

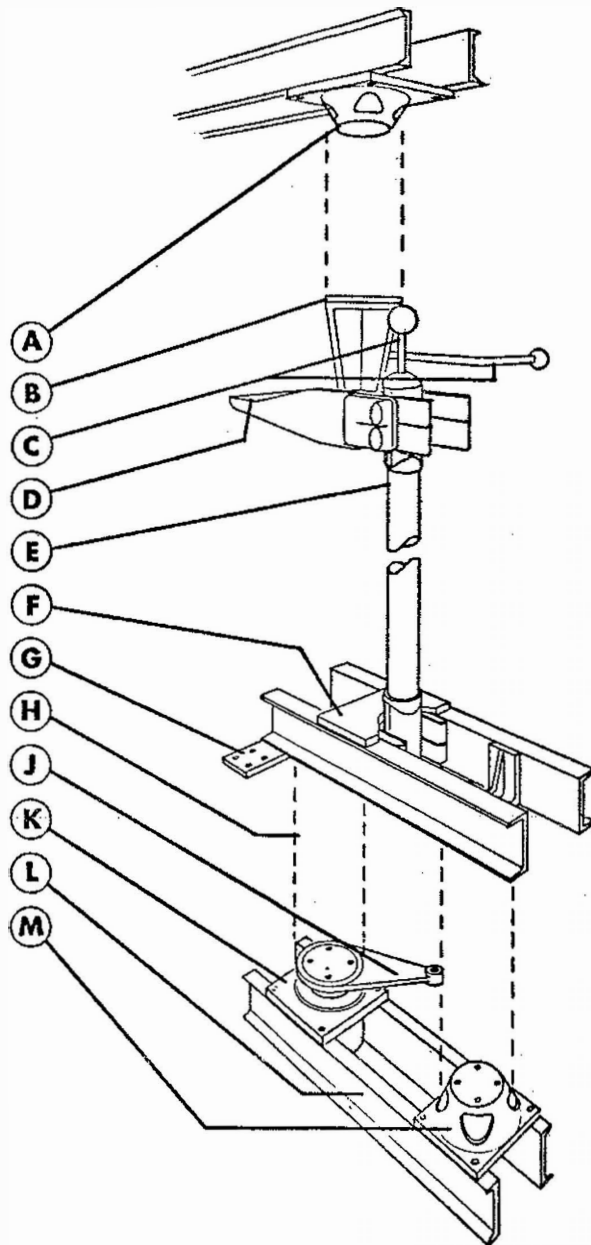
The Type EVR vertical reach switch is shipped in three major assemblies: (1) The base, (2) The hinge and blade assembly, and (3) The jaw. Assembly bolts, insulators, and control components are packed separately.

Installation consists of mounting the base on the structure, the insulators to the base, and the hinge and blade assembly to the insulators. The jaw insulator mounting adaptor is then mounted to the upper structure, the insulator to it, and the jaw to the insulators. As an option, the switch may be assembled on the ground and hoisted to the structure as a unit. When using this procedure, it will be necessary to construct level, stable platforms, such as metal sawhorses, to which the switch can be bolted to prevent overturn.

Figure 1 — Identification of parts:

Type EVR Vertical Reach Switch

- A — Jaw insulator mounting adaptor
- B — Spacer
- C — Arcing horns
- D — Jaw terminal pad
- E — Switch blade
- F — Hinge assembly
- G — Hinge terminal pad
- H — Rotating insulator
- J — Switch arm
- K — Switch bearing assembly
- L — Switch base
- M — Stationary insulator mounting adaptor



These instructions give the general procedure for adjusting EVR switches. It may be necessary to make adjustments not described in this manual. If any questions should arise concerning the installation or adjustment of this equipment, please call your local Southern States representative, or the factory.

WHEN LIFTING FULLY ASSEMBLED SWITCH, LIFT BY SWITCH BASE ONLY.

UNPACKING and DISASSEMBLY:

1. Uncrate the switches, remove the shipping ties, and check for damage in transit. If any damage is found, immediately file a claim with the carrier, and notify the factory.
2. Unpack and lay out all control components and check against the bill of material on the Operating Mechanism drawing.
3. Using any convenient means, match mark the lower parts of the hinge assembly with the switch arm and bearing to ensure correct re-assembly, as shown below.

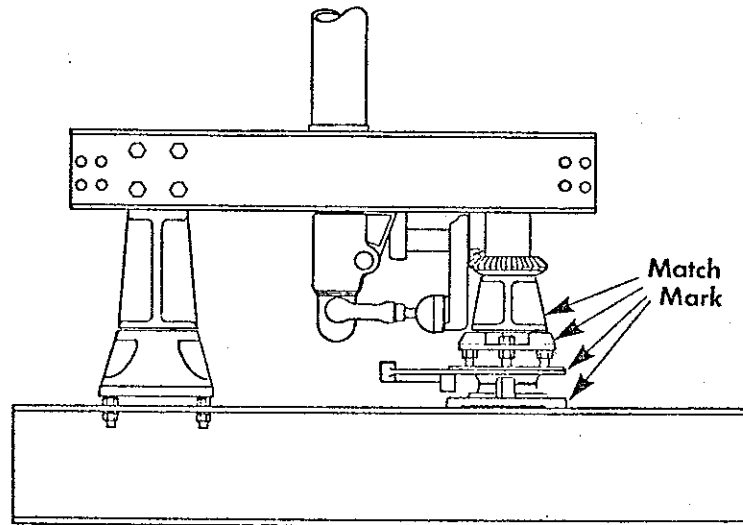


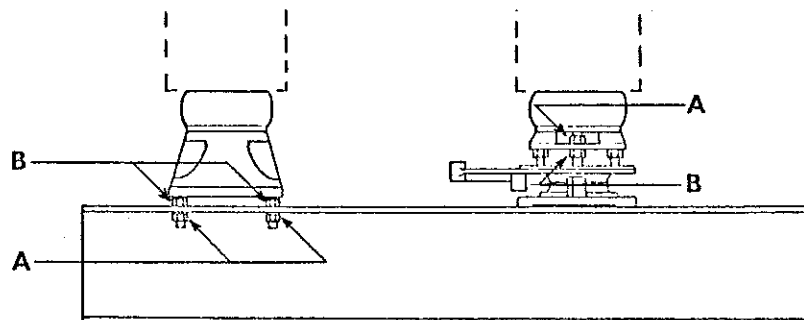
Figure 2 – Prior to disassembly, match mark parts shown.

DANGER: HIGH PRESSURE SPRINGS. The switch blade is controlled by strong counterbalance springs. For personnel safety, the live parts must be unbolted from the base ONLY with the switch blade fully closed (vertical to the base).

4. After match marking the parts in step 3 and making sure the switch is in the fully closed position, unbolt the live parts from the mounting adaptors. (If the bolts are of a type specified on the Unit Assembly Drawing for insulator mounting, save them for later re-use.)

Note: Adjustments to these switches mainly concern getting the insulator stacks in proper alignment. This is done with the jack screws that support the adaptors to which the insulators are bolted. The best procedure to do this is described below.

Figure 3



To adjust the insulator stack, first loosen all four nuts (A). Tilt the insulator to the required position by screwing up or down on nuts (B). Retighten nuts (A). (For underhung mounting, reverse the sequence.)

Note: When adjusting jack screws it is important that the actual height of the insulator remain the same. To do this, adjust opposite screws equally; that is, run one nut up a certain number of turns, and the other one down the same amount of turns. By doing this, the insulator stack will remain at its original height, but its angle of tilt will change.

INSTALLATION:

1. Refer to the operating mechanism drawing to determine the positioning of the center phase and mount the base to the structure.
2. Mount the insulators, using the bolts specified on the field assembly bolt list (SF drawing).
3. True the rotating insulator. It is important that this insulator rotate as nearly about the bearing axis (concentrically) as possible. The best method to achieve this is described in the following four steps.

STEP ONE

Make a marker of scrap lumber or metal and attach it to the end insulator to use for a reference point.

Place the reference point over the center of the rotating insulator. The rotating insulator should be up against a bearing stop.

STEP TWO

Rotate the insulator to the opposite bearing stop. Observe for eccentric rotation ("wobble").

STEP THREE

If during rotation the insulator has wobbled, leave it against the bearing stop in step two. Use the jack screws that mount the rotating insulator to the bearing to tilt it back one-half the distance to the reference point on the marker.

STEP FOUR

Rotate the insulator back to the beginning position. Loosen the marker and place the reference point over the center of the insulator again. Repeat the last three steps until the insulator rotates true. (Up to 1/4" wobble is acceptable.)

This method works whether the rotating insulator is out of adjustment axially, laterally, or any combination in between.

Once the stack rotates true, do not readjust.

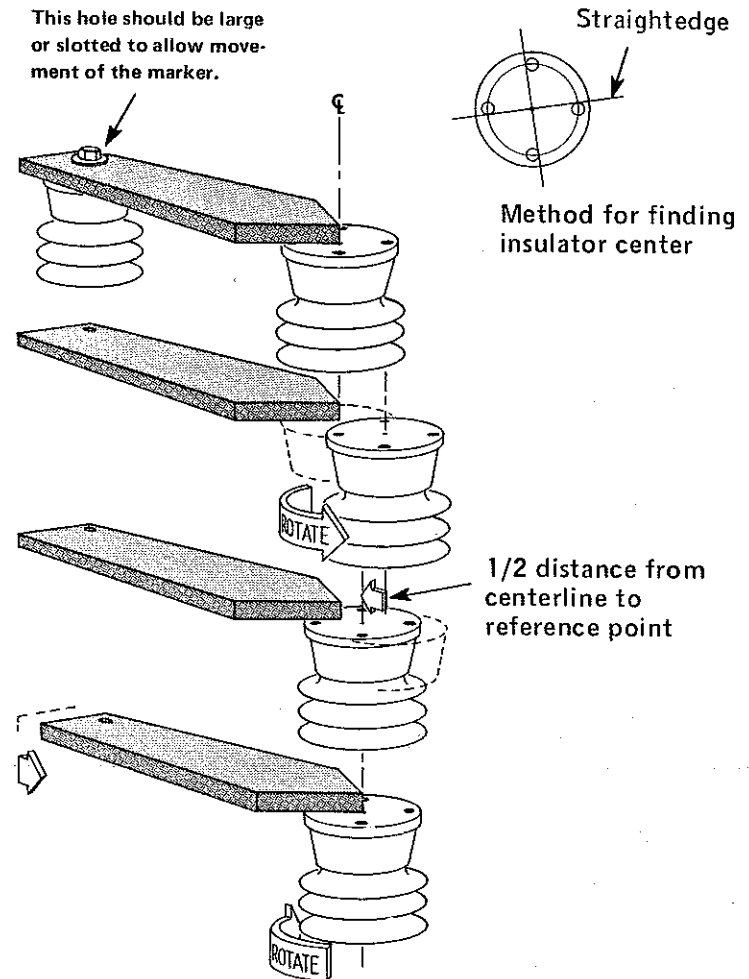


Figure 4 -- Adjusting the rotating insulator for concentric rotation.

4. Mount the hinge and blade mechanism on the insulators: (Rotate the bearing up against the closed position stop.)
 - Mount the rotating end first.
 - Then, mount the stationary end. If the mounting holes do not line up, adjust the jack screws at the bottom of the stationary stack until they do. Do not disturb the jack screws on the rotating stack.

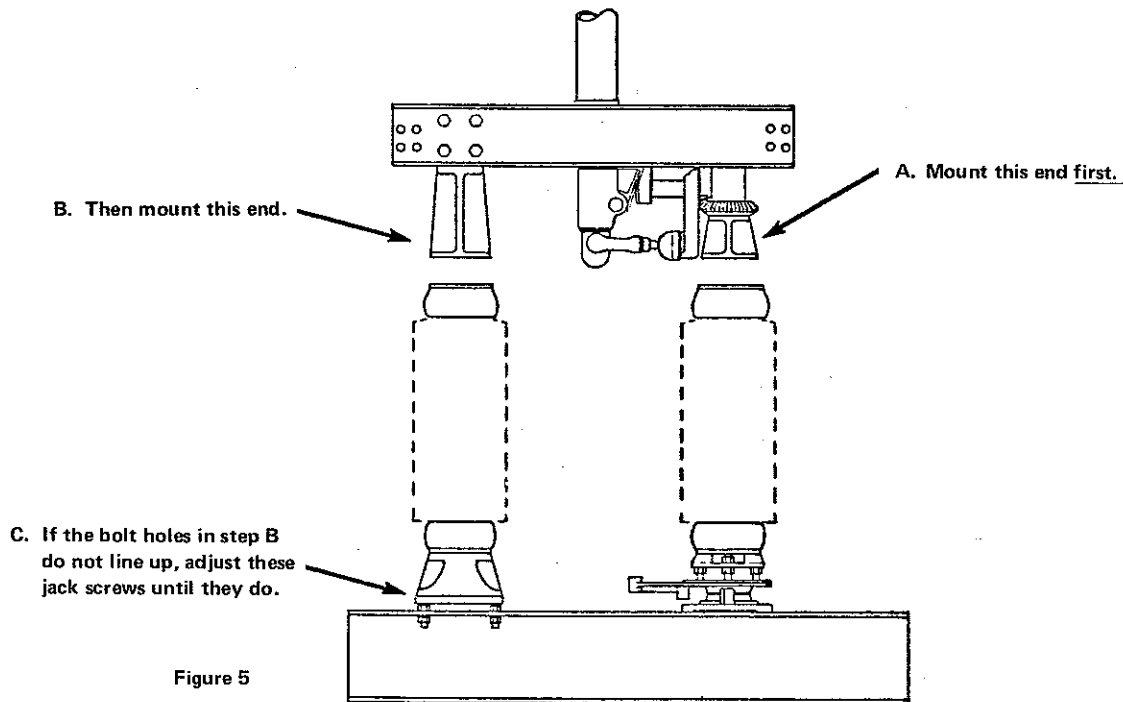


Figure 5

5. Open the switch and install the jaw insulator and the jaw insulator stacks. Use a plumb line and adjust the jack screws as necessary.
6. If a grounding switch is used, mount the grounding switch jaw and the line switch jaw as shown, discarding the 1/2" spacer.
7. If possible, attach the conductors at this time to avoid later realignment of insulators due to conductor loads.

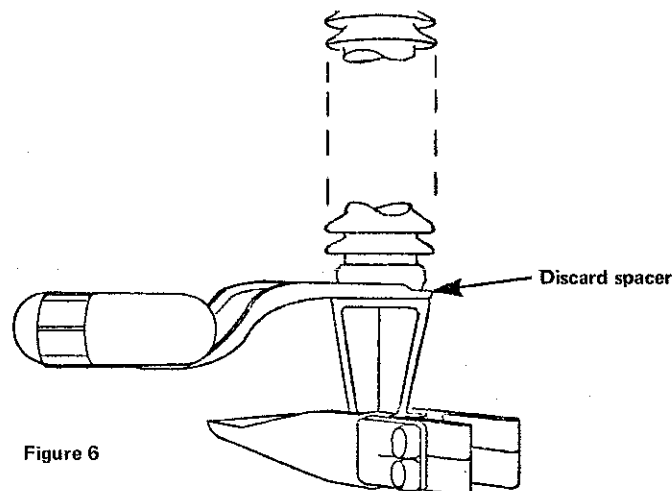


Figure 6

TEST OPERATE:

All test operations should be done by hand. Do not use electrical operation until the switch is completely adjusted.

1. Close the switch carefully. The blade should enter the jaw centrally with equal clearance on either side of the blade.
 - The blade also should come to rest firmly against the stop in the jaw.
 - Additionally, the silver of the blade should be centered in the silver of the jaw.
 - To adjust for these three conditions adjust the jack screws that support the jaw insulator stack, tilting the stack fore or aft, or from side to side as necessary. The jack screws also can be used to raise or lower the jaw to center the blade tip silver in the jaw contacts.

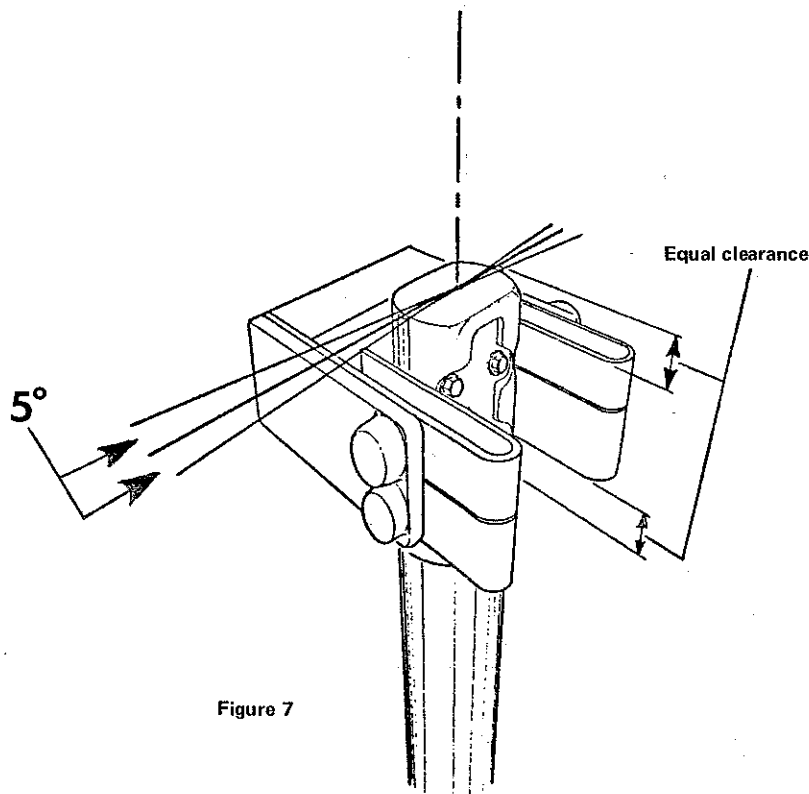


Figure 7

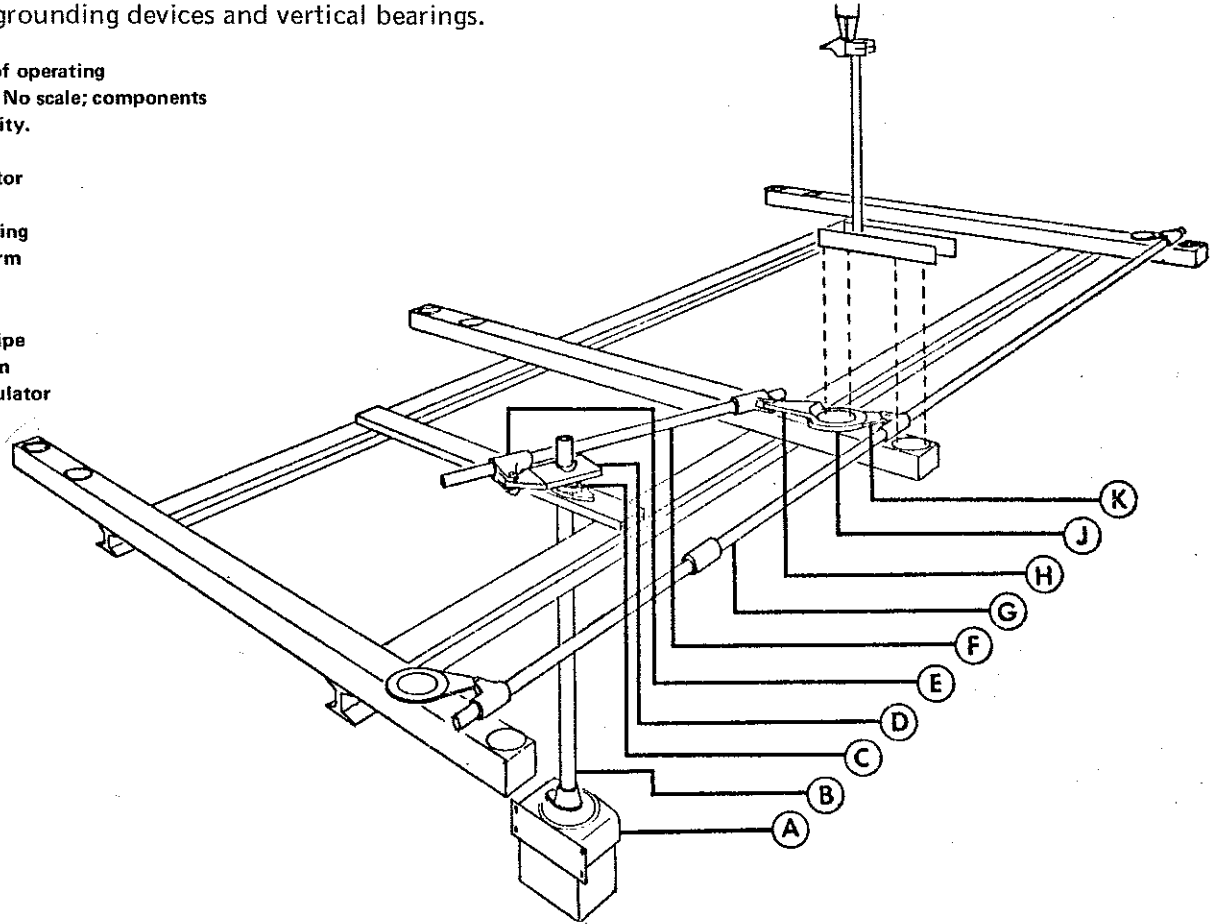
2. To achieve optimum contact pressure the blade tip must rest perpendicular in the contacts (plus or minus 5°). If necessary, adjust the closed position stop to achieve this alignment. Bearing stop adjustment may also be necessary.
3. When the contact adjustments are completed, tighten all bolts securely to lock the jaw into position.
4. Install the arcing horns as shown on the unit assembly drawing. The arcing horns should rub together with sufficient pressure to maintain contact, but not so hard as to cause binding. The stationary horn can be bent to achieve proper contact.

INSTALLATION:

1. Place the switch in the completely closed position.
2. Refer to the Operating Mechanism drawing and the sketch below, and install all brackets and support members, including (if applicable) pipe guides, motor mechanism supports, key interlock adaptors, braidless grounding devices and vertical bearings.

Figure 8 — Sketch of operating mechanism layout. No scale; components exaggerated for clarity.

- A — Motor operator
- B — Vertical pipe
- C — Vertical bearing
- D — Adjustable arm
- E — Pipe clevis
- F — Reach rod
- G — Interphase pipe
- H — Auxiliary arm
- J — Rotating insulator
- K — Switch arm



3. Hang the vertical pipe through the vertical bearing as indicated below. The pipe collar above the bearing must support the entire weight of the pipe. Set the length of the pipe to the height above the top of the foundation shown on the Op. Mech. drawing.

Note: When installing the operating mechanism, tighten all set screws to grip the pipe securely, but do not pierce the pipe until all adjustments are made. Match mark all parts that might slip during trial operations.

4. Mount the adjustable arm and set its position and radius as shown on the Op. Mech. drawing.
5. Attach the clevises to the reach rod and install this assembly as indicated.
6. Mount the manual gear operator. If the switch is motor operated, at this point refer to the motor mechanism installation instructions.

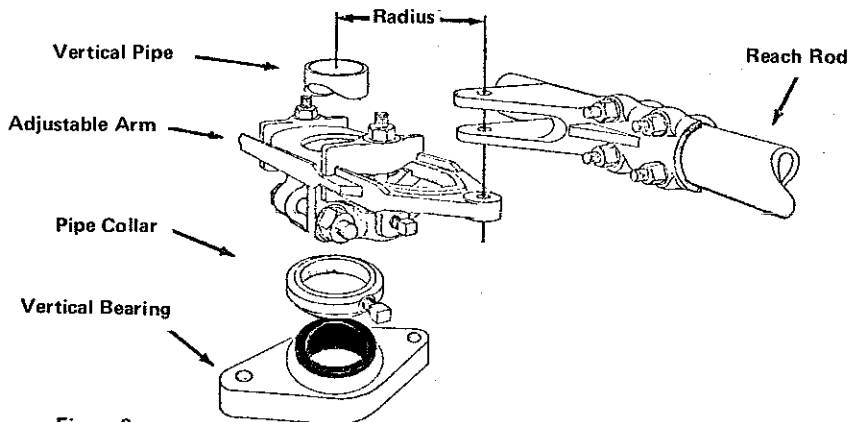


Figure 9

ADJUSTMENT:

Do not use electrical operation until all line switch adjustments are made.

1. The adjustable arm should travel 180° from toggle closed to toggle open. Manually test operate.
2. If the switch does not fully open, the radius of the arm is too short. To correct:
 - a. Check first to see that nothing has slipped.
 - b. Return the switch to the closed position.
 - c. Loosen the adjustable arm and clevis bolts as shown below.
 - d. Lengthen the radius of the adjustable arm about 1/4 inch and allow the clevis to reposition itself the same distance (shortening the pipe).
 - e. Test operate again and adjust as necessary.

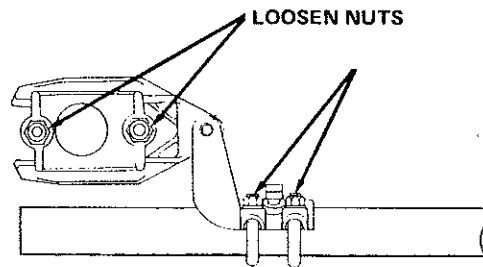


Figure 10

3. If the switch is fully open before the control handle reaches the open position, the radius of the adjustable arm is too long. To correct:
 - a. Check to see that nothing has slipped.
 - b. Return the switch to the closed position.
 - c. Loosen the adjustable arm and clevis bolts as shown above.
 - d. Shorten the radius of the adjustable arm about 1/4 inch and allow the clevis to reposition itself (lengthening the pipe).
 - e. Test operate again and adjust as necessary.
4. When the switch is completely adjusted, securely tighten all bolts, and tighten all set screws until the pipe walls are pierced. (For heavy wall pipe, drill the set screw holes, using the threaded drill guides supplied and a 1/4" drill.

The grounding switch is mounted on the line switch jaw stack as shown.

Note: Completely install and adjust the line switch before doing any work on the grounding switch. When adjusting the grounding switch, do not disturb the jack screws that support the line switch jaw. Make all adjustments necessary to align the grounding switch blade in the grounding switch jaw contacts to the jack screws that support the grounding switch hinge mechanism only.

1. After mounting the EVG-1 hinge and jaw, insert the blade into the blade socket and tighten the clamping bolts, but do not drive in the set screw at this time.

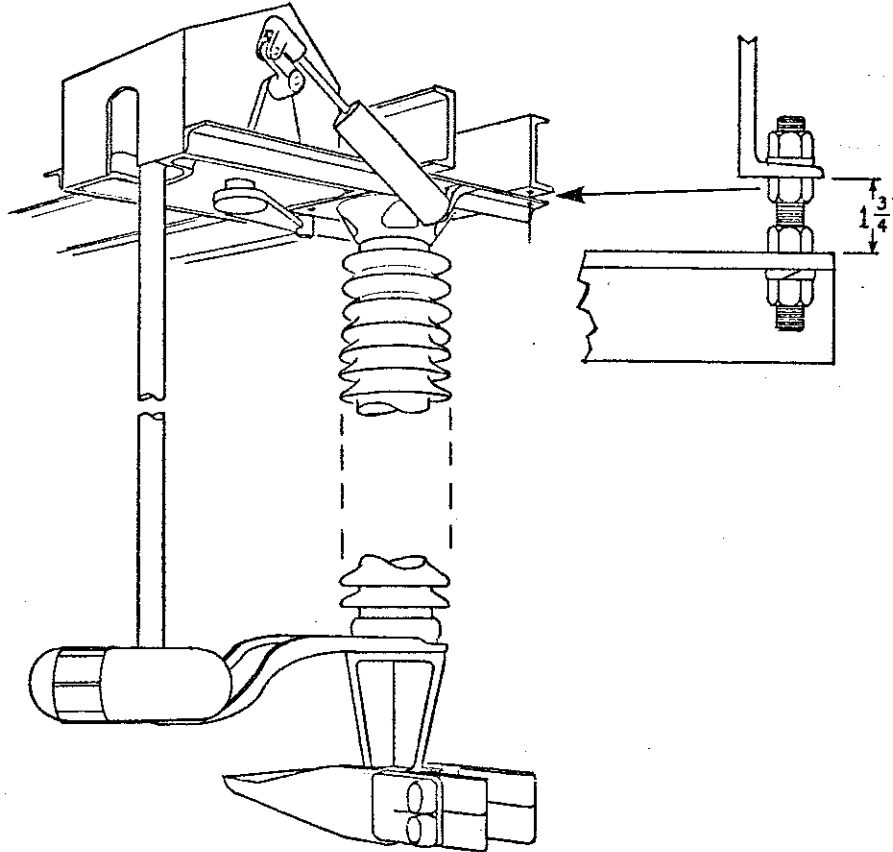


Figure 11

2. Make trial operations by hand. (Do not install the operating pipes until all phases are adjusted.)
 - The blade should close into the jaw in the middle, with equal clearance on either side of the blade, and with the blade tip firmly against the stop in the jaw.
 - Additionally, the silver of the blade tip must be centered in silver of the jaw contacts.

The jack screws that support the hinge mechanism can be used to tilt the entire assembly to move the EVG-1 blade tip to the left or to the right as it enters the jaw. These same jack screws also are used to adjust the depth of penetration of the blade tip into the jaw, which should be firmly against the stop but not so firmly as to cause deflection of the insulator stack.

The blade socket clamping bolts can be loosened and the blade moved up or down to center the contact silver.

3. The final condition of good contact adjustment is the proper blade rotation. Rotate the blade in the blade socket so that when the switch is completely closed, the tip will rest perpendicular to the jaw contacts as shown. These switches will have adequate contact pressure if the tip is as much as five degrees off perpendicular; however, every attempt should be made to get the blade tip as nearly square in the contacts as possible.

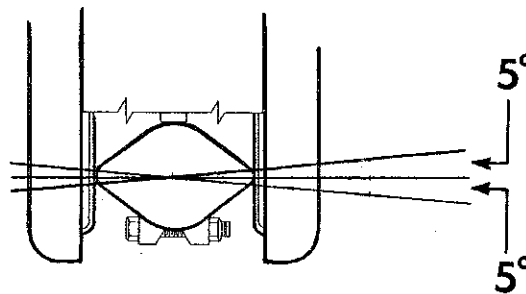


Figure 12

4. When the above adjustments are complete, drill a pilot hole and drive in the set screw in the blade socket.

INSTALLATION OF THE GROUNDING SWITCH OPERATING MECHANISM:

1. Place the switch in the completely closed position.
2. Refer to the Operating Mechanism drawing and the sketch below, and install all brackets and support members, including (if applicable) pipe guides, motor mechanism supports, key interlock adaptors, braidless grounding devices and vertical bearings.

Sketch of EVG grounding switch operating mechanism arrangement.
 No Scale. Switch shown closed.

- | | |
|----------------------|----------------------------|
| A - Operator | F - Reach rod |
| B - Vertical pipe | G - Interphase pipe |
| C - Vertical bearing | H - Auxiliary arm |
| D - Adjustable arm | J - Switch arm |
| E - Pipe clevis | K - Grounding switch blade |

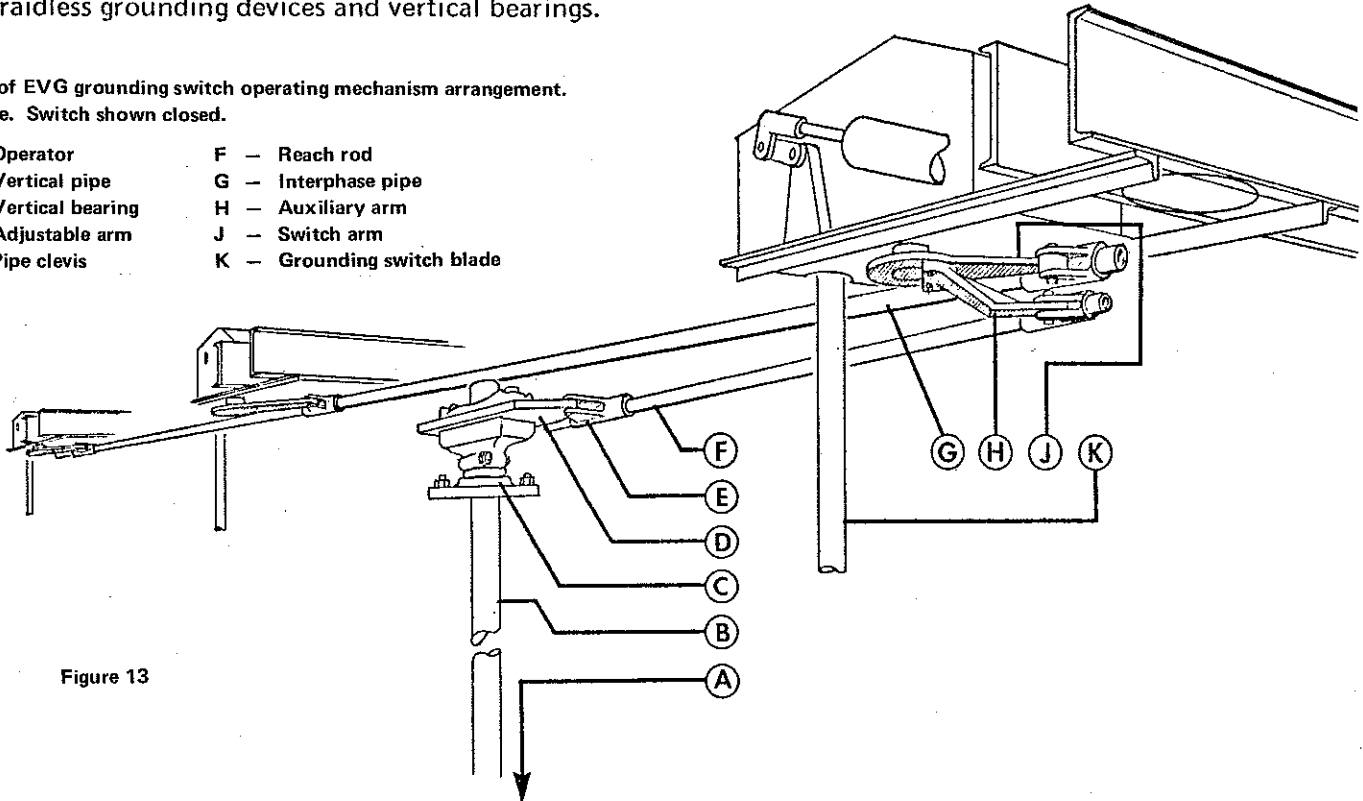


Figure 13

3. Hang the vertical pipe through the vertical bearing as indicated below. The pipe collar above the bearing must support the entire weight of the pipe. Set the length of the pipe to the height above the top of the foundation shown on the Op. Mech. drawing.

Note: When installing the operating mechanism, tighten all set screws to grip the pipe securely, but do not pierce the pipe until all adjustments are made. Match mark all parts that might slip during trial operations.

4. Mount the adjustable arm and set its position and radius as shown on the Op. Mech. drawing.
5. Attach the clevises to the reach rod and install this assembly as indicated.
6. Mount the manual gear operator. If the switch is motor operated, at this point refer to the motor mechanism installation instructions.

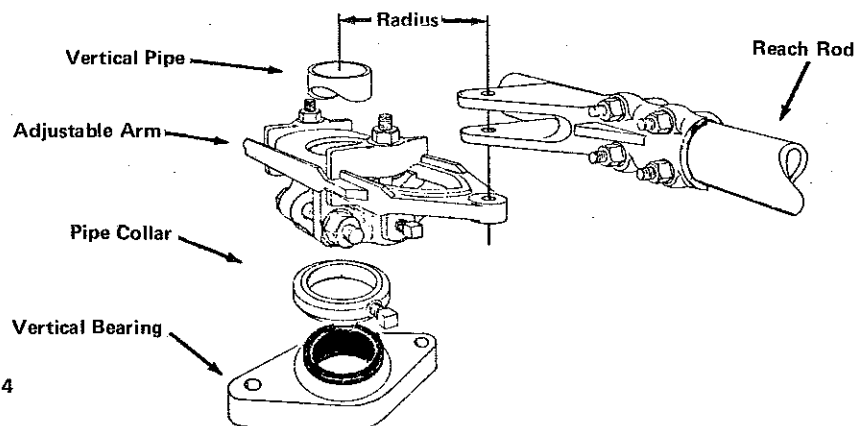


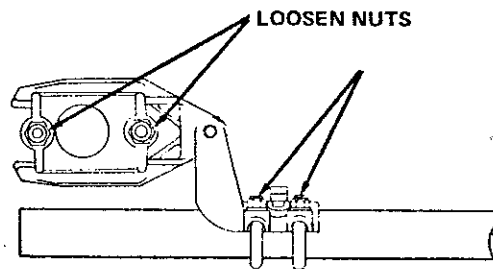
Figure 14

ADJUSTMENT:

Do not use electrical operation until all line switch adjustments are made.

1. The adjustable arm should travel 180° from toggle closed to toggle open. Manually test operate.
2. If the switch does not fully open, the radius of the arm is too short. To correct:
 - a. Check first to see that nothing has slipped.
 - b. Return the switch to the closed position.
 - c. Loosen the adjustable arm and clevis bolts as shown below.
 - d. Lengthen the radius of the adjustable arm about 1/4 inch and allow the clevis to reposition itself the same distance (shortening the pipe).
 - e. Test operate again and adjust as necessary.

Figure 15



3. If the switch is fully open before the control handle reaches the open position, the radius of the adjustable arm is too long. To correct:
 - a. Check to see that nothing has slipped.
 - b. Return the switch to the closed position.
 - c. Loosen the adjustable arm and clevis bolts as shown above.
 - d. Shorten the radius of the adjustable arm about 1/4 inch and allow the clevis to reposition itself (lengthening the pipe).
 - e. Test operate again and adjust as necessary.
4. When the switch is completely adjusted, securely tighten all bolts, and tighten all set screws until the pipe walls are pierced. (For heavy wall pipe, drill the set screw holes, using the threaded drill guides supplied and a 1/4" drill.