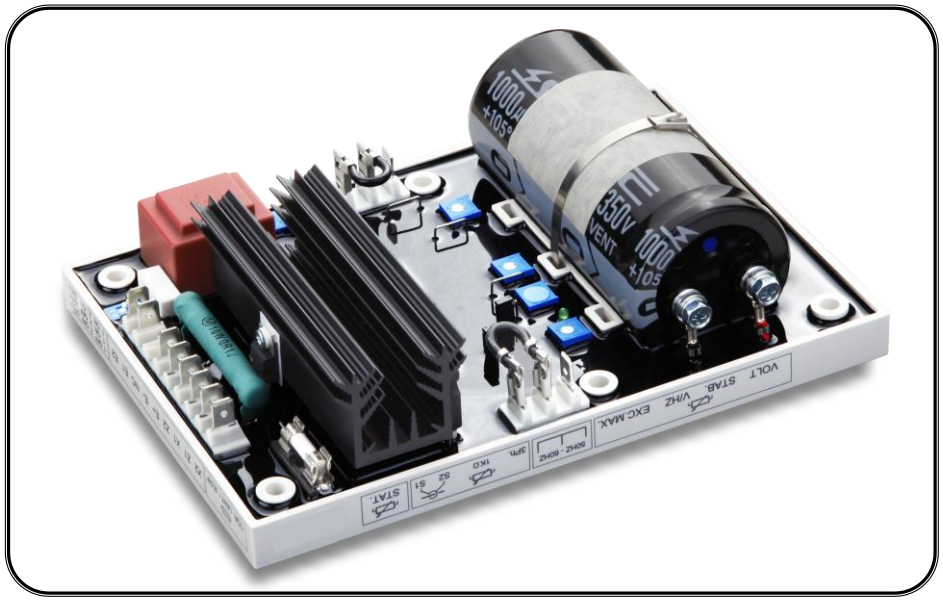
VR448

Generator Automatic Voltage Regulator
Operation Manual



Permanent Magnet Generator or A.R.E.P or Auxiliary Winding Type
Compatible with Leroy Somer R448*

* Use for reference purpose only and not a genuine Leroy Somer product.

SECTION 1: SPECIFICATION

Sensing Input (E1、E2) Average Reading
Voltage 95 – 520 Vac 1 phase 2 wire
DIP Switch Settings
Adjustment 95 – 140 Vac @ 110 Vac
170 – 260 Vac @ 220 Vac
340 – 520 Vac @ 380 Vac
Frequency 50/60 Hz Jumper selected

Power Input (X1、X2)
Voltage 40 – 150 Vac 1 phase 2 wire
Frequency 40 – 500 Hz

Auxiliary Input (Z1、Z2)
Voltage 40 – 150 Vac 1 phase 2 wire
Frequency 40 – 500 Hz

Excitation Output (E+、E-)
120V 1 phase Continuous 110 Vdc 7A
Max. 160 Vdc 10A 10Sec
Resistance Min. 15Ω, Max. 100Ω @120V
Fuse Spec. Slow blow 5 x 20mm 10A

External Voltage Adjustment (1KΩ)
Max. +/- 10% @ 1 KΩ 1 watt potentiometer

Quadrature Droop Input (S1、S2)
CT N:1A
Sensitivity +/- 7%@ PF +/- 0.7 (STAT. Adjustable)

Build Up Voltage
5 Vac 25Hz residual volts at power input terminal

Soft Start Ramp Time
3 seconds +/- 10%

Voltage Regulation
Less than +/- 0.5% (with 4% engine governing)

Typical System Response
0.3 – 1 seconds @ +/- 20% Voltage Vibration

Static Power Dissipation
Max. 4 watts

Under Frequency Protection
50 Hz system knee point at 45Hz
60 Hz systems knee point at 55Hz

Over Excitation Current limitation
3.5A to 10A (EXC.MAX. Adjustable)

Voltage Thermal Drift
Less than 3% from -40 to +70 °C

Environment

Operation Temperature	-40 to +70 ˚C
Storage Temperature	-40 to +85 ˚C
Relative Humidity	Max. 95%
Vibration	5.5 Gs @ 60 Hz

Dimensions
203.0 (L) x 153.0 (W) x 60.5 (H) mm
7.99 (L) x 6.03 (W) x 2.38 (H) inch

Weight
850 g +/- 2%
1.874 lb +/- 2%

SECTION 2: DIMENSIONS

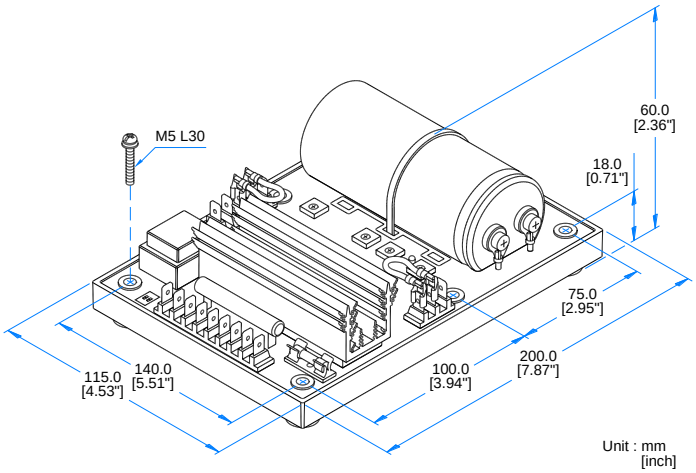
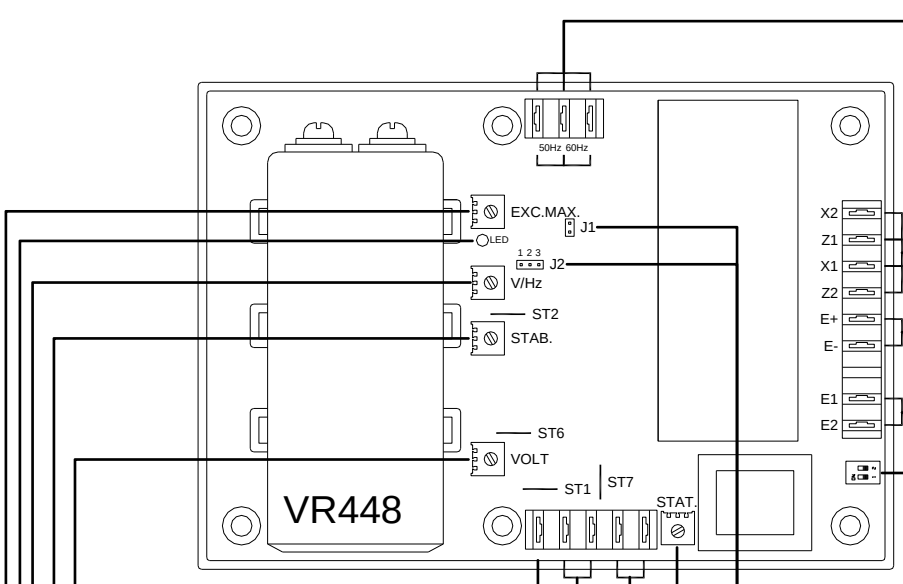


Figure 1. Outline Drawing

NOTICE

1. **This AVR may be installed in any suitable location on the generator set. The appearance and mounting holes are shown in Figure 1.**
2. **To ensure safety and avoid permanent damage to the AVR caused by high voltage, be sure to remove the wiring on the AVR before using meg-ohm meter / high voltage test equipment.**
3. **Be sure to tie up the connection wiring of the AVR when installing in a high-vibration environment. The heat sink may become hot and could damage the wiring.**

SECTION 3: DIP SWITCH SETTINGS



50Hz、60Hz：Frequency Selection

X1、X2：Power Input
Connect working voltage, Max. 150Vac

Z1、Z2：Auxiliary Power Input
Connect Auxiliary voltage, Max. 150Vac

E+、E-：Excitation Output
Connect to generator excitation field

E1、E2：Sensing Input
Connect sensing input voltage Max. 600Vac

Sensing Input Voltage Selection
1 OFF 2 OFF : 110Vac (95~140V)
1 ON 2 OFF : 220Vac (170~260V)
1 ON 2 ON : 380Vac (340~520V)

3Ph.：Three Phase Sensing Input
Connect to Three Phase Sensing Module

1KΩ：External Voltage Adjustment
Connect to external 1KΩ potentiometer
Terminals must be shorted when not in used

S1、S2：Quadrature Droop Input
Connect to generator CT

STAT.：Quadrature Droop Adjustment
Adjust the ratio of the idle power to the voltage drop, when used in parallel.
Adjustment range is 0% to 7%

VOLT：Voltage Adjustment
Adjust Generator output voltage
Adjustment range can be set by DIP SW

STAB.：Stability Adjustment
Under no-load operation, slowly adjust the STAB VR counterclockwise until the voltage is unstable, and then adjust it clockwise for about 1/5 circle

V/Hz：Under Frequency Adjustment
Adjustment for Under frequency and LAM knee point

LED： LED will illuminate when AVR in normal operation

EXC.MAX.：Over Excitation Current Limiting
Excitation output will be turned off when excitation current is over the setting value
Min. 3.5A, Max. 10A

J1 **J1 Disconnected：** Without LAM protection

J1 **J1 Connected：** With LAM protection

LAM：When Generator is loading the Engine speed will be reduced. When engine speed is lower than pre-set frequency threshold (V/Hz knee point), AVR will reduce voltage in 13% or 25% (set by J2). This will make the active power of loading reduce 25% to 45%, until engine speed reaches pre-set value once again then voltage will resume to normal value.

1 2 3 J2 **When J2 1–2 is shorted：** Drop ratio 13% in LAM voltage

1 2 3 J2 **When J2 2–3 is shorted：** Drop ratio 25% in LAM voltage

ST1：Single Phase / Three Phase Sensing Selection
Shorted：Single phase sensing
Open：Three phase sensing (must use with Three Phase Sensing Module)

ST2：Response Time Selection
Shorted：Slow
Open：Fast
Select response time according to Stability adjustment

ST6：Instantaneous Compensation for Voltage
Shorted：For Generator less than 600 KVA
Open：For Generator greater than 600 KVA

ST7： Keep shorted

SECTION 4: CONNECTION DIAGRAMS

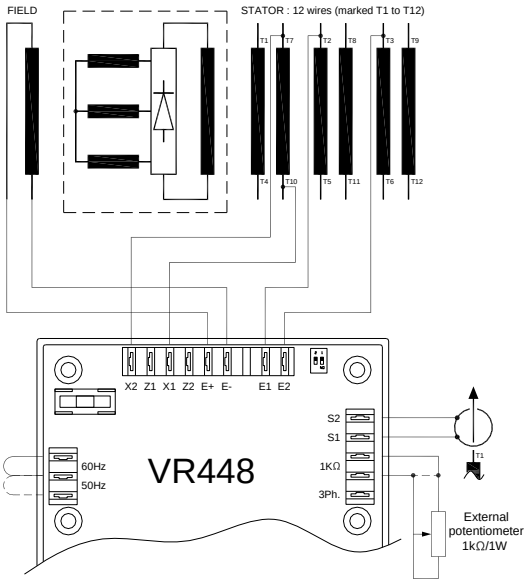


Figure 2. Self-Excited (SHUNT)

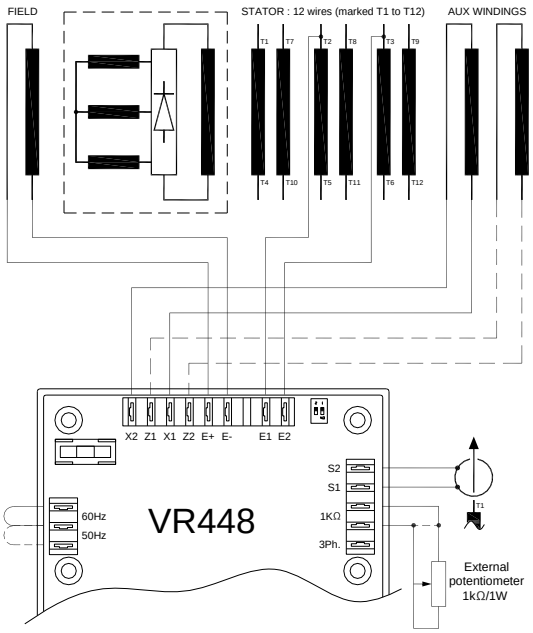


Figure 3. Auxiliary and Harmonic Power Winding

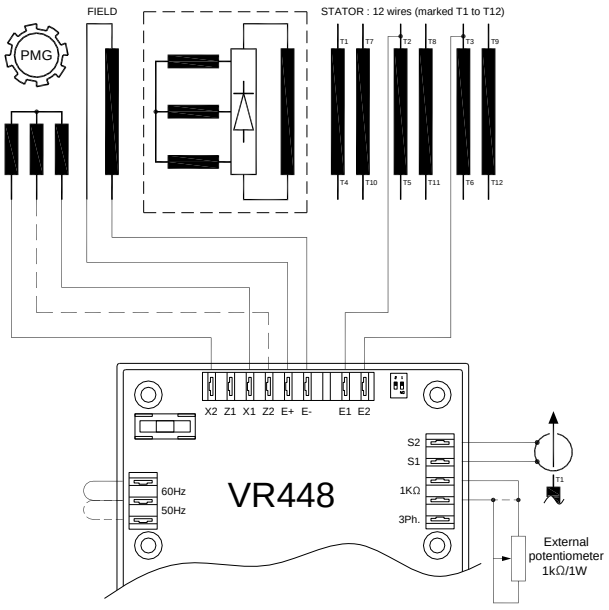


Figure 4. PMG Winding

ATTENTION*!!*

1. Improper setting of under-frequency protection could cause the output voltage of the unit to drop or become unstable with changes in load. Avoid making any changes to the U/F setting unless necessary.
2. Terminal Specification：6.35mm (1/4 inch) Flagged Terminals
3. Use only replacement fuses specified in this user manual.
4. Appearance and specifications of products are subject to change for improvement without prior notice.