Primary Relay with No-Voltage Release Device Style No. 568845

INSTRUCTIONS

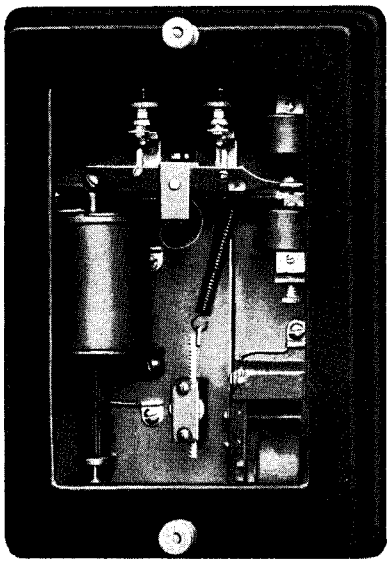

FIG. 1—PRIMARY RELAY

GENERAL

This relay is used on step type regulators when the operating motor is supplied from a source other than the line being regulated.

The primary 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 are closed. The closing of either contact energizes a corresponding compounding coil, which increases the pressure on the contacts and prevents chattering and holds the contacts firmly closed until the balance voltage is nearly reached again. The tripping of the no-voltage device opens a contact supplying voltage to the balance arm and prevents the tap changer from operating. See Figs. 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 moving contacts on the balance arm can be replaced by releasing a set screw. They are not used when making ordinary adjustments but only when replacing the contacts.

The lower end of the plunger is guided by a small needle shaft working in a bearing which is 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 release device is mounted in the lower right hand corner of the relay. Under normal operation, contacts on an arm attached to the armature of the release 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 contact arm attached, 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 and between the solenoid and plunger and on the no-voltage device. See that the balance arm and no-voltage release 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 and also energizes the lower compounding coil which assists the solenoid to hold the contact closed. When the voltage again begins to decrease, the pull from the solenoid decreases but the compounding coil still exerts a pull until it is finally overcome by the weight of the plunger, when it suddenly releases and opens the relay contacts with a minimum of burning.

On decrease in voltage, the pull on the plunger is decreased until the weight

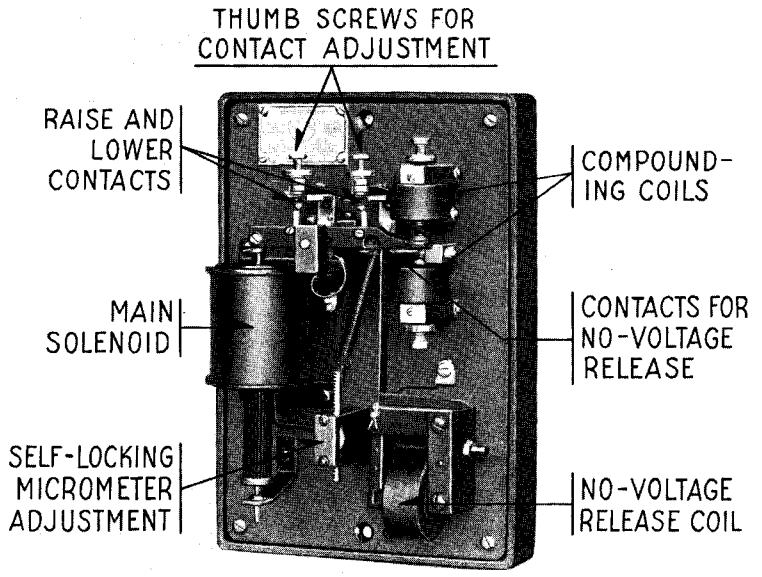

FIG. 2—PRIMARY RELAY WITH COVER REMOVED

Primary Relay with No-Voltage Release Device—Style No. 568845—Continued

INSTRUCTIONS—Continued

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 the first additional pull on the plunger does not open the contact but finally it overcomes the pull of the upper compounding coil and the contacts snap apart and the relay comes to the balanced position.

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

As received by the customer, mounted on a regulator no adjustment should be made to the contacts or compounding coil cores. If it is desired to operate the relay at a higher "balance" voltage this is accomplished by decreasing the spring tension and thereby increasing the unbalanced weight of the plunger. Conversely, if it is desired to lower the "balance" voltage operating point, then 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, then reduce the voltage (an amount corresponding to one step) and adjust right hand contact until it just closes and next raise 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 and then adjust the compounding coil 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 release 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 down with .000 sandpaper or crocus paper.

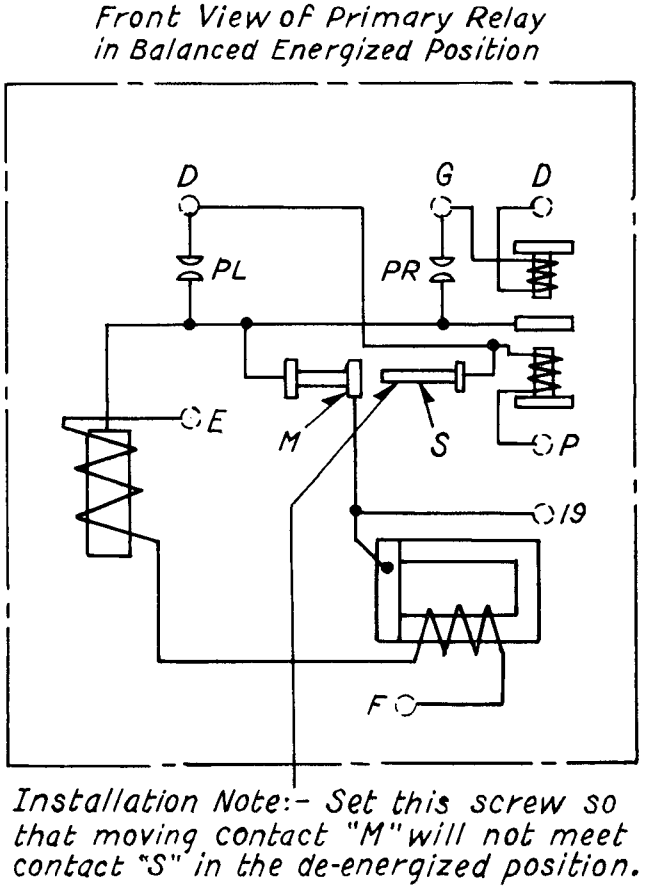

FIG. 3

If plunger is sluggish, remove the screw holding the guide bearing and then remove bearing screw at top and withdraw plunger and clean. There may be dirt or packing in the solenoid opening or 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 Release Coil	406 172	1

ORDERING INFORMATION

The complete relay should be ordered from Sharon Works. Parts only for relay should be ordered from Newark Works by giving the correct identification of the desired part and the complete nameplate reading of the relay.

Westinghouse Electric & Manufacturing Company

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