

**RELAYS**  
**209FF, 209FK, 209FL, AND 209FM**  
**USING TEST CIRCUIT SD-96121-01 OR SD-25274-01**  
**REQUIREMENTS AND ADJUSTING PROCEDURES**

**1. GENERAL**

**1.01** This section covers the electrical requirements for the 209FF, 209FK, 209FL, and 209FM relays when using test circuit SD-96121-01 or SD-25274-01 and procedures for operating the test circuit.

**1.02** The section is reissued to correct the specification of the cord assembly used to connect battery and ground to the test set and to make other minor corrections.

**1.03** Reference shall be made to Section 040-010-711 covering general requirements and definitions for additional information necessary for the proper application of the requirements listed herein.

**1.04** *Operate:* For the purpose of these tests, a relay is said to *operate* if, when current is connected to its winding, the armature moves from one contact and closes reliably with the opposite contact as determined by the extinguishing of the R or G lamp and the lighting of the lamp of different color.

**1.05** *Nonoperate:* For the purpose of these tests, a relay is said to *nonoperate* if, when current is reversed through its winding, the armature remains against the contact to which it was previously operated as determined by the continued illumination of the R or G lamp.

**1.06** Any adjustments due to failure to meet the requirements outlined in this section shall be made in accordance with the procedures covered in Section 040-231-701 covering 209-type relays.

**1.07** The cover may be either on or off when applying the electrical requirements.

**2. REQUIREMENTS**

**2.01:** *Operate:* After the residual magnetism has been removed from the armature and with the operate current specified on the circuit requirements table set up on the associated 35-type test set, the relay shall follow current reversals applied by the test set as indicated by the R and G lamps of the test circuit.

**2.02** *Nonoperate:* Immediately after the operate requirement has been applied and with the specified nonoperate current applied through the 35-type test set, the armature shall not leave the contact to which it is operated as indicated by the R and G lamps of the test circuit. This check shall be repeated with the armature operated to the opposite contact.

**3. OPERATION OF TEST CIRCUIT**

**3.001** *List of Test Apparatus*

CODE OR SPEC NO.	DESCRIPTION
<b>TEST APPARATUS</b>	
♦2P4A	Cord assembly consisting of P2B cord equipped with 310 plug on each end♦
♦2P10B	Cord assembly consisting of P2P cord equipped with 309 and 310 plugs♦
35 type	Test set

**3.01** *Preparation*

**NOTICE**

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- (1) See that the DM key on the test circuit is normal and that all resistance sliders of the 35-type test set are in the extreme right position. Then connect the TST jack of the test circuit to the T&R jack of the 35-type test set using the ♦2P4A♦ cord, and connect battery and ground to the 35-type test set with the ♦2P10B♦ cord.
- (2) Insert the relay under test into the 18A connecting block.
- (3) Depress one of the keys of the 35-type test set, and set the corresponding slider so that the reading on the meter agrees with the operate test current value shown on the circuit requirements table. In a similar manner, set up the nonoperate test current value.
- (4) After setting up current flow values as covered in (3), remove the residual magnetism from the relay armature by operating the DM key in the test circuit and turning the knob of the potentiometer on the test circuit in a clockwise direction to the extreme right-hand position. In this position, the alternating current through the relay winding is maximum and the relay may follow the current reversals causing the lamps to flash. Turn the knob slowly to the extreme left-hand position. ♦This will reduce the alternating current through the relay to zero and all residual magnetism will have been removed from the armature.♦ Restore the DM key to normal.

### 3.02 Procedures

#### Operate

- (1) Close the locking lever of the key in the 35-type test set which controls the operate test current. Operate and restore the REV key of the test set several times at the rate of two or three times per second and observe that the relay follows the current reversals as indicated

by the alternate flashing of the R and G lamps. Restore all keys to normal. The R or G lamp should remain lighted.

#### Nonoperate

- (2) Immediately after applying the operate requirement as described in (1), note whether the R or G lamp in the test circuit is lighted. Close the locking lever of the key in the 35-type test set controlling the nonoperate current. The lamp should not be extinguished. Now operate and restore the REV key of the test set several times and observe that the lamp is not extinguished. Restore all keys to normal.
- (3) Depress the key controlling the operate current to operate the relay. If the relay does not operate as indicated by the lamps, operate the REV key. The relay should now be operated to the opposite contact to which it was operated in (2), lighting the lamp of different color. Close the locking lever of the key controlling the nonoperate current. The lamp should not be extinguished. Operate and restore the REV key several times and observe that the same lamp remains lighted. Restore all keys to normal.
- (4) If the operate or nonoperate requirement is not met, set up the readjust operate and nonoperate current flow values on the 35-type test set and readjust the relay in accordance with the procedures in Section 040-231-701. ♦This section covers the operate and nonoperate requirements of 209-type relays.♦

#### Final Check

- (5) After testing or readjusting with the cover removed, remount the cover on the relay and recheck that the operate and nonoperate requirements are met.