DESCRIPTION • OPERATION • MAINTENANCE

INSTRUCTIONS

VOLTAGE REGULATING RELAY

Style No. 568 845, 1629 581 and 1629 582 With No-Voltage Device

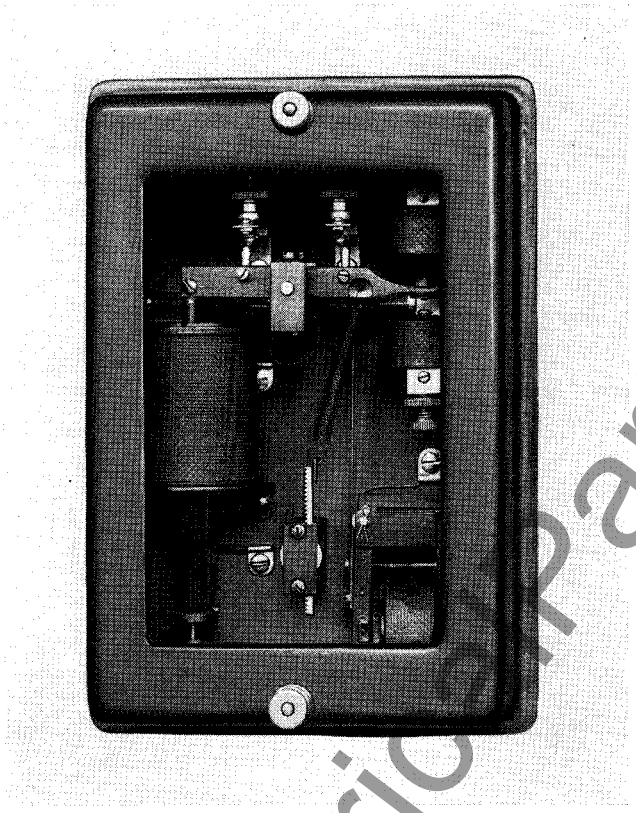

FIG. 1. Voltage Regulating Relay.

THE VOLTAGE REGULATING RELAY consists of a solenoid operated balance arm, pivoted at the center, with contacts on either side working in conjunction with two adjustable stationary contacts. In the balanced or horizontal position, neither pair of contacts is closed. The closing of either contact energizes a corresponding compounding coil, which increases the pressure on the contacts, prevents chattering and holds the contacts firmly closed until the balance voltage is nearly reached again. The no-voltage device opens the circuit to contacts PR and PL through the balance arm. See Fig. 1 and 2.

CONSTRUCTION

The solenoid plunger is hung at one end of the balance arm and its weight is partially counterbalanced by a spring at the opposite end. The solenoid exerts an upward pull on the plunger, the amount of pull depending upon the voltage applied to the solenoid. By adjusting the pull on the spring, the arm can be brought to a balance position for various voltages. Voltages above this value will close the left hand contact and voltages below this value will close the right hand contact. The tension on the spring is varied by a rack and pinion having a self-locking micrometer adjustment.

Adjusting thumb screws and lock nuts are provided on the stationary contacts and compounding coil cores so that the limits within which the relays operate may be changed. In addition, set screws are provided to positively hold the compounding coil cores in position after adjustments have been made.

The balance arm set screws which hold the moving contacts in place are used only if the contacts are to be replaced; they are not used for adjustment purposes.

The lower end of the plunger is guided by a small needle shaft working in a bearing which is

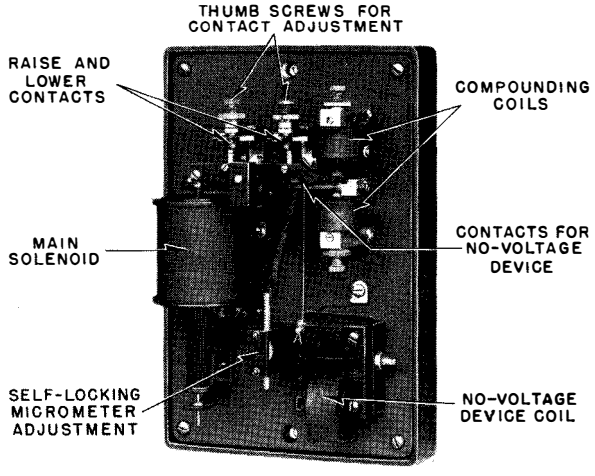

FIG. 2. Voltage Regulating Relay with Cover Removed.

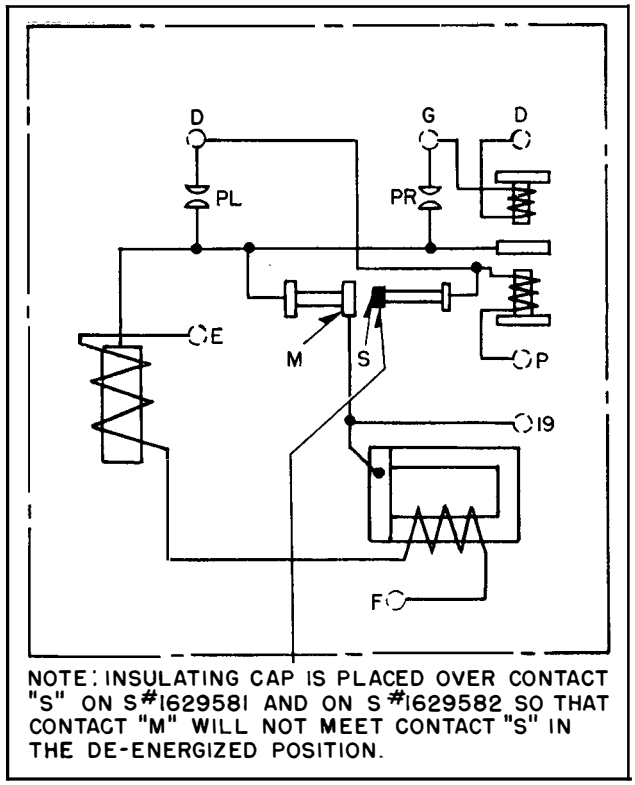

FIG. 3. Front View of Voltage Regulating Relay in Balanced Energized Position.

countersunk to give only a line contact and is practically frictionless.

The contacts are of silver and the stationary ones are carried on a double leaf spring to prevent chattering.

The standard relay may be adjusted to operate from 90 to 140 volts, 60 cycles (115 volts normal). One volt is the minimum change in voltage from the balance voltage at which the relay contacts should close and ½ volt is the minimum change in voltage from the balance voltage at which the compounding coils should release.

The no-voltage device is mounted in the lower right hand corner of the relay. Under normal operation, a contact on an arm attached to the armature of the no voltage device supplies current to the balance arm. When the line voltage fails, the balance arm tilts to the raise position, but the no-voltage coil releases and the armature swings outward and the attached contact arm breaks the circuit to the balance arm and holds the tap changer at the position it was on when the voltage failed.

Special coils can be furnished for special voltages and frequencies.

The relay panel has a shock-proof mounting and is enclosed in a dust-proof metal cover. A glass front allows ready inspection of the operating parts.

OPERATION

Before attempting to operate the relay, remove the blocking between contacts, between the solenoid and plunger and on the no-voltage device. See that the balance arm and no-voltage arm move freely.

The schematic diagram of the relay is shown in Fig. 3.

On increase in voltage, the plunger is raised, closing the left hand contact which completes a circuit from the balance arm to the external relays. It also energizes the lower compounding coil which assists the solenoid in holding the contact closed. When the voltage again begins to decrease, the pull from the solenoid decreases but the compounding coil still exerts a pull which is finally overcome by the weight of the plunger, when it suddenly releases and opens the relay contacts.

On decrease in voltage, the pull on the plunger is decreased until the weight of the plunger overcomes the spring tension and the right hand contact is closed. As previously described, the circuits are completed to the external apparatus and now the upper compounding coil is energized which helps to keep the contact closed. As the voltage again increases, a small additional pull on the plunger does not open the contact but finally it overcomes the pull of the upper compounding coil. The contacts snap apart and the relay comes to the balanced position.

The no-voltage device armature closes when the line voltage is first applied and remains closed until the line voltage fails, when it will open the circuit to the balance arm, thereby preventing automatic operation of the regulator.

ADJUSTMENT

As received by the customer, mounted on a regulator, no adjustment of the contacts or compounding coil cores should be required. If it is desired to operate the relay at a higher "balance" voltage, the spring tension should be decreased and thereby increasing the unbalanced weight of the plunger. Conversely, if it is desired to lower the "balance" voltage operating point, the spring tension should be increased until the relay balances at the desired new voltage.

If the relay is out of adjustment as regards the range in voltage required to close the contacts, balance the relay arm at a convenient steady voltage with the contacts open. Reduce the voltage (an amount corresponding to one step) and ad-

just right hand contact until it just closes. Then raise the voltage one half this amount and adjust the upper compounding coil core by turning it in or out until it just releases. Now adjust the left hand contact by raising the voltage (an amount corresponding to one step) above the steady balance voltage value and adjust the left hand contact until it just makes; adjust the compounding coil core until it just releases on decrease of one half this voltage step.

When making adjustments be sure that the contact arm does not touch the compounding coil cores, or the relay will chatter. The final stop should be the moving contact against the stationary contact.

The no-voltage device moving contact should positively close against the left contact when the coil is energized and snap open when the coil is de-energized.

MAINTENANCE

The relay should be inspected at regular intervals to see that the balance arm works freely and that the contacts are not burned. If contacts should be burned, dress them down with an S# 1002 110 file. Never use sandpaper, as non-conducting particles may lodge in the soft contact material and cause faulty relay operation.

If plunger is sluggish, remove the screw holding the guide bearing, remove bearing screw at top, withdraw the plunger and clean. There may be dirt or packing in the solenoid opening, a bent needle shaft, or dirt in the guide bearing.

Caution: Do not lubricate bearings. Keep cover on tight.

RENEWAL PARTS

The following are recommended as renewal parts to provide proper maintenance of this relay.

Description of Part	Style No.	No. Per Unit
Moving Contact and Stud	817 696	2
Stationary Contact with Spring	817 697	2
Moving Contact Shunt	127 466	1
Main Solenoid Coil	757 128	1
Compounding Coils	406 173	2
No-Voltage Device Coil	406 172	1

Complete Renewal Parts information may be obtained from nearest Westinghouse Sales Office. Be sure to specify the part needed and give complete nameplate reading of the relay for positive identification.

WESTINGHOUSE ELECTRIC CORPORATION
SHARON PLANT • TRANSFORMER DIVISION • SHARON, PA.
Printed in U.S.A.