

## 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.

## INSTRUCTIONS

### Replacement of the White Turnbuckle Assembly in Dead-Front Pad-Mounted Switchgear

The white turnbuckle assembly is used in Federal Pacific Dead-Front Pad-Mounted Switchgear to connect the shutter barrier and the fuse panel so that they will operate in tandem when the fuse panel is opened or closed. When the fuse panel is opened, the shutter barrier is pulled forward by the turnbuckle to close off the fuse-panel opening in the equipment mounting wall of each

fuse-termination compartment. When the fuse panel is closed, the shutter barrier is pushed away from the fuse-panel opening, allowing the fuse panel (1) to close off and seal the opening in the equipment mounting wall of each fuse-termination compartment and (2) to keep the shutter barrier positioned away from energized components on the interior of the medium-voltage compartment.

### **CAUTION**

It is essential that the shutter barrier not be pushed while holding the fuse panel. If the shutter barrier is pushed while the fuse panel is held, it is very likely that the ball rod will break at the neck-down area behind the ball. If the ball rod breaks or if other portions of the turnbuckle fracture, the turnbuckle or the damaged section(s) will need to be replaced. The necessary instructions for replacing the sections of the turnbuckle are contained in this instruction bulletin.

### Before Opening the Switchgear

### **DANGER**

The following instructions and procedures must be performed with the current-carrying parts in the unit completely de-energized, isolated from voltage and grounded. Any attempt to perform these instructions and procedures with the current-carrying parts energized or not grounded may result in an electrical arc flash that can cause equipment damage, severe personal injury or death.

**Tools needed:**

- 9/16" deep well socket or socket with extension rod
- Flat-headed and Phillips screwdrivers as required
- Ratchet drive for sockets
- Small to medium hammer
- Locking pliers (Vice-Grip® or equivalent)

**⚠ WARNING**

It is recommended that at least two personnel be available for this process to insure that all standard practices and procedures are followed, especially when de-energizing, testing for voltage and grounding the unit.

**⚠ NOTICE**

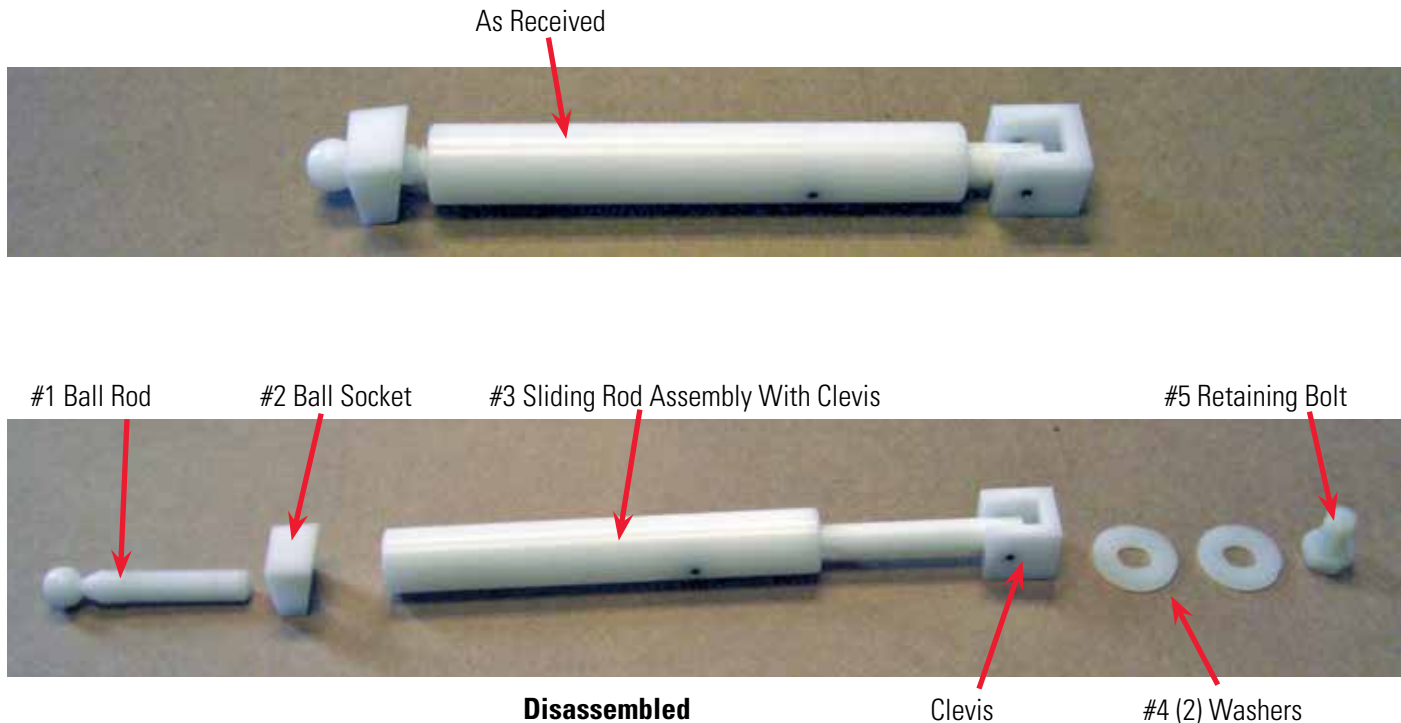
The replacement Turnbuckle will be received assembled and must be separated before installation, which is described in Part 2 on page 3.

If only the Threaded Ball Rod (see Figure 1) is broken, then remove and replace the Ball Socket and the Threaded Ball Rod as described in Part 2 and Part 3 followed by the assembly and adjustment procedure in Part 5 and Part 6 (i.e. Part 4 can be skipped).

If the Sliding Rod Assembly with Clevis is damaged or if the retaining bolt and washers are missing, then the procedures in Part 4 must be completed along with the assembly and adjustment procedure in Part 5 and Part 6.

**Part 1 – Major Components of the Turnbuckle Assembly**

The major components of the "white" Turnbuckle assembly are shown below:



**Figure 1.** Top photo shows the replacement "white" Turnbuckle as it is received from the factory (hardware provided is not shown). Photo at bottom shows the disassembled Turnbuckle and identifies the major components.

## Part 2 – Removal of the Old Ball Socket from the Shutter Barrier

If the Ball has broken away from the Ball-Rod Shaft:

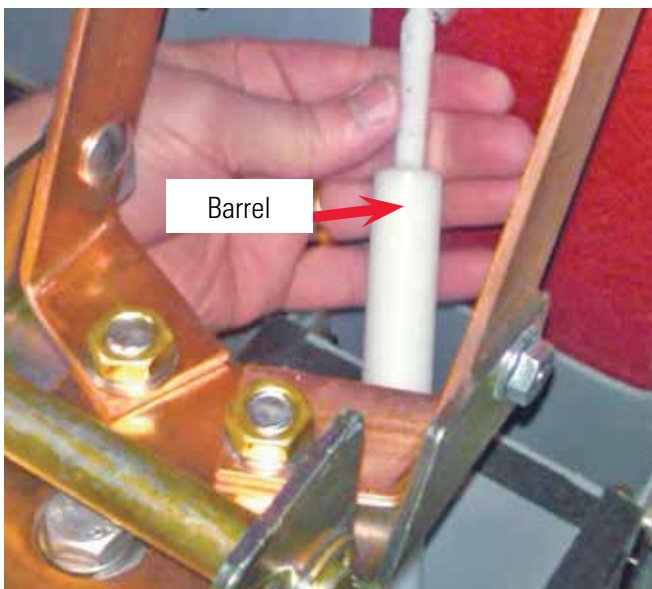
1) Separate the Ball Rod (#1) from the Sliding Rod and Clevis Assembly (#3) by holding the threaded shaft and turning the barrel of the Sliding Rod Assembly counter-clockwise until the parts are separated. See Figure 2. If the Sliding Rod Assembly with Clevis is not damaged, keep it in position. Discard the Ball-Rod Shaft that was removed.

2) Taking care not to damage the shutter barrier or widen the screw holes where the ball socket is secured to the shutter barrier, remove the Ball Socket (#2) from the GPO-3 shutter barrier using locking pliers (or other appropriate tool) to grip and twist the ball

socket until it breaks free from the two machine screws that secure it to the shutter barrier. Discard the Ball Socket and, if it remains, the Ball.

3) Gently push the two machine screws through the shutter barrier so they fall directly below the barrier and onto the floor of the medium-voltage compartment.

4) Having confirmed that the unit is completely **de-energized** as explained in the “**DANGER**” under the section headed “**Before Opening the Switchgear**” on page 1, push in on the barrier, reach in the medium-voltage compartment and remove the two machine screws and their washers from the floor of the compartment. Discard the machine screws and washers; they will not be reused.



**Figure 2.** Separate the Ball Rod from the Sliding Rod Assembly by holding the shaft of Ball Rod and turning the barrel of the Sliding Rod Assembly counter-clockwise.

### Part 3 – Installation of New Ball Socket and Ball Rod

5) Insert a plastic anchor (supplied with the replacement kit) into the upper-left and lower-right holes of the four holes in the shutter barrier. See Figure 3.

- a. Push the plastic anchors flush against the Shutter Barrier by gently tapping on them.
- b. DO NOT break, crack, or otherwise physically damage the Shutter Barriers or plastic anchors during this process.

6) Using the replacement Turnbuckle and while holding the Ball

Socket and Ball Rod together, unscrew them by turning the barrel of the Sliding Rod Assembly counter-clockwise until they separate. If the Ball Socket and Ball Rod inadvertently separate, reposition them together by inserting the threaded end of the Ball Rod through the square (flat) side of the Ball Socket and out through beveled (slanted) side of the Ball Socket. See Figure 4. The ball of the Ball Rod is captured by a ridge in the beveled side of the Ball Socket.

7) Insert two of the screws (supplied with the replacement kit) into the two holes on the slanted side of the Ball Socket.

8) Orient the Ball Socket with the thickest side at the top. Attach the Ball Socket (with the Ball Rod correctly positioned in it) to the Shutter Barrier by turning the screws down into the plastic anchors, which were previously installed in the Shutter Barrier in Step 5. See Figure 5.



**Figure 3.** Tap a plastic anchor in the upper-left and lower-right holes of the four holes in the shutter barrier.



**Figure 4.** The Ball-Rod Shaft is inserted through the flat side of the Ball Socket and out through the beveled side.



**Figure 5.** Secure the Ball Socket (with the Ball Rod correctly positioned in it) to the Shutter Barrier by tightening the two screws into the plastic anchors.



## Part 4 – Removal of the Damaged Sliding Rod Assembly with Clevis from the Fuse Panel

**Complete Part 4 only if the Sliding Rod Assembly with Clevis is Damaged.**

9) Remove and discard the nylon Bolt and washers from the exterior of the fuse panel using a 9/16" socket.

10) Unscrew the Ball Rod (#2) from the Sliding Rod Assembly with Clevis (#3) if this has not already been done.

11) Remove and discard the damaged Sliding Rod Assembly with Clevis.

## Part 5 – Installing the Replacement Sliding Rod Assembly with Clevis to the Fuse Panel

12) On the new nylon Bolt, place the two nylon washers over the shaft and against the Bolt head.

13) Apply a small drop of Loctite® to a thread or two of the Bolt.

14) With both washers on the exterior side of the fuse panel, insert the Bolt through the hole and thread it **finger tight** into the Clevis of the Sliding Rod Assembly, which are on the inside of the fuse panel.

15) With the Bolt finger tight, apply a small drop of Loctite® on the end of the Bolt shaft at the hole in the Clevis. The two drops of Loctite® applied are to insure that the bolt will not back out.

## Part 6 – Connecting and Adjusting the Ball Rod and Sliding Rod Assembly with Clevis

16) Grasp the shaft of the Ball Rod and the barrel of the Sliding

Rod Assembly and thread them together by turning the barrel until the Ball Rod is in approximately half-way.

17) Verify that the Clevis remains free to rotate.

18) When raising the fuse panel, initially the Shutter Barrier will be engaged by the contact rod of the fuse mounting. But, the Shutter Barrier must always be free and must not be tight against the contact rod so that the Ball Rod does not bind.



**Figure 6.** Turn the barrel of the Sliding Rod Assembly and thread it approximately halfway on the Ball Rod.

Confirm that the Ball Rod will not bind by slightly raising the fuse panel until the fuse-mounting contact rod engages the Shutter Barrier, and then gently push the Shutter Barrier to make certain it is not held tight against the contact rod. It should be possible to move the Shutter Barrier approximately 1/4" away from the contact rod. Throughout the interval where the Shutter Barrier and contact rod are engaged, there should always be sufficient play to separate the Shutter Barrier from the contact rod by approximately 1/4".

If sufficient play is not observed adjust the penetration of the Ball Rod accordingly.

After confirming that sufficient play exists, raise and lower the fuse panel to insure that the Shutter Barrier and fuse panel correctly move in tandem.

### CAUTION

Make certain to observe these precautions:

- The Loctite® must **not** be allowed to seep between the bottom of the clevis and the fuse panel or between the fuse panel and the washer.
- The Bolt should be "finger tight" to allow the Clevis to pivot freely during operation of the fuse panel. The Loctite® will hold the bolt securely to the clevis.
- When the installation is complete, make certain the Clevis rotates freely.

If the Clevis is not free to move, the Ball Rod may break when the fuse panel is operated.



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Every effort is made to ensure that customers receive an up-to-date instruction manual on the use of Federal Pacific products; however, from time to time, modifications to our products may without notice make the information contained herein subject to alteration.

