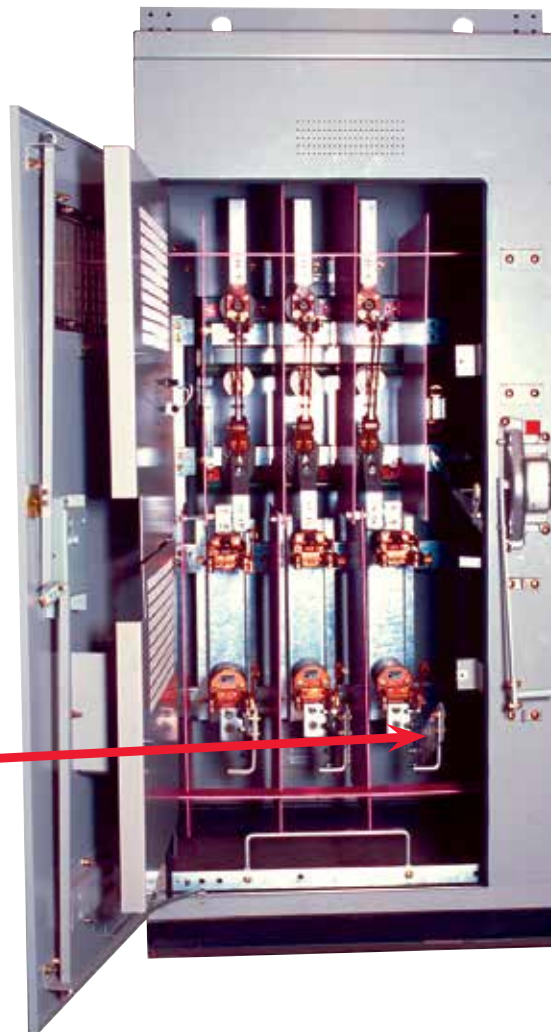


Figure 2. Typical switch-fuse feeder bay (loadbreak switch with non-loadbreak fuse mountings).

7. Barrier Removal

The use of interphase and phase-to-ground barriers enhances the performance of metal-enclosed switchgear by field personnel. The standard barrier system for metal-enclosed switchgear is a fixed barrier system that is to remain in place during cable termination when the switchgear is de-energized.

CAUTION

Care must be taken to keep the barriers 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.

If it is ever necessary to replace barriers or associated parts, proceed as follows:

- a. Completely disconnect the unit from all power sources.
- b. Open main door (see Door System on page 15 of Instruction Bulletin IB-3A-310) and secure with door keeper.
- c. 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.
- d. Remove the barrier or associated part from its normal position and install the replacement, making certain that items remain level and secured in place.

8. 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.

9. Fuse Operation

Open and close fuses and insure proper latching as described in the applicable fuse instruction bulletin provided by the fuse manufacturer. 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".

10. Lubrication

When maintenance is performed, check for lubrication shown in Figures 3-6.

⚠ CAUTION

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!**

⚠ CAUTION

Do not put any lubricant on switch probe or puffer contacts.

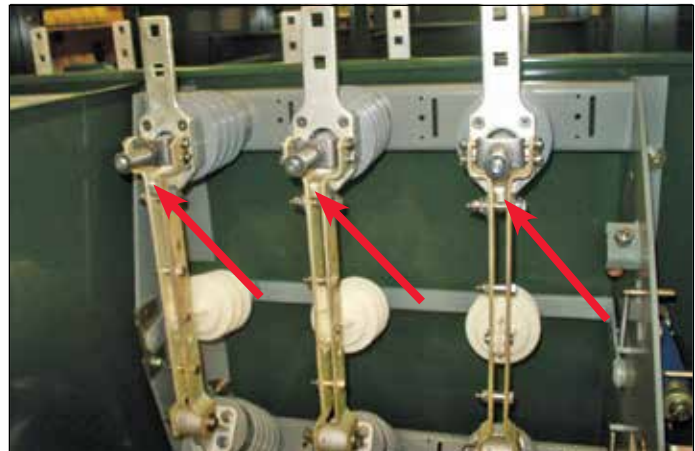


Figure 3. Lubricate only the interface between the main-contact stab and the switch blade marked by arrows.

Loadbreak Fuse Mountings (Lubrication Points)

1. On the switch main contact stab. See Figure 2.
2. On the contact interface at the fuse-mounting stationary main contact. See Figures 4 and 5.
3. 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 and fuse ferrule on the fuse assembly. Refer to fuse manufacturer's instructions.
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.

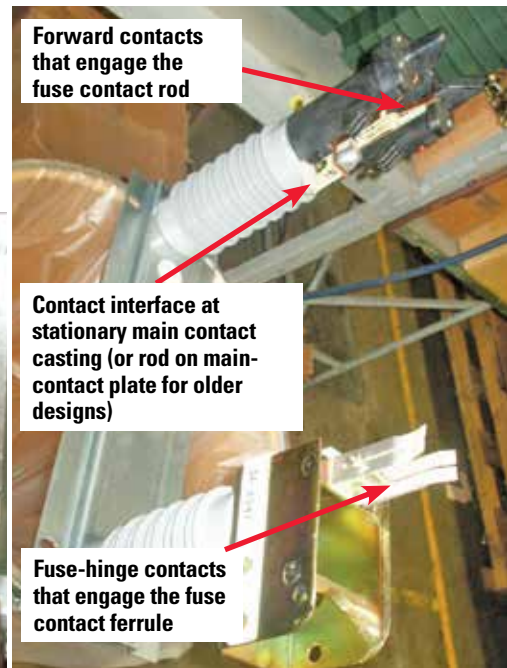
FOR LOADBREAK FUSE MOUNTINGS LUBRICATE ONLY:



Figure 4. For loadbreak fuse mountings, view shows present cast fuse main contact at left and previous main contact, which was a weldment, at right (removed from fuse mounting).



Figure 5. Lubrication points on loadbreak fuse mounting include three contact locations, namely, the main contact, forward contact and fuse hinge contacts.



Non-Loadbreak Fuse Mountings (Lubrication Points)

1. On the switch main-contact stab. See Figure 3.
2. On the fuse-mounting upper contacts. See Figure 6.
3. On the fuse mounting, at the fuse hinge contact. See Figure 6.
4. On the fuse assembly at the contact rod and fuse ferrule. Refer to the fuse manufacturer's instructions.
5. **DO NOT LUBRICATE ANY OTHER AREAS.**
6. If lubrication is required, apply a coating of NYE Rheolube 363, which is the only approved lubricant.

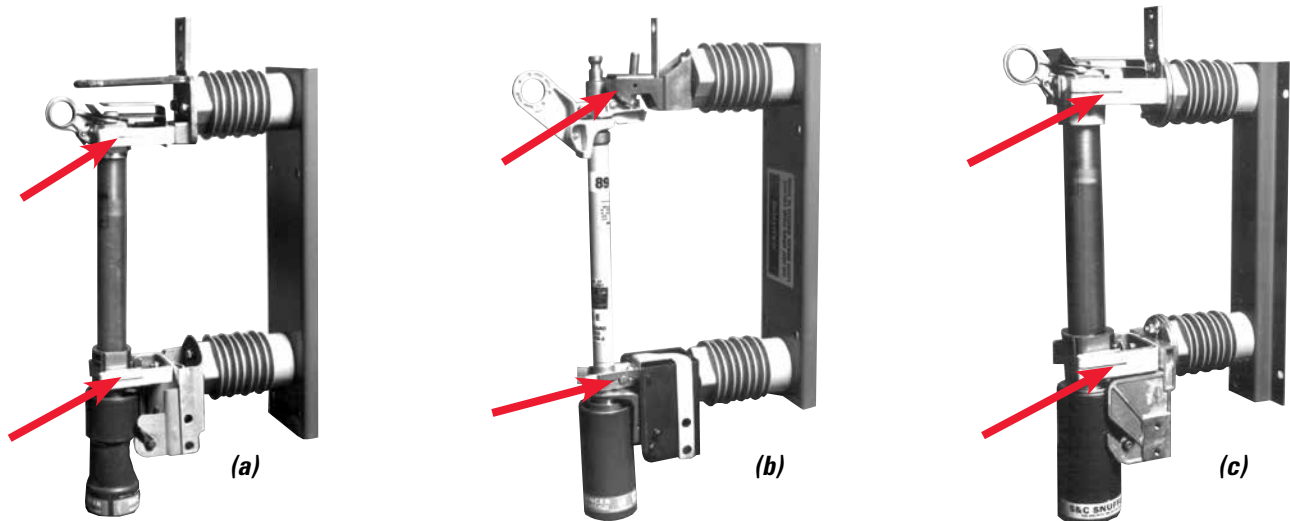


Figure 6. Lubrication points on non-loadbreak fuse mountings include two contact locations, namely, on the inside surfaces of the upper contacts and the hinge contacts. The inside contact areas to be lubricated are indicated by arrows in the above photos. Pictured are three of the many available fuse types: (a) SM-Z, (b) SM-290, and (c) SM-5S. Current-limiting fuses (not pictured) are lubricated at the upper and lower clip-style contacts.

11. 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 Manufacturer's Representative. A directory of the representatives can be found at www.federalpacific.com. If parts are ordered, the unit serial number and date of manufacture must be provided along with the part description.

