INSTALLATION • OPERATION • MAINTENANCE

INSTRUCTIONS

TYPE CJ-2 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 connection.

APPLICATION

The type CJ-2 relay is a complete automatic single step voltage control device for capacitor switching. The relay is primarily intended for applications on circuits where close voltage settings are not required or where voltage changes with load are gradual and not accompanied by repetitive voltage fluctuations of high magnitude. When applying the type CJ-2 relay, a graphic record of the voltage at the proposed location should be taken. By comparing the operating time of the relay for its contemplated settings and the voltage changes recorded on the graph, the expected number of operations can be estimated.

CONSTRUCTION

The relay consists of an induction disc type voltage sensing unit and a type SX toggle unit.

Voltage Sensing Unit (90)

The electromagnet is an "E" type laminated structure with the voltage coil mounted on the center leg that produces a flux which divides and returns through the outer legs. A shading coil on the right leg, front view, causes the flux to lag the main pole flux. The out-of-phase fluxes thus produced in the air gap cause torque on the disc.

Toggle Unit (SX) (90X)

The SX toggle Unit consists of two electromagnets with a common armature. One end of the armature has two pins which rest in a groove in the molded base. The other end of the

armature is held in one of two positions by means of a toggle spring which produces the toggle action. The toggle spring is protected during shipment by a removable lock pin which limits the forward motion of the armature. The lock pin does not affect the normal operation of the relay and may be left in after installation.

The moving contacts are mounted at one end of the armature and the stationary contacts are mounted on either side.

The relay units are mounted in a detachable socket type case similar to the standard socket type DSP watthour case. The base of the case is equipped with a disconnect link to isolate the main SX contacts for separate source tripping of the capacitor switch.

OPERATION

When the voltage unit 90R contact closes to the left-hand side (indicating that the line voltage is lower than normal) the raise coil of the toggle unit (90 X) is energized and the 90 X/R contact is toggled closed and the 90 X/L contact is now open. When the line voltage rises sufficiently to close the voltage unit 90 L contact the lower coil of the toggle unit (90 X) is energized and the 90 X/L contact is toggled closed and the 90 X/R contact is opened.

CHARACTERISTICS

The type CJ-2 relay has adjustable high and low voltage contacts that can be set around a calibrated scale between the limits of 105 and 135 volts. The moving contacts will assume a position corresponding to the voltage applied to the relay and will stay in that position until the voltage changes. If the voltage changes either gradually or suddenly, the contact 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 voltage, and if a voltage 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, voltage appreciably greater than the overvoltage setting, or appreciably less than the undervoltage setting, result in relay timing operating which are consistent for repeated trials.

The relay has inverse timing; that is the greater the increase in voltage the faster the relay contact will travel.

SX Contact Rating

The SX toggle unit contacts will carry 5 amperes continuously. They will interrupt non-inductive circuits carrying 20 amperes at 115 volts a-c, 10 amperes at 230 volts a-c, 2 amperes at 125 volts d-c, or 0.75 amperes at 250 volts d-c.

SETTINGS

There are two independent relay adjustments. These are the high voltage and low voltage contact settings as described under "Characteristics."

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.

Acceptance Check

The following check is recommended to insure that the relay is in proper working order:

A. Voltage Sensing Unit

1. Contact Adjustment Check - Set the left-hand adjustable contact in the center of the scale and adjust the voltage until the moving contact just makes. Set the left-hand contact back out of the way and bring the right-hand contact up until the contacts just make. The pointer should be within ± 1/32" of where the left-hand pointer was.

2. Calibration Check - Check the scale markings by setting either of the two contacts at a value marked on the scale, then alternately apply this voltage plus and minus 1 volt. Contacts should make and break respectively.

B. SX Toggle Unit

1. Calibration Check - If correctly adjusted, the unit will operate through its own contacts, without chattering at 80% of rated voltage.

Routine Maintenance

All relays should be inspected periodically and the time of operation should be checked at least once every year or at such other time intervals as may be dictated by experience to be suitable to the particular application. The use of phantom loads, in testing induction-type relays, should be avoided, since the resulting distorted current wave form will produce an error in timing.

All contacts should be periodically cleaned. A contact burnisher #182A836H01 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 contact.

CALIBRATION

Use the following procedure for calibrating the relay if the relay has been taken apart for repairs or the adjustments disturbed. This procedure should not be used until it is apparent that the relay is not in proper working order (See "Acceptance Check").

A. Voltage Sensing Unit

1. Contacts - Apply sufficient voltage to the relay to make the disc float in the center of its travel. Move both of the adjustable contacts until they just make with the moving contacts. If the two contact pointers do not meet at the same point on the scale, adjust the follow on both adjustable contacts. Approximately the same follow should be in each of the adjustable stationary contacts.

2. Calibration Check - The adjustment of the spring tension in calibrating the relay is most conveniently made with damping magnet removed.

Set either of the adjustable stationary contacts in the center of its travel and apply this voltage to the relay. Wind up the spiral spring by means of the spring adjuster until the stationary contact and moving contact just make.

Check the other scale markings by setting the adjustable contact on these markings and applying the corresponding voltage to the relay. The contacts should make within plus or minus 1 volt of scale marking.

B. SX Toggle Unit

If the SX Toggle Unit has been dismantled, it is necessary to check the toggle action and the contact follow after reassembling it. Set the gap between the lower pole pieces at 11/64". The contact follow should be set at .037". This may be obtained by adjusting the stationary contacts to just make when there is an .020" gap between the residual pin in the armature, and the upper pole pieces. The adjusting screw assembly should be pushed down until there is enough tension to cause the residual pin to rest against the pole piece. With the lock nut tightened, adjust the adjusting screw until there is equal toggle pressure on each side. This may be done mechanically with a gram gage or electrically by applying a voltage to the coils.

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, alwyas tive the complete nameplate data.

ENERGY REQUIREMENTS

The 60 cycle burdens for the CJ-4 relay are as follows:

Voltage sensing unit, VA = 11 75.5° lag at 120 volts
SX Toggle Unit, VA = 32 46° lag at 120 volts. Toggle unit is rated for intermittent duty.

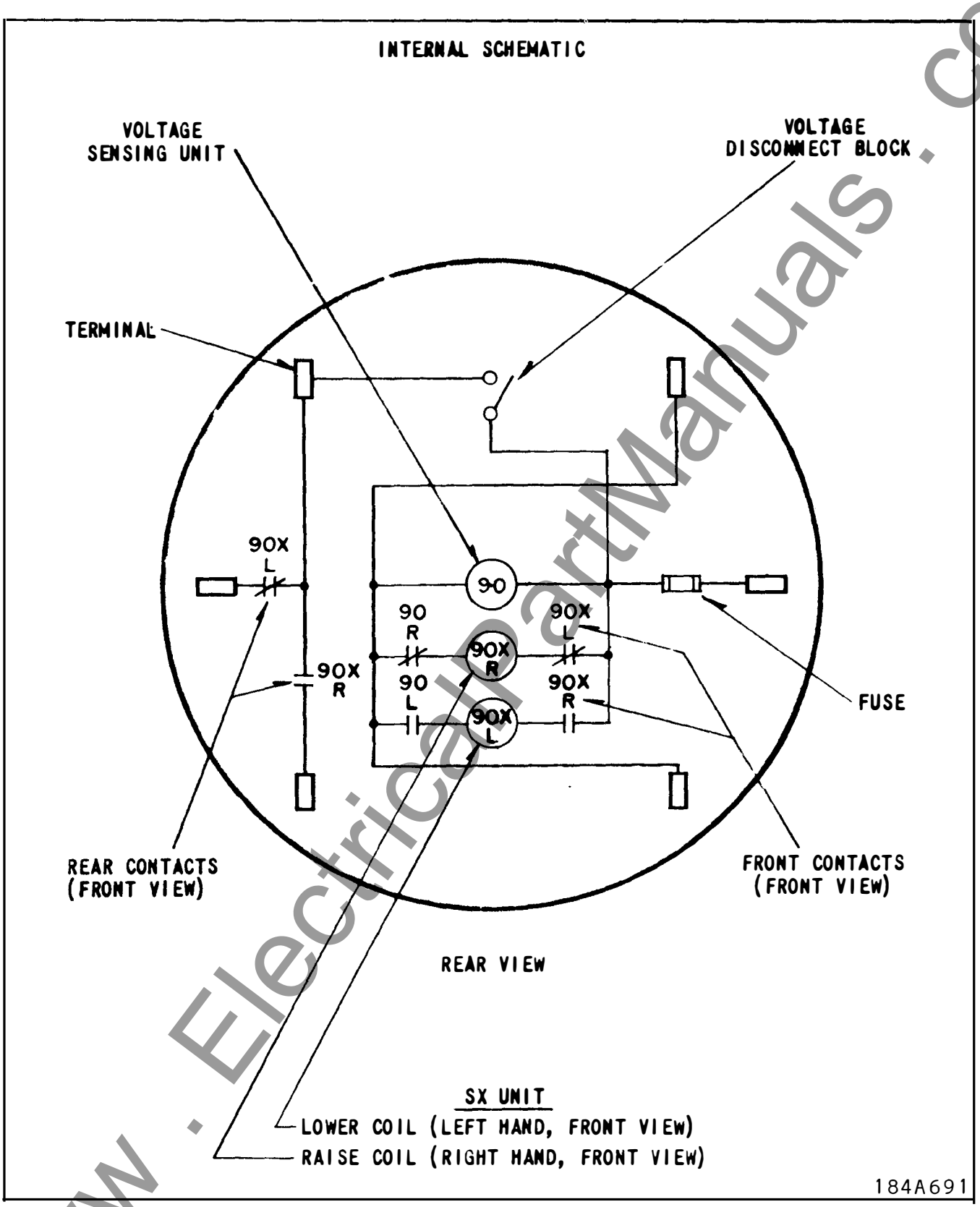

Fig. 1 Internal Schematic

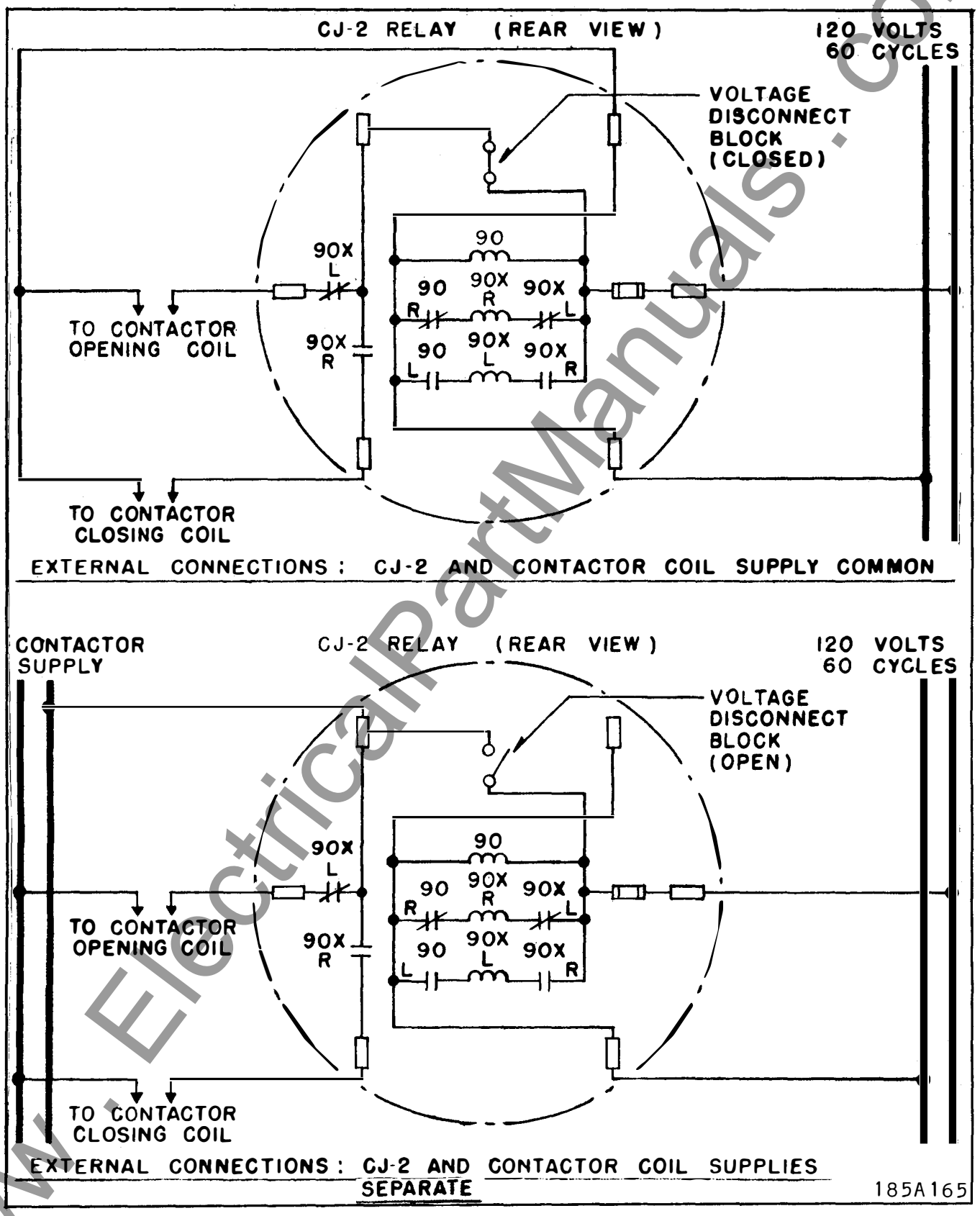

Fig. 2 External Schematic.

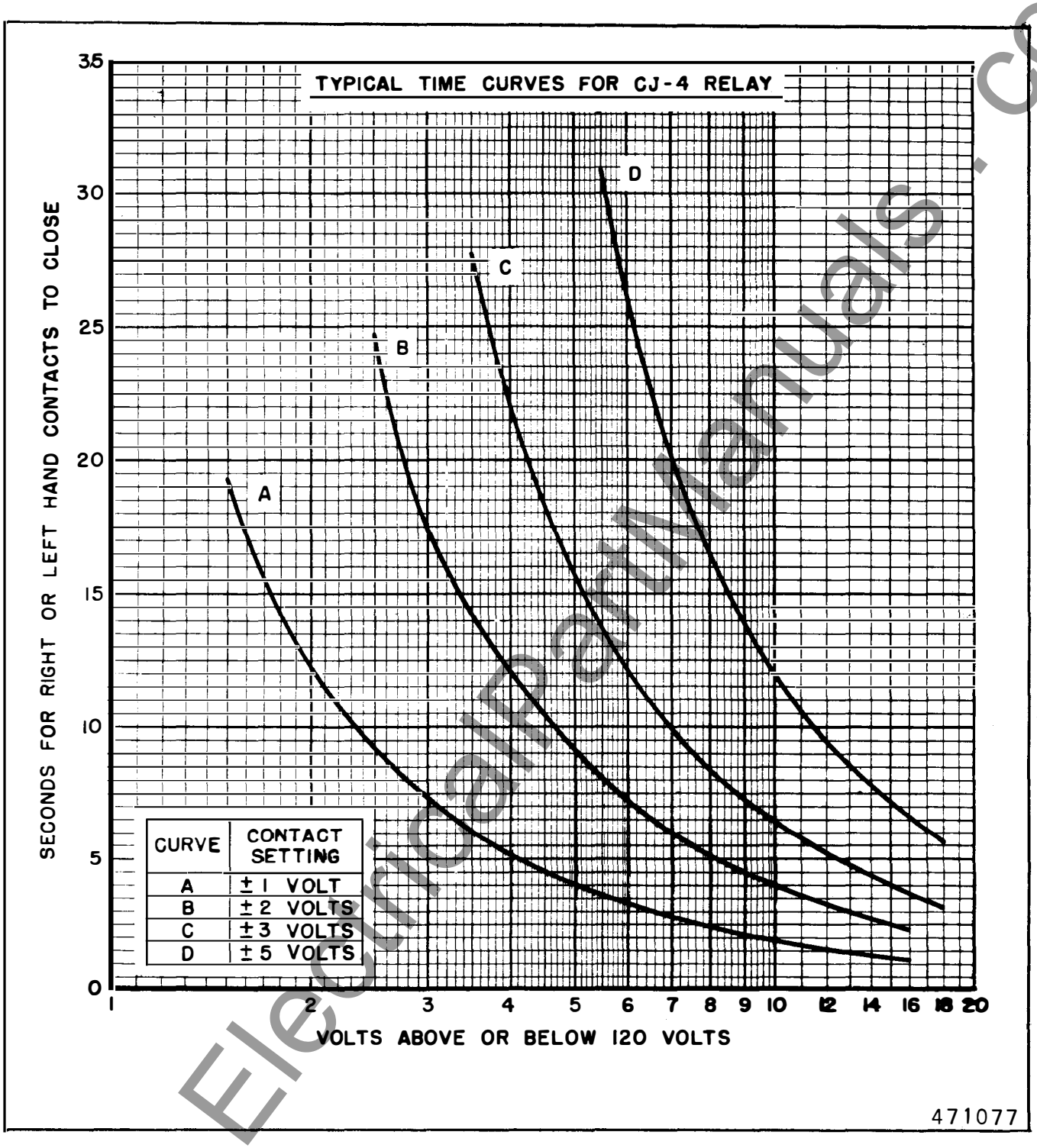

Fig. 3 Typical Time Curve for Type CJ-2 Relay.

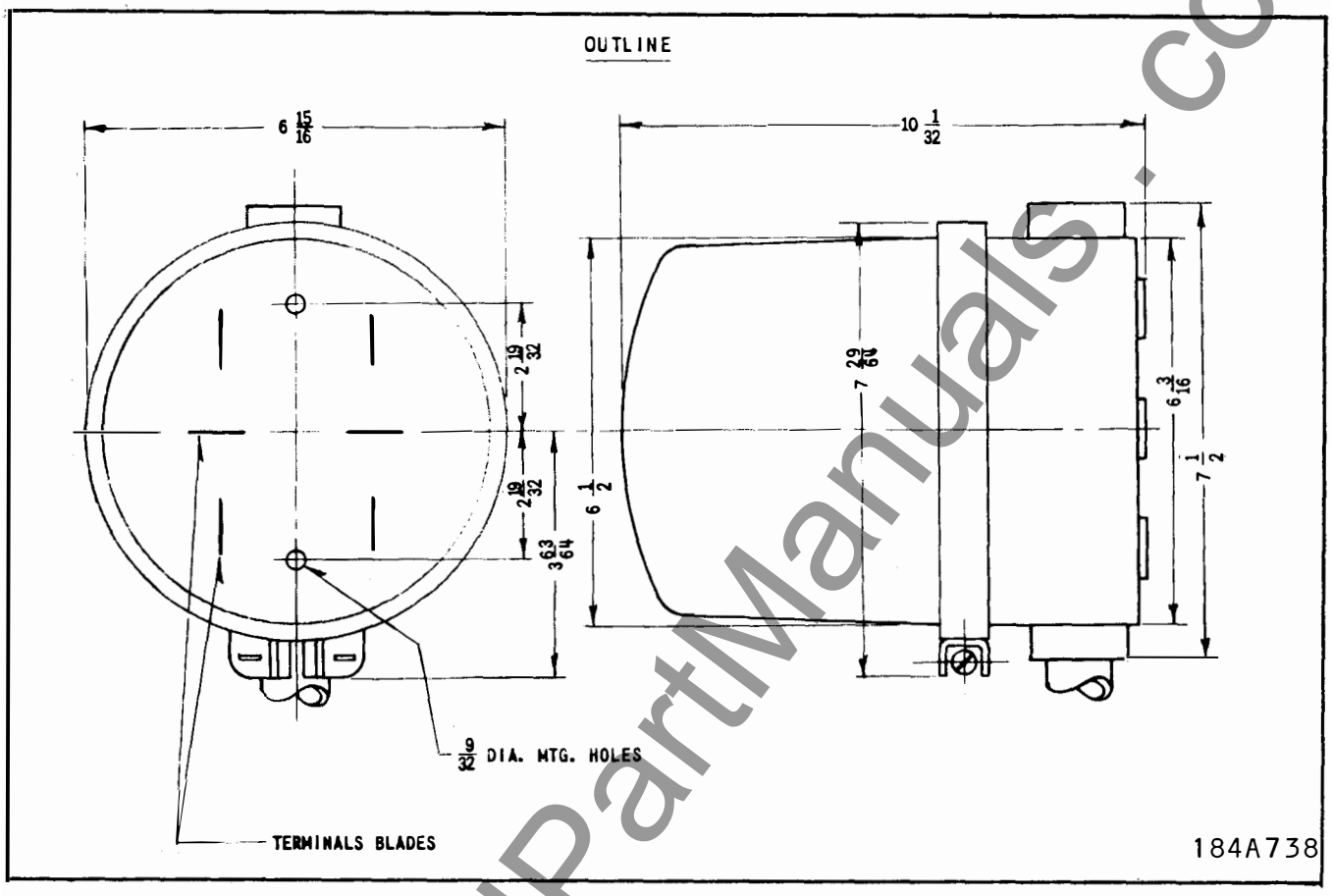

Fig. 4 Outline for Type CJ-2 Relay in Watthour Meter DSP Case and Socket.

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