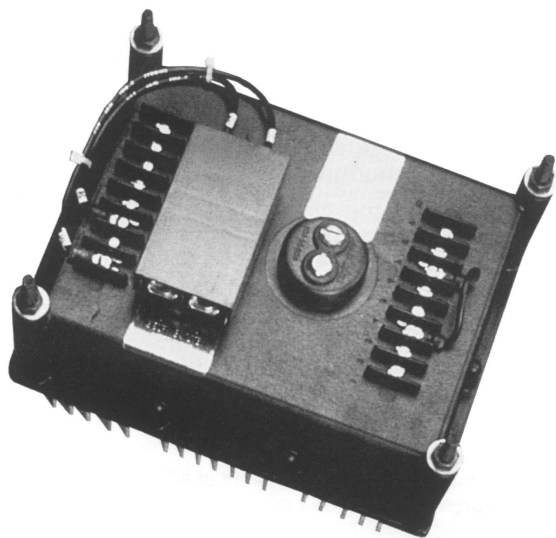




## FEATURES

- Self Excited (SE) and Permanent Magnet Excited (PM) versions available
- Regulation better than  $\pm 1.0\%$
- Frequency compensated
- Overexcitation shutdown
- Solid state voltage buildup
- Three phase sensing – standard
- Compact package size
- Moistureproof assembly
- Mechanically rugged
- Fast response time
- Applicable to 50 and 60 Hz systems
- Complete line of accessories available

# Automatic Voltage Regulators

## VR3

## SPECIFICATIONS

### Regulation

Less than  $\pm 1\%$  no load to full load

### Regulator drift

Less than  $\pm 1/2\%$  steady state

### Temperature drift

Less than  $\pm 1\%$  for any  $40^\circ\text{C}$  change over the operating temperature range

### Regulator response

Maximum of one electrical cycle (i.e., less than 16.6 milliseconds at 60 Hz, or 20 milliseconds at 50 Hz)

### Regulator sensing

Three phase sensing is standard. Single phase sensing can be selected on SE regulators only.

### Regulator stability

Regulator responds to the fundamental component of the sensed voltage and remains stable for total harmonic distortion of the generator output voltage waveform up to 20%.

### Regulator filtering

Telephone Influence Factor (TIF) less than 50. Optional filtering packages available to comply with MIL STD 461B Part 9 and VDE 85 level N.

### Harmonic tolerance

The AVR will maintain precise control of the generator output with up to 20% harmonic distortion in the generator output voltage.

### Voltage adjust range

-25% to 10% of nominal

### Regulator gain

Minimum of +5% to compensate for speed droop governors or line losses (voltage droop) between generator and load.

### Regulator build-up voltage

SE regulators will build up with the generator output voltage as low as 6 vac. No minimum requirement for PM regulators.

### Regulator start-up voltage

Voltage overshoot at full throttle engine starting will not exceed 5% of rated value.

### Volts/Hz characteristic

Linearly proportional to frequency (8 Volts/Hz on 480 Volt/60 Hz basis) over the frequency range of 30 Hz to 70 Hz provides matched engine/generator performance for improved block load performance.

### Reactive droop adjustment

Minimum of 8% droop at full load and 0.8 pf

**SPECIFICATIONS / continued**
**Overexcitation protection**

Shuts off generator output when excitation exceeds the nominal values shown below for approximately 10-16 seconds:

| Excitation Type | Shutoff Value               |
|-----------------|-----------------------------|
| SE              | Excitation voltage > 63 vdc |
| PM              | Excitation current > 14 amp |

**Fault protection**

Two fast-acting, high-interrupting capacity fuses are provided to protect the AVR and excitation system components against potentially damaging electrical faults.

Ambient operating temperature . . -40° C to +70° C

Storage temperature range . . . . . -40° C to +85° C

Power dissipation . . . . . 50 watt (max)

Shock . . . . . Withstands up to 20 g's

**Vibration**

Withstands 4.5 g's at frequencies between 18 and 2000 Hz in three mutually perpendicular planes.

Salt spray: . . . Meets MIL-STD-810C, method 509.1

Sealing: . . . . . Withstands up to 35 kPa (5.08 psi)

Weight: . . . . . 1.8 Kg

**STANDARD ACCESSORIES AVAILABLE**
**Series boost**

Able to sustain the generator output at 300% rated current for a minimum of ten seconds.

Not required for PM.

**KVAR/PF controller**

Provides KVAR or Power Factor control when generator is paralleled with utility.

**Remote voltage adjust**

Controls voltage level with a 10 k $\Omega$ , 1 watt remotely mounted rheostat.

**Manual voltage control**

Permits manual regulation of the generator output in the event of a regulator failure.

**Paralleling**

A reactive droop network consisting of a current transformer, 8 $\Omega$  25 watt rheostat, and control circuit allows generator to be paralleled with other generators either in reactive droop or cross current compensation (zero droop) modes.

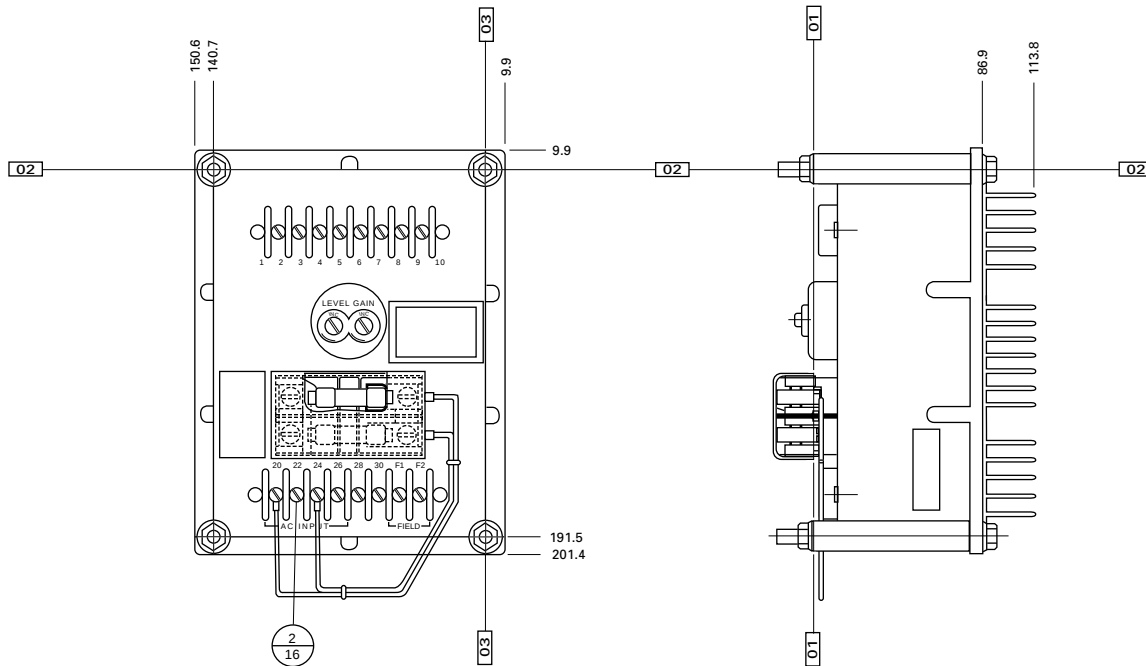
**Filtering**

Complies with requirements of MIL-STD 461B Part 9, VDE 875 Level N, EN50081-2 and EN50082-2.

**SUMMARY OF OPERATING PARAMETERS**

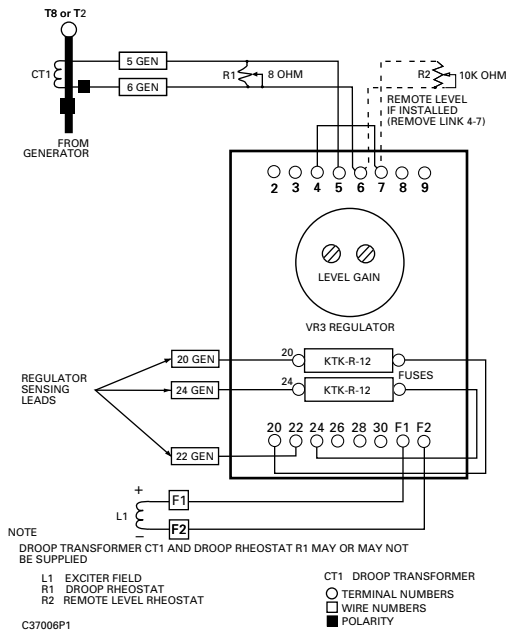
| Voltage Rating | Type | Power Input      |         |      | Output Rating   |    |              |    | Sensing |                          | Reactive Droop Input |           | Exciter Field Resistance |           |
|----------------|------|------------------|---------|------|-----------------|----|--------------|----|---------|--------------------------|----------------------|-----------|--------------------------|-----------|
|                |      | V                | Freq Hz | VA   | Max. Continuous |    | Min. Forcing |    | V       | Max VA Burden Per $\phi$ | Amps                 | VA Burden | Min. Ohms                | Max. Ohms |
|                |      |                  |         |      | V               | A  | V            | A  |         |                          |                      |           |                          |           |
| 240 volt       | SE   | 200/240 1 $\phi$ | 50/60   | 1500 | 50              | 10 | 90           | 15 | 200/240 | 1                        | 0.5                  | 3         | 3                        | 10        |
| 480 volt       | SE   | 200/240 1 $\phi$ | 50/60   | 1500 | 50              | 10 | 90           | 15 | 400/480 | 1                        | 0.5                  | 3         | 3                        | 10        |
| 120 volt       | PM   | 70-110 3 $\phi$  | 200/240 | 1500 | 50              | 10 | 90           | 15 | 100/120 | 1                        | 0.5                  | 3         | 3                        | 10        |
| 240 volt       | PM   | 70-110 3 $\phi$  | 200/240 | 1500 | 50              | 10 | 90           | 15 | 200/240 | 1                        | 0.5                  | 3         | 3                        | 10        |
| 480 volt       | PM   | 70-110 3 $\phi$  | 200/240 | 1500 | 50              | 10 | 90           | 15 | 400/480 | 1                        | 0.5                  | 3         | 3                        | 10        |

## OUTLINE DRAWING

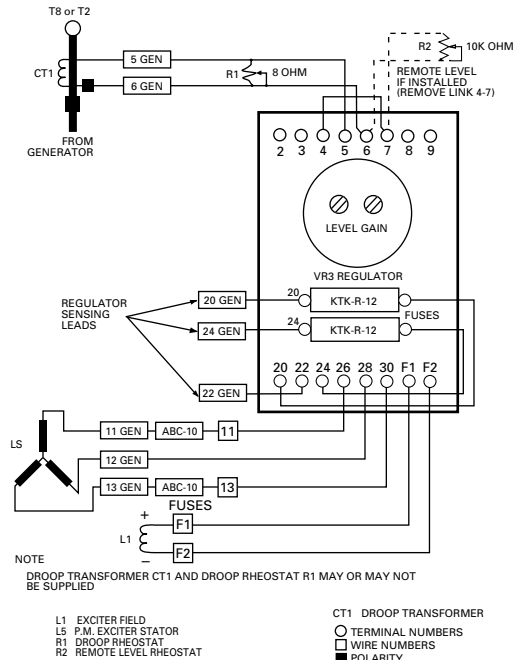


## CONNECTION DIAGRAMS

SELF EXCITED WITH DIRECT CONNECTION TO GENERATOR  
(240 VAC Sensing)



P.M. EXC WITH DIRECT CONNECTION TO GENERATOR  
(240 or 480 VAC Sensing)



For a complete listing of connection diagrams, see Caterpillar publication SENR4794-01 entitled "CONNECTION DIAGRAMS: SR4 GENERATORS VR3 & VR4 VOLTAGE REGULATOR OPTIONS"

