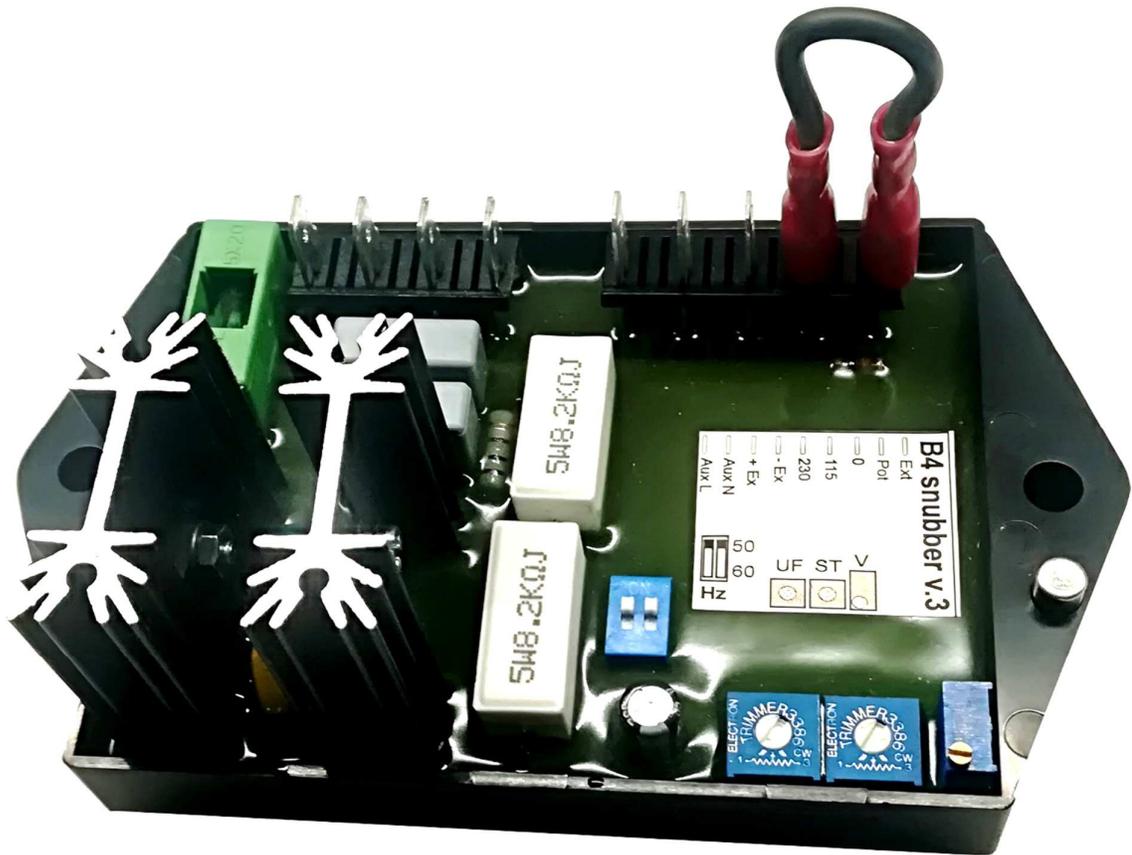


B4
Analogic AVR
Automatic Voltage Regulator
OPERATION MANUAL



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GENERAL FEATURES

SINCRO B4 is an analogic AVR automatic voltage regulator designed for 50/60 Hz brushes generators.

It regulates the output voltage of a generator by controlling the field current. It has single phase sensing.

The voltage regulator controls and keeps constant the voltage.

A frequency measuring circuit continually monitors the alternator output and provides output under-speed protection of the excitation system, by reducing the output voltage proportionally with speed below a pre-settable threshold. A manual adjustment is provided for factory setting of the under frequency roll off point, (UF). This can easily be changed to 50 or 60 Hz with two dip switches.

Provision is made for the connection of a remote voltage potentiometer, allowing the user fine control of the alternator's output.

ELECTRICAL SPECIFICATIONS

B4 AVR includes:

- A terminal strip (9 terminals)
- A voltage trimmer
- A stability trimmer
- An under frequency trimmer
- A frequency selection DIP switches
- Electric protection with fuse.

The electronic is sealed with resin (it is a perfect protection against vibrations and humidity) and it is complying with RoHS directive.

ADJUSTMENTS

Adjusting elements of AVR B4 are described as the figure below.

FREQUENCY SELECTION

The frequency selection is done using two DIP-Switches. Set both switches to “ON” for 50 Hz, to “OFF” for 60 Hz.

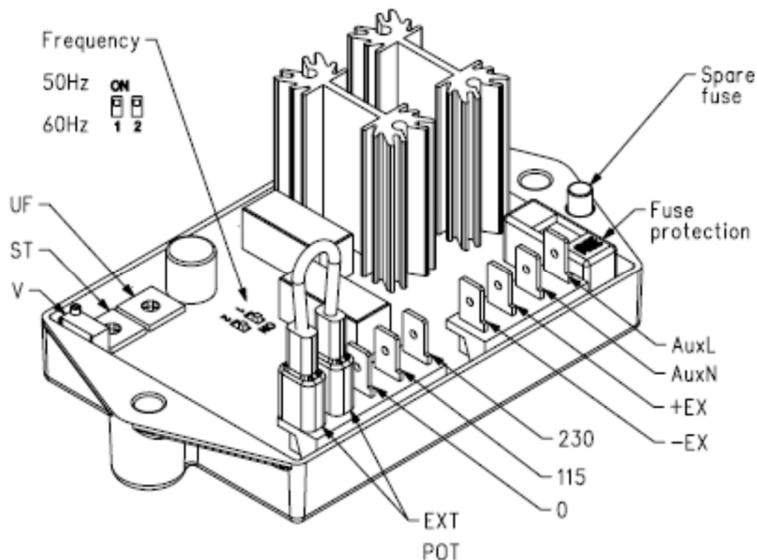
VOLTAGE ADJUSTMENT

The alternator output voltage is set at the factory, but it can be altered by adjustment of the V potentiometer on the AVR B4 board, or by the external hand potentiometer. Run the generating set to its nominal speed and turn until the required voltage is obtained. The voltage reference should be connected:

- To terminals “0” and “115” if connected to a voltage between 100 and 140 V
- To terminals “0” and “230” if connected to a voltage between 200 and 240 V.

In case of use of external hand potentiometer (5 kohm/0.5 W), it has to be fitted at the terminals Ext and Pot instead of shorting link.

If no hand potentiometer is required terminals Ext and Pot will be fitted with a shorting link.



Elements for adjustment on AVR B4

STABILITY ADJUSTMENT

The AVR B4 includes stability or damping circuit to provide good steady state and transient performance of the alternator.

The correct setting can be found by running the alternator at no load and slowly turning the stability ST clockwise until the alternator voltage starts to become unstable.

The optimum or critically damped position is slightly anti-clockwise from this point (i.e. where the machine volts are stable but close to the unstable region).

UNDER FREQUENCY KNEE ADJUSTMENT

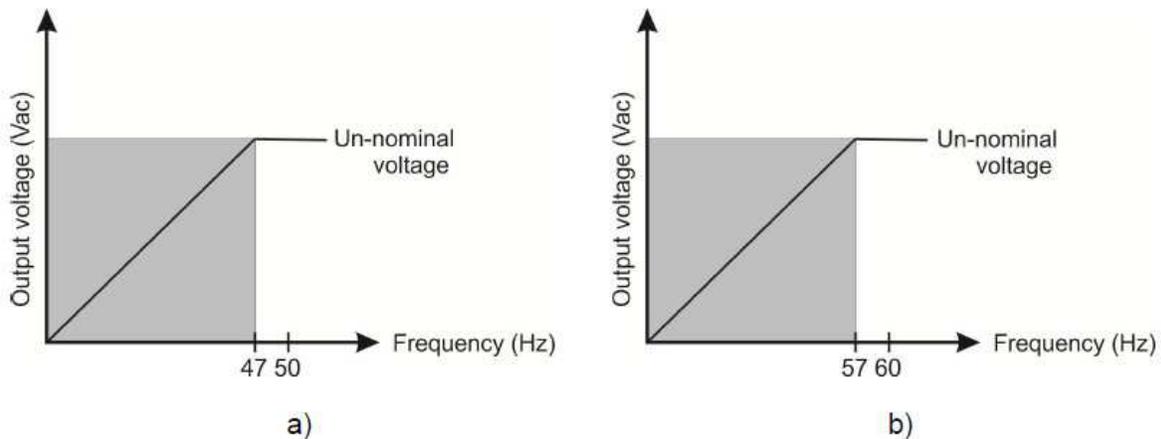
AVR B4 incorporates an underspeed protection circuit (UF) which gives a volts/Hz characteristic when the alternator speed falls below a presettable threshold known as the "knee" point.

The UF knee adjustment is preset at factory at the 47Hz on a 50Hz system or 57Hz on a 60Hz system. Selection of 50 / 60Hz can be made using the DIP-Switches.

The figures below show the curves for voltage variation as a function of frequency variation.

For nominal frequency operation, UF is disabled. When rotation decreases (e.g. when shutting down), excitation decreases, reducing the output voltage of the alternator.

The pre-set "knee" point can be altered, by UF trimmer, according to the needs of each application.



Under frequency "knee": a) 50 Hz system, b) 60 Hz system

PROTECTION FUSE

The fuse is used to limit the input supply current in order to protect the alternator field.

The power can be supplied by using an independent auxiliary windings, integrated in the alternator stator, or the phase of sensing.

The L line is protected by fuse (type 3.15 A, 250 V, 5x20).

TRIMMERS

Trimmer functions:

V = Voltage adjustments;

ST = Stability adjustments;

UF = UF "knee" adjustments.

Trimmer adjustments:

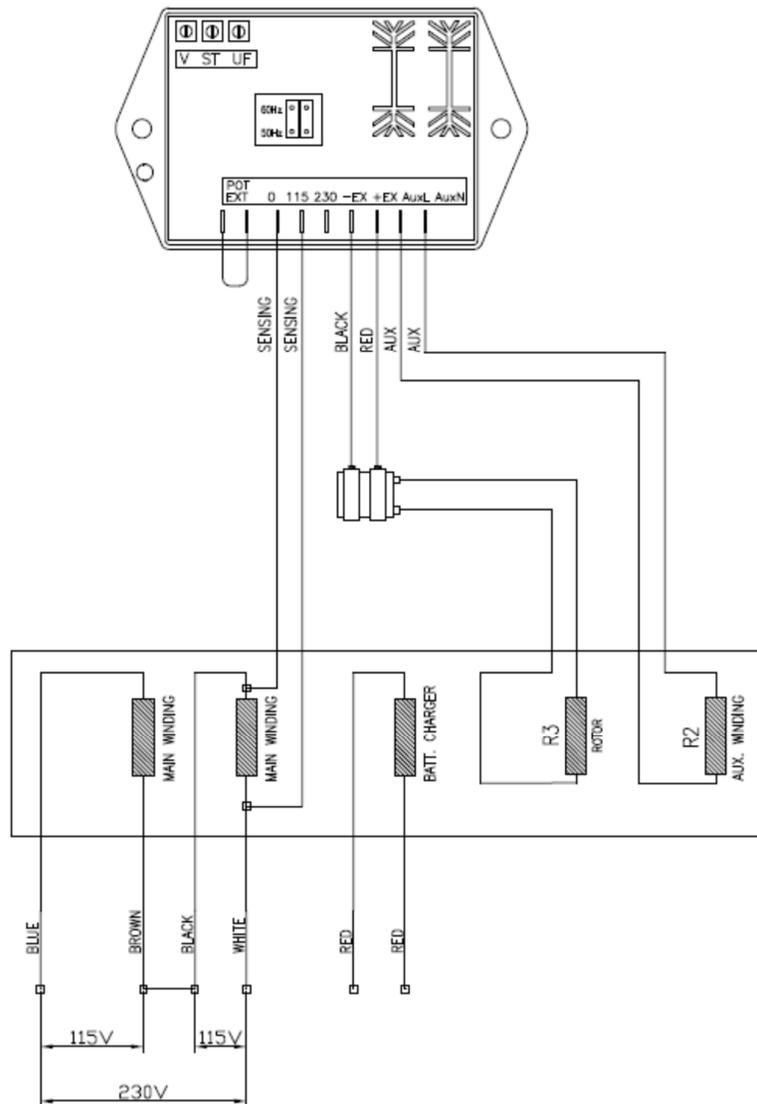
V = Turning clockwise, increases voltage;

ST = Turning clockwise, speeds up response;

UF = Turning clockwise, increases the UF protection limit.

CONNECTIONS

CONNECTION DIAGRAMS



CONNECTION TERMINALS

Sensing voltage:

230, 0 = 230 Vac

115, 0 = 115 Vac

Supply voltage:

Aux L, AuxN

Alternator field:

+Ex, -Ex

External adjustment potentiometer:

Ext, Pot

STARTING UP

If a replacement AVR has been fitted, or the re-setting of the voltage adjustment is required, please proceed as follows:

1. Connect the wires coming from the alternator according to the description in the CONNECTION DIAGRAM and the type of alternator to be used.
2. Check that the DIP switches and the connections are consistent with the characteristics of the machine (voltage, frequency, remote control)
3. Before running alternator, turn the volts trimmer "V" anti-clockwise
4. Turn stability trimmer "ST" to midway position
5. Start alternator set, and run on no load at nominal frequency e.g. 50-53 Hz or 60-63 Hz
6. Carefully turn volts trimmer "V" (or external pot, if fitted) clockwise until rated voltage is reached
7. If instability is present at rated voltage, refer to stability adjustment, and then re-adjust voltage if necessary

MAINTENANCE AND TROUBLE-SHOOTING

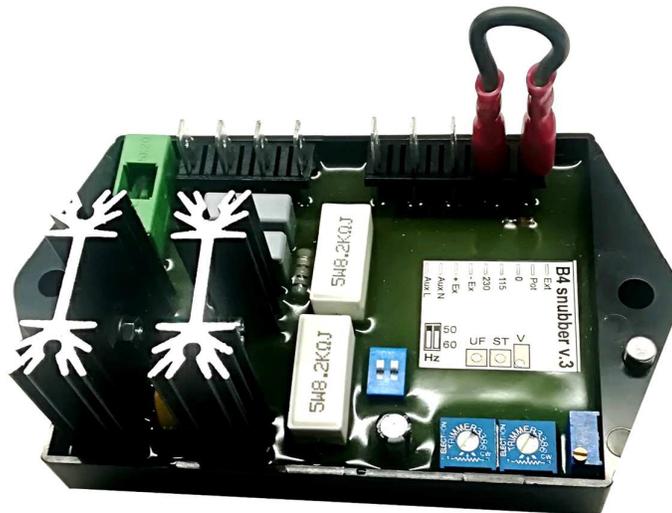
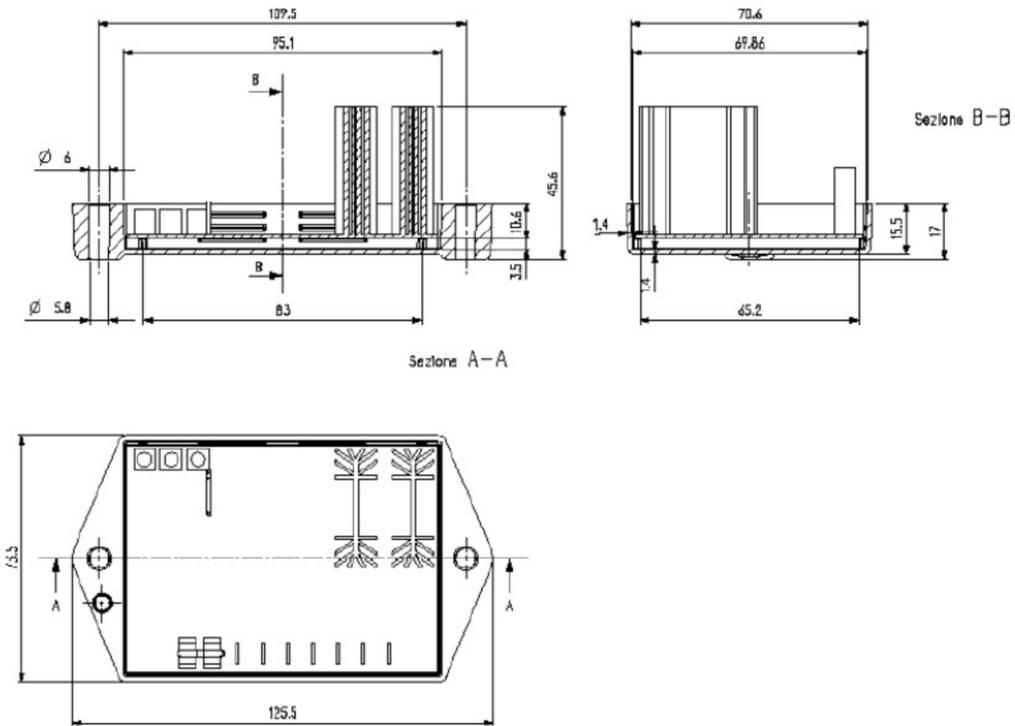
PREVENTIVE MAINTENANCE

Periodical inspections of the equipment are required to ensure they are clean, dust and moisture free. It is essential that all terminals and connections are kept free from corrosion.

TROUBLE-SHOOTING

Trouble	Possible causes	Solutions
NO OUTPUT VOLTAGE	<ul style="list-style-type: none"> - Demagnetized machine - Wrong connection of the AVR - Loose terminals/connections - External potentiometer terminals (Ext, Pot) not short circuited or potentiometer is open (if present) - Burnt fuse - Faulty AVR 	<ul style="list-style-type: none"> - Connect (for a while) an external battery (12Vdc) to the exciter (respecting the polarities) - Check as per wiring diagram - Check if all terminals/connections are well tightened - Short circuit (Ext, Pot) or change external potentiometer (if present) - Check and replace - Replace the AVR
LOW OUTPUT VOLTAGE	<ul style="list-style-type: none"> - Voltage potentiometer wrongly adjusted - Sensing wrongly connected - Dip-switch wrongly positioned - Low frequency (under the UF limit) - Under-Frequency protection is not properly adjusted - Faulty AVR 	<ul style="list-style-type: none"> - Check and adjust - Check the sensing connections - Check and fix - Increase the engine speed - Check and adjust - Replace the AVR
HIGH OUTPUT VOLTAGE	<ul style="list-style-type: none"> - Voltage potentiometer wrongly adjusted - Sensing wrongly connected - Dip-switch wrongly positioned - Missing sensing - Faulty AVR 	<ul style="list-style-type: none"> - Check and adjust - Check the sensing connections - Check and fix - Check if sensing is interrupted - Replace the AVR
UNSTABLE VOLTAGE	<ul style="list-style-type: none"> - Stability response incorrectly adjusted - Unstable engine speed - Loose terminals/connections - Faulty AVR 	<ul style="list-style-type: none"> - Adjust trimmer "ST" - Check the frequency/engine speed - Check if all terminals/connections are well tightened - Replace the AVR
FUSE BLOWS CONTINUOUSLY	<ul style="list-style-type: none"> - UF protection adjusted for a very low frequency (so the fuse burn during the turn-off procedure) - Faulty AVR 	<ul style="list-style-type: none"> - Adjust UF limit to a value close to the nominal frequency - Replace the AVR

DIMENSIONS





CHALLENGE THE OUTSIDE

SINCRO IS INSIDE

SINCRO has been manufacturing trustable alternators for over 30 years.
At the core of your best energy up to 2.6 MVA. Standard and custom.
Proudly 100% Made in Europe.



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