KS-5323 CUTLER-HAMMER AUTOMATIC REVERSE CURRENT RELAYS REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the Cutler-Hammer automatic reverse current relays, KS-5323, used with motor-driven charging generators.

1.02 This section is reissued to change the title, to change the volts per cell of the storage battery, to specify the use of petroleum spirits in place of carbon tetrachloride, and to include precaution that should be taken when using petroleum spirits.

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 The generator switch should be open when making any mechanical adjustments or cleaning the relay.

1.05 All electrical tests should be made with the operating coil at normal temperature or energized for 1/2 hour. If de-energized for adjustment, such time may be neglected if not in excess of 5 minutes.

2. REQUIREMENTS

2.01 ***Contact Surfaces:*** The contact surfaces shall be clean and free from burrs.

2.02 ***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 R-8550 scale.

2.03 ***Contact Pressure:*** With the relay armature closed against its stop pin, the contacts shall have closed with a noticeable flexure of the contact spring.

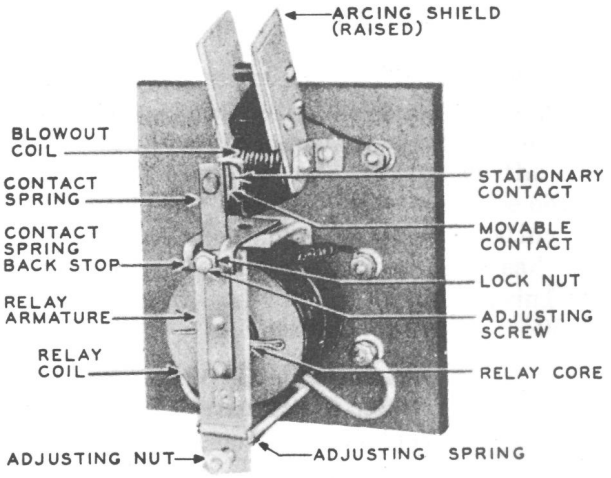

Fig. 1 – Reverse Current Relay

2.04 ***Operating Tests***

(a) The relay armature shall close against the stop pin in the relay core when the generator voltage applied to the shunt winding of the operating solenoid is equivalent to 1.95 volts per cell of the storage battery.

(b) With the shunt coil energized by the voltage of (a) and the associated holding resistance connected in series with this coil, the relay shall open upon a reverse current through the series winding, whose value is

	PERCENT OF RELAY RATING	
	MINIMUM	MAXIMUM
Test	3	8
Readjust	3	7

Use ammeter.

To check this requirement, connect the ammeter in the charging circuit so that it will read the reverse current. Start the charging set in the usual manner. With the relay operated, open the line switch to the driving motor and note the reversal of the current in the ammeter.

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3. ADJUSTING PROCEDURES

3.001 *List of Tools, Gauges, and Materials*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
417A	3/8- by 1/4-inch Open Double-end Flat Wrench
418A	7/36- by 5/16-inch Open Double-end Flat Wrench
KS-2662	File
R-5850	5/8- by 3/4-inch Open Double-end Offset Wrench
—	6-1/2-inch P-Long-nose Pliers
—	3-inch Cabinet Screwdriver
GAUGES	
R-8550	6-inch Scale
—	Ammeter, DC, Weston Model 281, Scale to suit installation or the replaced Weston Model 280
—	Voltmeter DC, Weston Model 281, Scale 3-60-150 or the replaced Weston Model 280
MATERIALS	
KS-7860	Petroleum Spirits
KS-14666 (or replaced D-98063)	Cleaning Cloth
—	4/0 Sandpaper

3.002 Care should be exercised when using petroleum spirits in power rooms where there are dc machines, since commutation may be adversely affected by the softening of the commutator film by the fumes. To avoid the need for burnishing the commutator of the dc machines after doing any cleaning operations called for in this section, provide adequate ventilation using the absolute minimum amount of petroleum spirits required for cleaning operation and keep the container closed when not in use.

3.01 *Contact Surfaces* (Rq 2.01)

(1) Clean the contacts by wiping with a clean KS-14666 cloth. Remove excessive burrs from the contacts with the KS-2662 file or 4/0 sandpaper before wiping with cloth.

Note: In extreme cases of gummed contacts but only then, should the contacts be wiped with a cloth moistened with KS-7860 petroleum spirits. In all cases wipe the contacts thoroughly with a clean dry cloth after using the petroleum spirits.

3.02 *Contact Separation* (Rq 2.02)

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

3.03 *Contact Pressure* (Rq 2.03)

(1) Adjust the movable contact supporting spring with the P-long-nose pliers and readjust the position of the stationary contact according to 3.02.

3.04 *Operating Tests* (Rq 2.04)

(1) Disconnect the voltage regulator (where provided) and obtain the desired voltage by manually operating 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 locknut on the adjusting screw and turn the adjusting screw in or out until the back of the contact spring is 1/16 inch (visual check) from the contact spring backstop and tighten the locknut. Operate the relay electrically and readjust as necessary by turning the adjusting nut on the adjusting spring until the relay closes at the proper voltage with external shunt coil resis-

tance short circuited. Turning the adjusting nut clockwise increases the closing voltage.

(4) Without increasing the closing voltage, remove the short circuit 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 locknut 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 per cent of the closing voltage. Tighten the locknuts. (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) If the reverse current is less than 3 per cent, the stationary contact should be turned clockwise (magnetic gap reduced) but not beyond the point of obtaining suitable contact wipe. If the stationary contact cannot be lowered, loosen the locknut on the adjusting screw and turn counterclockwise, decreasing the distance between the contact spring backstop and the contact spring. Tighten the locknut and readjust the adjusting spring tension for the desired closing voltage.

(6) If the reverse current exceeds 7 per cent, the stationary contact should be turned 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 locknut, turn the adjusting screw clockwise, tighten the locknut and readjust the closing voltage by the adjusting spring.