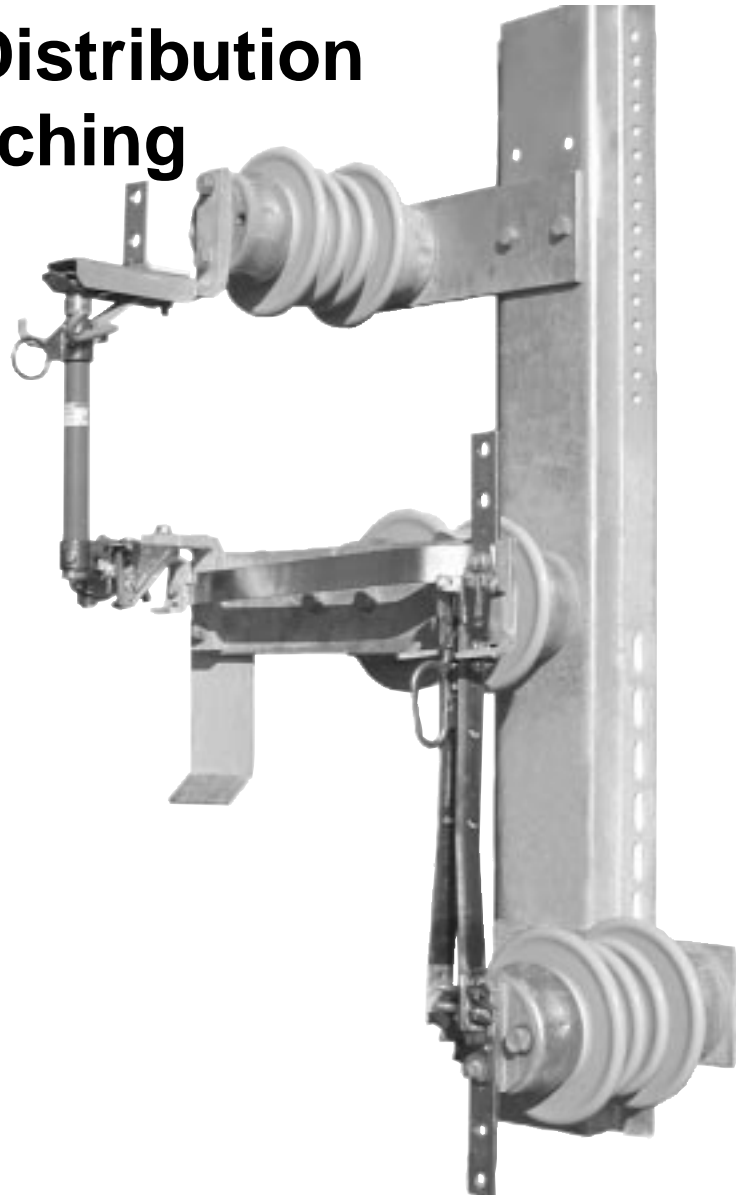




HUBBELL
POWER SYSTEMS, INC.

Type BPF Fused By-Pass Switch for Distribution Switching



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Printed in U.S.A.

IMPORTANT!
Keep this manual readily
available for future reference.

Warnings

DANGER



Electrical equipment contains hazardous voltages and high speed moving parts. Contact with these hazards will cause death, serious personal injury or damage equipment.

Only qualified personnel shall install, operate and maintain this equipment. Always properly ground equipment and lock out electric power (de-energize) before maintenance. Using non-specified/unauthorized parts or components to repair equipment, or tampering with safety devices/systems will result in dangerous conditions which can cause death, severe personal injury or damage to equipment. Take note of and follow all safety instructions contained in this installation, operation and maintenance manual.

IMPORTANT

These installation, operation and maintenance instructions do not claim to cover all details or variations in equipment. Nor do they provide for all possible conditions encountered while installing, operating or maintaining this equipment. If further information is desired or needed to address any particular installation, operation or maintenance problem not covered in this document, contact your authorized factory representative.

The information in this document does not relieve the user from exercising good judgment in selecting equipment for suitability of application. Nor does it relieve the user from using sound practices in installation, operation and maintenance of the equipment purchased.

Note: Because CHANCE has a policy of continuous product improvement, we reserve the right to change design and specifications without notice. Should a conflict arise between the general information in this document and the contents of drawings or supplementary material, or both, the latter shall take precedence.

QUALIFIED PERSON

For the purpose of this manual, a qualified person is:

- (a) **familiar with the installation, operation and maintenance** of the subject equipment and the hazards involved with its installation, operation and maintenance.
- (b) **trained** to de-energize, clear, ground, and tag circuits and equipment in accordance with established safety practices.
- (c) **trained** in the proper care and use of protective equipment such as rubber gloves, hard hat, safety glasses or face shields, flash clothing, etc., in accordance with established utility safety practices.
- (d) **trained** to render first aid.

SUMMARY

The information in this document does not claim to cover all details or variations in equipment, nor to provide for every possible contingency encountered with installation, operation, or maintenance. Should further information be needed or problems arise that are not covered sufficiently, contact your factory representative.

The contents of this document are not part of, nor do they modify, any prior or existing agreement, commitment or relationship. CHANCE terms and conditions of sale constitute the entire obligation of CHANCE. The warranty in the terms and conditions of sale is the sole warranty of CHANCE. Any statements in this document do not create new warranties or modify any existing warranty.

Overview

Qualified Person

Only qualified trained and competent personnel that understand proper safety procedures must select, install and service this equipment.

Read and understand these instructions before installing, operating or maintaining this equipment.

This guide is not a substitute for adequate training and experience in safety procedures for this type of equipment.

Signal Words

The signal words "DANGER," "WARNING" and "CAUTION" (along with their assigned symbol) throughout this manual indicate the degree of hazard the user may encounter. These symbols and words are defined as:



DANGER indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



WARNING indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



CAUTION indicates a potentially hazardous situation which, if not avoided, may result in moderate or minor injury.



CAUTION used without the safety alert symbol indicates a potentially hazardous situation which, if not avoided, may result in property damage.

Product

The products covered by this manual are the BPF fused substation by-pass switches for medium voltage electrical distribution switching.

These products are designed for distribution switching only at their rated capacities. They cannot be field modified for capacities other than what was shipped with the units. If a different capacity is desired, contact your supervisor or factory representative to secure the appropriate unit.

Function

These products are non-loadbreak disconnect switch and fuse combinations designed to provide a means for by-passing, disconnecting and isolating reclosers on the electrical distribution system.

General

The BPF By-Pass Switch is a single-phase fused hook stick operated switch. It is normally used with a companion switch such as a Chance M3S, station class hook stick switch. The BPF By-Pass switch is used for manually disconnecting a recloser without interrupting normal electrical service while continuing to provide over-current protection. Standard variations are:

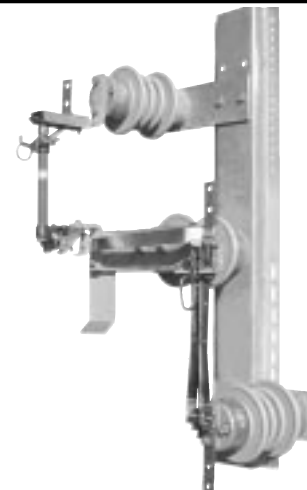
- A. Left or right fuse mounting.
- B. Terminal connectors.

The BPF disconnect switch has no inherent current making or breaking rating. The fuse is capable of interrupting over-currents within its assigned rating. Both switch and fuse include load break hooks for use with a load break tool. The BPF has no dead-ending provisions.

Specifications

Select the proper BPF switch for each installation with consideration to system and short circuit recovery voltage, continuous current, available short circuit over-current, short time current withstand, lightning impulse withstand and variations. If there is concern about the use of this switch as rated, consult your supervisor before installation.

- Nominal voltage ratings of 14.4kV or 25kV (model dependent)
- Lightning impulse peak withstand ratings of 110kV or 150kV (model dependent)
- Switch continuous current rating of 600 amperes
- Switch short time current withstand rating:
 - 25kA symmetrical, 1 second
 - 65kA peak



- Fuse continuous current ratings of 100 or 200 amperes (model dependent)
- Fuse interrupt ratings of:
 - 14.4kV nominal voltage rating
 - 7.1kA symmetrical, 10kA asymmetrical for 100 ampere fuse holder
 - 8kA symmetrical, 12kA asymmetrical for 200 ampere fuse holder
 - 25kV nominal voltage rating
 - 5.3kA symmetrical, 8kA asymmetrical for 100 ampere fuse holder
 - 6.6kA symmetrical, 10kA asymmetrical for 200 ampere fuse holder
- Rating of the fuse holder is given on the switch name plate. Consult factory representative prior to using any other fuse holder.

Switch Variations

A. Left or Right Fuse Mounting

Left or right fuse mounting may be specified. A left mounted fuse is to the left of the operator when viewed from the front of the switch. A right mounted fuse is to the right of the operator when viewed from the front of the switch. This selection allows the BPF to be tailored to fit the requirements of the application. Illustrations in this manual show only a left fuse mounting. Right fuse mounting will be opposite as shown but does not change the installation or operation procedures. (continued next page)

	⚠ DANGER
	Hazardous Voltage Will cause death, severe personal injury, or property damage. Only qualified personnel should work on or around this equipment after becoming thoroughly familiar with this document and other publications regarding this equipment.

Overview

B. Terminal Connectors (3 options)



1. No Terminal Hardware

The user supplies the terminal connectors and mounting hardware.

2. Captive Hardware

Provides 1/2" diameter by 1 3/4" long stainless bolt secured into each terminal pad hole. Each bolt is supplied with a hex nut and lock washer. Terminal connectors supplied by the user.



3. Terminal Connectors

Fortified cadmium plated aluminum parallel groove terminal connectors (ATC1343) with terminal pad mounting hardware are supplied. The connectors accommodate conductor sizes ranging from No 2 solid copper thru 500 MCM copper or aluminum.

Receiving & Handling

Inspect Packaging

- Upon receipt, immediately inspect packaging for signs of damage
- Start inspection with the packaging material and proceed to the equipment within
- Look for concealed damage
- If damage is found, note damage on Bill of Lading prior to accepting delivery.



Note: Documentation of visible shipping damage can determine the outcome of any damage claim. Immediately notifying the carrier of concealed damage is essential to resolving or minimizing unsettled claims. Immediately file your claim and notify your factory representative.

Unpack Switch

- Place shipping crate on stable, level surface near the installation site
- Remove the top and sides from the shipping crate
- Remove the clamping board(s) from the switch base

- Leave switch on its pallet until ready to install
- Compare switch with the photos here to be sure all items have been included
- Contact your factory representative if any parts are missing

Installation

Install Switch

- Determine the switch mounting location on the structure
- Provide a minimum of four $\frac{9}{16}$ " diameter mounting holes in the structure matching the hole and slot patterns as shown in the switch base detail in Figure 1
- Secure lifting sling as shown in the photo here
- Using your company's standard practice, hoist the switch into position
- Attach the switch to the structure with $\frac{1}{2}$ "-diameter user-supplied mounting hardware (four minimum) and torque according to your company standards.

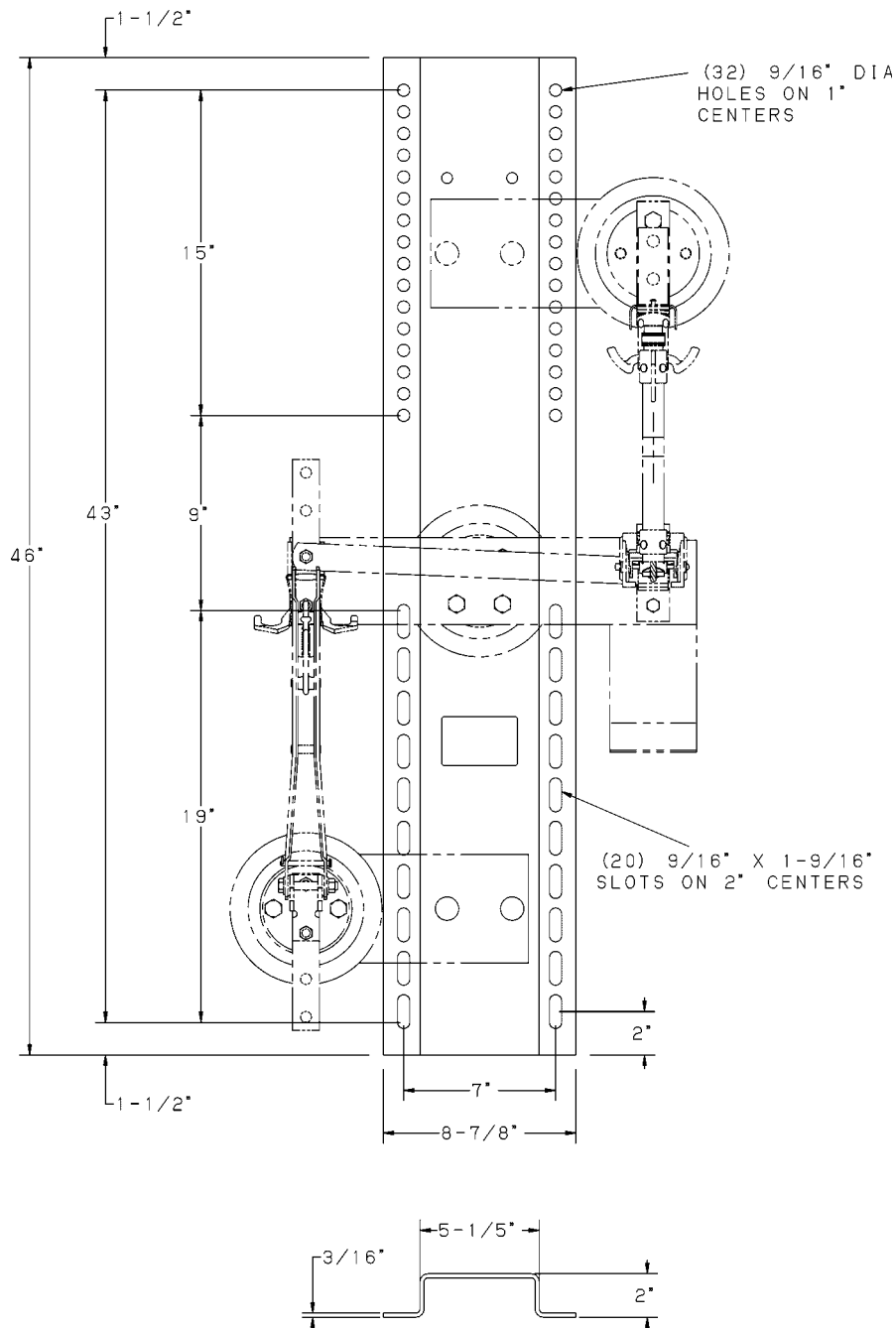
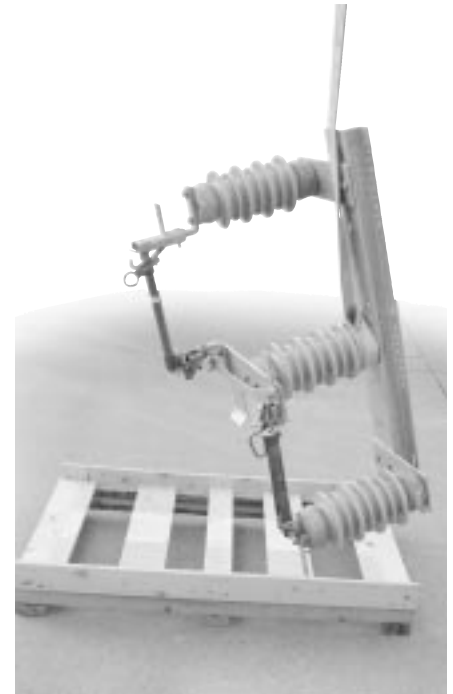




Figure 1



Installation

Install Fuse Link

	⚠ CAUTION
	<p>High Voltage Electrical Arc Hazard May cause moderate injury or property damage.</p> <p>Do not remove or damage the small tube on the fuse link. It is an integral part of the fuse link and removal or damage may result in the fuse's failure to interrupt an over-current.</p>

	⚠ CAUTION
	<p>High Voltage Electrical Arc Hazard May cause moderate injury or property damage.</p> <p>Do not use 100 ampere or smaller fuse links in 200 ampere fuse holders by employing washers or other means. This action may result in the fuse's failure to interrupt an over-current.</p>

- Install an appropriately rated fuse link in the fuse holder.
- To install the fuse link in the fuse holder, remove the cap from the upper ferrule of the fuse holder assembly.

NOTE: Fuse holders using an arc-shortening rod require the use of removable button-head fuse links.

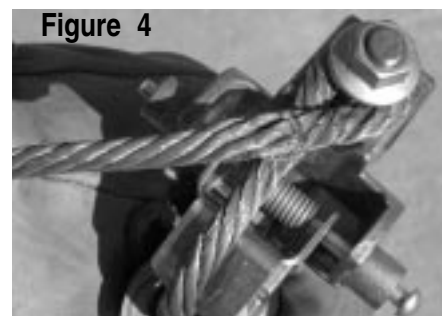
Figure 2




Figure 3



Figure 4



	⚠ CAUTION
	<p>High Voltage Electrical Arc Hazard May cause moderate injury or property damage.</p> <p>Do not replace an arc-shortening rod with a standard cap. The rod is required to achieve the designed interrupting rating and use of the fuse holder without the rod will reduce the fuse's interrupting capability and may cause the fuse to fail to interrupt an over-current.</p>

- To connect the fuse link and arc shortening rod, remove the screw-type button-head and washer (if equipped) from the fuse link.
- Screw the arc-shortening rod (attached to cap) onto the fuse link and tighten firmly (See Figure 2).
- Slide the fuse link cable into the top of the fuse holder and pull out at the lower end.
- Replace the cap or arc shortening rod assembly on the upper fuse holder ferrule and tighten with a wrench.
- Holding the fuse holder at the lower end, rotate the link ejector about its pivot until it stops, making certain that the tab on the link ejector engages the latch on the lower fuse holder ferrule (See Figure 3).
- Hold the ejector in this position and feed the cable over the link ejector channel and in a clockwise direction around the un-threaded portion at the base of the stud (See Figure 4).
- Maintain tension on the fuse link cable and tighten the fuse link attachment nut with a wrench.
- Cut off excess fuse link cable.


Wiring

Conductors

- Using your company's standard practices, train the conductors to the switch terminal pads
- Use sufficient conductor length to allow for ease of termination and switch operation

Connect High Voltage Conductors

- Wire brush mating surfaces of the terminal pads and terminal connectors
- Wire brush connector surfaces where conductors will be secured
- Wire brush conductor surfaces
- Apply a contact sealing paste to the cleaned surfaces (Chance Co. Z.L.N. or equivalent)
- Assemble connectors, conductors and hardware to the terminal pads
- Ensure bolt heads of the terminal connectors are on the insulator side of the terminal pad as shown.
- Torque all supplied hardware to 60 ft-lb.
- Torque user supplied hardware according to your company standards.

	CAUTION
	High Voltage Electrical Arc Hazard May cause property damage. Install terminal connectors with bolt heads toward the insulator. Failure to do so may compromise the electrical insulation resulting in an electrical arc.




Operation

General

Operation of the BPF By-Pass switch is shown in Figures 4 and 5. In normal operation, the fuse holder is not in place and the companion switch and by-pass switch disconnect blades are closed (Figure 5), allowing the recloser to be in the circuit. When isolation of the recloser is required, install the fuse holder fitted with an appropriately-rated fuse link and close the fuse holder to provide a parallel current path. Open the disconnect blades (Figure 6) to isolate the recloser from the circuit.

- Position yourself below and slightly to the



⚠ DANGER

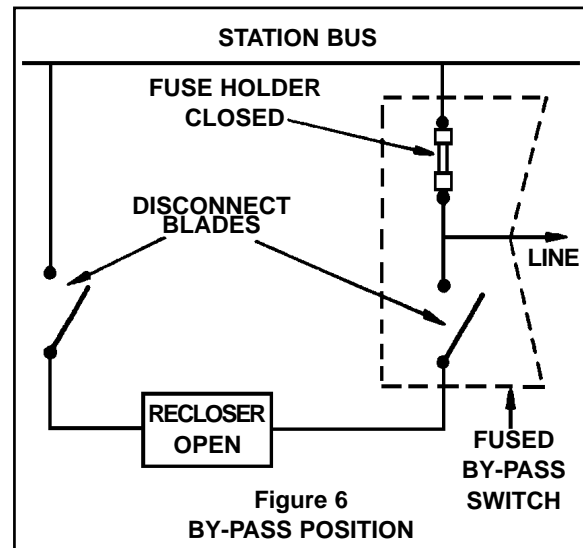
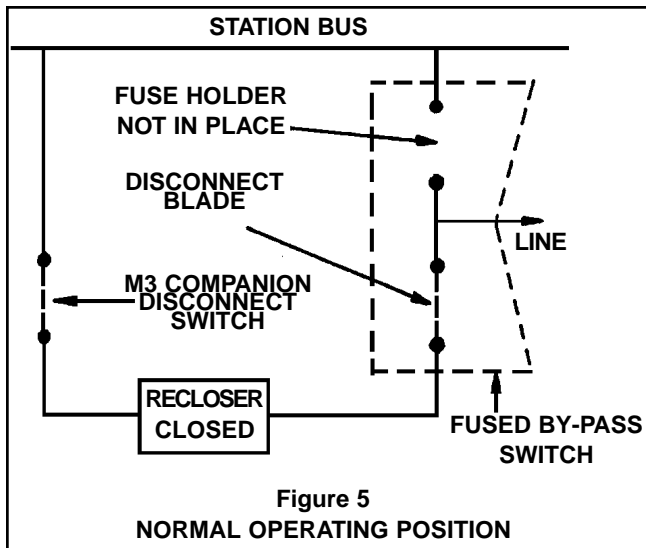
Electrocution Hazard

Will cause death, severe personal injury, or property damage.

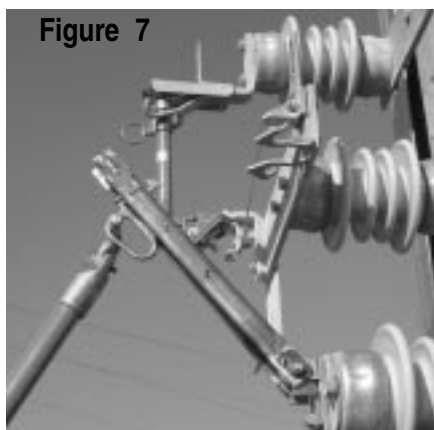
Avoid contact with energized circuits and hardware. Fuse is for protection of equipment only. Fuse will not protect personnel from electrocution or injury.

- front of the switch or fuse pull ring
- Position feet and body in a manner that provides good stability and allows for hook stick use without losing a steady footing
- Under ice conditions, be prepared to use

- greater force to overcome the additional resistance
- Allow a minimum of 24 inches (610 mm) clearance from the bottom of the hook stick to the ground for uninterrupted hook stick travel.



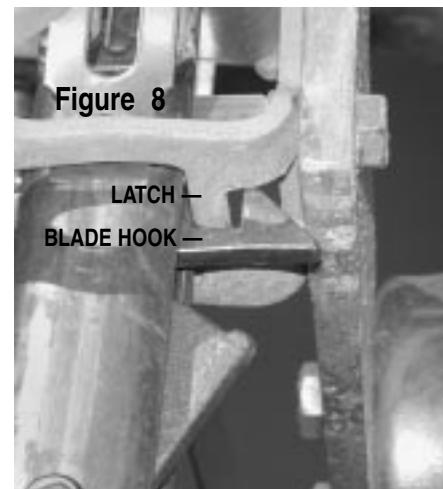
Closing Disconnect Switch



- To close the switch, place a hook stick in the pull ring on the blade and rotate the blade to an intermediate position as shown in Figure 7.
- Turn head and look away from the switch.



- **Quickly, firmly and without hesitation** drive the switch to the closed position.
- Carefully remove the hook stick from the pull ring to avoid opening the switch.
- The BPF switch is properly closed when



- the blade hook is fully engaged with the latch portion of the blade stop as shown in Figure 8.
- Visually check each switch blade for proper latching.

Operation

Opening Disconnect Switch







Figure 9

- To open the switch, first close the fuse electrically paralleling the switch. Place a hook stick in the pull ring as shown in Figure 9.
- Turn head and look away from the switch.
- **Quickly, firmly and without hesitation** pull down and towards the hinge end of



Figure 10

	 WARNING
	<p>High Voltage Electrical Arc Hazard</p> <p>Can cause death, severe personal injury or property damage.</p> <p>Close the fuse holder before opening either of the two disconnect blades. Failure to do so will result in an electrical arc.</p>

	 WARNING
	<p>High Voltage Electrical Arc Hazard</p> <p>Opening an energized disconnect switch without a loadbreak tool will create an electrical arc.</p> <p>Can cause death, severe personal injury or property damage.</p> <p>Use appropriately rated loadbreak tool to open a switch that is carrying load current.</p>

- the switch at about a 45° angle, as shown in Figure 10.
- Once the switch is open, continue the blade travel to its stop position, shown in Figure 11.
- Carefully remove the hook stick from the pull ring.



Figure 11



- The blade of the BPF switch is also equipped with loadbreak hooks for use with a loadbreak tool, as shown Figure 12.
- To open the switch under load, use only an approved loadbreak tool or device designed for use with switches.
- Follow the instructions provided with such tools.





Figure 12

Operation

Fuse Closing

	 DANGER
	<p>Electrocution Hazard</p> <p>Will cause death, severe personal injury, or property damage.</p> <p>Avoid contact with energized circuits and hardware. Fuse is for protection of equipment only. Fuse will not protect personnel from electrocution or injury.</p>



- Once an appropriately rated fuse link has been installed (see Install Fuse Link section) in the fuse holder, insert a hook stick into either the fuse holder trunnion opening or keyhole.
- Place the fuse holder into the hinge as shown in Figure 13.
- Remove the hook stick.

	 WARNING
	<p>High Velocity Hot Gases and Fuse Link Particles</p> <p>Can cause death, severe personal injury or property damage.</p> <p>Stay away from the conical area below and in-line with the fuse holder. High velocity hot gasses and fuse link particles are expelled from the fuse holder during interruption.</p>



Position yourself well clear from the vented end and exhaust path of the fuse holder.

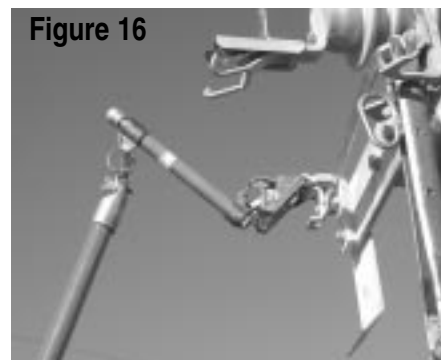
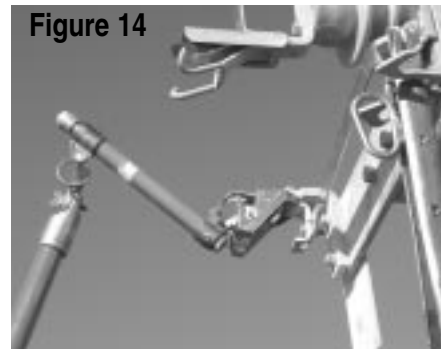
- Place the hook stick in the ring on the upper ferrule of the fuse holder.
- Rotate the fuse holder to an intermediate position as shown in Figure 14.
- Turn head and look away from the fuse.
- **Quickly, firmly and without hesitation**, drive the fuse holder into the closed position.
- Carefully remove the hook stick from the ring to avoid opening the fuse holder.

Opening Fuse

	 WARNING
	<p>High Voltage Electrical Arc Hazard</p> <p>Can cause death, severe personal injury or property damage.</p> <p>Close the two disconnect blades before opening the fuse holder. Failure to do so will result in an electrical arc.</p>

- To open the fuse, first close the two disconnect blades electrically paralleling the fuse. Place a hook stick in the pull ring as shown in Figure 15.
- Turn head and look away from the fuse.
- **Quickly, firmly and without hesitation** pull down and towards the hinge end of the fuse at about a 45° angle as shown in Figure 16.
- Complete the fuse holder travel to its full open position.
- Carefully remove the hook stick from the pull ring.
- Place the hook stick into either the fuse holder trunnion opening or keyhole.
- Remove the fuse holder from the fuse mounting, being careful not to drop the fuse holder.

	 CAUTION
	<p>High Voltage Electrical Arc Hazard</p> <p>May cause moderate injury or property damage.</p> <p>Store fuse holder in an upright position out-doors or in a non-heated weather protected area. Excessive water entering the bore of the fuse holder may cause interior corrosion, damage the fuse holder liner or damage the fuse link. These conditions may cause the fuse to fail to interrupt an over-current.</p>



Operation

- Store the fuse holder in an upright position out-doors.
- Fuse holders may also be stored inside a non-heated weather protected area.



	 WARNING
	<p>High Voltage Electrical Arc Hazard</p> <p>Can cause death, severe personal injury or property damage.</p> <p>Use appropriately rated load break tool to open a fuse carrying load current. Opening an energized fuse without a load break tool will create an electrical arc.</p>

Figure 17



The fuse is equipped with load break hooks for use with a load break tool as shown in Figure 17.

- To open a fuse carrying load current, use only an approved load break tool or device designed for use with this type of fuse.
- Follow the instructions provided with such tools.

Maintenance



General



Extend the life of the BPF By-Pass switch with a periodic inspection and maintenance program. Although the switch is designed for long-term exposure in all weather conditions, certain environments may reduce its life without periodic maintenance. Following these mini-

mum inspection and maintenance procedures will help ensure long service life.

Note: It is recommended that all switches go through a maintenance check at least once a year; more frequently if located in a contaminated area.

For additional recommendations, refer to ANSI C37.35 "IEEE Guide for the Application, Installation, Operation, And Maintenance of High Voltage Air Disconnect and Load Interrupter Switches" and ANSI C37.48 "IEEE Guide for the Application, Operation and Maintenance of High Voltage Fuses."

	 DANGER
	<p>Hazardous Voltage</p> <p>Contact with energized lines will result in death, personal injury or property damage.</p> <p>All maintenance work should be performed on de-energized switches. If work must be performed on live lines, follow your company's standard safe operating procedures.</p>

	 WARNING
	<p>Hazardous Voltage</p> <p>Contact with the switch base or hardware could result in electrical shock. Can cause death or severe personal injury.</p> <p>Always ground the switch base and mounting hardware prior to maintenance.</p>

Fused By-Pass Switch

Operate the switch periodically to clean contact surfaces to keep parts moving freely.

- Check for burned or pitted contacts and replace if necessary. Lubricate if necessary with Optimol® grease (Cat. No. C600-2870)
- Check the hinge bolts for looseness. If loose, clean bolt threads, apply Loctite® 271 and torque to 40 in-lb.
- Inspect all blade rivets for tightness and replace blade assembly if loose.
- Inspect the mounting hardware and tighten according to specifications located

in the Installation Section of the manual.

- Replace any damaged or tracked insulators. Clean or replace if heavily contaminated. Consult your factory representative for authorized replacement insulators.
- Replace fuse holder if it shows signs of electrical tracking. Consult your factory representative for authorized replacement fuse holders.
- Check fuse link cable attachment to fuse holder. Clean and/or replace if corroded.
- Inspect and ensure venting end of fuseholder is not plugged with foreign

material. Clean or replace if necessary.

- Inspect the fuse holder liner for cracking or excessive erosion. Replace if necessary.

Conductors

- Be sure all conductors are routed so they do not interfere with switch operation.
- Inspect all conductors to be sure terminations are tight and corrosion free.
- If necessary, clean and apply contact sealing paste (Chance Co. Z.L.N. or equivalent) and retighten terminations.

Notes/Records
