INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE COJ CAPACITOR SWITCHING RELAY

CAUTION Before putting relays into service, remove all blocking which may have been inserted for the purpose of securing the parts during shipment, make sure that all moving parts operate freely, inspect the contacts to see that they are clean and close properly, and operate the relay to check the settings and electrical connections.

APPLICATION

The type COJ relay is a completely automatic single step current control device for capacitor switching.

CONSTRUCTION AND OPERATION

The relay consists of a current operated disc element, a type SG auxiliary relay and resistors.

The operating element is an induction disc type element operating on current. The induction disc is a thin four-inch diameter conducting disc mounted on a vertical shaft. The shaft is supported on the lower end by a steel ball bearing riding between concave sapphire jewel surfaces, and on the upper end by a stainless steel pin.

The moving contact is a small silver rod hemispherically shaped at either end to form a double throw arrangement. It is fastened on the end of a conducting arm. The other end of this arm is clamped to an insulating tube on the disc shaft. The electrical connection is made from the moving contact thru the arm and a spiral spring. One end of the spring is fastened to the arm, and the other to a slotted spring adjuster disc which in turn fastens to the moulded insulation block mounted on the element.

The front and back stationary contact assemblies are both adjustable. Each mounts on a lever which can be set anywhere about the periphery of a calibrated scale. The moulded brackets, upon which the stationary contact leaf springs are mounted, are each secured to their respective lever arms by two screws. These screws may be loosened and the moulded contact supports pivoted to the positions required for correct tracking of both contact assemblies on the calibrated scale.

The moving disc is rotated by an electromagnet in the rear and damped by a permanent magnet in the front.

A resistor is connected in the upper pole circuit of the operating element electromagnet to minimize ambient temperature error.

The auxiliary type SG relay is provided with two main contacts, one make and one break, and a seal-in contact. The operating element high current contact closes to energize the SG element which seals in thru the flexible seal-in contact, and remains energized until the operating element low current contact short circuits the SG potential coil through the current limiting resistor.

The relay elements are mounted in a detachable socket type case similar to the standard socket type watthour case. The base of the case is equipped with a circuit closing device.

CHARACTERISTICS

The type COJ relay has adjustable high and low current contacts that can be set around a calibrated scale between the limits of 1 and

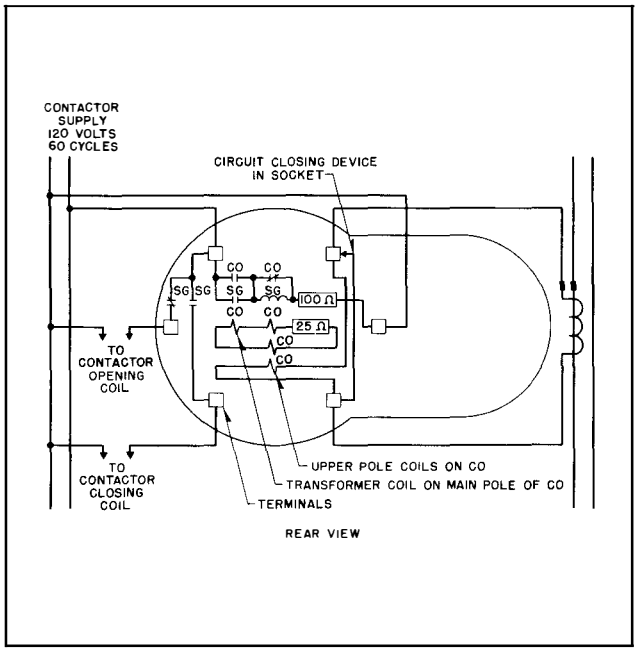

Fig. 1—Internal and External Schematic of Type COJ Relay. For Reference Only.

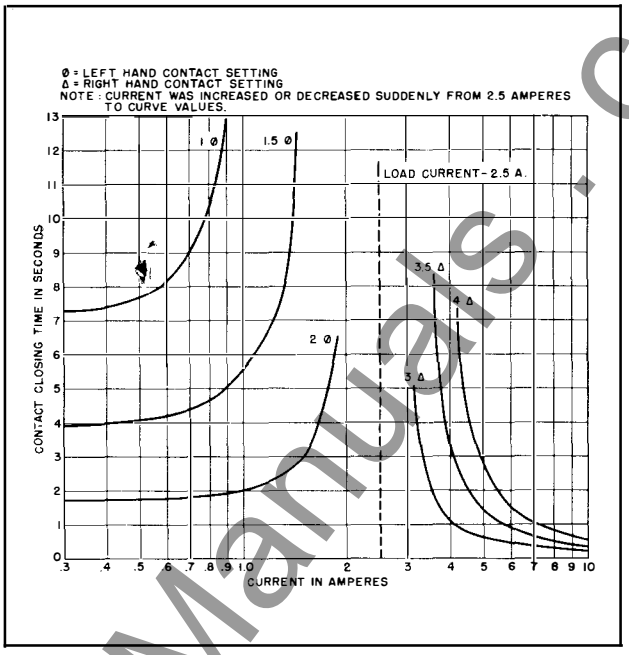

Fig. 2—Typical Time Current Curve for COJ.

4 amperes. The moving contacts assume a position corresponding to the current through the relay and will stay in that position until the current changes. If the current changes either gradually or suddenly, the contacts will assume a new position corresponding to the change unless the travel is limited by the setting of the adjustable contacts. If the contacts are set to close for a particular value of current, and if the current of that exact amount is applied, then the relay is operating at its minimum trip point and the times on repeated operations are not repetitive within close tolerances. However, current appreciably greater than the overcurrent setting or appreciably less than the undercurrent setting result in relay timing operations which are consistent for repeated trials.

The relay has inverse-timing. For example; the greater the increase in current above the load current the faster the relay contact will travel, or the smaller the current is in comparison to the load current the faster the relay contact will close.

ADJUSTMENTS AND MAINTENANCE

The proper adjustments to insure correct operation of this relay have been made at the factory and should not be disturbed after receipt by the customer. If the adjustments have been changed, the relay taken apart for repairs, or if it is desired to check the adjustments at regular maintenance periods, the instructions below should be followed.

All contacts should be periodically cleaned with a fine file. S#1002110 file is recommended for this purpose. The use of abrasive material for cleaning contacts is not recommended, because of the danger of embedding small particles in the face of the soft silver and thus impairing the contacts.

The relay has front and back adjustable stationary contacts; to adjust these properly, set the two levers so they both point to the same calibration point at approximately midscale. The contact leaf spring of the operating element should be positioned such that they are just free of the contact hook bracket to insure no ninitial tension on the leaf spring. Then adjust the position of the front and back contacts so they both just touch on either side of the moving contact. This is done by loosening the two screws at the top of each lever and rotating the adjustable contact

assembly slightly until the desired contact positions are obtained. The screws should be tightened securely.

To calibrate the relay, it should be connected to a suitable 60-cycle current supply. Current corresponding to the various values marked on the semi-circular scale plate should be applied to the relay and the position of the adjustable contacts checked for the various values. Readjustments can be made by rotating the notched spring adjuster with a screw driver blade inserted in one of the notches.

The flexible seal-in contact of the SG element should be adjusted by bending the associated back plate, such that there is a contact gap of approximately 1/16 inch when the element is de-energized.

ENERGY REQUIREMENTS

The 60-cycle burdens of the type COJ relay are as follows:

Operating element current coil with resistor in upper coil, VA = 7.25\65° lag at 5 amperes, SG element plus resistor, VA = 11\60° lag at 120 volts.

* Coil Rating

Continuous rating of the operating coil is 16 amperes. The one second rating is 460 amperes.

Contact Rating

The main SG element contacts will carry 12 amperes continuous and 30 amperes for one second and will interrupt 30 amps non-inductive load at 115 volts 60 cycles. For d.c. interrupting ratings for non-inductive circuit are given in the table that follows:

Volts	Amps.
24	15
48	8
115	2.4
230	0.75
550	0.25

RENEWAL PARTS

Repair work can be done most satisfactorily at the factory. However, interchangeable parts can be furnished to the customers who are equipped for doing repair work. When ordering parts, always give the complete nameplate data.

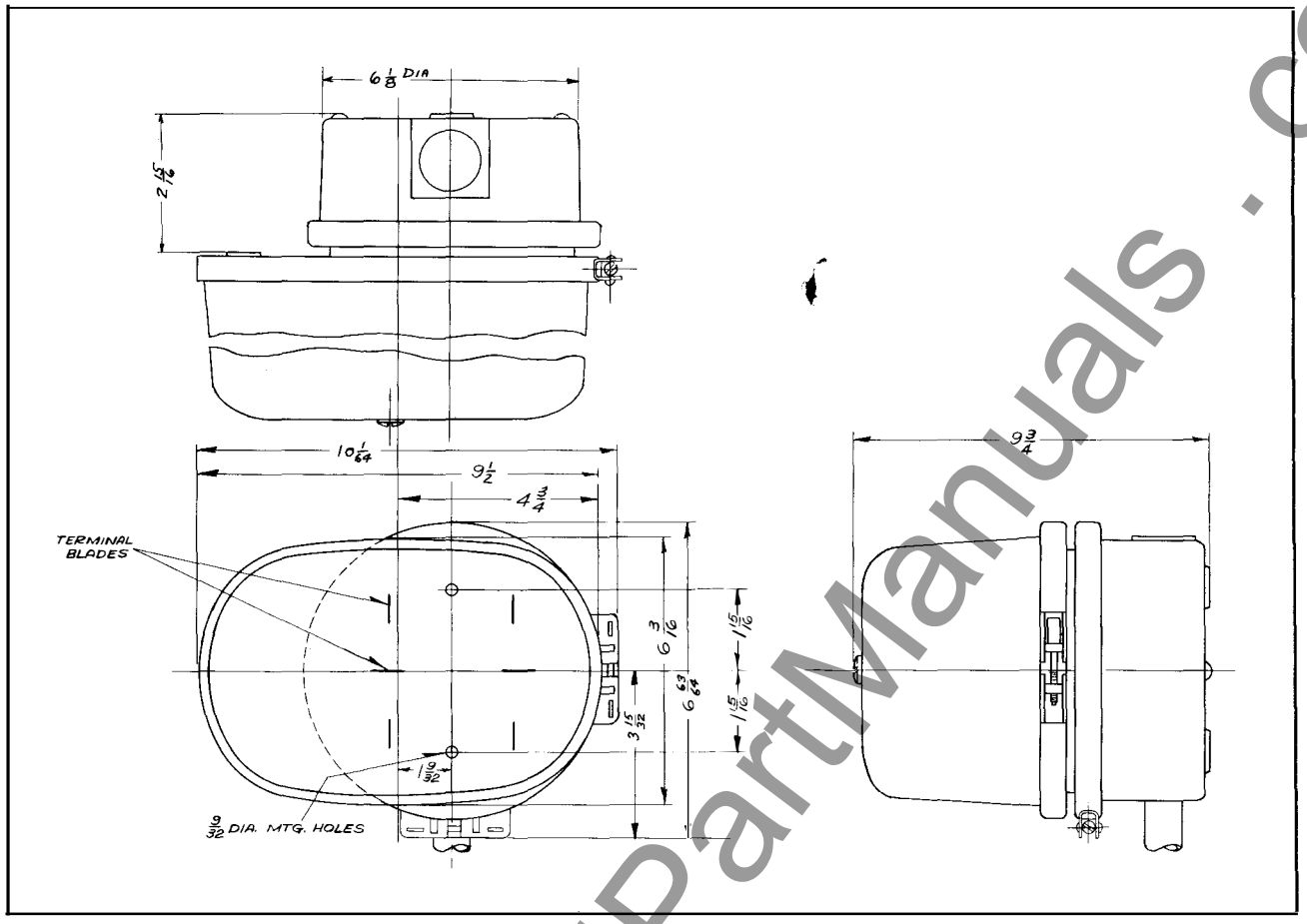

Fig. 3—Outline for Type COJ Relay. For Reference Only.

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