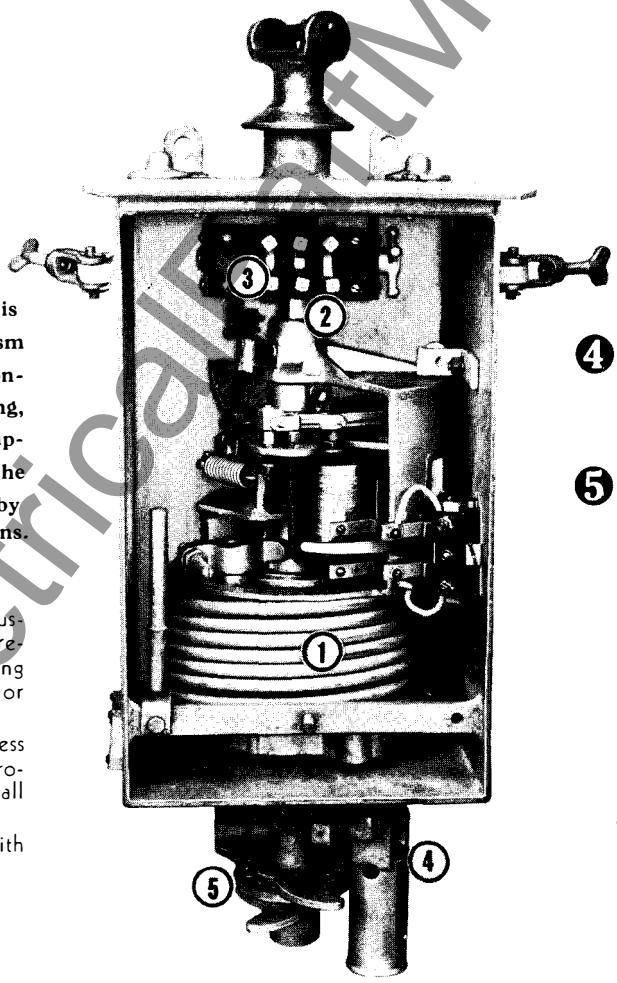
Instruction Manual

for

Type SO-2

Spring driven

SWITCH OPERATING MECHANISM



The Type SO-2 is a Spring Mechanism for the automatic operation of disconnecting switches. A torsional spring, either manually or motor wound, supplies the required stored energy for the operation which may be initiated by relays, remote control, or other means.

RELIABILITY

1. The main operating spring, with adjustable torque to suit operating requirements, encloses a "kick off" spring which provides extra torque for ice or unusual conditions.
2. Chromium plated shafts with oilless bearings eliminates maintenance and provides positive operation under all weather conditions.
3. Silver contact auxiliary switches with adjustable segments:

SAFETY

4. Trip free manual handle for rewinding spring or operating switch, eliminates any possibility of injury to operator should the switch be automatically tripped during manual operation.
5. Adjustable lock plates with provision for locking handle in either Open or Closed position.

CONVENIENCE

◆Individually hand adjustable auxiliary switch. ◆Torque of operating spring is adjustable. ◆All parts readily accessible by removal of one piece cover. ◆Switch can be manually operated at all times. ◆Can be operated from any supply source including dry or B batteries. ◆Furnished with two 1¼" conduit openings for control circuits. See page 2.

I-T-E Imperial Corporation

Instruction Manual FOR

Type SO-2 Spring Driven, Switch Operating Mechanism

General Description

The Type SO-2 operating mechanism consists of the following main components:

1. Housing
2. Operating shaft assembly
3. Hand shaft assembly
4. Operating springs
5. Latch and trip assembly
6. Trip-magnet
7. Auxiliary switch.

DIRECTION OF ROTATION OF SHAFTS

The following must be constantly borne in mind:

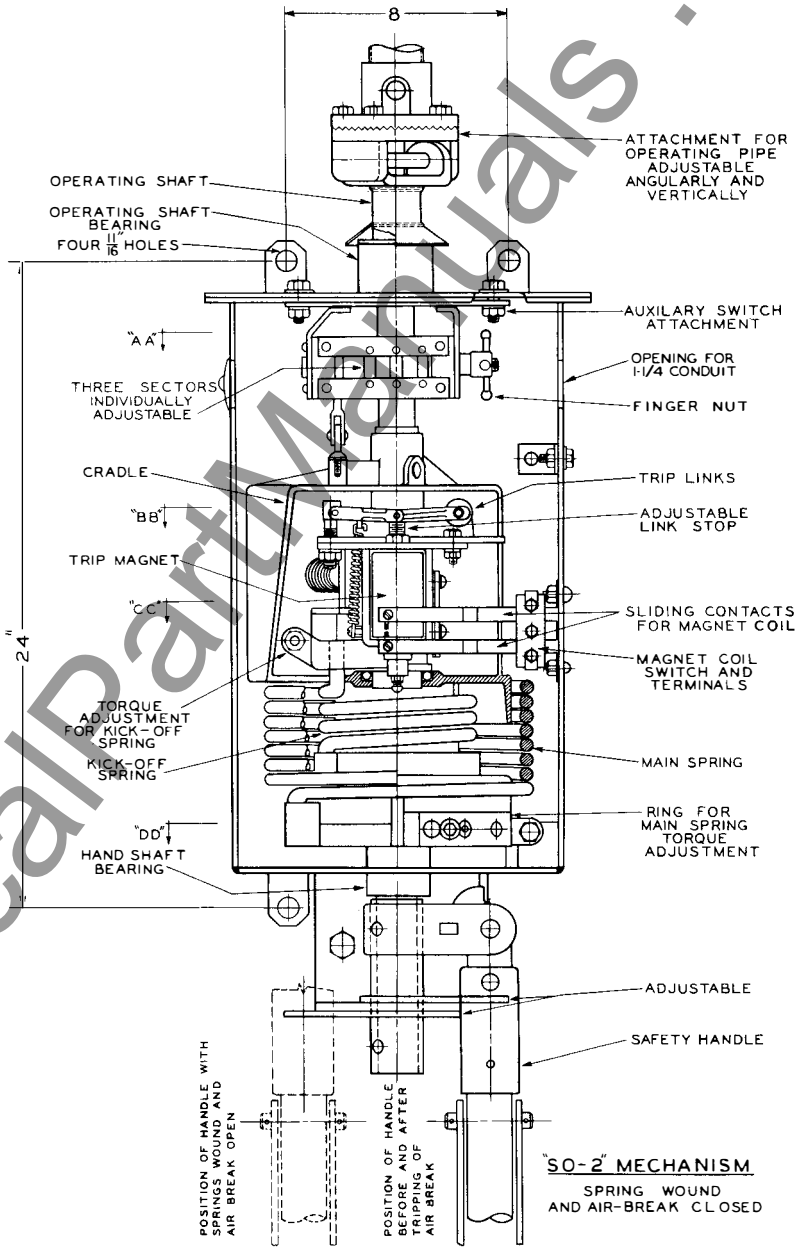
A-In tripping, only the operating shaft turns clockwise.

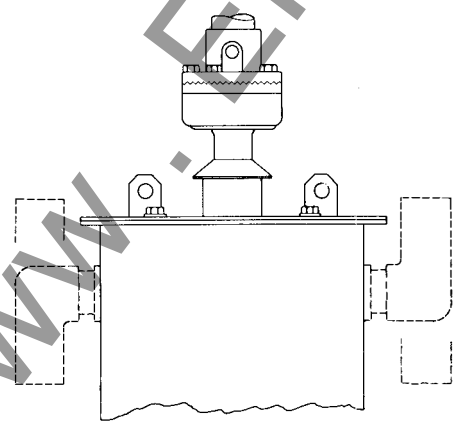
B-In rewinding of the springs, only the hand shaft turns clockwise.

C-In closing of the air break, both shafts turn counter-clockwise.

D-In opening of the air break manually, both shafts turn clockwise.

NOTE: The air break can not be closed unless the operating springs are wound.





CONDUIT ENTRANCE

Detail of suggested use of Crouse-Hinds condulet, Cat. No. LB-997 for conduit entrance.

Instruction Manual FOR

Mounting and Operating Type SO-2

IT IS IMPORTANT TO FOLLOW THESE INSTRUCTIONS CAREFULLY

1. Mount the mechanism and wind the springs with operating handle clockwise (looking from top) until latched. Do NOT TRIP the mechanism before all adjustments are made as instructed below.

2. Adjust stop bolt "SB" (bottom right hand) as follows: (Fig. 1)

operating angle see control dwg.	90°	100°	110°	120°
length "x"	2-5/8"	2-1/4"	1-3/4"	1-1/4"

WHEN MECHANISM OPERATES TO TRIP THE AIR-BREAK SWITCH OPEN, PROCEED AS IN PARAGRAPHS 3a AND 4a.

WHEN MECHANISM OPERATES TO TRIP THE AIR-BREAK SWITCH CLOSED, PROCEED AS IN PARAGRAPH 3b.

PARAGRAPHS 5 to 10 REFER TO BOTH CASES.

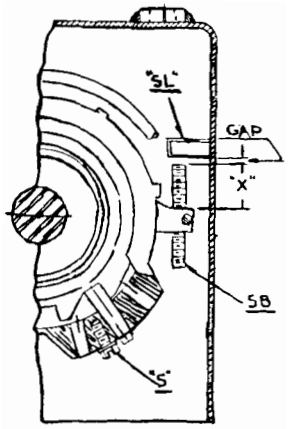


FIG. 1

3a. Operate mechanism with handle until stop bolt "SB" (Fig. 1) is about 1/2" away from stationary stop "SL". Leave it in this position. Close the air-break switch properly by operating directly at base of rotating insulator stacks; set stops on switch bases and connect the torsional operating pipe, first to switch rotor and then to angularly adjustable coupling at mechanism shaft.

3b. Operate mechanism with handle until stop bolt "SB" (Fig. 1) is about 1/4" away from stationary stop "SL" and leave it in this position. Open the air-break switch properly by operating directly at base of rotating insulator stacks. Set the stops at switch bases and connect the torsional operating pipe, first to switch rotor and then to angularly adjustable coupling at mechanism shaft.

4. Open air-break switch by means of operating handle at mechanism and then close again. If stop bolt "SB" interferes with proper closing of the air-break switch -- that is, if the stop bolt does not permit sufficient winding of the operating pipe - proceed as follows: Open switch again and disconnect couples at lower end of operating pipe from mate at mechanism shaft. Then close the switch a few degrees by operating directly at base of rotating insulator, and reconnect coupling. Repeat this procedure until the gap (Fig. 1) is about 1/4" with air-break switch properly closed. THE DIMENSION "X" MUST REMAIN AS SET IN PARAGRAPH 2.

5. Operate air-break switch by hand several times and notice whether there is any binding in the bearings due to distortion in mountings of the mechanism. Correct by shimming the mounting lugs.

6. Adjust JAWS OF LOCK PLATE so as to be able to lock the handle in open and closed positions of the switch.

7. Attach BATTERY LEADS to the two binding posts marked "+" and "-", close the switch (if the switch is automatic opening) or open the switch (if it is automatic closing), lock handle to lock-plate, and operate by completing the circuit.

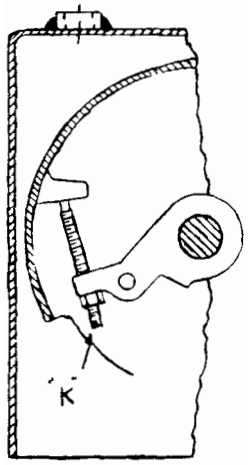


FIG. 2

8. There are TWO OPERATING SPRINGS, one inside of the other. The mechanism is shipped with both springs PARTLY WOUND. The inner spring acts only through a maximum of 30 degrees and its purpose is to help to break ice or to overcome stiffness due to cold weather. TO WIND THE INNER SPRING, TRIP THE MECHANISM and screw stud "K" (Fig. 2) in crank to which the upper end of the spring is attached. Lock with lock nut.

TO WIND THE OUTER (MAIN) SPRING, TRIP THE MECHANISM, take out cap screw "S" (at bottom of mechanism - Fig. 1) which holds the locking pin in place, insert the spring winding rod, which is held loosely in socket at left-hand lower corner (see paragraph 11) into one of the vacant holes, and wind clockwise (looking from top) at the same time applying a light pressure to the end of

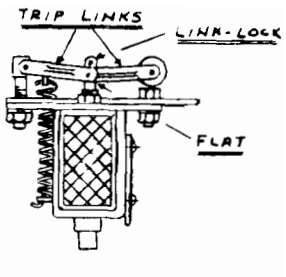


FIG 3

the locking pin with finger. The pin will thus drop into position when the next locking notch is reached. Four notches are provided and they can be seen from underneath the rotating drum.

9. Above the magnet coil and directly in front of the mechanism (when it is in position ready to trip) there are two broken-down bronze TRIP LINKS. The middle point of these links rests on a stud through the coil, which is so adjusted that the middle point is about 1/16" lower than the ends of the links. If it is desired to have the mechanism work at a voltage lower than that for which it is set, TRIP THE MECHANISM, loosen lock nut on top of stud supporting the links, screw up the stud, and lock with lock nut. There is a flat on the end of the stud for a wrench. The links must always be broken down sufficiently to prevent tripping by vibration.

10. To adjust the AUXILIARY SWITCH rotating contacts, unloosen finger nut and turn contacts to the desired position. Each contact can be adjusted individually without disturbing the others. TIGHTEN back finger nut with fingers.

11. To prevent mechanism from tripping accidentally while work is being done on it or on the line, remove "spring winding rod" from socket at left hand lower corner and insert short end of it into hole just behind the center of the broken-down trip links until the conical section of the rod comes in contact with the links. The cover cannot be replaced as long as the rod is in this position.

Application of Type SO-2 Spring Actuated Switch Operating Mechanism to an automatic sectionalizing installation.

In this operating scheme the air switch is normally closed. When the oil circuit breaker trips, the loss of voltage

at the potential transformer causes the air switch to open. The stored energy of the Type SO-2 Mechanism is sufficient to open the switch, but it is closed manually, thereby resetting the spring mechamism.

Note that the SO-2 Mechanism and relay cabinet may be mounted adjacent to each other on the pole.