VOLTAGE REGULATOR FOR RESERVE ALTERNATORS
WESTINGHOUSE - TYPE UV-AG
OPERATING METHODS

1. GENERAL

1.01 This section describes the method of operating Westinghouse type UV-AG vibrating regulator for the control of voltage on Westinghouse alternators as furnished for KS-5525 sets.

1.02 Operation as described herein assumes the contact surfaces parallel when closed, and properly centered (approximately 1/32 inch on each side of moving contact when in mid-position).

1.03 Operation as described herein assumes that the polarity at the contacts is as shown in the wiring diagram. (See Fig. 1) Should the polarity become reversed, it may be corrected by disconnecting the leads from the exciter field at the terminal board on the set and applying a separate source of d-c potential of from 24 to 125 volts, having the proper polarity for a few moments. In the attached sketch disconnect the leads marked "EF1" and "EF2" at the terminal board and apply separate potential to these leads in such a manner that "EF1" is positive and "EF2" negative. Repeat as necessary until the exciter field builds up so that when the positive terminal of a d-c voltmeter is connected to "EF1" and the other terminal to "EF2" a direct reading of the voltmeter will be obtained.

1.04 It is not anticipated that there will be maintenance required on these regulators other than an occasional cleaning of the contact surfaces and replacement of dashpot oil. In cleaning contacts use only hard non linting cloth to wipe the contacts unless they are excessively burned when they should be smoothed with fine sandpaper before wiping. Remove no more of the contact material than is absolutely necessary and make certain that all particles of sand or grit are removed.

1.05 All main contacts, such as M1 and M2 group, consist of a moving and a stationary element. Each moving element has two contact surfaces, one composed of graphite and the other of silver. The contacts are so arranged that the graphite surface engages with a graphite stationary contact and the silver surface engages with a silver stationary contact when their respective contacts are made. The moving contacts are Westinghouse catalog number S-942855 for the silver and S-942856 for the graphite. The stationary contacts are Westinghouse catalog number S-1014119 for the silver and S-1014120 for the graphite.

1.06 The dashpot oil furnished with the regulator is Westinghouse catalog number S-841399 but dashpot oil listed in the section on materials - greases, oils and cleaning fluids may be used for replacements. Dissimilar dashpot oils should not be combined, always clean the dashpot thoroughly before adding oil of a different manufacture.

Description

2.01 The UV-AG regulator consists of a regulating element with cover, disconnect switches, and voltage adjusting rheostat, all mounted on a base, together with a Rectox rectifier and resistors mounted in a framework on the rear of the base. A terminal block is provided for making external connections. The associated exciter field rheostat (Exc. Fld.) and the voltage limiting rheostat (VL) are not included as part of the regulator.

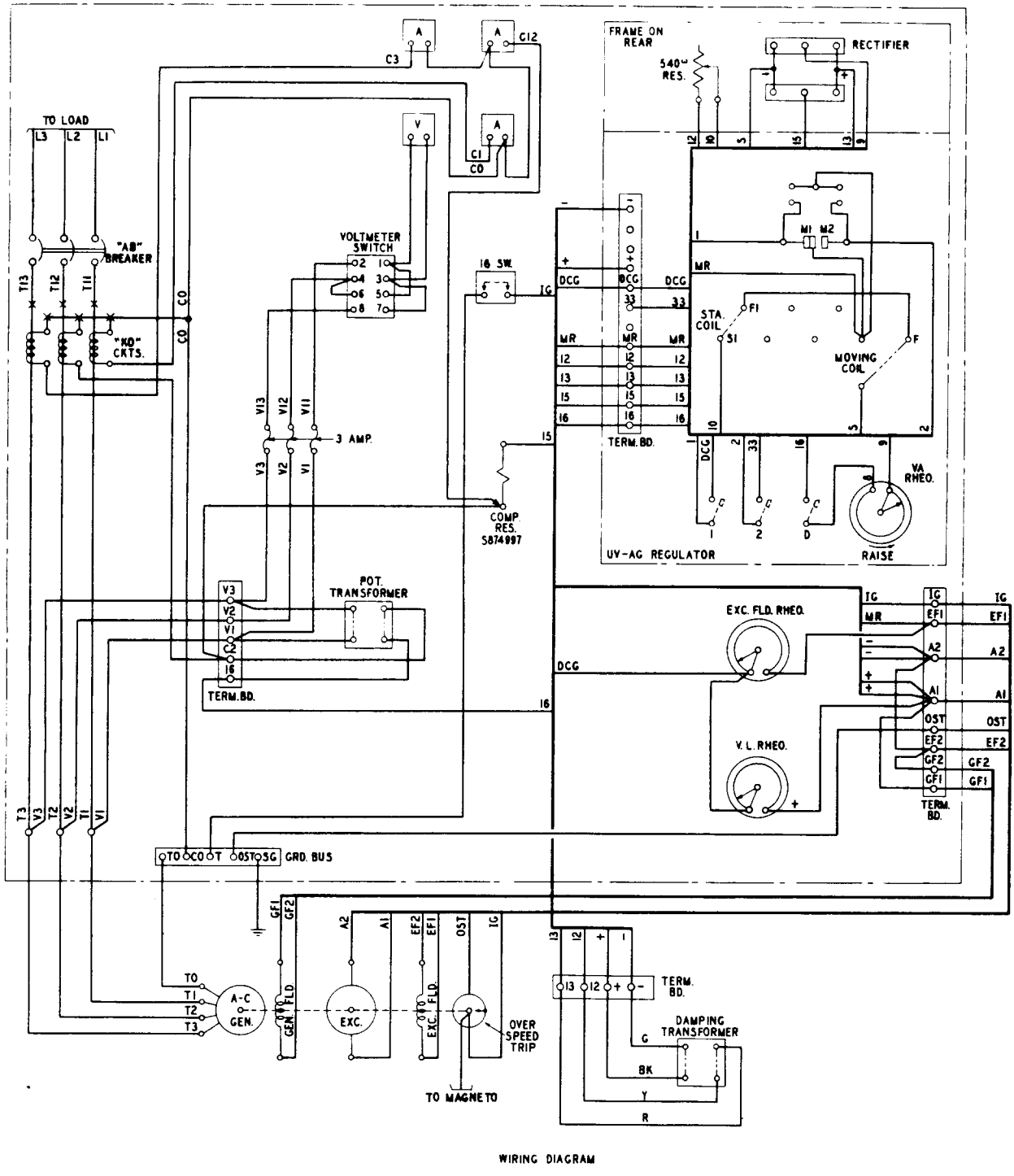
2.02 The regulator is designed for operation on 100-120 volts a-c. with connections on terminals 15 and 16. The regulator is tested and adjusted at the factory but final adjustment may be required at installation.

To Place Regulator in Service

2.03 To place regulator in service initially, remove the regulator cover, by loosening the thumb nuts and pulling the cover forward. As received from the manufacturer the dashpot oil is shipped in a separate container. Remove the dashpot, and clean the dashpot and plunger as necessary. Fill the dashpot to the lower mark on the window frame with the Westinghouse catalog number S-841399 oil received with the regulator or dashpot oil approved for use in the dashpots of other equipment used in the same office. Be careful not to spill the dashpot oil on other parts of the regulator. After adding the oil move the plunger up and down several times with the needle valve open to remove any trapped air. Then replace dashpot and cover.

2.04 With dashpot oil in the dashpot, open the switch D and the contact disconnecting switches 1 and 2. Leave switch 2 open. Adjust the voltage adjusting (VA) rheostat until its index finger shows the rheostat to be in its mid-position. Obtain normal voltage on the alternator by manual operation of the exciter field rheostat.

2.05 Close switch D. With normal a-c. voltage at the regulator terminals, the moving contacts should balance in approxi-



WIRING DIAGRAM

Fig. 1 - Wiring Diagram - Westinghouse Type UV-AG Regulator

2.05 (Continued)

mately their mid-position. This may be checked by varying the position of the voltage adjusting (VA) rheostat. After the check return the rheostat to its mid-position.

2.06 If balance is not obtained, make sure adjusting rheostat is in mid-position and then adjust the wire (10) at the 540 ohm resistor until the moving contacts balance in the mid-position with .43 ampere in the coil circuit (sta. coil and mov. coil). If necessary readjust balance at this current by loosening locknuts and changing tension of regulator main spring. Tighten locknuts after any adjustment.

Rheostat Settings

2.07 With the alternator running at no load turn the voltage limiting (VL) rheostat to the "all in" position and the exciter field rheostat to the "all out" position. Adjust the voltage limiting rheostat to give approximately 120% of the exciter rated voltage. Mark this position as a preliminary setting.

2.08 Next turn the exciter field rheostat to reduce the voltage to approximately 20% of the exciter rated voltage.

2.09 With switch D open, close contact disconnect switch (1), thereby short-circuiting the exciter field rheostat and note the time required to build up from 25% to 100% exciter rated voltage.

2.10 With switch D open, open the contact disconnect switch (1) and note time required to build down from 100% to 25% exciter rated voltage. The voltage limiting (VL) rheostat setting determines the time of building up. The exciter rheostat setting determines the time of building down. Readjust the exciter rheostat until the time of build up and build down is approximately the same. Temporarily mark the exciter rheostat position.

Note: If this adjustment cannot be accomplished with the exciter rheostat, cut in resistance in the voltage limit rheostat until this adjustment can be attained.

To Put Regulator in Control

2.11 Run the alternator at no load. With the contact disconnect switch (1) open adjust the a-c voltage to normal value by means of the exciter field rheostat, with the voltage limiting rheostat in the marked position.

2.12 Close switch D. Turn the voltage adjusting rheostat until the moving contacts open. Close the contact disconnect switch (1), thus connecting the moving contact across the exciter field rheostat. Turn the exciter field rheostat slowly to the marked position. As the rheostat is moved the moving contact should begin to vibrate, alternately opening and closing to give the required average voltage across the exciter field. Normal vibration is fast and of very small amplitude. A preliminary adjustment of the dashpot needle valve may be now made to stabilize the voltage.

To Adjust Dashpot

2.13 The dashpot stem spring should have only three or four free turns. Operate the alternator at normal voltage and no load. Hold the regulator moving contact in the mid-position, (contacts open) until the voltage drops about 20% and note time for regulator to bring the voltage back to normal.

2.14 Close needle valve all the way and then back off to open, leaving needle valve at point where voltage is settled in shortest time from a point 20% below normal.

To Check Regulator Under Load

2.15 With regulator rheostat and dashpot adjustments as outlined above and the rheostats in their marked positions, connect load to the alternator by steps up to full normal rated KW load. For any reasonable load change, the voltage should settle in several seconds.

2.16 If the regulator operation and voltage are steady over this range make the voltage limiting and exciter field rheostat position markings permanent. If the regulator operation is not steady on light load adjust the exciter field rheostat and if not steady on heavy loads adjust the voltage limiting rheostat to settings which will give satisfactory operation over the complete range and mark permanently. The rheostats should then always be at their marked positions when the regulator is in control.

2.17 If difficulty is encountered in obtaining satisfactory operation check the wiring and exciter polarity at the regulator terminals and on the black and green leads of the damping transformer primary.

To Take Regulator Out of Control

2.18 With alternator running remove load as much as is practicable.

2.19 Turn the exciter field rheostat towards the "all out" position to bring the moving contact of the regulator to the open or mid-position.

2.20 Open the contact disconnect switch (1) on the regulator panel.