RELAYS

209FB, 209FC, 209FH, 209FJ, 215A, 215H AND 255A

USING 116A1 RELAY TEST PANEL

REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the electrical requirements for the 209FB (D-91711) 209FC (D-92651), 209FH, 209FJ, 215A, 215H and 255A relays using the 116A1 relay test panel.

1.02 It is reissued to cover the 255A relay and to remove contact efficiency "test" requirements for all relays equipped with tungsten contact screws. Detailed reasons for reissue will be found at the end of the section.

1.03 Any adjustments due to failure to meet the requirements outlined in this section shall be made in accordance with the procedures covered in the section applicable to the relay.

1.04 The contact "test" shall apply only to relays not equipped with tungsten contact screws and shall be made first in order that the low voltage used in this test can give a reliable indication of the contact condition. If other tests are made before the contact test, the higher voltage used on these tests may temporarily break down a poor or dirty contact condition.

1.05 All electrical test requirements shall be applied with the relay cover in place.

1.06 The requirements and procedures given in this practice assume that the relay, to be tested, has been plugged into the connecting block on the panel and that the RELAY key has been operated to the position designated by the code of the relay to be tested. Unless otherwise stated all other keys shall be normal.

Note: The 209FH, 209FJ and 215H relays are the same as the 209FB, 209FC and 215A relays respectively except that they are equipped with tungsten contact screws.

1.07 In this section the requirements are specified in terms of meter scale readings. The number of meter scale divisions is one half of these specified scale readings. A reading of zero is mid-scale and a reading of 100 is full scale.

2. REQUIREMENTS

2.01 Contact: When the keys on the test panel are operated as shown in table 1A or 1B the needle of the milliammeter shall indicate a value on the scale to the right of zero (mid-scale) and this value shall be equal to or less than the reading given in the table. Table 1A shall be used for relays equipped with tungsten contact screws. Table 1B shall be used for all other relays.

TABLE 1A
FOR RELAYS EQUIPPED WITH TUNGSTEN CONTACT SCREWS

Relay Under Test	Operated Position of Keys		†Requirements in Meter Scale Readings (Readj. Only)
	Test	Bat	
209FH	CONT EFF	ON	25
209FJ	CONT EFF	ON	25
215H	CONT EFF	ON	15
255A	CONT EFF	ON	20

† See Paragraph 1.07.

TABLE 1B
FOR ALL OTHER RELAYS

Relay Under Test	Operated Position of Keys		†Requirements in Meter Scale Readings Test & Readj.
	Test	Bat	
209FB	CONT EFF	ON	25
209FC	CONT EFF	ON	25
215A	CONT EFF	ON	15

† See Paragraph 1.07.

2.02 Bias: When the keys on the test panel are operated as shown in table 2, the needle of the milliammeter shall vibrate steadily and the center of vibration shall not exceed the readings given in table 2.

TABLE 2

Relay Under Test	Operated Position of Keys		†Requirements in Meter Scale Readings	
	Bat	Test	Test	Readj.
209FB	ON,	BIAS	2	ZERO
209FC	ON,	BIAS	2	ZERO
209FH	ON,	BIAS	2	ZERO
209FJ	ON,	BIAS	2	ZERO
215A	ON,	BIAS	4	ZERO
215H	ON,	BIAS	4	ZERO
255A	ON,	BIAS	2	ZERO

† See Paragraph 1.07.

2.03 Sensitivity (Readjust Only): With the keys on the test panel operated as shown in table 3, the relay shall meet the operate and the non-operate requirements imposed by the test panel. Gauge by the electrical indications shown on the milliammeter as covered in table 3.

TABLE 3

Sequence of Check	Operated Position of Keys Bat	Adj	O-NO	†Requirements in Meter Scale Readings
1	ON,	S		FULL SCALE - RIGHT
2	ON,	S,	OPR	FULL SCALE - LEFT
3	ON,	S		FULL SCALE - RIGHT
4	ON,	S,	NON OPR	*FULL SCALE - RIGHT
5	ON,	M		FULL SCALE - LEFT
6	ON,	M,	OPR	FULL SCALE - RIGHT
7	ON,	M		FULL SCALE - LEFT
8	ON,	M,	NON OPR	*FULL SCALE - LEFT

*With a 215A or 215H relay the reading for checks 4 and 8 may be zero.

† See Paragraph 1.07.

3. PROCEDURES FOR APPLYING TEST REQUIREMENTS

3.01 Before applying the following electrical test requirements the relay shall have passed a visual contact inspection as covered in the section applicable to the relay. All electrical tests shall be made with the cover in place.

3.02 The procedures covered below should be followed to determine whether the relay is satisfactory for service. The test requirements covered in 2.01 and 2.02 are associated with these procedures.

3.03 All keys on the test panel should be in their normal positions before plugging the relay into the test panel connecting block and starting the tests.

3.04 Plug the relay to be tested (without removing the cover) into the connecting block on the panel.

3.05 Operate the RELAY key to the position corresponding to the code of the relay.

Contact

3.06 Operate the TEST key to CONT EFF. Operate the BAT key to the ON position and observe the milliammeter. The milliammeter needle should indicate a value on the scale and should meet the test requirements covered in 2.01.

Note: It is important that the keys should be operated in the sequence given above. If the BAT key is operated first the higher voltage impressed on the contacts may temporarily break down a poor or dirty contact condition.

3.07 Upon completion of the contact test restore the TEST key to normal.

Bias

3.08 Operate the BAT key, if not already operated. Operate the TEST key to BIAS. The milliammeter needle should vibrate steadily and should meet the test requirements covered in 2.02. The meter indicates spacing bias when the needle deflection is to the left of zero and marking bias when the deflection is to the right of zero.

3.09 Tap the relay cover lightly with the handle of a screwdriver and note any change in the reading of the meter. If a change in reading is observed it may be due to magnetic particles on the pole pieces or to loose assembly of the relay.

3.10 Upon completion of the bias test restore all test set keys to normal.

4. PROCEDURES FOR APPLYING READJUST REQUIREMENTS

4.01 The procedures covered below should be followed only when the relay fails to meet its test requirements.

4.02 Check to see that the mechanical requirements, as covered in the section applicable to the relay, are met.

4.03 All keys on the test panel should be in their normal or non-operated position before checking readjust requirements.

4.04 Operate the RELAY key to the position corresponding to the code of the relay.

Bias

4.05 Operate the TEST key to BIAS. Operate the BAT key to the ON position. The milliammeter needle should vibrate steadily and should meet the readjust requirements covered in 2.02.

4.06 Upon completion of the bias adjustment, restore the TEST key to normal.

Sensitivity

4.07 Operate the ADJ key to the S position. The meter needle should show a deflection of approximately full scale to the right.

4.08 Operate the O-NO key to the OPR position and hold it operated. The meter needle should show a deflection of approximately full scale to the left.

4.09 Release the O-NO key. The meter needle should show a deflection of approximately full scale to the right.

4.10 Operate the O-NO key to the NON-OPR position and hold it operated. The meter needle deflection to the right should not change when a 209 or 255 type relay is being tested. In the case of a 215 type relay with the correct mechanical adjustments, the meter needle should show a deflection of approximately full scale to the right or zero (mid-scale). Release the O-NO key.

4.11 Operate the ADJ key from the S position to the M position. The meter needle should show a deflection of approximately full scale to the left. Repeat the tests described in 4.08 to 4.10 inclusive. The meter needle deflections for this series of tests will be in the opposite direction from those given in the paragraphs above. Adjustments should be made, as required, until the relay meets the requirements in 2.03.

4.12 Upon the completion of the sensitivity adjustment, restore the ADJ key to normal.

4.13 If adjustments have been made to meet the sensitivity requirements, repeat the check for bias as covered in 4.05 and 4.06 and if necessary make further adjustments. If further adjustments are made repeat the check for sensitivity as covered in 4.07 to 4.12.

Contact

4.14 Operate the test key to CONT EFF. The milliammeter needle should indicate a value on the scale and should meet the readjust requirements covered in 2.01. Release the test key.

Final Check

4.15 Upon completion of readjustments, remount the relay cover and check that all readjust requirements are met.

4.16 Upon completion of the final check restore all test set keys to normal.

REASONS FOR REISSUE

1. To revise the title and (1.01) to cover the 255A relay.

2. To specify the contact requirement as a "readjust only" requirement for relays equipped with tungsten contact screws and omit the "test" requirement for these relays. Also, to include the 255A relay table 1A (2.01).

3. To add a bias requirement for the 255A relay (2.02).