

I.T.E. CIRCUIT BREAKERS REPLACEMENT PARTS AND PROCEDURES

1. GENERAL

1.01 This section covers the information necessary for ordering parts to be used in the maintenance of the manually operated types UX, J, EL, W, and LL, and solenoid operated types W and LL, I.T.E. plain overload, plain reverse current, or overload and reverse current circuit breakers in accordance with specifications KS-5105, KS-5105-01, KS-5181 and KS-5181-01. It also covers approved procedures for replacing these parts.

1.02 Part 2 of this section is called Replacement Parts and covers the various parts which may be replaced in the field in the maintenance of this equipment. Aside from screws, nuts, bolts and other small parts which can be obtained locally, the parts not designated herein are of a character which should ordinarily not be replaced by the regular maintenance forces. Part 2 also contains explanatory figures showing the different parts.

1.03 Part 3 of this section is called Replacement Procedures and covers the approved procedures for the replacement of the parts listed under Part 2.

2. REPLACEMENT PARTS

2.01 The figures included in this part show the various replacement parts in their proper relation to other parts of the apparatus with their corresponding names.

2.02 When ordering parts for replacement purposes all parts shall be ordered by giving the name, describing the part fully, and giving the circuit breaker nameplate data in full. When ordering coils, the data marked on the end of the coil should also be given. For example, Pair of Reversal Shunt Coils for Circuit Breaker Type LL, No. 18789, Amps. 500, Volts 24 D-C., Coils marked 24 V. 3100T, 26 Ohms.

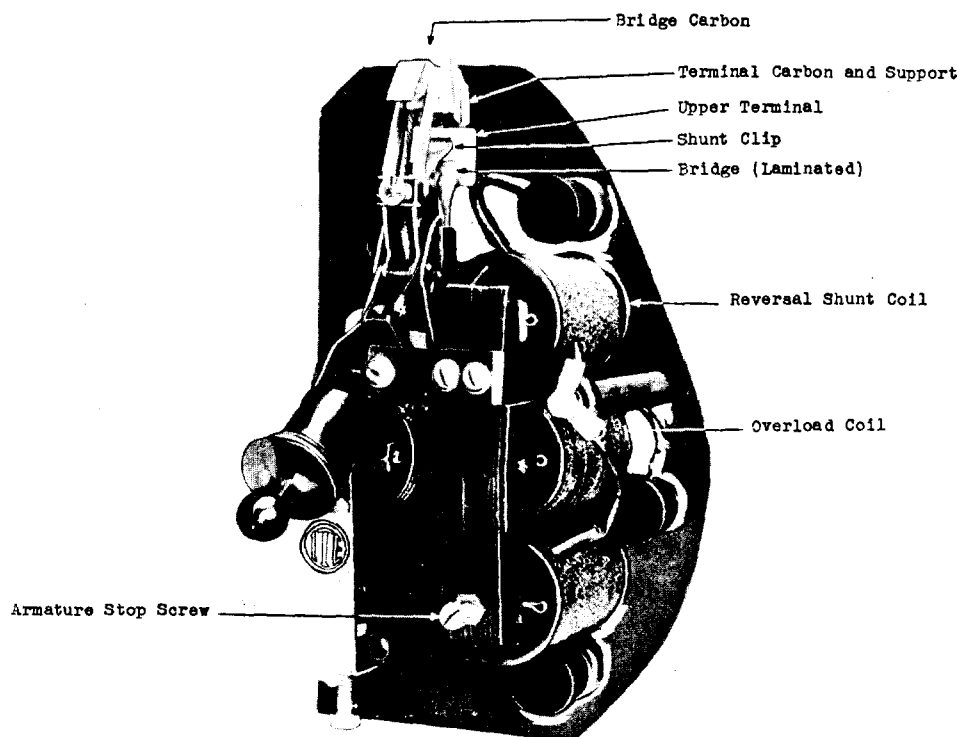


Fig. 1 - Types UX and J Breakers - Overload and Reverse Current, (Type J shown)

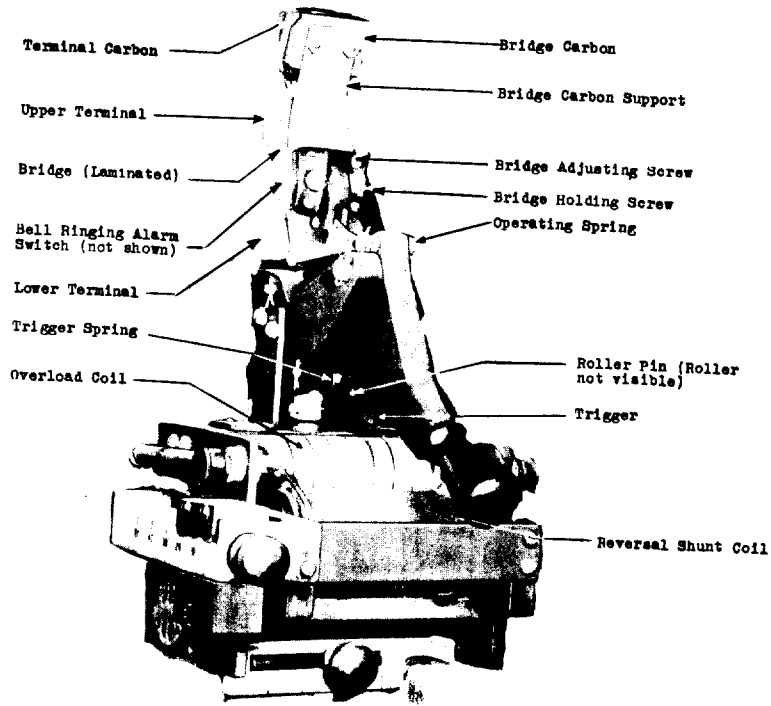


Fig. 2 - Type KL Breaker - Overload and Reverse Current

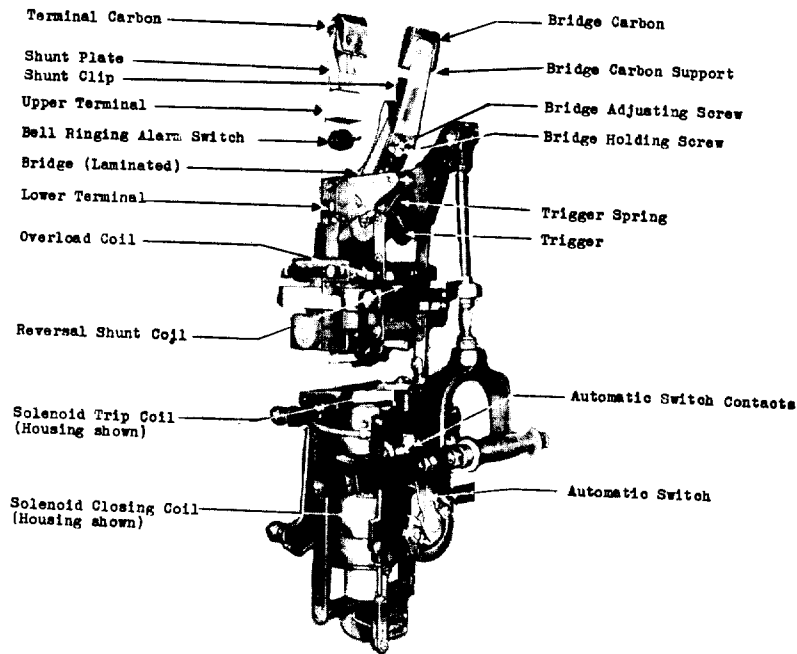


Fig. 3 - Type W Breaker - Solenoid Operated

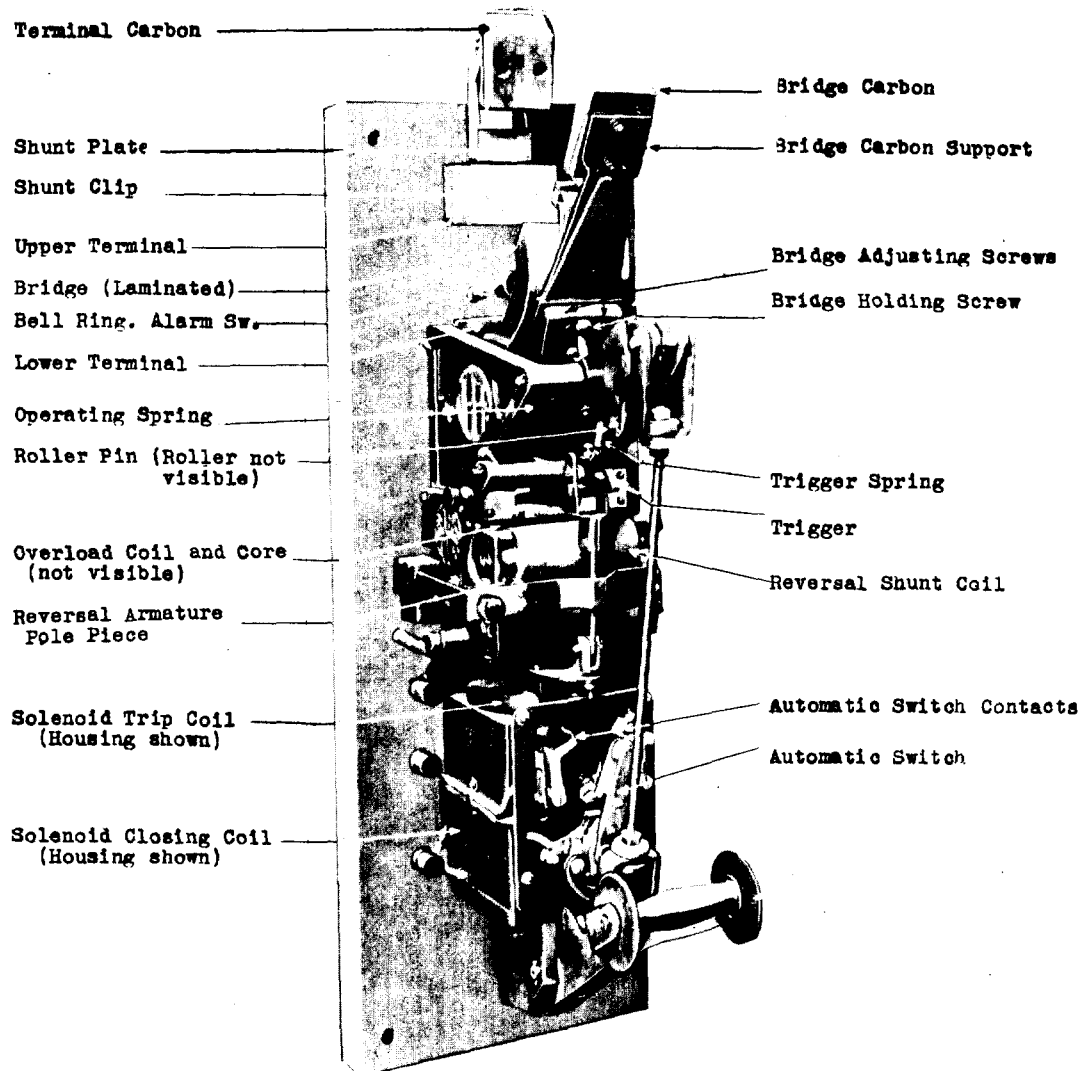


Fig. 4 - Type LL Breaker - Solenoid Operated

3. REPLACEMENT PROCEDURES

3.001 List of Tools and Materials

Tools

Pliers, P-long nose, 6-1/2", A.T. & T.Co.
Std. Spec. 6267

Screw-drivers as required

Wrenches, open end, flat, as required

Materials

Cloth, Twill Jean, KS-2423 or equivalent

3.002 Always disconnect the circuit breaker from the circuit when making replacements. This may be done by opening switches where provided or by removing leads.

Do not open bus bar connections unless no other means of disconnecting the circuit breaker from the circuit is available. Circuit breakers in grounded conductors may be disconnected by opening the leads from the ungrounded conductors to the coils.

Note: Plants equipped with ground potential compensators have a neutral conductor corresponding to the ground conductor of plants not so equipped. This neutral must be considered as an ungrounded conductor since its potential may be considerably above that of the framework ground.

3.003 After making a replacement, check the circuit-breaker to see that it meets the requirements specified in Apparatus Requirements and Adjusting Procedures for this equipment.

3.004 No replacement procedures, except for the reversal shunt coils and associated armature are specified since the procedures are not difficult to perform.

3.005 It is not believed enough advantage can be gained in the operation of the breaker to warrant replacing reverse current coils having machine voltage ratings (namely 30, 33, 65 or 175 volts) with coils of the corresponding battery rating (24, 48 or 130 volts) unless the coil is defective. However, when new shunt coils are installed they should be ordered for a voltage corresponding to the associated battery rather than the machine rating.

Reversal Shunt Coil

3.01 Type LL: To replace the reversal shunt coils, which should always be replaced in pairs, disconnect the shunt coil leads from the terminals, and remove the cross-piece fastened to the outer ends of the reversal armature. After removing the cross-piece the left hand pair of screws may be replaced to support the calibration plate. Remove the flat head screws holding the two shunt coil cores to the side plates, loosen the set screws holding the coil bobbins in position and remove the coils and cores. If the cores are held tightly in position back off the large round-headed screws at the top of the side plates to free them. Replace the coils with the green and black leads at the same ends as on the coils removed. When a common binding post is not provided, solder and tape the adjacent coil ends and press the joint back clear of the armature. Reassemble the parts as a unit, being careful to insert the coils in their original positions. When one core has two small brass pins or stops, one in the center of each end of the core, this core should be placed at the top in reassembling. Tighten the round headed screws in the side plates if these have been loosened. Clamp the coils in place by means of the set screws so as not to interfere with the armature. After reassembling, check the adjustment of the pivot screws.

3.02 Types W and EL: To replace the reversal shunt coil, disconnect the coil leads from the terminals. Remove the reverse current calibration scale, slider and adjusting screw as a unit by removing the two screws in the front and the two screws in the rear holding these parts in position. In type W breakers remove the tripping rod to the circuit breaker latch from the overload device and in addition, in the case of solenoid operated breakers, remove the trip rod of

the solenoid feature. This is done by removing the cotter pin at one end of each rod and the shoulder screw at the other. Loosen the lock nuts on the pivot pins, and remove the pivot pins. Remove the screws holding the armature to the striking pin support and remove the armature assembly. Loosen the set screw holding the coil in position and remove one of the pole-piece screws. Replace the coil with the green and the black leads at the same ends as the removed coil and reassemble the parts. Tighten the pivot screws so that the armature moves freely but is held securely in place and tighten the lock nuts on the pivot screws to hold this adjustment.

3.03 Type J or UX: To replace the reversal shunt coils which should always be replaced in pairs, remove the armature hinge pin and the armature of the reverse current feature. Disconnect the shunt coil leads from the terminals. Remove the coils and replace them with the green and the black leads on the same ends as those of the coils removed and reassemble the unit.

Reverse Current Armature Core and Associated Pole-pieces

3.04 Type LL: To replace the series coil core or reverse current armature pole-pieces disconnect the external leads from both the end plates. Remove the reverse current calibration plate and cross-piece fastened on the outer end of the pole-pieces. Remove the shunt coils and cores as outlined above. Remove the end plates on both sides and then remove the screws holding the pole pieces to the series coil core and remove the pole-pieces and core. In reassembling adjust the pivot screws in the end plates so that the core and pole-pieces are centered as regards the coil and so that the armature does not have excessive play, yet moves freely. Some reverse current cores have the two supporting screws at each end drilled off the center line. Select the position which will avoid scraping between the core and the inside of the series reverse current coil.

3.05 Other Types: Experience in the field has indicated that the aging of the iron in the magnetic circuit is only of such magnitude as to cause trouble with older breakers and then not in all cases. The procedure to be followed is similar to that described for replacing the shunt coil winding. New iron for the core and pole-pieces may be ordered through regular channels by giving the nameplate data of the breaker or the old iron parts may be returned to the breaker manufacturer for re-annealing.

Bell Telephone Laboratories, Inc.