

## CUTLER-HAMMER AUTOMATIC REVERSE CURRENT RELAYS

### KS-5323-01 AND KS-15572

### REQUIREMENTS AND ADJUSTING PROCEDURES

#### 1. GENERAL

- 1.01 This section covers the Cutler-Hammer automatic reverse current relays KS-5323-01 and KS-15572, used with motor-driven charging generators.
- 1.02 The KS-5323-01 relay has been used in several power plants including the 301C. The KS-15572 relay will first be used in the 302A power plant.
- 1.03 Reference shall be made to Section 020-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.
- 1.04 Requirements and associated procedures marked with a number sign (#) need not be checked by the installer unless it is thought that the requirement is not being met or performance indicates that such a check is advisable.
- 1.05 Requirements and associated procedures marked with an asterisk (\*) need not be checked during maintenance unless performance indicates that such a check is advisable.
- 1.06 The generator switch should be open when making any mechanical adjustments or cleaning the relay.
- 1.07 All electrical tests should be made with the operating coil hot (energized for 1/2 hour). If de-energized for adjustment, such time may be neglected if not in excess of five minutes.

#### 2. REQUIREMENTS

##### 2.01 Operation

- (a) With the shunt coil external series resistor short-circuited (relay CC operated), and with the shunt coil hot, adjust the reverse current relay to close by the action of the shunt coil alone, at 1.95 volts per cell of the connected battery.
- \*(b) With the shunt coil energized at float voltage for the plant, and the

associated holding resistance connected in series with this coil (relay CC released), the relay shall open upon a reverse current through the series winding of a value not to exceed 11 per cent of the relay series coil ampere capacity.

- # 2.02 Contact Surfaces: The contact surfaces shall be clean and free from burrs.
- # 2.03 Contact Separation: With the relay armature in its unoperated position the gap between the movable and stationary contacts shall be:  
Minimum -  $5/32$  inch  
Use scale.
- # 2.04 Contact Pressure: With the relay armature closed against its stop pin, the contacts shall have closed with a noticeable flexure of the contact spring.

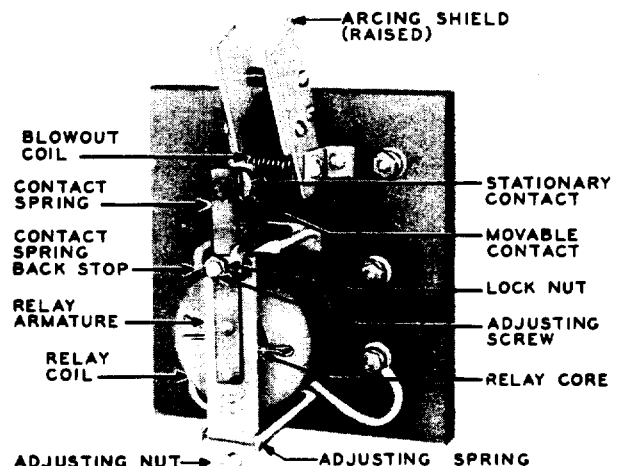


Fig. 1 - Typical Reverse Current Relay

### 3. ADJUSTING PROCEDURES

#### 3.001 List of Tools, Gauges and Materials

##### Tools

File, jeweler's, KS-2663  
Pliers, P-long-nose, 6-1/2 inch  
Scale, 6 inch Steel  
Screw driver, 3" Cabinet

Wrench 3/8" and 1/4", #417A tool  
Wrench 7/32" and 5/16", #418A tool  
Wrench, flat, 5/8", R-5850

##### Gauges

Ammeter, Weston, d-c Mod. 45, 150 scale divisions  
Shunt, ammeter, 50 millivolt drop, 1500 ampere  
Voltmeter, Weston d-c, Mod. 280, 150-60-3 Volts

##### Materials

Cloth, cleaning, D-98063  
Sandpaper, 4/0  
Spirits, Petroleum

#### 3.01 Operation (Rq. 2.01)

- (1) Disconnect the voltage regulator (where provided), open the generator switch, and obtain the desired voltage by operating manually the field rheostat of the generator. Check the operating voltage at the coil terminals of the relay.
- (2) If the relay does not close, test for open circuit using a voltmeter. Connect the voltmeter in multiple with the shunt coil, and if the voltmeter shows no reading when voltage is applied, the circuit is open. Having determined that the circuit is not open, connect the voltmeter in series with the coil. No reading on the voltmeter indicates the coil is open and should be replaced.
- (3) If necessary to adjust the relay for closing voltage, loosen the lock nut on the adjusting screw and turn the adjusting screw in or out until the back of the contact spring is 1/16 (visual check) from the contact spring backstop, and tighten the lock nut. Operate the relay electrically and readjust as necessary by turning the adjustment nut on the adjusting spring until the relay closes at the proper voltage with external shunt coil resistance short-circuited (relay CC operated). Turning the adjusting nut clockwise increases the closing voltage.
- (4) Without increasing the closing voltage, remove the short circuit (relay CC released) from the shunt coil resistance and the relay should remain closed but the contact spring will be flexed to a lesser degree. If the relay opens when the shunt coil external

resistance is inserted in the circuit, loosen the lock nut or nuts on the stationary contact and turn this contact clockwise to decrease the magnetic gap until the relay armature is held operated by the shunt coil on a voltage of from 90 to 95% of the closing voltage. Tighten the lock nuts. (The stationary contact should not be turned in to such an extent that the contact spring will not be noticeably flexed when the armature is held against the stop pin.)

- (5) Close generator switch. Start charging set in the usual manner. With the relay operated, open the line switch to the driving motor and note that the relay opens when the current flows from the battery to the generator.

- \*#(6) If it is suspected that the reverse current required to operate the relay exceeds 11% of the relay series coil ampere capacity, insert the ammeter and its associated shunt in the charging circuit so that it reads up-scale with a reverse current in the charging lead. Provide a means of opening the ammeter lead circuit to the shunt while the charging current is still in the normal direction. Turn the stationary contact counterclockwise, but not to a point where the relay will not remain operated on the closing voltage. If this adjustment cannot be obtained, loosen the lock nut, turn the adjusting screw clockwise, tighten the lock nut and readjust the closing voltage by the adjusting spring.

#### #3.02 Contact Surfaces (Rq. 2.02)

- (1) Clean the contacts by wiping with clean cloth. Remove excessive burrs from the contacts with a fine file or sandpaper before wiping with cloth.

**Note:** In extreme cases of gummed contacts, but only then, the contacts should be wiped with a cloth moistened with petroleum spirits. In all cases, wipe the contacts thoroughly with a clean dry cloth after using the petroleum spirits.

#### #3.03 Contact Separation (Rq. 2.03)

- (1) With the movable contact supporting spring resting against the adjusting screw, raise the arcing shield (if present), loosen the lock nuts on the stationary contacts, and adjust the gap by moving the stationary contact away from or nearer to the movable contact. Tighten the lock nuts.

#### #3.04 Contact Pressure (Rq. 2.04)

- (1) Shape the movable contact supporting spring with a pair of pliers and readjust the position of the stationary contact according to 3.03.