



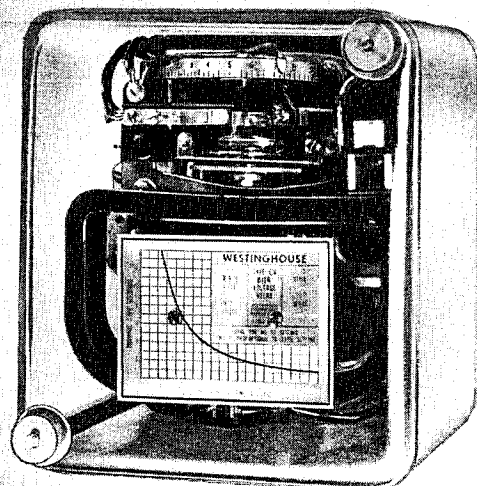
SLOW SPEED VOLTAGE RELAYS TYPE CV

DESCRIPTIVE BULLETIN

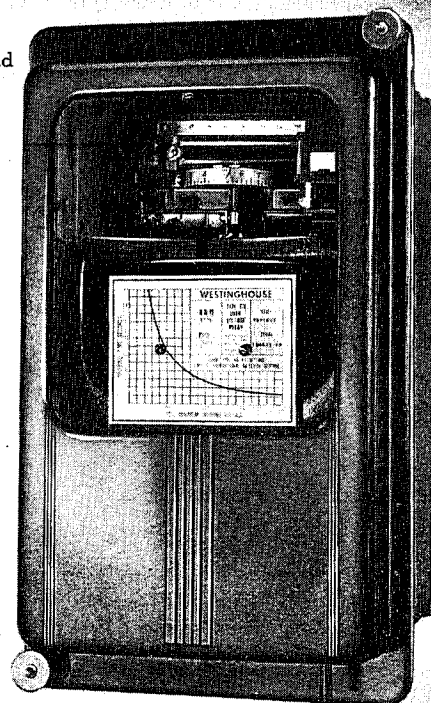
41-291

115, 230, 460 VOLTS • 25, 50, 60 CYCLES • SINGLE AND DOUBLE THROW • SINGLE POLE

Right—Type CV Relay in Projection and Semi-flush Flexitest Case



Above—Type CV Relay in Standard Rectangular Projection Type Case



WESTINGHOUSE TYPE CV RELAYS—are single phase, induction disc type relays used to detect under or over voltage or both on a-c circuits. The type CV relay is applied as a voltage fault detector in conjunction with other protective relays. It is also used as a timing device for various automatic applications.

Two types are available: non-g geared type for short time operation with quick reset; and geared type where longer time delay is needed.

The standard contact arrangement is single pole, single throw for the under and over voltage relays

or single pole, double throw on the combined under and over voltage relays. The Range of Adjustment is as follows:

RATED VOLTAGE	VOLTAGE ADJUSTMENT
115	50-140
230	100-280
460	200-560

The net weight of the CV relay is ten pounds, shipping weight twenty pounds for one relay per carton and 58 pounds with four relays per carton.

WESTINGHOUSE SPECIAL FEATURES

1 VOLTAGE EASILY ADJUSTABLE—Calibrated slide wire resistor with slide locking screw can be adjusted to vary voltage pickup.

2 SHOCK-PROOF OPERATION INDICATOR—Unaffected by vibration. Universal connection permits use of trip circuit currents between .2 and 30 amperes d-c.

3 INVERSE TIME CHARACTERISTICS—prevents operation on momentary voltage changes.

4 RELIABLE CONTACTS—Large silver wiping contacts located near the front of the relay assure good operation.

5 UNIFORM APPEARANCE—Available in three cases; projection rectangular with full glass cover, Flexitest projection and semi-flush with removable chassis. Universal studs allow mounting on slate or steel panel.

VOLTAGE ELEMENT

The induction disc type voltage element is made up of an electro magnet, damping magnet, mounting frame and bearings, moving element, calibrating resistor and contact assembly.

ELECTROMAGNET—is of single piece lamination construction. A voltage winding is located on the lower leg. The upper legs are energized by transformer action, through a second winding on the lower leg.

CALIBRATING RESISTOR—is connected in series with the upper pole windings and the secondary transformer winding on the lower pole. This internal slide-wire resistor is mounted in a horizontal position above the time lever and scale. Changing the resistance of the circuit varies the pickup voltage as shown on the calibrating scale. The slider is locked in position by a screw. Three standard ranges of adjustment are available.

TIME LEVER AND SCALE—are located on the mounting frame above the contacts. Adjustment of the time lever determines the time curve of the relay. This is indicated on the scale divided in ten major divisions. Characteristics of the time lever settings are shown in the voltage-time curves.

MOVING ELEMENT—consists of an aluminum disc pressed on a vertical brass shaft. The upper portion of this shaft carries an insulated sleeve which supports the moving contact and the inner end of the flat spiral spring which is the electrical connection for the moving contact. The outer end of the spring fastens to a spring adjuster on the mounting frame. On non-g geared short time relays the disc makes a fraction of a revolution. The long time feature on the geared style is obtained by a gear train so that the disc may make several complete revolutions. These gears are located directly above the disc.

STATIONARY AND MOVING CONTACT ASSEMBLY—The stationary contact consists of a silver contact attached to the free end of a leaf spring. This spring is fastened to a Micarta block on the mounting frame. A small set screw permits adjustment of contact follow. The moving contact is a small silver hemisphere for the single throw type and a silver capsule for the double throw type. The contact is mounted on the end of a rigid arm which is fastened to an insulating sleeve on the moving element shaft for the non-g geared style or to an auxiliary shaft for the geared style. The back contact for the double throw relay is mounted on the time lever. These contacts should not be required to open more than one ampere at 125 volts d-c.

MOUNTING FRAME AND BEARINGS—The mounting frame is of die cast, single piece construction. In addition to supporting various parts of the relay, it also houses the bearings. The lower bearing supports the shaft of the moving element. This bearing consists of a steel ball resting between two concave sapphire jewels. One is fixed in the end of the lower bearing screw. The other is mounted in a removable sleeve on the end of the shaft. The upper bearing serves as a guide to keep the shaft in a vertical position. It is a steel pin mounted on an adjustable bearing screw extending into a recess drilled in the shaft.

DAMPING MAGNET—is mounted in the front part of the relay so that the disc passes between the poles of the magnet. The magnet consists of two D shaped, rectangular cross-section, permanent magnets securely clamped together.

TRIP CIRCUIT

The standard trip circuit connection for the CV relay is comprised of the contactor switch and the operation indicator.

OPERATION INDICATOR—The shock-proof operation indicator is a small solenoid connected in the trip circuit. When energized, it releases an easily visible white target which is hand reset by a lever extending through the cover stud on the standard case or through the bottom of the cover on the Flexitest case. The operation indicator is normally connected in a "universal connection".

CONTACTOR SWITCH—This element is a small solenoid type switch, the coil of which is normally connected in the trip circuit. A small cylindrical plunger supporting a silver disc bridging contact on its lower end rides up and down on a vertical rod in the center of the solenoid. The guide rod is fastened to a stationary core. Dropout of the switch can be varied by adjustment of the core which extends through the upper part contactor switch frame. Pick-up can be adjusted by changing the location of a Micarta disc on the lower end of the guide rod. The contactor switch will carry tripping current up to 30 amperes long enough to trip a circuit breaker.

The standard trip circuit is a "universal connection". That is, the contactor switch and operation indicator are in parallel. This circuit is suitable for all trip currents from 2.25 amperes to 30 amperes. The resistance of both coils in parallel is approximately 0.25 ohms. If the trip current is less than 2.25, the contactor switch is not necessary and it should be disconnected. Therefore, the standard trip circuit is rated 0.2 to 30 amperes. To disconnect the contactor switch remove the lower lead on the front stationary contact of the switch and dead end it. A small fillister head screw located in the Micarta base of the switch is available for this purpose. The resistance of the operation indicator coil is 2.8 ohms.

CASE

Type CV voltage relay is available in either the standard rectangular case or the Flexitest case.

STANDARD RECTANGULAR CASE (FIG. 1 AND 10)—for projection-mounting has a full glass cover. The glass cover allows full view of the relay in operation. The cover is easily removable leaving the relay elements and wiring easily accessible for inspection, calibration and maintenance.

FLEXITEST CASE (FIGS. 1 AND 11)—for projection or semi-flush mounting is a steel enclosure with a glass window and removable cover. Both the relay element and test switches are combined in a single case. The complete chassis may be removed from the case for inspection or maintenance. The relay may be tested in or out of the case. Removal from the case changes the calibration less than one to two percent. For a complete description of the Flexitest case and test plugs refer to Catalog Section 41-070.

UNDER VOLTAGE AND OVER VOLTAGE RELAYS—TYPE CV

IDENTIFICATION

IDENTIFICATION				
VOLTS	FREQUENCY CYCLES*	STYLE NUMBERS		
		STANDARD PROJECTION CASE DIMENSIONS—(Fig. 10)	FLEXITEST PROJECTION CASE† DIMENSIONS—(Fig. 11)	FLEXITEST SEMI-FLUSH CASE DIMENSIONS—(Fig. 11)
NON-GEARED—SHORT TIME				
Single-Throw, Under Voltage				
115 230 460	60 60 60	WIRING DIAGRAM—(Fig. 6)	WIRING DIAGRAM—(Fig. 8)	WIRING DIAGRAM—(Fig. 8)
		1056 403	1273 679	1271 679
		1056 406	1273 685	1271 685
		1056 409	1273 691	1271 691
Single-Throw, Over Voltage				
115 230 460	60 60 60	WIRING DIAGRAM—(Fig. 6)	WIRING DIAGRAM—(Fig. 8)	WIRING DIAGRAM—(Fig. 8)
		1056 412	1273 697	1271 697
		1056 415	1273 703	1271 703
		1056 418	1273 709	1271 709
Double-Throw, Over Voltage (Under and Over Voltage)**				
115 230 460	60 60 60	WIRING DIAGRAM—(Fig. 7)	WIRING DIAGRAM—(Fig. 9)	WIRING DIAGRAM—(Fig. 9)
		1056 439	1273 751	1271 751
		1056 442	1273 757	1271 757
		1056 445	1273 763	1271 763
GEARED—LONG TIME				
Single-Throw, Under Voltage				
115 230 460	60 60 60	WIRING DIAGRAM—(Fig. 6)	WIRING DIAGRAM—(Fig. 8)	WIRING DIAGRAM—(Fig. 8)
		1056 448	1273 769	1271 769
		1056 451	1273 775	1271 775
		1056 454	1273 781	1271 781
Single-Throw, Over Voltage				
115 230 460	60 60 60	WIRING DIAGRAM—(Fig. 6)	WIRING DIAGRAM—(Fig. 8)	WIRING DIAGRAM—(Fig. 8)
		1056 457	1273 767	1271 787
		1056 460	1273 793	1271 793
		1056 463	1273 795	1271 795
Double-Throw, Over Voltage (Under and Over Voltage)**				
115 230 460	60 60 60	WIRING DIAGRAM—(Fig. 7)	WIRING DIAGRAM—(Fig. 9)	WIRING DIAGRAM—(Fig. 9)
		1056 485	1273 841	1271 841
		1046 487	1273 847	1271 847
		1056 490	1273 853	1271 853

* 25 and 50 cycle relays can be furnished. Order "Similar to 60 cycle style number except 25 (or 50) cycles."

† For projection Flexitest relays for mounting on panels thicker than 1½" order "Similar to style except to have long studs."

‡ A CV contact-making voltmeter is available. For information contact the nearest Westinghouse Sales Office.

** Electrically independent contacts, right hand contact closes at slide wire setting; left hand closes when voltage drops to value lower than setting.

NOTE—FOR PRICES SEE PRICE LIST 41-291.

ENERGY REQUIREMENTS

RATED VOLTS†	FREQUENCY	VOLTAGE SETTING	VOLT-AMPS.	WATTS	VARs	P.F.	R OHMS *†	X †	Z †
115 230 460	25	Highest	16.8	4.4	16.2	.26	206	760	788
		Rated	16.9	4.6	16.3	.27	213	753	783
		Lowest	17.4	10.0	14.2	.58	438	621	762
	50	Highest	7.5	2.0	7.2	.27	471	1700	1770
		Rated	7.6	2.1	7.3	.28	482	1680	1742
		Lowest	11.4	8.0	8.1	.70	815	826	1172
	60	Highest	6.1	1.3	5.9	.21	462	2120	2170
		Rated	6.2	1.5	6.0	.24	527	2086	2150
		Lowest	10.0	7.3	6.8	.73	965	900	1322

† These relays will stand 110% of rated voltage continuously.

* Values are for 115 volt relay. For the 230 and 460 volt relays, multiply values by 4 and 16, respectively.

† Resistance is a-c value.

PERFORMANCE CURVES OF UNDER VOLTAGE

TYPE CV RELAY

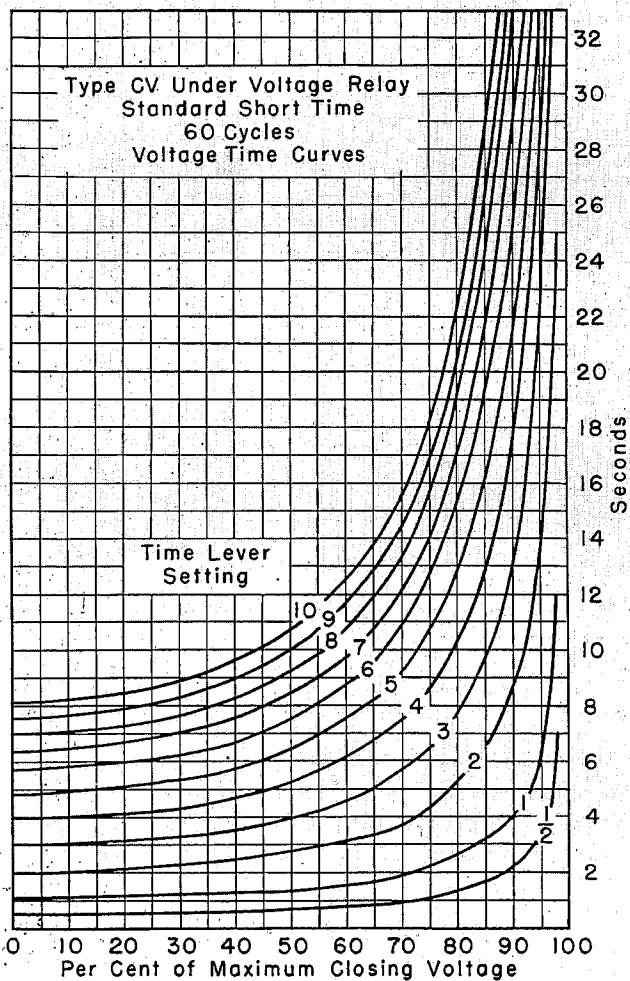


Fig. 2—Standard Short Time—Under Voltage Relay

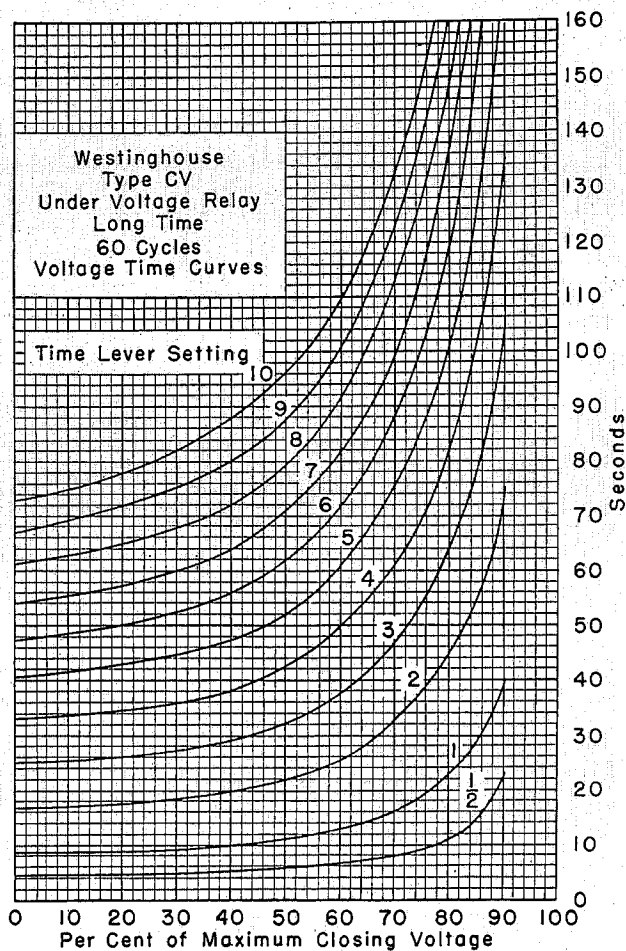


Fig. 3—Standard Long Time—Under Voltage Relay

VOLTAGE AND OVERVOLTAGE RELAYS—TYPES CV

PERFORMANCE CURVES OF OVER VOLTAGE TYPE CV RELAY

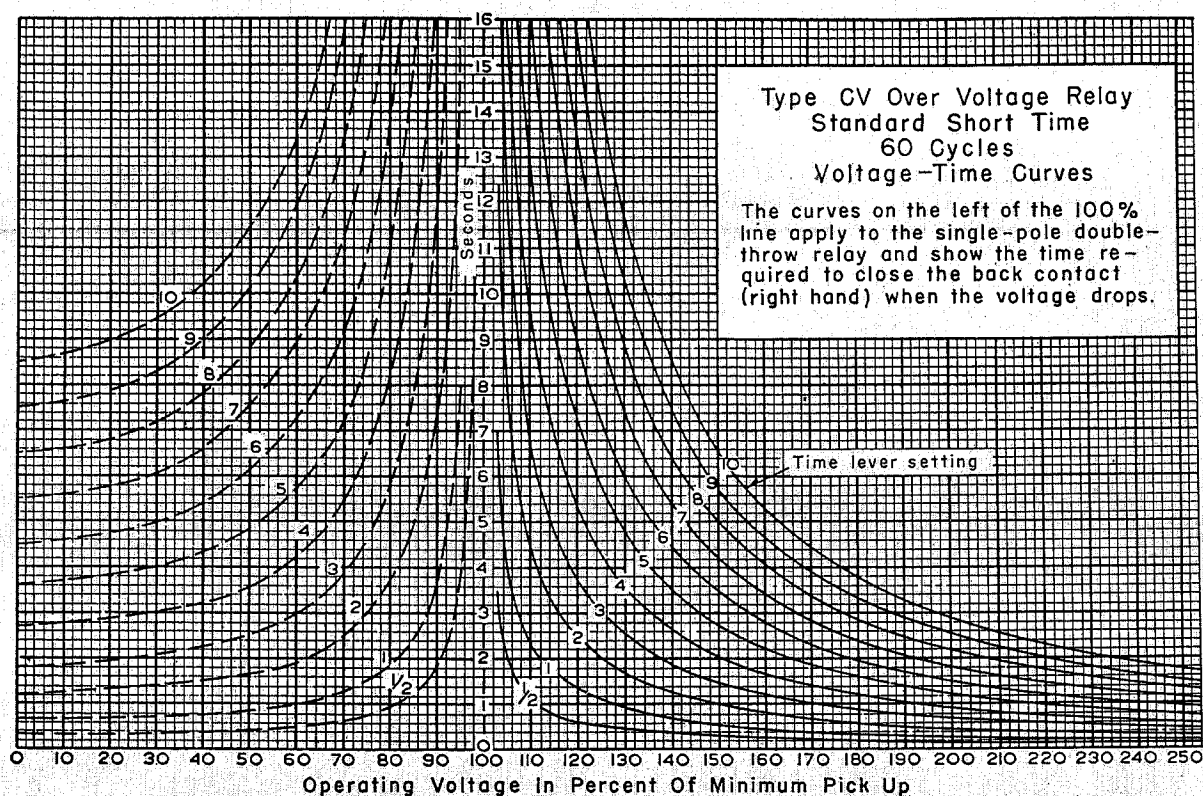


Fig. 4—Standard Short Time—Over Voltage Relay (Under-and-Over Voltage)

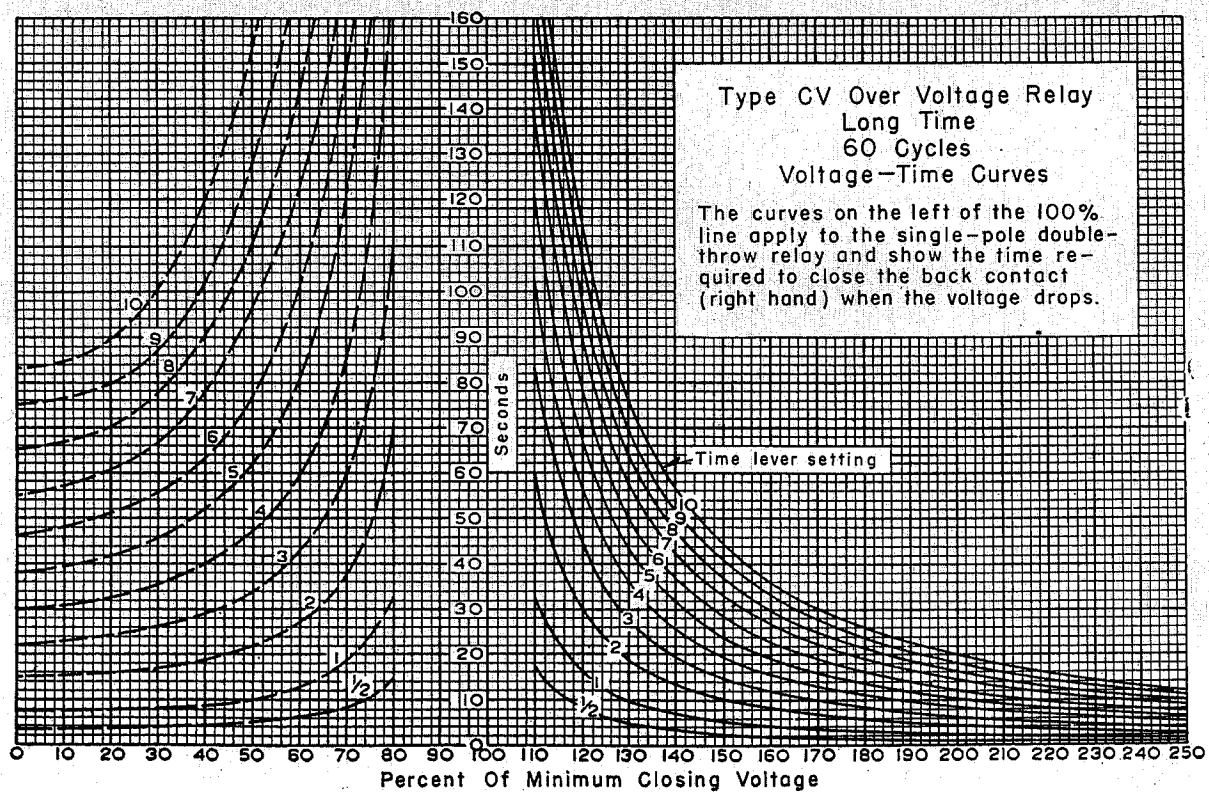


Fig. 5—Standard Long Time—Over Voltage Relay (Under-and-Over Voltage)

WIRING DIAGRAMS

STANDARD CASE

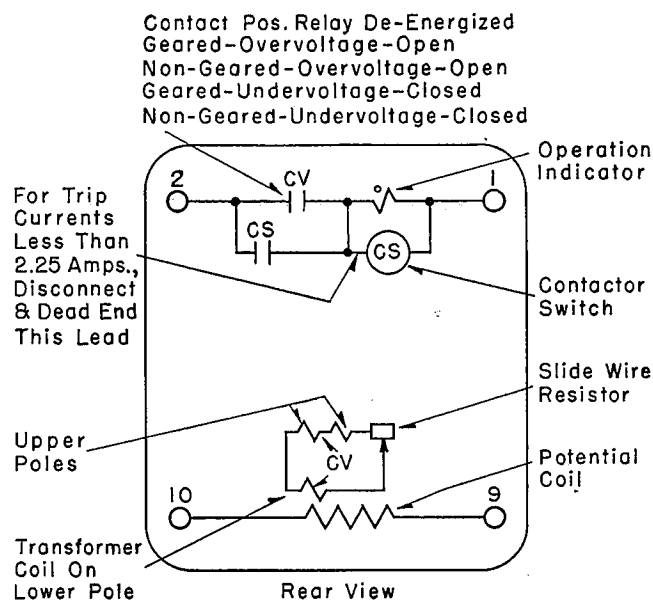


Fig. 6—Single Pole, Single-Throw for Over or Under Voltage in the Standard Case

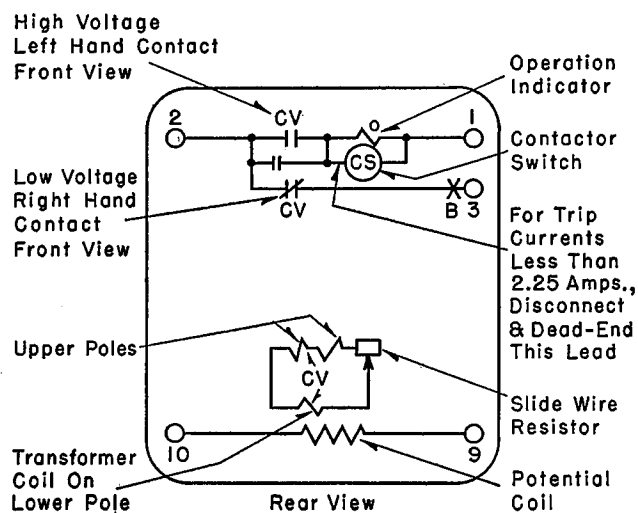


Fig. 7—Single-Pole, Double Throw for Over Voltage Operation in the Standard Case

FLEXITEST CASE

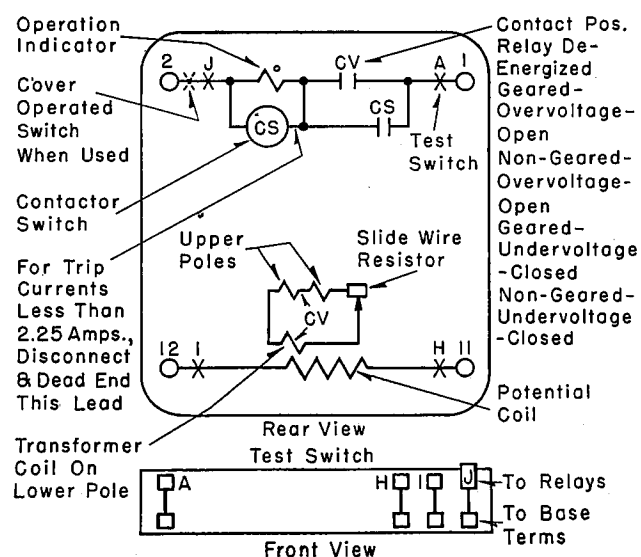


Fig. 8—Single-Pole, Single Throw for Over or Under Voltage Operation in the Flexitest Case

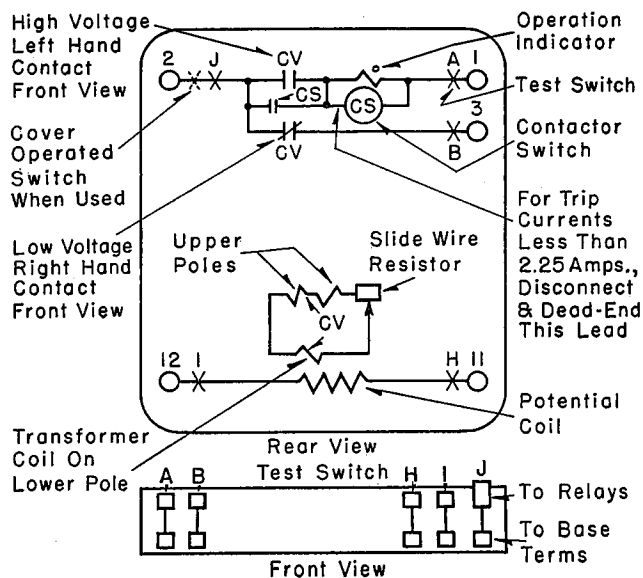
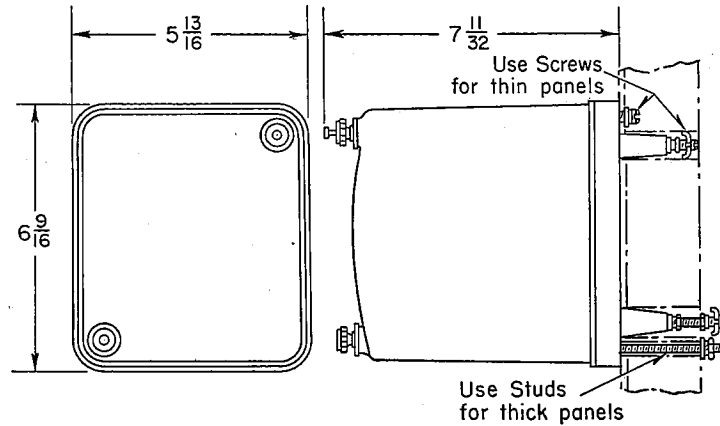
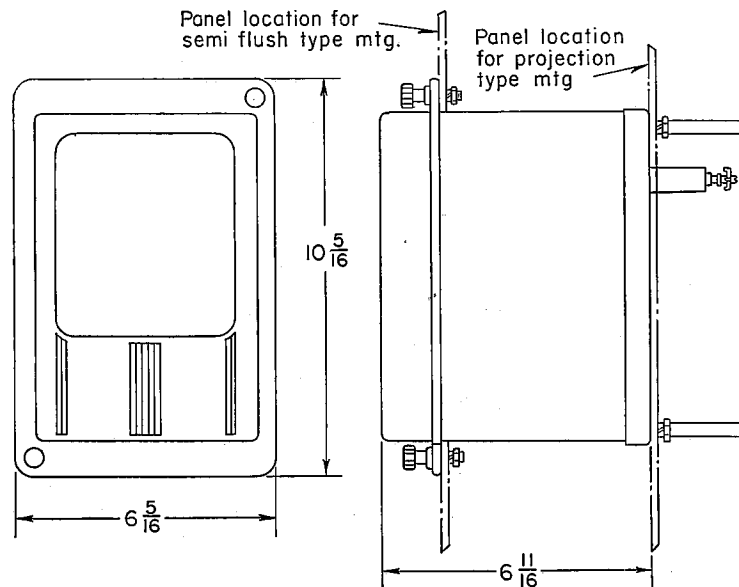


Fig. 9—Single-Pole, Double Throw for Over Voltage Operation in the Flexitest Case

STANDARD AND FLEXITEST RELAYS—TYPE CV

PRINCIPAL DIMENSIONS IN INCHES

Approximate Only. Do Not Use for Construction Purposes.

Fig. 10—Type CV Relay in the Standard Rectangular Case
(See Figs. 6 and 7 for Terminals Used)Fig. 11—Type CV Relay in the Projection or Semi-flush
Flexitest Case
(See Figs. 8 and 9 for Terminals Used)

LITERATURE REFERENCE

PRICES AND DIMENSIONS—See Price List 41-291



WESTINGHOUSE
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