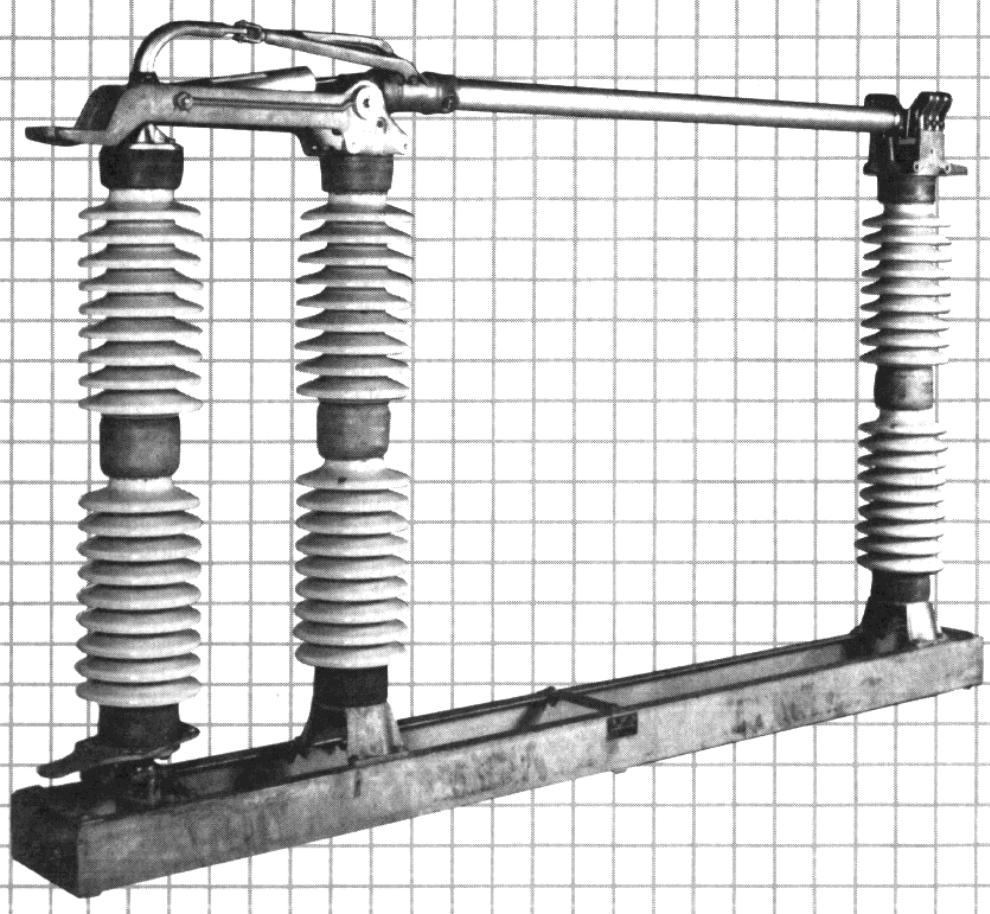
ASEA BROWN BOVERI

IB TTR6-A

Installation/Maintenance Instructions

Outdoor Air Switches

Type TTR6
Group-Operated, Vertical Break
8.25 thru 800 kV Max. Design



IMPORTANT

Make absolutely sure applicable equipment is de-energized and properly grounded before proceeding with any installation or maintenance.

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NOTICE

Normally Switch Operation Mechanism (SOM) drawings have been engineered for this switch and this switch base. These SOM drawings show the location and complete mounting details for:

Single-pole orientation • Offset bearing (If Used) • Control Linkage • Type of operator • Accessories

These SOM drawings should be followed during the installation.

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These instructions do not propose to cover all details or variations in equipment nor to provide for every possible contingency to be met in connection with installation, operation or maintenance. Should further information be desired or should particular problems arise which are not covered sufficiently for the purchaser's purposes the matter should be referred to the factory.

RECEIVING INSPECTION

Check the total shipment for completeness against the bill of material and installation drawings. If the switch shipping crate or the switch show evidence of shipping damage note the damage on the bill of lading.

HANDLING AND STORAGE

Trucking and handling of power switching equipment, after being received at its destination, should be done with the consideration that porcelain is frequently included and can be broken by sudden jarring or careless handling. Therefore, care should be exercised to prevent breakage or distortion of parts which could cause subsequent trouble, delay or inconvenience in installation.

Switching equipment should be properly stored prior to installation to protect it from damage.

WARNING WARNING WARNING WARNING

Before any installation is started, make absolutely sure that applicable equipment is de-energized and properly grounded. Protect the installers adequately from adjacent electrically energized parts by using barriers, screens, etc.

Factory installation drawings should be followed during installation. It is recommended that, insofar as it is possible to do so, that switching equipment be fully assembled and adjusted at ground level before it is placed into position. This should minimize final adjustments.

Rigging, which is used for erecting the switching equipment, must be adequate for the switching equipment involved. Attachments for hoisting should be made to the switch bases unless otherwise instructed. Lifting of switches by the insulator units, contacts, or live parts must be avoided, because of possible damage to these parts.

INSTALLATION AND ADJUSTMENT

If the switches have already been assembled at the factory, omit steps 1, 2, 3, 4 and 5. However, it is recommended that each switch pole be checked for alignment and proper adjustment after being mounted on the structure.

Step 1 - Check Bases

Check bases to make sure that insulator supports, spacers and rotor bearing tops are square and level. The tops of the two supports on the hinge end must be exactly the same height. If necessary, make adjustments or shim. Shims, leveling screws, and adjusting nuts are shown in Figs. 1 and 2 and are explained in Step 3.

Step 2 - Assemble Insulators

Assemble the insulator stacks to 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 factory. In some cases, involving higher voltage switches, the installer may choose to mount the switch bases on the structure before assembling the insulators. In such cases the switch bases should be mounted on the supporting structure in the positions shown on the installation drawing. The bases should be level and parallel to each other. Make sure that the base for the drive phase is in the correct location and operating cranks at their proper angles.

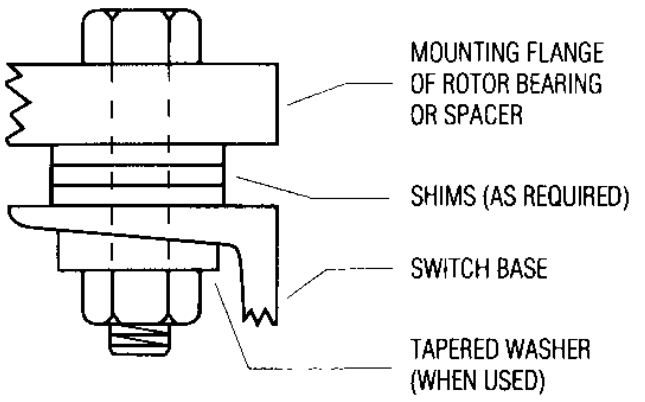
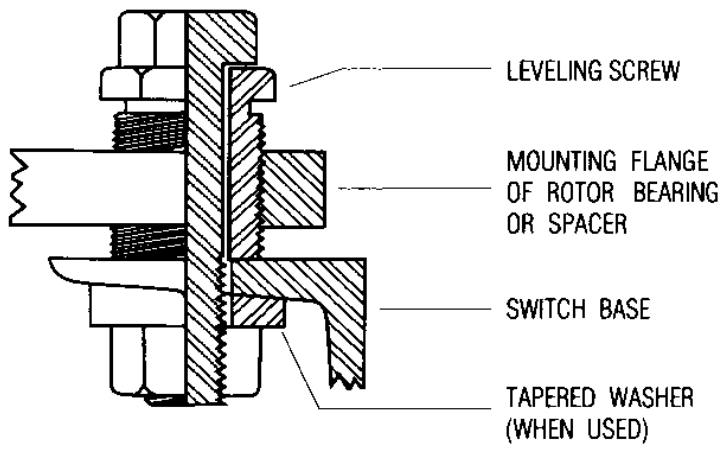
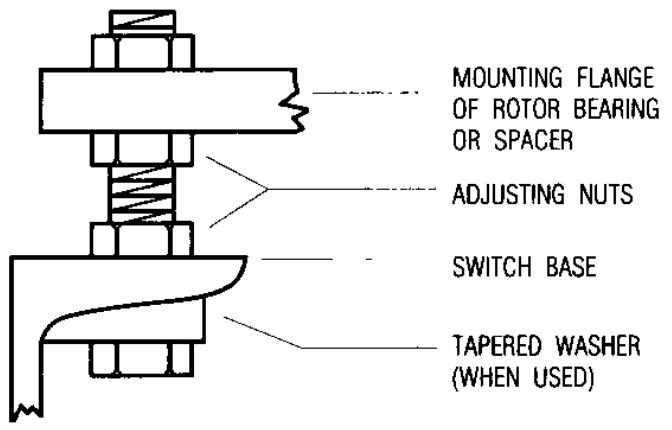


Fig. 1 Shims Used for Leveling Switches



LEVELING SCREWS



LEVELING BOLT

Fig. 2

Step 3 - Insulator Stack Alignment

Lower voltage switches, 8.25 thru 72.5 kV, generally do not require insulator stack alignment. Where required, the insulator stacks of switches thru 242 kV can be aligned by placing open-end shims (Fig.1) under the insulator supports (rotor bearing or spacer mounting flange) where the bolts secure them to the switch bases.

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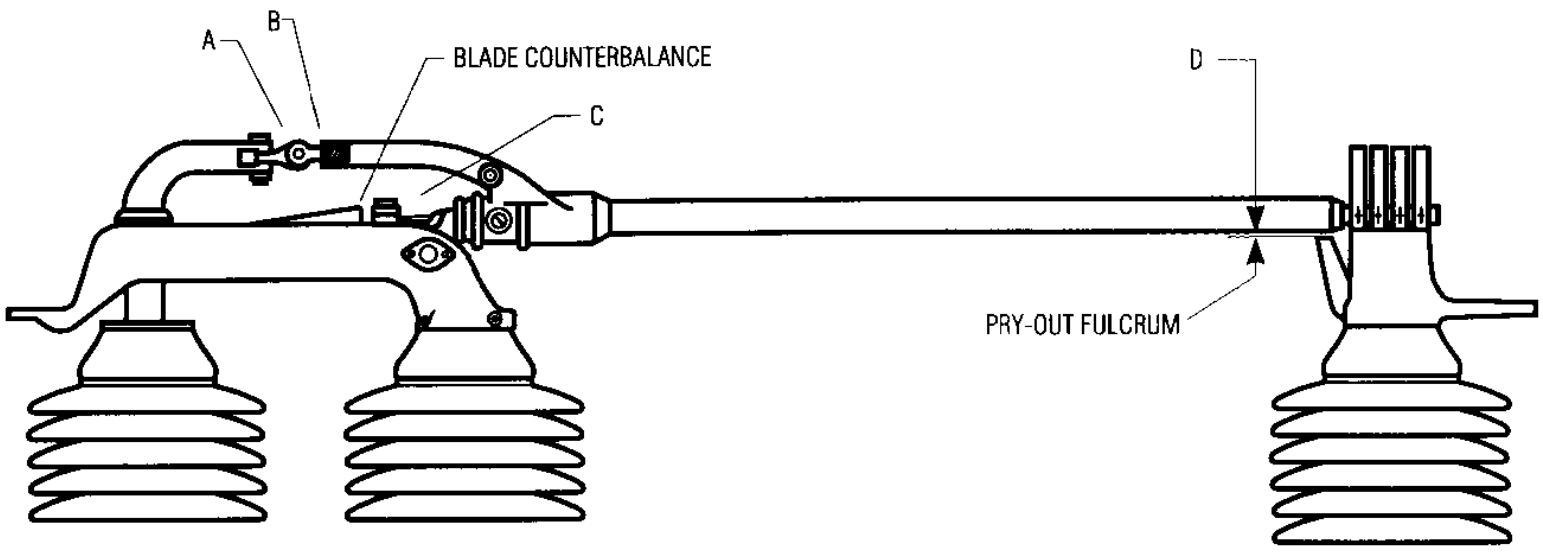

Fig. 3 Typical Set of Current-Carrying Parts

For lubrication of current carrying parts, see Table 1 on page 10.

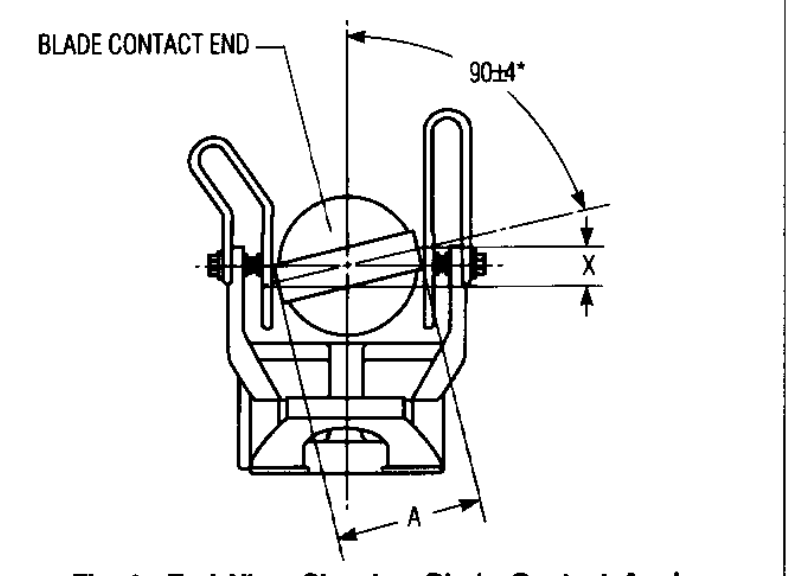

Fig. 4 End View Showing Blade Contact Angle

Insulator stacks of switches can be aligned using leveling screws or adjusting nuts as shown in Fig. 2, if supplied.

Step 4 - Mount Current Carrying Parts

CAUTION: When uncrating switches having blade counterbalances (Fig. 3), be careful to keep the linkage on dead center until the blade and hinge assembly have been bolted in place on the insulator columns. Otherwise, the counterbalance springs may collapse the hinge end toggle, possibly causing injury to workmen. Make certain that the base crank is in the proper position when mounting current carrying parts. i.e. - Base crank rotated to the maximum counterclockwise position with the blade closed. Care should be exercised when hoisting the blade hinge and jaw assemblies into position to prevent scratches or damage to these current-carrying parts. When assembling the jaws on the insulator columns, leave the jaw base hold down bolts finger tight. This will permit the jaw base to be rotated and shifted slightly for subsequent contact alignment. This alignment will be discussed later under blade entry (Step 6).

Step 5 - Mount Switches

Assemble the switches on the supporting structure in accordance with the positions shown on the installation drawing. The switches should be mounted level and parallel with each other. In case of a warped structure, shimming under the switch bases may be required.

Step 6 - Switch Blade Adjustment

When looking down on the switch rotating insulator column, rotation of the column is clockwise to open the switch and counterclockwise to close. First, make sure that stop bolts (Fig.13) at base of rotating insulators do not prevent switch from traveling to the complete open and closed positions, then check each pole unit for the following items:

Blade entry - Lower the blades slowly to the closed position to see if blade contact enters the jaw in a central position. If it does not, loosen the hinge assembly mounting bolts on stationary insulator stack and with blade just out of jaw, shift blade into alignment and tighten hinge assembly mounting bolts. Should this fail to give proper blade entry, the jaw insulator stack should be shimmed or adjusted to suit. When central entry is achieved, rotate the blade into contact and tighten jaw base mounting bolts.

Also make certain the jaw fingers are nearly centered on the blade end contact. If it is expected that the conductors to be attached to the switch jaw will impose an appreciable horizontal force, it is recommended that the jaw insulator column be adjusted so that the jaw fingers are slightly off center on the blade contact, in a direction toward the hinge end. The blade must rotate on opening and closing to relieve the jaw contact pressure.

Blade contact angle - (Fig.4) The allowable difference in elevation

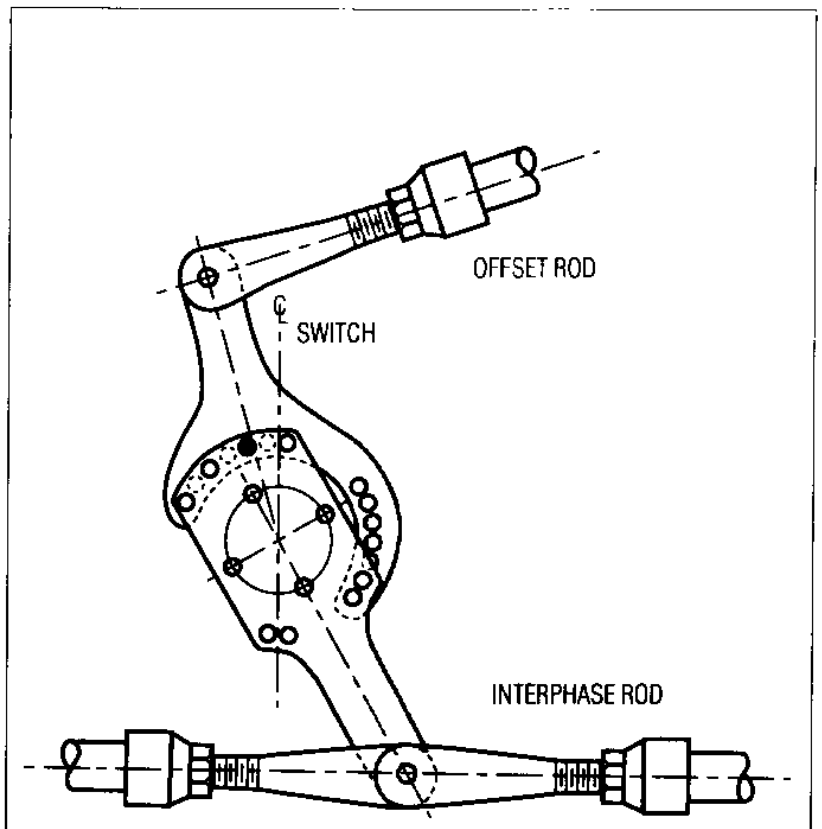

Fig. 5 Operating Pole Multi-angle Crank

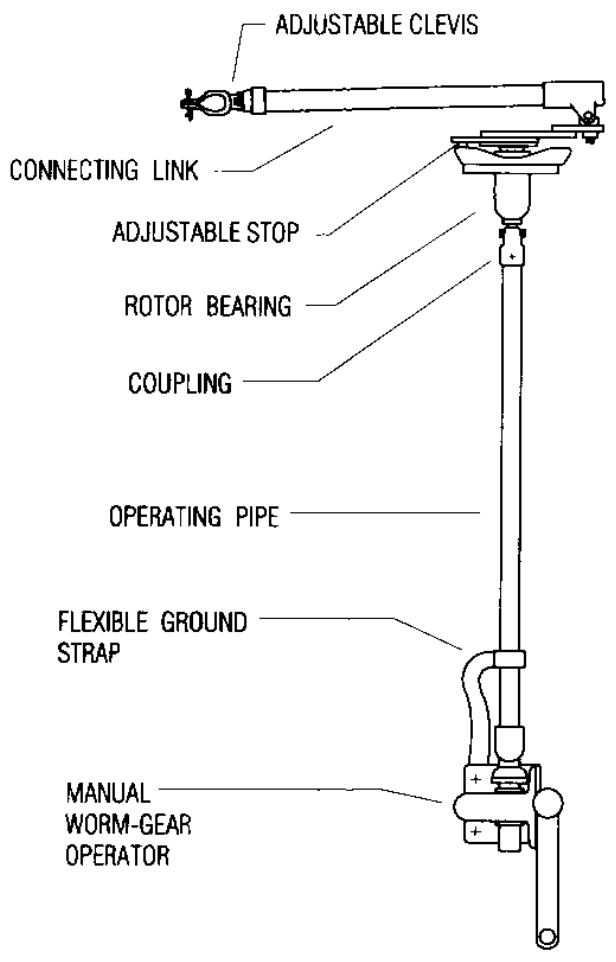

Fig.5A Manual Worm Gear Operating Mechanism

from one side of the blade contact to the other (dimension X) is 1/16" for each 1" of contact width. Example: If contact width (A) is 3", then dimension (X) can be as much as 3/16" and still be within the plus or minus 4 degree tolerance.

Also, Fig. 4 shows blade contact high on the right and low on the left. The reverse is also acceptable, high on the left and low on the right. It is common to have both situations on one three-pole switch. In fact, after all three poles have been adjusted in the open position, and then closed, you may find that one pole will be high on the right, one fairly level and one high on the left. This is due to many variables and tolerances plus the free play or clearance in pin connections of all the switches and control parts.

Variance in contact angle is not significant because no reduction in contact pressure occurs until the blade exceeds ±8° above the horizontal.

Blade height in jaw - In Fig. 3 dimension (D) can vary from 1/8" to 5/8" with the switch in the closed position. It is not usually possible to get this dimension to be equal on all three poles of a three pole switch. If it's necessary to adjust this dimension, remove connecting pin (A) and screw clevis (B) in or out 1/2 turn then reconnect and try switch. Screwing clevis in will move the blade away from the pry-out fulcrum. Conversely, screwing the clevis out will move the blade closer to the fulcrum in the switch closed position.

Open blade stop - On certain switches, there are stops for the blade in the open position, as shown at (C), Fig. 3. Some of these stops have flat washers that can be relocated to raise or lower this stop, while other voltage rated switches use threaded bolts with lock nuts. In either case, raising the stop surface (C) will reduce blade opening angle; lowering the stop surface (C) will increase blade opening angle. After each pole has been adjusted, set the open and closed stop bolts at base of each rotating insulator.

Step 7 - Mount Offset Bearing

For those installations requiring an offset bearing, mount the offset bearing and its supporting base on the structure in the position shown on the installation drawing Fig. 6 shows a typical arrangement using the offset bearing. Check operating crank for proper length radius and angle, and stop crank for correct position.

If this offset bearing has an adjustable crank, it is sometimes necessary to add 1/4" to 1/2" to the trial radius given on the control drawing to get the required travel of switch blades. This additional

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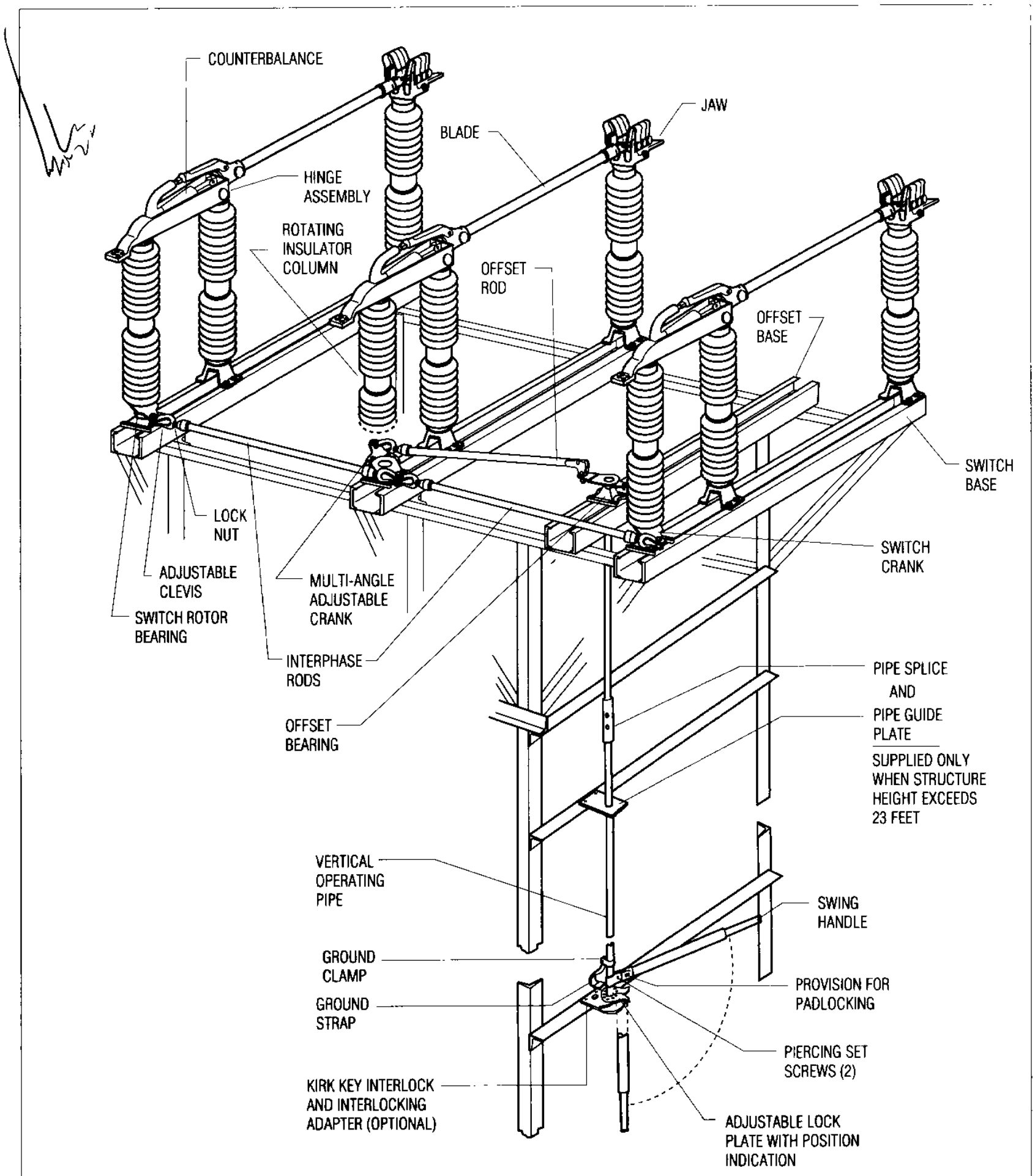

Fig. 6 Typical Three-pole TTR6 Switch Installation.

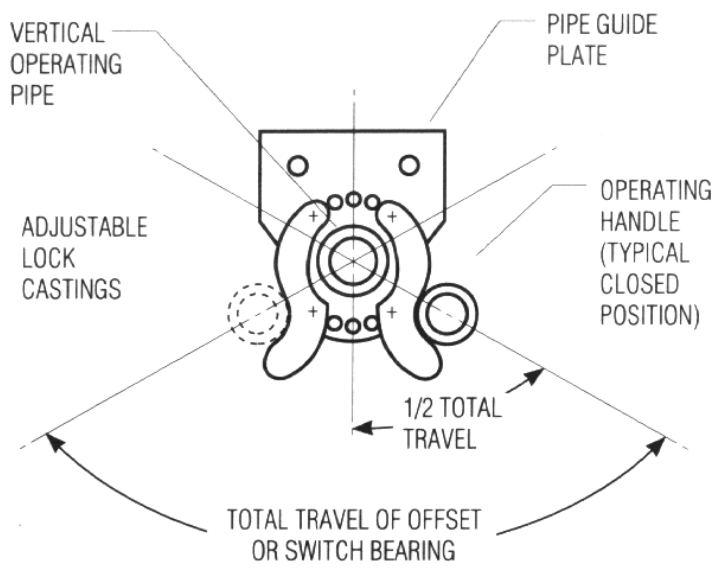

Fig. 7 Operating Handle Lock Plate

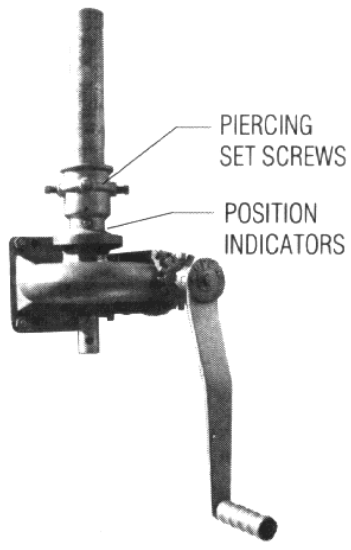

Fig. 8 Geared Mechanism

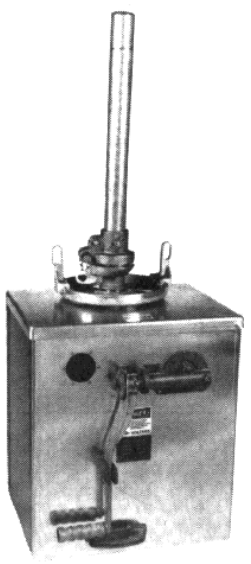

Fig. 9 MO-10 Motor Operator

length allows for lost motion and clearances in pin holes, it will also provide a definite audible sound accompanied by a reasonable amount of deflection in the structural members when the crank crosses the dead center position. This serves as a signal to the operator that the switch is either fully open or closed.

Step 8 - Adjust the Multi-Angle Crank

The crank is indentified in figure 6 and is shown in more detail in figure 5. This crank is supplied on the operating pole unit connected to the offset bearing.

3" Bolt Circle Insulators have a multi-angle crank that permits 333 degrees of angular adjustment with a crank location every 9 degrees, which results in adjustments to within 4-1/2 degrees of desired position.

5" Bolt Circle Insulators have a multi-angle crank that permits 336 degrees of angular adjustment with a crank location every 12 degrees which results in adjustments to within 6 degrees of the desired position.

In some adjustments, the adjustable crank may be in such a position as to interfere with the stop projection on the switch crank. If this is the case, then remove this projection. The other two poles will regulate the blade travel on this unit. The multi-angle crank should be set so that it forms an angle of approximately 45 degrees with the offset link in either switch position, open or closed.

Step 9 - Install Interphase and Offset Crank Rods

With all blades in the full open 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 offset bearing and the driven switch should be handled the same way.

d. For lubrication of pins and bearing areas, see Table 1 page 10 .

Note: On some applications of extra-high voltage switches, double interphase rods are used. In other applications, a torsional interphase shaft system is used or in some cases each pole is operated individually with its own operator. In these applications, refer to drawings that are supplied.

Step 10 - Install Vertical Operating Pipe

Attach vertical operating pipe to rotor bearing shaft, or to offset rotor bearing shaft, with coupling pins supplied, see Fig. 5A. At this point, check drawings for accessory equipment (auxiliary switches, mechanical interlocks, position indicators, ground straps, etc.)

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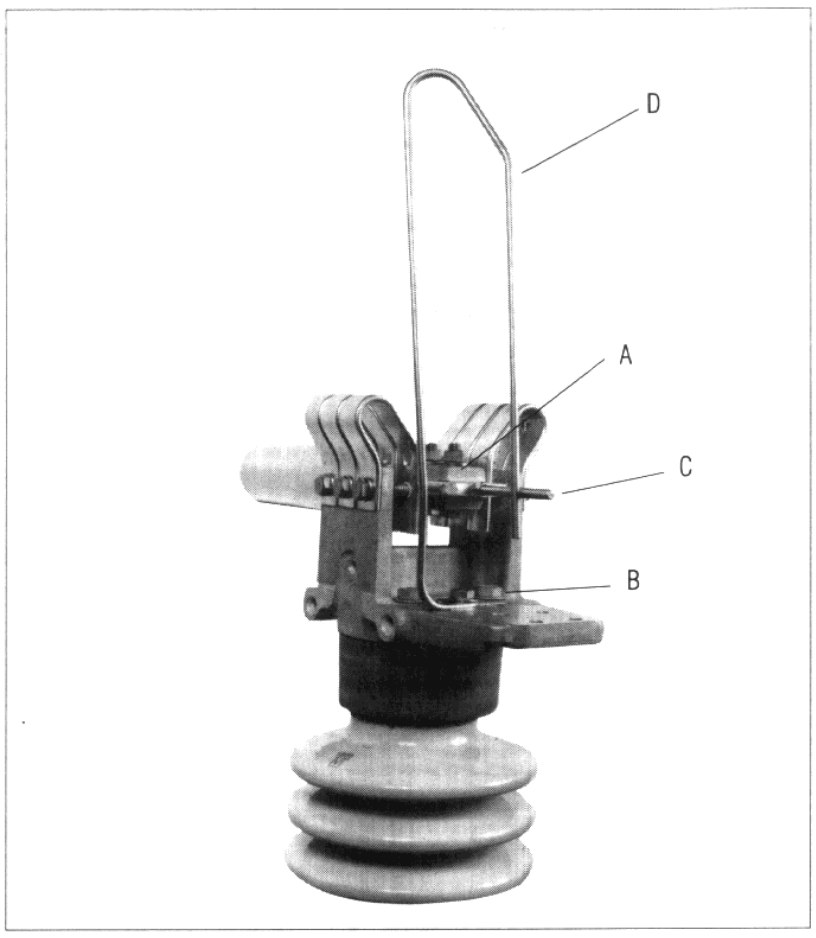

Fig. 10 Arcing Horns 8.25 kV thru 169 kV

which mounts on vertical operating pipe and install before continuing the 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 connected switches).

Step 11 - Install Pipe Splice and Guide Plate

When structure height exceeds 23 feet, a pipe splice and guide plate are furnished and should be installed as shown in Fig. 6. The pipe splice and both pieces of pipe are drilled to receive 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 so the hole in the guide plate lines up with the normal position of the pipe so that no binding occurs.

Step 12 - Install Operating Mechanism

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

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 and fasten the lock plate at the proper location. Recommended height for the lock plate is 3 ft. 6 in. above ground. The lock plate assembly (Fig. 7) 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. 7. 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 torisonal wind-up in the operating pipe. Tighten the two piercing set screws on the handle clamp until holes are punched in pipe and continue until the screws are firmly seated.

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.

Worm Gear Mechanism

With ground strap in place on vertical operating pipe, slide worm gear mechanism (Fig. 8) 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 square head set screws in the coupling until the vertical operating pipe is pierced. The three-pole switch should now be operated manually and checked 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.

CAUTION CAUTION CAUTION CAUTION

When installing motor operators, be sure the drive motor circuit is de-energized by motor limit switches just before the switch and offset bearing stops make contact.

Motor Operator

For remote operation, a motor operator (Fig.9) is supplied and it should be installed per the instructions supplied with it.
For lubrication of pins and bearing areas of switch operators, see Table 1 page 10.

Step 13 - Arcing Horn Installation (when supplied)

When arcing horns are used on switches, they should be installed and adjusted after mounting the switches on the structure. Arcing horns are furnished only when horn gap switches are ordered. Fig. 10 shows arcing horns used on switches 8.25 thru 169 kV. The movable straight horn (C) is assembled by screwing it into the blade

end. Tighten the locking nut seat securely against the end of the blade (A). The stationary horn is positioned properly on the jaw with the saddle clamp, and bolted (B). This stationary horn should be adjusted or even bent slightly to give light contact pressure between the two horns over the entire length of the stationary horn.

Arcing horns for 242 kV switches are essentially the same as Fig. 10 with the stationary horn contacting the movable horn at the surface between the end of the blade and small corona ball which is affixed at the end of the movable horn.

Arcing horns for switches 362 thru 800 kV do not use a movable horn. Instead, the stationary horn makes contact with the rear surface (corona-protected surface) of the corona ball.

Note: Always check switch operation mechanism drawing for type of arcing horns supplied.

Step 14 - Installation of Corona Rings and Balls

Corona rings and balls, when supplied, should be installed as shown on the single-pole drawings Prepare areas where ring supports contact switch parts per instructions for aluminum connections at right.

a. 169 kV switches and below do not require corona rings or ball.
b. 242 kV switches use corona rings at the jaw end and a small ball on each end of the blade.
c. 362 kV switches and above use rings at both ends and a large ball on the end of the blade.

After these are installed, the switches should now be ready for service.

Step 15 - Final Checks

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

a. In the open position, the blades should stand essentially vertical.
b. In closing, blades should make central entry into their jaws at approximately the same time.
c. In the closed position, all blades must be in full contact and horizontal within tolerances, see page 5.
d. In opening, the blades should rotate to relieve the jaw contact pressure. [If the blade remains flat, the blade beaver tail will engage the stops formed on the jaw fingers and further operating effort can result in mechanical damage.] Recheck base crank orientation per step 4.

TERMINAL CONNECTIONS

Because of the wide acceptance and use of aluminum conductors, the terminal surfaces are aluminum to provide an easy current transfer surface. (In cases where a copper conductor is used, it is recommended that a tinned terminal clamp be bolted to the aluminum switch terminal pad.) However, if a non-tinned clamp is used, a liberal amount of grease should be used at the joint and all over the pad of the fitting.

Make aluminum connections as follows: (1) Clean all contact surfaces of conductors and fittings with a stiff wire brush to remove heavy oxide coatings until they become a typical fresh aluminum color. (2) Immediately coat these contact ares with a liberal amount of corrosion inhibitor such as NO-OX-ID "A special" or NO. 2 EJC. (3) Abrade the contact surface again, this time through the applied compound with a stiff wire brush. (4) Make connections and tighten bolts.

CAUTION CAUTION CAUTION CAUTION

Do not remove the compound.

In making copper-to-aluminum connections: (1) Prepare all aluminum contact surfaces as described below. (2) Prepare any bare copper surfaces in the usual manner. (3) Do not abrade or wire brush any plated surfaces; a few light rubs with fine steel wool before greasing is sufficient. (4) Make connections and tighten bolts.

RECOMMENDED TORQUE FOR ALUMINUM BOLTS

Bolt Diameter, Inches	Lubricated Threads		Dry Threads	
	In. - Lbs.	Ft. - Lbs.	In. - Lbs.	Ft. - Lbs.
1/2	240	20	420	35
5/8	480	40	720	60
3/4	720	60	1140	95

MAINTENANCE

WARNING WARNING WARNING 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 on the atmospheric conditions at a given switch location and the frequency of operation. This service interval must be 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

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

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TABLE 1
Field Lubrication of Outdoor Switches

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

Refer to page 9 for surface preparation.

NOTE:
NO-OX-ID Grease may be obtained from:
SANDCHEM INC.
1600 South Canal St.
Chicago, IL 60616

Darina #2 Grease from:
Shell Oil Co. New York , NY

DC-4 Grease from:
Dow Corning Corporation
Midland, Michigan

NO 2 EJC - Electrical Joint Compound
Alcoa Conductor Products Co.
Division of
Aluminum Company of America
Pittsburgh, PA 15212
(Local distributors usually stock some of the above lubricants)

*None required at installation unless switches were exposed to abnormal conditions for a considerable length of time. During regular cleaning, give them a light coat of grease.

Summary on total grease requirements fro (6) three-pole switches.
(2) Quarts of Darina #2 Grease or (1) quart of Darina and
(1) Quart of DC-4.
(1) Quart of NO-OX-ID Grade "A" Special.

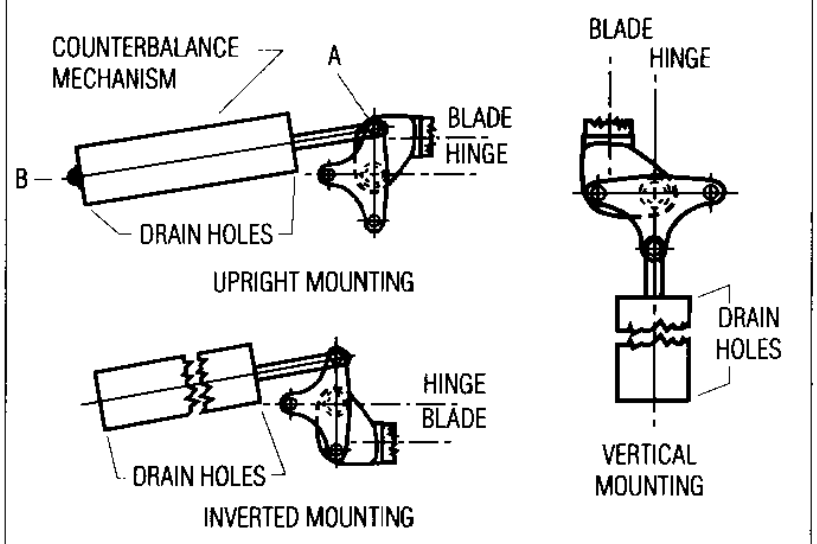

Fig. 11 Positions of Blade Counterbalance Mechanism

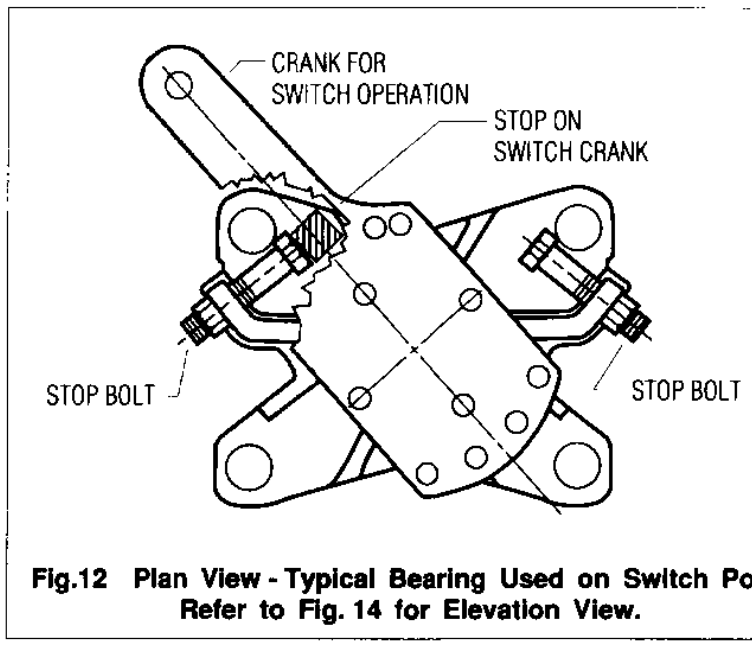

Fig.12 Plan View - Typical Bearing Used on Switch Poles Refer to Fig. 14 for Elevation View.

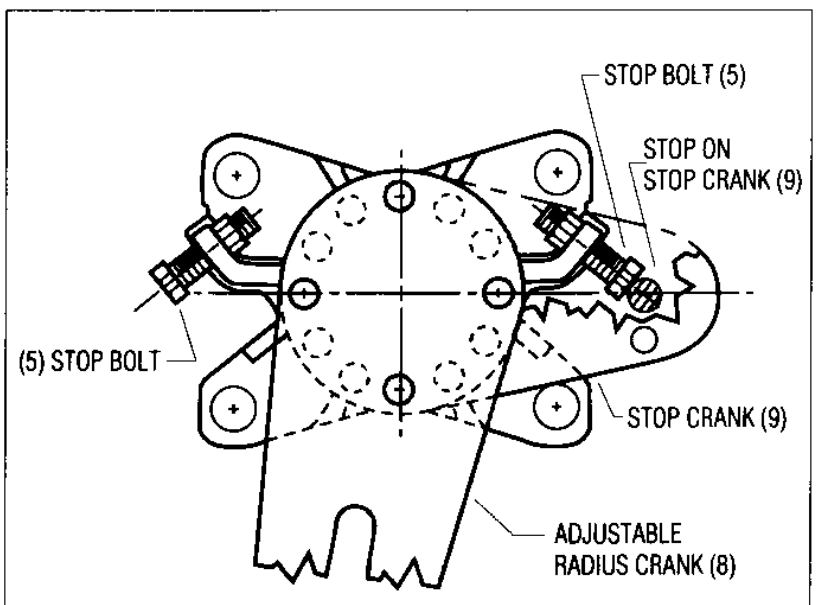

Fig. 13 Plan View - Typical Offset Bearing (5" B.C. Shown) Refer to Fig. 17 for Elevation View

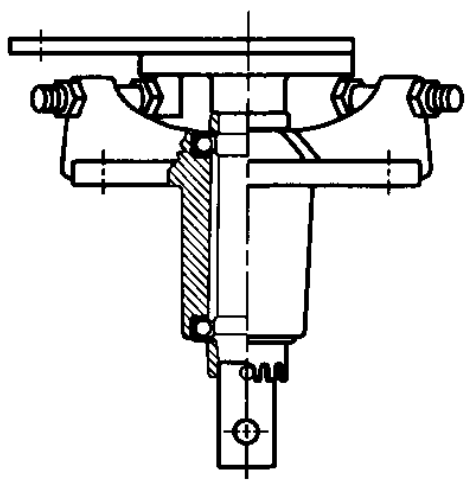

Fig. 14 Elevation View - Typical Switch Bearing (5" B.C. Shown) Refer to Fig. 12 for Plan View.

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. With the contact surfaces entirely clean, a coating of lubricant should be applied. Suggested lubricants are DARINA 2 grease or NO-OX-ID "A Special". DARINA 2 is a Shell Oil Company product. NO-OX-ID is made by SANDCHEM INC.

In general, operating linkages require virtually no maintenance. However, in contaminated atmospheres or where operation under sleet conditions is common, some lubricant 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.

COUNTERBALANCE

For voltage or current ratings in which blades are counterbalanced, Fig. 11 shows proper connections, and the proper location of the drain holes for the various switch mountings. The counterbalances are assembled at the factory for the mounting positions as required for each installation. If it is neccessary to change the mounting position of the switch in the field, the counterbalance should be changed, as described below:

UPRIGHT TO VERTICAL

WARNING WARNING WARNING WARNING

Danger - Parts in tension.

Open switch blade to approximately the 75° position. Clamp plunger of counterbalance with vise grip pliers or other means at a point against the face of the housing. With a good hold on the blade, carefully open blade a few more degrees or just enough to relieve the pressure, then remove pin (A) which attaches the

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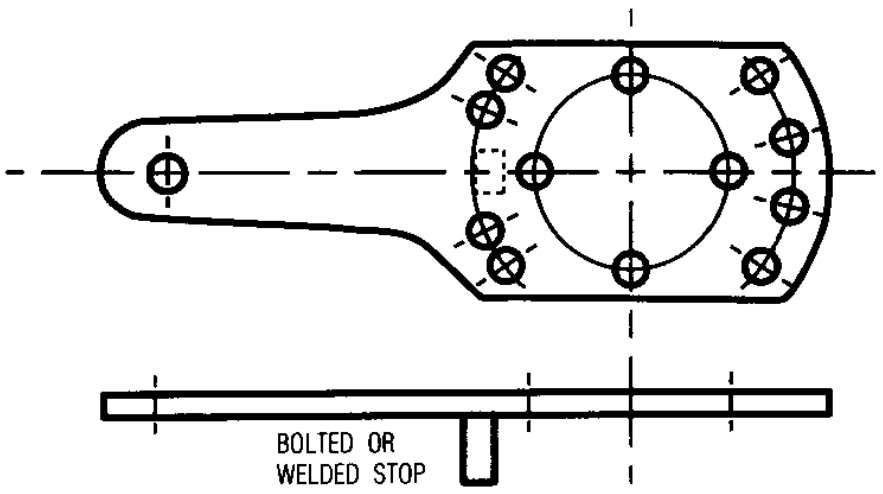

Fig. 15 Single Crank Used On Medium Voltage Switches, Non-drive Phases

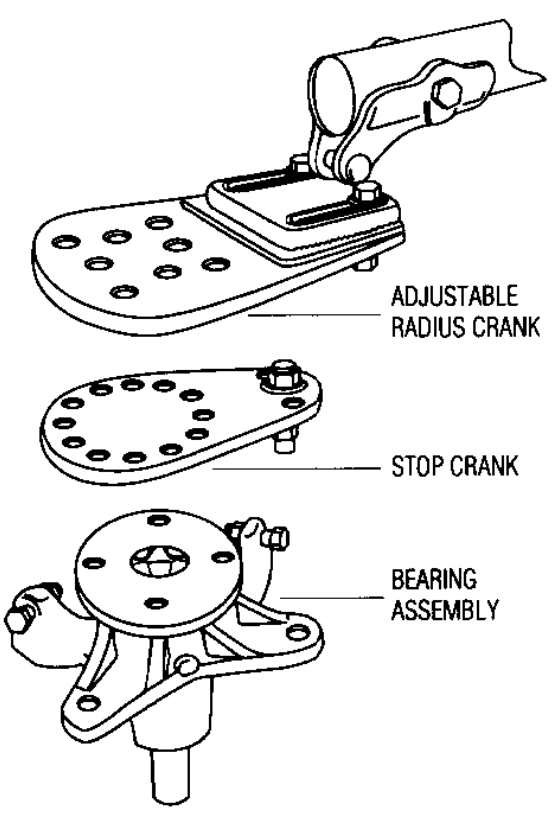

Fig. 16 Exploded View of Offset Bearing and Cranks

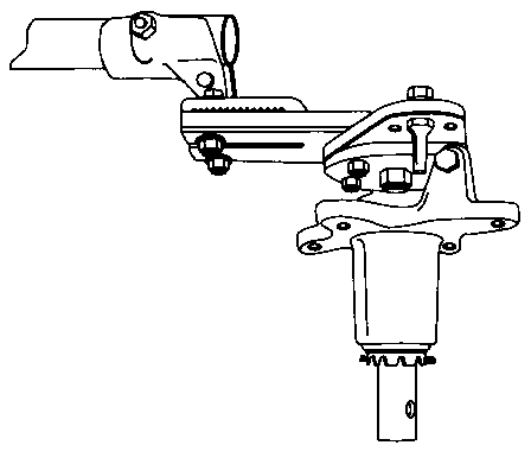

Fig. 17 Typical Offset Bearing and Crank Assembly Refer to Fig. 13 for Plan View

plunger to the blade hinge casting. This pin is larger in diameter at the center and the two shoulders hold it in place, which makes it somewhat difficult to remove. Now, lower the blade to an angle of about 15°. At or near this point, the counterbalance plunger can be connected to the proper point for vertical mounting as shown in Fig.7. Raise blade slightly to relieve pressure, remove vise grip pliers and file off any burrs on shaft.

CHANGE TO INVERTED

WARNING WARNING WARNING WARNING

Check the factory before proceeding.

With switch blade in the closed position, clamp counterbalance plunger with vise grip pliers or other means at a point up against the face of the housing. Raise the blade slightly to relieve pressure and remove Pin (A). This pin is larger in diameter in the center and the two shoulders hold it in place, which makes it somewhat difficult to remove. Next, remove Pin (B) at rear of counterbalance. Unit is now free to invert, so that drain holes will be located as shown for inverted mounting. Reconnect rear of counterbalance with Pin (B). With jaw removed, lower blade below the closed position and connect counterbalance plunger to the proper point for inverted mounting with Pin (A). Raise blade to relieve pressure and remove vise grip pliers. File off any burrs created by the pliers. Replace jaw assembly.

BEARINGS

The bearing of each switch and offset bearing is a greaseless type, Fig. 12 shows the location of stop bolts and switch cranks on all switch bearings. Fig.13 shows the required location of stop bolts (5) and stop crank (9) with a typical location of the adjustable radius crank (8) on the offset bearing. Fig.14 is an elevation view of a switch bearing.

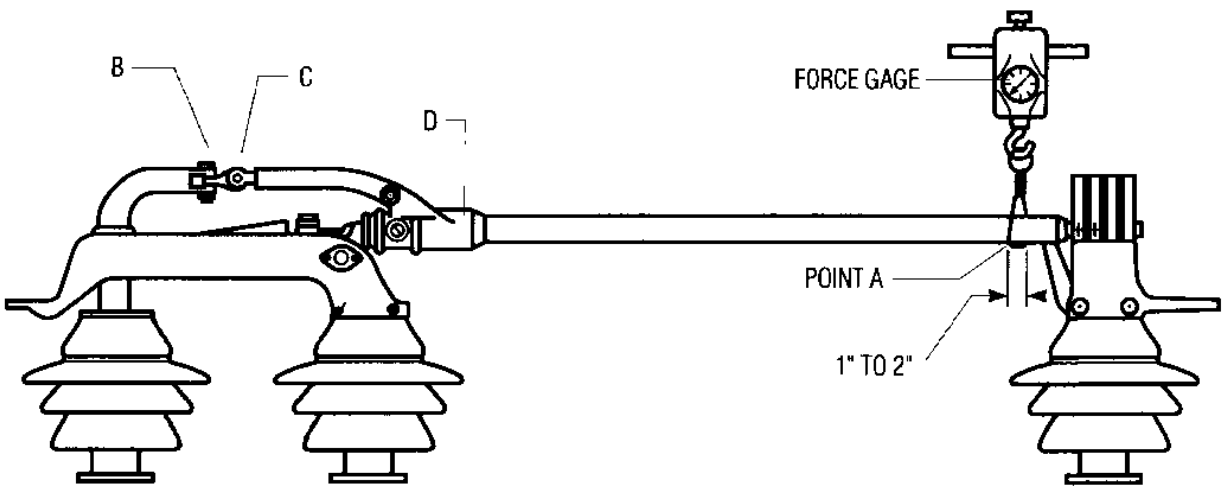

Fig. 18 Switch Current Carrying Parts

CRANKS

The two switch poles that are not connected to the offset bearing normally use a single crank, similar to Fig 15. The switch pole that is connected to the offset bearing (drive phase) uses either a solid double crank, or a two piece adjustable crank, as shown in Fig. 5. The offset bearing uses a two piece adjustable radius crank plus a separate stop crank with multiple mounting holes for angular adjustment. Figs. 16 and 17.

INSTRUCTIONS FOR SPECIAL SWITCHES

For switches specifically designed to operate under abnormal ice conditions, it is important that they be adjusted to assure the switch blade (on a closing operation) exerts force on the jaw stop.

FORCE VALUES

Switch Voltage	Force on Stop
8.25 thru 169kV	80 lbs.
242 thru 840kV	40 lbs.

The blade force adjustment should be made after the switch installation is complete, as described previously in this instruction manual, except for the corona rings.

The blade force adjustment is made as follows:

Start with the three pole switch in a position so that the blade end contacts are at least 1 foot from the stationary contact fingers. Using the manual operator, and observing one switch pole, lower the blade into the finger contact assembly and continue to close the switch to the point where it rests on the stop and there is approximately 1/8" clearance between the blade end contact and the stationary contact fingers on each side, see Fig. 19. This is the point at which the blade force is to be measured. It is important that the 1/8" clearance is obtained as the switch is being operated toward the closed position as described and never as the switch is being opened. This would cause an improper adjustment.

Using a force gauge, measure the force exerted by the blade on the jaw stop by either pushing the blade up from below and noting the lbs. at which the blade is lifted off the jaw stop, or by putting a wire loop around the blade and lifting it with the gauge and noting the lbs. required. The place on the blade at which the force is measured should be just outside the finger contact assembly,see Fig.18. If the force required is not proper, an adjustment must be made at the hinge end of the switch. To make the neccassary adjustment, move the switch blade to a convenient point near the full open position and remove crank pin (B), Fig.18, then move and twist blade or forked link (D) to disengage clevis (C) from crank.

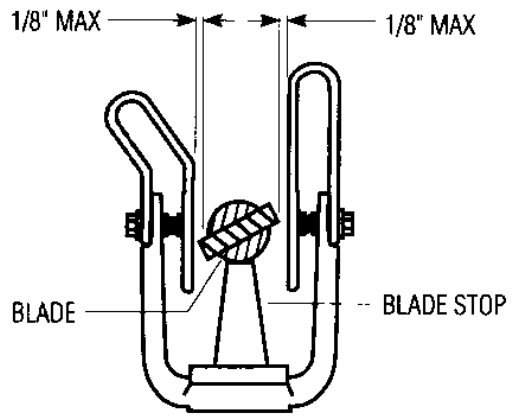

Fig. 19 Finger Contact Assembly

If the force measured was too high, turn the clevis (C), 1/2 turn into the forked link (D). But if the force measured was too low, turn the clevis (C) 1/2 turn out of the forked link and re-connect the clevis. Check the threads on the clevis,some switches have right hand threads and some have left hand threads. Close the switch to the point previously described and again measure the force. If the force still does not measure properly, another adjustment must be made. Repeat the precedure previously described. After one switch pole is satisfactorily adjusted, the other two poles should then be adjusted in the same manner.

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RENEWAL PARTS

To order renewal parts, refer to the switch nameplate, Fig.20. This nameplate is attached to the base assembly of each switch pole. The same data is shown on "record" engineering drawings and many installation files.

The master file at the factory for renewal parts is "keyed" to the serial number on the nameplate.

Renewal Parts Ordering Information

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

Refer your requests for renewal parts to the Factory

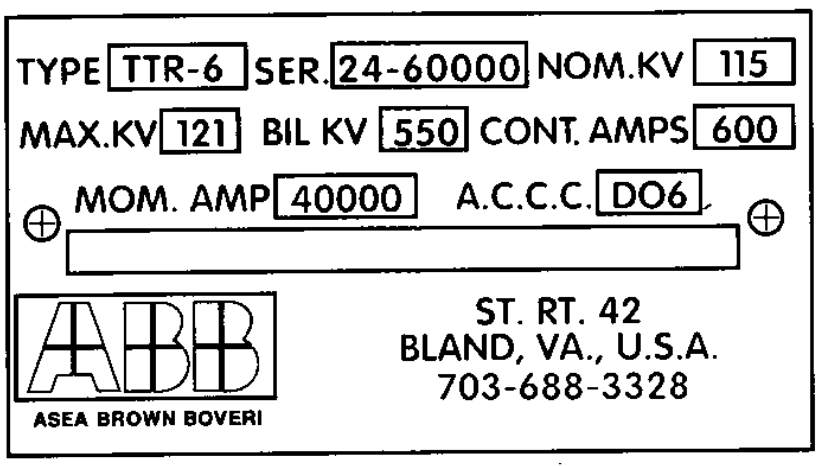

Fig. 20 Switch Nameplate

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