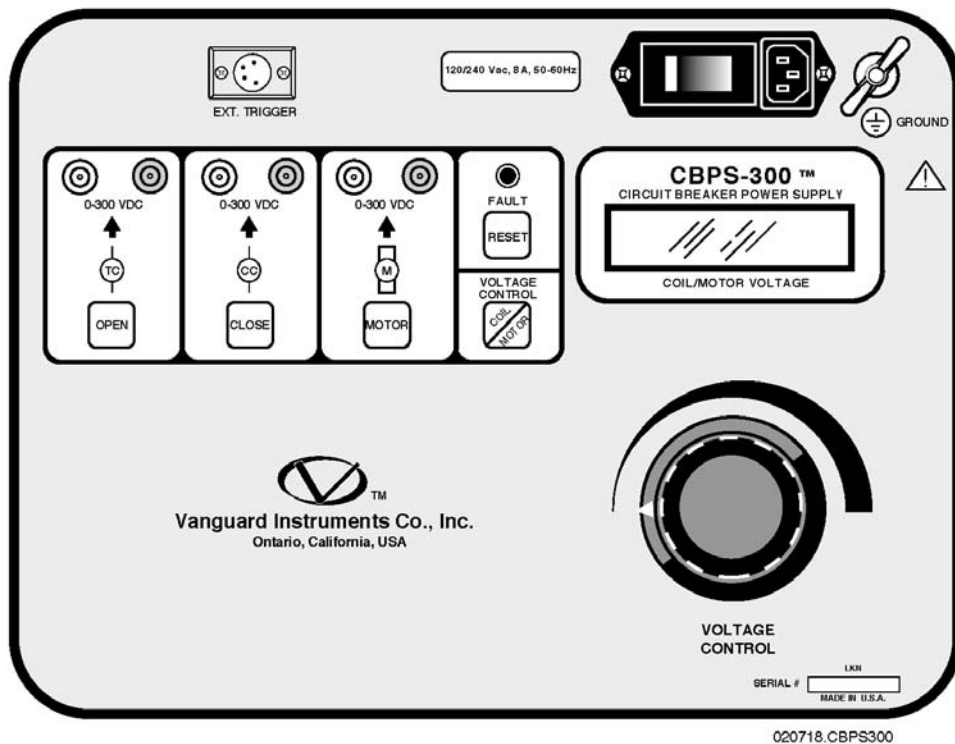

OPERATING INSTRUCTIONS
for the
CBPS-300™

CIRCUIT BREAKER
DC POWER SUPPLY



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SAFETY WARNINGS AND CAUTIONS

Only trained operators shall use this device. All circuit breakers under test shall be **off line and fully isolated**.

Do Not Service or Test Alone

Do not perform test procedures or service unless another person is also present who is capable of rendering aid and resuscitation.

Do Not Modify Test Equipment

Due to the added risk of introducing additional or unknown hazards, do not install substitute parts or perform any unauthorized modification to any CBPS-300 test unit. To ensure that all designed safety features are maintained, it is recommended that repairs be performed only by Vanguard Instruments Company's factory personnel or by an authorized repair service center. Unauthorized modifications can cause serious safety hazards and will nullify the manufacturer's warranty.

Follow Exact Operating Procedures

Any deviation from the procedures described in the operator's manual may create one or more safety hazards, damage the CBPS-300 and the test transformer, or cause errors in the test results. Vanguard Instruments Company, Incorporated assumes no liability for unsafe or improper use of the CBPS-300.

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1.0 INTRODUCTION

1.1 General Description

Vanguard Instruments Company produces the CBPS-300 as a microprocessor-controlled circuit breaker DC power supply. This device was designed to replace the substation batteries during circuit breaker testing.

The CBPS provides a ripple free, DC power source to operate utility circuit breakers for contact-timing and other breaker operations. The CBPS-300 allows the user to operate the OPEN and CLOSE coils of a circuit breaker during tests under different selectable operating conditions such as full voltage or minimum voltage operations. External trigger input allows the CBPS-300 to be used with the Vanguard Instruments circuit breaker timers.

A separate DC supply is also available to drive the breaker mechanism charging motor.

All CBPS-300 supply outputs are over current and short circuit protected. This feature protects the CBPS-300 power-supplies and eliminates the use of conventional fuses or circuit breaker protection circuitry.

The CBPS-300 test voltage is selectable from 24Vdc to 250Vdc. The voltage control knob on the CBPS-300 front panel allows the operators to select test voltages.

Coil or charging motor voltage reading is displayed on a 2 line by 16-character back lit LCD screen. Push button switches marked OPEN, CLOSE and MOTOR are used to operate the breaker's respected coils and charging motor

1.2 Functional Description

The CBPS-300 is a variable voltage DC power supply designed specifically to perform maintenance test on circuit breakers. The CBPS-300 DC voltage is selectable for 24Vdc to 250Vdc. Its ripple free DC output voltage is regulated up to 2%

voltage variation under-load; making it an ideal device for testing circuit breaker coils under different operating voltages.

A built-in initiate circuit allows the user to OPEN or CLOSE breakers from the CBPS-300 control panel.

The CBPS-300 will energize the breaker trip or close coil for one-second duration. This initiate circuit is over current and short circuit protected. Reset key on the front panel allows the user to clear the fault condition.

An unfiltered DC supply is also available to drive the breaker mechanism charging motor.

A voltage control knob allows the user to set coil or motor test DC voltage. DC voltage output is shown on the 2 lines by 16 characters back-lighted LCD.

1.3 Furnished Accessories

The CBPS-300 is shipped with six 10-foot test cables with "quick disconnect" type test plugs on the unit end, and alligator clips at the test load end. The following cables shall also be included with the CBPS-300: One power cord, One ground cable and a cable-carrying bag.

2.0 CBPS-300 SPECIFICATIONS**Table 1.0 CBPS-300 SPECIFICATIONS**

TYPE	Special-purpose test equipment, Variable DC Power Supply
SIZE (inches)	16.8" wide by 12.6" high by 12" deep (42.6cm x 32 cm x 27cm)
WEIGHT	60 pounds (27 Kg)
INPUT POWER	120 Vac or 240Vac selectable, 50/60Hz
DISPLAY	2 line by 16 character back-lighted LCD
VOLT METER DISPLAY	0-300VDC, ± 1 V
OUTPUT VOLTAGE	12 to 250 Vdc

COIL DC POWER SUPPLY

DC OUTPUT	CURRENT	REGULATION
24 Vdc	10A	<6%
48 Vdc	10A	<3%
120 Vdc	6A	<2%
250 Vdc	3A	<2%

CHARGING MOTOR DC POWER SUPPLY

NO LOAD VLTG	LOAD CURRENT	LOAD INTERVAL	FULL LOAD VLTG
48 Vdc	12A	60 S	40 Vdc
48 Vdc	18A	20 S	30 Vdc
120 Vdc	12A	60 S	90 Vdc
120 Vdc	18A	20 S	70 Vdc
240 Vdc	6A	60 S	200 Vdc
240 Vdc	9A	20 S	185 Vdc

OUTPUT PROTECTION	All DC outputs are over-current protected
ENVIRONMENT	Operating: -10°C to 55°C; Storage: -40°C to 65°C
WARRANTY	One-year parts & labor (post warranty service is available)

NOTE:

THE ABOVE SPECIFICATIONS ARE VALID AT NOMINAL OPERATING VOLTAGE AND AT A TEMPERATURE OF 25°C (77°F)

CBPS-300™ SPECIFICATIONS MAY BE UPGRADED AND CHANGED WITHOUT PRIOR NOTICE.

3.0 CONTROLS AND INDICATORS

CBPS-300 controls and indicators are shown in Figure 1.0. The leader line with an index number points to each control or indicator, which is then cross-referenced to a functional description in Table 2.0. The table describes the function of each item on the control-panel. The purpose of the controls and indicators may seem obvious,

but users should become familiar with them before using the CBPS-300. Accidental misuse of the controls may damage the CBPS-300. Users should also be familiar with the Safety Warnings and Cautions found on the front page of this operator's manual.

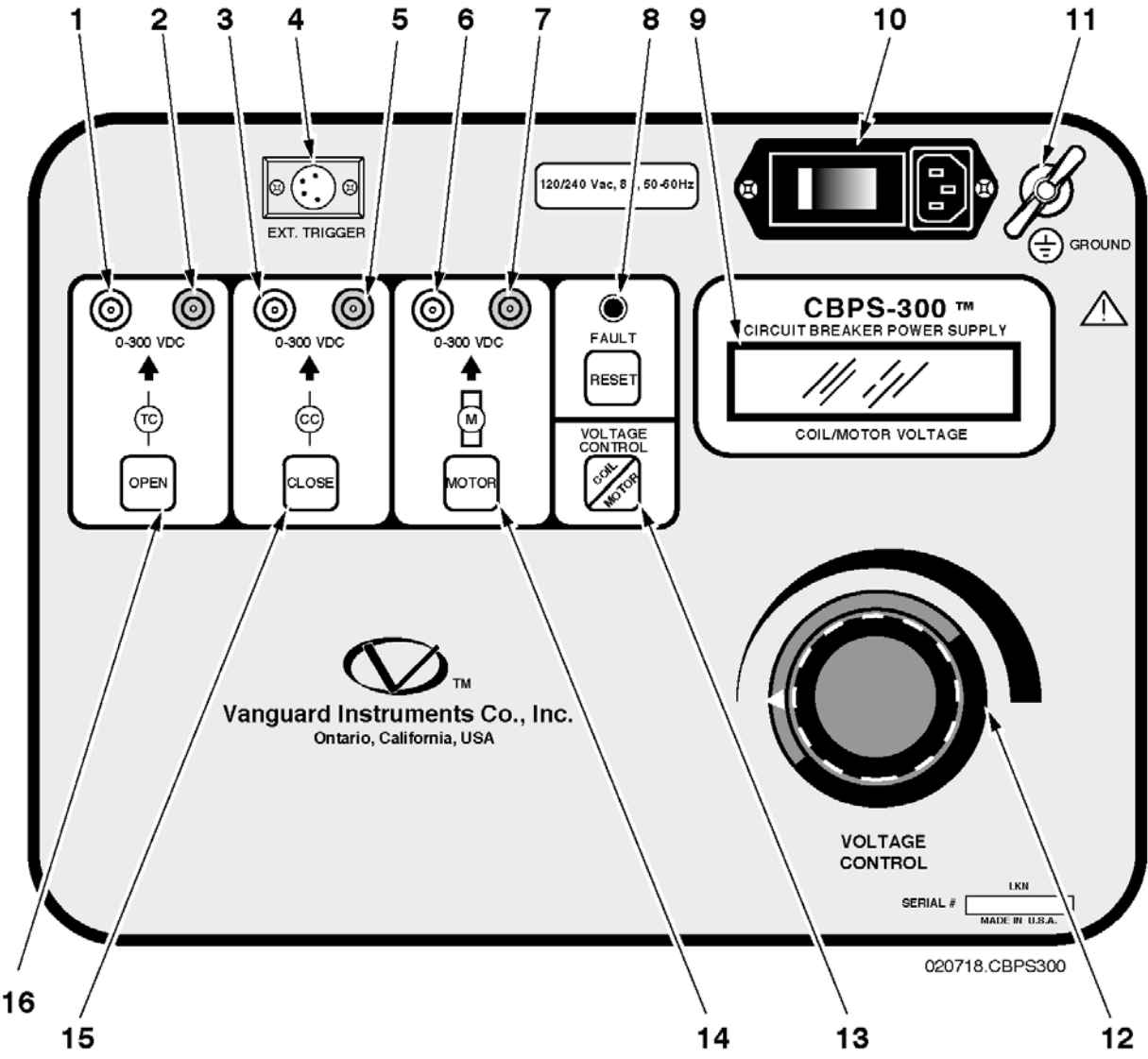


Figure 1.0 CBPS-300 Controls and Indicators

Table 2.0 Functional Descriptions of the CBPS-300 Controls and Indicators

Fig. 1 Index	Panel Markings	Functional Descriptions
1	NONE	OPEN coil voltage positive terminal. Female, Red connector jacks used for connecting voltage test leads.
2	NONE	OPEN coil voltage negative terminal. Female, Black connector jacks used for connecting voltage test leads.
3	NONE	CLOSE coil voltage positive terminal. Female, Red connector jacks used for connecting voltage test leads.
4	EXT TRIGGER	External trigger input for remote control. This input is to be used with the Vanguard Instruments Company circuit breaker timers. Female, 4 pin connector.
5	NONE	CLOSE coil voltage negative terminal. Female, Black connector jacks used for connecting voltage test leads.
6	NONE	MOTOR voltage positive terminal. Female, Red connector jacks used for connecting voltage test leads.
7	NONE	MOTOR coil voltage negative terminal. Female, Black connector jacks used for connecting voltage test leads.
8	FAULT RESET	Fault LED. Led is lit when over current is detected. RESET switch. Reset fault condition and ready CBPS-300 for next operation.
9	NONE	LCD; 2-line by 16-character; back-lighted; Displays coil/motor voltages.
10	120/240 Vac, 8A, 50- 60 Hz	Input power connector with third-wire safety ground and 10A built-in circuit breaker
11	NONE	Safety Ground. A 5/16 threaded stud with hand-turned wing nut. This must be connected to the station ground before connecting any CBPS-300 test leads to the transformer.

Table 2.0 Functional Descriptions of CBPS-300 Controls and Indicators Cont.

Fig. 1 Index	Panel Markings	Functional Descriptions
12	VOLTAGE CONTROL	Voltage control knob.
13	COIL/MOTOR	Coil or Motor voltage display selection.
14	MOTOR	Motor voltage initiate switch. Depress switch to energize motor.
15	CLOSE	Close coil initiate switch. Depress switch to energize close coil. The CBPS-300 will energized the close coil for 1 second period.
16	OPEN	Trip coil initiate switch. Depress switch to energize close coil. The CBPS-300 will energized the close coil for 1 second period.

4.0 PRETEST SETUP

4.1 Operating Voltages

The operating voltages for the CBPS-300 are selectable between 90-130 Volts AC, 50/60 Hertz or 200-240 Volts AC, 50/60

Hertz. Voltage selection is set by the 120/240 selector switch as how in Figures 2.0 and Figure 3.0.

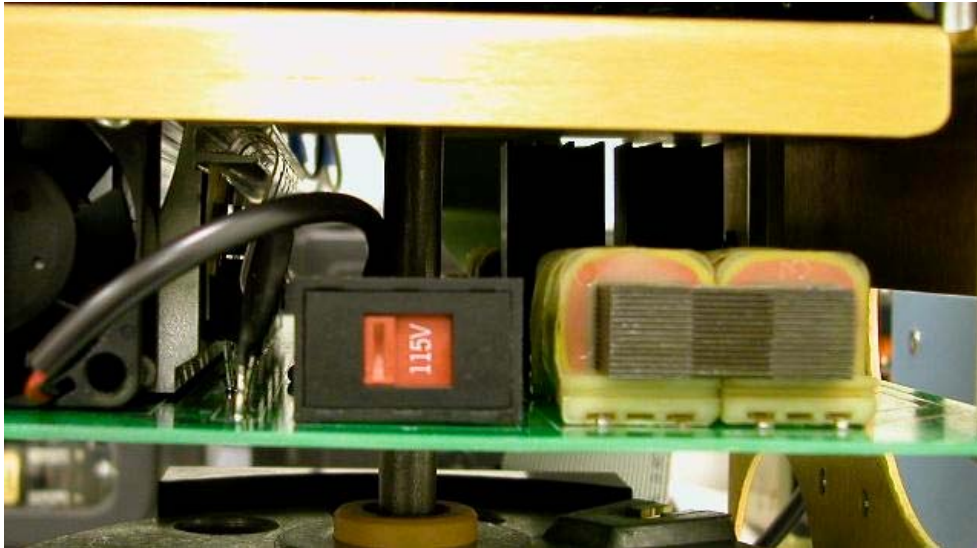


Figure 2.0 90 to 130Vac Switch Setting

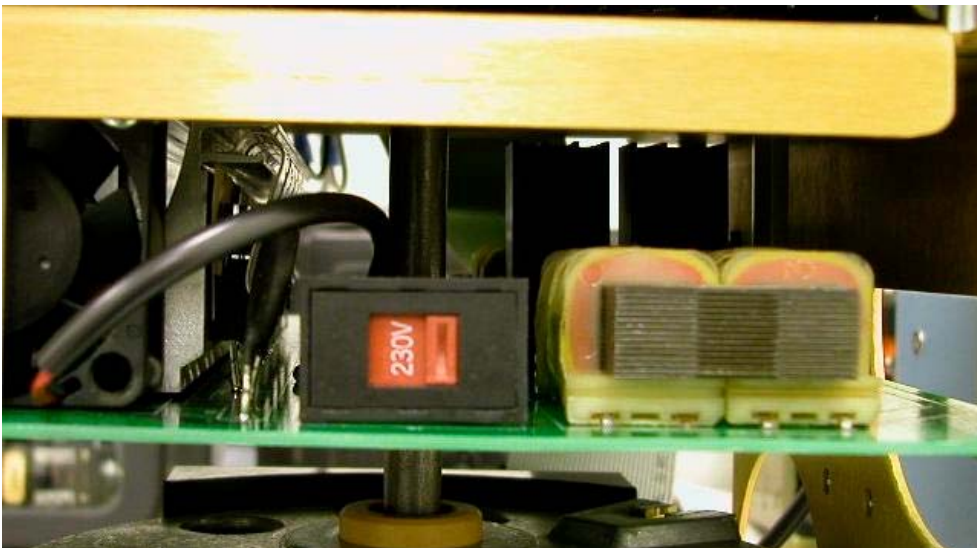


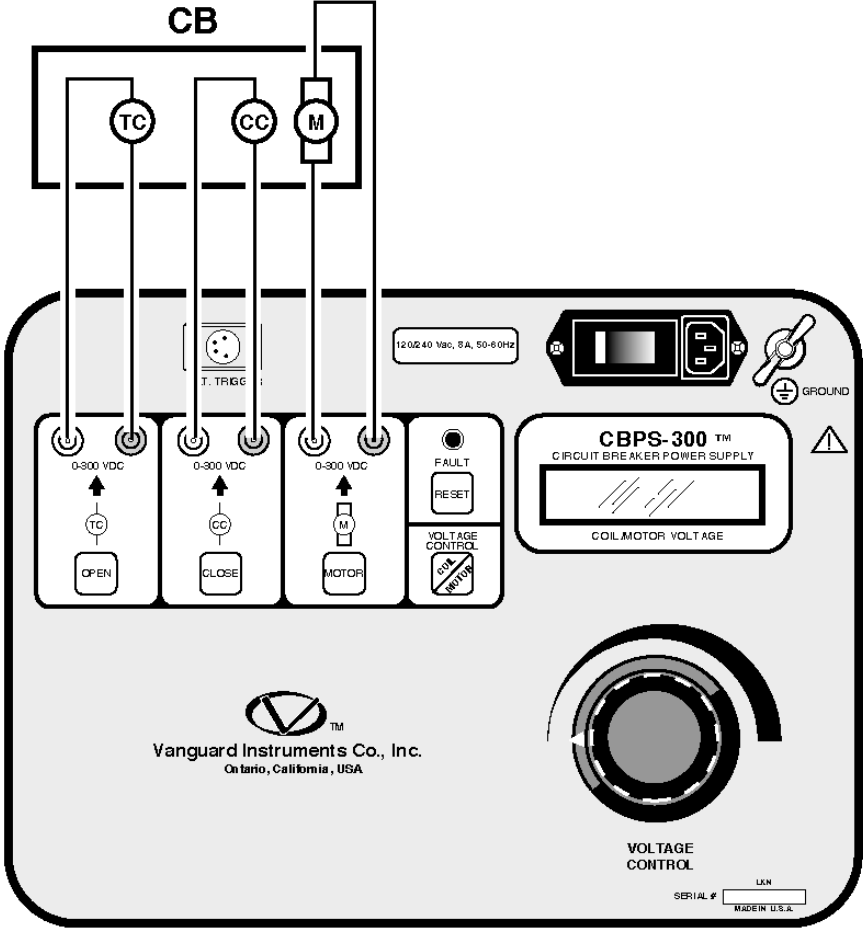
Figure 3.0 200 to 240 Vac Switch setting

5.0 OPERATING PROCEDURES

Before using the CBPS-300, operators should familiarize themselves with the CBPS-300 controls and indicators.

5.1 CBPS-300 Cable connection

A typical connection diagram of the CBPS-300 is shown in Figure 3.0.



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Figure 4.0 Typical CBPS-300 Connection Diagram

5.2 General Procedures

a. Ground the CBPS-300 to the substation ground. (Item 11 in Figure 1.0.)

b. Disconnect Circuit breaker control circuitry from the substation battery.

WARNING

Never connect the CBPS-300 control signals to substation battery or live circuit. ***Failure to follow this procedure will damage the CBPS-300.***

c. Plug the CBPS-300 power cable into a power outlet.

WARNING

Always return the voltage control knob to the ***zero position*** before connecting or disconnecting the CBPS-300 test leads.

d. Connect the CBPS-300 positive and negative cable clips to the appropriate terminals of the trip coil.

e. Connect the CBPS-300 positive and negative cable clips to the appropriate terminals of the close coil.

f. Connect the CBPS-300 positive and negative cable clips to the appropriate terminals of the circuit breaker motor.

g. ***Turn voltage control knob to zero.*** Turn on the CBPS-300 power. Observe that after configuration data is displayed briefly, the coil voltage is displayed on LCD as shown below:



COIL VLTG: 0.0V

WARNING

Always turn the CBPS-300 voltage control knob to zero before turning on the CBPS-

300. Failure to follow this procedure may damage the CBPS-300.

5.3 Test OPEN Coil Procedure

The following procedures will allow the operator to initiate an Open operation.

a. Make sure the CBPS-300 display voltage is selected to display coil voltage. Press Coil/Motor switch to display coil voltage.

b. Turn the voltage control knob to select the desired test voltage. Observe test voltage displayed on the LCD as shown below:



COIL VLTG: 120.0 V

NOTE

Allow 3 seconds after turning voltage control knob for the voltage display to be stable.

c. Press the control OPEN switch to energize OPEN coil.

d. Observe OPEN coil was energized and circuit breaker was opened.

e. If an over-current condition was detected, the FAULT LED will be lit.

f. Check the OPEN coil connection. Press RESET switch and go to step c to open circuit breaker.

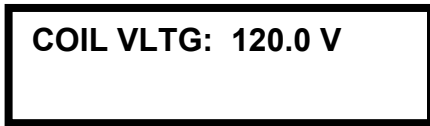
g. To end test, turn the voltage control knob to zero position before turning off CBPS-300.

5.4 Test CLOSE Coil Procedure

The following procedures will allow the operator to initiate a CLOSE operation.

a. Make sure the CBPS-300 display voltage is selected to display coil voltage. Press Coil/Motor switch to display coil voltage.

b. Turn the voltage control knob to select the desired test voltage. Observe test voltage displayed on the LCD as shown below:



NOTE

Allow 3 seconds after turning voltage control knob for the voltage display to be stable.

- c.** Press the control CLOSE switch to energize CLOSE coil.
- d.** Observe CLOSE coil was energized and circuit breaker was closed.
- e.** If an over-current condition was detected, the FAULT LED will be lit.
- f.** Check the CLOSE coil connection. Press RESET switch and go to step c to close circuit breaker.
- g.** To end test, turn the voltage control knob to zero position before turning off CBPS-300.

WARNING

Always return the voltage control knob to the zero position before connecting or disconnecting the CBPS-300 test leads.

5.5 Energize Spring Charging Motor Procedure

The following procedures will allow the operator to energize circuit breaker charging motor.

a. Make sure the CBPS-300 display voltage is selected to display coil voltage. Press Coil/Motor switch to display motor voltage.

b. Turn the voltage control knob to select the desired test voltage. Observe test voltage displayed on the LCD as shown below:



NOTE

Allow 3 seconds after setting voltage control knob for the voltage display to be stable.

- c.** Hold the MOTOR switch to energize circuit breaker charging motor.
- d.** Observe circuit breaker charging motor is energizing.
- e.** Release switch after spring was charged.
- f.** If an over-current condition was detected, the FAULT LED will be lit.
- g.** Check motor lead connection. Press RESET switch and go to step c to energize charging motor.
- h.** To end test, turn the voltage control knob to zero position before turning off CBPS-300.

WARNING

Always return the voltage control knob to the zero position before connecting or disconnecting the CBPS-300 test leads.

5.6 Remote control Mode

The CBPS-300 can be control by the Vanguard Instrument circuit breaker timers (CT-6500, CT-7000, CT-7500). The following procedures allow the user to operate the CBPS-300 with the Vanguard Instrument timers.

- a.** Connect the initiate cable from the CT-XXX timer to the CBPS-300.
- b.** Turn the voltage control knob to zero.

- c. Turn on the CBPS-300.
- d. Turn the voltage control knob to select the desired test voltage. Observe test voltage displayed on the LCD as shown below:

COIL VLTG: 120.0 V

NOTE

Allow 3 seconds after turning voltage control knob for the voltage display to be stable.

- e. Initiate Open or Close command from the circuit breaker timer.
- f. Observe circuit breaker operated.
- g. To end test, turn the voltage control knob to zero position before turning off CBPS-300.

WARNING

Always return the voltage control knob to the zero position before connecting or disconnecting the CBPS-300 test leads.



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