POWER ELECTRONICS

SE-2C12
AUTOMATIC VOLTAGE REGULATOR

USER MANUAL

POWER ELECTRONICS

SE-2C12

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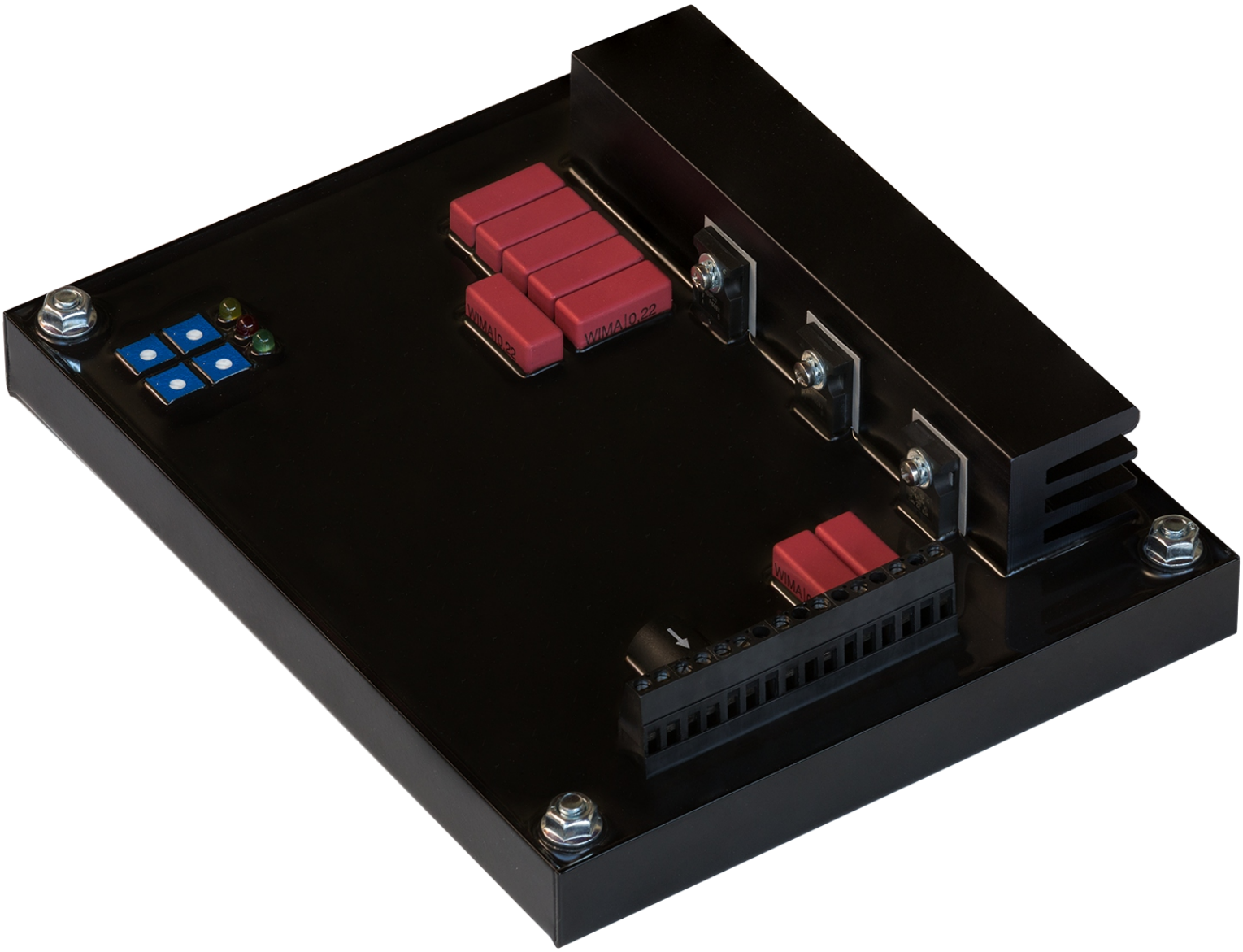
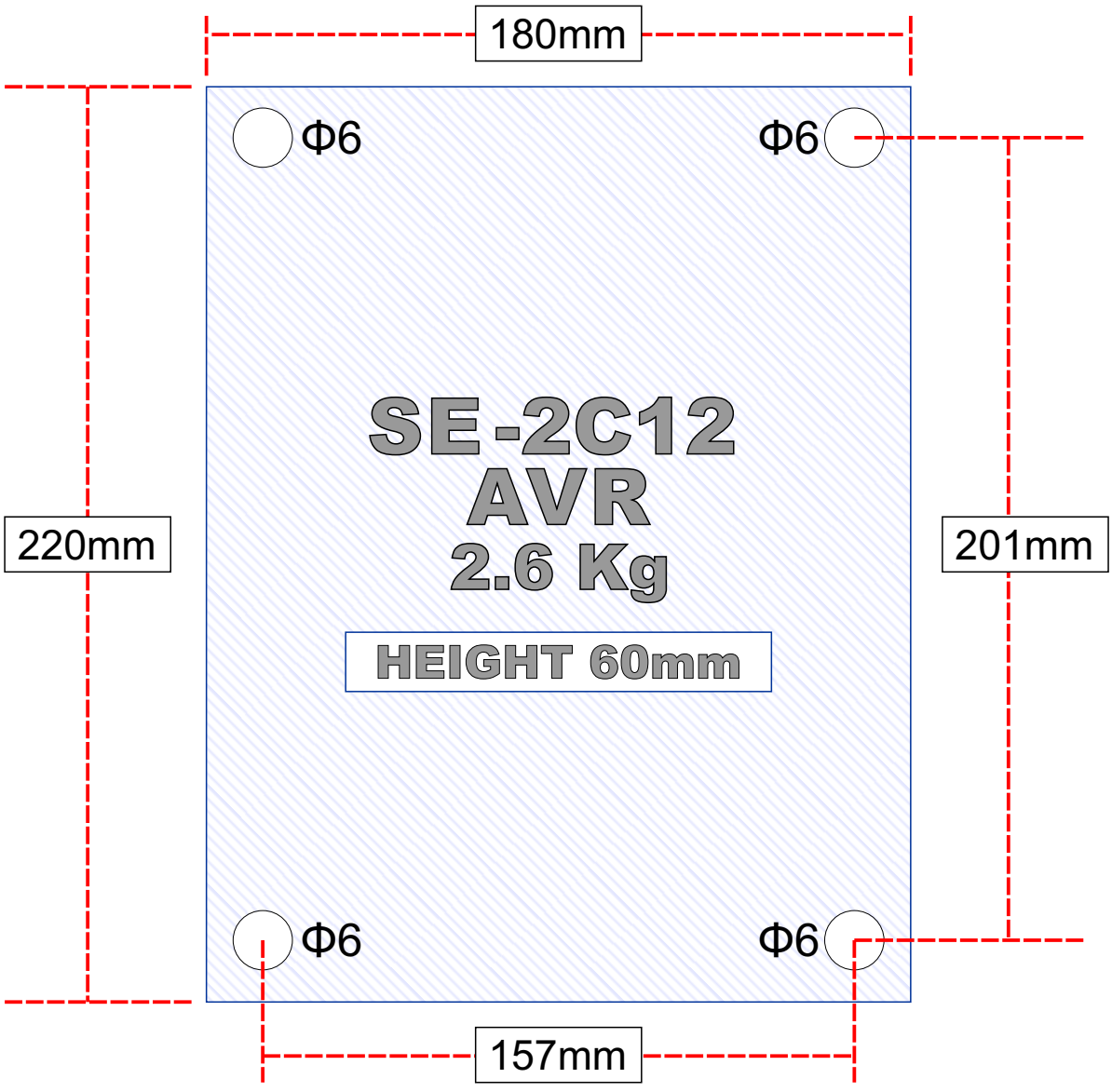
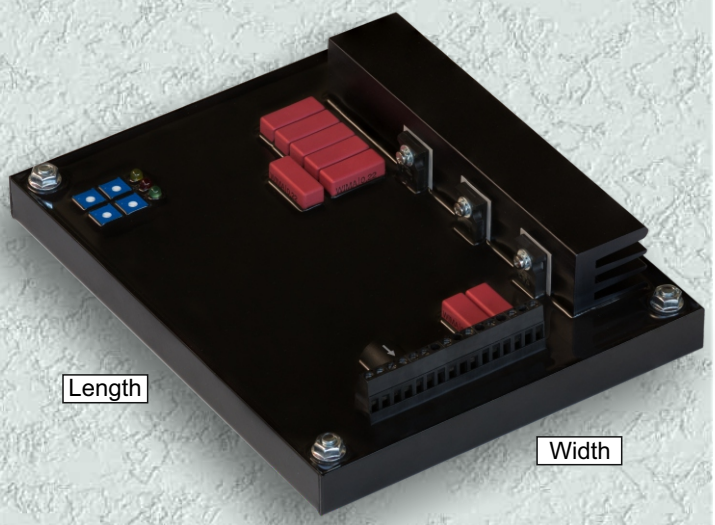



180mm
Φ6
Φ6
SE-2C12
AVR
2.6 Kg
HEIGHT 60mm
220mm
201mm
Φ6
Φ6
157mm

GENERAL DESCRIPTION — MODEL SE-2C12

The **SE-2C12** is a halfwave phase controlled thyristor type Automatic Voltage Regulator and forms part of the excitation system for a brushless generator.



TECHNICAL SPECIFICATION

- INPUT 350 - 500 V
- FREQ. 40 - 70 Hz
- 3 PHASE ONLY NO USE OF NEUTRAL
- 50/60Hz COMPENSATION
- UNDER FREQUENCY PROTECTION
- OUTPUT 0 - 130 V
- CURRENT 6A CONTINUOUS
- EXC.FIELD 4 Ohms MIN
- REGULATION +/- 1%
- OPER.TEMP +80°C MAX
- QUADRATURE DROOP FOR PARALLEL OPERATION

ADJUSTMENTS

- **VOLT** for voltage output level
- **STAB** for stability voltage control
- **P/F** for power factor correction
- **U/F** for under frequency protection
- **FINE POT** for external voltage level

DESIGN AND MANUFACTURE BY RESEARCH TEAM OF POWER ELECTRONICS C.O. *GREECE*

Dimensions (mm)

Length	Width	Height	Weight (Kg)
220	180	60	2.6

MODEL SE-2C12

- NON USE OF NEUTRAL.
- AUTOMATIC FLASH (REQUIRES 7V MINIMUM).
- 50 - 60 Hz COMPATIBILITY.
- UNDER FREQUENCY PROTECTION.
- P/F COMPENSATED IN PARALLEL OPERATION.
- CABLE CHECKER IN PARALLEL OPERATION.
- REGULATION +/- 0.5%
- OPERATIONAL TEMPERATURE 80°C MAX.
- A1-A2 (+/-) 5V VAR / PF CONTROL.

SPECIFICATIONS

INPUT		OUTPUT	
VOLT AC	350-500	VOLT DC	0V - 130V
PHASE	3 NO NEUTRAL	CURRENT	6A CONTINUOUS
FREQUENCY	40 - 70 Hz	EXC. FIELD OHM	4 Ohms MINIMUM

IMPORTANT INSTALLATION NOTES

- FOR SINGLE OPERATION ,THE USE OF "CT" IS NOT NECESSARY.
- IN CASE OF USING THE CURRENT TRANSFORMER "CT" *IT MUST BE TO PHASE V.*
- CONNECT FINE VOLTAGE POT ON PANEL (500 Ohm) OR ELSE YOU MUST LINK TERMINAL s" - t".
- USE MAX 6 AMPERES FUSES.
- THE AVR HAS A SYSTEM THAT DROPS THE GEN VOLTAGE TO HALF IF WRONG PHASE CONNECTION APPLIES.
- **THE CABLE CHECKER GREEN LED IS LIT WHEN:**
  1. THE IDENTITY OF THE PHASES ARE OK.
  2. THE SEQUENCE OF THE PHASES ARE OK.
  3. THE POLARITY OF CURRENT TRANSFORMER ARE OK.
- **THE CIRCUIT OF THIS LED WILL ACTIVATED IF:**
  A: THE CT IS INSTALLED.
  B: THE GENERATOR IS UNDER LOAD.

UNDER FREQUENCY PROTECTION

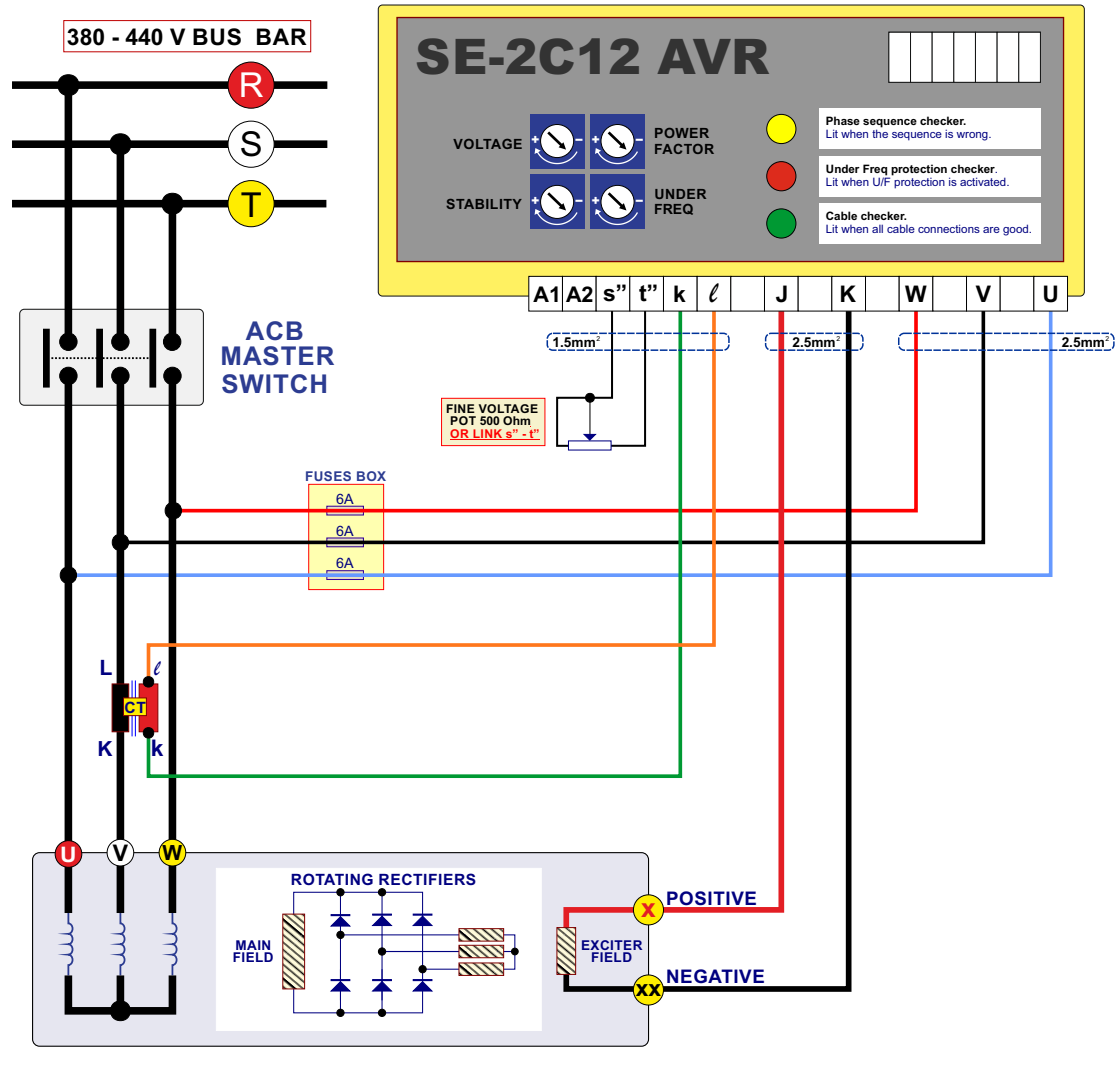
THE CLOCKWISE TURNING OF U/F TRIMMER ACTIVATES THIS FEATURE AT HIGHER Hz. (~74Hz THE HIGHEST)

THE ANTI-CLOCKWISE TURNING OF UNDER U/F TRIMMER ACTIVATES THIS FEATURE AT LOWER Hz. (~22Hz THE LOWEST)

STABILITY

THE CLOCKWISE TURNING OF STAB ADDING STABILITY BUT THE GEN HAS SLOWER VOLTAGE RECOVERY.

THE ANTI-CLOCKWISE TURNING OF STAB DECREASE STABILITY BUT THE GEN HAS FASTER VOLTAGE RECOVERY.



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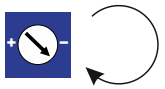

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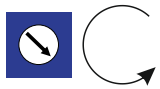

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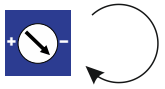
STABILITY



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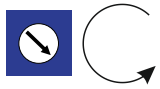

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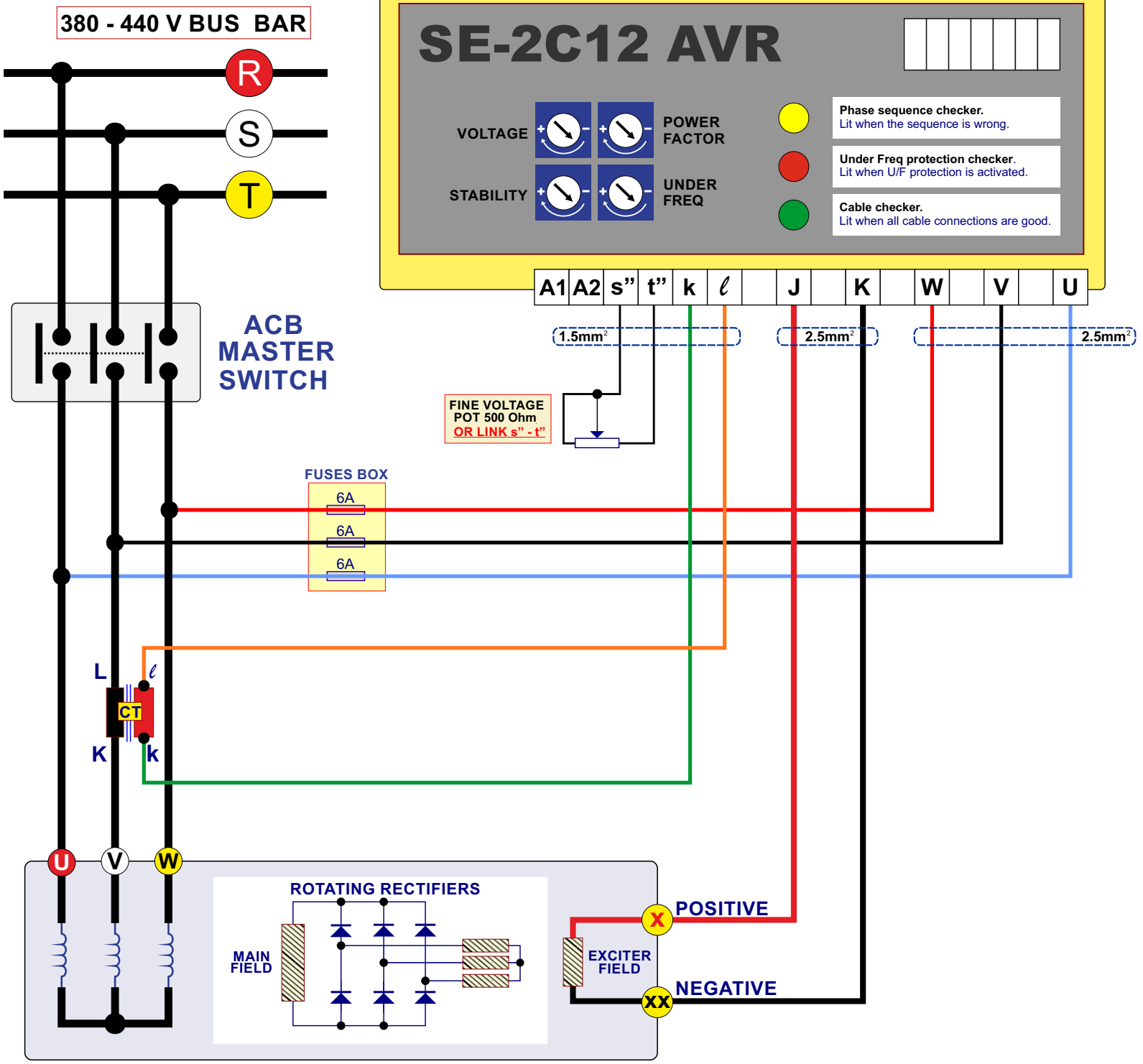

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Powerele@gmail.com

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INSTRUCTIONS TO INSTALLING AND ADJUSTING THE AVR

MODELS: SE-2C12

THREE PHASE CONNECTION & WRONG PHASE SEQUENCE INDICATOR

1. The right suggestion of the phases is a must for the normal function of the AVR.
   If the bars are marked (R, S, T) or (U, V, W) we follow the marks, if they are not, then we take the middle bar as "S" or "V" and connect it to terminal **"V"** of the AVR (important).
   If we use current transformer its mandatory to connect it to this specific phase also (important).

2. On the AVR there is a **yellow led**. When we start the generator and it builds up voltage, if the yellow led is lit up that means that the connection on the bars (R, T) or (U, W) is wrong and we must swap the position of two out-side wires (R-T) (or U-W).

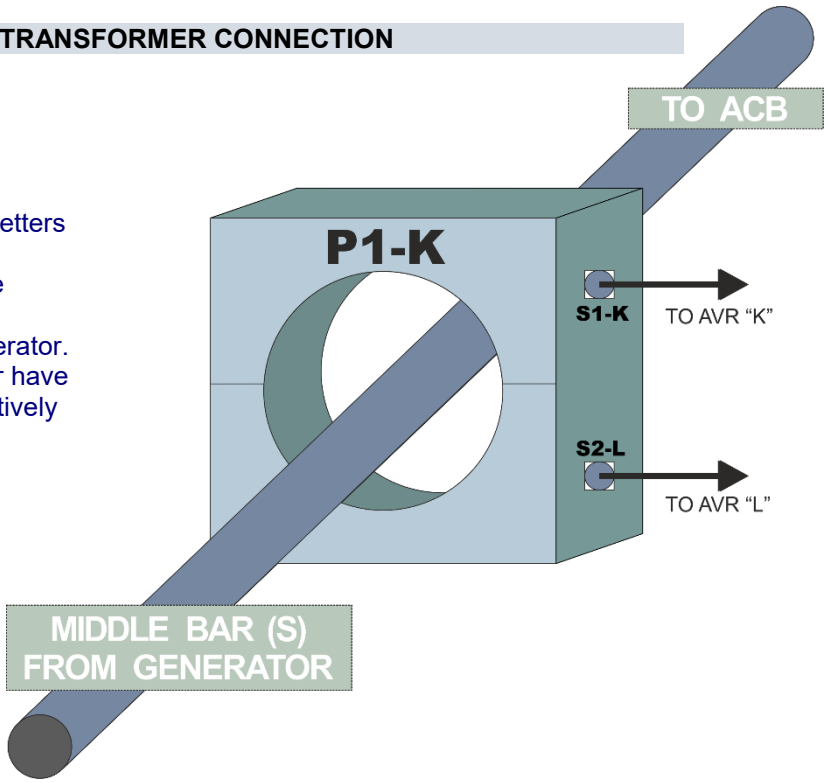
3. If the yellow led is lit the AVR automatically drops down the generator voltage around 200V to 250V so, we can easily identify the source of the problem. The yellow led absolutely must never lit-up (important).

CURRENT TRANSFORMER CONNECTION

1. It is necessary that the current transformer must be installed to the phase that also goes to terminal "V" of the AVR.

2. The current transformer has from one side the letters K (or P1) and on the other side L (or P2).
   From the side, K (or P1) enters the bar from the generator and as it exits from the L (or P2) it is going to ACB i.e. to main switch of the generator.
   The two-connecting point of current transformer have the letters k-l (or s1-s2) and correspond respectively with K-L of the AVR.

   The current ratio of the CT is:
   AMPERES OF GENERATOR
   FOR FIVE AMPERES



CONNECTING EXTERNAL VOLTAGE POTENTIOMETER

The connection of the external pot does not need any polarity because it is doing the work of a rheostat.
The value as with all our AVRs is always 500 Ohms.

EXCITATION POLARITY

The correct polarity of the feeding DC current to the exciter from the AVR J-K is a must otherwise the exciter will be demagnetized and will not build-up any voltage. If that happens we have to re-magnetize the exciter so after we disconnect the J-K cables from the AVR and while the engine has the right periods we connect (with the right polarity) a 12V car battery to the generator side exciter J-K for about 15 minutes.
After the re-magnetization, we can restore the J-K connections to the AVR.

WRONG CABLE CONNECTION MUST BE AVOIDED

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INSTRUCTIONS TO INSTALLING AND ADJUSTING THE AVR

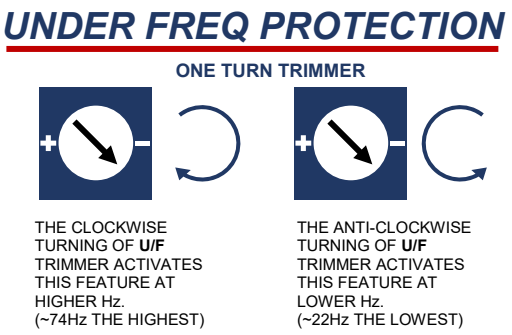
MODELS: SE-2C12

U/F - Under Frequency Protection. It protects the generator from over-excitation current due to lower engine revs.
To adjusting the U/F trimmer proceed as follows*:*

The AVR comes with pre-configured **Under frequency** protection.
If re-adjusting is to be needed, proceed to the follows:

1. We turn all the way (anti-clockwise) the trimmer **U/F.**
2. We start the engine and set it to normal run (50Hz or 60Hz)
3. We reduce the fuel from the Governor until the periods are 6Hz less than the normal e.g. If the engine is running on 50Hz, then the periods are to be reduced to 44Hz and if the engine is running on 60Hz, then the periods are to be reduced to 54Hz.
4. Turn clockwise the **U/F** trimmer until the **red led** lights up.
   Note that the generator voltage will also starts to drop.

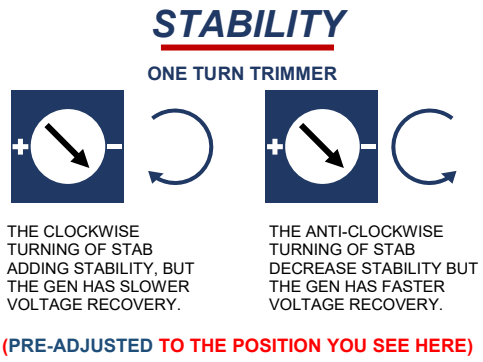
After that procedure, we can have brought up speed to the normal levels.



STAB - Stability. It eliminates the voltage fluctuations.
To adjusting the STAB trimmer, proceed as follows*:*

1. Turn anti-clockwise the Stab trimmer all the way (1 turn).
2. Turn clockwise the STAB trimmer and set it just after the voltage fluctuation stops.

*Setting the trimmer at a far clockwise position will decrease the generator sensitivity. This may result to extensive voltage recovery time due to the vast self-induction loads.



(PRE-ADJUSTED TO THE POSITION YOU SEE HERE)

VOLT - Voltage. Voltage adjustment. It co-operates with the external pot.
To adjusting the VOLT trimmer, proceed as follows:

Since the engine has the right-periods (cycles), then the remote knob is adjusted to the middle position.
Then the VOLT trimmer (which is located in the main unit) is adjusted until the right voltage is reached.
All the above adjustments i.e. U/F, STAB, VOLT, must be done without any load in the generator,
the switch (ACB) must be in OFF position.

P/F - Power Factor. This adjustment is done when the generator is already in parallel with another or others.
To adjusting the P/F trimmer proceed as follows:

We start by placing the trimmer to the middle position.
If turning it anti-clockwise, the amperes of generator build-up in relation to the other generator.
If the trimmer is moved in a clockwise manner, the amperes are reduced in relation to the other or other generators**.**

GREEN LED CABLE CHECKER. The green led will help to achieve the right installation.

It will light **only*** if all the below are ok:

1. The circuit of this led will activated, if only if a current transformer is installed.
2. The generator is 20% at least under load.
3. The identity of the phases is ok.
4. The suggestion of the phases is ok.
5. The polarity of current transformer is ok.

*If there is more than one wrong cable connection at the same time, there is a chance that the green led will be lighten.