

Instructions for Load Break Air Switch, Type LBF, for Power Centers



I.L. 47-066-18A

The Westinghouse Type LBF Switch is an air insulated, gang operated, three pole, two position link type load interrupter switch. The switch is mounted in a separate free standing compartment which can be bolted to air cooled or liquid filled power center transformers. See Fig. 1. LBF Switches, 5 KV or 15 KV, will interrupt load currents of 600 amperes. In addition, the LBF Switch will close on fault currents of 61,000 amperes at 5 KV and 40,000 amperes at 15 KV.

At times a feeder selector switch and an LBF switch are combined within a single enclosure. In these cases the feeder selector switch is located in a separate compartment immediately to the rear of the LBF Switch in the same housing.

OPERATION

LBF Switch. The small operating mechanism door must be unlocked and the operating handle withdrawn from the receptacle at the right hand of the opening. Insert the handle into the socket provided in the operating cam and move the handle to the desired position. The operating mechanism is powered by torsion bars, and will not move the blades until the handle is advanced beyond a certain point. At this time, the blades will move at a predetermined speed which is independent of the operator.

Feeder Selector Switch. In specific cases, a no load feeder selector switch is coupled to an LBF Switch. To operate the feeder switch, first place the LBF Switch in the open position, using the procedure outlined above. A mechanical interlock is thus released so that the main LBF Switch door can be opened, revealing the feeder switch operating handle. Pivot the feeder handle hand grip to disengage the locking pin, and rotate the handle 180° in the direction indicated to select the proper feeder.

Since the feeder switch is a no load switch, speed of operation is not essential to opera-

tor safety. However, to insure good contact when changing feeders, first disengage the contacts, then rapidly and forcefully rotate the operating handle to the desired feeder position.

Fuses. To gain access to the fuses, first place the LBF Switch in the open position. This action releases the mechanical interlock so that the main LBF Switch door can be opened, revealing the fuses in the bottom portion of the compartment. Use caution at this point to be certain the transformer is not energized by an additional source of power, either high voltage or low voltage. The switch cannot be reclosed until the main door has been closed.

INSTALLATION

During the installation of the switch, a general inspection should be made for shipping or handling damage. The switch should be operated several times to check the blade alignment and operating mechanism. Check the key interlock if supplied to be certain the switch and breaker interlocks are keyed alike.

MAINTENANCE

The LBF Switch and feeder selector switch, if supplied should be inspected a minimum of once a year. The following points should receive special care during the inspection:

1. Main Switch blade contacts.
2. Quick-break blade contacts.
3. Arc chutes.

All blades with burned or pitted contacts should be replaced to insure trouble free operation. Arc chute erosion, and/or burned quick-break blade contacts would indicate burned arc chute contacts, requiring replacement of the arc chutes.

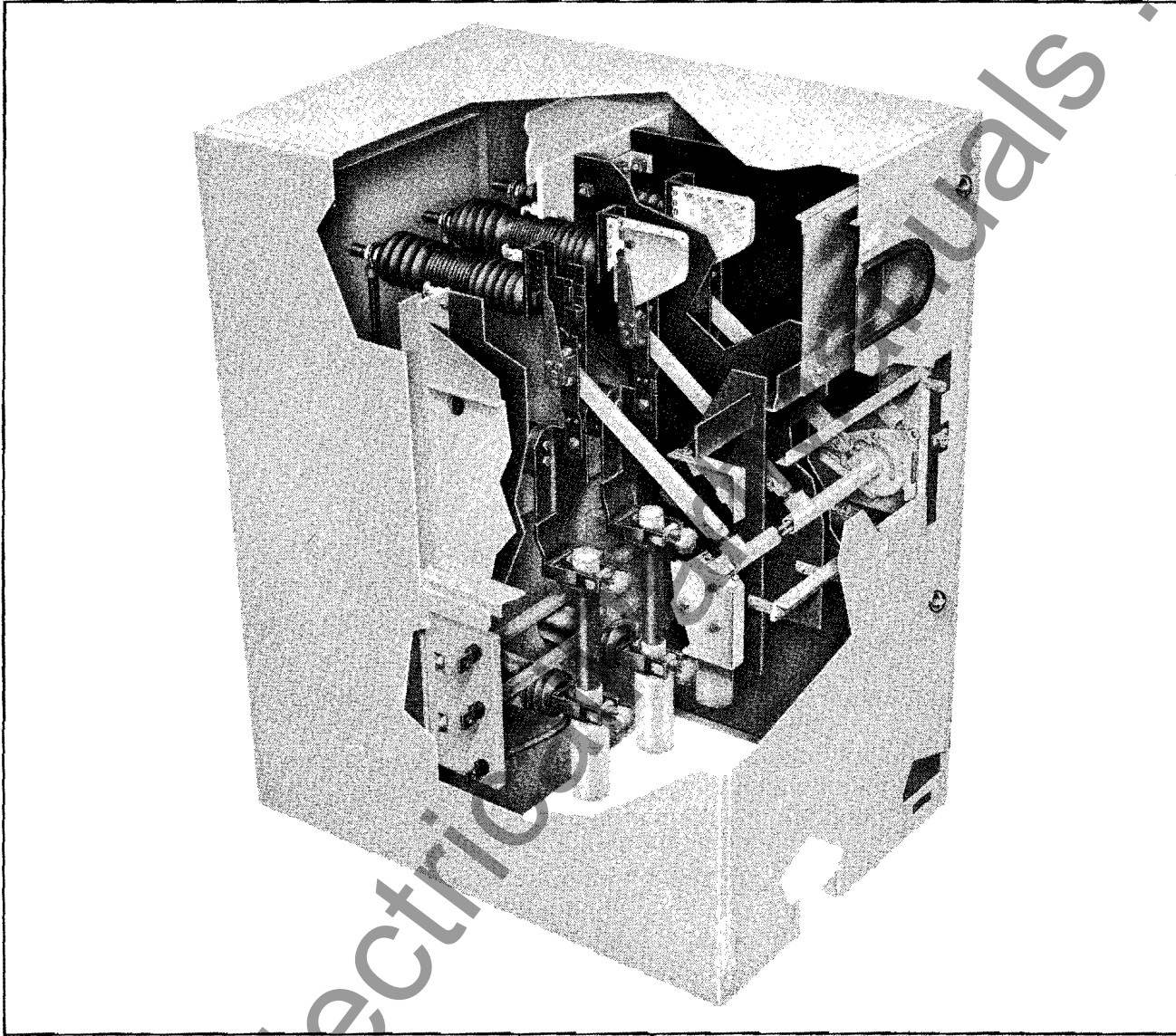


Fig. 1 Load Break Air Switch, Type LBF

RENEWAL PARTS

If renewal parts are required, order from the nearest Westinghouse Sales Office, giving

description of parts wanted, with transformer serial number and rating as stamped on transformer instruction plate.

Westinghouse Electric Corporation
Power Transformer Division, Sharon, Pa.

Printed in U. S. A. (W.E.)

for Interrupter, Switch for and Power Centers



1.1. 47-066-29

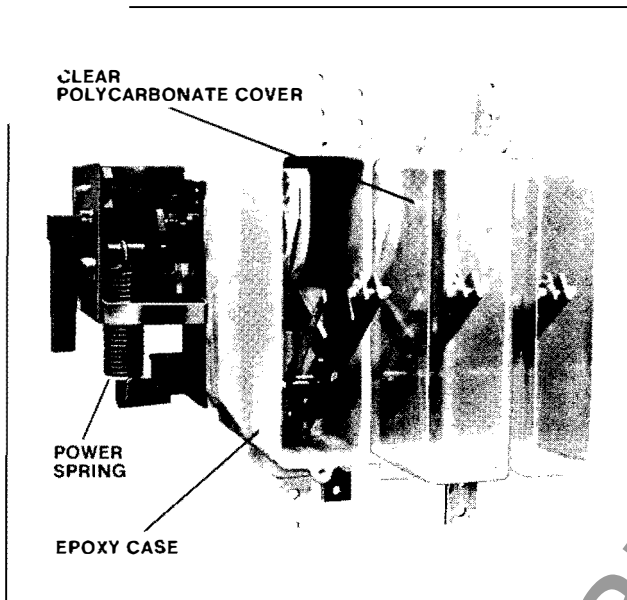


Fig. 1 Molded Power Switch (One Cover Removed)

GENERAL INFORMATION

The molded power switch is a three-pole, air insulated, current interrupter switch with a molded epoxy case. The switch may be used with either air cooled or liquid filled transformers and bolted to pad mounts or power centers. The switch is designed to be manually operated to interrupt load currents of 600 amperes at 15 KV. The switch will close on fault current of 40,000 amperes RMS asymmetric at 15 KV. It has been designed in accordance with the A.N.S.I. and N.E.M.A. standards. The design of the switch requires operation within a metal enclosure.

DESCRIPTION

The basic components of the molded power switch are as follows:

Molded Epoxy Case — The switch blades and interrupting arc-chutes are enclosed by an epoxy case and polycarbonate covers. This arrangement provides additional insulation between phases and ground such that the required open air distances are reduced. The covers are vented to permit any ionized gases to escape. See Figure 1.

Main Blades and Contacts — The main blades are copper with the contact ridge formed in one end. They are equipped with silver-tungsten pre-arc contacts to make their performance burn free. See Figure 2, Page 2.

Load Interrupter — These are comprised of a quick-break blade, torsional spring and arc-chute.

Operating Mechanism — The operating mechanism consists of a power spring connected to the crank. When the manual crank is turned, energy is stored in the spring until a predetermined position is reached. At this time the manual crank is released and the energy is transmitted to the blades by glass-polyester connecting rods.

OPERATIONS

With the switch in the closed position, the current flows in the main blades. For operations, the small operating mechanism door must be unlocked and the operating handle removed. Insert the socket of the handle over the operating shaft of the mechanism. By moving the handle in the desired direction, the power spring is stretched until a certain point is reached. At this time, the stored energy of the spring releases the operating handle and snaps open the main contact blades. The current continues to flow in the quick-break blade until a predetermined position of the main blade is reached. At this point, the torsional spring at the pivot snaps open the quick-break blade. The arc drawn within the arc-chute is quickly extinguished by the heat of the arc releasing a blast of de-ionized gas from the gas generating material within the arc-chute, and the high speed of the blade by combination of the main blade speed and rotation by the torsional spring. Closing operations are similar with quick-break and main blades making initial contact on silver-tungsten contacts.

STORAGE AND HANDLING

When storing these switches, they should remain in their original packing cases. They should be protected from weather, dust and similar conditions.

Care should be taken when unpacking the switch to prevent damage. Dust, moisture, and packing material should be removed from the contacts, interruption chambers, and blades.

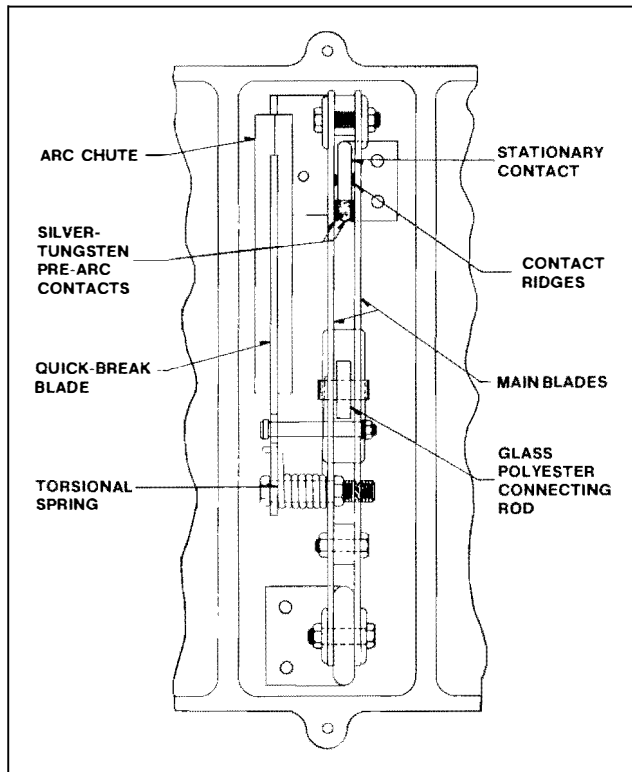


Fig. 2 Main Blade and Quick-Break Blade

When welding, sanding, drilling, filing or sawing operations are performed nearby, the casing and mechanism should be covered and kept clean.

ADJUSTMENTS

Each switch has been adjusted and tested at the factory. Additional adjustments should not be necessary; however, the following inspections may be made to insure adjustments have not been altered during shipment and handling.

- a. To assure contact along the entire length of the contact ridge in the main blades, a 2-mil feeler gauge shouldn't slip between the main blades and the stationary contact.
- b. Adjust contact pressure on both ends of the main blades by tightening the bolts .75 turn past the position where play is eliminated.
- c. Before tightening the mounting bolts of blade assembly, main contact and arc-chute, adjust alignment to assure that all parts close and open smoothly. It is recommended that the connecting rods be disconnected for this operation.
- d. Adjust the adjusting bolts in the stop so that, with the switch open, the tip of the main blades extend 13.25 inches from the epoxy mounting surface; and closed, the blades are 1.06 inches above the epoxy mounting surface.
- e. At least two no-load operations of the mechanism should be made to insure smooth operations of the switch.

MAINTENANCE

Inspection and Cleaning — It is recommended that the switch be inspected at a minimum of every 50 current interruptions or once a year, whichever occurs first. The epoxy case, arc-chute, quick-break blade, and main blade should be cleaned of dust or any foreign material which might be deposited on them. The contact ridge on the main blades should not be filed or abraded, which could cause excessive wear and perhaps galling on the stationary contact.

The quick-break blade should be inspected to determine if excessive carbon, damage or blade misalignment has occurred to either the blade or the silver-tungsten contacts. If either is damaged, the arc-chute should be assumed to be damaged; therefore, both the arc-chute and the quick-break blade should be replaced. If excessive carbon deposits are found, replace the arc-chutes. Misalignment may be corrected by slightly bending the blade back into its original position so that the blade strikes the slit in the arc-chute. The torsional spring at the pivot of the blade should be inspected to determine if it is broken. If it is broken, it must be replaced before the switch is placed in service.

The stationary contacts, pre-arc contacts, main blades, and contact ridge should be inspected for damage or misalignment. If damage has occurred, the part should be replaced. If misalignment is discovered, disconnect the glass-polyester connecting rod, loosen and move stationary contact in line with the blade. Tighten the stationary contact bolts and connect the connecting rod.

Inspection of the glass-polyester connecting rod should be made around the pins. If cracks or breaks are found, the rod must be replaced.

The mounting bolts should be inspected to determine if vibration has loosened them. They should be tightened until they hold the switch firmly in place.

When inspections are complete, refer to "Adjustments" on this page.

Replacement Schedule — It is recommended that the main blades, arcing blades, arc chutes and stationary contacts be replaced at the completion of 500 operations because of mechanical wear. The periodic inspection suggested in "Inspection and Cleaning" may indicate replacement of certain parts prior to this mechanical limit because of varying service and environmental conditions.

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RENEWAL PARTS

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Westinghouse Electric Corporation

Small Power Transformer Division
South Boston, Virginia

Instructions for Interrupter, Molded Power Switch for Pad Mounts and Power Centers



I.L. 47-066-29

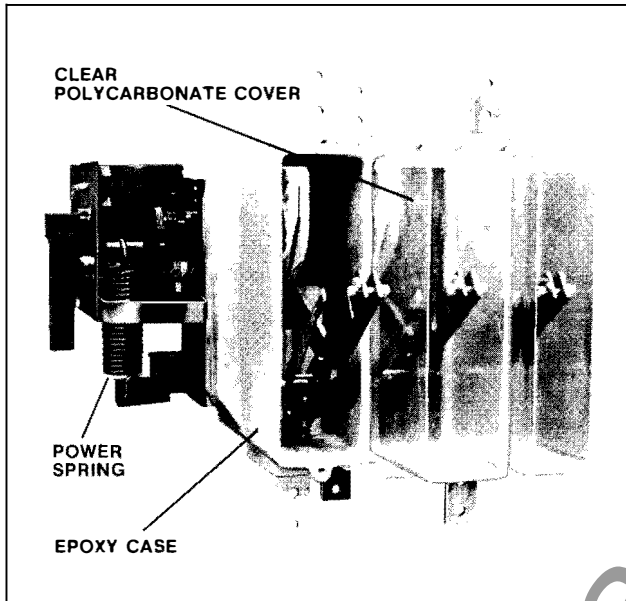


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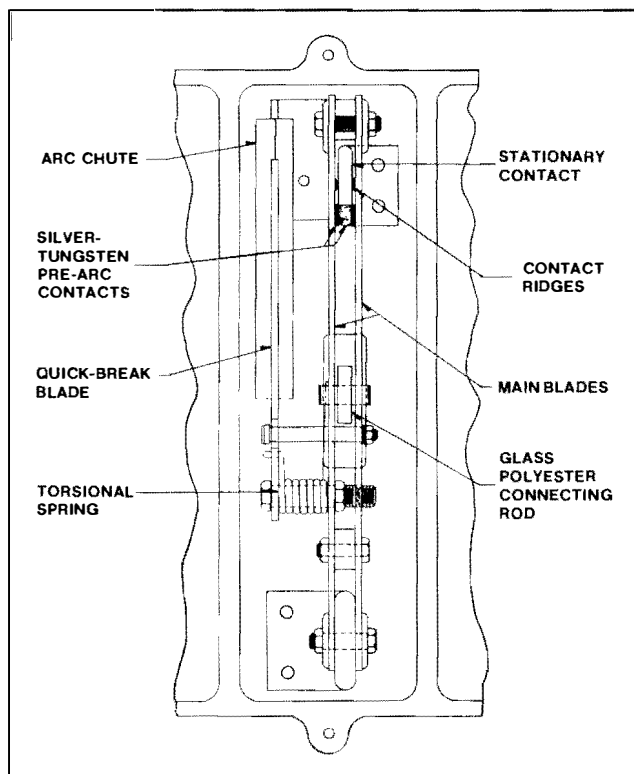


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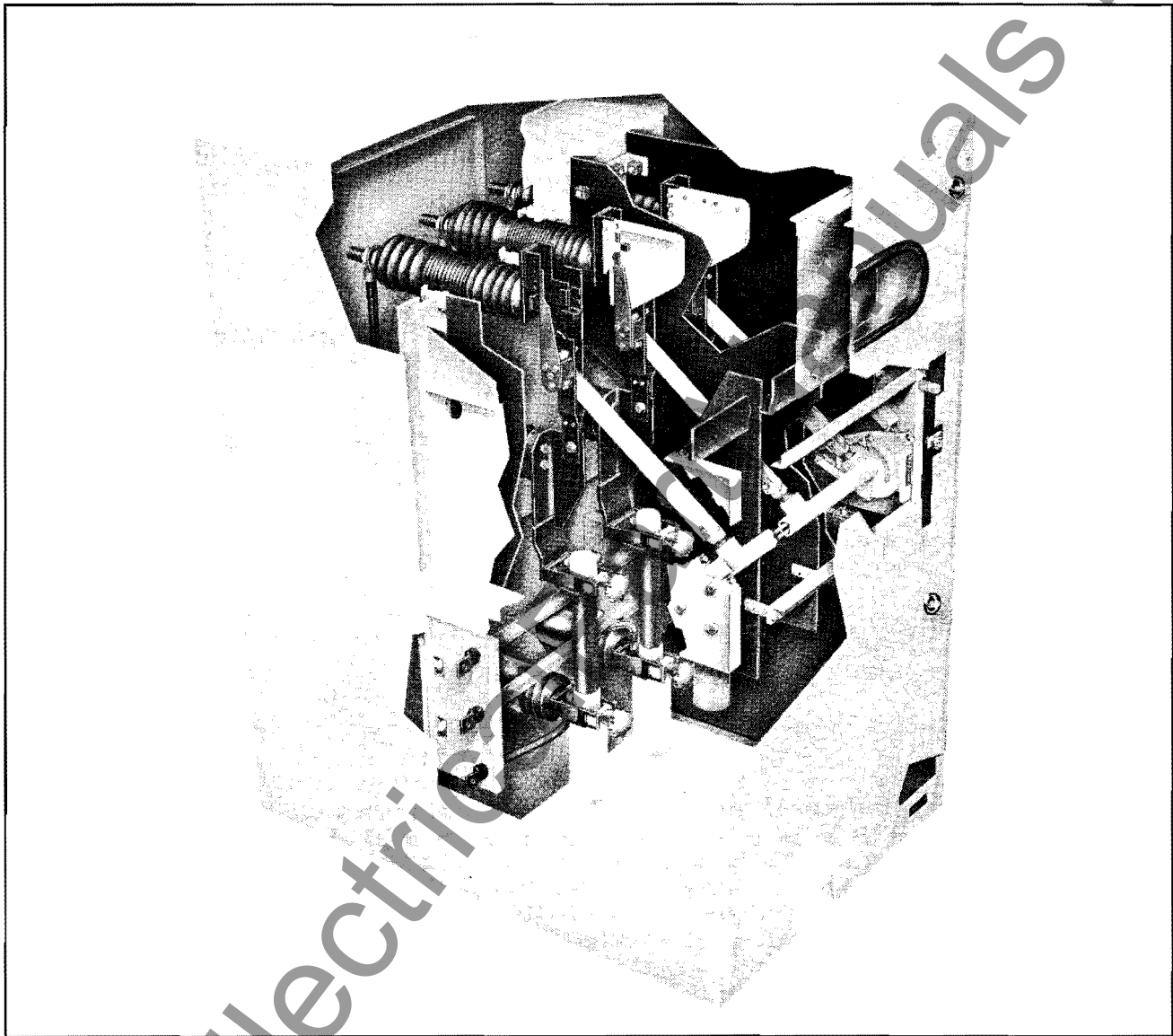


Fig. 1 Load Break Air Switch, Type LBF

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