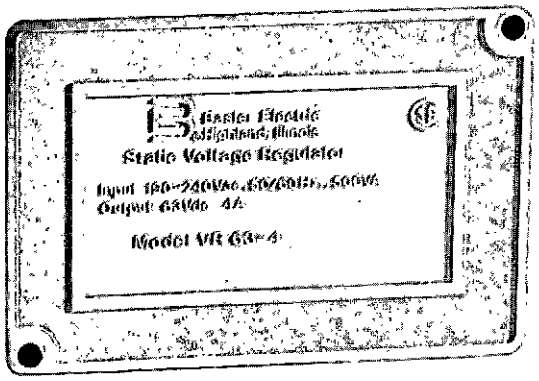
CLASS 300 EQUIPMENT
VR63-4/UL, VR63-4A/UL
VOLTAGE REGULATORS



The VR63-4/UL and VR63-4A/UL Static Voltage Regulators are small, ruggedly constructed regulators designed for brushless ac generators. Combining proven solid-state technology with rugged packaging, the VR63-4/UL and VR63-4A/UL provide accurate and reliable regulation under the most severe environmental conditions. The smallest regulators produced by Basler Electric, the VR63-4/UL and VR63-4A/UL are heavy-weights with EMI suppression, frequency compensation, solid state voltage build-up and overexcitation shutdown circuitry as standard.

FEATURES:

- Integrated circuitry for compact size, simplicity, high reliability.
- Extremely rugged.
- Exciter field current 4A continuous, 7A forcing.
- Regulation accuracy better than ±1.0% no load to full load.
- Fast response.
- Frequency compensation.
- Overexcitation shutdown.
- EMI suppression.
- Available from stock.
- CSA approved/UL recognized (VR63-4B is CSA approved only).

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SVB-6
11-95

DESCRIPTION:

The VR63-4/UL and VR63-4A/UL voltage regulators provide regulation for 50/60 Hz brushless generators. The regulator senses generator output voltage (VR63-4/UL:190 to 240 Vac, VR63-4A/UL:100 to 120 Vac) to control the amount of power applied to the exciter field of the generator. During start-up, the solid-state voltage build-up circuit operates from residual voltages as low as 10 Vac from the generator output. An internal voltage adjust rheostat provides adjustment of the generator voltage (VR63-4/UL: 171 to 264 volts, VR63-4A/UL: 90 to 132 Vac). A remote voltage adjust rheostat may be connected to the unit.

The frequency compensation characteristic (See Figure 1) of the regulator restrains voltage recovery during startup until the frequency is near the nominal operating frequency. A frequency compensation characteristic having a "corner frequency" of 55 Hz is selectable by cutting an external jumper; otherwise, the "corner frequency" is 45 Hz. The two characteristic curves allow small frequency, variations to occur without affecting regulation accuracy; larger variations in frequency cause the output to decrease along the curves. Overexcitation shutdown is included that removes the output power if the exciter field voltage exceeds 100 ±5 Vdc after a time delay. If the voltage exceeds 135 ±5 Vdc, the power is removed instantaneously. Two seconds after removing power, the regulator shutdown circuit resets.

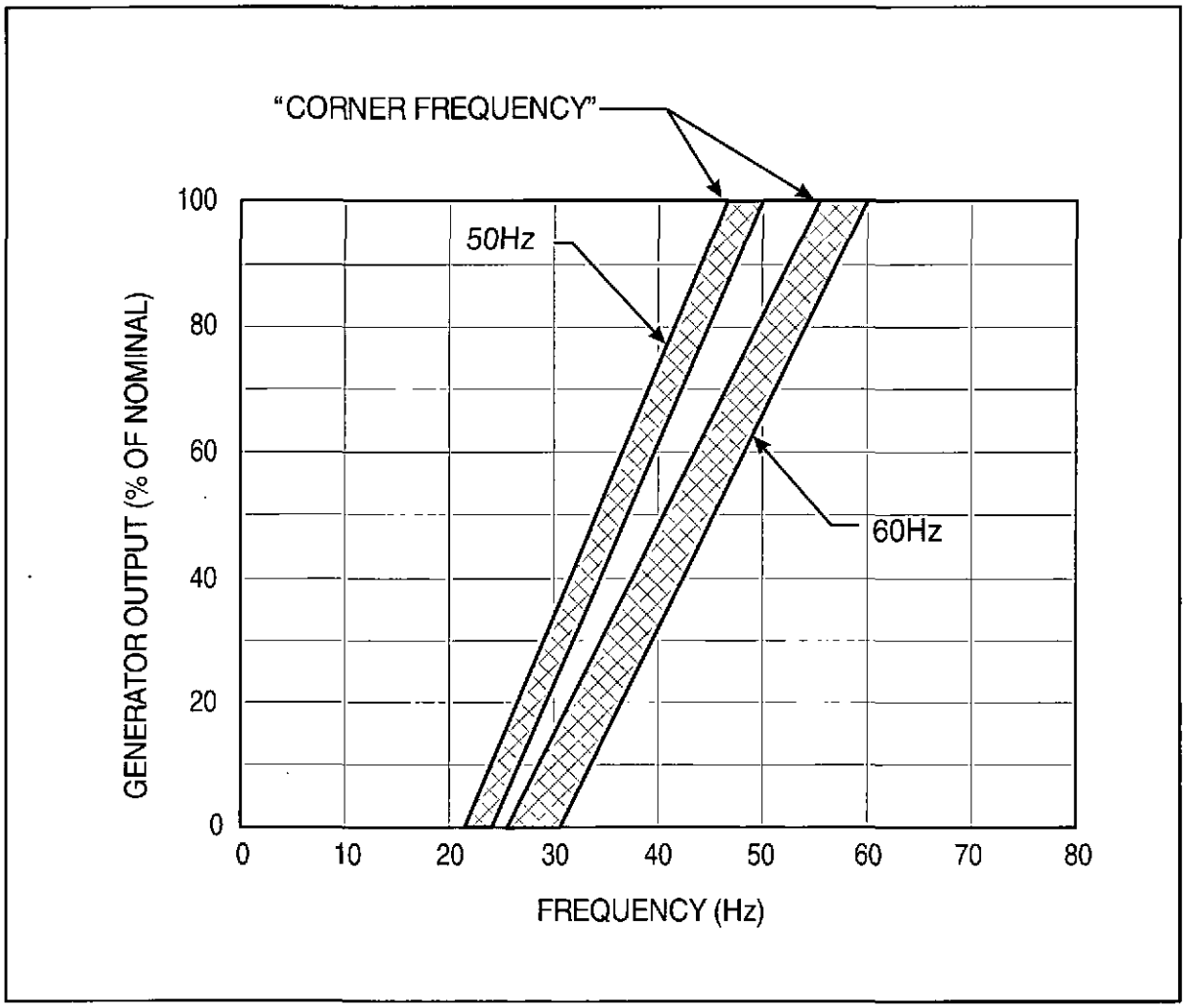

FIGURE 1 - FREQUENCY COMPENSATION CHARACTERISTIC

SPECIFICATIONS:

	DC OUTPUT				EXCITER FIELD RESISTANCE		POWER INPUT		SENSING INPUT
	MAX. CONT.		MAX FORCING 1 MIN (240 Vac Input)		MIN. OHMS @ 25°C	MAX. OHMS @ 40°C	SINGLE PHASE VOLTAGE RANGE	BURDEN	VOLTAGE ADJUST RANGE
	AMP	VOLT	AMP	VOLT					
VR63-4/UL	4	63	7	100	15	100	190-240 Vac	500VA	171-264 Vac
VR63-4A/UL	4	63	7	100	15	100	190-240 Vac	500VA	90-132 Vac
VR63-4B	4	63	7	100	15	100	190-240 Vac	500VA	171-264 Vac

REGULATION ACCURACY: Better than ±1.0% no load to full load.

RESPONSE TIME: Less than 1.5 cycle.

FREQUENCY COMPENSATION CHARACTERISTICS: (See Figure 1).

EMI SUPPRESSION: Internal electromagnetic interference filtering (EMI filter).

OVEREXCITATION SHUTDOWN: Output power is removed under the following conditions:

Exciter field voltage exceeds 100±5 Vdc after a time delay.

Exciter field voltage exceeds 135±5 Vdc, instantaneously.

(The regulator resets after two seconds as soon as the generator voltage is less than 6 Vac).

VOLTAGE BUILDUP: Internal provisions for automatic voltage buildup from generator residual voltages as low as 10 Vac.

POWER DISSIPATION: 8 Watts maximum.

OPERATING TEMPERATURE: -40°C (-40°F) to +60°C (+140°F).

STORAGE TEMPERATURE: -65°C (-85°F) to +85°C (+185°F).

VIBRATION: Withstands 5 to 26 Hz @ 1.3Gs; 26 to 50 Hz @ 0.036" double amplitude; 50 to 500 Hz @ 5Gs.

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

WEIGHT: 14 oz. (0.34 kg) net.

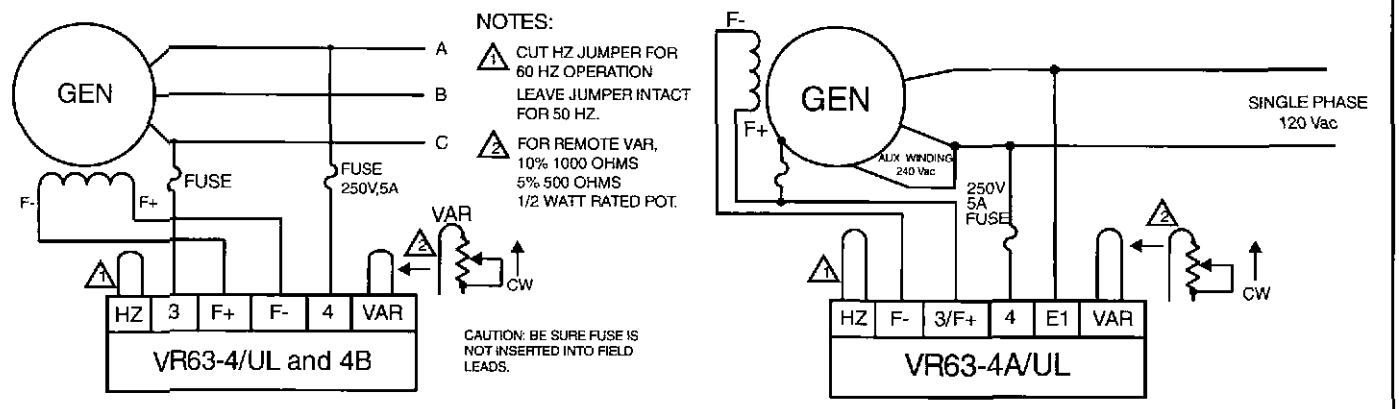

FIGURE 2 - TYPICAL INTERCONNECTION DIAGRAM

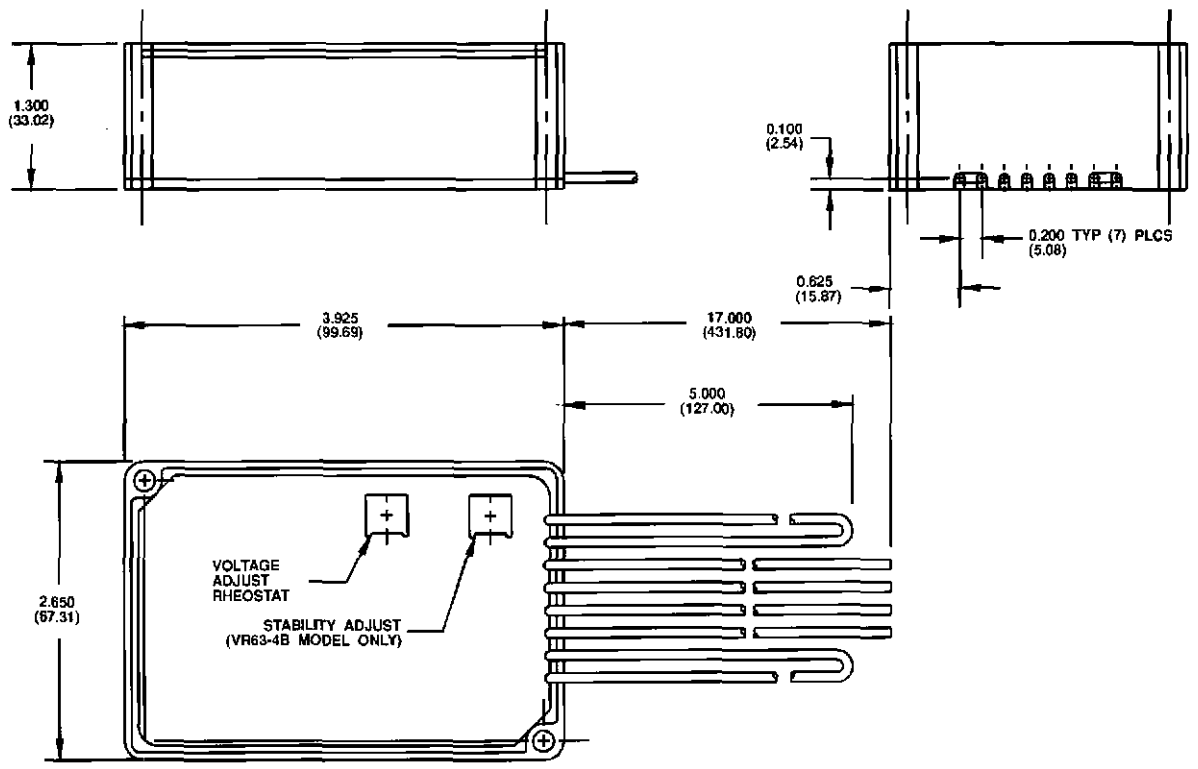

FIGURE 3 - OUTLINE DRAWING

NOTES:
1. Dimensions in parentheses are in millimeters.
2. All drawings and data subject to change without notice.

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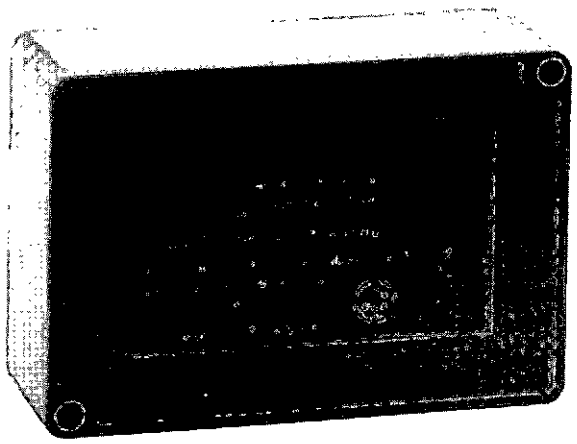
CLASS 300 EQUIPMENT
VR63-4C/UL
VOLTAGE REGULATOR



Using enhanced technology, the VR63-4C/UL full wave voltage regulator is designed for use on 50/60 Hz brushless generators. This encapsulated regulator is small in size, ruggedly constructed, and incorporates solid state technology with frequency compensation, automatic voltage build-up, and overexcitation shutdown as standard.

FEATURES:

- Integrated circuitry for compact size, simplicity, high reliability.
- Extremely rugged.
- Exciter field current 4A continuous, 7A forcing.
- Regulation accuracy better than ± 1.0% no load to full load.
- Fast response.
- Frequency compensation.
- Overexcitation shutdown.
- EMI suppression.
- Available from stock.
- CSA approved/UL recognized.

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SVF-3
11-95

DESCRIPTION:

The VR63-4C/UL model of voltage regulator maintains generator line voltage on brushless generators from 5 KW to over 100 KW in size. The voltage regulator senses generator average voltage to maintain a precise regulation band within ± 1 percent. This is accomplished by converting a 120 VAC single phase power input to a controlled DC signal to the generator's exciter field. The solid-state voltage build-up circuit will enable automatic generator line voltage build-up with a voltage input to the regulator of at least 6 VAC. Customer accessible stability and range adjusts enable fine tuning of the voltage regulator to the generator in use.

The over-excitation feature assists in protecting the voltage regulator during an over-excitation fault condition. During this mode, a shutdown signal is sent to the power stage, turning the regulator off. This feature will reset when the voltage input is removed (less than 6 VAC for a minimum of 2 seconds) to the regulator. Figure 1 demonstrates the underfrequency characteristics of the voltage regulator during prime mover low speed conditions. Customer curve selection matches the voltage regulator to 50 or 60 Hz systems.

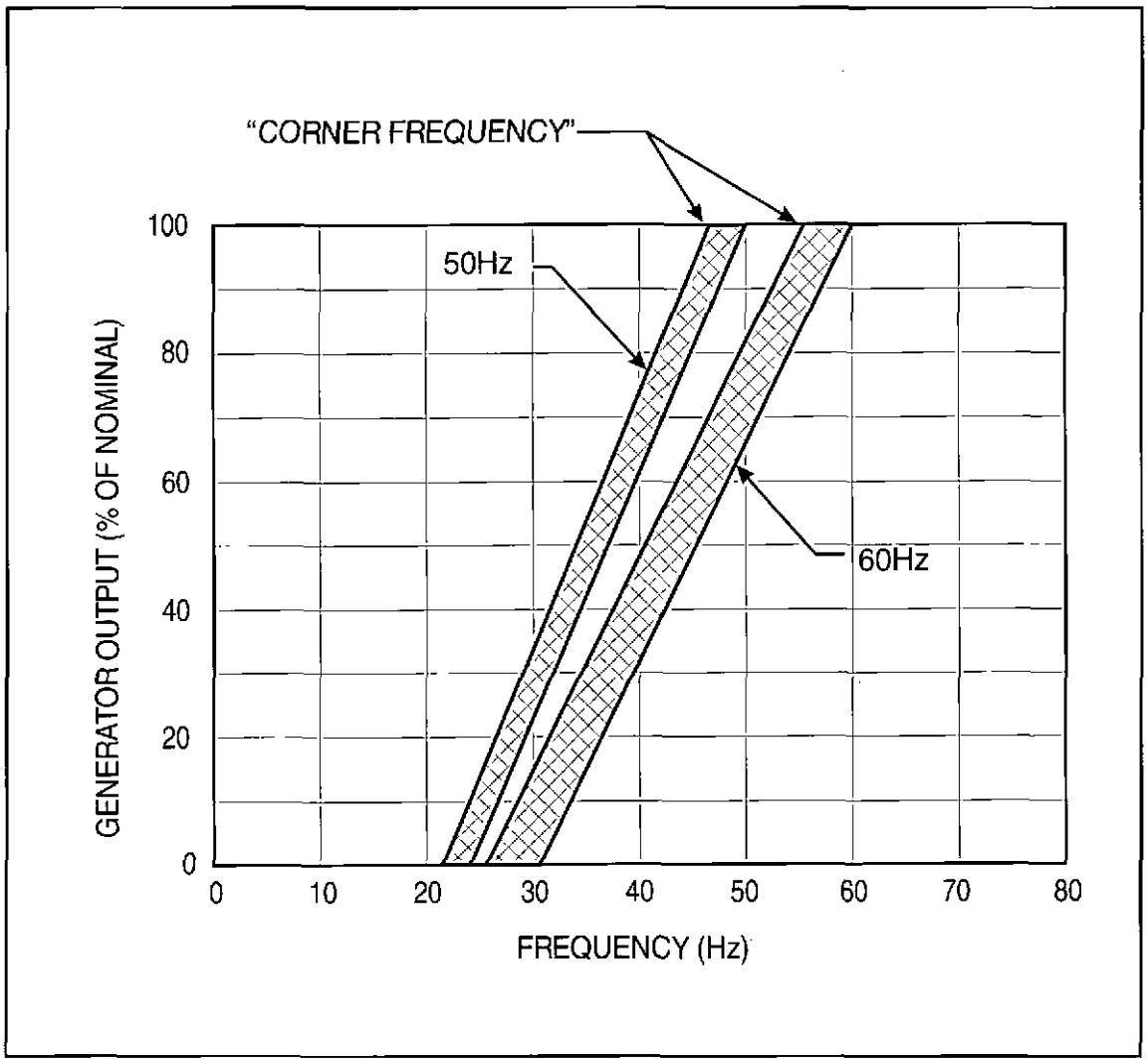


FIGURE 1 - FREQUENCY COMPENSATION CHARACTERISTIC

SPECIFICATIONS:

DC OUTPUT				EXCITER FIELD RESISTANCE		POWER INPUT		SENSING INPUT [1]
MAX. CONT.		MAX FORCING 1 MIN (120 Vac INPUT)		MIN. OHMS @ 25°C	MAX. OHMS	SINGLE PHASE VOLTAGE RANGE	BURDEN	VOLTAGE ADJUST RANGE
AMP	VOLT	AMP	VOLT					
4	63	7	100	15	100	85-139 VAC	450VA	85-139 VAC

[1] Sensing and power for the voltage regulator is derived from the same lead input.

DC OUTPUT POWER: 4 Adc at 63 Vdc maximum continuous, 7 Adc at 100 Vdc one minute forcing. (Forcing with 120 Vac nominal input).

EXCITER FIELD DC RESISTANCE: 15 ohms minimum; 100 ohms maximum.

AC POWER INPUT: Operating range: 85-139 Vac single phase, 50/60 Hz ±5%. Burden 450VA.

SENSING INPUT: 85-139 Vac single phase, 50/60 Hz ±5%. Sensing and power is same input for regulator.

VOLTAGE ADJUST RANGE: 85-139 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 filtering.

OVEREXCITATION SHUTDOWN: Field voltage shuts down after time delay if exciter field voltage exceeds 95 Vdc, ±5%. The time delay is inversely proportional to the magnitude of the detected overvoltage condition up to the 140 Vdc point, thus allowing nominal forcing for approximately 1 minute. Beyond 140 Vdc, the field voltage is removed within 2.0 seconds.

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

POWER DISSIPATION: 12 Watts maximum.

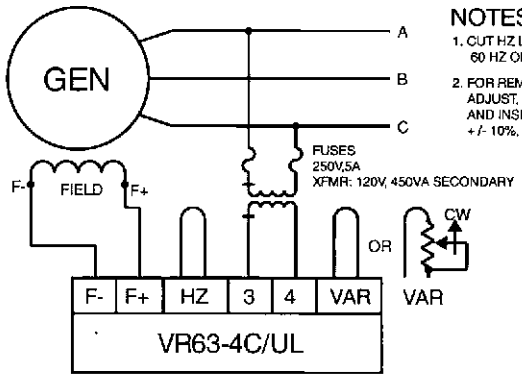
OPERATING TEMPERATURE: -25°C (-13°F) to +60°C (+140°F).

STORAGE TEMPERATURE: -40°C (-40°F) to +85°C (+185°F).

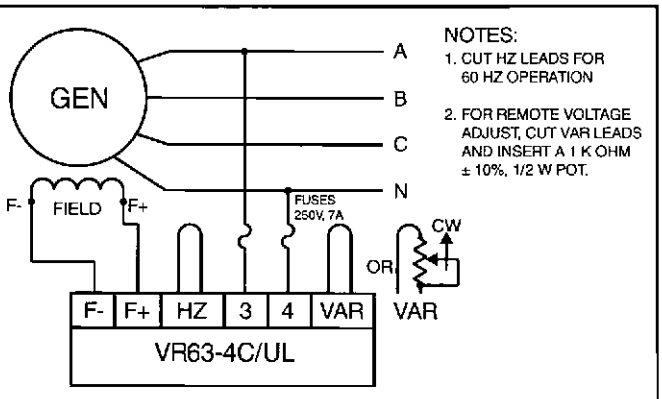
VIBRATION: Withstands 1.2Gs at 5 to 26 Hz; 0.036" double amplitude at 27 to 52 Hz; and 5 Gs at 53 to 1000 Hz.

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

WEIGHT: 10 oz. (0.28 kg) Net.



Interconnection Diagram for 240V, 3 phase system. Transformer output of 120V.



Interconnection Diagram for 208V L-L/120V L-N 3 phase, 4 wire system.

FIGURE 2 - TYPICAL INTERCONNECTION DIAGRAM

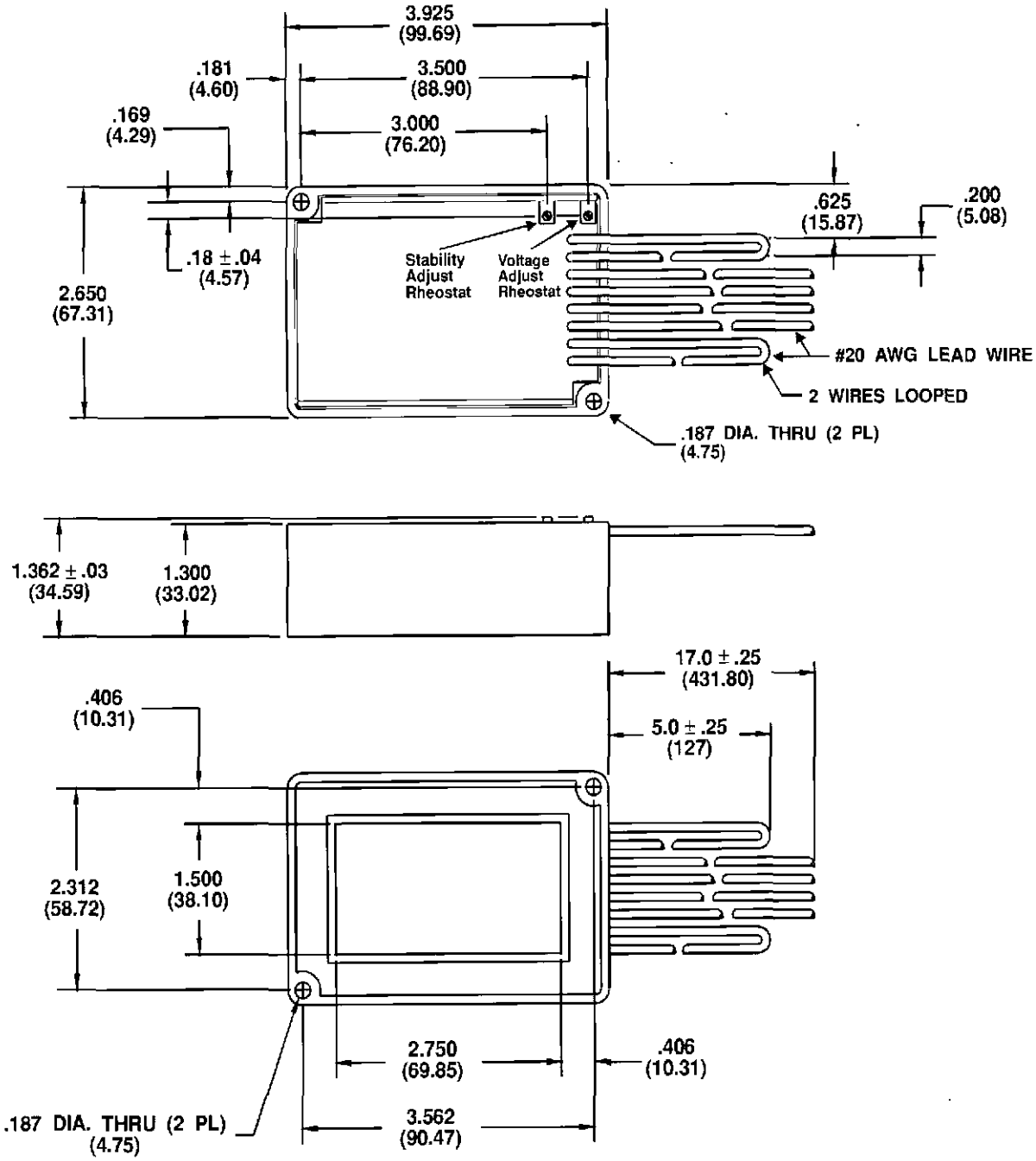


FIGURE 3 - OUTLINE DRAWING

NOTES:

1. Dimensions in parentheses are in millimeters.
2. All drawings and data subject to change without notice.
3. Dimensions apply to both models of VR63-4C regulators.

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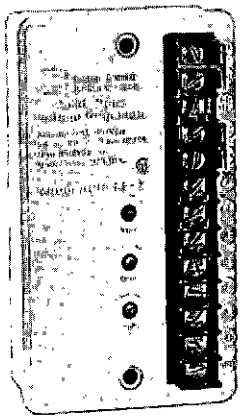
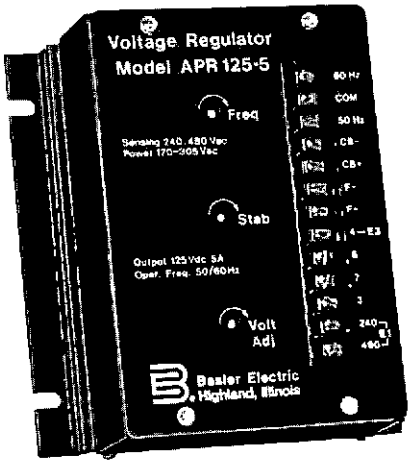


APR63-5/UL



APR125-5

CLASS 200 EQUIPMENT
APR SERIES
VOLTAGE REGULATOR

The APR series voltage regulators provide a small, reliable and economical voltage regulator for 50 or 60 Hz brushless ac generators. The APR has frequency compensation which aids system block load pickup performance and controls excitation when operating below synchronous speed. The regulator is designed for prime and standby power applications for small and medium sized brushless generators. Accessory equipment can adapt the APR to a broad range of specialized applications.

FEATURES:

- Regulation Accuracy Better Than ±0.25%
- Frequency Compensated
- Overexcitation Shutdown
- Solid State Voltage Buildup
- Moisture Proof Encapsulated Assembly
- Mechanically Rugged
- Remote Voltage Adjust Rheostat Supplied
- Small Size, Reliable, Low Cost
- EMI Filter is Built in
- Fast Response Time
- Applicable to 50 or 60 Hz Systems
- Complete Accessory Line Available
- Available from Stock
- CSA Approved
- UL Listed (APR63-5/UL only)

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SWA-6
11-95

DESCRIPTION:

The APR series voltage regulators are completely solid-state and use an electromagnetic interference (EMI) suppression circuit to reduce EMI generated by the regulator. Voltage is internally or remotely adjustable. The APR has a jumper selectable, frequency compensated operating characteristic as shown by figures 1 and 2.

SPECIFICATIONS:

OUTPUT POWER:

Voltage Regulator	Output Voltage	Output Current	Forcing Voltage	Forcing Current
APR 63-5/UL	63.5 Vdc	5.0 Adc	100 Vdc	8.0 Adc
APR 125-5	125 Vdc	5.0 Adc	200 Vdc	8.0 Adc

EXCITER FIELD DC RESISTANCE:

Voltage Regulator	Minimum	Maximum
APR 63-5/UL APR 125-5	12.6 ohms 25 ohms	100 ohms 100 ohms

POWER DISSIPATED:

APR 63-5/UL	9 Watts (max.)
APR 125-5	25 Watts (max.)

AC INPUT POWER:

	Voltage	Burden
APR 63-5/UL	190 to 277 Vac, single phase, 50/60 Hz. ±10%	650 VA (max.)
APR 125-5	190 to 277 Vac, single phase, 50/60 Hz. ±10%	1000 VA (max.)

AC SENSING:

	Voltage	Burden
APR 63-5/UL	190-240, 380-480, single phase, 50/60 Hz. ±10%	5 VA (max.)
APR 125-5	190-240, 380-480, single phase, 50/60 Hz. ±10%	1 VA (max.)

During start-up, the solid-state voltage build-up circuit operates from generator output residual voltages as low as 6Vac. The built-in over-excitation limiting removes the output power if the exciter field voltage exceeds a predetermined level. (See figures 3 and 4). After removing power the regulator monitors the generator output and resets when the voltage has decreased below 6Vac.

VOLTAGE ADJUST RANGE: 170 to 264 Vac, 340 to 528 Vac.
REGULATION ACCURACY: ±0.25%
VOLTAGE DRIFT: Less than ±1% voltage variation for a 50°C (90°F) temperature change.
RESPONSE TIME: One cycle.
FREQUENCY COMPENSATION: Refer to figures 1 and 2.
EMI SUPPRESSION: Built-in
VOLTAGE BUILD-UP: *Solid state build-up circuit* operates from generator residual voltages as low as 6 Vac.
OVER EXCITATION SHUTDOWN: Shuts off field voltage if exciter exceeds the following (see figure 4 and 5):

Model	Field Voltage
APR 63-5/UL APR 125-5	95-105 Vdc 170-190 Vdc

OPERATING TEMPERATURE: -40°C (-40°F) to +60°C (+140°F).
STORAGE TEMPERATURE: -65°C (-85°F) to 85°C (+185°F).
SHOCK: Withstands up to 15 G's in each of three mutually perpendicular axes.
VIBRATION: Withstands the following:

Frequency	Acceleration
5-26 Hz. 26-52 Hz. 53-500 Hz.	1.2 G 0.036 in. displacement 5 G

WEIGHT: APR 63-5/UL 2.5 lb. (1.1 kg) net, 3.5 lb. (1.6 kg) shipping
APR 125-5 5.1 lb. (2.3 kg) net, 6.1 lb. (2.8 kg) shipping

ACCESSORY ITEMS:

POWER ISOLATION TRANSFORMER - Low voltage power isolation transformers can be used to provide electrical isolation and to match voltages from the generator to the regulator as follows:

APR 63-5/UL - BE18674
APR 125-5 - BE18674

APM 2000 PARALLELING MODULE - To parallel two or more generators using droop or cross current compensation, use this module and a current transformer with a 5 ampere nominal secondary such as the Basler CT series.

MVC 300 MANUAL VOLTAGE CONTROL - With an electronically regulated output, this control offers backup excitation for the regulator in critical applications.

CBS 305/310/320 SERIES CURRENT BOOST SYSTEM - Using electronics built into the APR and a current transformer to tap the generator line current, the CBS boosts the field current during short circuit or large motor starting.

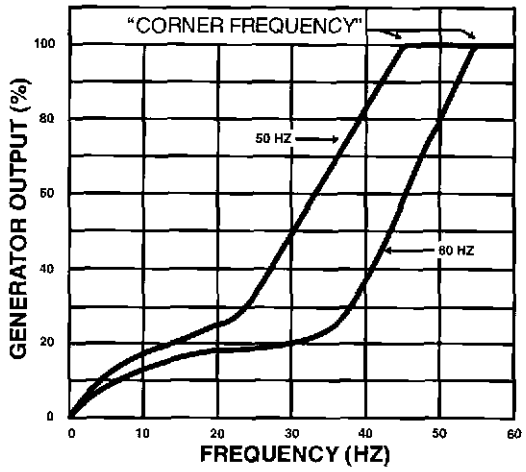

FIGURE 1 - FREQUENCY COMPENSATION CURVES, APR 63-5/UL

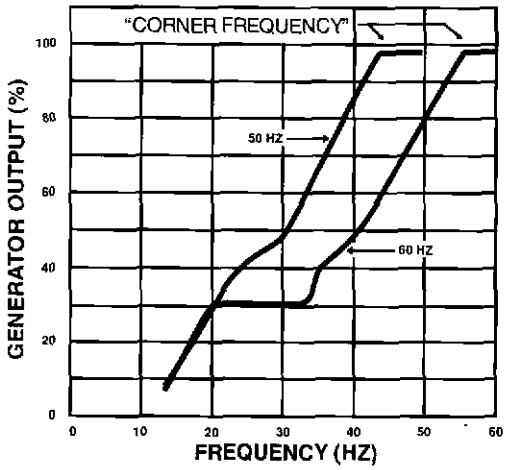

FIGURE 2 - FREQUENCY COMPENSATION CURVES, APR 125-5

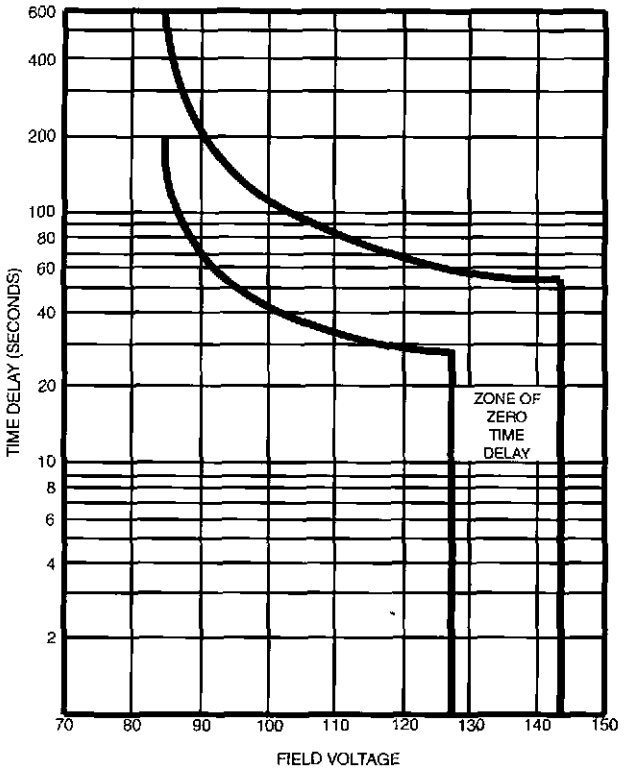

FIGURE 3 - OVEREXCITATION SHUTDOWN CHARACTERISTIC CURVES, APR 63-5/UL

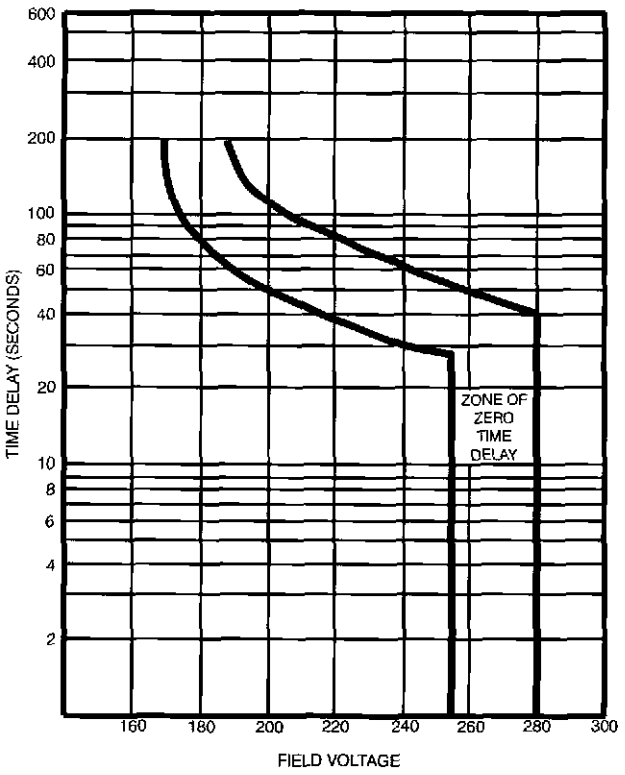

FIGURE 4 - OVEREXCITATION SHUTDOWN CHARACTERISTIC CURVES, APR 125-5

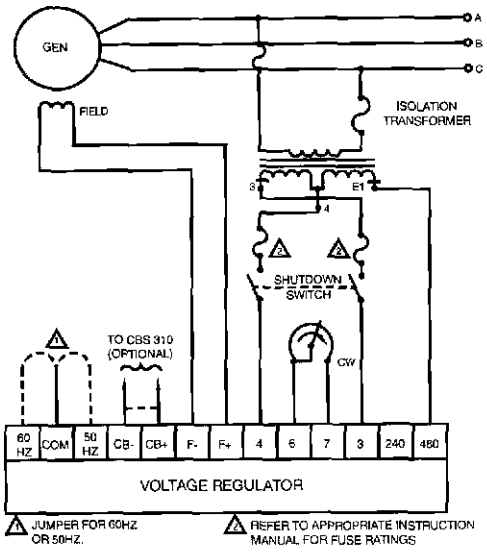

FIGURE 5 - TYPICAL INTERCONNECTION

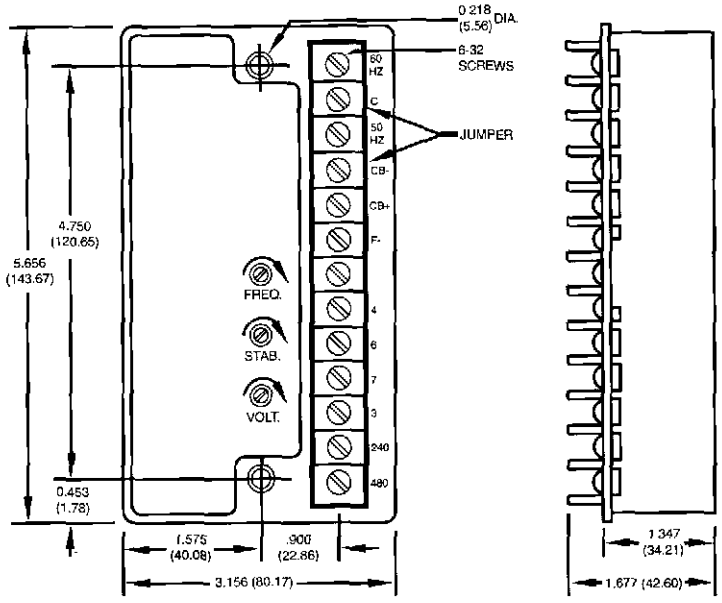

FIGURE 6 - OUTLINE DRAWING, APR 63-5/UL

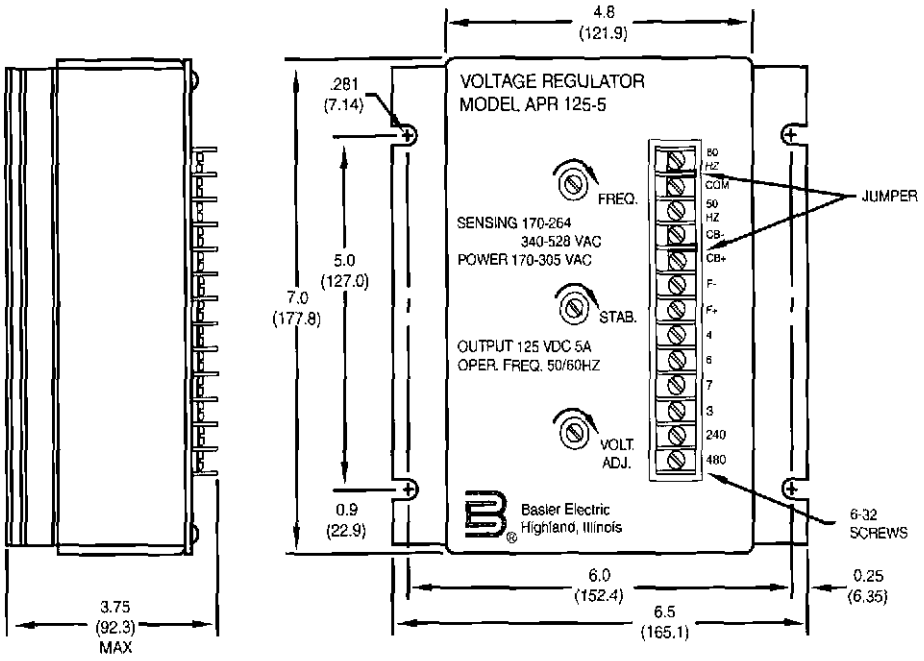

FIGURE 7 - OUTLINE DRAWING, APR 125-5

NOTE: *All dimensions are in inches (millimeters).*
All drawings and data subject to change without notice.

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