Type A7

8.25 THRU 145 kV
600-1600A
40-70 KA Momentary

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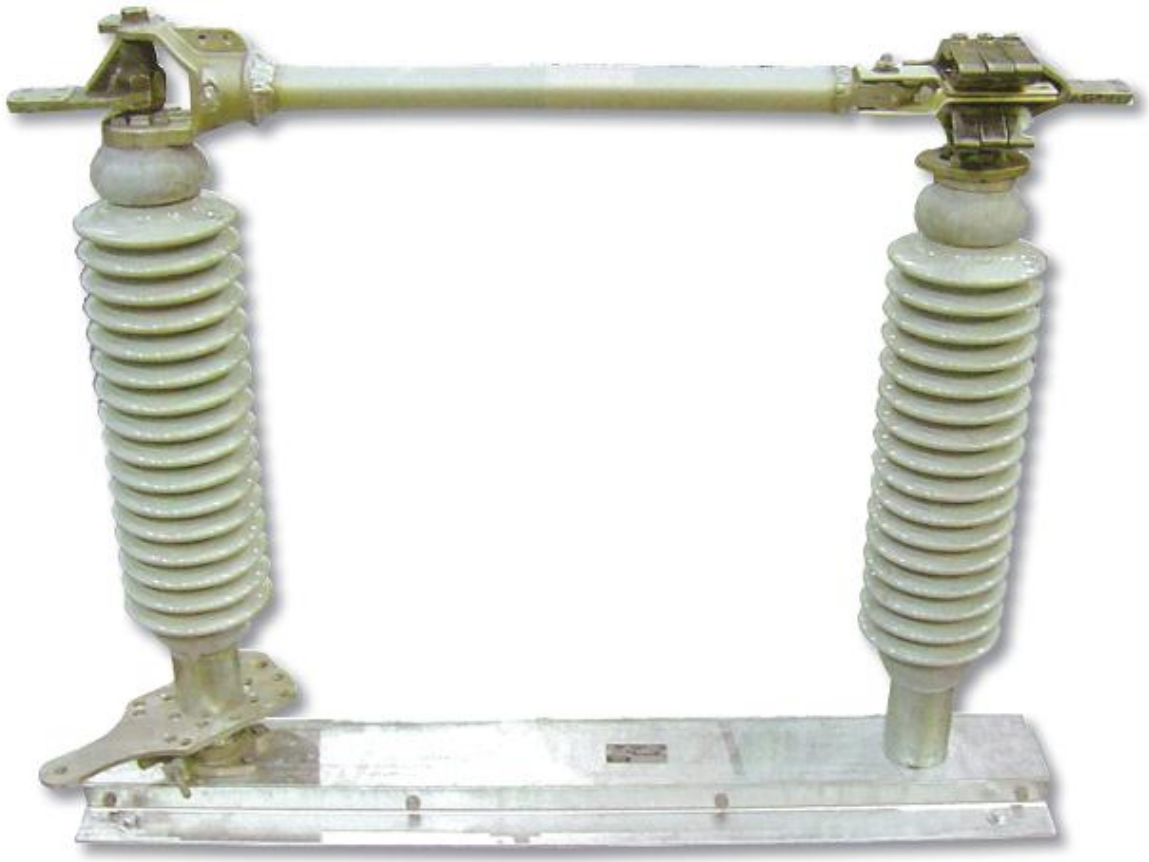


Side-Break Outdoor Air Disconnect Switch

Contents

Suggested Tools

- 15/16" Open-End Wrench
- 15/16" Socket
- 3/4" Open-End Wrench (2)
- 3/4" Socket
- 1 1/2" Open-End Wrench or Adjustable
- Lineman Pliers
- Tape Measure
- Angle Finder
- Metal Cutting Saw
- Level

IMPORTANT: Read manual before installing or maintaining equipment! Make absolutely sure that equipment is de-energized and properly grounded.

This manual should be used in conjunction with the factory drawings. The drawings contain critical information, which if not followed could affect the operation of the switch.

Instructions cannot cover all possible variations in equipment nor provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be required or should particular problems arise which are not covered sufficiently for the purchaser's purposes, the concern should be referred to the factory.

For Technical Assistance Call 276-688-3328

RECEIVING INSPECTION

Check the shipment for completeness against the bill of material and installation drawings. If damage is found, file a claim immediately with the transportation company and notify your Pascor Atlantic representative.

HANDLING

Handling of disconnect switches should be done with care. Porcelain is fragile and may be damaged due to improper handling.

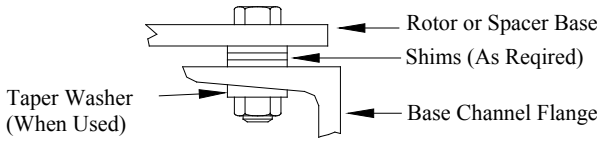
Factory drawings should be followed during installation. It is recommended that switches be fully assembled and adjusted at ground level before being placed into position. This should minimize final adjustments.

Lifting of switches by insulators, contacts, or live parts should be avoided, because of possible damage to these parts. Attachments for hoisting should be made to the switch bases unless otherwise instructed. (See Fig. 2)

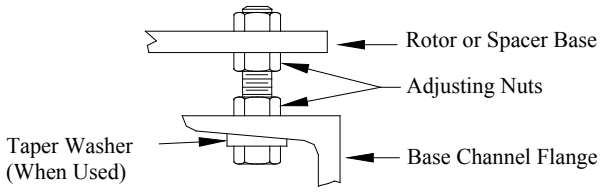
CAUTION: When uncrating switches having blade counterbalances (Fig. 3), open the switch blade to relieve the pressure of the counter balance before removing the live parts from the base.

INSTALLATION AND ADJUSTMENT

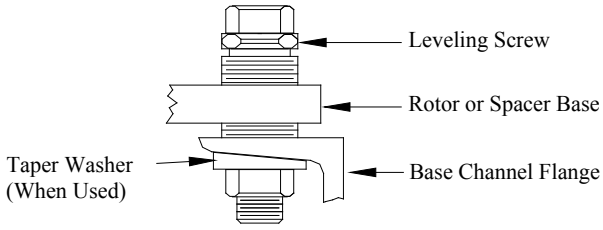
If the switches have already been assembled with insulators at the factory, proceed to step 5. However, it is recommended that each switch pole be checked for alignment and proper adjustment after being mounted on the structure.



Shims Used for Leveling Switches



Leveling Bolts



Leveling Screws

Fig. 1 Types of Leveling Devices

Step 1—Assemble Switches

If the switches are not assembled, assemble the insulator stacks to the switch base. Do not disturb the position of the switch crank when mounting the insulator stack to the rotor bearing, as the crank has been properly located at the

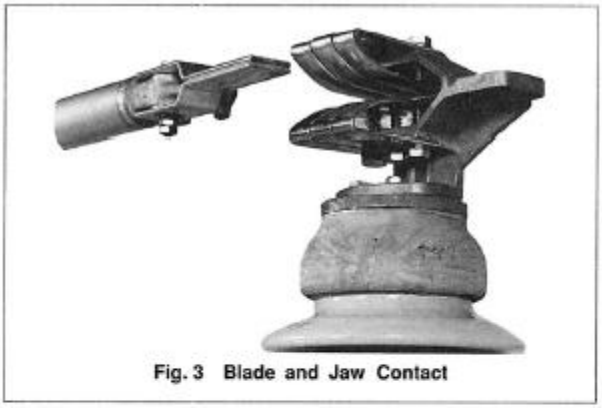


Fig. 3 Blade and Jaw Contact

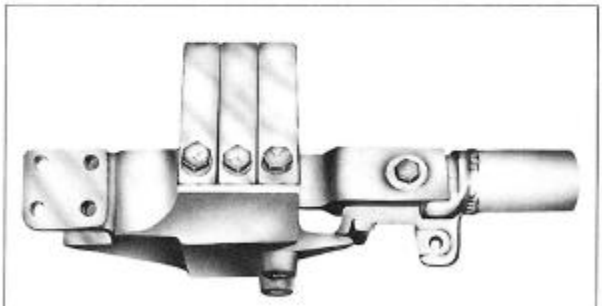


Fig. 4 Plan View of Switch Blade in Fully Closed Position

factory. After the insulator stacks are all in place, the live parts should be mounted on top of the stacks with the switch in the closed position.

Step 2—Insulator Stack Alignment

Lower voltage switches 8.25 thru 72.5kV generally do not require insulator stack alignment. Where required, the insulator stacks of switches thru 242kV can be aligned using open-end shims or leveling screws and/or adjusting nuts (Fig. 1) if supplied (optional).

- If using shims, place the shims under the insulator supports (rotor bearing or spacer mounting flange) where the bolts secure the rotor bearing or spacer mounting flange to the switch bases.
- If optional leveling screws and/or adjusting nuts have been supplied, as shown in Fig. 1, adjust the leveling screw and/or adjusting nut to align the insulator stacks. Loosen all hardware before jacking to prevent binding.

Step 3—Adjust Blade and Jaw

Blade and jaw contacts should be coated with a lubricant before adjusting. Suggested lubricants are MOBIL 28 of NO-OX-ID "A Special".

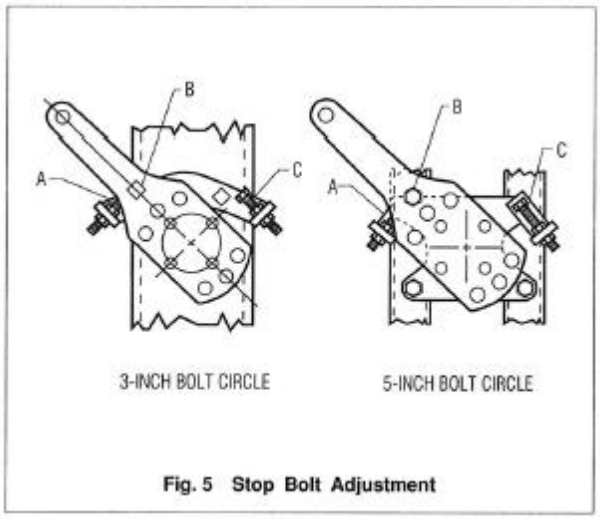


Fig. 5 Stop Bolt Adjustment

After aligning the insulator stacks, close the switch by hand to see if blade contact (A) properly engages jaw contact (B), Fig. 3. The blade contact should enter the jaw contact centrally, and engage deep enough so that the blade stop either touches or is within 1/2" of touching the jaw stop, Fig. 4. It may be necessary to re-adjust the insulator stacks to achieve proper contact engagement.

Step 4—Set Stop Bolts

Adjust the stop bolts in the switch rotor bearing as follows:

1. With the switch in the fully closed position, adjust the closed position bolt (A) so it engages the mating projection (B) on the crank. See Fig. 5

2. Move the switch to the fully open position and adjust the open stop bolt (C) in the same manner.

Step 5—Mount Switches

Assemble the switches on the supporting structure in accordance with the positions shown on the installation drawing. Make sure the multi-angle adjustable crank is attached to the operating pole.

Step 6—Mount Offset Base

Locate and mount the offset base and bearing on the structure in accordance with the switch operating mechanism drawing.

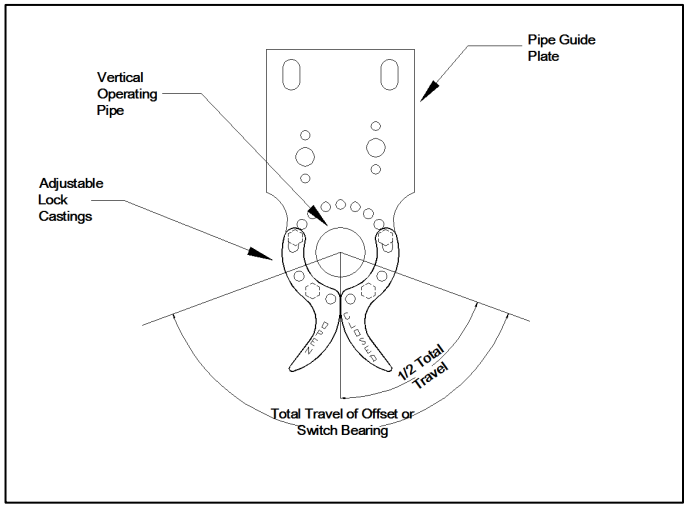


Fig 6. Operating Handle Lock Plate

Step 7—Install Interphase and Offset Crank Rods

With all blades in the closed position, install the interphase rods and offset crank rod as follows:

a. Lengthen the interphase rods that are in compression during opening, as much as possible, yet allowing for the pins to be inserted.
b. On the rods that are in tension during opening, shorten them as much as possible, yet allowing for the pins to be inserted.
c. The offset crank rod between the outboard bearing and the driven switch should be handled the same way
d. For lubrication of pins and bearing areas, see Table 2

Step 8—Install Vertical Operating Pipe

Attach vertical operating pipe to rotor bearing shaft, of to offset rotor bearing shaft, with coupling pins supplied. At this point, check drawings for accessory equipment (auxiliary switches, mechanical interlocks, position indicators, ground straps, etc.) which mounts on vertical operating pipe and install before continuing installation. The vertical pipe is predrilled at one end for a 5/8" diameter pin, two of which are shipped, together with a coupling, in a bag, for connection to the offset bearing shaft (or on the pole unit rotor bearing in the case of direct connection switches)

When the structure height exceeds 23 feet, a pipe splice and a guide plate are furnished and should be installed. The pipe spice and both pieces of pipe are predrilled to receive

Fig. 7 Geared Mechanism

Fig. 8 MO-10 Motor Operator

the 5/8" diameter pins. The guide plate should not be solidly mounted until after the vertical pipe has been completely installed. Then bolts holding the guide plate on the structure should be tightened in order that the holes in the guide plate line up with the normal

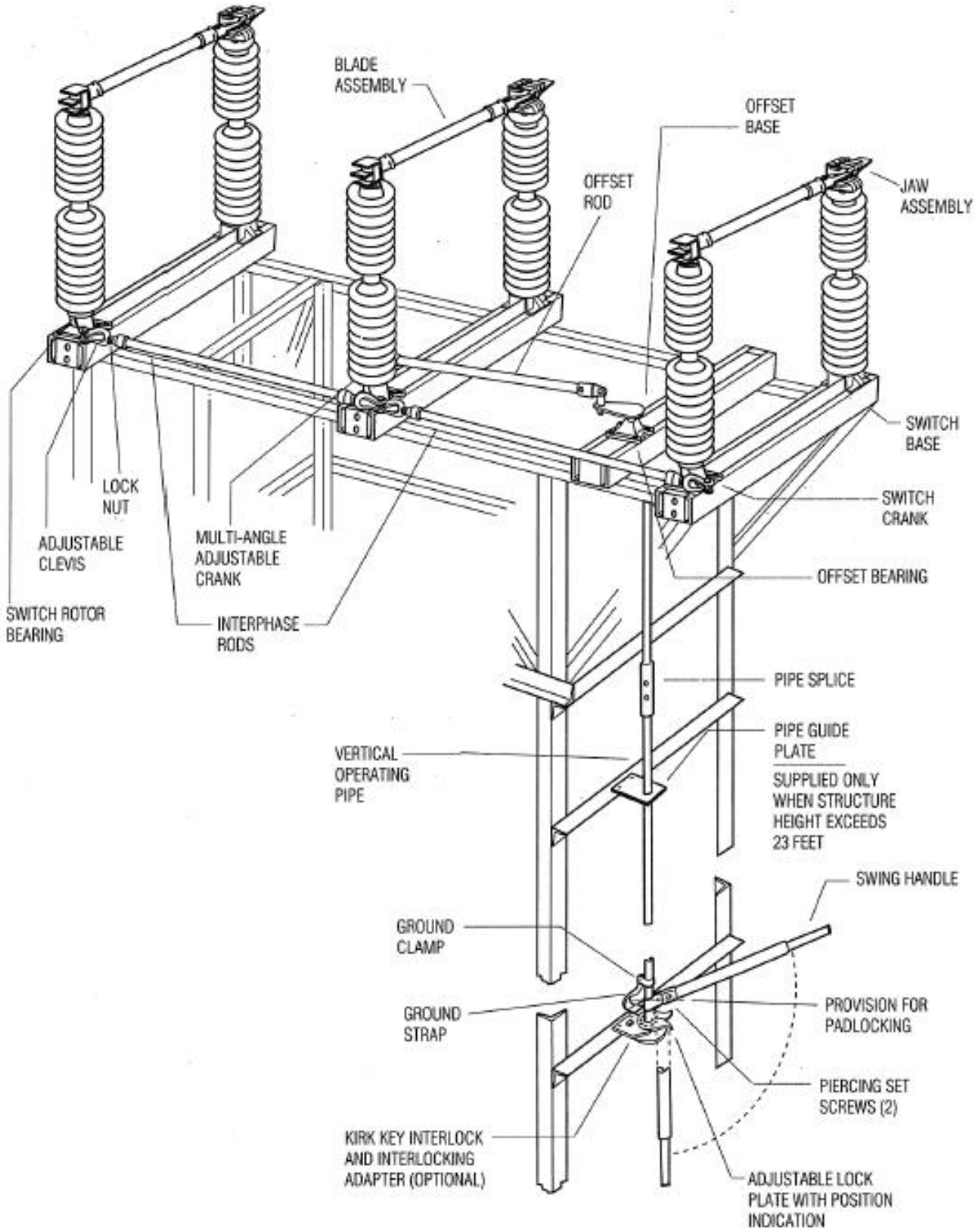


Fig. 9 Typical A7 Switch Installation.

position of pipe. This assures that there is no binding.

Step 9—Install Operating Mechanism

Either a swing handle or a worm gear mechanism is (normally) supplied for manual switch operation.

Swing Handle Operator

To install the swing handle operator:
With ground strap in place on vertical operating pipe, slide handle and handle lock plate over the end of the vertical operating pipe. Fasten the lock plate at the proper location. Recommended height for the lock plate is 3 ft. 6 in. above ground.

Note: The lower end of the vertical operating pipe should extend through the lock plate at least 3 inches. It may extend as much as 3 feet or more, just so it doesn't touch the ground or column footing.

The lock plate assembly (Fig. 6) consists of two castings, mounted on the pipe guide plate, which can be easily adjusted in an arc to provide the required rotation. These act as locks for the manual operating handle when it is dropped from the operating position. The handle must be raised to a horizontal position for operation. With the switch in the fully closed position, set the handle clamp so its set screws are 4 inches above the lock plate and its vertical centerline is at or near as possible to the closed position, see Fig. 8.
Temporarily fasten the handle to the pipe with the set screws. Operate the switch and move the adjustable lock castings until they exert pressure against the handle in both the open and closed positions of the switch. This provides a slight torsional wind-up in the operating pipe. Tighten the two piercing set screws on the handle clamp until holes are punched into the pipe and continue until the screws are firmly seated.

Worm Gear Mechanism

With ground strap in place on vertical operating pipe, slide worm gear mechanism (Fig. 7) over the vertical operating pipe and attach it to the structure. Remove the small position indicators, which are attached to the worm gear coupling with Allen set screws. Tighten hex head set screws in the coupling until the vertical operating pipe is pierced. The three-pole switch should now be operated manually to check for proper adjustment. If all stops at switch elevation have been set, including the offset bearing, then it is safe to reinstall the position indicators on the worm gear mechanism. These indicators should not quite touch the raised boss on the worm gear housing in either the open or closed position. There is a possibility of damage to the indicators or the coupling if this is not observed

Motor Operator

For remote operation, a motor operator is supplied and it should be installed per the instructions supplied with it.

Step 10—Arcing Horn Installation (When Supplied)

Arcing horns are furnished only when horn gap switches are ordered. When arcing horns are used, they should be installed and adjusted after the switches are mounted and adjusted.
The arcing horn should be adjusted to make very light contact when the switch is operated, the main switch contacts should separate before the arcing horns disengage. Refer to arcing horn assembly drawing supplied with the order for detailed information.

Step 11—Final Checks

The completed 3-pole installation should be checked for the following:

1. All bolts are tight and all cotter pins are bent adequately.
2. The single poles are held against or nearly against their individual rotor bearing stops in both the open and closed positions and also the stops on the offset bearing.
3. Operating effort required to operate the switch is not excessive.

Terminal Connections

The aluminum surface of the terminal connection provides for easy current transfer.

Notice: In cases where a copper conductor is used, bolt a tinned terminal clamp (if available) to the aluminum switch terminal pad.
If a non-tinned terminal clamp is used, apply a liberal amount of electrical joint grease at the joint and all over the pad of the fitting.

To connect aluminum-to-aluminum terminals:

1. Clean all contact surfaces of conductors and fittings using a stiff wire brush to remove heavy oxide coatings until the aluminum finish is visible and restored.
2. Coat these now clean contact areas with a liberal amount of corrosion inhibitor such as NO-OX-ID"A Special" or No. 2 EJC.
3. Abrade the contact surface through the corrosion inhibitor again using the stiff wire brush.

Notice: Do not remove the compound.

4. Connect the terminals and torque the bolts as per Table 1.

To connect copper-to-aluminum terminals:

1. Except for plated surfaces, clean all contact surfaces of conductors and fittings using a stiff wire brush to remove heavy oxide coatings until the aluminum finish is visible and restored.
2. Prepare any bare copper surfaces in the usual manner.
3. Coat these now clean contact areas with a liberal amount of corrosion inhibitor such as NO-OX-ID "A Special" or no. 2 EJC.
4. Abrade the contact surface through the corrosion inhibitor using a stiff wire brush.

Notice: Do not remove the electrical joint grease.

5. Connect the terminals and torque the bolts as per Table 1.

MAINTENANCE

WARNING

Before servicing the switch, be sure it is disconnected from all electric power sources and properly grounded.

A certain amount of care and inspection is recommended. The frequency of inspection depends upon atmospheric conditions and frequency of operation. The service interval is largely determined by the user. Recommended maintenance is similar to that listed in the latest industry standards.[1] First, it is important that the insulators are always clean. It is also important that the contacts be examined to see that they are aligned, clean, and have a firm uniform pressure. If the contacts are pitted, or burned to some extent, they should be removed and replaced. Under normal service conditions, the jaw contacts should be examined and maintained at least once a year, depending upon the type of atmosphere to which they are exposed.

Periodic maintenance should consist of cleaning the contact surfaces thoroughly by carefully scraping off any contamination or deposit and sanding the surface entirely clean, a coating of lubricant should be applied. Suggested lubricants are MOBIL 28 grease or NO-OX-ID "A Special". MOBIL 28 is an Exxon Mobil product. NO-OX-ID is made by SANDCHEM INC.
In general, operating linkages require virtually no maintenance. However, in contaminated atmospheres of where operation under sleet conditions is common some lubrication at pivot points may be desirable. The grease used should be durable even when exposed to the elements, and should retain its viscosity over a wide temperature range.

BOLT SIZE	condition of Threads	Recommended torque in Ft. Lbs.			
		Silicon Bronze	Aluminum 2024-t4 anodized	Staniless Steel Type 304	Bright Zinc, Black & Galv. Steel
3/8"-16	Dry Lubricated	20 15	15 12	16 13	12 10
1/2"-13	Dry Lubricated	40 30	35 20	40 30	30 20
5/8"-11	Dry Lubricated	70 50	60 40	70 50	50 40
3/4"-10	Dry Lubricated	100 85	95 60	100 80	90 70
7/8"-9	Dry Lubricated	150 120	130 75	140 110	130 100
1"-8	Dry Lubricated	200 160	160 95	170 140	170 130

[1] ANSI C37.35 (American National Standard Guide for the Application, Installation, Operation and Maintenance of High-Voltage Air Disconnecting and Interrupter Switches)

RENEWAL PARTS

Refer to the switch nameplate when ordering renewal parts. The nameplate is attached to the base assembly of each switch pole. The same data is shown on the record engineering drawings. The master file at the factory is linked to the serial number on the nameplate.

Renewal Parts Ordering Information

Serial Number
Switch Type
Part Name
Quantity Required
Max. kV
B.I.L. kV
Cont. Amps
Mom. Amps

Refer your requests for renewal parts to the Factory.

Table 1
Lubrication Guide for Outdoor Switch Components

Part Name	Type Lubricants Recommended	Amount Applied	Qty. Req'd. for (6) Three-pole Switches
Jaw Fingers	NO-OX-ID Grade "A" Special or Mobil 28 Grease	Medium Coat	
Blade Ends	NO-OX-ID Grade "A" Special or Mobil 28 Grease	Medium Coat	(1) Quart
Pins On current carrying parts	Mobil 28 Grease or DC-4	*	
Pins On control parts	Mobil 28 Grease or DC-4	Light Coat	(1) Quart
Bearing Areas On control parts	Mobil 28 Grease or DC-4	Medium Coat	
Terminal Connections	NO-OX-ID Grade "A" Special or NO 2 EJC	Heavy Coat	(1) Quart

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