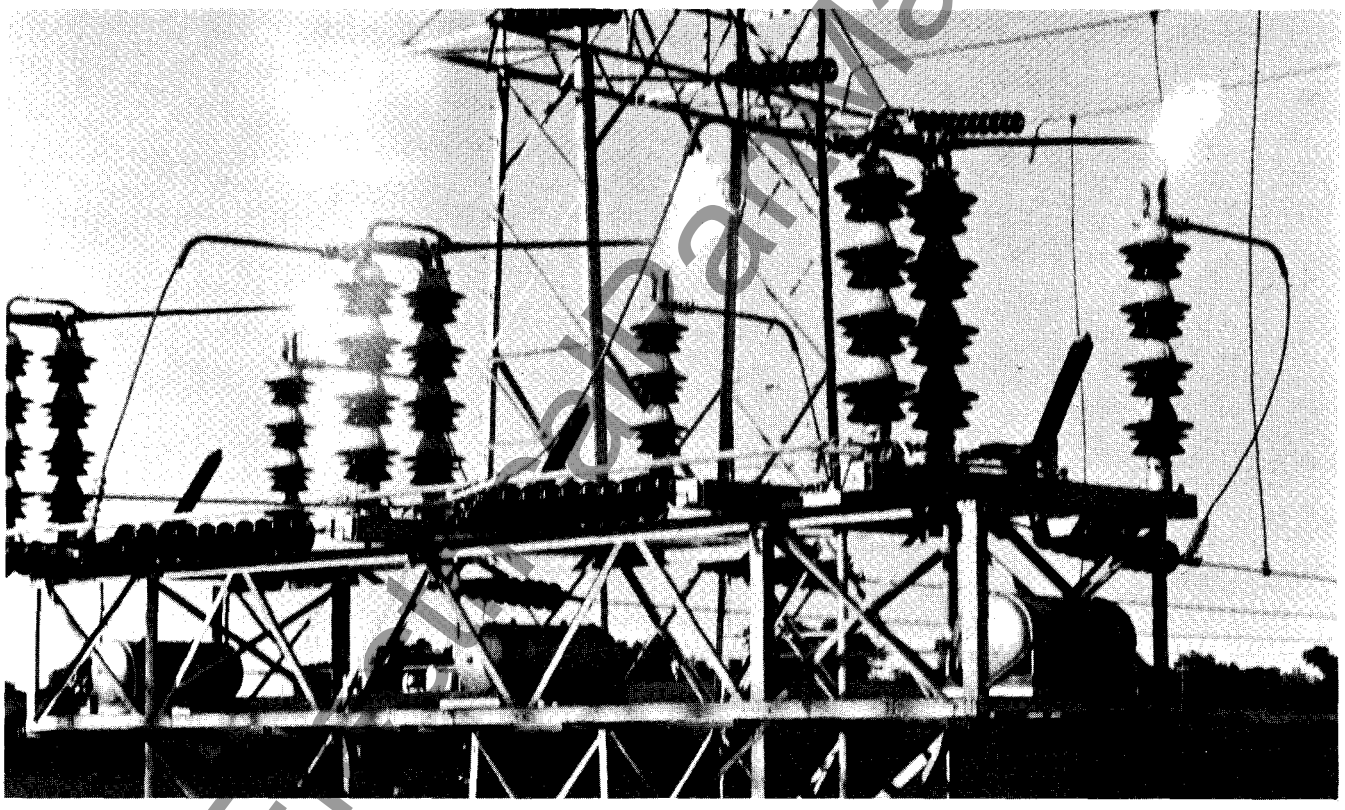
Instruction Manual

for

INSTALLATION and OPERATION

of

GAS BLAST SWITCH ATTACHMENTS



Gas Blast Tubes attached to 161 Kv Switch, shown during test operation.

BULLETIN IB-1346D

I-T-E CIRCUIT BREAKER COMPANY

INSTALLATION

1. Assemble switches on the mounting structure in the usual manner in accordance with the operating mechanism drawing provided for the installation, making any adjustments necessary to have the three switch poles operating in unison and to have the three individual blades making central entry and proper contact in the jaws.

This portion of the installation may be done independently of the gas blast attachment.

2. Assemble the movable arcing horn in the end of the blade and the stationary horn on the jaw in accordance with the instructions provided with the switches.

3. Clamp the air chute assembly supports to the switch bases (one per single pole), positioning the support as indicated on both the single pole and the installation drawing furnished.

For new installations these supports are normally clamped to the bases prior to shipment from the factory.

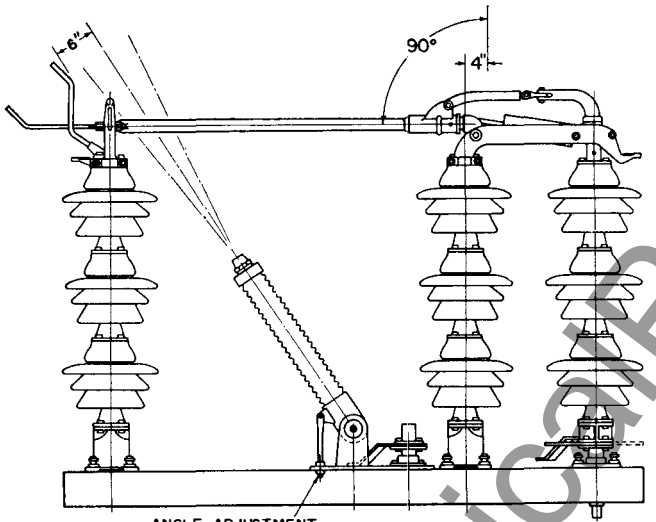


FIG. 1

Complete Single Pole Assembly of a Blast Tube on a standard Type TTR-49 air switch.

4. Mount the air chutes on the supports with the central axis of the air chutes (porcelain tubes on higher voltage switches) aimed in the direction of the switch jaws. A clevis with a jack screw effect is provided for elevating or lowering the central axis so that the central axis passes the jaw at a point approximately 6 inches above the point of separation of the arcing horns. This is clearly shown on the single pole drawing Figure 1. A relatively simple way of adjusting the elevation of the air chute axis is to fasten a chalk line or string on the 5/8" hinge bolt of the air chute assembly, stretching it to coincide with the central axis, and measuring the distance from the stretched line to stationary arcing horn.

5. Mount the three storage tanks (one provided per each single pole switch) on the structure, locating the tanks as indicated on the installation drawing, using the mounting bases that are provided with the storage tanks.

6. Assemble the quick acting valves and actuating lever assemblies to the inlet side of the air chute assembly, using the fitting that is provided, being sure that the arrow designating air flow through the valve points in the direction of the air chute assembly. Complete the plumbing system by installing the piping from each valve to its associated storage tank, the piping between storage tanks, the supply line from the tanks to ground elevation along with the pressure indicating gauge and supply valve.

7. Operate the valve actuating crank of the air chute support assembly by hand to be sure that the cam attached to this crank properly engages the roller of the valve lever assembly and to check that the cam action moves the valve stem in 3/8" (as indicated in Figure 3 for single acting gas blast switches, or in Figure 4 for gas blast switches having gas blast for both opening and closing operations.)

See figs. 3 and 4.

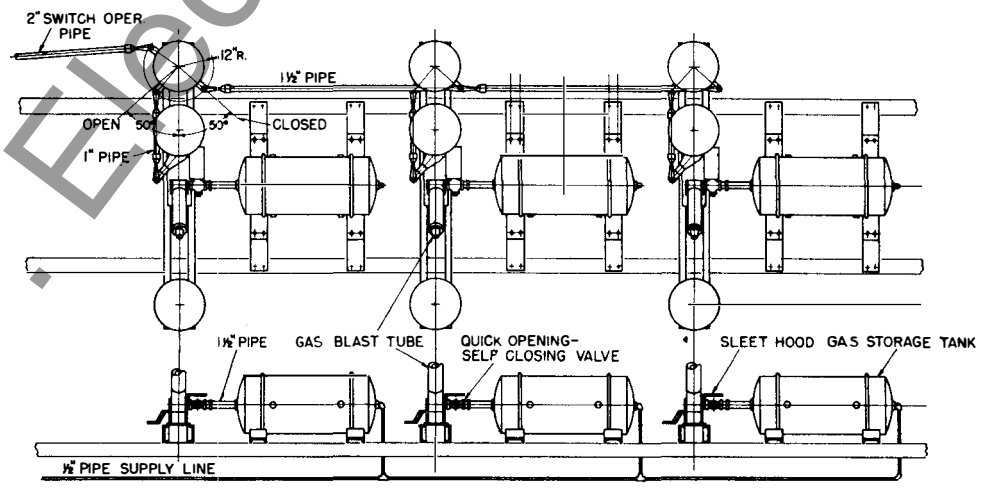


FIG. 2

Plan and elevation views of the tank installation and connection to switches. Note that the gas supply enters the tube directly through the valve. NEMA Standard phase spacing for horn gap switches applies for all gas blast installations.

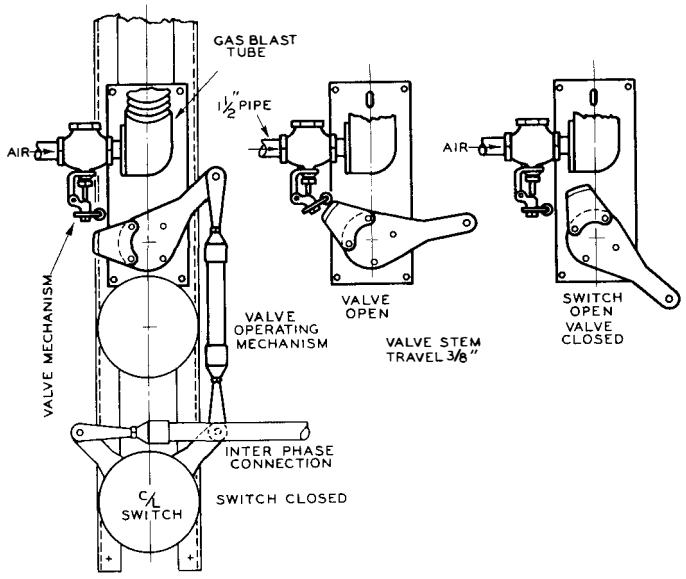


FIG. 3

Method of mounting and connecting valve mechanism gas blast attachment, single blast on opening of switch.

8. With the main switch closed, couple each main switch rotor crank to its associated valve actuating crank with the short interconnecting rods provided. The relative position of the valve actuating crank and its cam with respect to the valve lever assembly in the switch closed position is indicated in Figures 3 and 4.

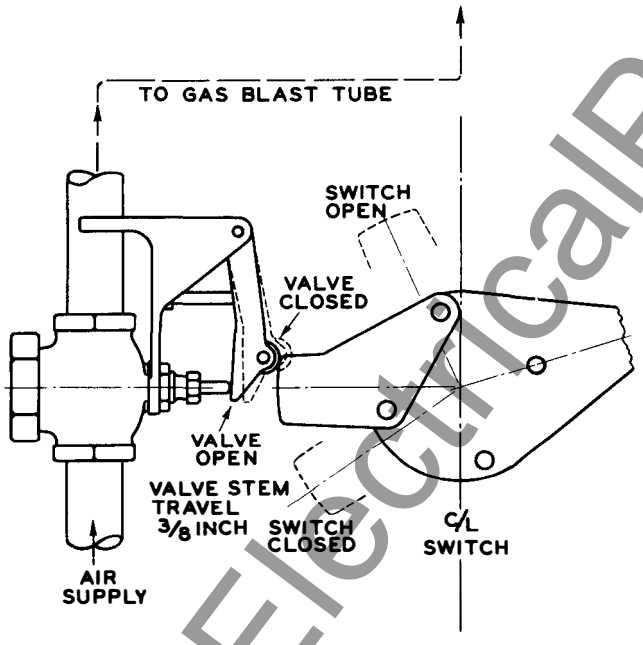


FIG. 4

Showing valve arrangement on the double blast—opening and closing of switch.

9. After the cranks of all three single pole switches have been so connected individually, the three pole switch should be operated through its operating mechanism and the mechanical operation of the valves should be checked to ascertain that the three valves act in unison and most important, that the valve stem has been moved the full amount of its travel at the point of separation of the main switch arcing horns. This check will determine that a full charge of air will be blasted into the arc stream when the switch is being opened.

The amount of crank travel necessary to move the valve stem its full amount may be varied by lengthening or shortening, as required, the short interconnecting rod that couples the main switch crank to the valve actuating crank. This adjustment may be made on each switch pole independently of the others and without altering the interphase connections of the main switch.

OPERATION

1. Gas blast switches installed and adjusted in line with the above mentioned instructions are now ready for operation under actual service conditions, except that the storage tanks must be charged with nitrogen or air prior to arc interruption.

2. Bottled nitrogen has been used to good advantage for charging the storage tanks with the arc quenching agent since it is both dry and inexpensive as well as readily available on the commercial market. The three 60 gallon storage tanks can be filled from a 200 cubic foot bottle of nitrogen to the recommended operating pressure, which will be mentioned later, leaving sufficient nitrogen in the bottle for re-charging the storage tanks for a second switch operation. Each additional bottle of nitrogen will permit re-charging the storage tanks to recommended operating pressure for at least six operations. A recommended type of regulator for use with nitrogen bottles is the one supplied by the Air Reduction Sales Co. It has an indicating gauge reading up to 3000 p.s.i. on the high pressure side, and 400 p.s.i. on the low pressure side, and a flow capacity of 4000 cubic feet per hr.

3. Recommended operating pressure may vary slightly depending on the application. Field tests have indicated that satisfactory switch performance is obtained if the gas pressure in the storage tanks at the start of a switch operation is as follows:

SWITCH RATING, KV	GAS PRESSURE IN STORAGE TANK
up to and including 69	70 - 80 p.s.i.
115	90 - 100 "
161	115 - 125 "
230	140 - 150 "

Pressure should not exceed 150 pounds per square inch. Valves and storage tanks are designed for this rating. Safety valves are recommended as indicated in Figure 5, to protect the plumbing system.

4. Initial movement of the switch operating mechanism, from the closed toward the open position (either motor or manual), releases pressure from the jaw contacts and disengages the main blade from the stationary contacts. At the point of separation of the arc horns, the valve actuating cam opens the quick acting valve which in turn releases the high velocity gas blast from the air chute nozzle. The blast continues until the main blade has been opened a predetermined amount which establishes adequate re-strike distance. The cam then passes out of engagement

with the valve actuating lever roller and the valve closes automatically under the effort of its reset spring, the valve being of the quick-acting, self-closing type. The gas blast may or may not be applied during the closing operation, depending upon the requirements of the particular application.

5. Operation of the gas blast switch is identical with that of the conventional group-operated disconnect, except that the operator must first adjust the gas pressure in the storage tanks to the proper range. Conventional manual operating mechanisms such as the crank gear and handwheel type may be used. Close proximity electrical operation may be used with equally satisfactory results if the control point is near enough the switch installation that the operator may be given an indication of the storage tank gas pressure prior to operating the switch.

6. Remote control from a point of operation a mile or several miles from switch location requires the correct application of a supervisory control system which should include the following features:

(a) Means for opening and closing the switch.

(b) Indication of the switch position at the point of control.

(c) Indication of gas pressure at the point of control.

(d) Provision for adjusting the gas pressure to the proper range from the point of control.

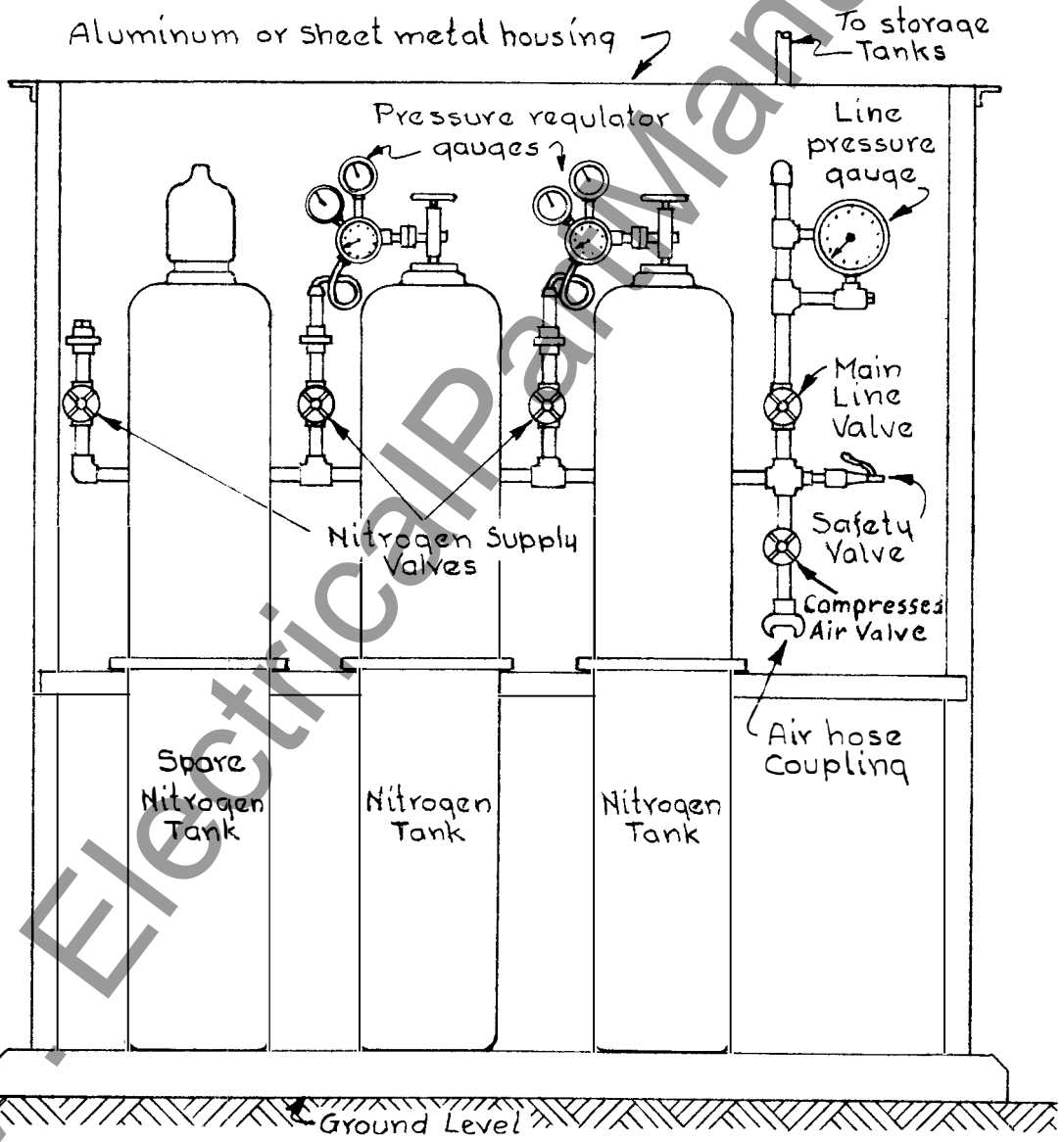


FIG. 5

Typical Housing scheme for nitrogen supply tanks as built by one utility for use with gas blast switch attachments. Equipment furnished with gas blast switches includes all plumbing connections down to, and including the Main Line Valve.

PRINTED IN U.S.A.
5C-368