

# R220 AUTOMATIC VOLTAGE REGULATOR (AVR)

4291 en - 2013.03 / d



## 1 - SPARE PARTS

### 1.1 - Designation

Description	Type	Code
A.V.R.	R 220	AEM 110 RE 028

### 1.2 - Technical support service

Our technical support service will be happy to provide any information you require.

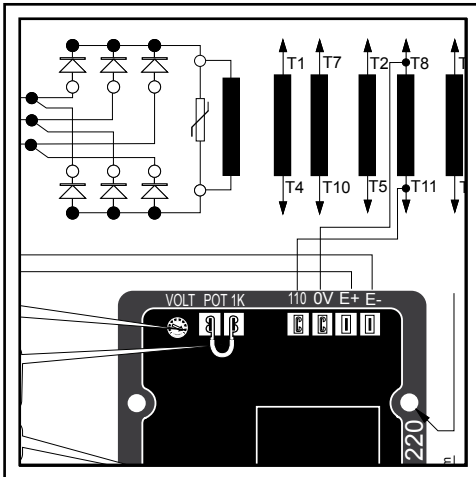
When ordering spare parts, you should indicate the complete machine type, its serial number and the information indicated on the nameplate.

Part numbers should be identified from the exploded views and their description in the parts list.

Our extensive network of «service stations» can dispatch the necessary parts without delay.

To ensure correct operation and the safety of our alternators, we recommend the use of original manufacture spare parts.

In the event of failure to comply with this advice, the manufacturer cannot be held responsible for any damage.



# R220

## A. V. R.

## Installation and maintenance

## 2 - SUPPLY

### 2.1 - SHUNT excitation system

The alternator with Shunt excitation is self-excited with an R 220 voltage regulator. The regulator monitors the exciter excitation current as a function of the alternator output voltage. Very simple in design, the alternator with shunt excitation has no sustaining short-circuit capacity.

## 3 - R220 A.V.R.

### 3.1 - Characteristics

- Storage : -55°C ; +85°C
- Operation : -40°C ; +65°C
- Voltage regulation: ± 0.5%.
- Voltage supply/sensing range 85 to 139 V (50/60 Hz)
- Rapid response time (500 ms) for a transient voltage variation amplitude of ± 20%
- Voltage setting **P1**
- Stability setting **P2**.

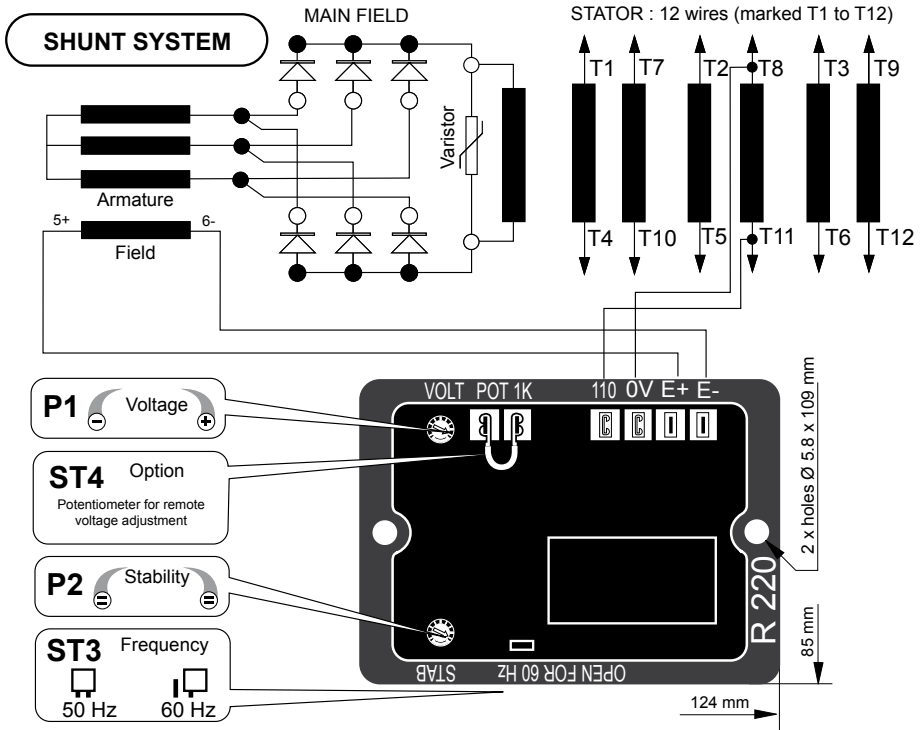
- Power supply protected by 8 A fuse, slow-blow action (tolerates 10 A for 10 s)  
The fuse is impregnated in the resin, therefore it can not be replaced.
- Frequency: 50 Hz with **ST3** jumper - 60 Hz without **ST3** jumper.
- The size of the screwdriver tip used to adjust the potentiometer is 2.5 mm.

### 3.2 - R220 AVR option

- Potentiometer for remote voltage adjustment, 1000 Ω / 0.5 W min: adjustment range ± 5%.
- Remove the **ST4** jumper.



**For wiring up the external potentiometer; the “earth” wires must be isolated as well as the potentiometer terminals (wires at the same voltage as the power).**



## 4 - INSTALLATION - COMMISSIONING

### 4.1 - Electrical checks on the AVR

- Check that all connections have been made properly as shown in the attached wiring diagram.
- Check that the ST3 frequency selection jumper is on the correct frequency setting.
- Check whether the ST4 jumper or the remote adjustment potentiometer have been connected.

### 4.2 - Settings



The machine is tested and set at the factory. When first used with no load, make sure that the drive speed is correct and stable (see the nameplate). After operational testing, replace all access panels or covers. The only possible adjustments to the machine should be made on the AVR.

#### 4.2.1 - R 220 setting (shunt system)

Initial potentiometer settings

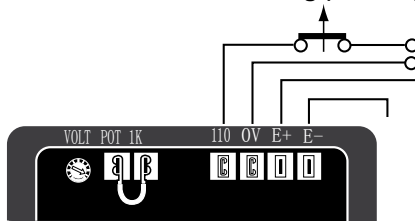
- **P1** potentiometer (AVR voltage adjustment): fully anti-clockwise.
  - Remote voltage adjustment potentiometer: centre position.
- Run the alternator at its rated speed. If the voltage does not increase, the magnetic circuit should be remagnetized (see section 3.3).
- Turn the AVR voltage adjustment potentiometer **P1** slowly until the output voltage rated value is obtained.
  - Adjust the stability setting using **P2**.  
Clockwise: increase the rapidity.  
Anti-clockwise: decrease the rapidity.

### 4.2.2 - Special type of use

**WARNING**

Excitation circuit E+, E- must not be left open when the machine is running : AVR damage will occur.

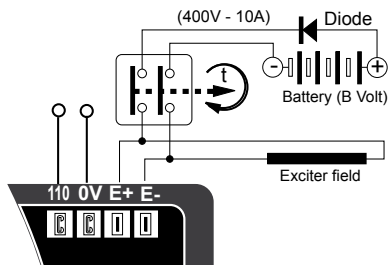
#### 4.2.2.1 - R220 field weakening (SHUNT)



The exciter is switched off by disconnecting the AVR power supply (1 wire - 0 or 110V). Contact rating : 16A - 250V alt.

The power supply contactor must only be closed when the alternator is not being driven

#### 4.2.2.2 - R220 field forcing



**Battery must be isolated from the earth.**



**Exciter field may be at line potential.**

### 4.3 - 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 builds up and its voltage is still correct when the battery is removed.	- Lack of residual magnetism
		The alternator builds up but its voltage does not reach the rated value when the battery is removed.	- Check the connection of the voltage reference to the AVR - Faulty diodes - Armature short-circuit
		The alternator builds up but its voltage disappears when the battery is removed	- Faulty AVR - Field windings disconnected - Main field winding open circuit - check the resistance
Voltage too low	Check the drive speed	Correct speed	Check the AVR connections (AVR 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 AVR voltage pot. (P2) before running at the correct speed)
Voltage too high	Adjust AVR voltage potentiometer	Adjustment ineffective	Faulty AVR
Voltage oscillations	Adjust AVR stability potentiometer		- Check the speed : possibility of cyclic irregularity - Loose connections - Faulty AVR - Speed too low when on load (or U/F bend 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 AVR		- Check the speed (or U/F bend set too high)
			- Faulty rotating diodes - Short-circuit in the main field. Check the resistance - Faulty exciter armature.
<b>(*) Caution :</b> For single-phase operation, check that the sensing wires coming from the AVR are correctly connected to the operating terminals			
Voltage disappears during operation	Check the AVR, 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 exciter armature - Faulty AVR - Main field open circuit or short-circuited



**Warning :** after operational testing, replace all access panels or covers.