

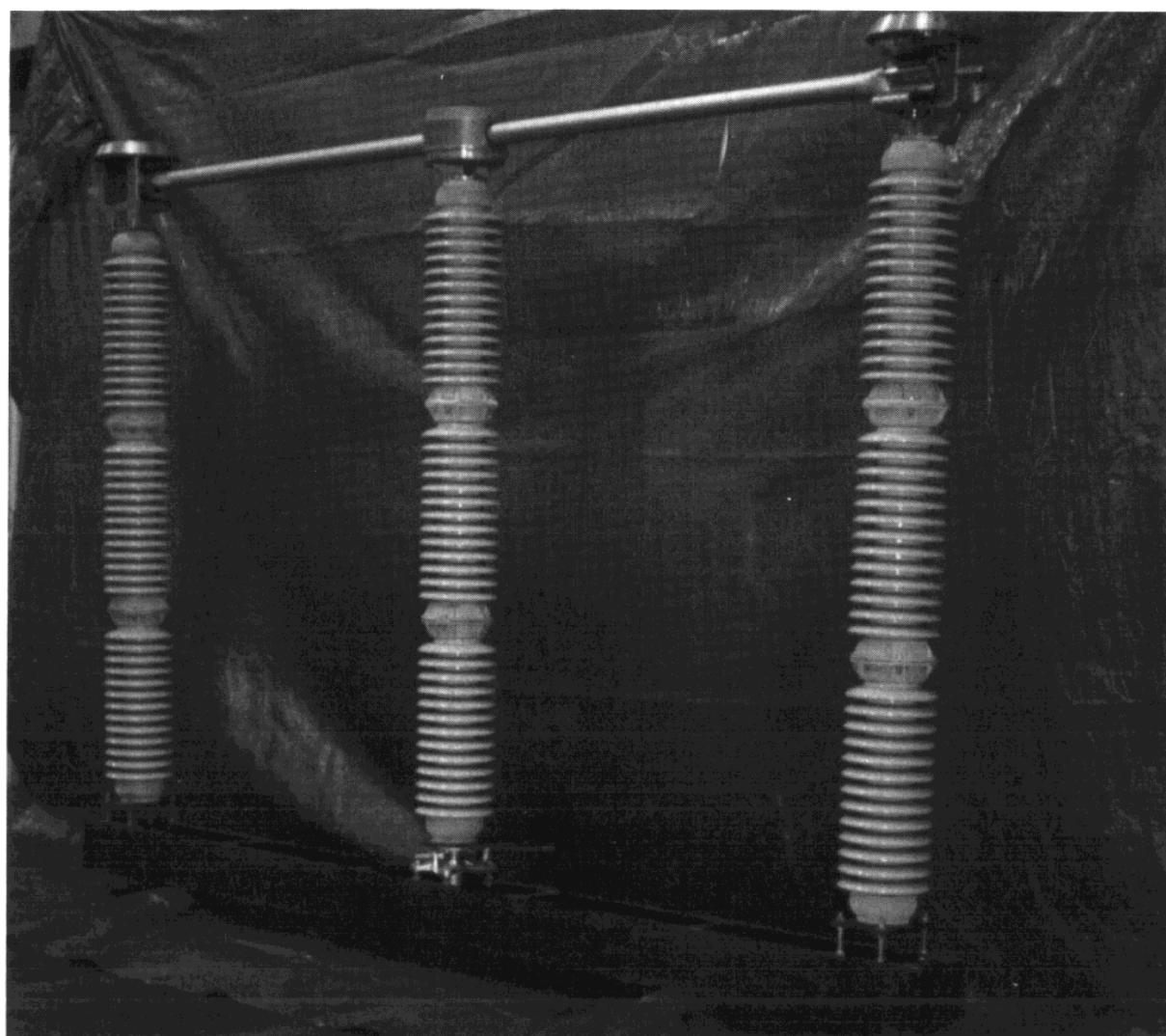
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Installation & Maintenance Instructions for Type TTT8 Outdoor Air Switch[®]

Type TTT8
Group-Operated
Double Break
8.25 through 550 kV Maximum Design



IMPORTANT

Read the entire manual before installing and maintaining equipment. Make absolutely sure that applicable equipment is de-energized and properly grounded.

Notice 1

Based on our own experience, you will obtain the best possible operational reliability by following the recommendations given in these instructions. The data contained herein purports solely to describe the product, and it is not a warranty of performance or characteristics. It is with the best interests of our customers in mind that we constantly strive to improve our products and keep them abreast of advances in technology. This may lead to discrepancies between a product and these instructions.

Notice 2

Within the scope of these instructions, it is impossible to take into account every eventuality which may arise with technical equipment in service. Please consult our local salesman in the event of any irregularities, especially if not referred to herein.

Notice 3

We expressly decline liability for damages resulting from any incorrect operation or wrong handling of our equipment, even if these instructions contain no specific indication in this respect. We stress the fact that only genuine spare parts should be used for replacements.

Notice 4

This publication is a copyrighted work. Therefore, it is not permissible to disclose, reprint, copy, or reproduce any part of these instructions without express written permission from ABB.

These instructions do not purport 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 ABB Power T & D Company Inc. Power Circuit Breaker Division, 125 Theobald Ave., Greensburg, PA 15601, Phone No. (412) 838-5200.

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TTT8 OUTDOOR AIR SWITCH

1. INTRODUCTION

The Type TTT8 Switch (Fig. 1) is a versatile, adaptable outdoor air switch. This three-insulator, double-break air disconnect switch exceeds standards set by ANSI C37 and IEC and is designed for many applications:

- Disconnecting the main line
- Sectionalizing a bus
- Isolating a breaker
- Bypassing a breaker
- Disconnecting a transformer
- Interrupting line-charging and transformer magnetizing current (when equipped with interrupter attachments).

The switch is designed for applications ranging from 8.25 to 550 kV. Highly conductive, durable aluminum alloys and silverplated contacts ensure the integrity of the current-carrying components. All hardware is made of corrosion-resistant materials. A galvanized

structural steel base supports the insulators and live parts for stability and durability. The switches can be mounted upright, inverted, or vertically.

Other features of the TTT8 Switch include:

- Standard bases to fit most structures
- Switch can be operated manually or by a motor
- Open-close stops on each switch pole
- Package controls available for quick delivery.

The following operators can be supplied for the TTT8 Switch:

- Manual swing handle operator
- Manual worm gear mechanism
- MO-10 motor operator.

The blade (Fig. 2) of the switch opens and closes horizontally. The contact at the end of the blade enters the jaw at a slight angle and then rotates vertically to firmly press against the jaw contact fingers. In addition to ensuring definite contact pressure, this dual motion also facilitates ice-breaking on opening.

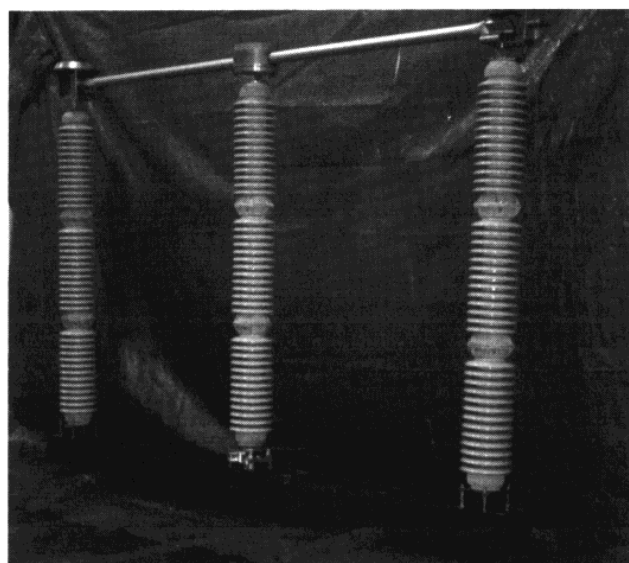


Figure 1
TTT8 Switch Assembly

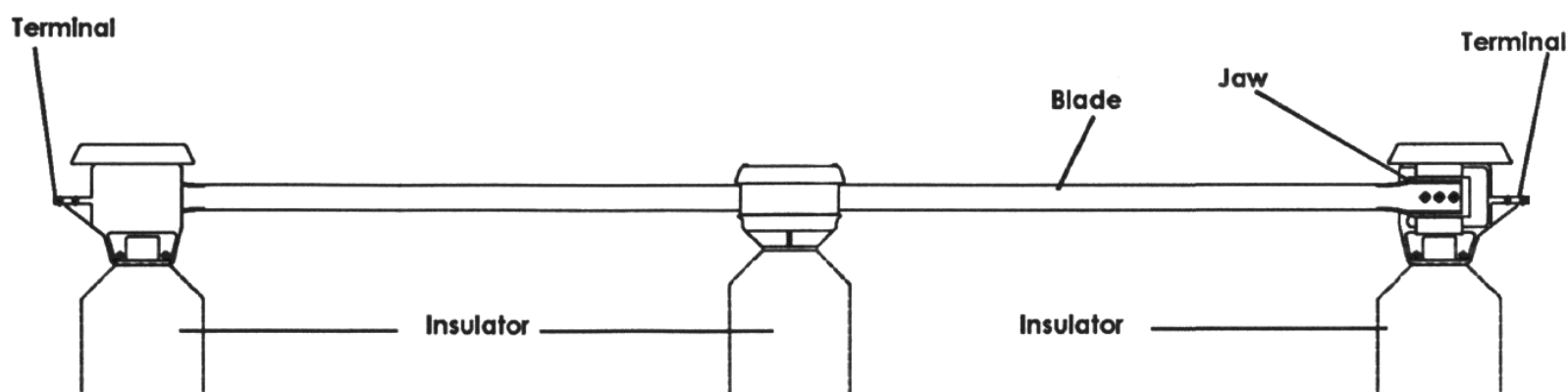


Figure 2
Top Portion of the TTT8 Switch Assembly

8 February 1995

2. SAFETY

DANGER

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.

Follow the instructions in this manual to prevent accidents and failures. The instructions are written in terms that should be readily understood by well-trained, competent operators. Personnel should thoroughly understand the instructions in this manual before operating this equipment.

Operating switches and related electrical and mechanical components present inherent dangers. Therefore, adhere to the procedures presented herein in the step-by-step sequence for the safety of personnel and equipment.

Hazard alert nomenclature (safety precautions and tips) used in this manual are: danger, warning, caution, notice, and important. These terms comply with standards set forth in ANSI Z535. These hazards are defined and appear in this manual as follows, starting with the most serious hazard alert term and descending to the least serious:

DANGER

DANGER INDICATES AN IMMINENTLY HAZARDOUS SITUATION WHICH, IF NOT AVOIDED, WILL RESULT IN DEATH OR SERIOUS INJURY.

WARNING

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

Caution

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

Notice: *NOTICE is used for hazards that may result in property damage only.*

Important: *IMPORTANT designates an operating tip or maintenance suggestion.*

3. RECEIVING, HANDLING, & STORAGE

When receiving the TTT8 Switch:

1. Check that the total shipment is complete as per the bill of materials and installation drawings.
2. If the shipping crate and/or switch show signs of damage note the damage on the bill of lading.
3. Carefully lift the disconnect switch at the switch base unless specified otherwise. Do not lift the switch by insulator units, contacts, or live parts.

Caution

The TTT8 Switch contains porcelain components; porcelain is extremely brittle and can be easily cracked or broken by impact jarring or careless handling. When lifting or transporting the switch, take precautions to prevent bumping the switch components – especially porcelain.

Exercise care when handling the blade and jaw assemblies to avoid scratching or damaging these current-carrying parts.

4. Store the switch in a safe area, protected from damage.
5. Refer to section 4 for assembly and installation instructions.

4. ASSEMBLING AND INSTALLING THE TTT8 SWITCH

Refer to the installation flow chart at the end of this publication for an overview of installation procedures.

DANGER

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.

Important: *Refer to the installation drawings provided with the switch for specific assembly and installation instructions.*

If the switch has not already been assembled at the factory, installing the TTT8 Switch begins with assembling the insulators and live components on the ground.

Important: *For higher voltage switches, it may be easier to mount the switch base on the support structure and then assemble the insulators and live components.*

To assemble the switch pole units, refer to section 4.1, then proceed to section 4.2 for final installation and adjustments. If the switch pole units were pre-assembled at the factory, proceed to section 4.2 for final installation and adjustment.

4.1 Assembling the Switch Pole Units

To assemble the TTT8 switch pole units:

1. Check the bases to make sure that the insulator supports, spacers, and rotor bearing tops are square and level.
2. Assemble the insulators to the switch base and rotor bearing without disturbing the position of the switch crank stops. The switch crank stops have been set 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 angle.

Caution

Exercise care when handling the blade and jaw assemblies to avoid scratching or damaging these current-carrying parts.

3. Assemble the live parts (blade and jaw assemblies, etc.) (Fig. 2 on page 1) to the switch as follows:
 - a. Check that the base crank is rotated to the maximum counter-clockwise position with the blade closed.
 - b. Fasten the blade to the support insulators as shown in Fig. 2.
 - c. When assembling the jaws on the insulator columns, keep the jaw base hold-down bolts finger-tight to allow the jaw base to be rotated and shifted slightly as needed to align the contacts during final installation as per section 4.2.
4. Proceed to section 4.2 for final installation and adjustment procedures.

4.2 Installation and Final Adjustment

DANGER

MAKE ABSOLUTELY SURE THAT THE SUPPORT STRUCTURE FOR THE SWITCH IS PROPERLY GROUNDED.

Follow the factory installation drawings enclosed with the TTT8 Switch.

If the switch pole units were not pre-assembled at the factory, refer to section 4.1. To install the switch pole unit, proceed as follows:

- Mount and position the switch pole units (section 4.2.1)
- Check the blade entry (section 4.2.2.)
- Check the blade contact angle (section 4.2.3)
- Check the blade engagement when the switch is closed (section 4.2.4)
- Set the close stops on current carrying parts (section 4.2.5)
- Mount the offset bearing (section 4.2.6)
- Adjust the multi-angle crank (section 4.2.7)
- Install the interphase rods and offset crank rod (section 4.2.8)
- Install the vertical operating pipe (section 4.2.9)
- Install the pipe splice and guide plate (section 4.2.10)
- Install the operating mechanism (section 5)
- Install arcing horns (if supplied) (section 6)
- Final installation checks (section 7).

4.2.1 Mounting and Positioning the Switch Pole Units

Mount the switch pole units level and parallel with each other as per the installation drawings and Fig. 3 (on the next page). Insert shims between the support structure and switch base as needed to ensure that the switches are level.

Mounting precautions include:

- Be certain that the rigging gear is appropriate and suited for hoisting the equipment.
- Unless otherwise directed in these instructions, attach the hoisting equipment to switch bases.
- Do not lift switches by the insulators, contacts or live parts (to avoid damaging the parts).

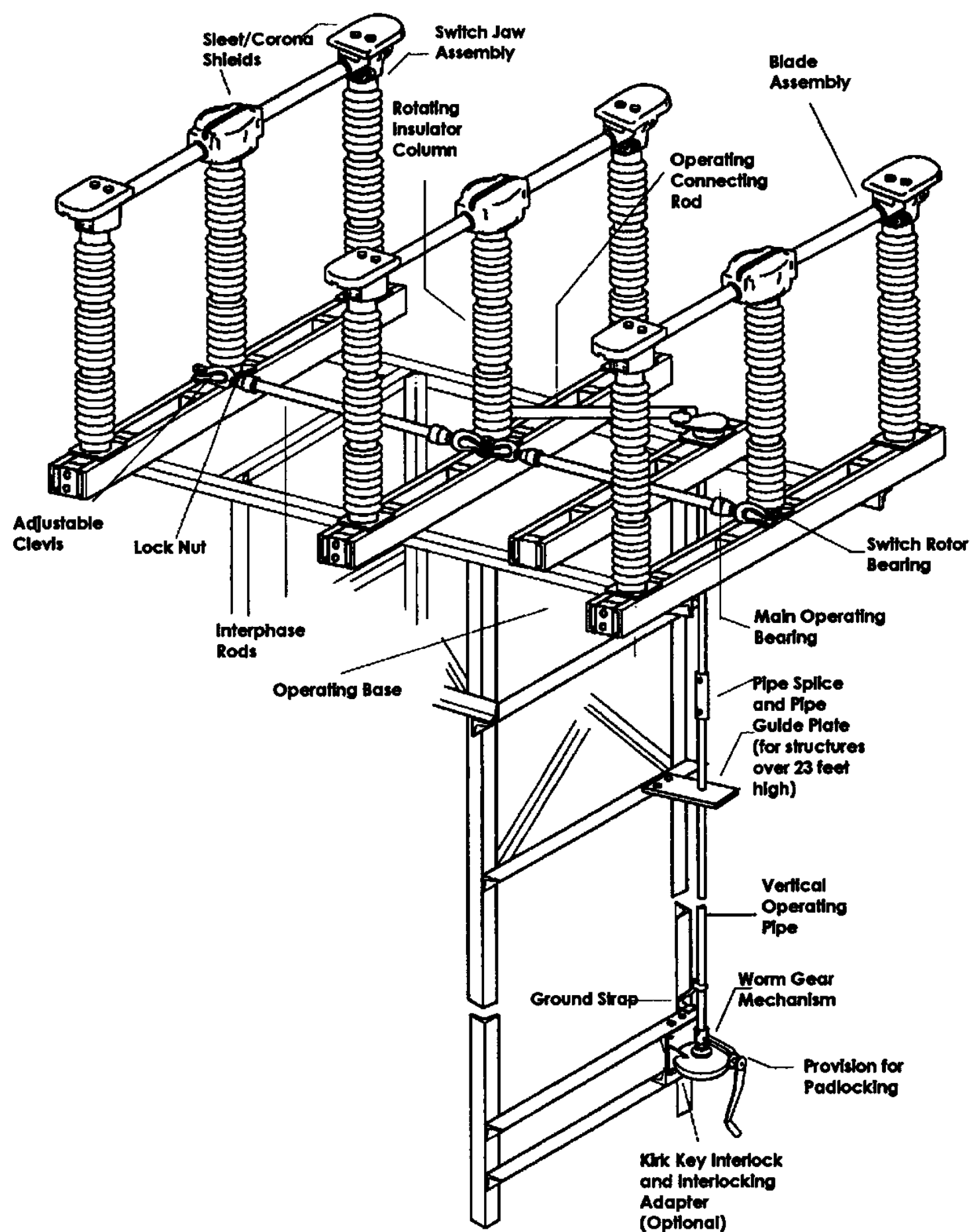


Figure 3
Typical Three-Pole TTT-Type Switch Installation (Including Typical Offset Bearing)

4.2.2 Blade Entry

Using a piece of pipe as a handle inserted onto the crank at the bottom of the rotating insulator stack, turn the switch blade slowly toward the CLOSED position. The contacts on the ends of the blade should hit both stops at approximately the same time. As the blade contacts enter the jaw, they should not rub the jaw fingers. If the blade rubs the top fingers on one jaw and the bottom fingers on the other jaw, make an adjustment at the bottom center insulator stack using the adjusting nuts (Fig. 4) provided to rectify the entry.

Should the blade rub either the top or bottom fingers on both jaws, use the adjusting nuts at the center insulator stack to either raise or lower the blade.

After making any adjustment, re-check the blade entry and penetration. Make sure that each blade hits both stops at the same time. If a blade does not hit the stops simultaneously, turn the adjusting nuts at the center insulator stack to make any adjustment.

Once the proper blade entry and penetration are achieved, check that all of the jaw fingers are contacting the blade end contact. Turn the adjusting nuts at the base of the jaw insulator stacks to correct any misalignment.

Notice: *If conductors are to be attached to the terminal pads and will exert a heavy load, adjust the jaw insulator columns so that the jaw fingers end up slightly off center on the blade contact to counter-act the additional force.*

Once the blade entry and contact fingers are aligned and adjusted where needed, tighten the jaw mounting bolts.

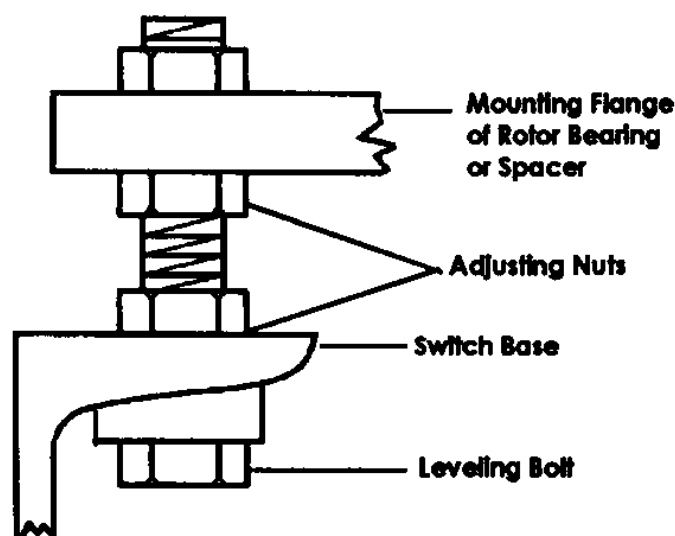


Figure 4
Leveling Screws and Adjusting Nuts

4.2.3 Blade Contact Angle

The blades can be at a slight angle in the CLOSED position (Fig. 5). An allowable contact angle of 4 degrees permits an (X) dimension of 1/16-inch for each 1-inch of contact width.

For example:

If the contact width (A) is 4-1/2-inches, then dimension (X) can be as much as 9/32-inches and still be within the ± 4 -degree tolerance.

Figure 5 shows the top of the blade contact leaning to the left. The top of the blade contact can also lean to the right as long as it does not exceed the 4-degree angle allowance. Both situations are common on a three-pole switch because of the many variables, tolerances, and free play or clearance allotted in the pin connections of all the switches and control parts.

4.2.4 Blade Engagement When Switch Is Closed

When the switch is fully closed, the distance between the blade and its stop may vary up to 1 inch due to friction and deflection. Although it is usually not possible to make this distance equal among all three poles, adjust the insulator stacks to attain the best alignment.

4.2.5 Setting the Close Stops on Current Carrying Parts

The stops on the blade mechanisms are set at the factory and seldom require adjustment. However, should these stops prevent the blades from turning to an acceptable CLOSED or OPEN position, they should be re-adjusted. After each pole has been adjusted, set the open and close stop bolts at the base of the rotating insulator.

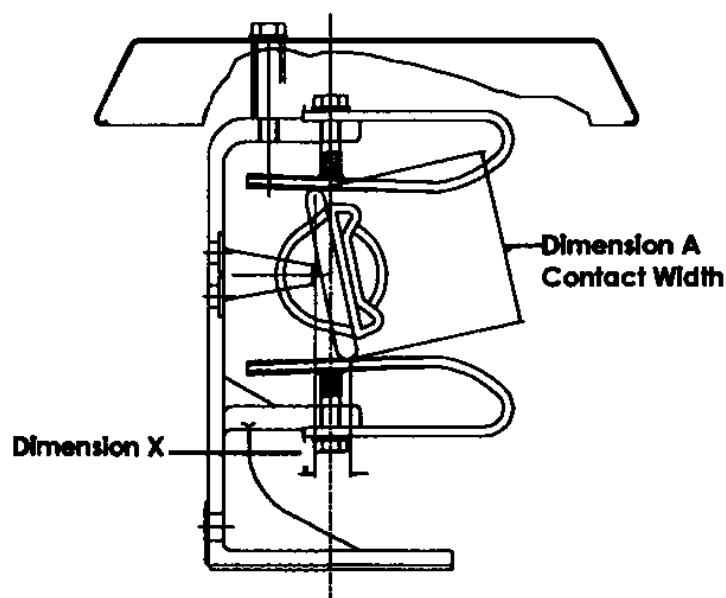


Figure 5
Blade Contact Angle

4.2.6 Mounting the Offset Bearing

Bearings in the switch and offset bearing are greaseless. Figure 6 shows the location of stop bolts and switch cranks on all switch bearings. Figure 7 shows an elevated view of the switch bearing. Figure 8 shows the required location of stop bolts and the stop crank as well as the typical location for the adjustable radius crank on the offset bearing.

The offset bearing may use a two-piece adjustable radius crank plus a separate stop crank with multiple mounting holes for angular adjustment. Refer to Figs. 8, 9, and 10.

To mount the offset bearing and its supporting base on the structure, refer to your installation drawings. Figure 3 illustrates a typical TTT-type switch arrangement using the offset bearing.

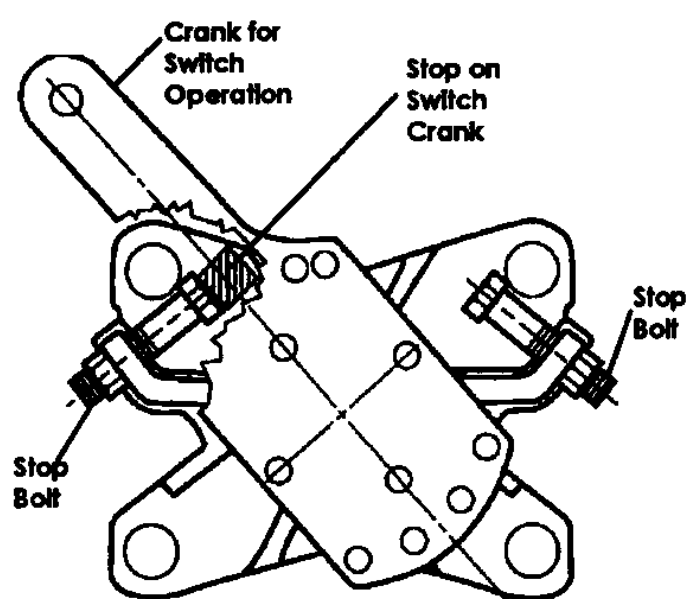


Figure 6
Typical Bearing Used on Switch Poles
(Plan View)

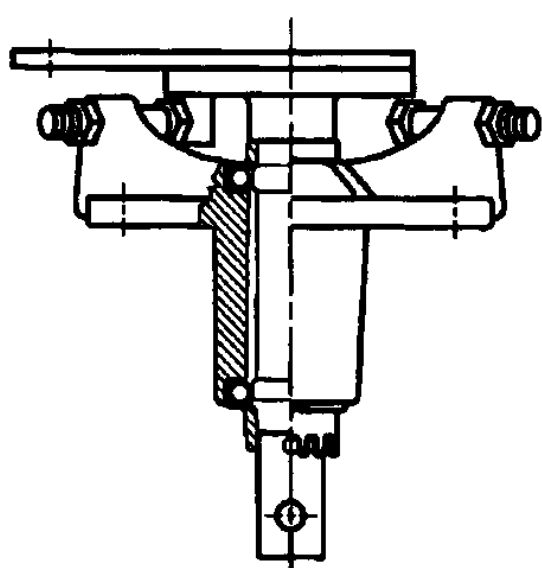


Figure 7
Typical Bearing Used on Switch Poles
(Elevated View)

Check the installation drawings to ensure that the operating crank is set at the proper radius and angle. Also check that the stop crank is at the proper position.

If the offset bearing has an adjustable crank, 1/4 to 1/2-inch may need to be added to the trial radius on the drawing to attain the required travel of the switch blades. This extended radius allows for lost motion and clearances in pin holes and provides an audible sound and deflection as the crank crosses the dead center position indicating that the switch is either fully OPEN or CLOSED.

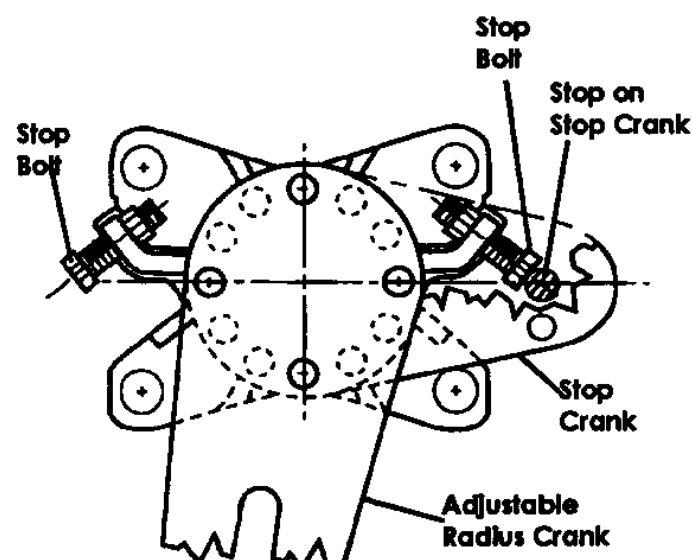


Figure 8
Typical Offset Bearing

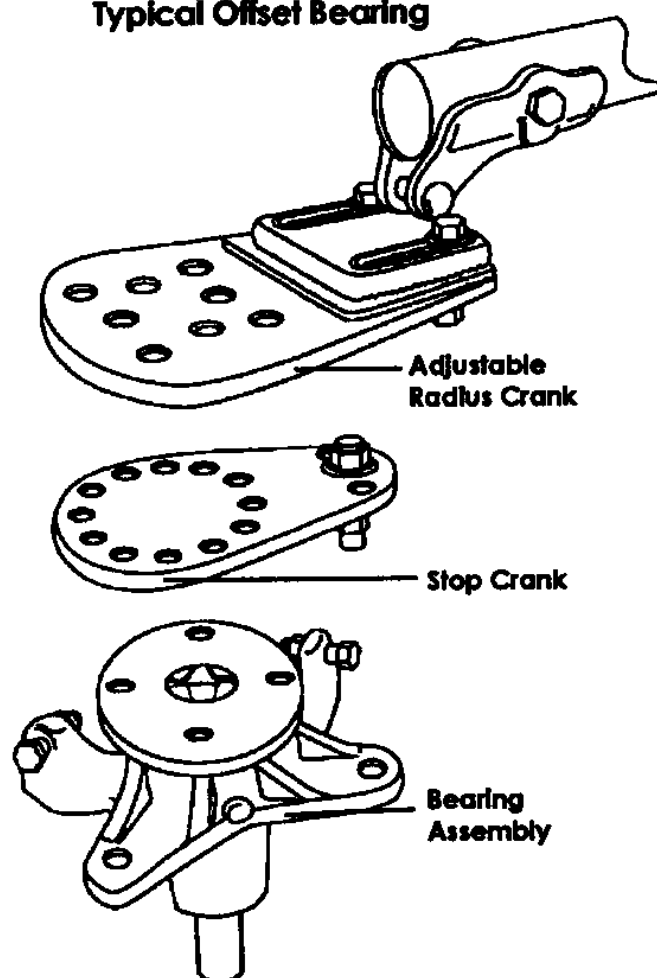


Figure 9
Exploded View of Offset Bearing and Cranks

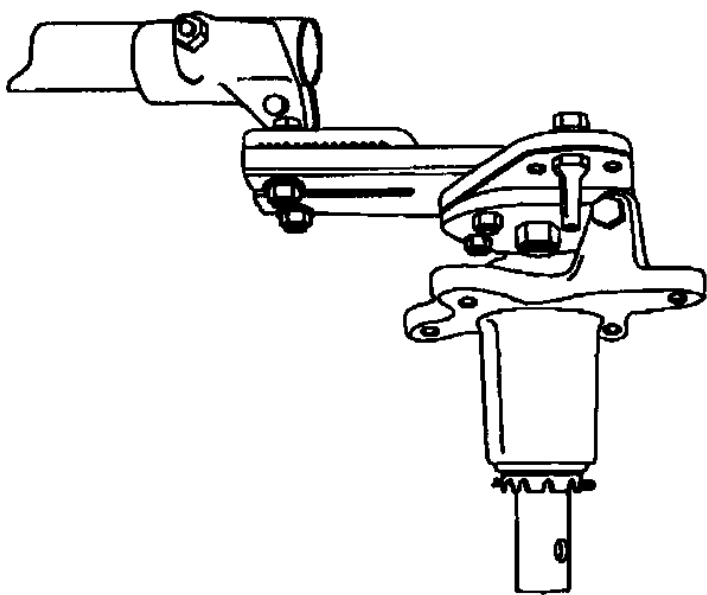


Figure 10
Typical Offset Bearing and Cranks

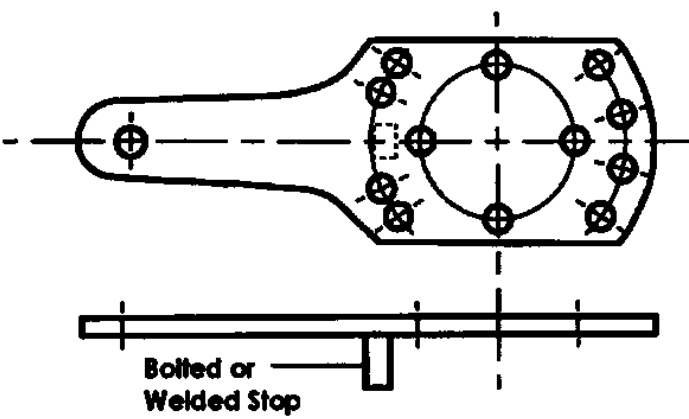


Figure 11
Single Crank Used on Medium Voltage Switches,
Non-Drive Phases

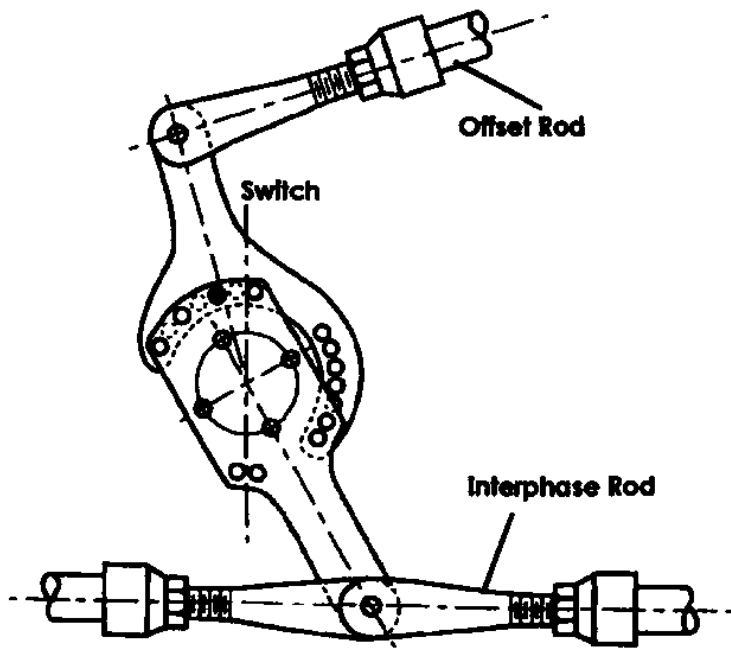


Figure 12
Operating Pole Adjustable, Multi-Angle Crank

4.2.7 Adjusting the Multi-Angle Crank

The two switch poles that are not connected to the offset bearing normally use a single crank, similar to the one shown in Figure 11. The switch pole that is connected to the offset bearing (drive phase) uses either a solid double crank or a two-piece adjustable, multi-angle crank as shown in Figure 12. The multi-angle cranks are located on the operating pole unit that is connected to the offset bearing.

The bolt circle radius for the insulator determines the type of multi-angle crank that is installed on the unit. Refer to Table 1.

The multi-angle crank should be set to form a 45° angle with the offset link in either the OPEN or CLOSE switch position.

In some adjustments, the position of the adjustable multi-angle crank may interfere with the stop projection on the switch crank. To correct this problem, remove the stop projection. The other two poles will regulate blade travel.

Table 1 Multi-Angle Cranks	
Insulator Bolt Circle Radius	Type of Multi-Angle Crank
3-inch Bolt Circle Insulator Radius	333° of angular adjustment Crank location of every 9° Allows adjustments to within 4-1/2° of desired position
5-inch Bolt Circle Insulator Radius	336° of angular adjustment Crank location of every 12° Allows adjustments to within 6° of desired position

4.2.8 Installing the Interphase Rods and Offset Crank Rod

Important: If torsional interphase shafts are used or if each pole is operated by an operator, refer to the drawings supplied with the switch to install the interphase rod (Fig. 3 on page 4) and offset crank rod (Fig. 12). In all other applications, follow the procedure listed below.

With all blades in the fully OPEN position, install the interphase rods (Fig. 3) and offset crank rod (Fig. 12) as follows:

1. Turn the adjustable clevises to extend the interphase rod that is in *compression* (during the opening stroke of the switch) as much as possible allowing enough room for the pins to be inserted.

2. Turn the adjustable clevises to shorten the inter-phase rod in *tension* (during the opening stroke of the switch) as much as possible allowing enough room for pins to be inserted.

3. If the offset crank rod is in *compression* during the opening stroke, repeat step 1 for this rod. If the
- offset crank rod is in *tension* on the opening stroke, repeat step 2 for this rod.

4. Lubricate all pins and bearings based on the guidelines in Tables 2a and b.

Table 2a Lubrication Guide for Outdoor Switch Components			
Component	Recommended Lubricant	Amount to Apply	Quantity Required 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
*None required on installation unless switches were exposed to abnormal conditions for a considerable length of time. During regular cleaning, apply a light coat.			
All surfaces require preparation as described in sections 8.1 and 8.2			

Table 2b Vendor Guide for Lubricants	
Lubricant	Vendor Address
NO-OX-ID Grease	SANDCHEM INC. Chicago, IL 60616
Darina #2 Grease	Shell Oil Company New York, NY
DC-4 Grease	Dow Corning Corporation Midland, Michigan
NO 2 EJC - Electrical Joint Compound	ALCOA Conductor Products Company Pittsburgh, PA 15212

4.2.9 Installing the Vertical Operating Pipe

The vertical operating pipe (Fig. 13) is pre-drilled at one end for insertion of a 5/8-inch diameter pin.

To install the vertical operating pipe:

1. Fasten the vertical operating pipe to the offset rotor bearing shaft (or on the pole unit rotor bearing shaft for direct-connected switches) using the 5/8-inch coupling pins supplied with the unit. Refer to Fig. 13.
2. Install accessory items. Refer to the drawings shipped with the unit for instructions on installing accessory items (auxiliary switches, mechanical interlocks, position indicators, ground straps, etc.) which mount on the vertical operating pipe.

4.2.10 Installing the Pipe Splice and Guide Plate (Only installed for units taller than 23 feet)

A pipe splice and guide plate (Fig. 14) are furnished for structures taller than 23 feet. The pipe splice and both pieces of pipe are drilled for insertion of the 5/8-inch diameter pins.

1. Install the pipe splice.
2. Mount the guide plate shown in Fig. 14 (after installing the vertical operating pipe as per section 4.2.9).
3. Align the hole in the guide plate with the normal position of the vertical pipe without any binding and tighten the bolts on the guide plate.

5. INSTALLING THE OPERATING MECHANISM

Two types of manual operating mechanisms are available for the TTT8 Switch:

- Swing-handle operator (section 5.1)
- Worm gear mechanism (section 5.2).

A motor operator also can be supplied for remote operation. Refer to section 5.3.

5.1 Installing the Swing Handle Operator

The operating handle lock plate (Fig. 14) on the swing handle operator is made of two castings mounted on the pipe guide plate (Fig. 14). The castings can be easily adjusted in an arc to attain the required rotation. The castings act as locks for the manual operating handle when it is dropped vertically from the operating position. The handle must be raised to a horizontal position for operation.

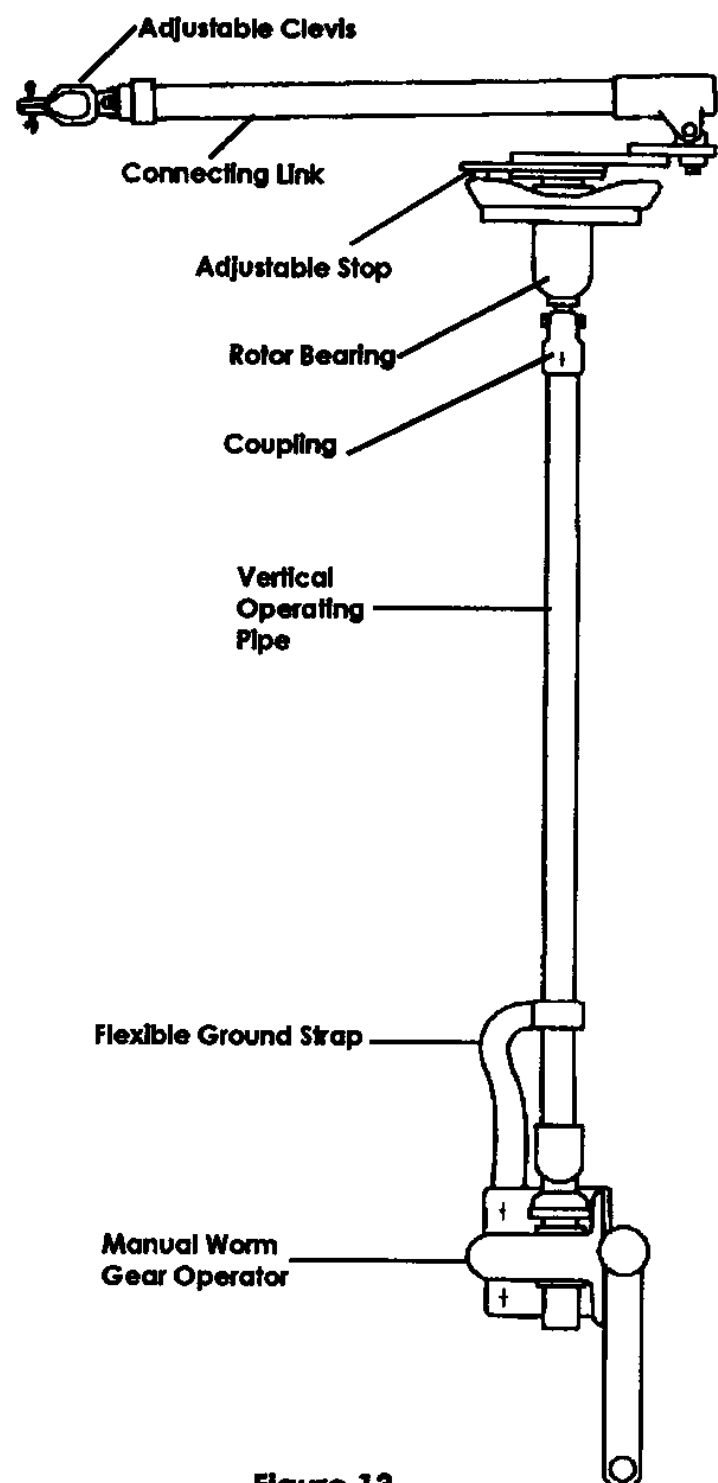


Figure 13
Manual Worm Gear Operating Mechanism

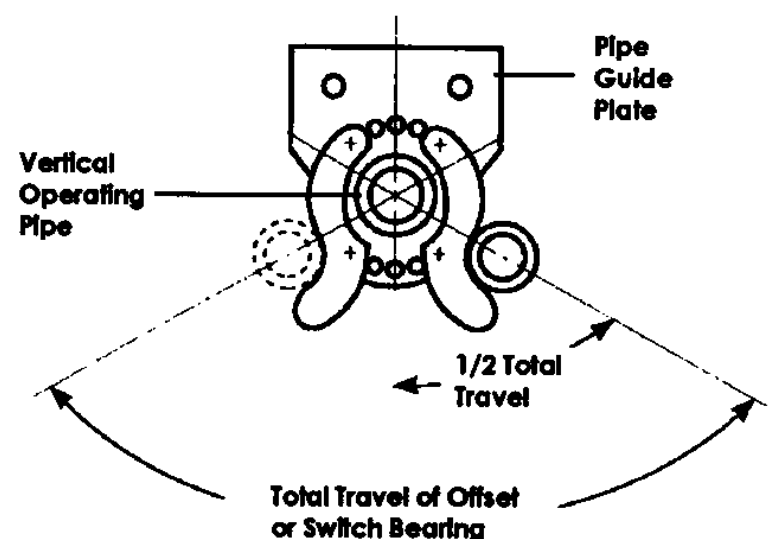


Figure 14
Operating Handle Lock Plate

To install the swing handle operator:

1. Slide a flexible ground strap on the vertical operating pipe (Fig. 13) and connect the opposite end to the structure. Ensure that the strap is solidly in place on both the vertical operating pipe and structure.

DANGER

SOLIDLY CONNECT THE FLEXIBLE GROUND STRAP TO THE VERTICAL OPERATING PIPE AND TO THE STRUCTURE TO ENSURE POSITIVE GROUNDING OF THE VERTICAL OPERATING PIPE. FOR SAFETY, ENSURE THAT THE STRAP IS SOLIDLY IN PLACE ON BOTH THE VERTICAL OPERATING PIPE AND STRUCTURE.

2. Slide the handle and the handle lock plate (Fig. 14) over the end of the vertical operating pipe.
3. Fasten the lock plate at the proper location. The recommended height for the lock plate is 3 feet, 6-inches above ground.

Important: The lower end of the vertical operating pipe should extend through the handle lock plate at least 3 inches or more. The pipe is not to touch the ground or column footing.

4. With the switch in the fully CLOSED position, set the handle clamp so that its set screws are 4 inches above the lock plate and its vertical center line is at or near as possible to the CLOSED position.
5. Temporarily fasten the handle to the pipe with the set screws.
6. Position the adjustable castings so that they exert pressure against the swing handle when the handle is turned vertically in both the OPEN and CLOSED positions of the switch. (This will create a slight torsional wind up force in the operating pipe.)
7. Tighten the two set screws on the handle clamp. Turn the screws until they pierce the pipe and become firmly seated.

5.2 Installing the Worm Gear Mechanism

To install the worm gear mechanism:

1. Slide a flexible ground strap on the vertical operating pipe (Fig. 13) and connect the opposite end to the structure. Ensure that the strap is solidly in place on both the vertical operating pipe and structure.

DANGER

SOLIDLY CONNECT THE FLEXIBLE GROUND STRAP TO THE VERTICAL OPERATING PIPE AND TO THE STRUCTURE TO ENSURE POSITIVE GROUNDING OF THE VERTICAL OPERATING PIPE. FOR SAFETY, ENSURE THAT THE STRAP IS SOLIDLY IN PLACE ON BOTH THE VERTICAL OPERATING PIPE AND STRUCTURE.

2. Slide the worm gear mechanism over the vertical operating pipe and attach the worm gear mechanism to the structure.
3. Remove the small position indicators on the worm gear coupling by removing the Allen set screws.
4. Tighten the square head set screws in the worm gear coupling until they pierce the vertical operating pipe.
5. Operate the three-pole switch manually.
6. Check the switch for proper adjustment.
7. If all stops at the switch elevation have been set, including the offset bearing, it is safe to re-install the position indicators. Install the position indicators so that they do not quite touch the raised boss on the worm gear housing in either the OPEN or CLOSED position.

Notice: Do not use the OPEN-CLOSE position indicators as stops.

5.3 Installing the Motor Operator

A motor operator is used to remotely operate the switch. To install the motor operator:

1. Slide a flexible ground strap on the vertical operating pipe (Fig. 13 on page 9) and connect the opposite end to the structure. Ensure that the strap is solidly in place on both the vertical operating pipe and structure.

DANGER

SOLIDLY CONNECT THE FLEXIBLE GROUND STRAP TO THE VERTICAL OPERATING PIPE AND TO THE STRUCTURE TO ENSURE POSITIVE GROUNDING OF THE VERTICAL OPERATING PIPE. FOR SAFETY, ENSURE THAT THE STRAP IS SOLIDLY IN PLACE ON BOTH THE VERTICAL OPERATING PIPE AND STRUCTURE.

2. Follow the installation instructions shipped with the motor operator.

Caution

When installing the motor operators, de-energize the drive motor circuit using the motor limit switches just before the stops on the switch pole unit and the offset bearing stop reach their limits.

5.4 Lubrication

For lubrication guidelines for the operating mechanism, refer to Tables 2a and b on page 8.

6. INSTALLING THE ARCING HORN

Arcing horns are supplied only when horn gap switches are ordered. Install the arcing horns or arc restrictors as per enclosed field assembly drawings. Attach the stationary horn to the jaw. Bend or adjust the stationary horn slightly to exert light contact pressure between the horn and the switch blade.

7. FINAL INSTALLATION CHECKS

Check all three poles for the following:

- Blades enter the center of their respective jaws at approximately the same time on CLOSING.
- In the CLOSED position, the blades must be in full contact and vertical within tolerances.
- On 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 damage. Re-check the position of the base crank. The base crank should be rotated to the maximum counter-clockwise position with the blade closed.

Once these checks are made, the TTT8 Switch is ready for service.

8. 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 tin terminal clamp (if available) to the aluminum switch terminal pad.*

If a non-tin terminal clamp is used, apply a liberal amount of electrical joint grease at the joint and all over the pad of the fitting.

8.1 Connecting Aluminum-to-Aluminum Terminals

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. Refer to Table 2a on page 8.
- 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 3.

8.2 Connecting Copper-to-Aluminum Terminals

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.

Notice: *Do not abrade any plated surfaces.*

- 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. Refer to Table 2a on page 8.
- 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 3.

Table 3 Recommended Torque for Aluminum Bolts				
Bolt Diam.	Lubricated Threads		Dry Threads	
1/2-inch	240 in.-lbs	20 ft-lbs	420 in.-lbs	35 ft-lbs
5/8-inch	480 in.-lbs	40 ft-lbs	720 in.-lbs	60 ft-lbs
3/4-inch	720 in.-lbs	60 ft-lbs	1140 in.-lbs	95 ft-lbs

9. MAINTENANCE

The TTT8 Switch requires minimal maintenance which consists primarily of inspections. The frequency of inspection depends upon atmospheric conditions and frequency of operation. Maintenance intervals are largely determined by users.

Refer to ANSI C37.35 for recommended maintenance for high voltage air disconnect and interrupter switches.

WARNING

Before performing any maintenance, be sure that the TTT8 Switch is disconnected from all electrical power sources and properly grounded.

Complete the maintenance checklist items listed in the table to assure that all proper maintenance is carried out.

Notice: Contaminated environments or operation in sleet conditions also may require applying the lubricants at pivot points. The grease should be durable and able to retain its viscosity over a wide temperature range.

TTT8 Switch Maintenance Checklist	
Item to Check	Check
Under normal service conditions, inspect the jaw contacts at least once a year .	
Examine contacts to be sure that they are aligned, clean, and have a firm uniform pressure.	
If contacts are pitted or burned, remove and replace the old contacts with new ones.	
Clean the contact surfaces thoroughly by scraping off any contamination or deposit.	
After cleaning the contacts, apply a coat of lubricant, either DARINA #2 Grease or NO-OX-ID Grade "A" Special.	

10. RENEWAL PARTS

Refer to the switch nameplate (Fig. 15) 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.


The following information is required when ordering renewal parts from the factory:

- Switch Type
- Part Name
- Quantity Required
- Serial Number
- Maximum kV
- BIL kV
- Continuous Current (Amps)
- Momentary Current (Amps)

TYPE SER. NOM.KV

MAX.KV BIL KV CONT. AMPS

⊕ MOM. AMP A.C.C.C. ⊕


ASEA BROWN BOVERI

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Figure 15
Switch Nameplate

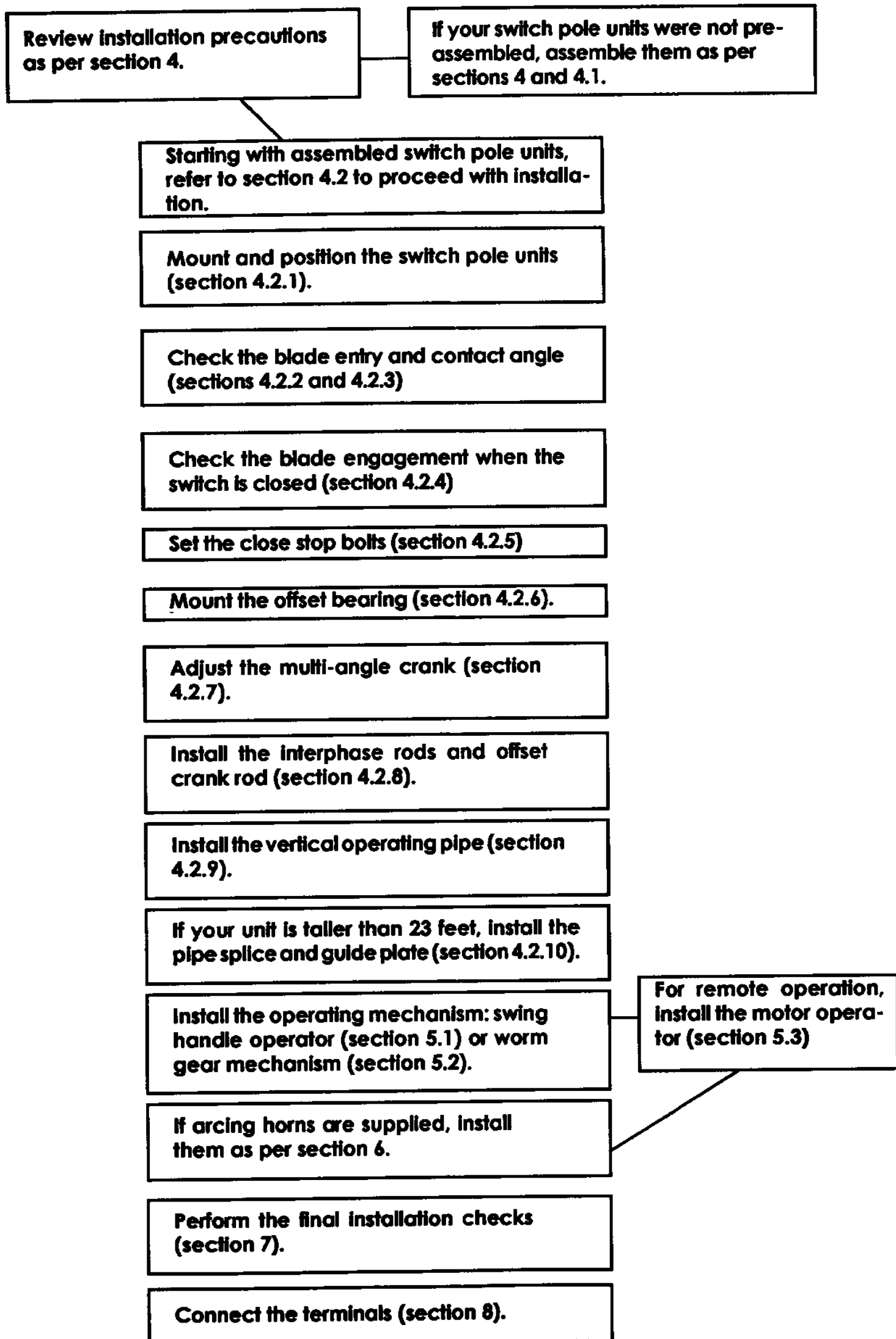
Flow Chart for Installing the TTT8 Switch



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