INSTRUCTIONS
FOR
VOLTAGE REGULATOR
AVC63-4A

9 2858 00 102

INTRODUCTION

The AVC63-4A Voltage Regulators are designed for use on 50/60 Hz brushless generators. The regulator includes frequency compensation, over-excitation shutdown, a solid-state buildup circuit, and EMI filtering.

ELECTRICAL SPECIFICATIONS

Dc Output Power:
4 Adc at 63 Vdc (252 W) maximum continuous,
7 Adc at 100 Vdc (700 W) forcing one minute (at 120 Vac input).
9 Adc at 134 Vdc (1206 W) forcing for 10 seconds (at 153 Vac input).

Exciter Field Dc Resistance:
15 ohms, minimum; 100 ohms maximum.

AC Power Input:
Operating range: 95 Vac to 139 Vac, ±10%; Single phase, 50/60 Hz; Burden: 450 VA.

Sensing Input:
95-139 Vac, ±10%, or 190-277 Vac, ±10%, single phase, 50/60 Hz.

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:
Field voltage shuts down after time delay if exciter field voltage exceeds 95 Vdc, ±5%. (See *Overexcitation Shutdown* for inverse time delay curve and description).

Voltage Buildup:
Internal provisions for automatic voltage buildup from generator residual voltages as low as 6 Vac.

Power Dissipation:
15 Watts maximum.

Terminations:
1/4 inch "Fast-On" terminals.

PHYSICAL SPECIFICATIONS

Operating Temperature:
-40 ° C to +60 ° C (-40 ° F to +140 ° F).

Storage Temperature:
-40 ° C to +85 ° C (-40 ° F to +185 ° F).

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

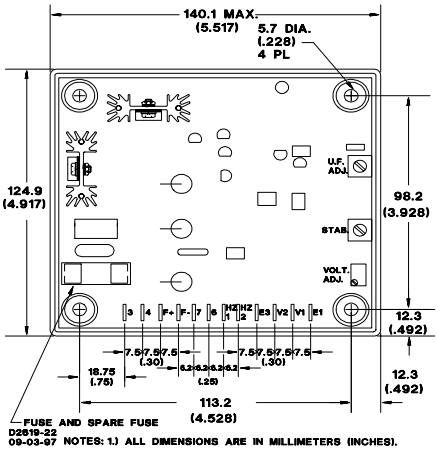
Shock:
Withstands up to 20 Gs in each of three mutually perpendicular axes.

Weight:
10 oz. (0.28 kg) Net.

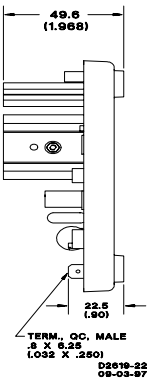
FUSES

Although the AVC63-4A has an internal fuse, it is recommended that fuses with high interruption capability be installed per the interconnection diagram to protect wiring from faults before the regulator. A spare fuse is included with the AVC63-4A (internal fuse). It is mounted "piggy-back" to the original fuse. Refer to the *Outline Diagrams.*

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



AVC63-4A Outline Diagram (Top View)



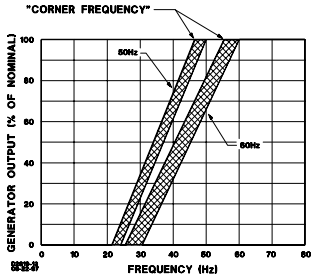
AVC63-4A Outline Diagram (Side View)

V/HZ "CORNER FREQUENCY" SELECTION AND ADJUSTMENT

For 60 Hz systems, the regulator is preset at the factory for a 55 Hz "corner frequency." For 50 Hz systems, a 45 Hz "corner frequency" is achieved by connecting a jumper across terminals HZ1 and HZ2.

The corner frequency can be adjusted by the **UF ADJ** rheostat on the AVR. Clockwise rotation results in raising the corner frequency (shifting the curve to the right). To set the UF rheostat:

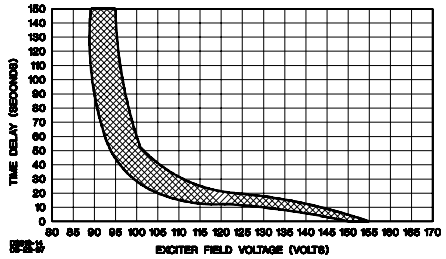
1. Adjust the UF Rheostat fully CCW.
2. Start the generator and set at rated voltage.
3. Adjust the generator frequency to the desired kneepoint frequency.
4. Slowly adjust the **UF ADJ** rheostat clockwise (CW) until the generator voltage just begins to decrease.



Frequency Compensation Curves

OVEREXCITATION SHUTDOWN

Overexcitation shutdown is included that removes the output power if the exciter field volt-age exceeds 95 Vdc. If exciter field voltage exceeds 95 Vdc ±5%, the regulator automatically removes field current, after a time delay. The time delay is inversely proportional to the magnitude of the detected overvoltage condition. At 134 Vdc, the field voltage is removed after approximately 10 seconds. Refer to the following figure.



Typical Time Delay Characteristic Curves

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After output power is removed, the regulator can be reset by decreasing the input voltage to less than 6 Vac for a minimum of 2 seconds. This may be accomplished by stopping the prime mover or by interrupting the regulator input with a reset switch.

STABILITY ADJUST RHEOSTAT (STAB)

An internal screwdriver-adjustable potentiometer provides adjustment to the response rate of the generator output voltage to a change in load. Clockwise rotation of this adjustment provides an increase in the response time and therefore decreases the amount of voltage overshoot thereby increasing stability. Counterclockwise rotation of this adjustment provides a decrease in the response time (faster response time) and therefore increases the amount of voltage overshoot providing decreased stability.

OPERATION

The following system operation procedures provide instructions for adjusting the AVC63-4A voltage regulator. Symptoms resulting from a faulty regulator and certain generator system problems are included, together with suggested remedies.

Complete the following steps before proceeding with the system startup.

CAUTION

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

PRELIMINARY SETUP

1. Verify that the voltage regulator specifications conform with the generator system requirements.

2. Ensure that the regulator wires are as follows:
   a) If the remote voltage adjust rheostat is not to be connected, ensure terminals 6 and 7 are shorted with a jumper.
   b) If a 55 Hz "corner frequency" for 60 Hz systems is desired, ensure that the HZ1 and HZ2 terminals are open. If a 45 Hz "corner frequency" for 50 Hz systems is desired, ensure that the HZ1 and HZ2 terminals are shorted together with a jumper.
   c) For 120 V nominal sensing, ensure that terminals V1 and V2 are not connected. For 240 V sensing, ensure that terminals V1 and V2 are connected together.
3. Ensure the voltage regulator is correctly connected to the generator system.
4. Install the fuses as described in *Fuses*.
5. Set the regulator Voltage Adjust Rheostat (Var) and external Var (if used) as follows:

Switch	Initial Setting
Regulator VAR	Fully CCW
Remote VAR	Centered

SYSTEM STARTUP

1. Perform preliminary setup as described in the above paragraphs.

NOTE

All voltage readings are to be taken with an average-reading voltmeter.

2. Start the prime mover and bring it up to its rated speed.

RESULT: Voltage should build up. If not, perform field flashing.

3. Slowly adjust the regulator Var CW until the generator output voltage reaches the nominal value. If used, adjust the remote Var to set the generator voltage to the exact value de-sired.

RESULT: Voltage should build up to its rated value. If voltage does not build up to rated value, check the generator for a short or excessive load.

4. Check regulator under normal operating and loading conditions.

RESULT: Voltage regulation should be better than ±1.0% no-load to full-load. If regulation is not within this range, perform the following steps:

1. Voltage reduction under load may be due to a speed change from no load to full load causing the frequency compensation (V/Hz) circuit to reduce voltage at lower frequencies.
2. Replace the voltage regulator.

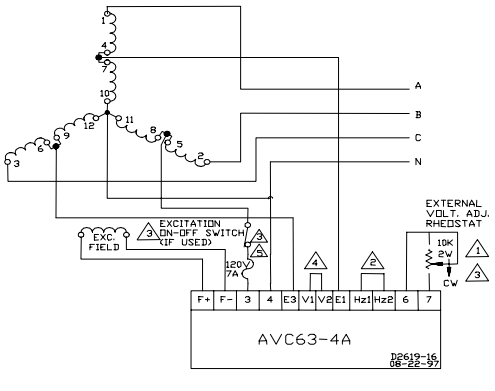
OPERATIONAL TEST

1. Connect the test setup as shown in the following figure, *Operational Test*. Do not apply power. Ensure that the light bulb is rated for 120 V and is less than 100 W.
2. Adjust the regulator Var and/or remote Var, and the STABILITY Adjust to maximum CCW.
3. Apply 120 V, 50/60 Hz power to the regulator. The light bulb should illuminate.
4. Slowly adjust the regulator Var control CW. At the regulation point, the light bulb should extinguish. Small adjustments above and below this level should cause the light bulb to go off and on. Note that the light bulb goes on and off rapidly.
5. Rotate the STABILITY ADJ fully CW. Now adjust the regulator Var above and below the regulation point. The light bulb should still go off and on but the transition from off to on (and vice versa) should be much slower than in the paragraph above.

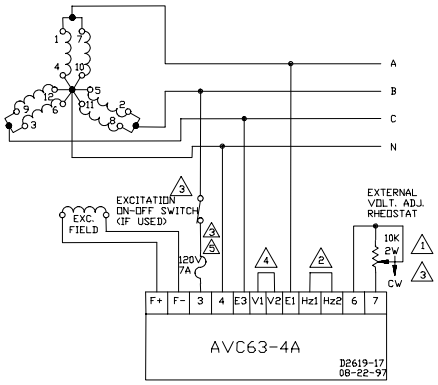
The following notes (Δ) apply to the interconnection and operational test diagram:

1. If external pot is not used, short terminals 6 and 7.
2. Short terminals HZ1 and HZ2 and leave open for 60 Hz.
3. Item not supplied by Basler Electric.
4. For 120 V Nominal sensing, make no connection to terminals V1 and V2.

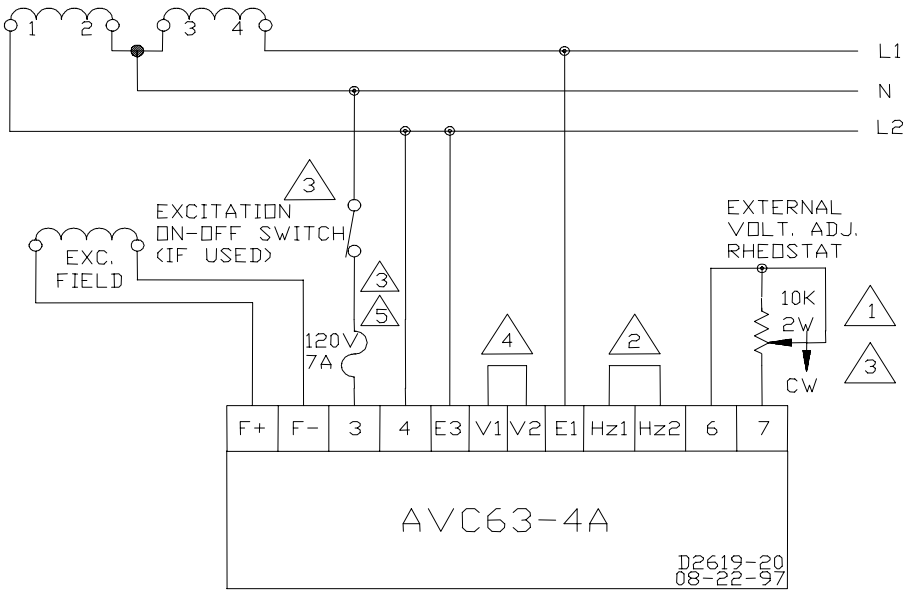
   For 240 V Nominal sensing, short terminals V1 and V2 together.
5. Select fuses with a high interrupting capacity.
6. If glass type fuse is used, enclose for safety.



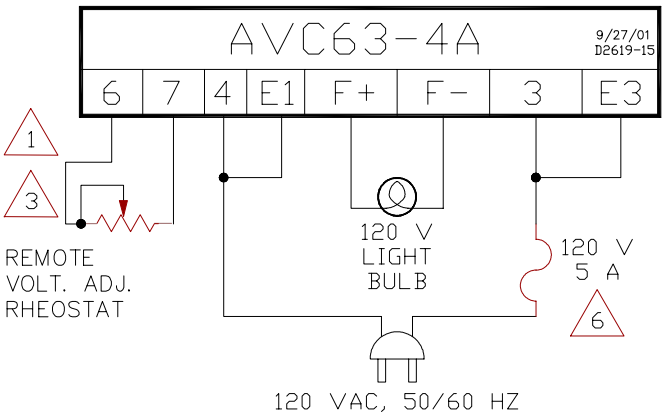
Interconnection Diagram, 277/480 V Nominal, 3-Phase 4-Wire Wye Connection



Interconnection Diagram, 120/208 V Nominal, 3-Phase, 4-Wire, Wye Connection



Interconnection Diagram, 120/240 V Nominal, 1-Phase, 3-Wire



Operational Test