INSTRUCTIONS
FOR
VOLTAGE REGULATOR
MODEL: AVC32-4
9 2421 00 101

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INTRODUCTION

The AVC32-4 Voltage Regulator is designed for use on 50/60 Hz brushless generators. The regulator includes frequency compensation, overexcitation foldback, selectable sensing taps, dual power inputs, droop, and a solid state build-up circuit.

ELECTRICAL SPECIFICATIONS

Dc Output Power:
4 Adc at 32 Vdc (128 W) maximum continuous

Ac Power Input:

Power is supplied from two generator windings. One winding connects to terminals X1 and X2 and delivers a voltage proportional to generator terminal voltage at a frequency equal to generator frequency. The other winding connects to terminals Z1 and Z2 and delivers a voltage proportional to generator output current at three times generator frequency.

X1-X2:
35.7 to 55.2 Vac at 50 Hz
42.8 to 66.2 Vac at 60 Hz
Z1-Z2:
7.2 to 27.6 Vac at 150 Hz
8.7 to 33.1 Vac at 180 Hz

Sensing Input:

Low Range:
95 to 140 Vac, single phase, 50/60 Hz
Medium Range:
180 to 252 Vac, single phase, 50/60 Hz
High Range:
330 to 504 Vac, single phase, 50/60 Hz

Note
A 22 kΩ customer supplied potentiometer may be added in series with the sensing input to allow a ±5% variation of the voltage setpoint.

Regulation Accuracy:

Better than ±2%, no load to full load

Underfrequency:

Excitation is reduced when generator frequency falls below the adjustable setpoint. (See *V/HZ Corner Frequency Selection and Adjustment* for description).

Overexcitation:

Excitation current from the regulator folds back and latches to a reduced level after a time delay if the current exceeds the adjustable setpoint. (See *Overexcitation / Current Limit* for description).

Voltage Build-Up:

Internal provisions for automatic build-up from generator residual voltages as low as 2 Vac.

Droop:

Adjustable up to 5% when excitation voltage varies from 7.5 to 30 Vdc.

Terminations:

One-quarter inch Fast-On terminals.

Adjustments:

VOLT - Voltage regulation setpoint
LIM - Output current limit
STAT - Droop
STAB - Stability
V/Hz - Underfrequency corner

PHYSICAL SPECIFICATIONS

Operating Temperature:

-40°C (-40°F) to +65°C (+149°F).

Storage Temperature:
-55°C (-67°F) to +85°C (+185°F).

Vibration:

Withstands 1.5 Gs at 5 to 29 Hz; 0.036" double amplitude at 29 to 52 Hz; and 5 Gs at 52 to 500 Hz.

Shock:

Withstands up to 15 Gs in each of three mutually perpendicular axes.

Weight:

14.38 oz. (0.41kg) net.

Fuses:

CAUTION
Fuses should be sized to meet the application. The internal fuses included with the AVC32-4 are sized to allow for maximum rated output from the regulator. The customer may want to replace these with fuses having a lower current rating for the specific application.

Although the AVC32-4 has internal fuses, it is recommended that fuses with high interruption capability be installed per the interconnection diagram to protect from faults before the regulator. Refer to the *Interconnection Diagrams*.

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

V/HZ CORNER FREQUENCY SELECTION AND ADJUSTMENT

The regulator is preset for use with 50 Hz systems. Cutting the orange jumper (JP2) sets the regulator for use with 60 Hz systems.

The corner frequency can be set by adjusting the **V/Hz** rheostat on the AVR. Clockwise rotation results in raising the corner frequency (shifting the curve to the right).

To set the **V/Hz** rheostat:
1. Adjust the **V/Hz** rheostat fully counter clockwise (CCW).
2. Start the generator and set at rated voltage.
3. Adjust the generator to the desired corner frequency.
4. Slowly adjust the **V/Hz** rheostat clockwise (CW) until the generator voltage just begins to decrease.

OVEREXCITATION CURRENT LIMIT

The regulator features a hard current limit that is adjustable from 3 Amps to 8 Amps with the **LIM** rheostat. The regulator begins timing at 55% (typ) of the hard limit setpoint. After time out, output current is latched to a reduced level of 0.5 Amps (typ). The time delay is typically 11 seconds.

The regulator can be reset by removing input power to the regulator. This may be accomplished by stopping the prime mover or by interrupting the regulator input with a reset switch.

STABILITY ADJUST

The **STAB** potentiometer provides adjustment to the response rate of the generator output voltage to a change in load. The regulator features two ranges of response. The regulator is preset for the slower range of response. Cutting the blue jumper (JP1) selects the faster range of response.

OPERATION

General:

The following system operation procedures provide instructions for adjusting the AVC32-4 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 start-up.

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

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Preliminary Set-up:

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

2. Ensure the voltage regulator is correctly connected to the generator system.

3. Install the fuses as described in *FUSES.*

4. Set the regulator **VOLT**, **LIM**, **STAT**, and **V/HZ** adjustments fully CCW (minimum).

5. Set the regulator **STAB** adjust and the remote voltage adjust (if used) to mid range.

System Start-up:

1. Perform preliminary set-up as described in the above paragraphs.

Note
All voltage reading are to be taken with an RMS reading voltmeter.

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

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

3. Slowly turn the regulator **VOLT** adjust CW until the generator output voltage reaches the nominal value. If used, adjust the remote pot to set the generator voltage to the exact value desired.

4. Check the regulator under normal operating conditions.

Result: Voltage regulation should be better than +/- 2% no load to full load. If regulation is not within this range, verify the prime mover is at rated speed. Voltage reduction under load may be due to speed change from no load to full load, causing the frequency compensation (V/Hz) circuit to reduce voltage at lower frequencies.

OPERATIONAL TEST

1. Connect the test setup as shown in Figure 2. Do not apply power. Ensure that the light bulb is rated for 120V and is less than 100W.

2. Turn the **VOLT** adjust to maximum CW and the **STAB** adjust to mid range.

3. Apply 200 Vac, 50/60 Hz to the test set.

Result: The light bulb should illuminate.

4. Slowly turn the **VOLT** adjust CCW.

Result: At the regulation point, the light bulb should extinguish. Small adjustments above and below this level should cause the light bulb to go on and off.

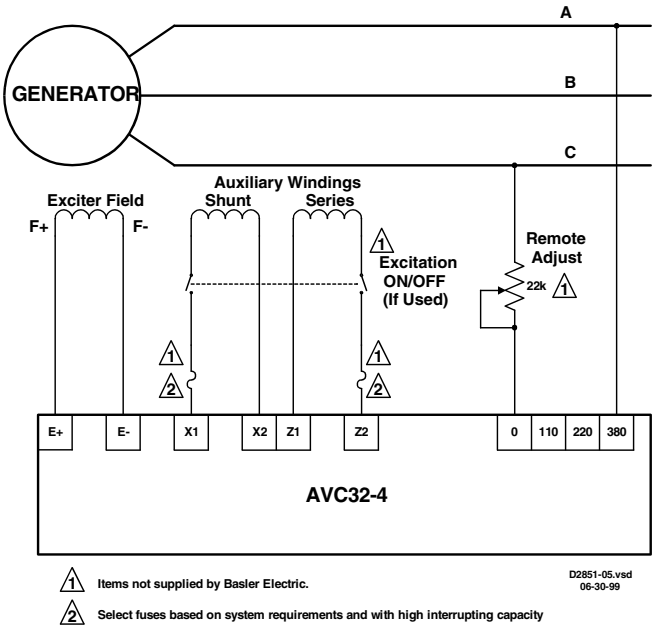

Figure 1. Interconnection Diagram

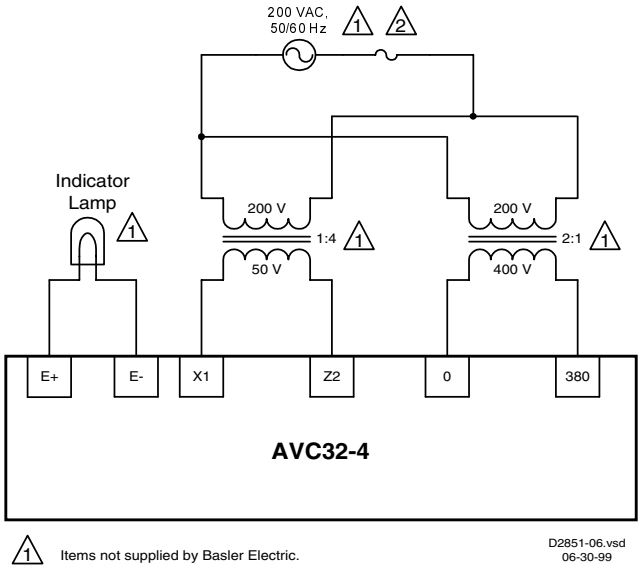

Figure 2. Operational Test

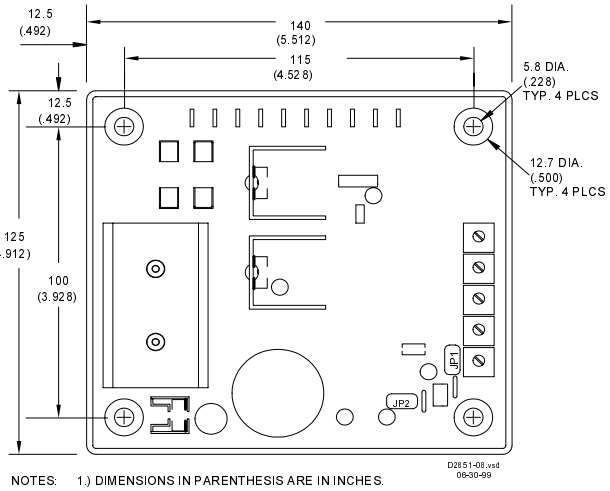

Figure 3. Overall Dimensions, Top View

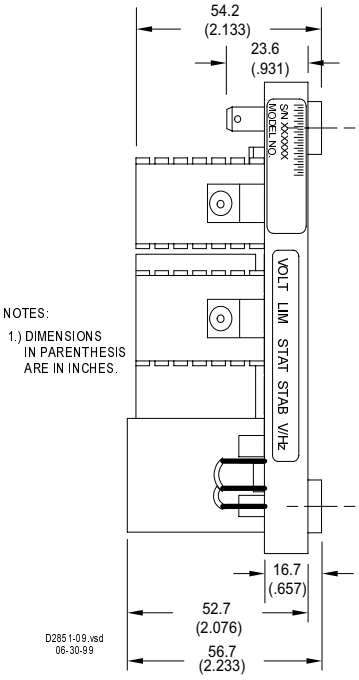

Figure 4. Overall Dimensions, Side View