U.V.R.6

2) U.V.R.6 ELECTRONIC REGULATOR

2.1) General characteristics

The UVR6 type voltage regulator is an advanced design electronic regulator that ensures excellent performance of the alternators while they are running and during starting. The regulator is equipped with a complete protection system against operation conditions that could be dangerous for the machine. The UVR6 regulator is suitable for being used with all Mecc Alte alternators and is standard supply for power outputs above or equal to 85 KVA, both three-phase and single phase.

The terminal board is equipped with indications to help connection and avoid errors.

Some connection diagrams that are suitable for different configurations are given on the back of the regulator (see fig. 9).

2.2) Technical characteristics

2.2.1) Supply

The supply to the regulator can be from 170 to 270 Vac between terminals + and 2 of the terminal board, with + and B not connected, or from 80 to 160 Vac between terminals + and 2 but with + and B connected to each other. Supply can also be separate from the sensing and in this case should be insulated from it.

2.2.2) Sensing

The regulator is equipped with three differential sensing inputs (terminals 1-2, 3-4, 5-6), which measure up to three different machine voltages. In this way you can check the average voltage on one or three phases of your choice.
The most common connections are the following:

a) Direct voltage adjustment of one of the phase windings, with the machine either star or delta connected.

b) Direct adjustment of the voltage of the three phase windings (also for 12 terminal machines), with the machine either star or delta connected. In both cases (“a” and “b”), the passage of the machine connection from triangle to star does not need regulator connection modification.

c) Direct adjustment of the voltage to the terminals being used, with machine either star or delta connected.

2.3) Adjustments

2.3.1) Voltage precision

The voltage remains within ±1% of the pre-set value when passing from zero to full load, from cos φ 1 to 0.8 and with turn variations of up to -6% of the nominal value. The precision of the voltage improves if the regulator sensing inputs are connected directly to the terminals being used (see point c of the previous paragraph).

OUTLINE DIMENSIONS
DIMENSIONI D’INGOMBRO
149,5 x 114,5 x 44 mm

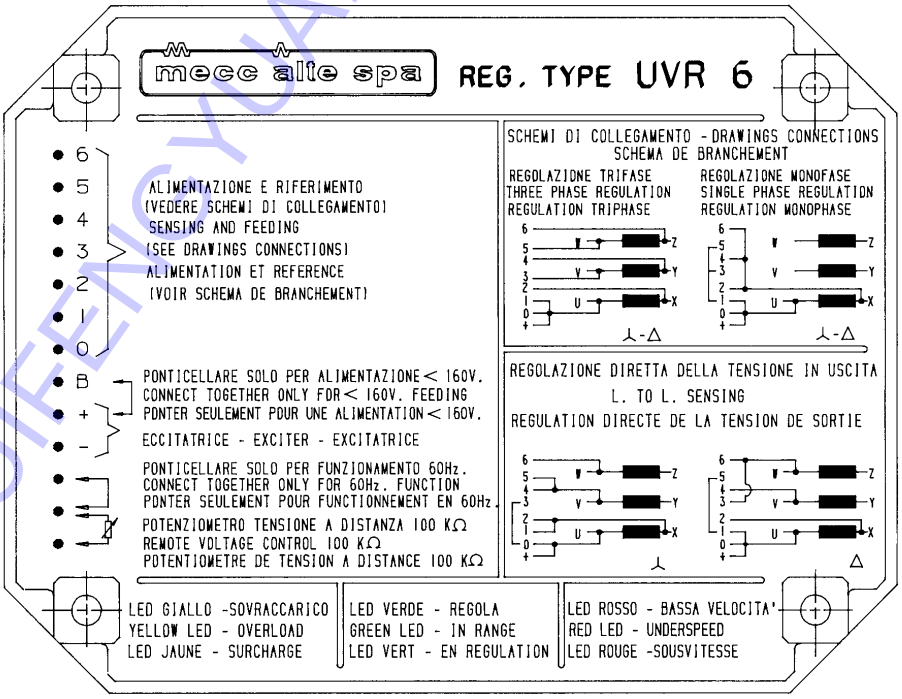

fig. 9

2.3.2) Voltage adjustment

The voltage can be adjusted using the potentiometer marked "VOLT".
It is also possible to regulate the voltage at a distance of ± 5% by inserting a 100 kOhm potentiometer onto the relevant terminals of the terminal board that are marked a variable resistance symbol.

2.3.3) Transitory reply time adjustment

The regulator is equipped with a “STAB” stability potentiometer with which it is possible to vary the regulator reply in a way that limits the swing and obtains from the machine a minimum voltage reset time at nominal value, after the application or release of a load. This permits optimum use of the UVR6 regulator for the whole range of Mecc Alte alternators.

2.4) Protections

The UVR6 regulator is equipped with two protection systems, and when they intervene the following LEDs light up:

a) Delayed protection for overloads (yellow LED).

b) Low speed protection (red LED).

Both protections have an intervention threshold that can be adjusted using the respective potentiometers. The protections cause an output voltage decrease that reduces the excitation current of the machine, so reducing overheating of the exciter rotor.
The overload protection has a delay that let’s the machine overload briefly, for electric motor starting or other needs.

The regulator also has a third LED (green) which when lit indicates that the regulator is working correctly. All these signals can be observed remotely using the S.P.D.96/A type “REMOTE PROTECTION SIGNALLER” that is available upon request (see paragraph 3).

Fuse

The UVR6 electronic regulator is equipped with a fuse, which protects the alternator from overheating in cases of regulator malfunction. The fuse can be replaced easily, but the new one must have the same characteristics as the one being replaced (250V - 6.3A, quick acting, F type).

2.5) Usage field

The UVR6 can be used with all voltages from 80 to 480 Vac at 50 Hz.
It can also function at 60 Hz by bridging the "60 Hz" terminals of the regulator terminal board.
The admissible calibration field corresponds to the one specified for Mecc Alte alternators.

2.6) Self-excitation

The regulator is equipped with a “starter” device that utilises the residual voltage of the machine for supply and excitation adjustment.
This permits safe alternator excitation, also with very low residual voltages and in very short time, avoiding voltage swings during the starting phase. In this way, the voltage rises to the stabilised nominal value, approximately at the same moment when the speed reaches nominal value, even with prime movers with very fast starting ramps.

2.7) TEST PROCEDURES

2.7.1) Workbench test procedure

-) Prepare the connection diagram as shown in figure 10.

-) Before supplying the circuit with current, take the “VOLT” and “STAB” trimmers to minimum (turn anticlockwise), and the “AMP” and “Hz” trimmers to maximum (turn clockwise). The variac cursor should remain at minimum.

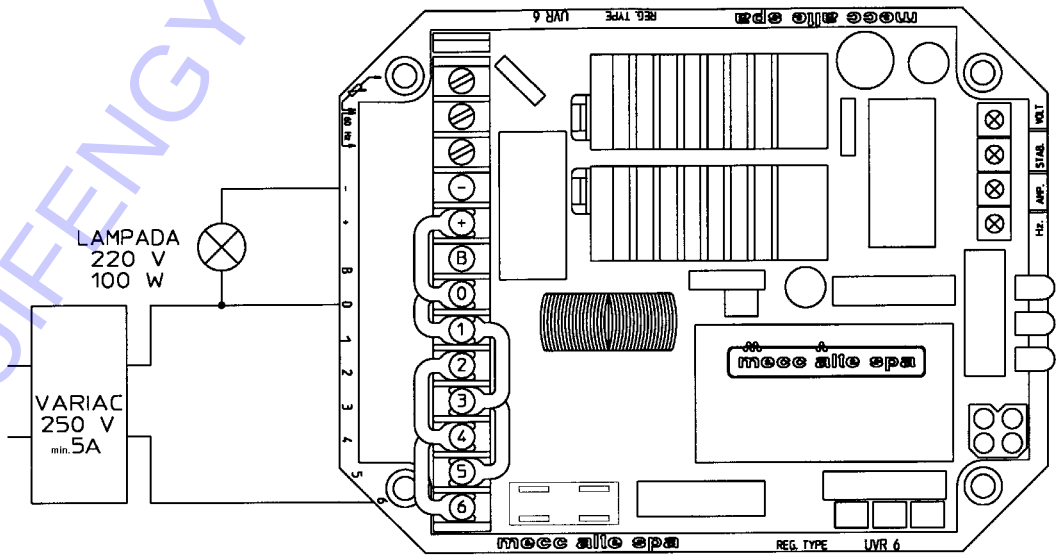

fig. 10

-) Switch on the variac and increase the voltage slowly, making sure that the light switches on and then immediately off.

-) Raise the variac voltage to approximately 200 Vac: the light should not light up.

-) Turn the “VOLT” trimmer slowly clockwise. The lamp should switch on, starting from minimum and going to maximum brightness. Make sure that the green LED switches on then immediately off again during the brightness intensity changes.

-) Take the “VOLT” trimmer to maximum. The light switches on fully and the green LED remains unlit. Turn the ”AMP” trimmer to minimum (anticlockwise) and wait approximately 20 seconds in these conditions. You should see that the overload protection switches off the lamp and lights the yellow LED. Almost immediately after, the green LED switches on, as does the light but only slightly.

-) Slowly turn the “AMP” trimmer towards maximum. Make sure that the light illuminates with increasing intensity.
Leave the “AMP” trimmer at half range.

-) In these conditions, the light should flicker if the “STAB” trimmer is turned slowly clockwise. When the “STAB” trimmer reaches maximum, the flicker turns into intermittent light.

-) Take the “STAB” trimmer back to minimum. The green and yellow LEDs should be lit, and the light should be at medium brightness.

-) Turn the “Hz” trimmer to minimum (anticlockwise). Make sure that the red LED switches on.
NOTE: If the test bench is at 50 Hz and the red LED does not illuminate, bridge the “Hz” terminals of the terminal board. If the test bench is at 60 Hz and the red LED does not light up, this does not mean that the regulator has problems. The low frequency protection should, instead, be tested in the machine.

-) Short-circuit the remote potentiometer terminals. The light should switch on with greater intensity.

If during all the above tests the described behaviour happens, the regulator being examined is suitable for operation.

2.7.2) Machine test procedure

The regulator should be connected as shown in the relevant diagram in figure 11.

-) Before starting the system, turn the "VOLT" and "STAB" trimmers fully anticlockwise and the "AMP" and "Hz” trimmers fully clockwise.

-) Connect a light between the generator phase and neutral (select the working voltage of the light in relation to the nominal value of the generator phase-neutral voltage).

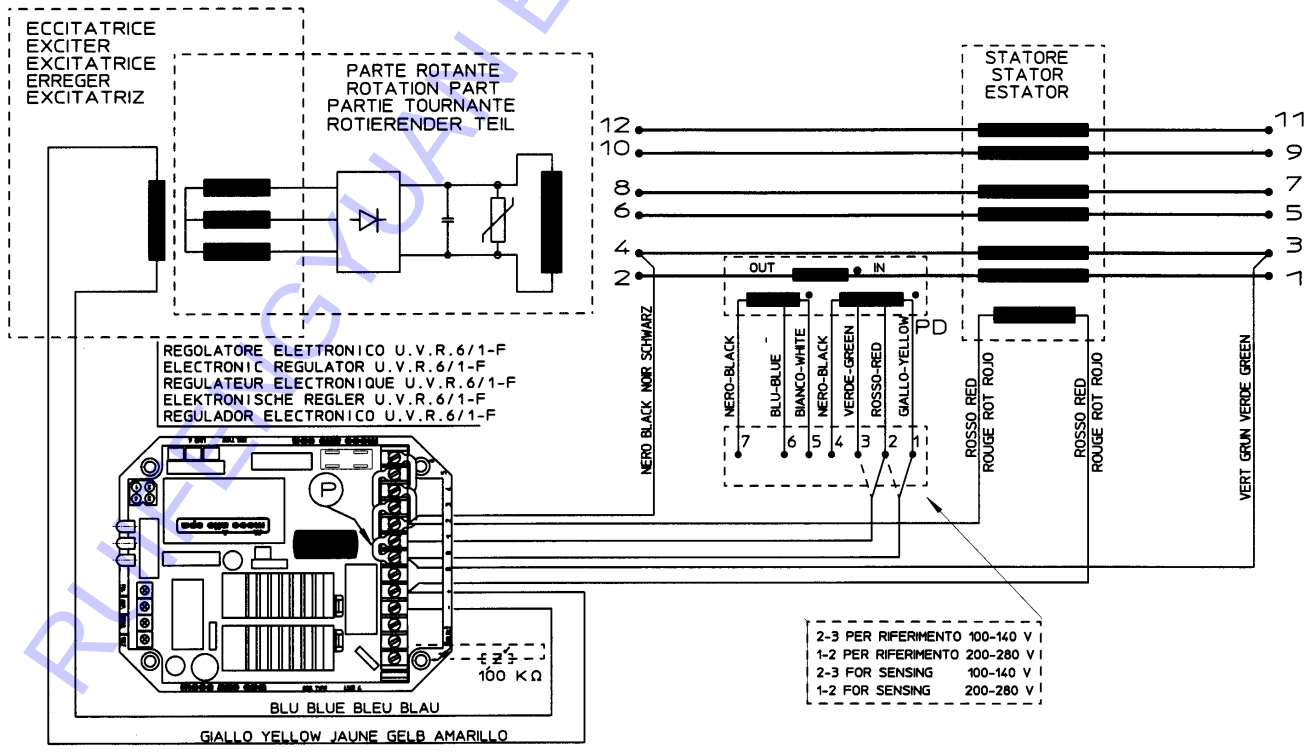

fig. 11

-) Voltage calibration
The output voltage may oscillate when the generator is at no load, at nominal speed and with the “VOLT” voltage trimmer at minimum. If this happens, slowly turn the “VOLT” trimmer clockwise. The generator voltage should rise and stabilise itself. Increase the voltage to the nominal value. In this situation only the green LED should be lit.

-) Stability calibration
To adjust regulator stability, slowly turn the “STAB” trimmer clockwise until the light that was previously connected between phase and neutral begins flashing slightly. Turn the “STAB” trimmer anticlockwise until the light becomes perfectly stable.

-) Overload protection calibration
To adjust the “AMP” overload protection apply a nominal load to the alternator then decrease the speed by 10% and turn the “AMP” trimmer fully anticlockwise. After a pause of 15-20 seconds, the generator voltage value should decrease and the yellow LED should light up. In these conditions, slowly turn the “AMP” trimmer clockwise until the output voltage value is at 97% of the nominal value – the yellow LED is still lit. When returning to normal speed, the yellow LED should switch off and the generator voltage return to nominal value. If this does not happen, repeat the calibration.

-) Low speed protection calibration
If the machine is to work at 60 Hz, make sure that the “60 Hz” terminals of the electronic regulator are bridged. To adjust the low frequency protection, make the generator run at a speed that is equal to 90% of the nominal one. Slowly turn the “Hz” trimmer in an anticlockwise direction until the generator voltage begins to decrease and at the same time make sure that the red LED lights up. When the speed is increased, the generator voltage should normalise and the red LED should switch off. Take the speed back to the nominal value.

If during all the above tests the described behaviour happens, the regulator being examined is suitable for operation.

2.8) Replacement of electronic regulators that are no longer produced

UVR6 could replace old regulators (RT80, RT80A, RT83, RT83N).