

# INSTRUCTION MANUAL



**Basler Electric  
Highland, Illinois**

VERI-SYNC RELAY  
Model PRS 250  
Part Number: 90 88800 102

#### Publication

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#### CONFIDENTIAL INFORMATION

OF BASLER ELECTRIC COMPANY, HIGHLAND, ILL.  
IT IS LOANED FOR CONFIDENTIAL USE, SUBJECT  
TO RETURN ON REQUEST, AND WITH THE MUTUAL  
UNDERSTANDING THAT IT WILL NOT BE USED IN  
ANY MANNER DETRIMENTAL TO THE INTERESTS OF  
BASLER ELECTRIC COMPANY

**WARNING**

TO PREVENT PERSONAL INJURY OR EQUIPMENT DAMAGE,  
ONLY QUALIFIED TECHNICIANS/OPERATORS SHOULD  
INSTALL AND OPERATE THIS DEVICE.

**CAUTION**

MEGGERS AND HIGH POTENTIAL TEST EQUIPMENT MUST  
NOT BE USED. INCORRECT USE OF SUCH EQUIPMENT  
COULD DAMAGE THE SEMICONDUCTORS CONTAINED IN  
THE REGULATOR.

## SECTION 1.0

### GENERAL INFORMATION

#### 1.1 DESCRIPTION

1.1.1 The PRS 250 Veri-Sync Relay, Basler Part Number 90 88800 102, is a solid-state device using silicon diodes, silicon transistors, capacitors and resistors. The PRS 250 is relatively unaffected by temperature, humidity, vibration or shock. A built-in relay is used as the power switching device.

#### 1.2 PURPOSE

1.2.1 The Veri-Sync Relay provides contact actuation when the slip frequency, phase angle, and voltage of two signals are within predetermined limits.

#### 1.3 SPECIFICATIONS

1.3.1 The following table lists the specifications of the Veri-Sync Relay.

TABLE 1-1 SPECIFICATIONS

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Input Power:	
Voltage	65 to 140 or 130 to 305 VAC *1
Frequency	45 to 65 hertz
Phase	Single
Burden	6 VA at 0.9 P.F. (Each Input)
Voltage Acceptance Band:	+8 volts *2
Slip Rate (maximum):	+0.5 Hertz *2
Phase Angle (adjustable):	0 - + 20 degrees *3
Operational Parameters	See Figure 1-1
Output Contacts:	SPDT
Contact Rating (non-inductive)	1.0 amps at 125 VDC 7.5 amps at 208 VAC
Vibration:	Withstands 5 G's at 70 Hertz
Shock:	Withstands 15 G's in any plane
Operating Temperature	-40°C to +70°C (-40°F to +158°F)
Dimensions:	7.12" x 7.10" x 3.31"
Maximum Weight:	Net 6.5 pounds
Shipping Weight:	7.5 pounds
Finish:	Main chassis - zinc plated with chromate wash Upper and lower panels - dark fawn

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\*1 Terminals 2 and 5 will accept voltage between 65 and 140 VAC  
Terminals 3 and 6 will accept voltage between 130 and 305 VAC

\*2 Bus at 120V, 60 Hz; Phase Angle set at 20°

\*3 Incoming and bus 120V, 60 Hz, 0° Hz slip.

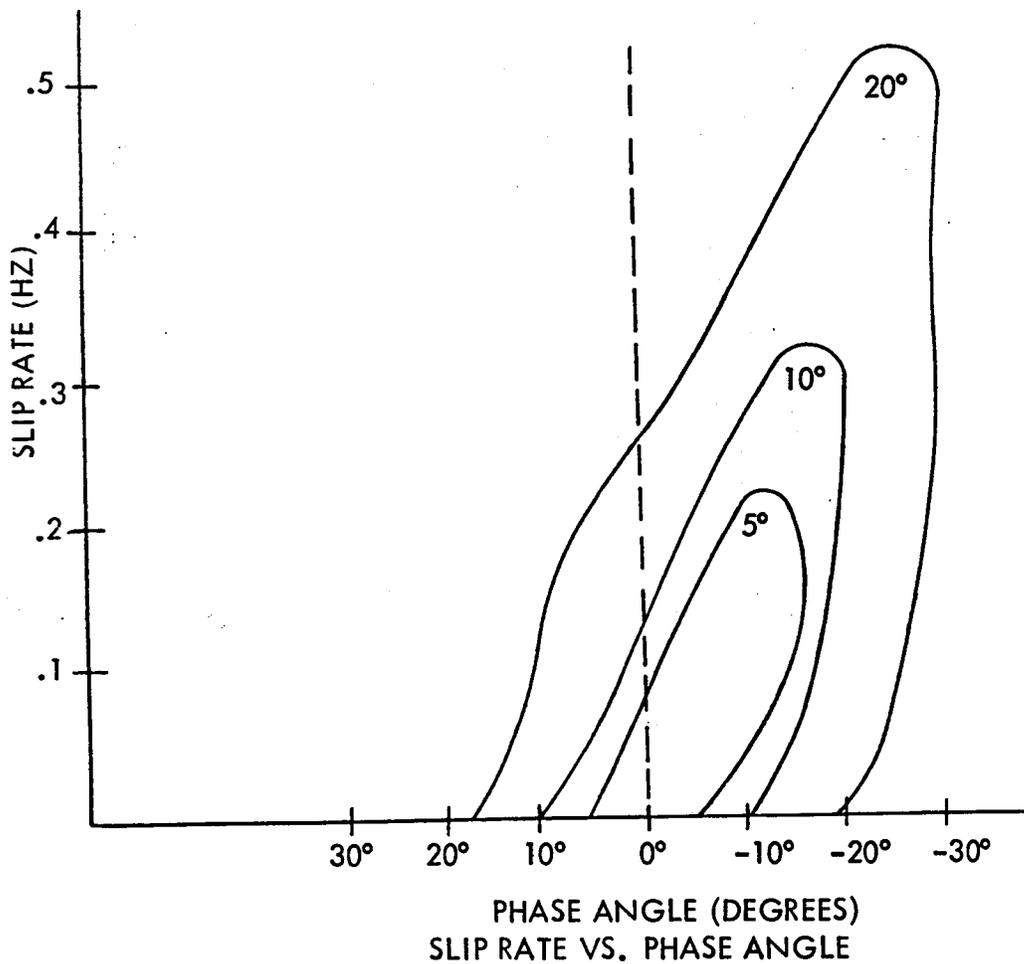
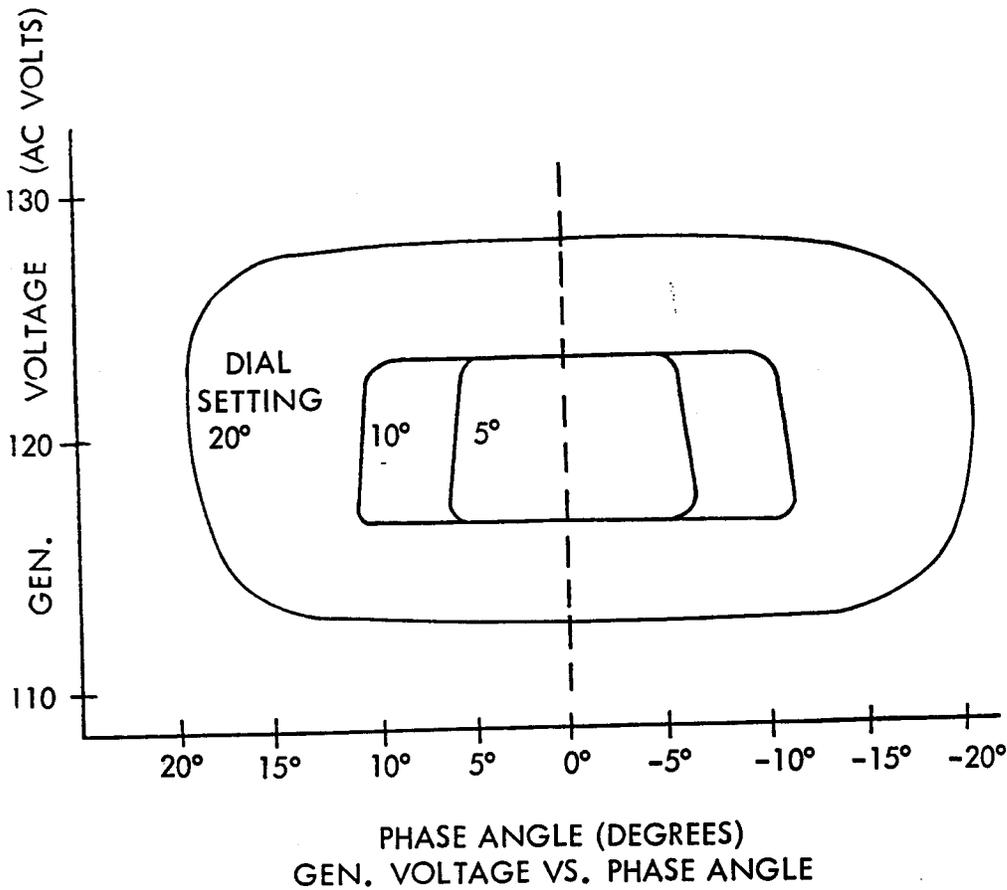


Figure 1-1. TYPICAL OPERATING CURVES

## SECTION 2.0

### PRINCIPLES OF OPERATION

#### 2.1 GENERAL

2.1.1 The PRS 250 compares frequency, phase angle, and voltage of two signals. Output contact closure occurs when the following parameters are within the specified ranges and when the unit is operating with 120V @ 60Hz, 0° slip rate.

<u>Parameter</u>	<u>Range</u>
Frequency	+0.5 Hertz
Phase Angle	0° to +20° (adjustable)
Voltage	+8 volts

2.1.2 The unit consists of three basic circuits. These circuits are: a power supply, a phase angle and slip frequency comparator, and a voltage comparator. These circuits are explained in the following paragraphs:

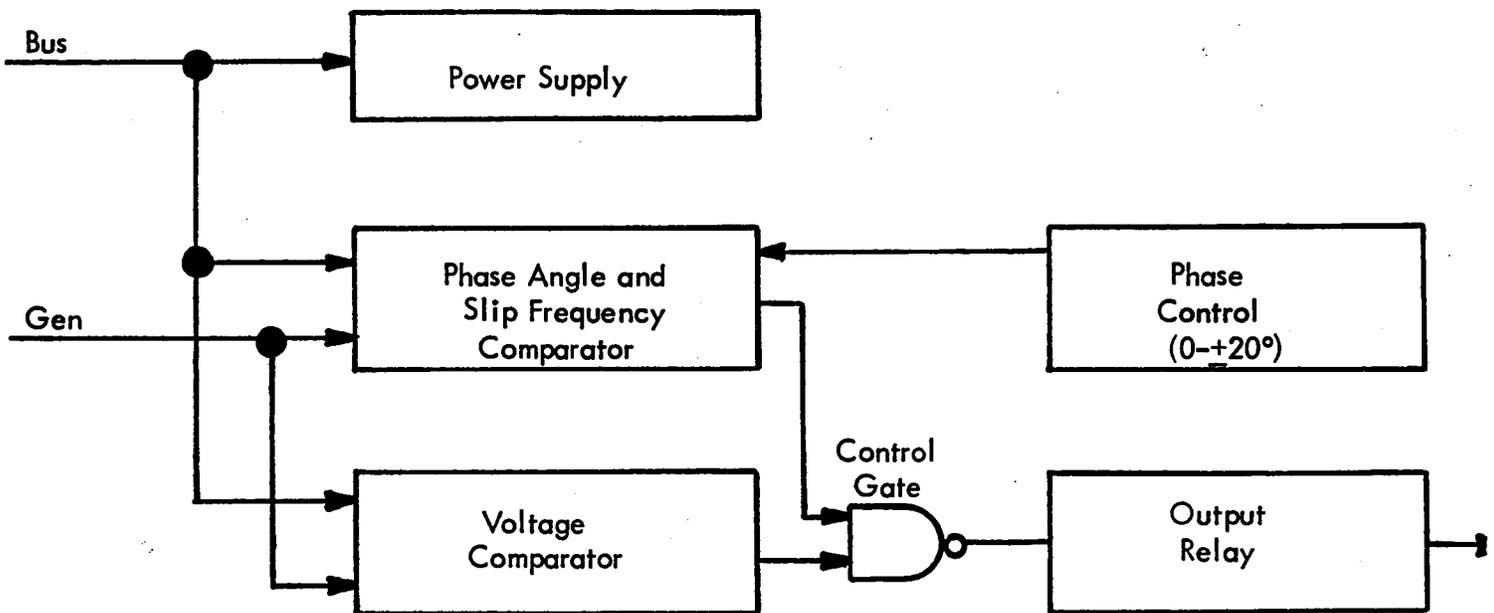


Figure 2-1 Overall Block Diagram

## 2.2 POWER SUPPLY

2.2.1 The power supply rectifies and filters the secondary voltage from a transformer and clamps it to 24 volts. This provides the input power to the Veri-Sync Relay circuitry.

## 2.3 PHASE ANGLE AND SLIP FREQUENCY COMPARATOR

2.3.1 This circuit measures the phase angle between the two signals and determines when it is within the preset angle. It also verifies that the slip rate is below 0.5 Hertz. When these conditions are met simultaneously, an output signal is sent to the control gate.

## 2.4 VOLTAGE COMPARATOR

2.4.1 This circuit compares two signal voltages for coincidence within  $\pm 8$  volts. If this condition is met, the voltage comparator provides an output signal to the control gate. When both the voltage comparator and the phase and slip frequency comparator are providing an output signal, the relay closes.

### CAUTION

THE SPDT RELAY CONTACTS ARE PROVIDED FOR INITIATING AND NOT INTERRUPTING CIRCUIT BREAKER OPERATION. (REFER TO TABLE 1-1 FOR CONTACT RATING SPECIFICATIONS).

## SECTION 3.0

### INSTALLATION AND OPERATION

#### 3.1 GENERAL

3.1.1 This section contains information concerning the installation and operation of the PRS 250 Veri-Sync Relay. It is extremely important that the Interconnection and initial operation be done with care to insure proper operation of the unit.

3.1.2 The protective relay is packed in accordance with the best commercial practices. Carefully remove all inserts and packing from around the unit.

3.1.3 When the unit has been removed from the container, it should be inspected for physical damage. The wiring should be inspected for damaged insulation and loose or broken connections.

3.1.4 Normal safety precautions should be observed before and during operation of the relay.

#### 3.2 MOUNTING

3.2.1 The unit is intended for switchgear back panel mounting in a vertical position for proper operation. All data necessary for mounting the protective relay is contained in Figure 5-1.

### 3.3 INTERCONNECTION

3.3.1 The unit should be connected to the system according to system requirements. However, the unit is not limited to generator applications. It can be used with any equipment on which voltage, frequency and phase angle comparison are required.

#### CAUTION

MEGGERS AND HIGH POTENTIAL TEST EQUIPMENT  
MUST NOT BE USED. INCORRECT USE OF SUCH  
EQUIPMENT MAY DESTROY THE SEMICONDUCTORS.

3.3.2 Generator potential transformer and bus potential transformer connections must conform in terms of phase and polarity as indicated on interconnection diagram, Figure 5-2. Alternate phase connections may be employed.

3.3.3 After initial set-up, with the Veri-Sync Relay phase angle set at  $0^\circ$ , using an ohmmeter and a synchroscope, verify that the relay actuate at  $0^\circ$ . If the contacts actuate at  $180^\circ$ , interchange wires 1 and 2 of the Veri-Sync.

### SECTION 4.0

#### MAINTENANCE

##### 4.1 PREVENTIVE MAINTENANCE

4.1.1 The PRS 250 requires no periodic maintenance. Inspection should be made on this unit to insure that it is kept clean and free from dirt and moisture. Accumulations of dust should be removed from the unit with a soft bristle or with an air line that has a moisture trap. Also, it is recommended that the connections between the relay and the system be checked at this time.

##### 4.2 CORRECTIVE MAINTENANCE

4.2.1 The unit can be removed from its fabricated steel box to remove and replace parts. Due to a protective transparent conformal coating, repair on the printed circuit board is difficult and should not be attempted.

### SECTION 5.0

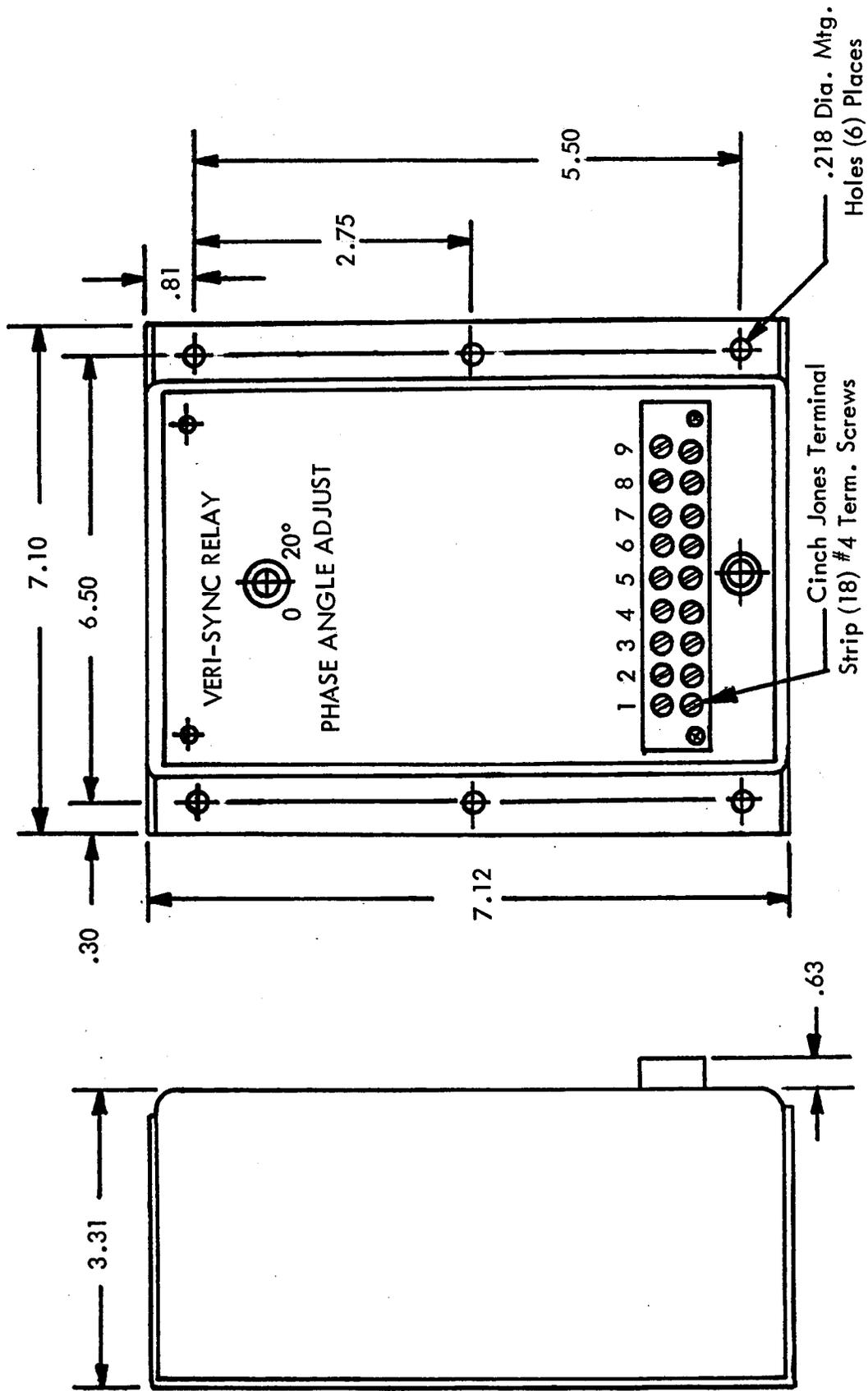
#### DRAWINGS

##### 5.1 GENERAL

5.1.1 This section contains drawings and diagrams to facilitate the installation, operation, and maintenance of the Veri-Sync Relay.

Figure 5-1 Outline Drawings

Figure 5-2 Interconnection Diagram



NOTE: Dimensions are in inches.

Figure 5-1

Outline Drawing

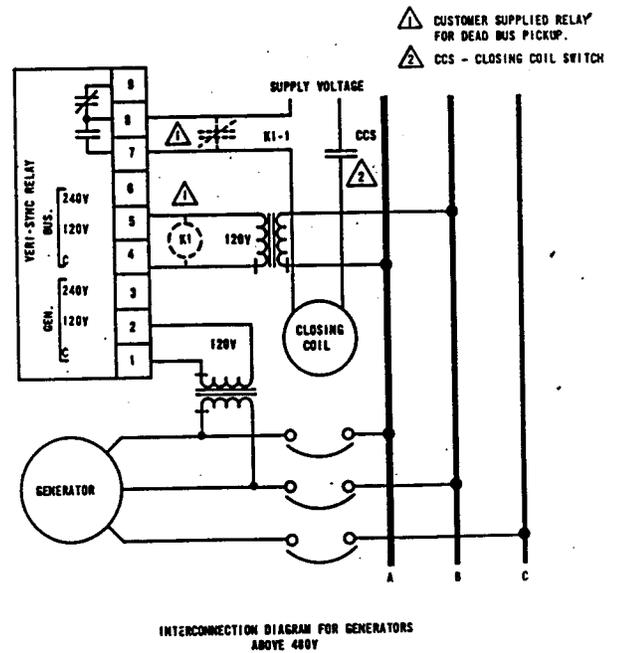
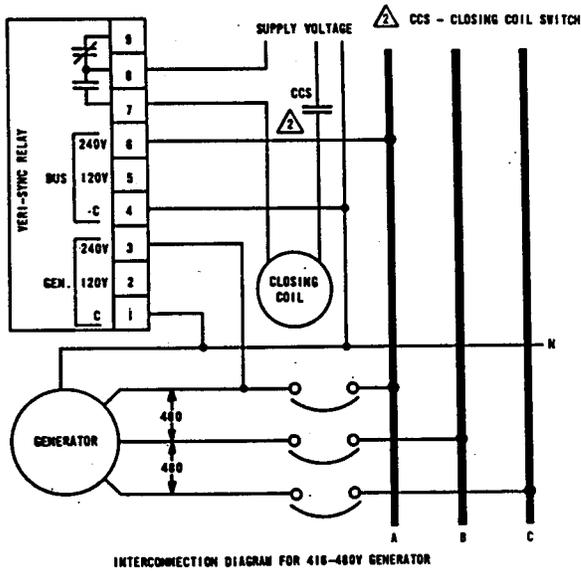
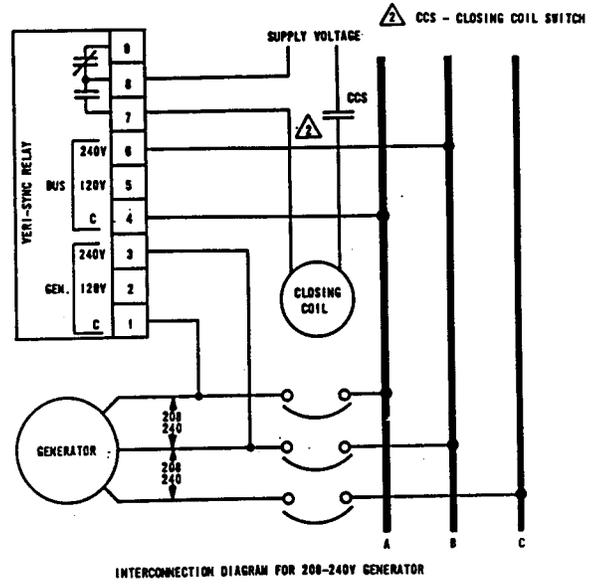
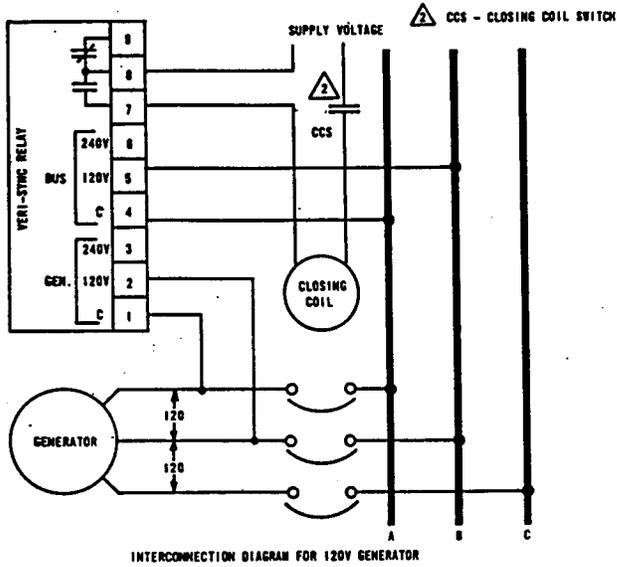


Figure 5-2  
Interconnection Diagrams