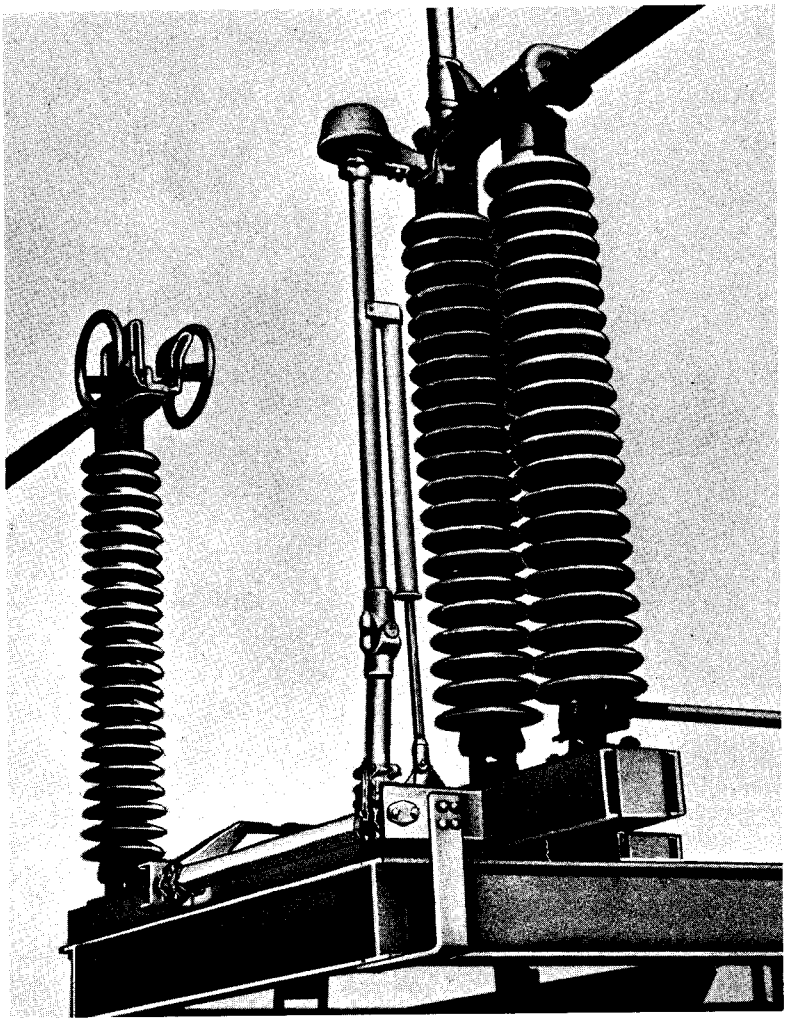
IB-13.2.8-1
ISSUE A

GOULD I-T-E AIR SWITCHES — OUTDOOR

INSTRUCTIONS

AG8 GROUNDING SWITCHES
115 THRU 765 KV



IMPORTANT

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

GOULD

INSTRUCTIONS FOR 115-THRU 765-KV

AG8 GROUNDING SWITCHES

GENERAL

This manual provides instructions for the installation and maintenance of AG8 group-operated grounding switches and should be read before attempting to install or service the equipment.

RECEIPT

Check the total shipment for completeness against the shipping notice, bill of material and installation drawings. Report any shortages or damages immediately to the carrier and file proper claim. The shipping notice (designated S/N) identifies the numbered crate or carton in which the various items of the bill of material are to be found. Typical example: The bill of material drawing covering complete switch and control parts might list Item 15 as a ground clamp. The shipping notice should then list Item 15 and its drawing number as being included in some carton number such as 1252-54. Similarly, all other parts of the switch and controls will be identified and designated as being in certain numbered cartons, crates or bundles.

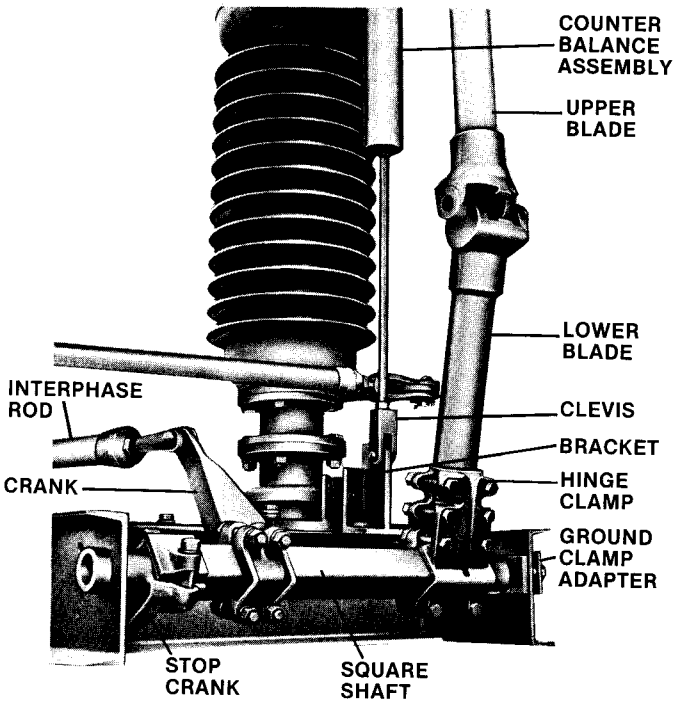


Fig. 1 Frame assembly and other components

INSTALLATION AND ADJUSTMENT

If the main switches have already been installed and adjusted, some readjustment may have to be made when installing the grounding switches.

Step 1 - Mounting Frame Assemblies

Mount the grounding switch frame assemblies on the main switch bases as shown on the switch and switch operating mechanism drawings. The mounting of grounding switch frame assemblies depends on which side of the main switch base they are to be located and whether the grounding switch blade is intended to operate parallel to or perpendicular to the switch base. On a few occasions the grounding switch frame assembly will be shipped already mounted to the main switch base.

Step 2 - Mounting Shield and Jaw Contact Assembly

Mount the shield and jaw contact assembly as shown on the installation drawings. Be sure the contact assembly is installed such that the large jaw finger is in the correct position as shown on the drawings.

Step 3 - Installing Switch Blade and Attaching Counterbalance Assembly

Prepare the lower part of the grounding switch blade and inside of hinge clamp, as described in the Terminal Connections section. Insert the grounding switch blade into the hinge clamp and finger tighten the bolts, see Fig. 1.

With the blade in the position shown in Fig. 6, install the counterbalance assembly by first attaching the end opposite the plunger to the upper blade. Then complete the installation by attaching the clevis end of the plunger to the bracket at the frame assembly, see Figs. 1 and 2.

The plunger has been extended and preset to the proper length at the factory. It is held to length with supports and tape. **CAUTION** — Do not remove supports and tape until after the counterbalance assembly has been securely attached at both ends. Then move the switch further open to reduce the pressure on the spacing supports, and remove tape and spacing support from the plunger rod. The grounding switch is then free for full movement. It can be operated by using a piece of pipe slid over the crank at the frame assembly.

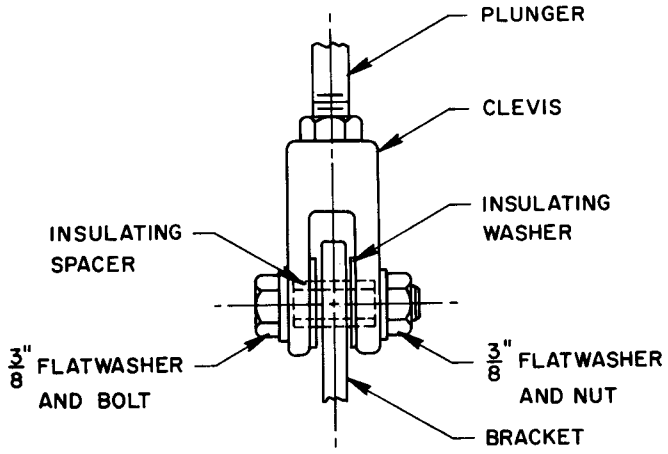


Fig. 2 Counterbalance plunger end assembly

Move the grounding switch blade to the position shown in Fig. 3 making sure that the blade end contact makes central entry into the blade guide and stop. If it doesn't, twist the blade the proper direction to make it do so, then tighten the bolts in the hinge clamp at the frame assembly, again see Fig. 1.

If a counterbalance weight is supplied on the upper blade, it can be moved along the upper blade for proper blade balance.

Step 4 - Blade Contact Clearance

Move the grounding switch blade toward the closed position so that the blade end contact passes under the jaw contact assembly, as shown in Fig. 3. Check that the dimension (X) between the top of the blade end contact and the bottom of the nearest jaw finger is as shown on the drawings. If it is not, loosen the bolts on the blade end contact and move the blade end contact to achieve the proper dimension.

Step 5 - Setting Switch Stops

The stops at the frame assembly on each switch should then be set at the required position to permit complete opening and closing of the grounding switch blade. The blade is normally considered fully open when its lower segment makes an angle of 18 degrees with the horizontal, see Fig. 6. It is recommended that in the fully closed position, the stop be set such that the upper blade and lower blade are either in line or toggled over center up to a maximum of 3/4", refer to Fig. 7.

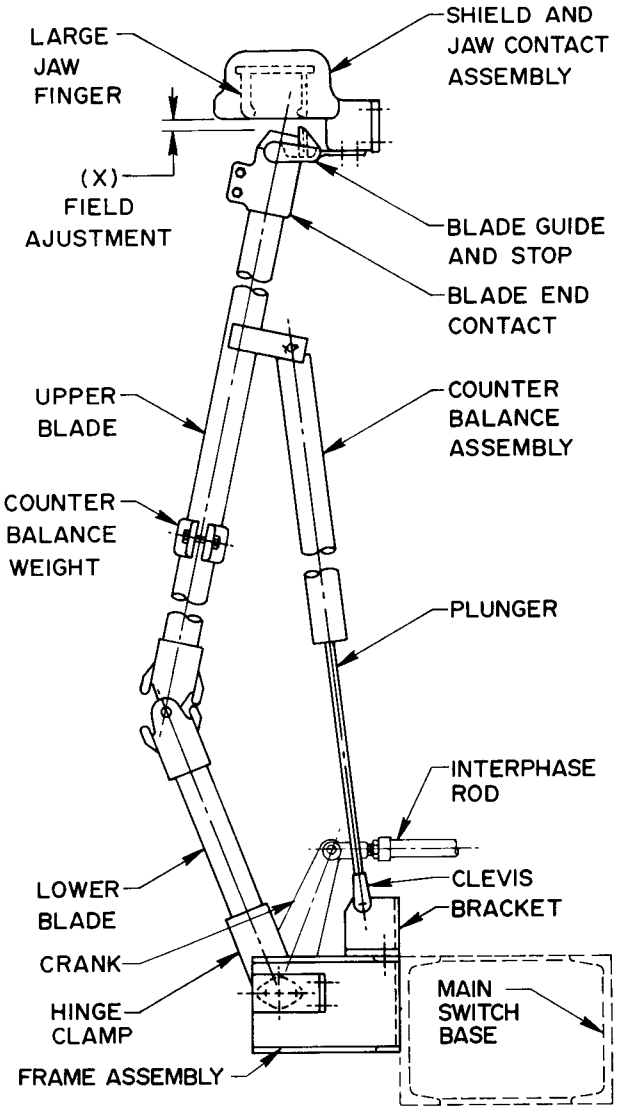


Fig. 3 Switch in partially closed position

Step 6 - Mounting Main Operating Bearing and Operating Connecting Rod

Mount the main operating bearing and its base on the supporting structure as shown on the switch and switch operating mechanism drawings. Check the operating crank for the proper radius and angle for open position.

With the driven switch pole in the open position, connect the operating connecting rod to the operating crank of the driven switch and to the operating crank of the main operating bearing.

Step 7 - Vertical Operating Pipe

Connect the vertical operating pipe to the main operating bearing shaft with the coupling and pins provided.

MAINTENANCE

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. **Before servicing the switch, be sure it is disconnected from all electric power sources and is properly grounded.** Recommended maintenance is similar to that listed in the latest industry standards. 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 bear with 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 to a smooth finish with clean fine emery or sand paper being careful to wipe off evidence of sand. With the contact surfaces entirely clean, a coating of lubricant should be applied. Suggested lubricants are Darina #2 grease or NO-OX-ID Grade A special. (Darina #2 grease is a Shell Oil Company product. NO-OX-ID is made by Dearborn Chemical Co., 310 South Michigan Ave., Chicago, Illinois.)

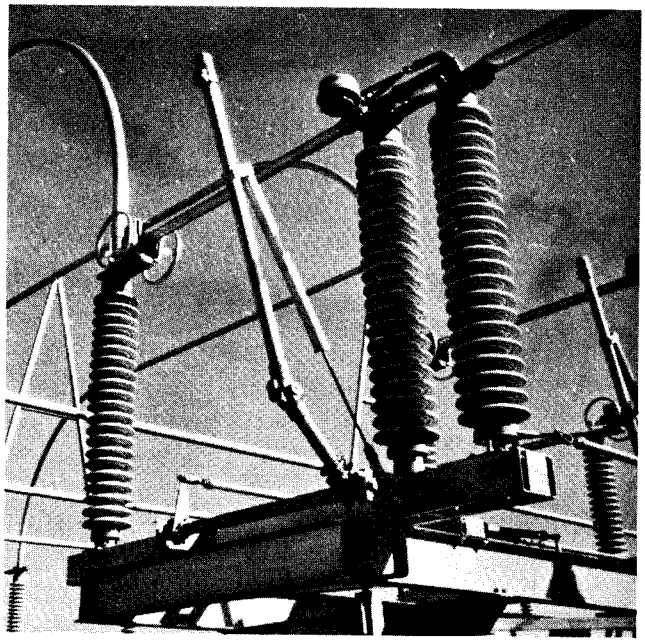
In general, operating linkages require virtually no maintenance. However, in contaminated atmospheres or where operation under sleet conditions is common, some lubrication at pivot points may be desirable. The grease used should be durable even when exposed to the elements, and should retain its viscosity over a wide temperature range.

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

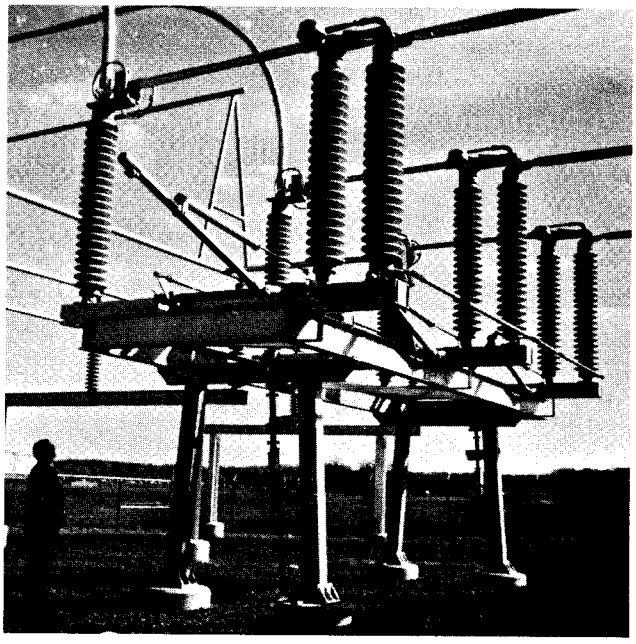
ORDERING INFORMATION

In ordering parts or in correspondence regarding this equipment, contact nearest Gould I-T-E Sales Office and state the voltage, current rating, type and the serial number as indicated on the switch name plate.

230-KV AG8 GROUNDING SWITCH INSTALLED ON TTR6 SWITCH



Grounding switch partially open during installation



Grounding switch fully open

Gould Inc., Power Systems Division
Theobold Ave., Greensburg, Pa. 15601

New 5-77 Printed in U.S.A. SG-3M

GOULD

Step 8 · Switch Operating Mechanism

Refer to the switch operating mechanism drawing for mounting the switch operator (5' swing handle, Fig. 4, or geared mechanism, Fig. 5).

Manually operate the switch using the operator supplied. Adjust the connecting rod as needed to obtain proper operation of the switch. After this test operation, leave the switch in the open position.

If the operating bearing has an adjustable crank, it is sometimes necessary to add 1/4" to 1/2" to the trial radius given on the drawings to get the required travel of the switch blades. This additional length in the crank radius allows for lost motion and clearances in pin holes. Also, it will 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 fully open or closed.

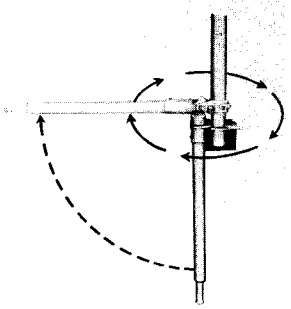


Fig. 4 Swing Handle

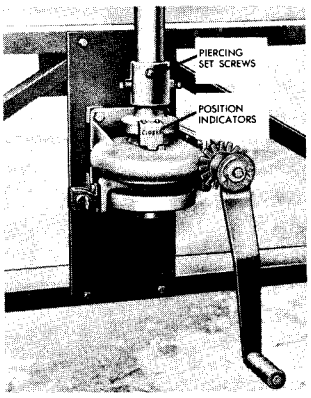


Fig. 5 Geared Mechanism

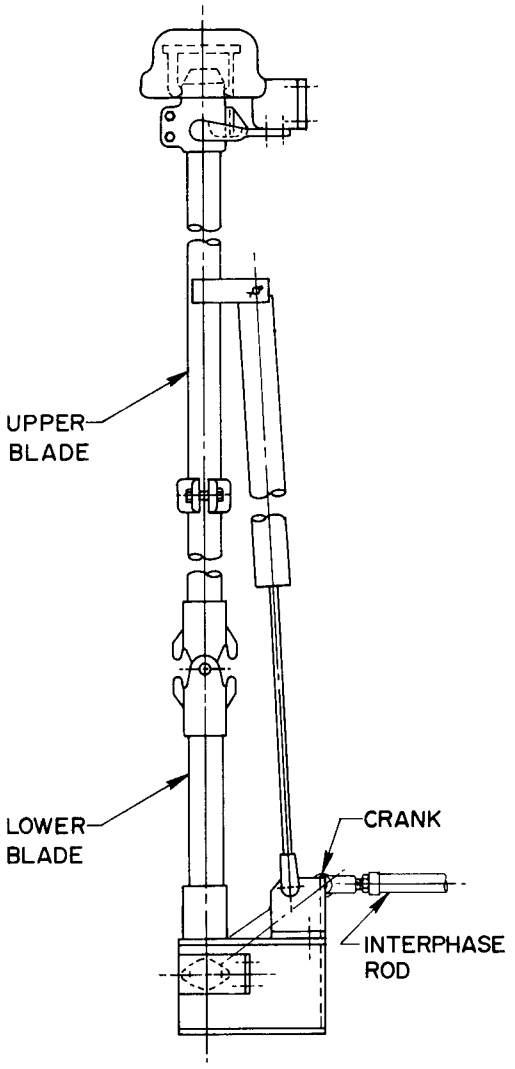


Fig. 7 Switch in fully closed position

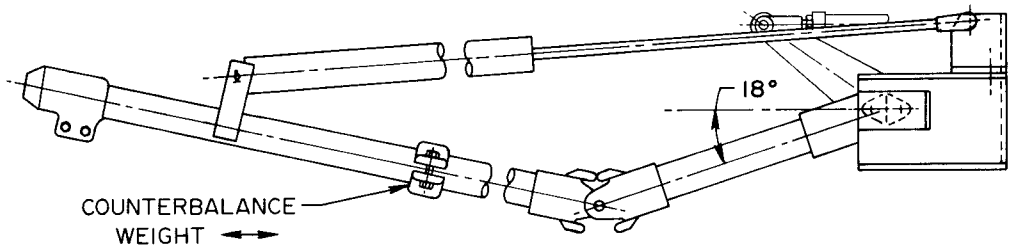


Fig. 6 Switch in fully open position

Step 9 - Installing Interphase Rods

With the other two poles in the open position, connect one interphase rod between the operating single-pole switch and the switch on the next phase. Fig. 1 shows an interphase rod connected to a switch crank. Operating manually only, adjust the interphase rod as needed to obtain proper operation of both poles. Rods in compression should be made as long as possible and rods in tension should be made as short as possible while still being able to insert the pins. Connect the remaining interphase rod between the switch not connected and the adjacent switch. Again operating manually, adjust the interphase rod as needed to obtain proper operation of the three switches. Figs. 6 and 7 show the grounding switch in the fully open and fully closed positions.

Step 10 - Attaching Ground Clamp

Clean the vertical operating pipe and apply a corrosive-resistant grease on the spot where the ground clamp is to be attached. Attach the ground clamp so the ground strap is not stretched tight when the switch is in either the open or closed position.

Step 11 - Interlocks

If Kirk key interlocks or other mechanical interlocks are to be used, install them in accordance with the instructions supplied.

Step 12 - Final Checks

Check to see that:

a. All bolts are tight and all cotter pins are bent adequately.
b. The single poles are against their individual stops in both the open and closed positions.
c. The operating effort required to operate the switch is not excessive.

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 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.

An instruction tag is attached to the terminal clamps shipped with the switches for making 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 areas with a liberal amount of corrosion inhibitor such as NO-OX-ID Grade A Special or equivalent. (3) Abrade the contact surface again, this time through the applied compound with a stiff wire brush. (4) Make connections and tighten bolts.

CAUTION - Do not remove the compound.

In making copper-to-aluminum connections: (1) Prepare all aluminum contact surfaces as described above. (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