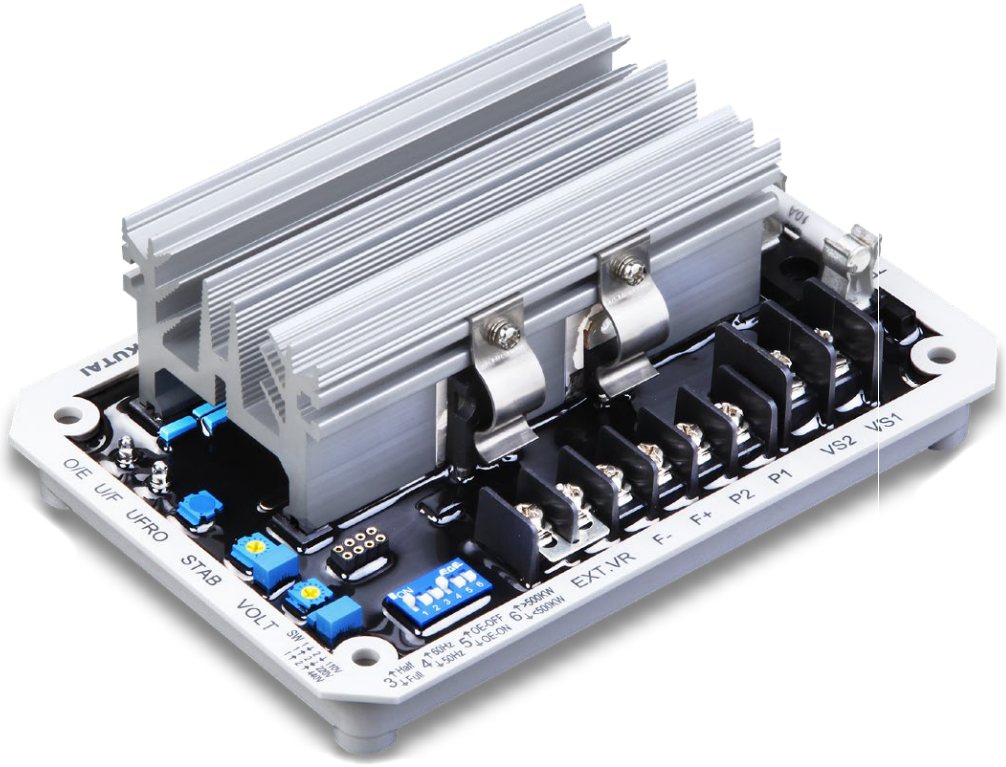
SS12-N

Universal Hybrid Analog-Digital
Voltage Regulator Operation Manual



Analog / Digital, Single-phase sensing, Excitation Current 7/10
Amp Selectable Full-wave or Half-wave Rectifier Output
For use with self-excited generators.

SECTION 1 : SPECIFICATION

Sensing Input (VS1, VS2) Average Readings
Voltage 90 – 540 Vac 1 phase 2 wire
DIP switch setting
Adjustment 90 – 130 Vac @ 110 Vac
175 – 270 Vac @ 220 Vac
350 – 540 Vac @ 440 Vac
Frequency 50/60 Hz DIP switch setting

Power Input (P1, P2)
Voltage 60 – 300 Vac 1 phase
Frequency 40 – 60 Hz

External Voltage Adjustment (EXT.VR)
Max. +/- 10% @ 1 KΩ 1 watt potentiometer

Build Up Voltage
Residual voltage at power input > 5 Vac @ 25 Hz

Soft Start Ramp Time
3 seconds +/- 10%

Voltage Regulation
Less than +/- 0.5% (with 4% engine governing)

Response Time
Less than 20 ms

EMI
Built-in electromagnetic interference filter

Static Power Dissipation
Max. 4 watts

Under Frequency Protection (Factory Presets)
50 Hz system knee point presets at 45 Hz
60 Hz system knee point presets at 55 Hz

Voltage Thermal Drift
Less than 3% from -40 to +70 ˚C

Under-Frequency Knee Point Thermal Drift
Less than +/- 0.1 Hz from -40 to +70 ˚C

Environment
Operating Temperature -40 to +70 ˚C
Storage Temperature -40 to +85 ˚C
Relative Humidity Max. 95%
Vibration 5.5Gs @ 60 Hz

Dimensions
162.0 (L) x 112.0 (W) x 59.0 (H) mm
6.38 (L) x 4.41 (W) x 2.32 (H) inch

Weight
640 g +/- 2%
1.41 lb +/- 2%

Excitation Output, Resistance, O/E Voltage Protection and DIP SW Setting

	SW3 Position	Power Input	Excitation Output (F+ 、F-) *1	Exciter resistance	O/E Voltage Protection *2
Half Wave	ON	110 Vac	Continuous 31 Vdc 7A Max. 45 Vdc 10A 10 Sec	Min.4.5 Ohm, Max.100 Ohm	Excitation Voltage 43V +/-10 %
		220 Vac	Continuous 63 Vdc 7A Max. 90 Vdc 10A 10 Sec	Min.9 Ohm, Max.100 Ohm	Excitation Voltage 85V +/-10 %
Full Wave	OFF	110 Vac	Continuous 63 Vdc 10A Max. 90 Vdc 10A 10 Sec	Min.9 Ohm, Max.100 Ohm	Excitation Voltage 85V +/-10 %
		220 Vac	Continuous 125 Vdc10A Max. 180 Vdc 10A 10 Sec	Min.18 Ohm, Max.100 Ohm	Excitation Voltage 170V +/-10 %

*1 Fuse specification 6.3 x 32 mm 10A Fast Blow type.
*2 Excitation output will be turned off in 10 seconds time delay, Inverse-time curve. This function can be turned OFF

SECTION 2 : EXTERNAL APPEARANCE / DIMENSIONS / INSTALLATION DRAWING

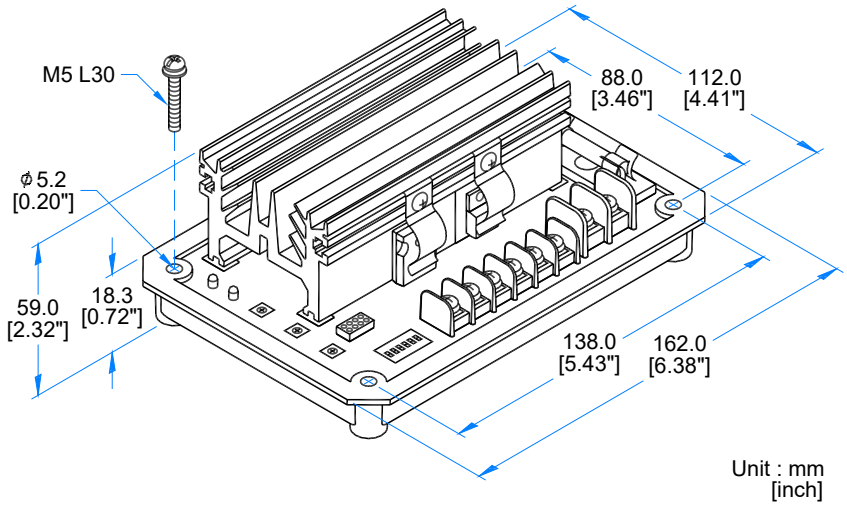


Figure 1 Outline Drawing

ATTENTION!!

1. AVR can be mounted directly on the engine, genset or any position that will not affect operation. Please see Figure 1 for dimension.
2. Secure all wiring connection. Do not install AVR at a place with high vibrations to prevent loose connections. For safety do not touch the heat sink while in operation.

SECTION 3 : DIP SWITCH SETTING & VR ADJUSTMENTS

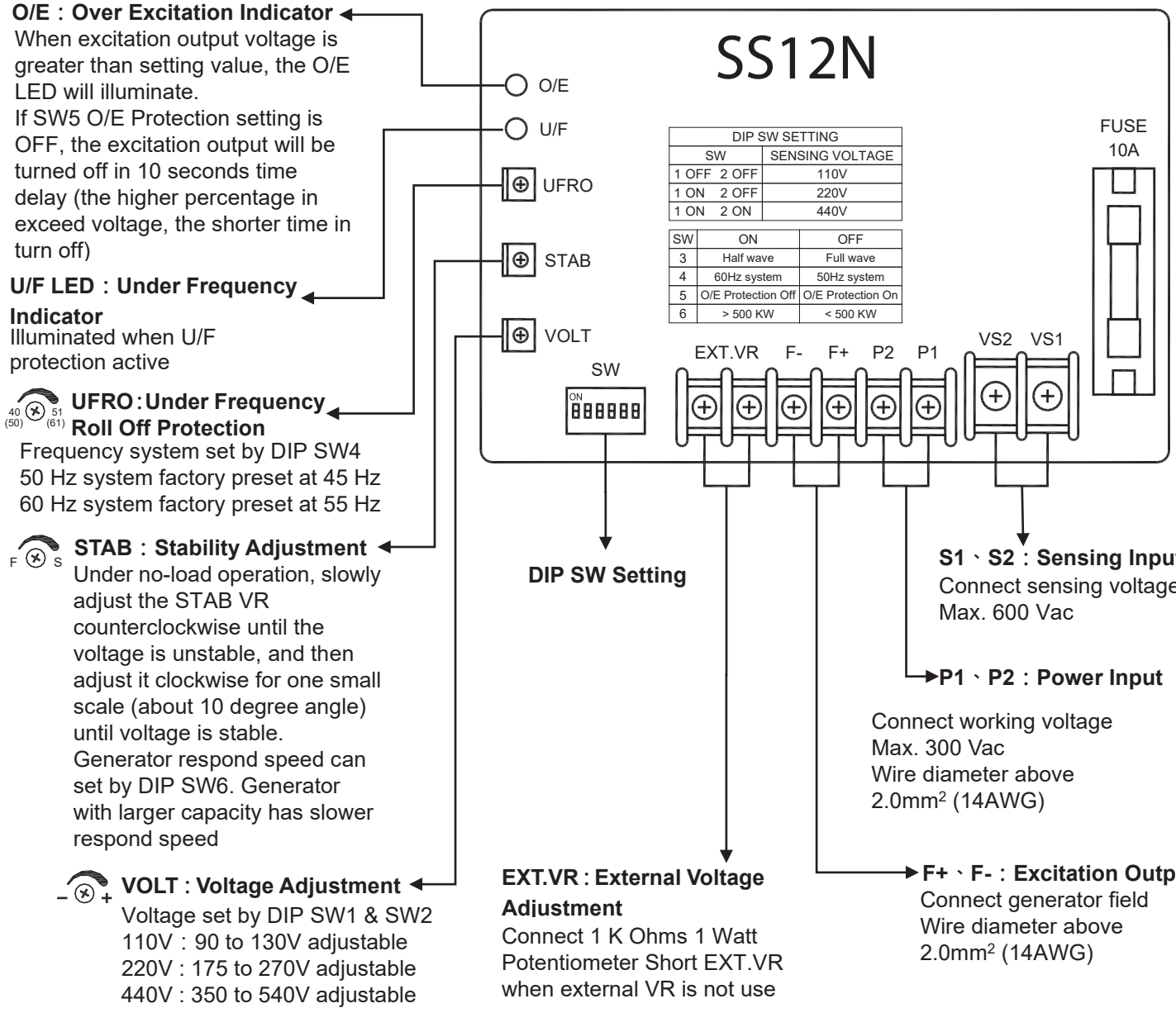
O/E : Over Excitation Indicator
When excitation output voltage is greater than setting value, the O/E LED will illuminate.
If SW5 O/E Protection setting is OFF, the excitation output will be turned off in 10 seconds time delay (the higher percentage in exceed voltage, the shorter time in turn off)

U/F LED : Under Frequency Indicator
Illuminated when U/F protection active

UFRO : Under Frequency Roll Off Protection
Frequency system set by DIP SW4
50 Hz system factory preset at 45 Hz
60 Hz system factory preset at 55 Hz

STAB : Stability Adjustment
Under no-load operation, slowly adjust the STAB VR counterclockwise until the voltage is unstable, and then adjust it clockwise for one small scale (about 10 degree angle) until voltage is stable.
Generator respond speed can set by DIP SW6. Generator with larger capacity has slower respond speed

VOLT : Voltage Adjustment
Voltage set by DIP SW1 & SW2
110V : 90 to 130V adjustable
220V : 175 to 270V adjustable
440V : 350 to 540V adjustable



DIP SW Setting

EXT.VR : External Voltage Adjustment
Connect 1 K Ohms 1 Watt Potentiometer Short EXT.VR when external VR is not use

S1 、S2 : Sensing Input
Connect sensing voltage
Max. 600 Vac

P1 、P2 : Power Input
Connect working voltage
Max. 300 Vac
Wire diameter above
2.0mm^2 (14AWG)

F+ 、F- : Excitation Output
Connect generator field
Wire diameter above
2.0mm^2 (14AWG)

ATTENTION*!!*

1. **Before using a Megger or a Withstand Voltage Tester remove the wires connecting to the AVR to prevent high voltage damage to the regulator.**
2. **Improper setting of Under Frequency Roll Off Protection could cause the output voltage of the unit to drop or become unstable with changes in load. Avoid making any changes to the UFRO setting unless necessary.**
3. **The connection wire for VEXT.VR must be shielded wire, the grounding wire of shielded wire should be as close as possible to the AVR, it's suggested to directly lock it on AVR mounting screw.**
4. **When power input is 110Vac and Generator excitation field voltage is lower than 20Vdc at full-load, set ADVR-07FH at Half-wave output.**
   If Generator excitation field voltage is greater than 20Vdc, then SS12-N must set at Full-wave output.
   When power input is 220Vac and Generator excitation field voltage is lower than 45V at full-load, set ADVR-07FH at Half-wave output.
   If Generator excitation field voltage is greater than 45V, then SS12-N must set at Full-wave output.
   If Generator needed Full-wave output but SS12-N was set at Half-wave, it may cause voltage drop in huge range or voltage cannot resume when generator is loaded.
   If Generator needed Half-wave output but SS12-N was set at Full-wave, it may cause Generator voltage unstable.
5. **Do not change DIP SW setting when Generator is running to avoid damage or injury.**

Use only the replacement fuses specified in this user manual.
Appearance and specifications of products are subject to change for improvement without prior notice.

SECTION 4 : WIRING CONNECTIONS

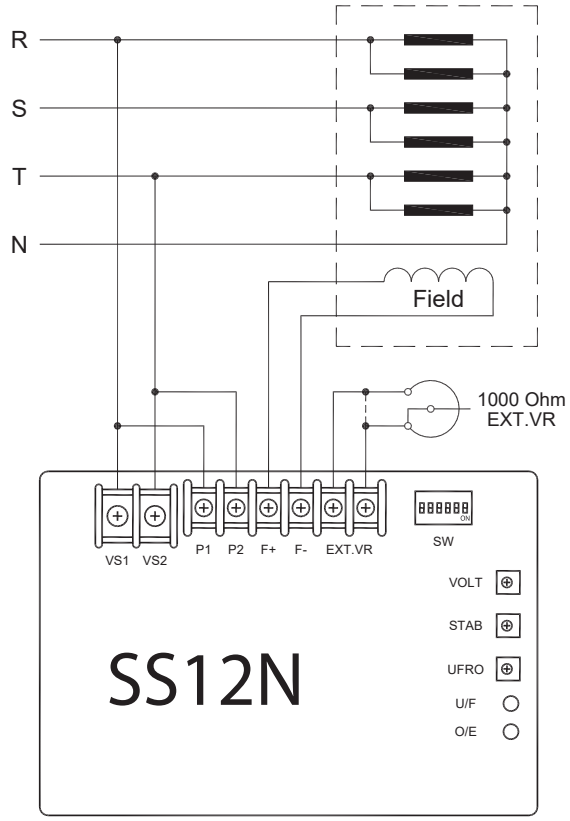


Figure 3 110/220 Vac

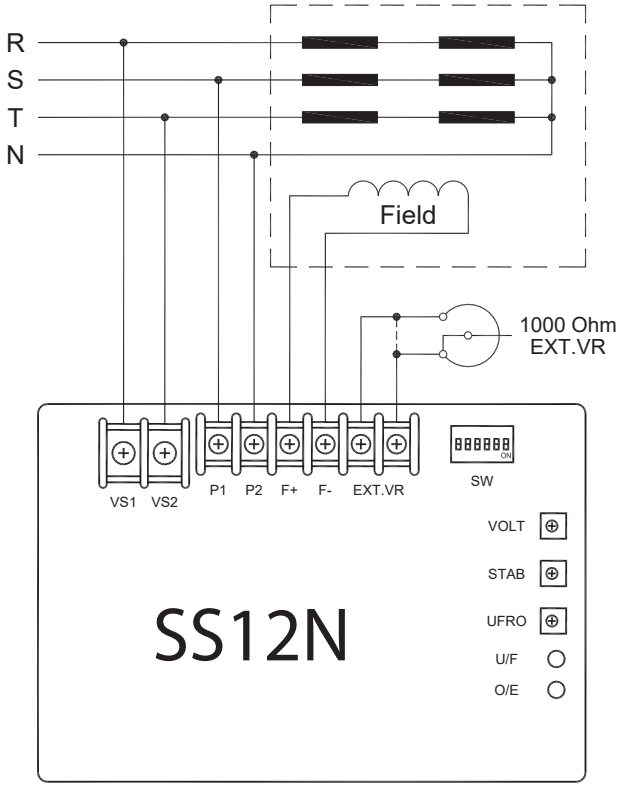


Figure 4 220/380/440 Vac

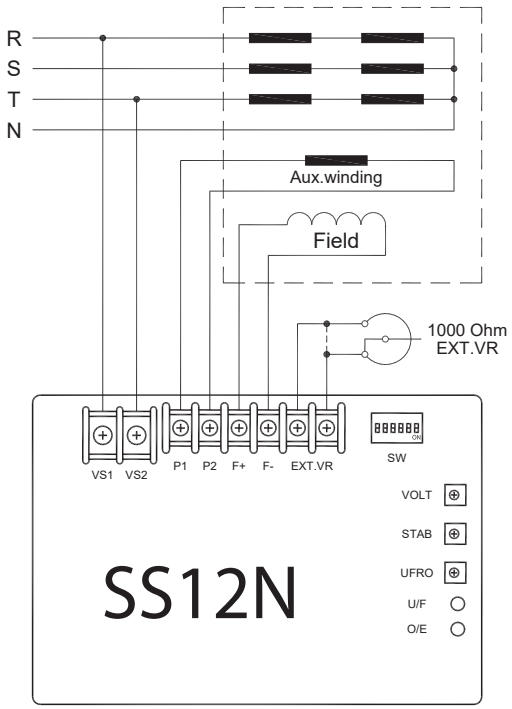


Figure 5 Auxiliary Winding

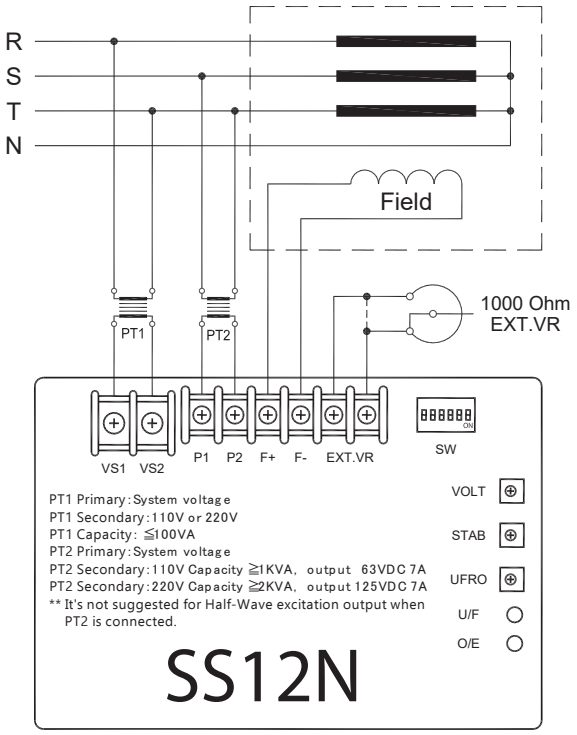


Figure 6 Medium/High voltage generator