INTRODUCTION

VR63-4C/UL voltage regulators are designed for use on 50/60 hertz brushless generators. The regulator includes frequency compensation and overexcitation shutdown functions, a solid-state buildup circuit, and EMI filtering.

Warning!

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

SPECIFICATIONS

DC Output Power

Maximum Continuous ..... 4 Adc at 63 Vdc, 252 W
One-Minute Forcing ..... 7 Adc at 100 Vdc, 700 W (at 120 Vac input)

Exciter Field DC Resistance

15 Ω minimum, 100 Ω maximum

AC Power Input

Operating range ..... 85 Vac to 139 Vac, single-phase
Frequency ..... 50/60 Hz ±5%
Burden ..... 450 VA.

Sensing Input

85 to 139 Vac, single-phase, 50/60 Hz +5%, common with ac power input.

Voltage Adjustment Range

85 to 139 Vac

Regulation Accuracy

Better than ±1.0% no load to full load.

Response Time

Less than 1.5 cycles for ±5% change in sensing voltage.

EMI Suppression

Internal electromagnetic interference (EMI) filter.

Overexcitation Shutdown

Output power is removed under the following conditions: the exciter field voltage exceeds 95 Vdc, ±5 Vdc for a time inversely proportional to voltage magnitude, or within 2 seconds if the exciter field voltage exceeds 140 Vdc, ±5 Vdc.

Voltage Buildup

Internal provisions for automatic voltage buildup from generator residual voltage as low as 6 Vac.

Power Dissipation

12 W maximum

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9253700991	G	*Instructions*	Jan 2023	2023

Temperature

Operating ..... –40 to 60°C (–40 to 140°F)
Storage ..... –65 to 85°C (–85 to 185°F)

Vibration

Withstands 1.2 g at 5 to 26 Hz; 0.036" double amplitude at 27 to 52 Hz; and 5 g at 53 to 1000 Hz.

Shock

Withstands up to 20 g in each of three mutually perpendicular axes.

Agency Certifications

UL 6200:2019 recognized, CSA certified

Weight

10 oz. (283 g)

MOUNTING

The VR63-4C/UL may be mounted in any position. Figure 1 shows the panel drilling diagram for mounting the regulator. Dimensions are shown in inches with millimeters in parenthesis.

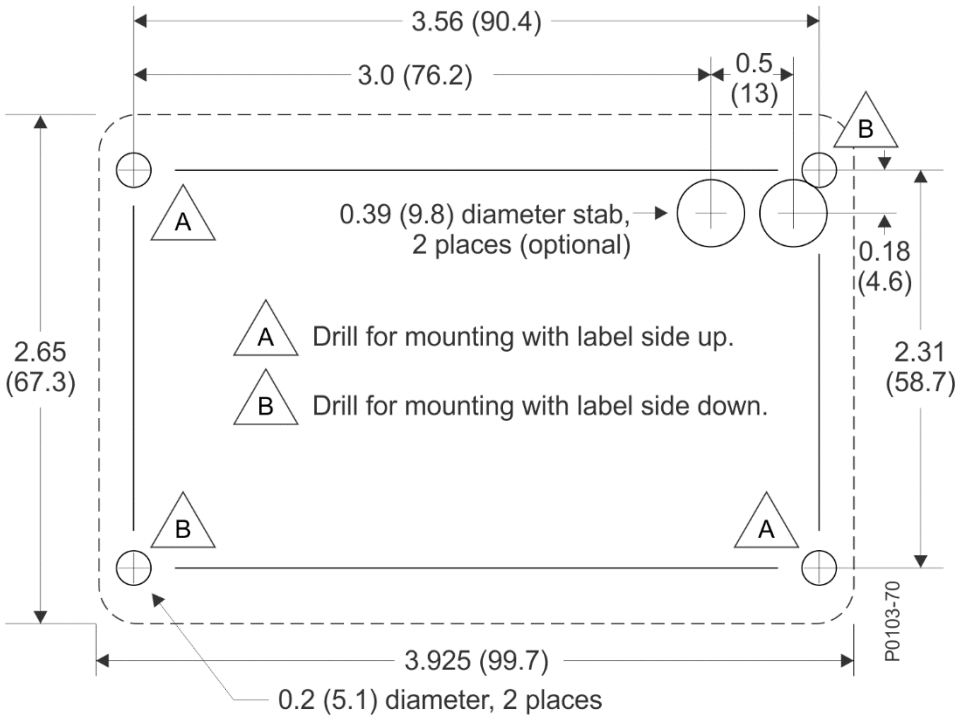


Figure 1. Drilling and Mounting Diagram

CONNECTIONS

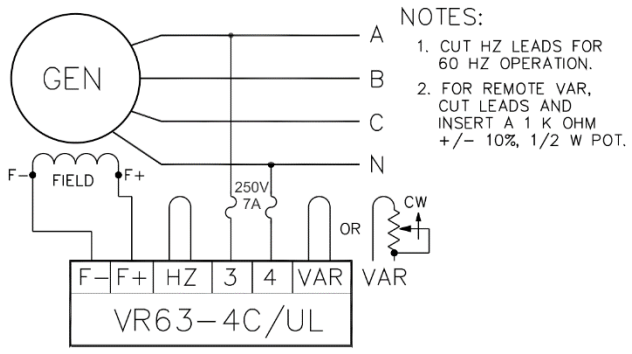
Connect the VR63-4C/UL as shown in the interconnection diagrams of Figure 2.

Caution

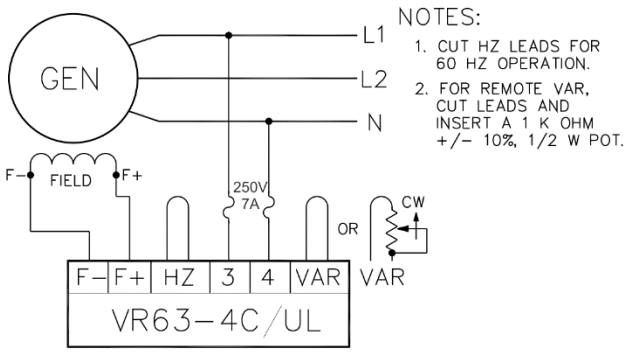
The dc resistance of the exciter field must be equal to or greater than 15 Ω and less than 100 Ω.

Exciter Field Power

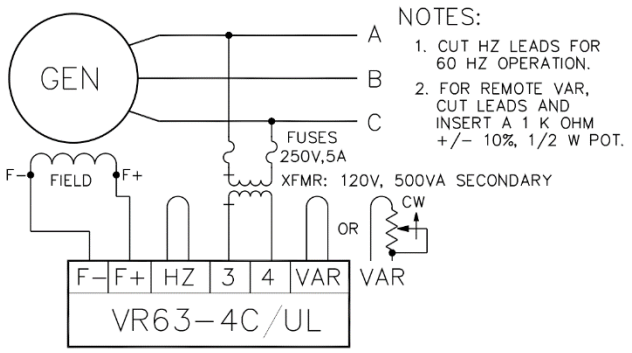
Connect regulator wire F+ to the brushless exciter field terminal F+ and wire F– to terminal F–.



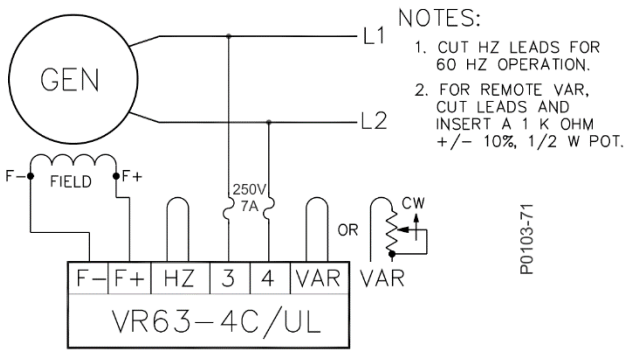
208/240 Vac Nominal, 3-Phase, 4-Wire



120/240 Vac Nominal, Single-Phase with Neutral



240 Vac Nominal, 3-Phase, 3-Wire



120 Vac Nominal, Single-Phase

Figure 2. Interconnection Diagrams

Power/Sensing Input

Power for the exciter field and regulator circuitry is derived from the generator output or auxiliary winding. The operable power input range is 85 to 139 Vac and is connected to regulator terminals 3 and 4.

FUSES

It is recommended that fuses with high interruption capability be installed to protect wiring from faults before the regulator. Refer to Figure 2 for fuse details.

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

FREQUENCY COMPENSATION

Frequency compensation improves system load pickup performance by restraining voltage recovery until the frequency has also started to recover. The VR63-4C/UL frequency compensation characteristic is illustrated in Figure 3.

The regulator is preset at the factory for a 50 hertz system and a 45 hertz corner frequency. For a 60 hertz system, a 55 hertz corner frequency is achieved by cutting the external HZ jumper wire. Be sure to insulate the two wire ends so that they are not exposed.

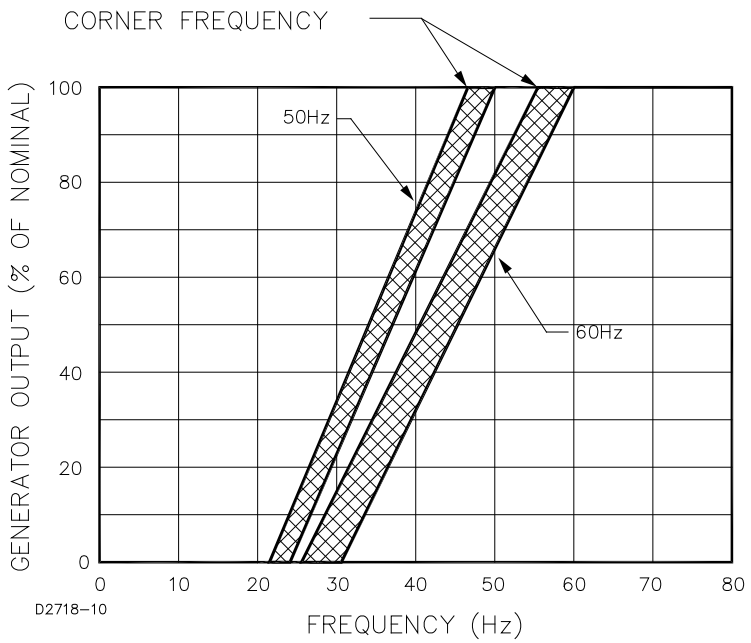


Figure 3. Frequency Compensation Characteristic

OVEREXCITATION SHUTDOWN

If the exciter field voltage exceeds 95 Vdc, ±5 Vdc, the regulator automatically removes the field current after a time delay. The time delay is inversely proportional to the magnitude of the detected overvoltage condition, up to 140 Vdc. Beyond 140 Vdc, the field voltage is removed within 0.2 seconds. The overexcitation shutdown time delay characteristic is illustrated in Figure 4.

After shutdown, reset the regulator by decreasing the voltage below 6 Vac. This is achieved by stopping the prime mover or interrupting the regulator input with a reset switch for at least two seconds.

Figure 4. Overexcitation Shutdown Time Delay Characteristic

ADJUSTMENT CONTROLS

VR63-4C/UL adjustment controls consist of two screwdriver-adjusted potentiometers: voltage adjust and stability adjust.

Voltage Adjust

The voltage adjust potentiometer adjusts the level of generator output voltage. Clockwise adjustment increases the generator voltage.

A remote voltage adjust rheostat may be used in place of the onboard potentiometer. A 1 kΩ, ½-watt rheostat is adequate for most applications. To connect a remote rheostat, cut the VAR wire on the regulator and connect the rheostat to each end of the cut wire. Remote rheostat connection details are shown in Figure 2.

Stability Adjust

The stability adjust potentiometer adjusts the response rate of the generator output voltage to a change in load. Clockwise rotation increases the response time and decreases the amount of voltage overshoot (increased stability). Counterclockwise rotation decreases the response time and increases the amount of voltage overshoot (decreased stability).

OPERATION

Perform the following procedures to adjust the VR63-4C/UL for operation in your application.

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 Setup

To prevent damage to the regulator, complete the following procedure before proceeding with system startup.

1. Verify that the VR63-4C/UL specifications conform with the generator system requirements.
2. Using Figure 2, ensure that the regulator is connected to the generator correctly.
3. Install the fuses according to the connections shown in Figure 2.
4. Set the regulator voltage adjust potentiometer fully counterclockwise. If a remote VAR rheostat is used, adjust it to the center position.

System Startup

1. Start the prime mover and bring it up to rated speed. Generator voltage should build up. If not, and a minimum residual of 6 Vac is not present, perform the procedure under *Field Flashing*.
2. Slowly adjust the voltage adjust potentiometer clockwise until the generator voltage reaches the nominal value. If a remote rheostat is used, adjust it to set the generator output voltage at the exact value desired.

Operational Test

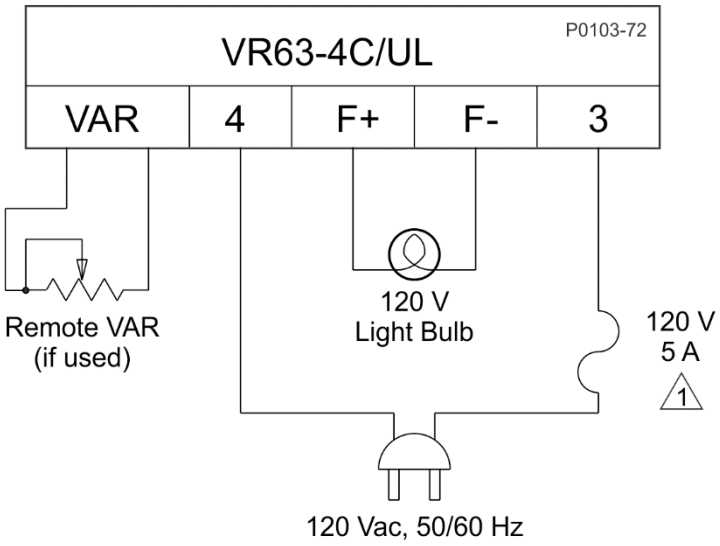
If an operational test of the regulator is desired, perform the following procedure.

1. Connect the regulator for testing as shown in Figure 5.
2. Adjust the regulator voltage adjust potentiometer fully counterclockwise. If a remote rheostat is used, adjust it fully counterclockwise also.
3. Apply 120 Vac, 50/60 hertz power to the regulator.

   The light bulb should flash momentarily.
4. Slowly adjust the regulator voltage adjust potentiometer clockwise.

Before minimum brilliance is reached, the light bulb should reach maximum brilliance to signify the regulating point.

At the regulating point, a small change in the voltage adjust potentiometer should turn the light bulb on or off.



1 If glass-type fuse is used, enclose for safety.

Figure 5. Operational Test Connections

Field Flashing

When the regulator is operated with the generator for the first time, the polarity of the residual magnetism may not be correct or the magnitude not enough. If the generator voltage does no build up after startup, stop the prime mover and perform the following steps.

1. With the prime mover at rest, apply an ungrounded dc source of not more than 12 Vdc to terminals F+ and F– in series with a limiting resistor of 3 to 5 ohms. Apply the flashing source for approximately 3 seconds before removing it.
2. Start the prime mover and measure the voltage at regulator leads 3 and 4. If the voltage is greater than 6 Vac, voltage buildup should be successful. Repeat step 1 if less than 6 Vac residual is measured.
3. If repeating steps 1 and 2 does not result in generator voltage buildup, replace the voltage regulator.

ACCESSORY EQUIPMENT

An optional locking remote rheostat is available from Basler Electric. Order part number 17727.