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CVR-63-6 - Commercial Voltage Regulator

INTRODUCTION

The **CVR-63-6** Voltage Regulator is a half-wave, 63-volt, 6-Amp automatic voltage regulator designed for brushless alternators. The unit is designed for 50Hz or 60Hz operation with under frequency compensation, over-excitation shutdown and EMI Filtering. The **CVR-63-6** offers high performance AC voltage regulation operation at an affordable price. Steady state voltage regulation is less than ±0.5% with rapid response to load transients. This is due to the high-speed voltage sensing and control circuitry **GAC** has incorporated into **CVR-63-6**. A **STABILITY** adjustment is used to optimize regulator performance for load transients on the generator.

INSTALLATION & WIRING

1. Refer to the generator requirements and compare them to the **CVR-63-6** specifications for compatibility.

2. Refer to (**Wiring Diagram 1 or 2)** for installing the **CVR-63-6**. Follow local and NEC standards as it pertains to wire size and methods.

3. Select the proper frequency range, for 60 Hz operation; leave **Terminals Hz1** and **Hz2** open. If 50 Hz operation is desired add a jumper to **Terminals Hz1** and **Hz2**.

4. Connect the AC power for the **CVR-63-6** to **Terminals 3** & **4**. An optional single-pole, single-throw ON/OFF switch can be installed in series to **Terminal 3**. **Ternimals 3 & 4** can be connected to either 120 VAC or 240 VAC Line-to-Line or Line-to-Neutral. Note: In the Line-to-Neutral Connection **Terminal 4** is **ALWAYS** connected to generator neutral.

5. The sensing input must be connected to either **Terminal E1** (120 VAC) or **Terminal E2** (240 VAC). It is necessary to connect the sensing wire to the same connection as **Terminal 3.**

6. Connect the alternator's exciter field lead to **Terminal F+** and **F-**. Make sure the **Terminal F+** lead of the exciter field is connected to the **Terminal F+** on the **CVR-63-6** and the **Terminal F-** lead of the exciter filed is connected to the **Terminal F-** of the **CVR-63-6**.

Caution: Never open or disconnect the exciter filed connections during genset operation. Never attempt to install or check a fuse while the generator is running. Turn all equipment OFF before servicing. Failure to do so will result in equipment damage and personal injury.

SET-UP & OPERATION

After mounting and wiring the **CVR-63-6** and before starting the genset, check all wiring to insure it is both proper and all connections are tight. Be sure to check the **Power Input (3** and **4)**, **Sensing (E1** and **E2)**, and **Frequency (Hz1** and **Hz2)** wiring for proper system operation. After review the connections, the engine can be started (follow the engine and or genset manufacturers operation guide and check list before starting the engine).

With the genset running at no-load rated speed, adjust the internal 25-turn **VOLTAGE ADJUST POT** on the **CVR-63-6**. Turning the **VOLTAGE ADJUST POT** CW raises the alternators output voltage.

If remote fine voltage control is desired an **EXTERNAL TRIM POT** may be installed across **Terminal 6** and **7** (see **Wiring Diagram 1.**). The **TRIM POT** must be a 10K Ohm, 1W. The **TRIM POT** will give about ± 5% voltage adjustment around the nominal voltage set point of the genset. If the trim feature is not needed **Terminals 6** & **7** should be shorted with a jumper.

The **STABILITY POT** is pre-set at 50% from the factory. From this position, optimum performance can be determined by connecting a chart recorder to the alternators output (follow the manufacturers recommended procedure for proper set-up). Make sure the genset is operating at no-load rated voltage and the **STABILITY POT** is set at 50%. To check the systems performance, apply a load to the genset and monitor the chart recorder during the transition. If the voltage recovery is too long turn the **STABILITY POT** CW one division and repeat the process. If the voltage becomes unstable turn the **STABILITY** pot CCW one division and repeat the process.

The Underfrequency Roll-Off Set Point is factory set at 5Hz below nominal operating frequency and is customer adjustable using the **UNDER FREQ ADJUST POT**. If the alternators frequency falls below this setting, the alternator voltage will decrease proportionally to the decreasing frequency until the shutoff point is reached (see **Chart 1**). The Roll-Off Frequency can be set as follows:

1. Adjust the engine speed down to the desired roll-off speed.

2. Adjust the **UNDER FREQ ADJUST** pot until the AC voltage just starts to fall off at that speed. CW rotation of the **UNDER FREQ ADJUST POT** lowers the Underfrequency Roll-Off Set Point. The rate of reduction and time constants for voltage reduction are fixed by internal circuitry.

TROUBLESHOOTING

A simple bench test can confirm if the regulator is functional. Connect an AC light bulb to the field terminals. Use a variac to adjust the AC voltage to the regulator. Connect the input of the variac through an isolation transformer. Connect the common side of the variac output to **Terminal 4**. Connect the adjustable side to **Terminal 3** and to either **Terminal E1** (120 VAC) or **Terminal E2** (240 VAC) depending on the variac's maximum output voltage.

Carefully adjust the variac output while monitoring its output voltage. The light bulb should start to glow when about 50 VAC is reached. Continue to increase the voltage from the variac until the lamp gets bright and then goes dim. The point where the lamp goes dim is the point of regulation. If the lamp does not go dim with rated voltage on the regulator, turn the internal voltage adjustment CCW until the lamp go dim. If the lamp cannot be made to go dim or never illuminates at all, the regulator is defective.

WIRING DIAGRAM 1.

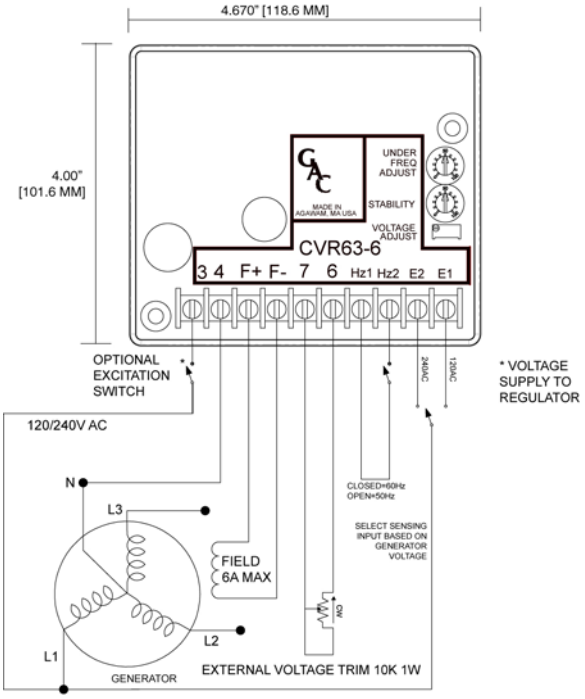


CHART 1 - Generator Voltage vs. Frequency

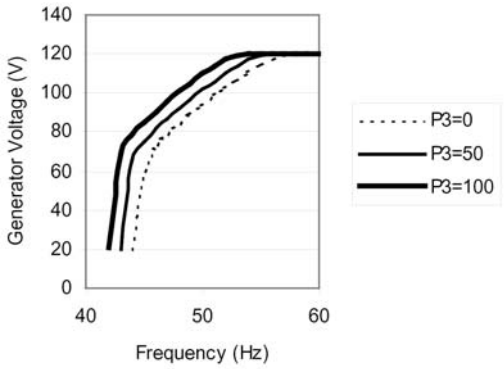
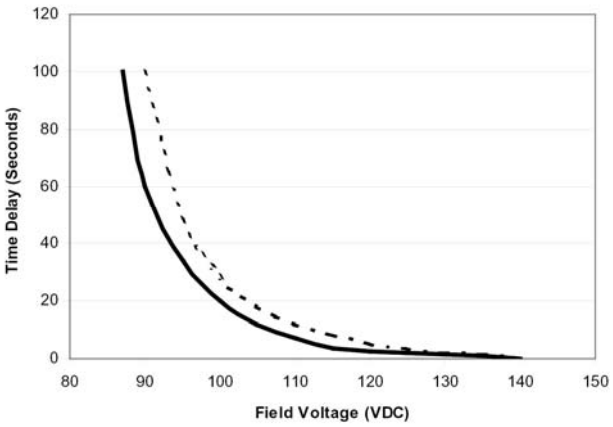


CHART 2 - Generator Overexcitation Shutdown Time Relay



SPECIFICATIONS

RESPONESE TIME	The **CVR-63-6** makes corrections for each electrical cycle. The minimum delay in the control loop is obtained by precise, proprietary voltage sensing and control circuitry.
EMI SUPRESSION	Filters have been added to all inputs and outputs of the **CVR-63-6**. The use of significant quantities of SMT hardware also result in low EMI radiation and susceptibility.
VOLTAGE BUILD-UP	Less than 6 VAC residual is required from the generator to bootstrap the **CVR-63-6**.
INTERNAL FUSE	The **CVR-63-6** is equipped with an internally mounted 10 Amp, Type F fuse. The fuse prevents the **CVR-63-6** from extreme overexciting the field

PERFORMANCE
Regulation from No Load to Full Load ..... < ±1.0%
Steady State Regulation ..... < ±0.5%

ENVIRONMENTAL
Ambient Operating Temperature Range ..... -40°F to + 185°F
..... (-40° C to + 85° C)
Vibration ..... 1 G@20-100Hz
Testing .....100% Functionally Tested
Relative Humidity .....up to 95%
Hard Potted Module .....Fungus Proof and Corrosion Resistant

INPUT VOLTAGE
Input Voltage Range (120 VAC nominal) ..... 90 VAC – 145 VAC
(240 VAC nominal) ..... 190 VAC – 290 VAC

OUTPUT POWER
Current (Maximum Continuous) ..... 6 ADC @ 63 VDC
Required Field Resistance .....10.5 to 500 Ohms
Current (forcing for 1 minute) .....7 ADC @ 100 VDC
Current (forcing for 10 seconds) .....9 ADC @ 134 VDC

VOLTAGE SENSING
Voltage Sensing Input (Terminal E1) .....90 VAC – 145 VAC
(Terminal E2) .....190 VAC – 290 VAC

PHYSICAL
Dimensions .....See Diagram
Weight 14.8oz
Mounting .....Any Position, Vertically Preferred
Ext Voltage Adjust Pot ..... 10K Ohms, 1W