

AMMETER RELAYS

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1. GENERAL

1.1 Scope

1.11 This section covers installation and adjustment of the following ammeter relays:

KS-5342	KS-5787	KS-15802
KS-5348	KS-15570	KS-15803
KS-5561	KS-15573	
KS-5662	KS-15796	

1.12 Figures 1 through 3 show typical ammeter relays and Table A lists scales and other information about these relays.

1.2 Associated Information

1.21 Coordinate the information in this section with test of the power plant in Handbook 21.

1.3 Precautions

1.31 Do not remove covers from these ammeter relays except when adjusting or shifting contact positions. This will prevent dust and dirt getting on the moving parts and contacts.

1.32 Before starting work on any ammeter relay or associated shunt which is in service, give consideration to the section in Handbook 0 which covers the following:

- 1.321 Co-operation with the telephone company.
- 1.322 Safeguards to prevent service interruptions.
- 1.323 General protection of working equipment.

1.4 Inspection

1.41 Make an inspection of each ammeter relay and its associated shunt and shunt leads. If defects are found at

this time or later during test of the power plant originate a J.I.M. in accordance with the Job Clerical Handbook.

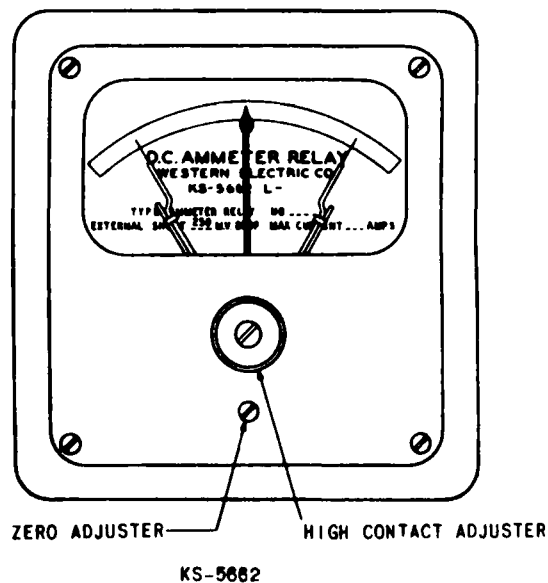
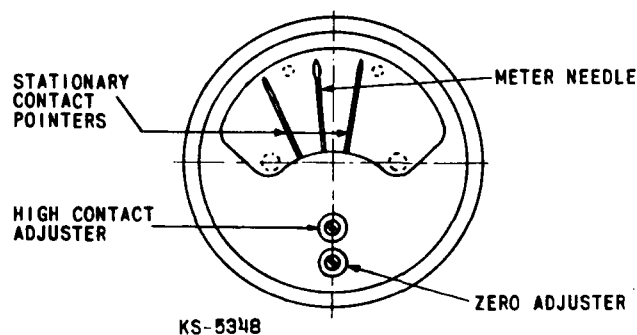
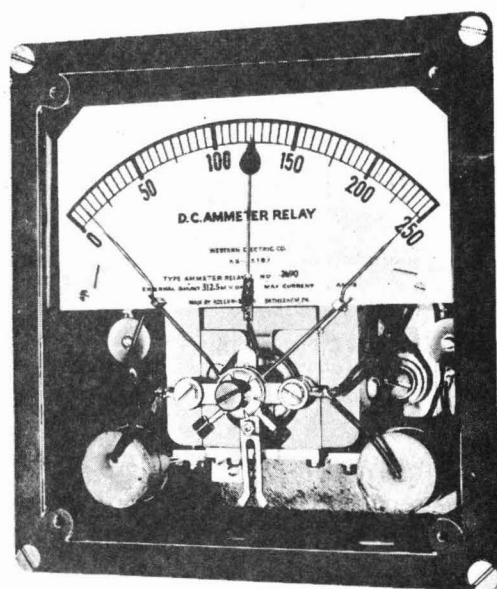
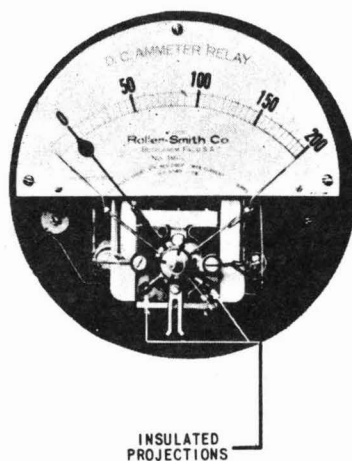


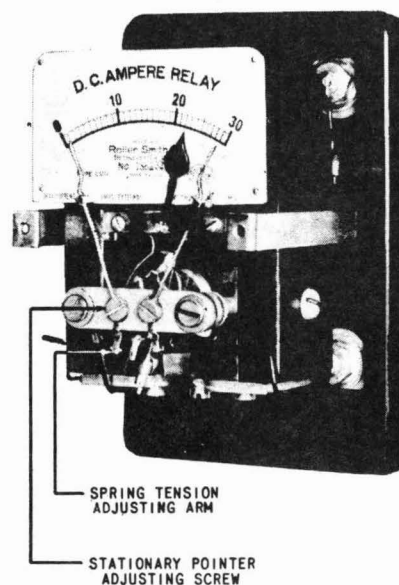
FIG. 1 TYPICAL AMMETER RELAYS (COVERS ON)
(PAR. 1.5, 7.2)



KS-5348

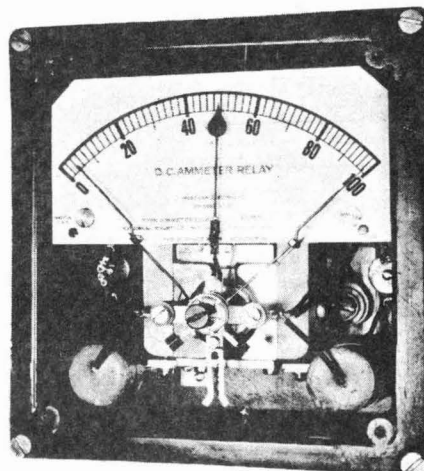


KS-5561



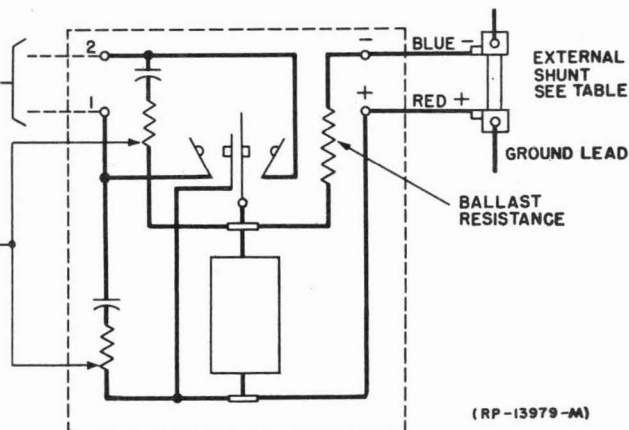
KS-5787

(RP-13977-M)

FIG. 2 TYPICAL AMMETER RELAYS (COVERS REMOVED)
(PAR. 1.5, 7.3, 7.5)

TO TELEPHONE
TYPE RELAYS
(OPERATING
CURRENT OF 24
MILLIAMPERES)
CONNECTED TO
NEG. 24 OR 48
VOLTS D.C.

CONTACT
PROTECTION



(RP-13979-M)

FIG. 3 TYPICAL AMMETER RELAY SHOWING INTERNAL WIRING
(PAR. 1.5)

1.5 Description

1.51 Ammeter relays are indicating meters with built-in relay contacts. One contact is carried on the moving element of the meter. This makes with a contact on a stationary pointer whose position can be changed. Two adjustable stationary contacts are furnished, one for a low current setting and one for a high current setting. These can be adjusted within the ranges shown in Table A.

1.52 The meter movement is a millivolt-meter. Full scale deflection of the meter is obtained with about 0.1 ampere.

An associated piece of apparatus called a "shunt" is required with the meter. Shunts are connected in the main current-carrying circuit and are designed to provide a specific voltage drop, such as 250 or 312.5 millivolts, across a pair of terminals to which the meter movement is connected. The same basic meter movement can then be used to indicate many different ranges of current by changing the scale marking and providing a shunt of the correct current rating. Some of these ammeter relay scales are in dc amperes while others indicate 0-100% dc load current.

TABLE A

KS NO.	FULL SCALE MARKINGS	EXTERNAL SHUNTS (MILLIVOLTS)	CONTACT ADJUSTMENT IN PER CENT FULL SCALE DEFLECTION	
			LOW	HIGH
5342	Various ranging from 25 Amps. to 1200 Amps.	250	0 to 95%	5 to 100%
5348	Various ranging from 25 Amps. to 1200 Amps.	250	-10% to 90%	0 to 100%
5561 L-01 5561 L-02	30 Amperes 40 Amperes	250	0 to 16%	83 to 100% 75 to 100%
5662	100 Amperes 200 Amperes	250	0 to 90%	10 to 100%
5787	250 Amperes	312.5	0 to 90%	10 to 100%
15570	Various ranging from 25 Amps. to 1500 Amps.	250	-10% to 90%	0 to 100%
15573	Various ranging from 100 Amps. to 1500 Amps.	250	0 to 40%	60 to 100%
15796	100%	250	0 to 90%	10 to 100%
15802	250 and 500 Amperes	None	0 to 40%	60 to 100%
15803	100 Amperes	None	0 to 80%	20 to 100%

1.53 Contact protection networks are provided for each pair of contacts. In most cases these are contained in the relay case. The network consists of a capacitor and resistor in series, connected as shown in Figure 3. The networks for KS-5561, KS-15802, and KS-15803 contact protection are outside the case and are part of the shop wiring. These networks consist of a 1 microfarad capacitor in series with a 4000 ohm, 1 watt, resistor connected across the coils of the relays operated by the ammeter relay contacts.

2. INSTALLING EQUIPMENT

2.1 Tool kits already on the job will contain sufficient tools for installing and adjusting operations.

3. SHUNTS AND SHUNT LEADS

3.1 All connections on the shunt shall be tight. This applies both to current-carrying connections and ammeter relay shunt lead connections.

Gauge by feel. Tighten if necessary.

3.2 Shunt lead connections on the meter shall be tight.

Gauge by feel. Tighten if necessary.

4. FREEDOM OF MOVEMENT

4.1 The meter needle shall move freely without bind. This is checked during test of the power plant in accordance with Handbook 21. A preliminary check should

be made by turning the zero-adjusting screw on the front of the meter back and forth a few times to determine that the meter needle swings freely. (When there are two screws on the front of the meter the lower screw is the zero-adjuster.) Reset the meter needle to zero. (See Paragraph 8.)

4.2 If the meter needle binds at any point on the scale it will be necessary to replace the meter.

5. METER ACCURACY

5.1 The meter need not be checked for accuracy. If there is no external evidence of damage, such as cracked or broken glass, and freedom of movement (Paragraph 4) is satisfactory, the accuracy of the meter has not changed in shipment and should not require checking on the job.

6. CONTACT SURFACES

6.1 Contact surfaces shall be clean and free from pits or build-ups that may affect operation of apparatus connected to the contacts.

Gauge by eye.

6.2 No attempt should be made to clean or burnish contacts. If circuit trouble is traced to dirty or defective contact surfaces the ammeter relay should be replaced.

7. CONTACT ADJUSTMENT

7.1 Final contact settings will be as determined by circuit conditions in accordance with test methods in Handbook 21.

7.2 The high contact setting may be adjusted by means of the upper screw adjuster on the meter cover (the lower screw is the zero-adjuster for the meter needle) except for KS-5342 and KS-5561 ammeter relays. (See Figure 1)

7.3 The low contact setting, except for KS-5342 and KS-5561 ammeter relays, is adjusted by removing the relay cover and manipulating the insulated projection on the lower part of the stationary contact pointer arm. (See Figure 2)

7.4 On KS-5342 ammeter relays, the spacing between contact pointers is fixed and the adjusting screw on the front of the meter runs the pair of pointers up or down, maintaining the spacing. If the spacing between the contact pointers is to be changed, remove the cover and manipulate the insulated projections on the lower part of the pointer arms. These pointers cannot be set closer than 5%.

7.5 On KS-5561 ammeter relays both high and low contact settings are adjusted by removing the cover and turning the stationary pointer adjusting screw with a small screwdriver. (See Figure 2) A pin has been provided to limit the adjustment because the moving pointer contact will not make with the stationary contact outside of a certain range.

No arrows are shown due to extensive changes.

[Vertical lines at side of paragraphs indicate requirements.]

8. ZERO ADJUSTMENT

8.1 Adjust the meter needle to zero, with the ammeter relay on no-load, before proceeding with tests in Handbook 21. All ammeter relays except KS-5342 and KS-5561 have a zero-adjusting screw for the meter needle on the front of the cover. Turn the zero-adjuster with a small screwdriver until the meter needle indicates zero.

8.2 For KS-5342 and KS-5561 adjust the meter needle to zero by removing the cover and moving the spring tension adjusting arm with a small screwdriver or other pointed tool.

9. CONTACT PROTECTION NETWORKS

9.1 Observe connections of contact protection networks. (See Paragraph 1.53) Networks contained in the case may be observed when the cover is removed to adjust contacts. Check for breakage of leads, etc.

9.2 For all ammeter relays observe contacts when they break. If there is little or no sparking the contact protection networks are not defective.

9.3 Report any difficulties with meter-contained networks to the supervisor. The meter will probably have to be replaced.

R. E. RAHMES

Engineer of Installation

Reason for Reissue:

- (1) To include information on KS-15796, KS-15802, and KS-15803 ammeter relays.
- (2) To eliminate requirement for shunt temperature.
- (3) To tabulate certain information in Table A.

Replaces Section 103 dated 5- 7-53.