RELAYS

METER TYPE RELAYS

REQUIREMENTS AND ADJUSTING PROCEDURES

1. GENERAL

1.01 This section covers the requirements and adjusting procedures for Weston Models 705, 723, 813, 1085; LFE Models 281-M-II, 281-M-III, 385-M, 391-M, 723-M, and other KS-types.

1.02 This section is reissued to add information for LFE models (formerly API), to update and include new information regarding KS-type meter relays, and change the title of the section.

1.03 Meters which bear the designation Assembly Products Inc. (API) are referred to in this section as LFE Models (Fig. 8 through 14).

1.04 The letter "M" in the LFE model meters designates that the meter has magnetic contacts.

1.05 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.

1.06 The meter relays contained in this section are permanent magnet moving coil-type precision relays and should be treated as electrical indicating instruments. These relays are equipped with either one or two fixed contacts which are small permanent magnets. The mating contact consists of a silver-plated or gold-plated iron "rider" mounted on the contact arm (pointer). A change in current (or voltage) in the moving coil winding, from a predetermined value, moves the pointer and the iron "rider" into the magnetic field of the stationary magnet, and the "rider" is drawn firmly against the magnet, closing the contact. The contact remains closed until reset either manually or by operation of a solenoid. A correction of the moving pointer on certain models may be made by means of a zero adjuster.

1.07 A ***controlled*** circuit is a circuit which functions directly through the contacts of the relay.

1.08 When no requirements are specified in the circuit requirement table, or when no dc current-indicating instrument accurate to 1 percent is available to check the relay in accordance with its current requirements, the relay shall be checked in accordance with the voltage requirements covered in Table A. This table shows both current and voltage values where possible. When the voltage values are used, the procedures outlined in Part 3 of this section should be applied.

1.09 The detailed procedures for checking the relays are based on using the KS-8039 volt-milliammeter, which has a rated accuracy of 1/4 of 1 percent, although the general methods are applicable to other equivalent instruments.

1.10 When checking or adjusting a relay with the voltmeter, it is recommended that the scale on the meter be selected so that the voltage limit to be checked falls in the upper third of the scale range. This will give the most accurate adjustment of the relay.

1.11 ***Weston Models (Fig. 1 through 7):***

(a) ***Model 705*** is available in both surface and flush-type cases. The screw and locknut on the rear end of the solenoid housing controls the solenoid resetting voltage and should not be disturbed. ***The solenoid housing should be removed only for cleaning as covered in 3.05(11). When doing this, the cover of the relay should not be removed.***

(b) ***Model 723*** employs a round flush-mounting sealed metal case and is equipped with a self-shielded core magnet mechanism and a built-in electrical reset device. ***This relay is sealed and the cover should not be removed.***

(c) ***Models 813 and 1085*** are surface mounting types having transparent plastic covers and bakelite bases. Zero adjusters for external adjustment are not provided.

1.12 ***LFE (API) Models (Fig. 8 through 14):***

(a) ***Models 281-M-II and 281-M-III*** are surface mounting types having transparent plastic covers and bakelite bases similar to Weston Models 813 and 1085. Zero adjusters for external adjustment are not provided.

(b) ***Model 385-M*** employs a round flush-mounting sealed metal case with a built-in electrical reset device. It is similar in exterior design to the Weston Model 723.

(c) ***Model 723-M*** is a surface mounting type relay supplied with either a manual or electromechanical reset. The contact may be of the fixed or movable type.

(d) ***Model 391-M*** employs a flush mounting type case with fixed contacts and a electromechanical reset.

2. REQUIREMENTS

2.01 ***Mounting of Relay and Cover:*** The relay and the relay cover shall be held securely by their mounting screws.

Gauge by feel.

2.02 ***Freedom of Pointer Movement:*** When current through the instrument is gradually decreased or increased, the pointer shall follow this change smoothly.

Gauge by eye.

To check this requirement, it will be necessary to vary the voltage. This may be done in some cases by changing the load, in others by changing the float voltage of the charging unit, and in others by using the 35-type test set as covered in 3.02-3.04.

2.03 ***Pointer Setting***

(a) ***KS Relays Listed in Table A:*** With the voltage value specified under the heading POINTER SETTING in Table A applied to the relay, the pointer shall coincide with the scale reading specified in the table. Relays having no scale markings other than the point at which contact is made cannot be checked.

(b) ***All Other Relays:*** With a definite value of voltage applied to the relay, and to the standard instrument, the pointer shall point to the same scale reading on the relay as indicated by the pointer on the standard instrument. Relays having no scale markings other than the point at which contact is made cannot be checked.

To check this requirement, choose any convenient voltage value between the relay contacts as determined from the scale reading on the individual relay.

2.04 ***KS Meter Relay Electrical Requirements***

(a) ***General:*** Unless otherwise specified on the circuit requirement table or other job information, the relay shall meet the accuracy requirements for contact operation as specified in Table A. The electrical requirements shall be met with the relay cover on.

> ***Note:*** Table A covers the operate and nonoperate values for both high and low contacts of the relay. The voltage values are the voltages applied across the relay and the series resistance given in Table A or the associated resistor furnished with the relay.

2.05 ***Solenoid Operation:*** The solenoid, when provided on the relay to release the pointer, shall meet the requirements for operation as covered in the circuit requirement table or in Table A.

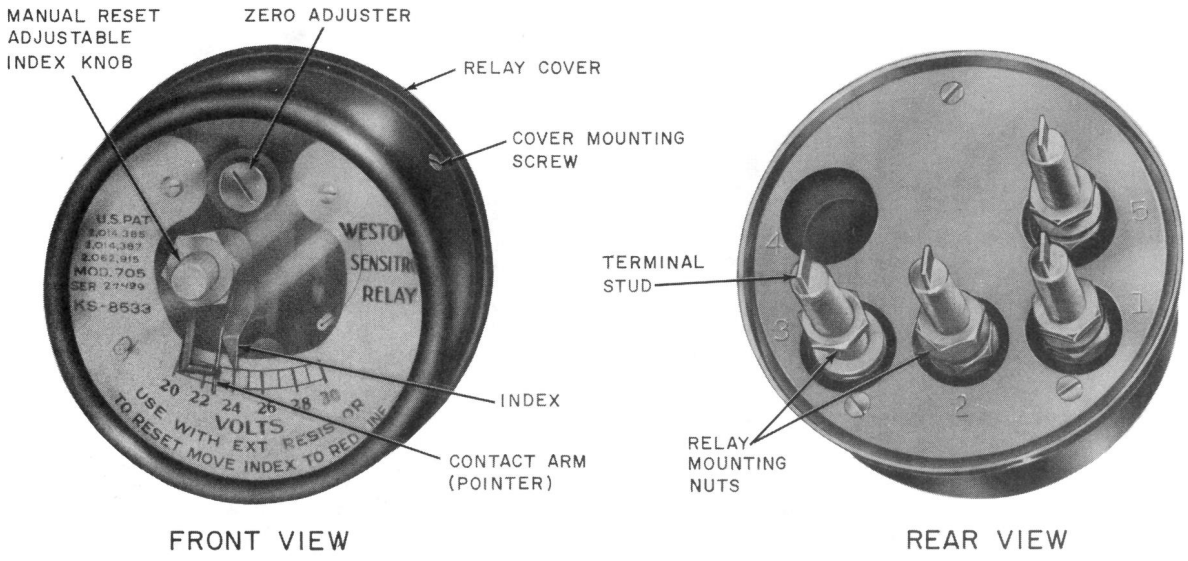


Fig. 1—Model 705 (surface case)—Single Contact—Adjustable Index Reset

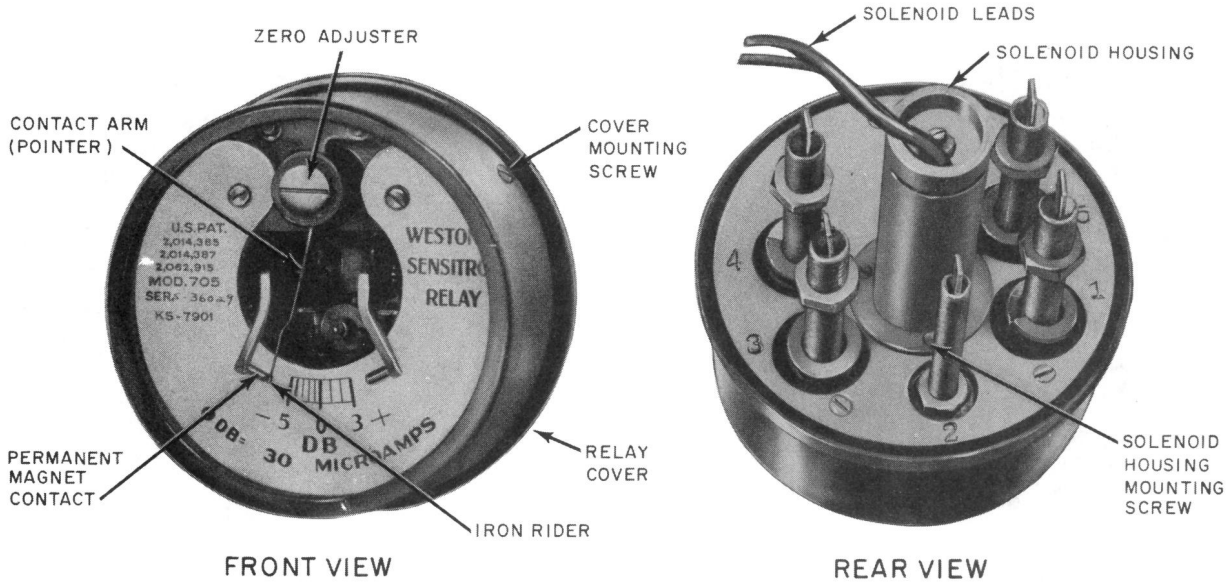


Fig. 2—Model 705 (surface case)—Fixed Contacts—Solenoid Reset

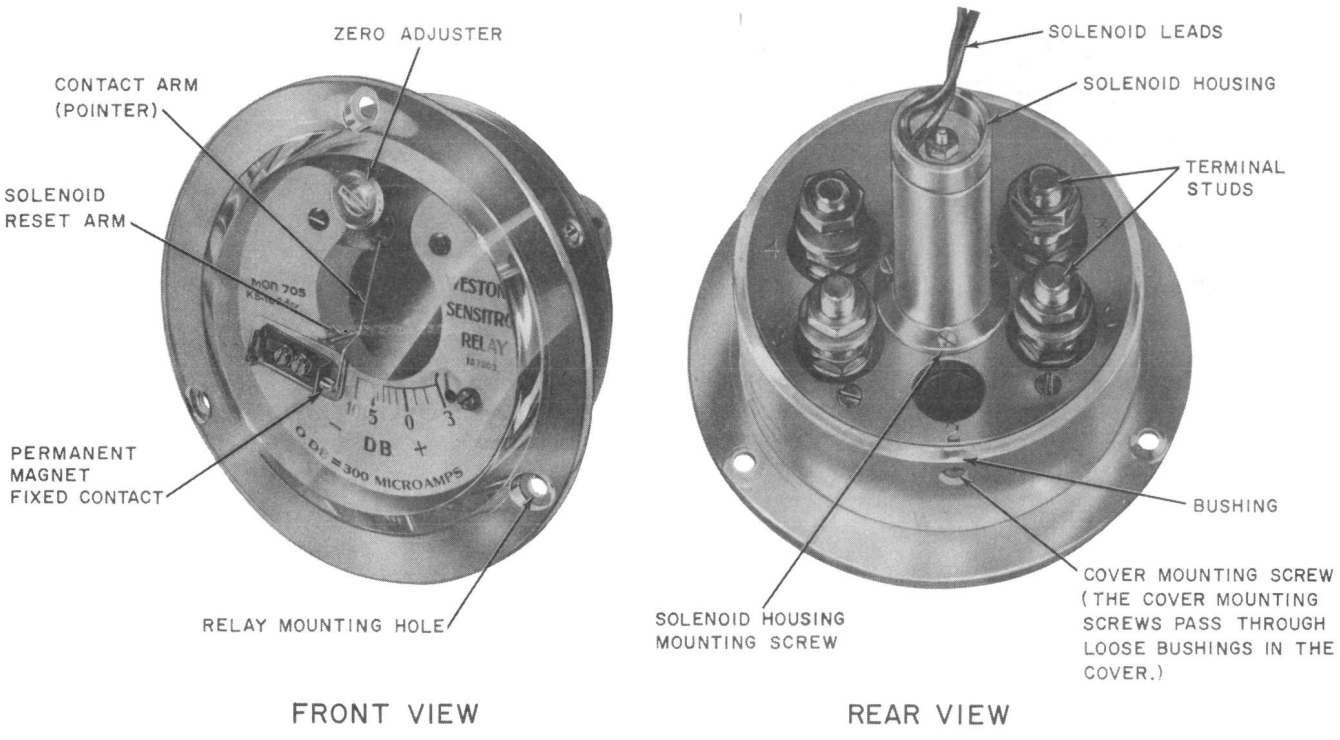


Fig. 3—Model 705 (flush mounting case)—Single Fixed Contact—Solenoid Reset

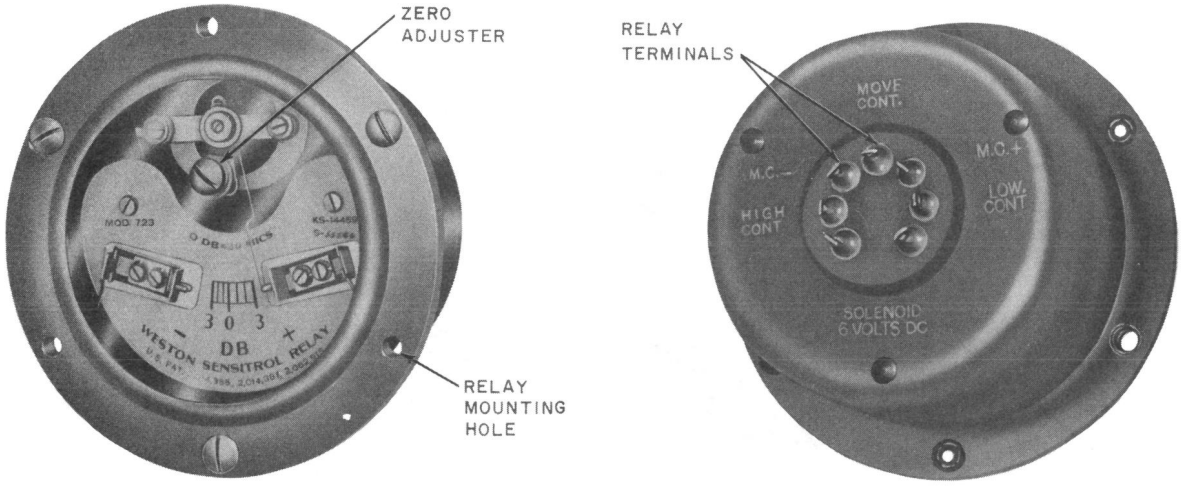


Fig. 4—Model 723 (flush mounting case)—Sealed Fixed Contacts—Solenoid Reset

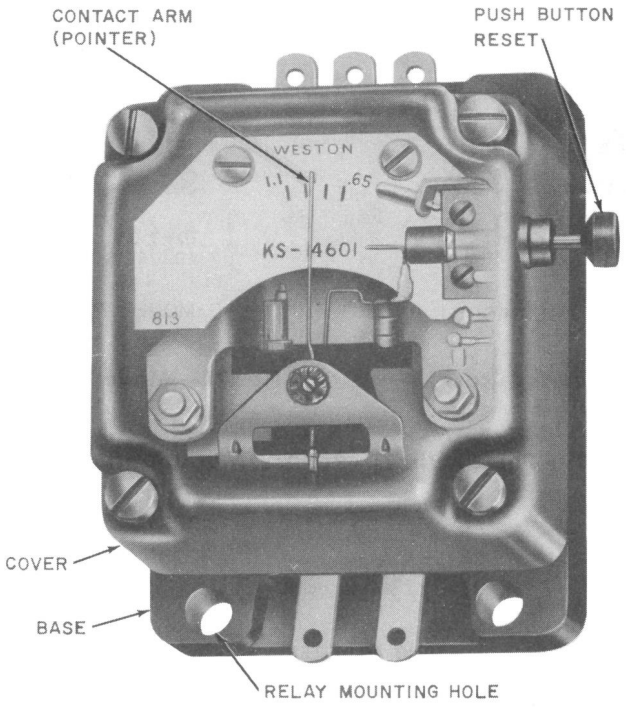


Fig. 5—Model 813 (no zero adjuster)—Single Fixed Contact—Manual Reset

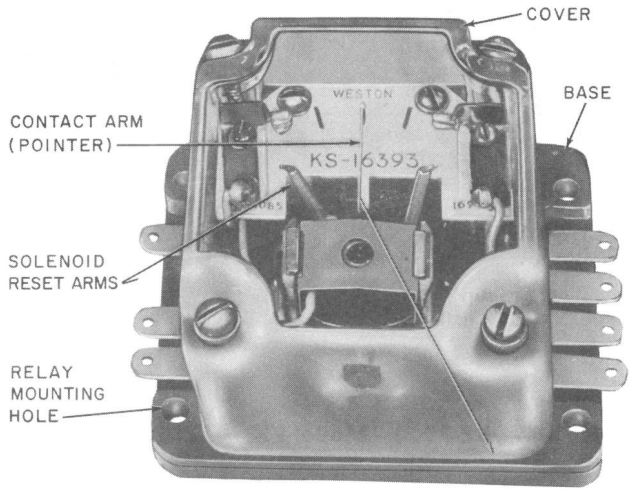
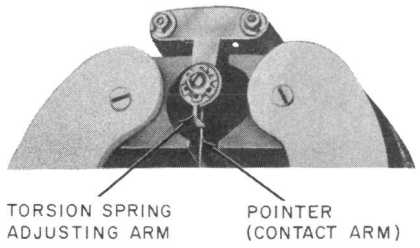
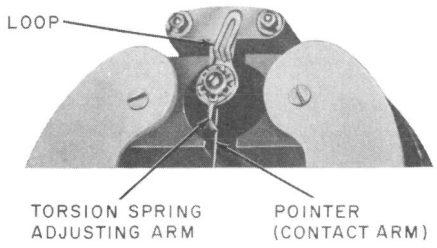


Fig. 6—Model 1085 (no zero adjuster)—Fixed Contacts—Solenoid Reset



A-MODEL 705 (SURFACE CASE)

Fig. 7A—Model 705 (surface case)



B-MODEL 705 (FLUSH-MOUNTING CASE

Fig. 7B—Model 705 (flush-mounting case)

Fig. 7—Model 705—Partial Views—Pointer Adjusting Mechanism Inside Case

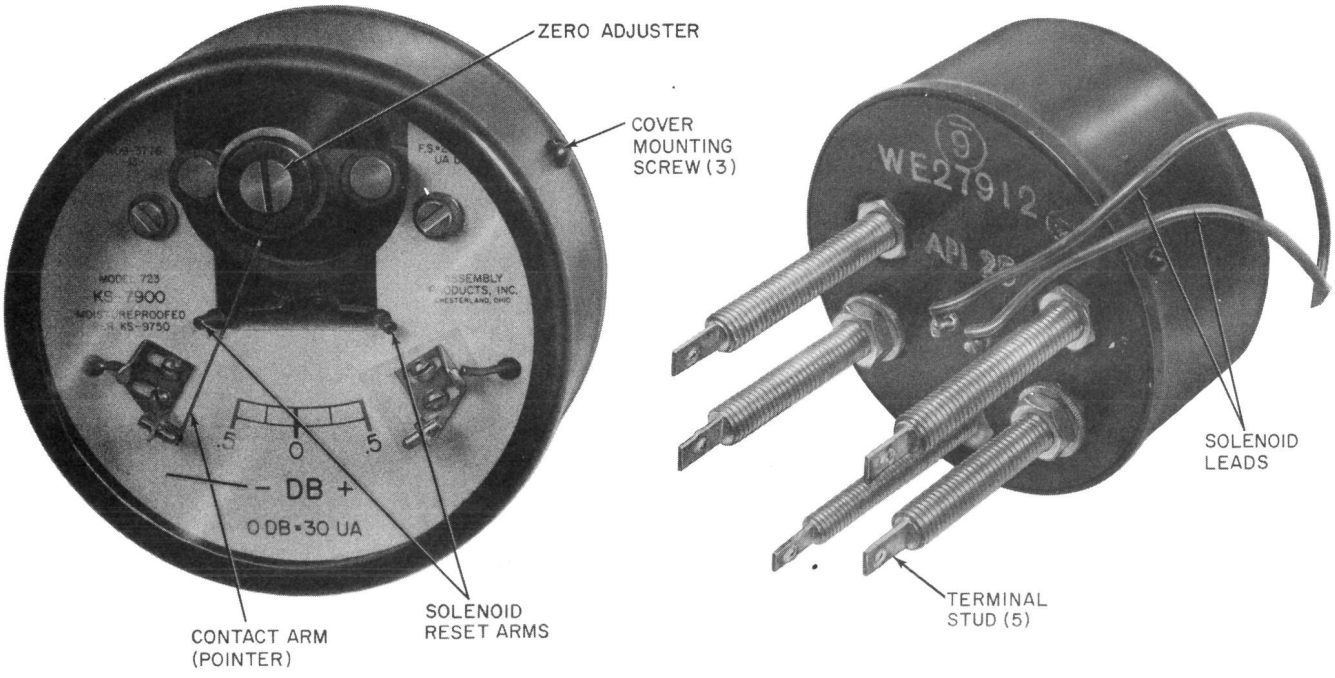


Fig. 8—KS-7900—Model 723—API (now LFE)

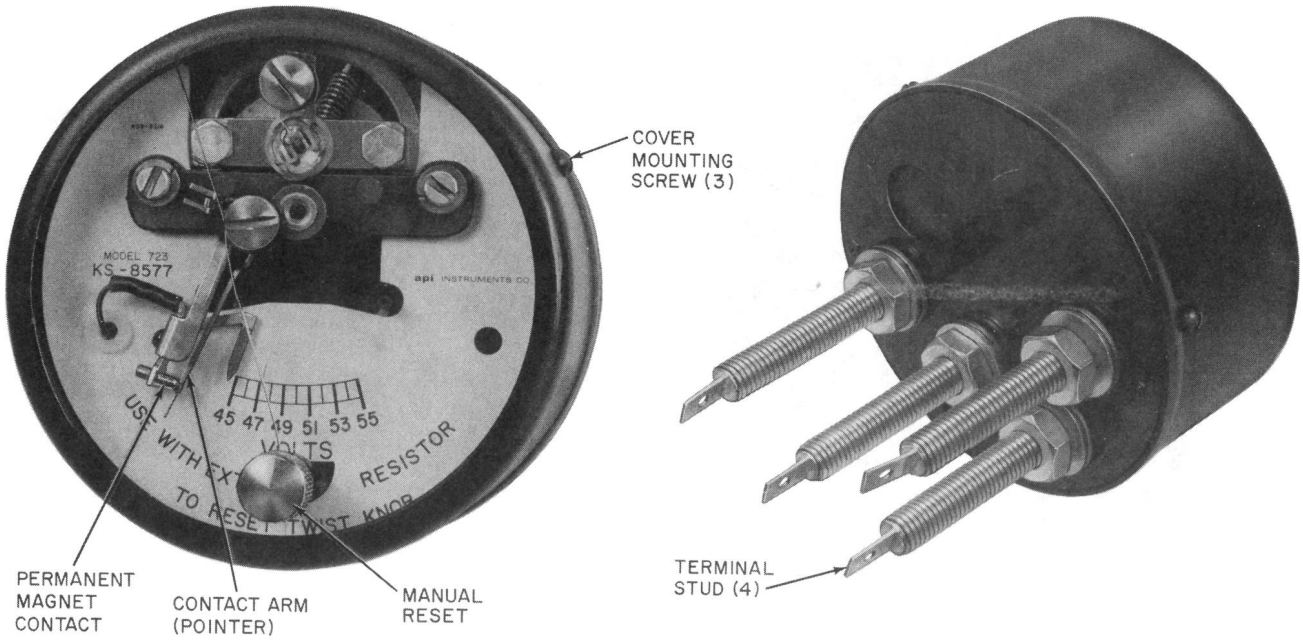


Fig. 9—KS-8577—Model 723—API (now LFE)

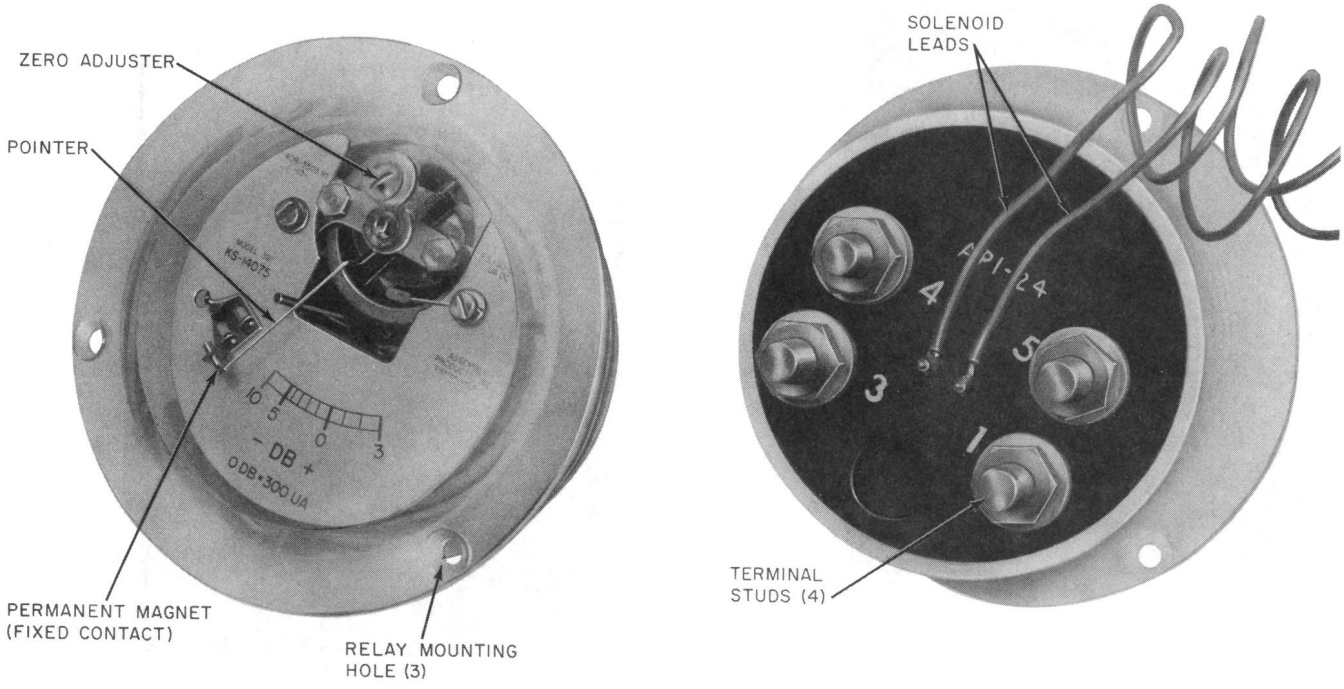


Fig. 10—KS-14075—Model 391—API (now LFE)

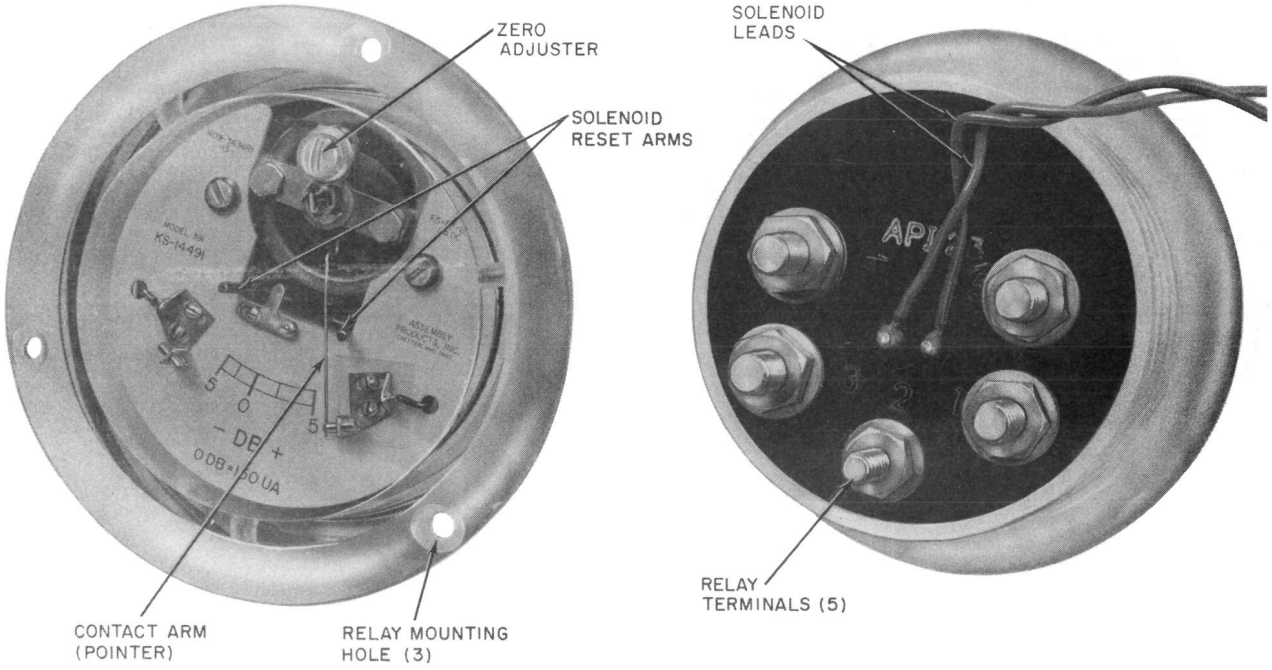


Fig. 11—KS-14491—Model 391—API (now LFE)

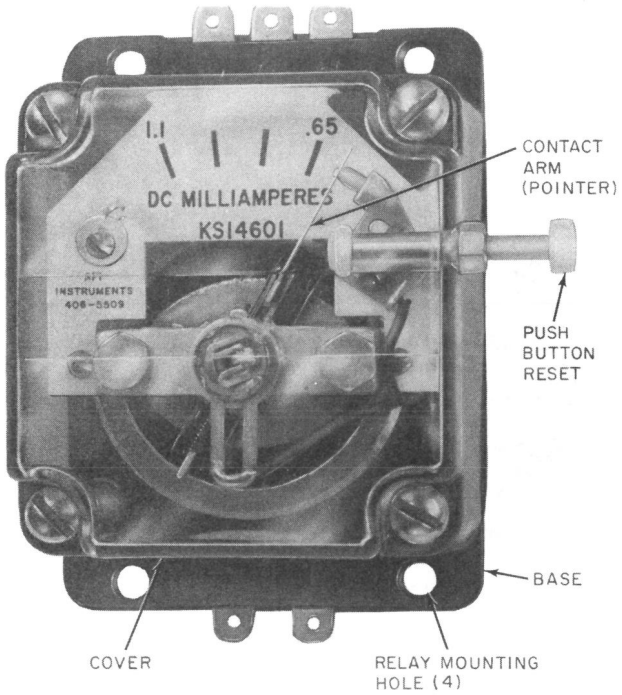


Fig. 12—KS-14601—API (now LFE)

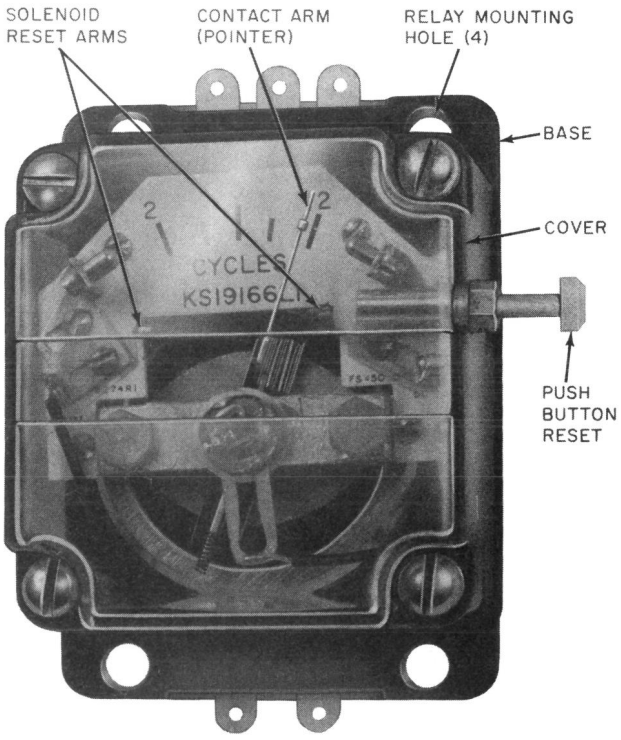


Fig. 13—KS-19166 L1—API (now LFE)

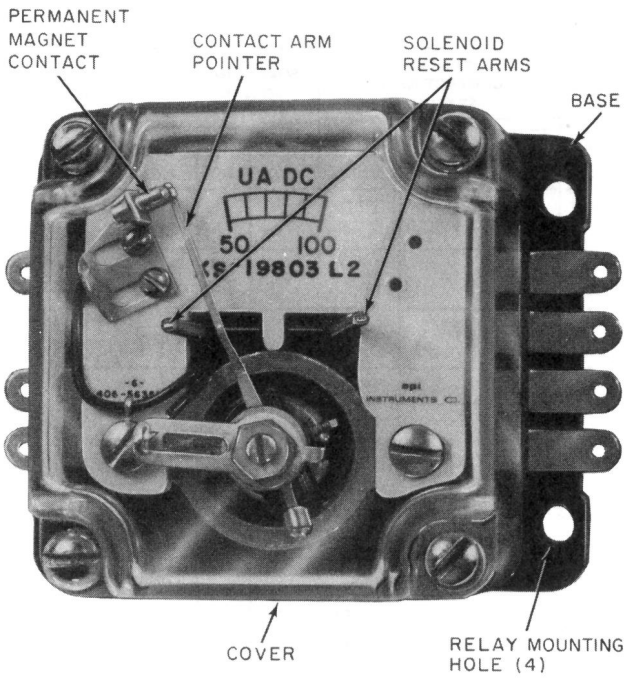


Fig. 14—KS-19803 L2—API (now LFE)

3. ADJUSTING PROCEDURES

3.001 *List of Tools, Materials, and Test Apparatus*

CODE OR SPEC NO.	DESCRIPTION
TOOLS	
417A	1/4- and 3/8-Inch Hex. open single-end wrench
KS-6320	Orange stick
KS-6854	3-1/2-Inch screwdriver
R-1005	Jewelers screwdriver
—	3-Inch C screwdriver
MATERIALS	
2A	Cushion
KS-2423	Cloth
KS-6528	Cleaning tape
TEST APPARATUS	
35-type	Test set
KS-8029	Volt-milliammeter and associated connecting lead or equivalent
—	Key or switch capable of carrying the current required to operate the solenoid
—	IRC-type WW4 wire-wound resistors (1 per cent accuracy) or the equivalent values as specified in Table A. (Resistances of the required values are also included in the KS-8295 volt-ohm-meter; where available, and may be obtained as follows.)

RESISTANCE OHMS	CONNECT TO PIN JACKS	OPERATE SWITCH
15,000	15V & 30V	—
150,000	150V & 300V	—
300,000	— & 300V	DC

3.002 Before making any adjustment on the relay, determine that the trouble is not with the connecting circuits. No adjustments other than those covered in this section should be made by the regular maintenance forces. It is assumed that all other adjustments will be made in a central instrument bureau, repair center, or by authorized instrument repair personnel.

3.003 When making adjustments, place the relay in the position corresponding to that which it occupies when in use in order to maintain the same relative position between the moving parts of the relay and the contact points. Relays intended for mounting on steel panels shall be adjusted either on their respective panels or on steel panels of similar thickness. Relays intended for mounting on nonmagnetic panels shall be adjusted in a place where they will not be affected by outside influences such as iron, steel, magnetic fields, and other relays. The relay under test should be kept at least 18 inches away from the current or voltage measuring instrument.

TABLE A

RELAY	CONTACT SETTING	CONTACT REQUIREMENTS					POINTER (CONTACT ARM) SETTING			SOLENOID REQUIREMENTS VOLTS		NOTES
		CURRENT		VOLTAGE								
		MICROAMPS		VOLTS		SERIES RES. OHMS ±1%	SCALE READING	MICRO-AMPS	VOLTS			
		O	NO.	O	NO.					O	NO.	
KS-7770	Low 0.9 High 1.1	845 1155	955 1045	12.65 17.35	14.35 15.65	15,000	1	1000	15.0	—	—	1,5,6
KS-7900	Low High	26.5 34	28.5 32	8.0 10.3	8.65 9.65	300,000	0	30	9.05	5	4	1,5
KS-7901	Low High	5.8 56.6	15.8 46.6	1.7 17.0	4.75 13.95	300,000	0	30	9.00	5	4	1,5
KS-7996	Low 13	349	407	12.0	14.0	—	16	465	16.0	—	—	1,5,6,7
KS-8124	Low	—	—	131	139	—	—	—	—	130	—	1,5,7
KS-8326	Low High	22 43	24 41	6.6 13.0	7.3 12.35	300,000	—	30	9.05	6	—	1,5
KS-8327	Low —5 High +5	51 210	71 190	0.75 3.20	1.10 2.85	15,000	0	113	1.70	—	—	1,5,6
KS-8333	Black Line	—	—	—	—	—	—	—	—	48	—	1,8,14
KS-8346	High	132	118	2.0	1.75	15,000	100	100	1.50	48	—	1,5
KS-8357	Low High	14 54.5	19.5 49	2.10 8.20	2.95 7.35	150,000	0	30	4.5	19	15	1,5
KS-8383	Low	45	55	6.75	8.30	150,000	75	75	11.30	24	—	1,5
KS-8384	Low	—	—	—	—	—	—	—	—	—	—	1,8,15
KS-8385	Low	—	—	—	—	—	—	—	—	—	—	1,8,15
KS-8388	Low	0.0	5.0	0.0	0.75	150,000	50	50	7.50	24	—	1,5
KS-8476	—	—	—	—	—	—	—	—	—	—	—	1,8,16
KS-8533	Red Line	91.3	103.5	27.6	31.2	300,000	28	112	33.9	—	—	1,5,6
KS-8577	Red Line	88.7	99.6	26.8	30.1	300,000	53	106	31.9	—	—	1,5,6
KS-8847, L1	Low High	68 279	94 253	10.2 42.0	14.2 38.0	150,000	0	150	22.6	20	19	1,5,9
KS-8847, L2	Low High	68 279	94 253	10.2 42.0	14.2 38.0	150,000	0	150	22.6	18	14	1,5
KS-13627	Low High	22 43	24 41	6.6 13.01	7.3 12.35	300,000	0	30	9.05	6	—	1,5
KS-13742	Low High	—	—	—	—	—	—	—	—	—	—	1,8,17
KS-13747	Low High	—	—	—	—	—	—	—	—	—	—	1,8,18
KS-14075	Low	10	50	0.15	0.75	15,000	0	300	4.5	20	—	1,5,10
KS-14459	Low High	22 43	24 41	6.6 13.01	7.3 12.35	300,000	0	30	9.05	6	—	2,5,12
KS-14491	Low High	80 279	94 253	12.1 42.0	14.1 38.1	150,000	0	150	22.6	18	14	1,5
KS-14535	High	55	45	8.3	6.8	150,000	0	30	4.5	18	14	1,5
KS-14578	High	55	45	8.3	6.8	150,000	0	30	4.5	18	14	1,5
KS-14601	Low 0.65	600	700	9.0	10.5	15,000	1.1	1100	16.5	—	—	3,5,6,12
KS-14613	Low High	112 202	126 176	16.9 30.2	19.0 26.5	150,000	0	150	22.6	18	14	1,5
KS-14767	High	—	—	—	—	—	—	—	—	—	—	1,7,11
KS-16003	Low	—	—	—	—	—	—	—	—	—	—	1,7,11
KS-16393	Low High	—	—	—	—	—	—	—	—	—	—	4.13

TABLE A (Cont)

RELAY	CONTACT SETTING	CONTACT REQUIREMENTS					POINTER (CONTACT ARM) SETTING			SOLENOID REQUIREMENTS VOLTS		NOTES
		CURRENT		VOLTAGE								
		MICROAMPS		VOLTS		SERIES RES. OHMS ±1%	SCALE READING	MICROAMPS	VOLTS			
		O	NO.	O	NO.					O	NO.	
KS-16525, L1	Low −4.5 db	1045	1155	15.7	17.3	15,000	0	2000	30	24	—	2,5,12
KS-16526, L1	High 150 cps	52.5	47.5	7.88	7.13	150,000	60	20	3	24	—	2,5,12
KS-16631, L1	Low High	—	—	—	—	—	—	—	—	18	14	1,8,19
KS-16640, L1	Low −10 db	15	45	2.25	6.75	150,000	0	300	45	—	—	1,5,20
KS-16649, L1	Low 70	67	73	10	10.95	150,000	100	100	15	10	8	4,5,12
KS-16716, L1	High	55	45	8.25	6.75	150,000	0	30	4.50	18	14	4,5,12
KS-16724, L1	Low Red Line	22.5	27.5	6.75	8.25	300,000	50	50	1.50	24	—	2,5,12
KS-19095 L1	Low High	—	—	—	—	—	—	—	—	28	16	4,12
KS-19095 L2	Low High	—	—	—	—	—	—	—	—	28	16	4,12
KS-19166 L1	Low High	−55 +55	−45 +45	—	—	—	0	0	—	—	—	3,12
KS-19348 L1	Low High	35 215	55 195	—	—	—	—	100	—	16	—	4,12
KS-19803 L1	Low 50	45	55	—	—	—	100	100	—	21	—	4,12
KS-19803 L1	Low 50	45	55	—	—	—	100	100	—	21	—	4,12

Notes for Table A

1. →Weston Model 705, LFE Models 723-M or 391-M.←
2. →Weston Model 723, LFE Model 385-M.←
3. →Weston Model 813, LFE Model 281-M-II.←
4. →Weston Model 1085, LFE Model 281-M-III.←
5. The requirements are dc values and should be applied to the relay and the specified series resistance or the associated Weston resistor furnished with the relay.
6. The relay is equipped with a manually operated resetting mechanism.
7. The relay is furnished with an external resistor.
8. The relay is furnished with an external rectifier.
9. KS-8847, L1 relays are not marked "L1".
10. In addition to the requirements in the table, a scale reading of +3 shall be obtained with 500 ±15 microamperes (7.5 ±0.22 volts) using 15,000 ohms series resistance.
11. The accuracy of the relay is checked by tests specified in the circuit requirement table.
12. No field adjustment is recommended for the relay. If the relay does not meet the requirements, it should be replaced.
13. The relay should be replaced if it does not function satisfactorily under circuit operating conditions.
14. The accuracy of the relay is checked by tests specified in Section 201-507-502 covering the No. 3A announcement system.
15. The accuracy of the relay is checked by tests specified in Section 312-610-500 covering the 140A1 carrier supply.
16. The accuracy of the relay is checked by tests specified in Section 179-604-501 covering the multifrequency pulsing supply J98608.
17. The accuracy of the relay is checked by tests specified in Section 179-205-501 covering the 1600- or 2000-cycle single-frequency signaling system SD-55962-01.
18. The accuracy of the relay is checked by tests specified in Section 179-602-501 covering the multifrequency current supply and distributing circuit SD-95391-01.
19. No field adjustment, other than that required for the solenoid operation requirement, is recommended for the relay.
20. The normal ac operating circuit should be used to check the solenoid operation requirement for the relay.

3.004 When making adjustments and the cover has been removed, do not place the relay where moving air currents may cause the pointer to deflect.

3.005 When cleaning the contacts of the relay, do not leave the cover off longer than necessary because of the possibility of dust accumulating on the parts of the relay mechanism.

3.006 When readjusting, the relay shall make contact as close as practicable to the specified voltage as indicated by the standard voltmeter.

3.007 ***Removing Covers (Weston Model 705 and ⏵LFE Models 391-M and 723-M):*** ⏴ To clean the relay contacts, it will be necessary to remove the relay covers as follows.

(1) ***Surface Case:*** Fig. 1 and 2—Remove the cover mounting screws using the R-1005 screwdriver and remove the cover.

(2) ***Flush Mounting Case:*** Fig. 3—Remove the cover mounting screws using the KS-6854 screwdriver and remove the cover. Take care not to damage the loose bushings in the cover when removing the cover mounting screws.

Note: The Weston Model 705 and ⏵LFE Model 391-M⏴ (flush-mounting case relays) must be removed from the mounting before removing the cover. Use the 3-inch C screwdriver to remove the relay mounting screws.

3.008 ***Remounting Covers (Weston Model 705 and ⏵LFE Models 391-M and 723-M).⏴*** After cleaning the relay contacts, remount the cover. Use the R-1005 or KS-6854 screwdriver, as required, and tighten the cover screws securely.

Caution: Do not use force to press home the cover.

(1) ***Surface Case:*** Fig. 7A—Be ***very*** careful when placing the cover on the case to see that the two projections underneath the zero adjuster straddle the torsion spring adjusting arm. Use the R-1005 screwdriver to turn the zero adjuster screw in the cover so that the projections are in the proper location for assembly.

(2) ***Flush-Mounting Case:*** Fig. 7B—Be ***very*** careful when placing the cover on the case to see that the single projection underneath the zero adjuster fits within the loop of the torsion spring adjusting arm. Use the KS-6854 screwdriver to turn the zero adjuster screw in the cover so that the projection is in the proper location for assembly.

3.01 ***Mounting of Relay and Cover*** (Reqt 2.01)

(1) ***Model 705 (Surface Case):*** If the relay is not held securely to the mounting, tighten the mounting nuts using the 417A wrench. If the relay cover is not held securely by the mounting screws, tighten the screws using the R-1005 screwdriver.

(2) ***Model 705 (Flush-Mounting Case):*** If the relay is not held securely by the mounting screws, tighten the screws using the 3-inch C screwdriver. If the relay cover is not held securely by the mounting screws, tighten the screws using the KS-6854 screwdriver.

(3) ***Models 723, 813, and 1085:*** (Fig. 4, 5, 6) If the relay is not held securely by the mounting screws, tighten the screws using the 3-inch C screwdriver.

3.02 ***Freedom of Pointer Movement*** (Reqt 2.02)

3.03 ***Pointer Setting*** (Reqt 2.03)

3.04 ***Electrical Requirements*** (Reqt 2.04)

(1) ***General:*** Relays failing to meet the requirements should be replaced.

(2) ***Preparation:*** To check whether the relay meets the requirements, use the 35-type test set and the KS-8039 volt-milliammeter.

(3) ***KS Relays:*** Remove potentials from the relay being checked and disconnect all wiring at the relay terminals.

(4) ***All Other Relays:*** Remove potentials from the relay being checked. Disconnect the wiring at the winding terminals of the relay. Do not disturb the connections from the contacts of the relay to the controlled circuit.

Caution: When disconnecting soldered connections at the relay terminals, unsolder them. Do not cut the wires.

(5) ***35-Type Test Set Application:*** Connect the relay to the test set using B/G/V application as covered in Section 100-101-101. In this application, when using the 35D or 35F test set, the VM key should be normal with the external voltmeter connected across the winding terminals of the relay.

(6) Determine the voltage at which the relay is to be checked. For KS relays, use the voltage specified in Table A. When no voltage is specified in the table, follow the information covered in the associated note or in the circuit requirement table. For all other relays, follow the information specified in the circuit requirement table.

(7) Turn the VOLTS switch on the standard instrument to the scale position so that the relay checking voltage is in the upper two thirds of the scale.

Caution: If a potential greater than 60 volts is used, take care not to touch the metal portions of the rheostat while using the test set.

(8) When the relay is equipped with a solenoid for releasing the pointer (contact arm), connect the proper operating potential to the solenoid winding through a key or other suitable device for opening and closing the circuit. The normal circuit connection may be used when convenient.

Freedom of Pointer Movement

(9) ***All Relays:*** Adjust the sliders of the test set, as required, until the standard instrument indicates a value slightly higher than the starting value as covered in (6). Gradually decrease and then increase the current through the relay using the sliders, as required, and check that the requirement is met.

Note: The pointer (contact arm) may be released from the contact by momentarily operating the key in the solenoid circuit or by means of the manual release mechanism, as required, for the relay under test.

Pointer Setting (Relays Having Zero Adjusters)

(10) ***KS Relays:*** For KS relays having voltage requirements as specified under the heading POINTER SETTING in Table A, adjust the sliders of the test set, as required, until the standard instrument indicates the voltage value. For KS relays having no voltage requirements specified in Table A, follow the information covered in the associated note or in the circuit requirement table. Then proceed as covered in (12).

(11) ***All Other Relays:*** For all other relays, adjust the sliders of the test set, as required, until the standard instrument indicates a voltage value between the relay contacts as determined from the scale of the relay under test, unless otherwise specified in the circuit requirement table. Then proceed as covered in (12).

(12) ***Pointer Setting:*** Using a screwdriver to fit the zero adjuster screw slot, turn the screw until the requirement is met.

Caution: The zero adjuster screw should turn freely. Do not attempt to turn the screw after resistance is met, as the adjusting mechanism may be seriously damaged. In making this adjustment, observe that there is considerable slack motion in the zero adjuster screw. When the position of the pointer has been changed, back off the screw slightly before the final check.

Accuracy

(13) ***KS Relays:*** Adjust the sliders of the test set, as required, to check the contacts for the voltage requirements as covered in Table A. If the relay does not function satisfactorily, on the specified voltage values, it may be due to dirty contacts. For the Weston Model 705 ***only,*** proceed as covered in (19) and (20).

(14) ***All Other Relays:*** Adjust the sliders of the test set, as required, until the lower limit of the specified low voltage is indicated on the standard voltmeter. The left contacts should make as indicated by the functioning of the controlled circuit.

(15) Increase the applied voltage towards the upper limit of the specified low voltage by adjusting the sliders so as to decrease the resistance in the circuit. Observe whether or not the controlled circuit functions just before or just as the upper limit of the specified low voltage is reached.

(16) Then adjust the sliders of the test set until the lower limit of the specified high voltage is reached. The controlled circuit should not function until this limit is reached but it should function before or when the upper limit of the specified high voltage is reached.

(17) ***Example:*** Assume that the specified range of a voltage alarm relay is 24.5 to 29.5 volts with a tolerance of $\pm$0.25 volt for each of these values. The left contacts shall make, as indicated by the alarm, on a low voltage of minimum 24.25 volts or a voltage less than 24.75 volts. The right contacts shall make on a high voltage of maximum 29.75 volts of a voltage more than 29.25 volts. Neither of the alarms shall be given when the applied voltage is at or between 24.75 and 29.25 volts.

(18) If the relay does not function satisfactorily, on the specified voltage values, it may be due to dirty contacts. For the Model 705 ***only*** proceed as covered in (19), and (20).

(19) ***Cleaning Contacts (Weston Model 705):*** Remove the relay cover and clean contacts as covered in Section 069-306-801.

(20) After cleaning the contacts, check the relay with the cover on as covered in (13) for KS relays, and in (14), (15), and (16) for all other relays.

Note: Operate the key in the solenoid circuit or operate the manual release mechanism, as required, to release the pointer while making contact tests.

(21) After completing the tests, unless the solenoid operation test is to be made at this time, remove all test connections and remount the relay on the panel. Then restore all wiring to the relay and set the indexes as required.

3.05 ***Solenoid Operation*** (Reqt 2.05)

(1) ***Preparation:*** To check whether the relay solenoid meets the requirements, use the 35-type test set and the KS-8039 volt-milliammeter.

(2) Remove potentials from the relay being checked and disconnect all wiring at the relay and solenoid terminals.

Caution: When disconnecting soldered connections at the relay terminals, unsolder them. Do not cut the wires.

(3) ***35-Type Test Set Application:*** Connect the solenoid leads of the relay to the test set using the B/G/V application as covered in Section 100-101-101. In this application when using the 35D or 35F test set, the VM key should be normal. Connect the SERIES RES specified in Table A, or the Weston external resistor furnished with the relay in series with the external voltmeter across the winding terminals of the relay.

(4) Determine the voltage, as covered in Table A, at which the solenoid is to be checked.

(5) Turn the VOLTS switch on the standard instrument to the scale position so that the solenoid checking voltage is in the upper two thirds of the scale.

(6) ***Caution: If a potential greater than 60 volts is used, take care not to touch the metal portions of the rheostat while using the test set.***

(7) Adjust the sliders of the test set, as required, until the voltmeter indicates the NO (nonoperate) voltage value. The solenoid should not operate.

(8) Adjust the sliders of the test set, as required, until the voltmeter indicates the 0 (operate) voltage value. The solenoid should operate.

(9) If the solenoid operates satisfactorily, remove all test connections and restore all wiring to the relay.

(10) ***Weston Models 723, 813, 1085, and all LFE Models:*** If the solenoid of the relay fails to operate satisfactorily, the relay should be replaced.

(11) ***Weston Model 705:*** If the solenoid of the Model 705 relays fails to operate satisfactorily, it may be due to sticking of the plunger in the inner barrel of the solenoid housing. To correct this condition, proceed as follows.

(a) Remove the relay from the panel and place it face down on a bench. Observe the position of the slot in the solenoid housing so that the housing may be remounted in the same position. The slot generally faces terminal 2. Remove the solenoid housing mounting screws with the R-1005 screwdriver and lift the housing straight upward.

Caution: If for any reason the relay is removed from its face down position while the solenoid housing is off, take care that the plunger is held in position against the relay and the plunger retracting spring inside the plunger is not lost. If the retracting spring does drop out of the plunger, insert it into the plunger with the end of the spring having the close convolutions furthest from the relay.

(b) Place the forefinger on the end of the plunger and while holding it securely in a vertical position, wipe the plunger surface with a clean KS-2423 cloth.

Caution: Do not allow the plunger to tilt appreciably from its normal position, perpendicular to the relay case, as it may become desengaged from one or both restoring arms inside the case.

(c) If the surface of the plunger is coated with dirt or other foreign material which cannot be removed with a cloth, scrape it off with the KS-6320 orange stick wound at one end with the KS-6528 cleaning tape. Proceed as follows. Cut a strip approximately 9 inches long from a roll of the tape. Place one end of the tape about 1/2 inch from the end of the orange stick and wind it spirally to the nearest end of the stick, overlapping slightly with each turn. Then wind several turns of tape one over the other, permitting the tape to project slightly beyond the end of the stick. Continue winding toward the other end of the stick, overlapping slighly with each turn. When the tape is completely wound on the orange stick, slip a 2A cushion over the covered end, rotating the cushion in the same direction the tape was wound, until the cushion covers the free end of the tape and holds it securely in place.

(d) Wipe the inside wall of the soleniod housing with the covered end of the KS-6320 orange stick, using a push-pull motion while rotating the housing.

(e) Then insert the mounting screws in the solenoid housing and slide the housing over the plunger, taking care that the slot in the housing is in the same position as it was prior to removal. Tighten the mounting screws securely.

(f) Recheck the operation of the solenoid as covered in (1) to (8), inclusive.

(g) If the solenoid is working satisfactorily, remove all test connections from the relay, remount the relay on the panel, and connect the wires that were removed. If the solenoid fails to operate satisfactorily, the relay should be replaced.