

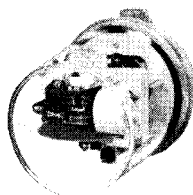
Westinghouse



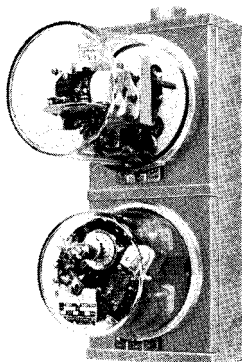
Controls for Automatic Switching

Current, Voltage, Var
Socket or Cabinet Type
Inherent or Fixed Time Delay

Socket Type

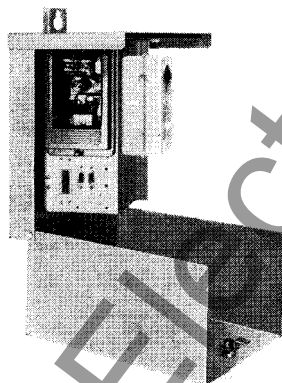


COJ or CJ-2



CJ-2 with Time Switch

Cabinet Type



CJ-5, CJ-4 or CJ-7 with Time Switch

General Information

After a switched Autotrol® capacitor has been hoisted into position on a pole, and line leads have been connected to the three switch terminals, one more step remains before the installation becomes a self-contained, automatically switched capacitor bank. A control device sensitive to current, voltage, vars, or time, must actuate the switch operating mechanism in order to place the bank "on" or "off" as conditions dictate. Such control is usually contained in an enclosure mounted near the base of the pole where it is readily accessible for inspection or maintenance. Purchaser's control wiring from this device is then run up the pole into the common junction box on the Autotrol to complete the installation.

The controls contained in this price list are intended for use with non-fault interrupting switching devices such as contactors and types CSL and PRC oil switches. For application with small low voltage circuit breakers such as Westinghouse type DB, refer to Westinghouse. These controls are *not* for use with large fault interrupting power circuit breakers.

In general, two major types of control are available - socket type and cabinet type.

Socket Type Controls

The socket type is the least expensive. It is primarily intended for applications on circuits where close settings are not required or where changes are gradual and not accompanied by repetitive fluctuations of high magnitude. The basic element is a current or voltage sensitive induction disc relay with inherent inverse time delay characteristics. This relay is combined with necessary auxiliary relays in a detachable socket type case similar to that used for watt-hour meters. Combinations are obtained by plugging additional devices into specially wired troughs.

The type COJ current control can be adjusted between the limits of 0.5 to 2 and 1 to 4 amperes. The base of the socket is equipped with a circuit closing device.

The type CJ-2 voltage control can be adjusted between the limits of 105 and 135 volts.

Cabinet Type Controls

The cabinet type is a more deluxe control using a similar current or voltage sensitive element but which incorporates a fixed time delay by the addition of thermal relays in the "trip" and "close" circuits. The basic element, auxiliary relays, time delay relays, toggle relay and an electric operation counter are all contained in a Flexitest® FT-21 case.

This case is mounted on a panel containing a circuit breaker for the control circuit, "close-trip" and "auto-manual" selector switches, type RVS lightning arrester terminal block and other devices necessary to obtain the desired control. The panel is assembled into a weatherproof sheet steel enclosure suitable for pole or structure mounting.

The fixed time delay devices have sealed-in-glass elements and are mounted in standard radio type octal sockets. A standard time delay of 60 seconds is provided; however, other plug-in time delays are available from 2 to 120 seconds.

The toggle relay mentioned above stays in position in the event of loss of voltage so that the capacitor switch will not be tripped out (if closed) upon restoration of voltage.

The RVS lightning arrester is connected across the 120 volt circuit to protect the heater elements of the plug-in time delay relays from high voltage surges.

The type CJ-5 current control has a dual range of adjustment from 0.5 to 2 amperes and from 1 to 4 amperes.

The type CJ-4 voltage control can be adjusted between the limits of 105 and 135 volts.

The type CJ-7 var controls can be adjusted from 250 vars leading to 500 vars lagging. The principal difference between the var control for wye systems and the one for delta systems is that the former is designed to have zero torque when the voltage and current are in phase; whereas, the latter has zero torque when the voltage leads the current 30 degrees.

On all of the above types of control, the "close" and "trip" contact settings are independently adjustable throughout the entire range as long as the band spread between the two contacts is greater than the change produced by switching the capacitors.

Current relays should be energized from the 5 ampere secondary of a current transformer. Voltage relays should be energized from the 120 volt secondary of a voltage transformer or from a nearby secondary circuit. Auxiliary devices in these controls, and time switches when used in combination with these controls, require a 120 volt a-c control circuit.

If a time control *only* is desired, select a single pole, double throw, 35 ampere time switch with desired features such as omitting device and spring powered carryover. Time switches in combination with current or voltage controls are available from this price list.

Westinghouse



Socket Type

Inverse Time Delay, Complete with Socket or Trough (Fig. 1 and 2)

Type	Description	Style Number	Net Prices		Approx. Net Wt. Lbs.
			When Purchased With Capacitor Equipments	When Purchased Separately	
Current Controls					
COJ	Load Current	290B305A17	\$159	\$207	25
COJ with Time Switch (time switch current modified)	Both current relay and time switch must call for "close"; either current relay or time switch may call for "trip". Alternate: Both current relay and time switch must call for "close"; time switch only may call for "trip".	①	219	285	70
		①	219	285	70
COJ with CJ-2 (current voltage modified)	Both current and voltage relays must call for "close"; either current or voltage relays may call for "trip".	①	330	429	70

Voltage Controls

CJ-2	Circuit Voltage	290B305A09	159	207	25
CJ-2 with Time Switch (time switch voltage modified)	Both voltage relay and time switch must call for "close"; either voltage relay or time switch may call for "trip".	①	219	285	70
CJ-2 with Time Switch and Rheostat (voltage-time recalibrated)	Voltage relay only may "close" or "trip". Time switch and rheostat changes level at which voltage relay operates.	①	228	296	80
CJ-2 with COJ and Rheostat (voltage-current recalibrated)	Voltage relay may "close" or "trip". Current relay and rheostat changes level at which voltage relay operates at predetermined values of load current.	①	339	441	80
CJ-2 with Rheostat (voltage current compensated)	Voltage relay may "close" or "trip". Rheostat changes level at which voltage relay operates in proportion to load current.	①	188	244	45

① Order by type and description.

Cabinet Type

Inverse Time Delay Plus Fixed Thermal Time Delay (Fig. 1, 2, 3)

A 60 second time delay is normally supplied. Other time delays are available on request.

Type	Description	Style Number	Net Prices		Approx. Net Wt. Lbs.
			When Purchased With Capacitor Equipments	When Purchased Separately	
Current Controls					
CJ-5	Load current	366C888G02	\$287	\$373	75
CJ-5 with Time Switch (time switch current modified)	Both current relay and time switch must call for "close" either current relay or time switch may call for "trip". Alternate: Both current relay and time switch must call for "close" time switch only may call for "trip".	366C888G04	352	458	95
		366C888G08	352	458	95
Voltage Control					
CJ-4	Circuit voltage	366C888G01	287	373	75
CJ-4 with Time Switch (time switch voltage modified)	Both voltage relay and time switch must call for "close" either voltage relay or time switch may call for "trip".	366C888G05	352	458	95
CJ-4 with Time Switch and Rheostat (voltage-time recalibrated)	Voltage relay only may "close" or "trip". Time switch and rheostat changes level at which voltage relay operates.	366C888G06	362	471	100
CJ-4 with Rheostat (voltage-current compensated)	Voltage relay only may "close" or "trip". Rheostat changes level at which voltage relay operates in proportion to load current.	366C888G07	316	411	80
CJ-6 (Induction Disc Voltage and Current Elements and Rheostat) (voltage-current recalibration)	Voltage relay only may "close" or "trip". Current relay and rheostat changes level at which voltage relay operates at predetermined values of load current.	①	419	545	225
Var Control					
CJ-7	Circuit vars (for wye system -- single phase element)	366C888G03	310	403	75
CJ-7	Circuit vars (for delta system -- single phase element)	366C888G09	310	403	75

① Order by type and description.

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Fig. 1 Typical Time-Current Curve Type COJ Current Control

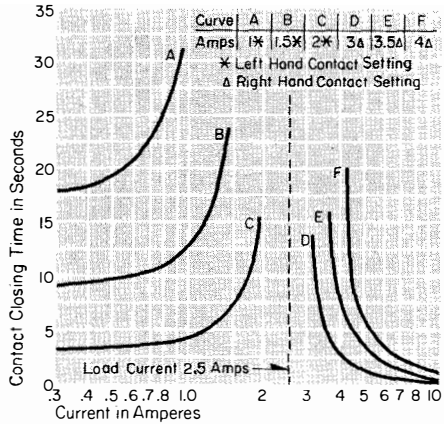


Fig. 2 Typical Time-Current Curve Type CJ-2 Voltage Control

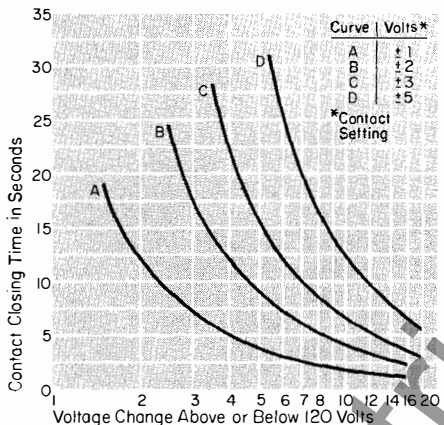
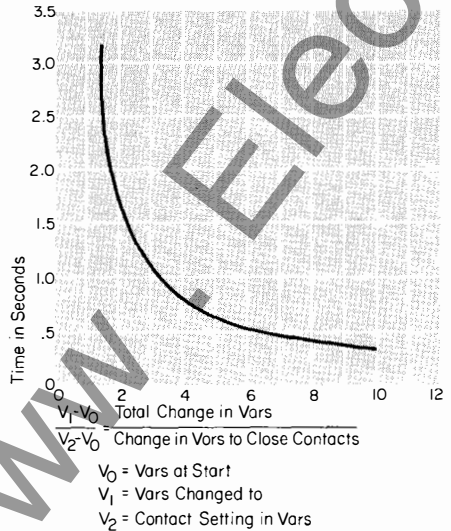


Fig. 3 Typical Time-Current Curve Type CJ-7 Var Control



Schematic Diagrams

Fig. 4 Type COJ Current Control

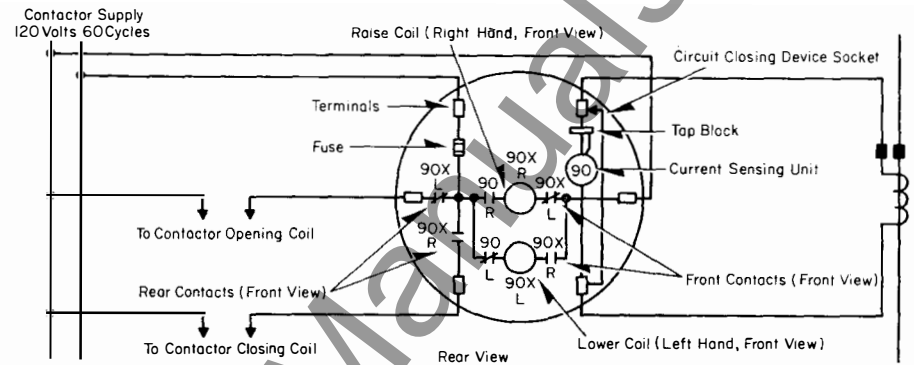


Fig. 5 Type CJ-2 Voltage Control

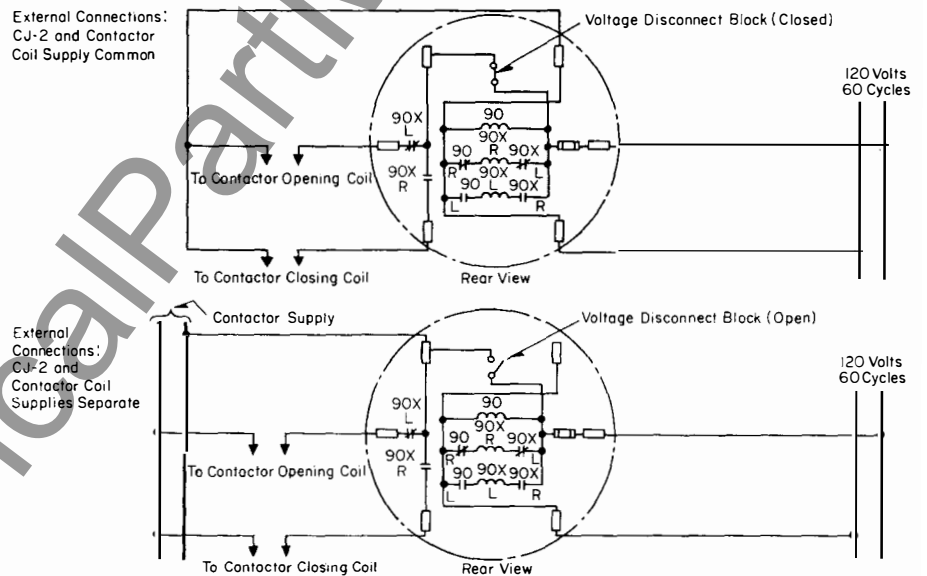
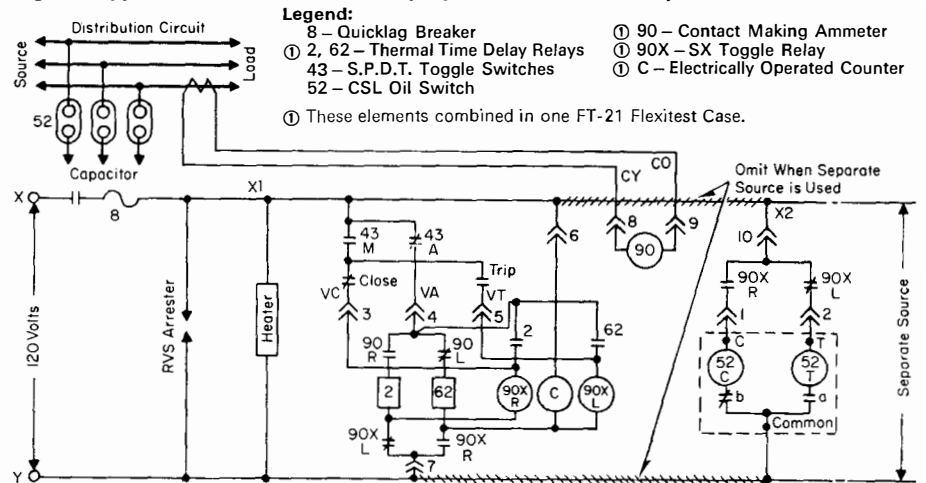


Fig. 6 Type CJ-5 Current Control (Style No. 366C888G02)

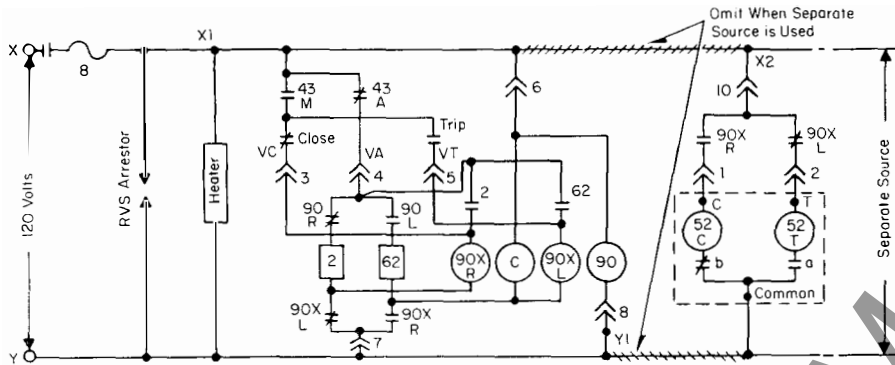


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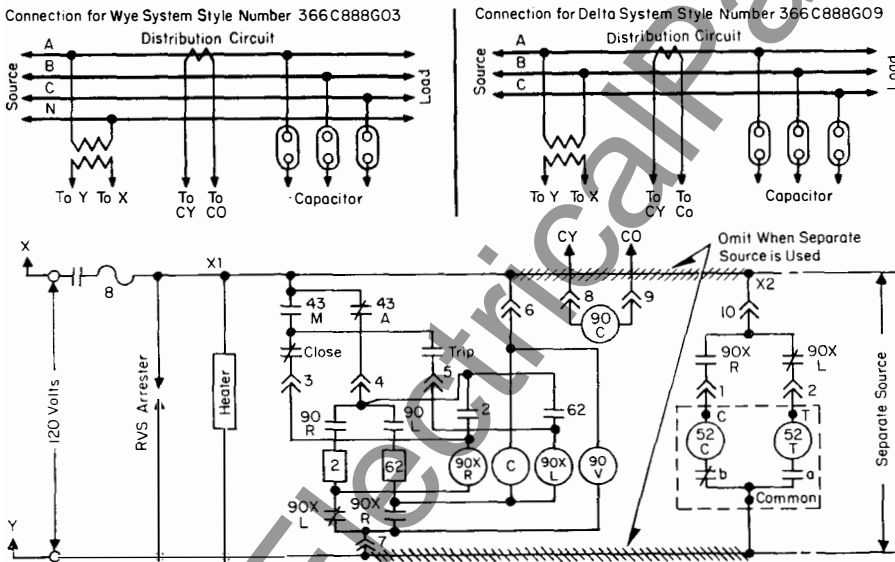
Schematic Diagrams (Continued)

Fig. 7 Type CJ-4 Voltage Control (Style No. 366C888G01)



- Legend:**
- 8 - Quicklag Breaker
 - ① 2, 62 - Thermal Time Delay Relays
 - 43 - S.P.D.T. Toggle Switches
 - 52 - CSL Oil Switch
 - ① 90 - Contact Making Voltmeter
 - ① 90X - SX Toggle Relay
 - ① C - Electrically Operated Counter
- ① These elements combined in one FT-21 Flexitest Case.

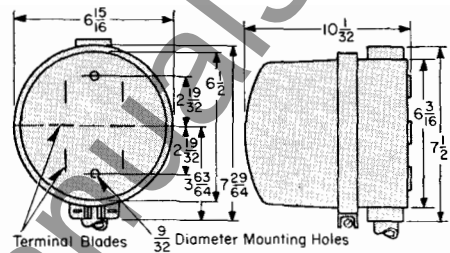
Fig. 8 Type CJ-7 Var Control



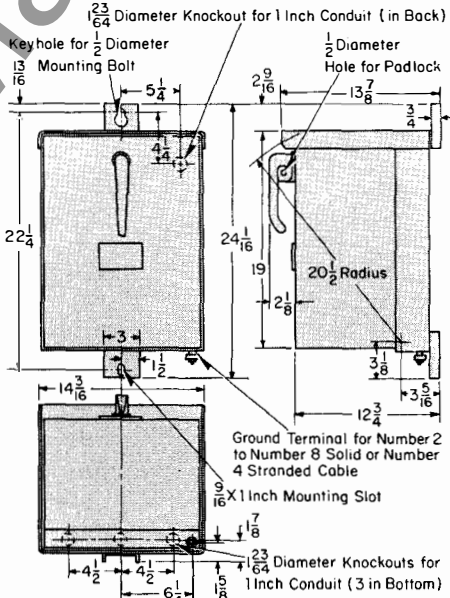
- Legend:**
- 8 - Quicklag Breaker
 - ① 2, 62 - Thermal Time Delay Relays
 - 43 - S.P.D.T. Toggle Switches
 - 52 - CSL Oil Switch
 - ① 90 - Var Contact Making Relay
 - ① 90X - SX Toggle Relay
 - ① C - Electrically Operated Counter
- ① These elements combined in one FT-21 Flexitest Case.

Note: When viewed from the front, 90R contact at right makes on increase of lagging vars; 90L contact at left makes on decrease of lagging vars or increase of leading vars.

Dimensions in Inches



Cabinet Type (all except CJ-6)



Further Information

Autotrol Capacitors: DB 39-257 or DB 39-431