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# INSTRUCTION MANUAL FOR VOLTAGE REGULATOR Model: VR63-4B

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**WARNING**

To prevent personal injury or equipment damage, only qualified technicians or operators should install, operate, or service this device.

**ELECTRICAL SPECIFICATIONS****Dc Output Power:**

4 Adc at 63 Vdc (252W) maximum continuous,  
7 Adc at 100 Vdc (700W) forcing one minute (at 240 Vac input).

**Exciter Field Dc Resistance:**

15 ohms minimum; 100 ohms maximum.

**Ac Power Input:**

Operating range: 190 Vac to 240 Vac,  $\pm 10\%$ ,  
Single phase, 50/60 Hz  $\pm 5\%$ , Burden 500 VA.

**Voltage Adjust Range:**

171-264 Vac.

**Regulation Accuracy:**

Better than  $\pm 1.0\%$  no load to full load.

**Response Time:**

Less than 1.5 cycles for  $\pm 10\%$  change in sensing voltage.

**EMI Suppression:**

Internal electromagnetic interference filter (EMI filter).

**Overexcitation Shutdown:**

Output power is removed under the following conditions: Exciter field voltage exceeds  $100 \pm 5$  Vdc for a time inversely proportional to voltage magnitude, or instantaneously if the exciter field voltage exceeds  $135 \pm 5$  Vdc.

**Voltage Build-up:**

Internal provisions for automatic voltage build-up from generator residual voltages as low as 10 Vac.

**Power Dissipation:**

8 Watts maximum.

**PHYSICAL SPECIFICATIONS****Operating Temperature:**

$-40^\circ\text{C}$  ( $-40^\circ\text{F}$ ) to  $+60^\circ\text{C}$  ( $+140^\circ\text{F}$ ).

**Storage Temperature:**

$-65^\circ\text{C}$  ( $-85^\circ\text{F}$ ) to  $+85^\circ\text{C}$  ( $+185^\circ\text{F}$ ).

**CSA Approved****FUSES**

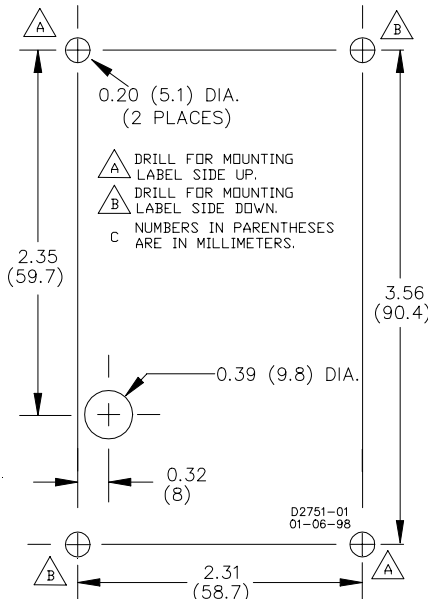
It is recommended that fuses with high interruption capability be installed per the interconnection diagram to protect wiring from faults before the regulator. Refer to the *Interconnection Diagram*.

**NOTE**

Fuse must be installed per the interconnection diagrams to avoid interrupting the field current.

**MOUNTING**

The regulator may be mounted in any position. Refer to the drilling diagrams.



Drilling Diagram

**EXCITER FIELD POWER CIRCUIT (wires F+ and F-).**

Connect the regulator wire F+ to the brushless exciter field terminal F+, and wire F- to terminal F-.

**CAUTION**

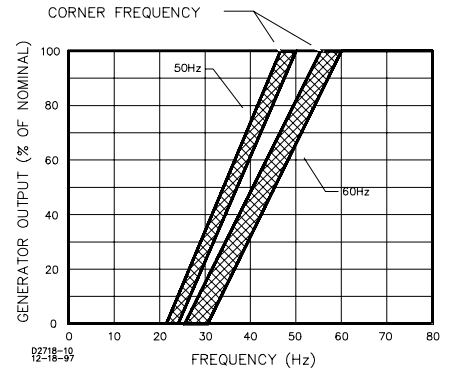
The dc resistance of the exciter field must be equal to or greater than 15 ohms and less than 100 ohms.

**POWER/SENSING INPUT CIRCUIT (wires 3 and 4)**

Connect as shown by the *Interconnection Diagram*.

**UNDERFREQUENCY CHARACTERISTIC POINT**

For 50 Hz systems, connect the Hz leads. For 60 Hz systems, disconnect the Hz leads. See curves the following figure.



Frequency Compensation Curves

**OVEREXCITATION SHUTDOWN**

This circuit removes the output power if the exciter field voltage exceeds  $100 \pm 5$  Vdc after a time delay. If the voltage exceeds,  $135 \pm 5$  Vdc, the output power is removed instantaneously.

After shutdown, reset the regulator by decreasing voltage below 6 Vac either by stopping the prime mover or interrupting the regulator input with a reset switch for 2 seconds or more.

**VOLTAGE ADJUST**

Screwdriver adjustable potentiometer adjusts generator output voltage. Adjustment CW increases voltage.

**STABILITY ADJUST**

Screwdriver adjustable (on non-label side) potentiometer adjusts the stability and response of the generator output voltage. Adjustment CW increases the stability.

**NOTE:** Excessive CCW rotation of this adjustment may result in oscillations (hunting) of the generator output voltage.

**OPERATION**

The following system operation procedures provide instructions for adjusting the VR63-4B Voltage Regulator.

**CAUTION**

Meggers and high potential test equipment must not be used. Incorrect use of such equipment could damage the semiconductors contained in the regulator.

**PRELIMINARY SET-UP**

To prevent damage to the regulator, complete the following steps before proceeding with system start-up.

- Verify that the voltage regulator specification conforms with the generator system requirements.

- b. Ensure that the regulator is correctly connected to the generator. See Interconnection Diagram.
- c. Install fuses per *FUSES* paragraph.
- d. Set the regulator voltage control fully CCW and the Stability Potentiometer to mid-range.

**SYSTEM START-UP**

- a. Start the prime mover and bring up to rated speed. Voltage should buildup. If a minimum residual of 10V is not present, perform field flashing.
- b. Slowly adjust voltage control until voltage reaches nominal value.

**OPERATIONAL TEST**

- a. Connect the test setup as shown in *Operational Test*. Do not apply power.

- b. Adjust regulator voltage adjust to maximum CCW.
  - c. Apply 240V, 60 Hz power to regulator.
- RESULT:** Light bulb flashes momentarily.
- d. Slowly adjust the regulator voltage adjust CW.

**RESULT:**

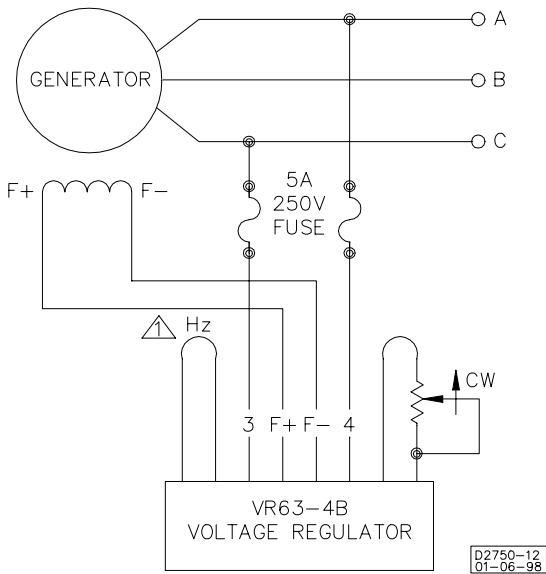
- 1) Before the full CW position is reached, the light bulb reaches full brilliance to signify the regulating point.
- 2) At the regulating point, a small change in the voltage adjust should turn the light bulb on or off.

**FIELD FLASHING**

When the regulator is operated with the generator for the first time, the polarity of residual magnetism may not correct or the magnitude not enough. If the generator does

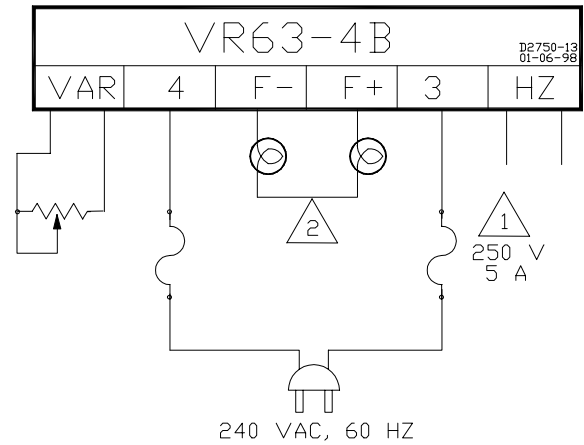
not build-up after startup, shut down the prime mover and proceed with the following steps:

- a. With the prime mover at rest, apply a dc source (not grounded) of not more than 12V, to terminals **F+**(positive) and **F-**(negative) in series with a limiting resistor of 3-5 ohms.
- b. Allow approximately 3 seconds before removing the dc source.
- c. Start prime mover and measure voltage at regulator leads **3** and **4**. If voltage is greater than 10 volts, voltage build-up should be successful. Repeat field flashing procedure if less than 10 V residual is measured.
- d. If repeating steps 1 and 2 does not result in generator voltage build-up, replace the voltage regulator.



⚠ CONNECT Hz LEADS FOR 50 Hz OPERATION  
DISCONNECT Hz LEADS FOR 60 Hz OPERATION

*Interconnection Diagram, 208/240 V Nominal*



**NOTE:**

- ⚠ ENCLOSE FUSES FOR SAFETY.
- ⚠ TWO 120 VOLT BULBS, LESS THAN 100 WATTS.

*Operational Test*