Basler Electric	www.basler.com +1 618.654.2341 (USA) info@basler.com	Model AVC63-4 AVC63-4D	Part Number 9166800136 9166800137

Introduction

AVC63-4 and AVC63-4D analog voltage controllers regulate voltage on 50 hertz or 60 hertz brushless generators. The controllers include frequency compensation, overexcitation shutdown, solid-state buildup circuitry, and EMI filtering.

The AVC63-4 and AVC63-4D differ in their location of the adjustment potentiometers. AVC63-4 adjustment potentiometers are accessed on the terminals and components side of the controller AVC63-4D adjustment potentiometers are accessed through the controller front panel.

Specifications

Output Power

Maximum Continuous:	4 Adc at 63 Vdc (252 W)
One-Minute Forcing:	7 Adc at 100 Vdc (700 W) with 240 Vac power input

Exciter Field DC Resistance

15 to 100 Ω

Input Power

Range:	190 to 240 Vac, ±10%, single-phase
Frequency:	50/60 Hz, ±10%
Burden:	500 VA

Sensing Input

190 to 240 Vac, single-phase, 50/60 Hz, ±10%, common with ac power input

Voltage Adjustment Range

171 to 264 Vac

Regulation Accuracy

Better than ±1.0%, no-load to full-load

Response Time

Less than 1.5 cycles for ±5% changes in sensing voltage

EMI Suppression

Internal electromagnetic interference (EMI) filtering

Overexcitation Shutdown

Field voltage shuts down after time delay if the exciter field voltage exceeds 100 Vdc, ±5%. (See *Overexcitation Shutdown* for the inverse time delay curve and description.)

Voltage Buildup

Automatic voltage buildup occurs for residual generator voltages as low as 6 Vac.

Power Dissipation

8 W maximum

Publication	Revision		Date	Copyright
9166800890	F	Instructions	May 2025	2025

Temperature

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

Vibration

2 to 27 Hz:	1.3 g
27 to 52 Hz:	0.036 inches, double-amplitude
52 to 1000 Hz:	5 g

Shock

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

Weight

8 oz (220 g) net

Agency Certifications

UL 6200:2019 recognized, CSA certified

China RoHS

The following table serves as the declaration of hazardous substances for China in accordance with PRC standard SJ/T 11364-2014. The EFUP (Environment Friendly Use Period) for this product is 40 years.

PRODUCT:	AVC63-4, AVC63-4D									
	有害物质 Hazardous Substances									
零件名称 Part Name	铅 Lead (Pb)	汞 Mercury (Hg)	镉 Cadmium (Cd)	六价铬 Hexavalent Chromium (Cr^{6+})	多溴联苯 Polybrominated Biphenyls (PBB)	多溴二苯醚 Polybrominated Diphenyl Ethers (PBDE)	邻苯二甲酸二丁酯 Dibutyl Phthalate (DBP)	邻苯二甲酸丁苄酯 Benzyl butyl phthalate (BBP)	邻苯二甲酸二酯 Bis(2-ethylhexyl) phthalate (BEHP)	邻苯二甲酸二异丁酯 Diisobutyl phthalate (DIBP)
金属零件 Metal parts	X	O	O	O	O	O	O	O	O	O
聚合物 Polymers	O	O	O	O	O	O	O	O	O	O
电子产品 Electronics	X	O	O	O	O	O	O	O	O	O
电缆和互连配件 Cables & interconnect accessories	O	O	O	O	O	O	O	O	O	O
绝缘材料 Insulation material	O	O	O	O	O	O	O	O	O	O

本表格依据 SJ/T11364 的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

This form was prepared according to the provisions of standard SJ/T11364.

O: Indicates that the hazardous substance content in all homogenous materials of this part is below the limit specified in standard GB/T 26252.

X: Indicates that the hazardous substance content in at least one of the homogenous materials of this part exceeds the limit specified in standard GB/T 26572.

Controls

AVC63-4 and AVC63-4D controls consist of jumpers and screwdriver-adjusted potentiometers.

Potentiometer Controls

AVC63-4 potentiometer controls are located on the components and terminals side of the controller. AVC63-4D potentiometer controls are accessed through the controller front panel. See Figure 1 for the potentiometer control locations for both models.

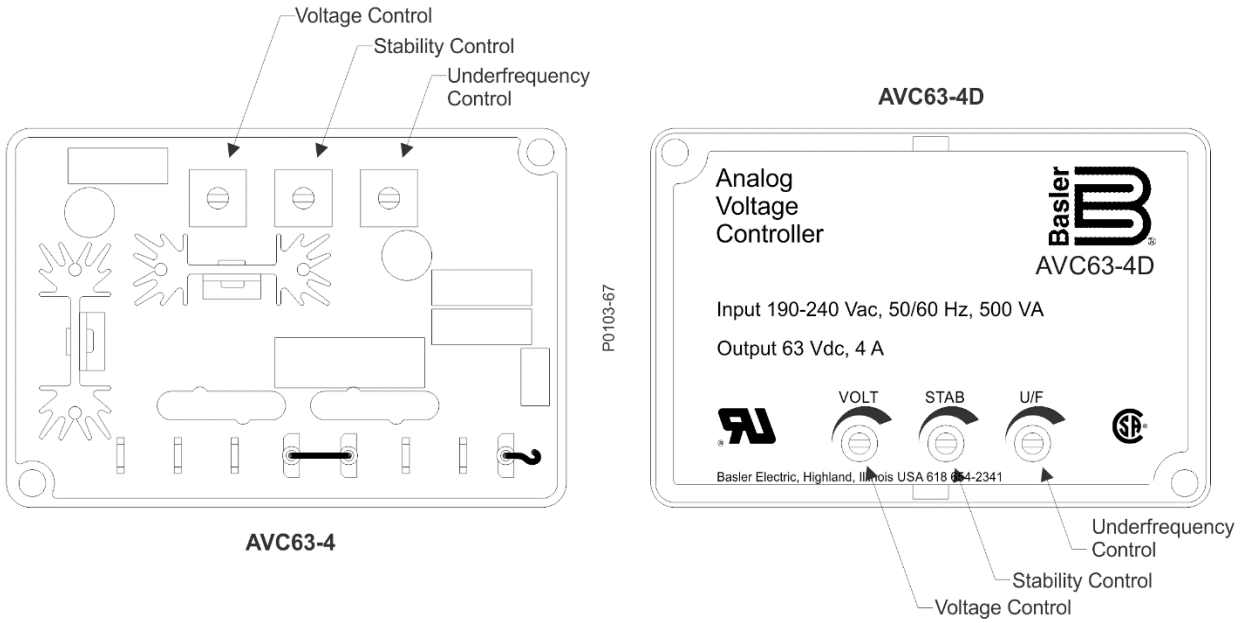

Figure 1. Potentiometer Control Locations

Jumpers

Two jumpers connect to the controller terminals: the Corner Frequency jumper and the Voltage Adjust Rheostat jumper. These jumpers are shown in Figure 2.

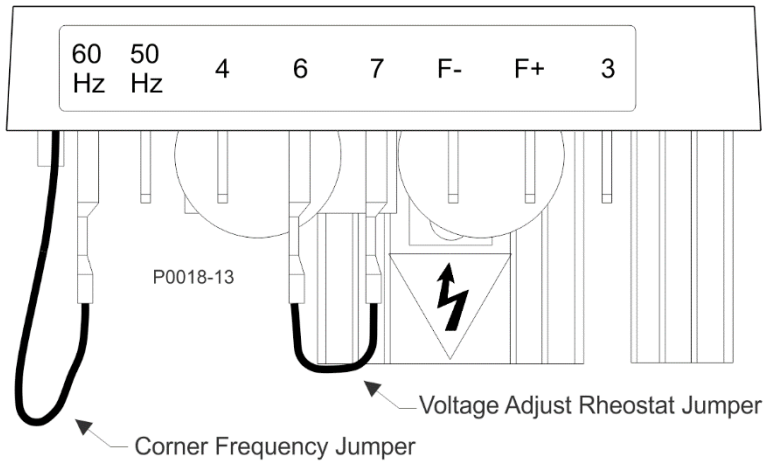

Figure 2. Jumper Locations

Corner Frequency Jumper

Analog voltage controllers are delivered with the Corner Frequency Jumper set for 60 hertz operation. This gives a corner frequency of 55 hertz. For 50 hertz operation and a corner frequency of 45 hertz, the Corner Frequency jumper must be moved to the 50 Hz terminal.

Voltage Adjust Rheostat Jumper

Analog voltage controllers are delivered with the Voltage Adjust Rheostat jumper connected across terminals 6 and 7. This enables adjustment of the generator output voltage with the controller's internal Voltage Control potentiometer. Clockwise rotation of the control increases the generator voltage.

If remote adjustment of the generator output is desired, the Voltage Adjust Rheostat jumper must be replaced with a user-supplied rheostat. A 1,000 ohm, ½-watt rheostat will provide an adequate voltage adjustment range for most applications. For the proper remote rheostat connections, see the *Installation* section.

Input Power/Sensing Input

Power for the analog voltage controller is derived from the generator output and applied to terminals 3 and 4. The acceptable power input range is 171 to 264 Vac. See the *Installation* section for details about the input power connections.

Exciter Field Power Circuit

Controller terminal F+ is connected to the brushless exciter field positive terminal and controller terminal F– is connected to the brushless exciter field negative terminal.

Caution

The exciter field resistance must be between 15 Ω and 100 Ω.

If the exciter field dc resistance is less than 15 Ω and the full-load field current does not exceed the maximum continuous current rating of the controller, a resistor of sufficient wattage must be added in series with the field to increase the total resistance to 15 Ω.

Frequency Compensation

The frequency compensation feature improves system load pickup performance by restraining voltage recovery until the frequency has also started to recover. Figure 3 illustrates the underfrequency characteristics of the AVC63-4 and AVC63-4D.

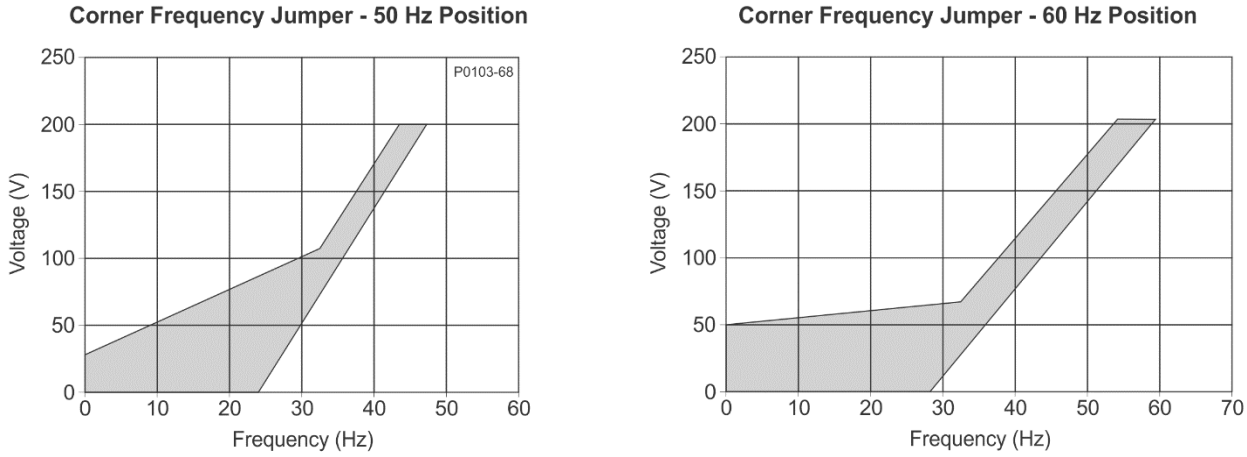

Figure 3. Frequency Compensation Characteristics

The corner frequency range is set for 50 hertz or 60 hertz by connecting the Corner Frequency jumper to the appropriate terminal. Refer to *Controls, Jumpers* for details about selecting the corner frequency range.

The corner frequency setting is adjusted by the Underfrequency control potentiometer. Clockwise rotation of the Underfrequency control increases the corner frequency and counterclockwise rotation decreases the corner frequency. If user adjustment of this factory-set potentiometer is desired, follow the *Preliminary Setup* and *System Startup* procedures.

Overexcitation Shutdown

The overexcitation shutdown feature removes controller output power, after a time delay, if the exciter field voltage exceeds 100 Vdc, ±5%. The time delay is inversely proportional to the magnitude of the detected overvoltage—up to 135 Vdc. Beyond 140 Vdc, the field voltage is removed after approximately 2 seconds. Figure 4 shows the overexcitation shutdown time delay characteristic.

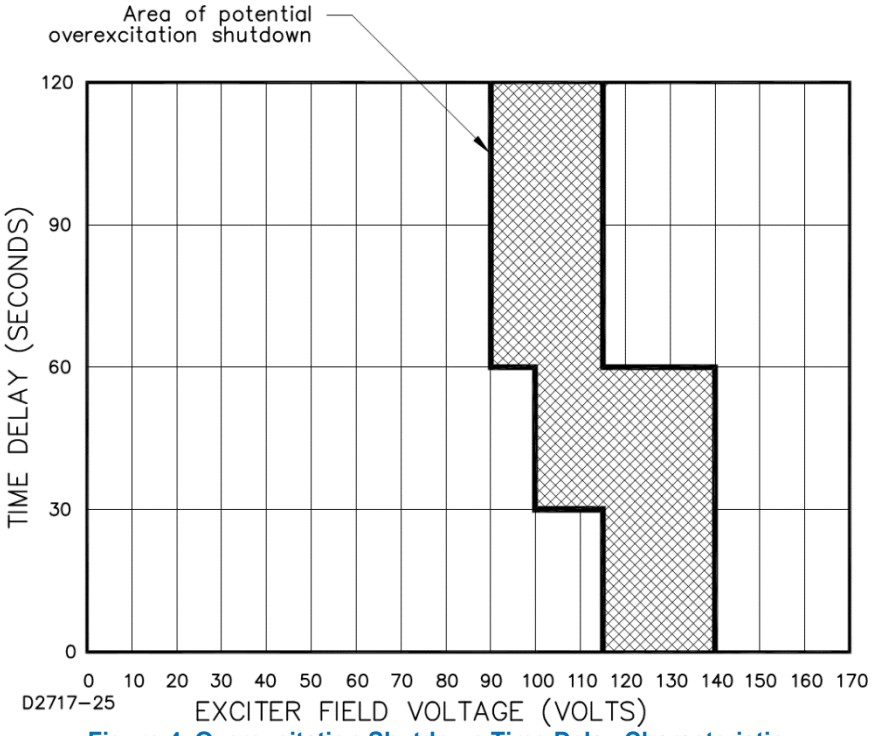

Figure 4. Overexcitation Shutdown Time Delay Characteristic

Once the output power is removed, the controller can be reset by decreasing the input voltage to less than 10 Vac for two seconds, minimum. This can be achieved by stopping the prime mover or by interrupting the controller input power with a reset switch.

Mounting

The AVC63-4 and AVC63-4D controllers may be mounted on the generator in any convenient position. Figure 5 shows the outline dimensions and drilling locations. Dimensions are shown in inches with millimeters in parenthesis.

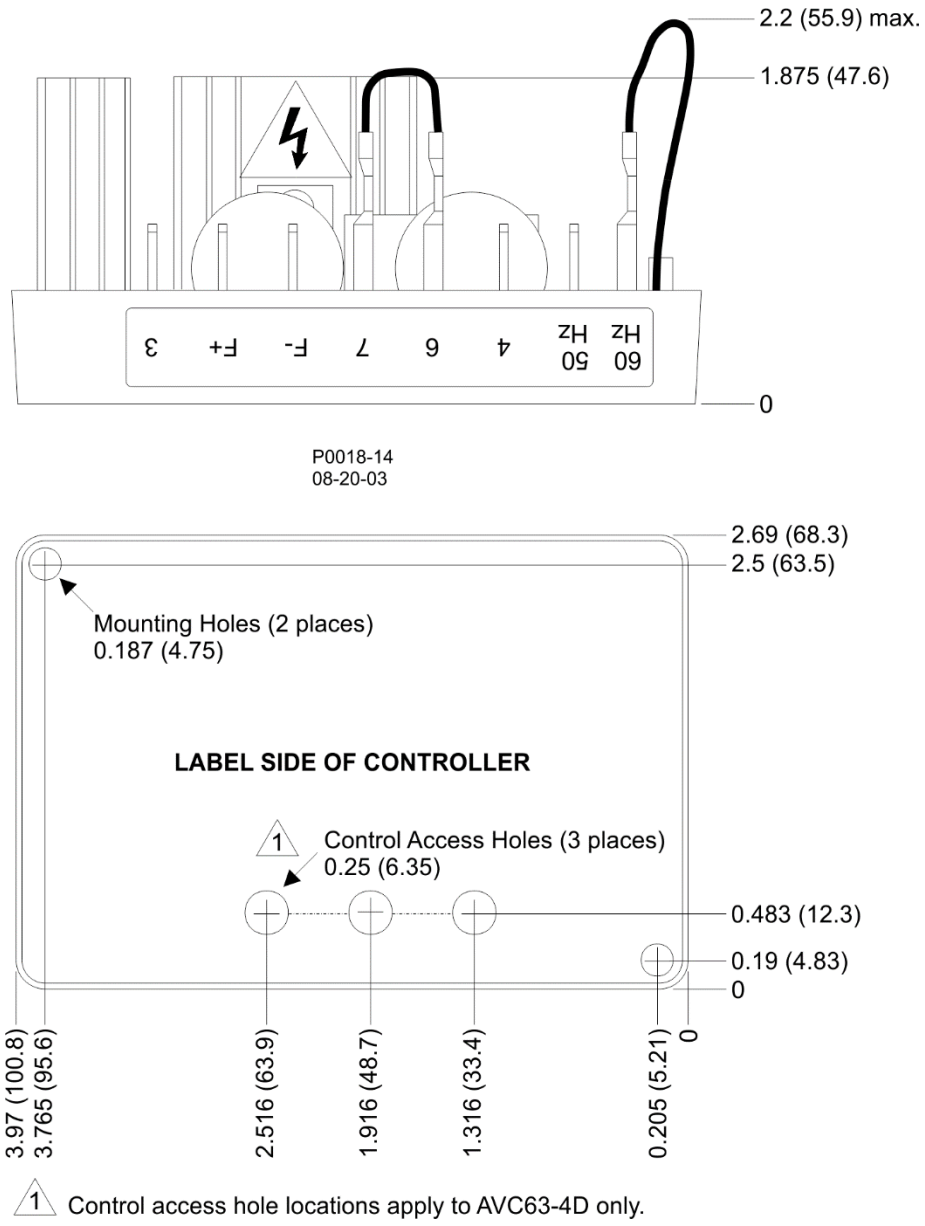

Figure 5. Outline and Drilling Dimensions

The recommended mounting hardware is two #8 or M4 screws torqued to 9 inch-pounds (0.9 newton meters). Nylon-lined locking nuts are recommended.

Connections

AVC63-4 and AVC63-4D controller terminals consist of quarter-inch, quick-connect tabs.

Typical AVC63-4 and AVC63-4D connections are shown in Figure 6.

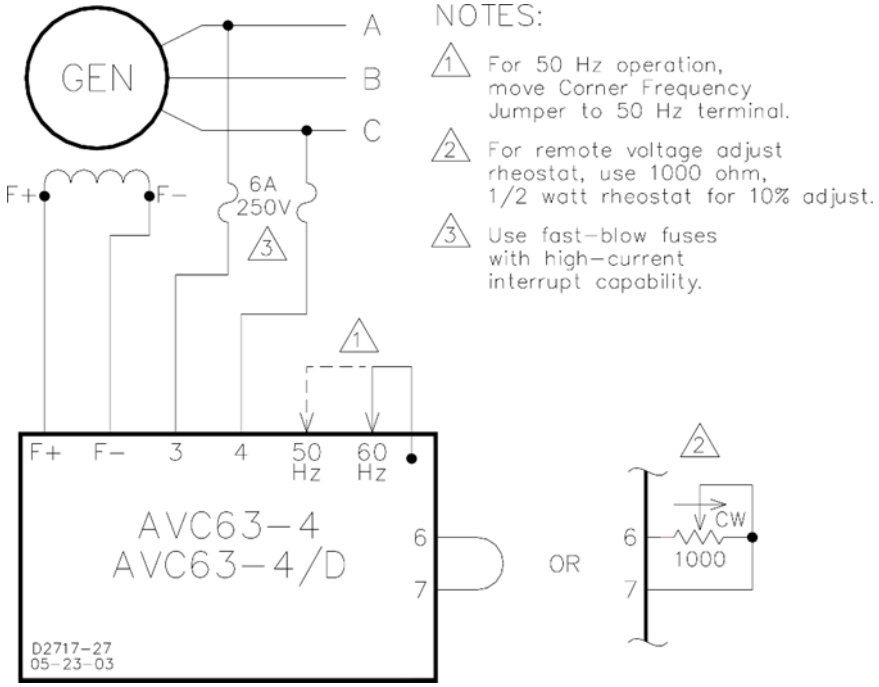

Figure 6. Typical Interconnection, 208/240 Vac Nominal Input

Operating Procedures

The following procedures provide instructions for adjusting the AVC63-4 and AVC63-4D controllers. Symptoms caused by certain generator system problems or a faulty controller are included along with suggested remedies.

Caution

Meggers and high-potential test equipment must not be used. Use of such equipment could damage the semiconductors contained in the controller.

Preliminary Setup

Complete the following steps before proceeding with system startup.

1. Verify that the analog voltage controller specifications conform with the requirements of the generator system.
2. Ensure that the controller jumpers are positioned as follows.
   a. If a remote voltage adjust rheostat will not be used, ensure that the Voltage Adjust Rheostat jumper is connected across terminals 6 and 7.
   b. If a 55 hertz corner frequency for a 60 hertz system is desired, connect the Corner Frequency jumper to the 60 Hz terminal. If a 45 hertz corner frequency for a 50 hertz system is desired, connect the Corner Frequency jumper to the 50 Hz terminal.
3. Ensure that the connections between the generator system and the controller are correct.
4. Install the fuses as shown in Figure 6.
5. Set the controller's Voltage control fully counterclockwise and the remote voltage adjust rheostat (if used) to the centered position.

6. Adjust the controller's Stability control fully clockwise. This provides the most stability and the slowest response.
7. If user adjustment of the Underfrequency control is required, start with the potentiometer adjusted to the fully counterclockwise position. Then slowly adjust the potentiometer clockwise to set.

System Startup

Note
Take all voltage readings with an average-reading voltmeter.

Perform the steps under Preliminary Setup.

1. Start the prime mover and bring it up to rated speed. Generator voltage should build up. If it does not build up, perform the steps under Field Flashing.
2. Slowly adjust the controller's Voltage control (or remote voltage adjust rheostat) until the generator voltage reaches the nominal level. If the voltage does not build up to the rated level:
   a. Check the generator output for excessive load or a short-circuit.
   b. If a minimal residual of 6 volts is not present, perform the steps under Field Flashing.
3. Apply and remove the generator load to verify stability. If the generator responds too slowly or hunts (oscillates):
   a. Check the generator output for excessive load or a short-circuit. Adjust the controller's Stability control with no load applied.
   b. Check the stability of the governor system.
4. Check regulation under normal operating conditions. If the regulation is poor:
   a. Verify that the prime mover is operating at rated speed.
   b. Verify that the voltmeter is connected to the same point as the controller sensing.
   c. Use an average-sensing voltmeter (not an rms-sensing voltmeter).
5. Verify the corner frequency setting by slowly reducing the generator frequency until the generator output voltage just starts to decrease. If adjustment of the corner frequency is required:
   a. Rotate the Underfrequency control fully counter-clockwise.
   b. Reduce the generator frequency from nominal (either 50 Hz or 60 Hz) to the desired corner frequency.
   c. Slowly adjust the Underfrequency control clock-wise until the generator output voltage just starts to decrease.

Field Flashing

When the controller is operated with the generator for the first time, the polarity of the field's residual magnetism may not be correct or the magnitude may not be high enough. If generator voltage does not increase after startup, stop the prime mover and perform the following steps.

1. With the prime mover at rest, connect a dc source in series with a 3 to 5 Ω limiting resistor to the field's positive (F+) and negative (F–) terminals. The dc source should not be grounded and should not have an output greater than 12 Vdc.
2. Apply the dc voltage for approximately 3 seconds, then remove it.
3. With controller terminals 3 and 4 disconnected, start the prime mover and measure the voltage at the generator output terminals.
4. If the voltage is greater than 6 Vac, voltage buildup should be successful and controller terminals 3 and 4 can be reconnected. If less than 6 Vac is measured, repeat steps 1 through 3. If repeating these steps does not result in generator voltage buildup, contact Basler Electric.

Operational Test

1. Connect the analog voltage controller as shown in Figure 7. Do not apply power. Ensure that the incandescent light bulbs are rated for 120 volts and less than 100 watts.
2. Adjust the controller's Voltage control and remote voltage adjust rheostat (if used) fully counterclockwise.
3. Apply 240 Vac, 60 Hz power to the controller. The light bulbs should flash momentarily.
4. Slowly adjust the controller's Voltage control clockwise.

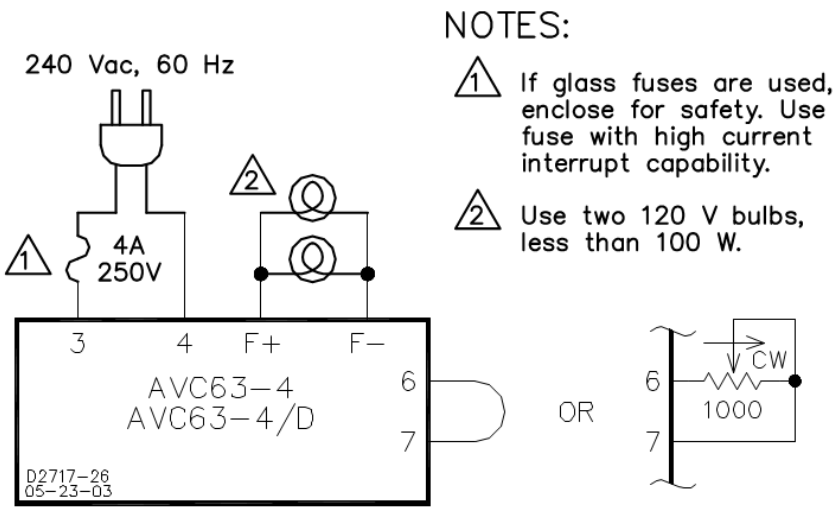

Figure 7. Operational Test Connections

Results

- Before minimum luminance is reached, the light bulbs should attain maximum luminance to signify the regulation point.
- At the regulation point, a small change in the Voltage control or remote voltage adjust rheostat position should turn the light bulbs on or off.

Controller Differences

Previous versions of the AVC63-4 controller sold prior to mid-2003, are slightly different in appearance and control adjustment.

Your controller version can be determined by the location of the heat sinks. Figure 8 shows the heat sink location on the previous and current version of the AVC63-4.

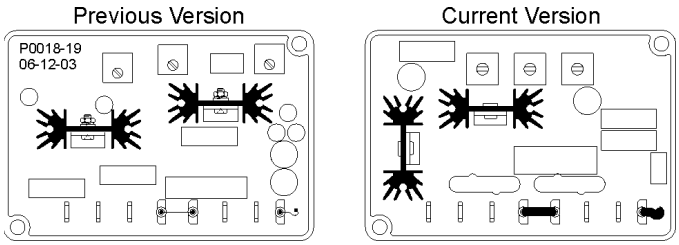

Figure 8. Controller Version Heat Sink Location

Adjustment of the Underfrequency Control is different on previous versions of the AVC63-4. When adjusting the Underfrequency Control on previous versions, clockwise rotation decreases the corner frequency and counterclockwise rotation increases the corner frequency. References to the rotation of the Underfrequency control in this publication should be reversed when adjusting the corner frequency on previous versions of the AVC63-4.