

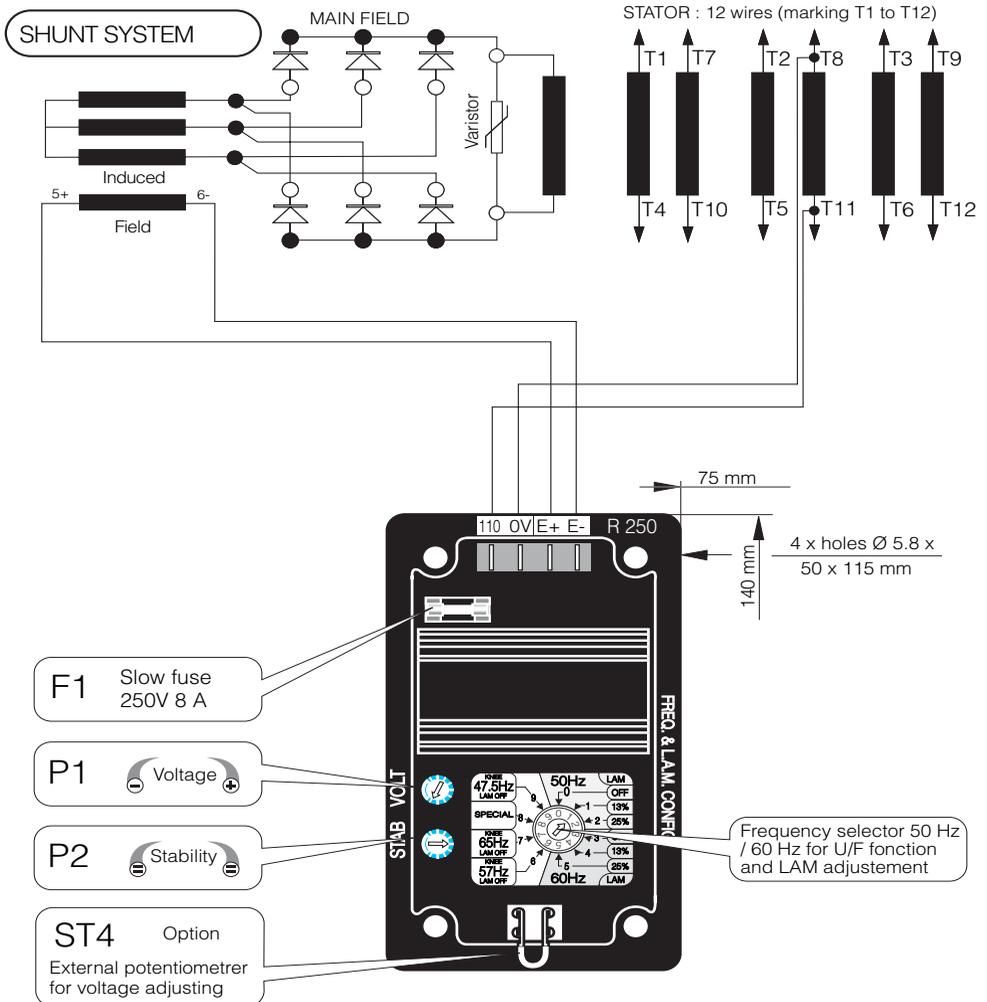
# R250 A.V.R.

## 1 - SUPPLY

### 1.1 - SHUNT excitation system

The SHUNT excitation alternator is auto-excited with a R 250 voltage regulator.

The regulator controls the excitation current according to the alternator's output voltage. With a very simple conception, the SHUNT excitation alternator does not have a short circuit capacity.



# R250

## A.V.R.

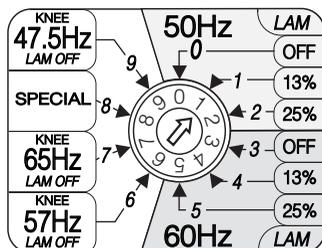
## 2 - R250 A.V.R.

### 2.1 - Characteristics

- Voltage regulation: around  $\pm 0,5 \%$ .
- Supply range/voltage detection 85 to 139 V (50/60Hz).
- Rapid response time (500 ms) for a transient voltage variation amplitude of  $\pm 20 \%$ .
- Voltage setting **P1**.
- Stability setting **P2**.
- Supply protected with an 8 A fuse, slow action (supports 10 A for 10 s).

### 2.2 - U/F Fonction and LAM

The threshold position (50 Hz - 60 Hz) to action the U/F fonction as well as the LAM setting type is selected using the potentiometer.



**WARNING:** The jumper settings must correspond to the rated operating frequency (see the nameplate on the alternator).

**Risk of destruction for the alternator.**

The threshold position and LAM fonction settings are done with the jumper.

### Operating at 50 Hz: (U/F gradient)

**0:** threshold at 48 Hz without LAM for impacts between 30 and 40% of the rated load.

**1:** threshold at 48 Hz with LAM 13% for impacts between 40 and 70% of the rated load.

**2:** threshold at 48 Hz with LAM 25% for impacts > 70% of the rated load.

### Operating at 60 Hz: (U/F gradient)

**3:** threshold at 58 Hz without LAM for impacts between 30 and 40% of the rated load.

**4:** threshold at 58Hz with LAM 13% for impacts 40 and 70% of the rated load.

**5:** threshold at 58Hz with LAM 25% for impacts > 70% of the rated load.

### Specific operating

**6:** threshold at 57Hz without LAM for speed variations at a steady state > 2 Hz

**7:** threshold at 65Hz without LAM for variable speed and tractelec / gearlec (U/F gradient).

**8:** special: the factory setting 48Hz 2U/F gradient ; a special programme is possible on request. This programme must be specified before ordering, during the project study.

**9:** threshold at 47.5 Hz without LAM for speed variations at a steady state > 2 Hz

### 2.3 - R250 A.V.R. option

Potentiometer for voltage setting, 1000  $\Omega$  / 0,5 W min: setting range  $\pm 5 \%$ .

- Remove the **ST4** jumper.

# R250

## A.V.R.

### 2.4 - LAM characteristics (Load Acceptance Module)

#### 2.4.1 - Voltage drop

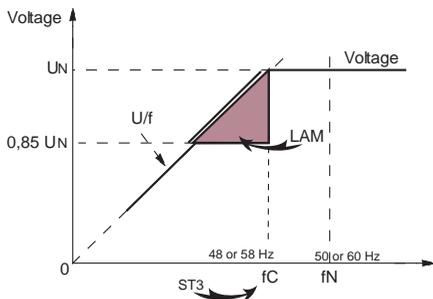
The LAM system is integrated in the A.V.R. It is active as standard. It can be adjusted to 13% or 25%.

- Role of the «LAM» (Load Adjustment Module):

On application of a load, the rotation speed of the generator set decreases. When it passes below the preset frequency threshold, the LAM causes the voltage to drop by approximately 13% or 25% and consequently the amount of active load applied is reduced by approximately 25% to 50%, until the speed reaches its rated value again.

Hence the "LAM" can be used either to reduce the speed variation (frequency) and its duration for a given applied load, or to increase the applied load possible for one speed variation (turbo-charged engines). To avoid voltage oscillations, the trip threshold for the "LAM" function should be set approximately 2 Hz below the lowest frequency in steady state.

It is advised to use the "LAM" at 25% for load impacts > at 70% of the genset rated power.

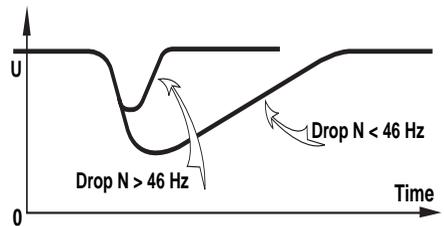


#### 2.4.2 - Gradual voltage return function

During load impacts, the function helps the genset to return to its rated speed faster thanks to a gradual increase in voltage according to the following principles:

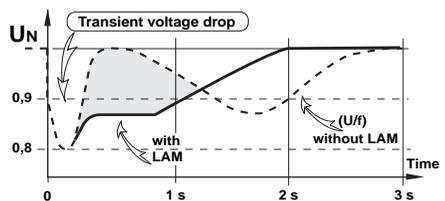
- if the speed drops between 46 Hz and 50 Hz, the rated voltage follows a fast gradient as it is restored.

- if the speed drops below 46 Hz, since the engine needs more help, the voltage follows a slow gradient as it returns to the reference value.

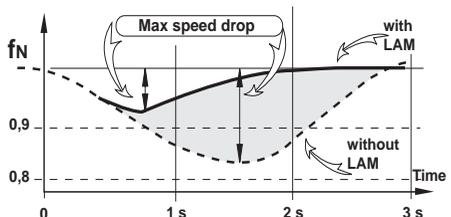


### 2.5 - Typical effects of the LAM with a diesel engine or without a LAM (U/ F only)

#### 2.5.1 - Voltage

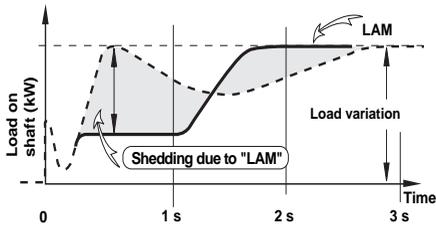


#### 2.5.2 - Frequency



# R250 A.V.R.

## 2.5.3 - Power



## 3 - Electrical faults

Fault	Action	Effect	Check/cause
No voltage at no load on start-up	Connect a new battery of 4 to 12 volts to terminals E- and E+ respecting the polarity for 2 to 3 seconds	The alternator starts up and its voltage is still correct when the battery is removed.	- Lack of residual magnetism
		The alternator starts up but its voltage does not reach the rated value when the battery is removed.	- Check the connection of the voltage reference to the A.V.R. - Faulty diodes - Induced short circuit
		The alternator starts up but its voltage disappears when the battery is removed	- Faulty A.V.R. - Exciter field short-circuited - Short-circuit in the main field. Check the resistance
Voltage too low	Check the drive speed	Correct speed	Check the A.V.R. connections (A.V.R. may be faulty) - Field windings short-circuited - Rotating diodes burnt out - Main field winding short-circuited - Check the resistance
		Speed too low	Increase the drive speed (Do not touch the A.V.R. pot (P1) before returning to the correct speed.)
Voltage too high	Adjust A.V.R. potentiometer	Adjustment ineffective	- Faulty A.V.R. - 1 faulty diode
Voltage oscillations	Adjust A.V.R. stability potentiometer		- Check the speed: possibility of cyclic irregularity - Loose terminals - Faulty A.V.R. - Speed too low on load (or U/F gradient set too high)
Voltage correct at no load and too low when on load (*)	Run at no load and check the voltage between E+ and E- on the A.V.R.		- Check the speed (or U/F gradient set too high)
			- Faulty rotating diodes - Short-circuit in the main field. Check the resistance - Faulty induced excitation
<b>(*) Warning:</b> For single-phase operation, check that the sensing wires coming from the A.V.R. are correctly connected to the operating terminals (see the alternator manual).			
Voltage disappears during operation	Check the A.V.R., the surge suppressor, the rotating diodes and replace any defective components	The voltage does not return to the rated value.	- Exciter winding open circuit - Faulty induced excitation - Faulty A.V.R. - Main field open circuit or short-circuited