ADVR-2100M

Universal Hybrid Analog-Digital Voltage Regulator Operation Manual

Hybrid Universal Analog / Digital 1 or 3 Phase 5 Amp Self Excited, Shunt, Auxiliary Winding, Harmonic Power or PMG Automatic Voltage Regulator Easy to Set-Up and Program Install Manual

KUTAI

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ISO 9001
ETC

SECTION 1 : SPECIFICATION

Sensing Input (E1, E2, E3) Average Reading

Voltage	220 – 600 Vac, 1 phase / 3 phase
	DIP switch setting
	180 – 280 Vac @ 220 Vac
	330 – 515 Vac @ 380 / 440 Vac
	420 – 660 Vac @ 480 / 600 Vac
Frequency	50/60 Hz, DIP switch setting

Power Input (P1, P2)

Voltage	60 – 300 Vac, 1 phase 2 wire
Frequency	50 – 500 Hz

Excitation Output (F+, F-)

110V 1 phase	Continuous	63 Vdc	5A
	Max. 90 Vdc 7A for 10 secs.		
220V 1 phase	Continuous	125 Vdc	5A
	Max. 180 Vdc 7A for 10 secs.		
220V 3 phase	Continuous	150 Vdc	5A
	Max. 215 Vdc 7A for 10 secs.		
Resistance	≧ 13 ohms @ power input 110 Vac		
	≧ 25 ohms @ power input 220 Vac		
	Max. 100 ohms		
Fuse Spec.	Slow blow 5 x 20 mm S505-5A		

External Voltage Adjustment (VR1, VR2)

Max. +/- 5%	@ 500 ohms 1 watt potentiometer
Max. +/- 10%	@ 1K ohm 1 watt potentiometer

Voltage Regulation

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

Build Up Voltage

5 Vac 25 Hz residual volts at power input terminal

Soft Start Ramp Time

4 seconds +/- 10%

Typical System Response

Less than 20 milliseconds

EMI Suppression

Internal electromagnetic interference filtering

Static Power Dissipation

Max.12 watts

Burden in SHUNT & PMG Wiring

550 VA @ power input 110 Vac
1100 VA @ power input 220 Vac

Quadrature Droop Input (C1, C2)

CT 1A or 5A greater than 5VA (DIP switch setting)
Sensitivity +/- 7% @ PF +/- 0.5 (Droop adjustable)

Analogue Voltage Input (A1, A2)

Input resistance greater than 2K ohms
Max. Input +/- 5 Vdc or +10 Vdc
Sensitivity 1 Vdc for 2.5% Generator Volts (adjustable)

Under Frequency Protection (Factory Presets)

50 Hz system presets knee point at 45 Hz
60 Hz system presets knee point at 55 Hz

Over Excitation Protection

Set point 125 Vdc +/- 4 % @ power input 220 Vac
Inverse-time curve. This function can be turned off.

Voltage Thermal Drift

Less than 3% at temperature range -40 to +70 ˚C

Under-Frequency Knee Point Thermal Drift

Less than +/- 0.1 Hz at -40 to +70 ˚C

Environment

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

Dimensions

150.0 (L) x 135.0 (W) x 55.5 (H) mm
5.91 (L) x 5.31 (W) x 2.19 (H) inch

Weight

470 g +/- 2%
1.04 lb +/- 2%

SECTION 2 : OUTLINE / SIZE / INSTALLATION REFERENCE

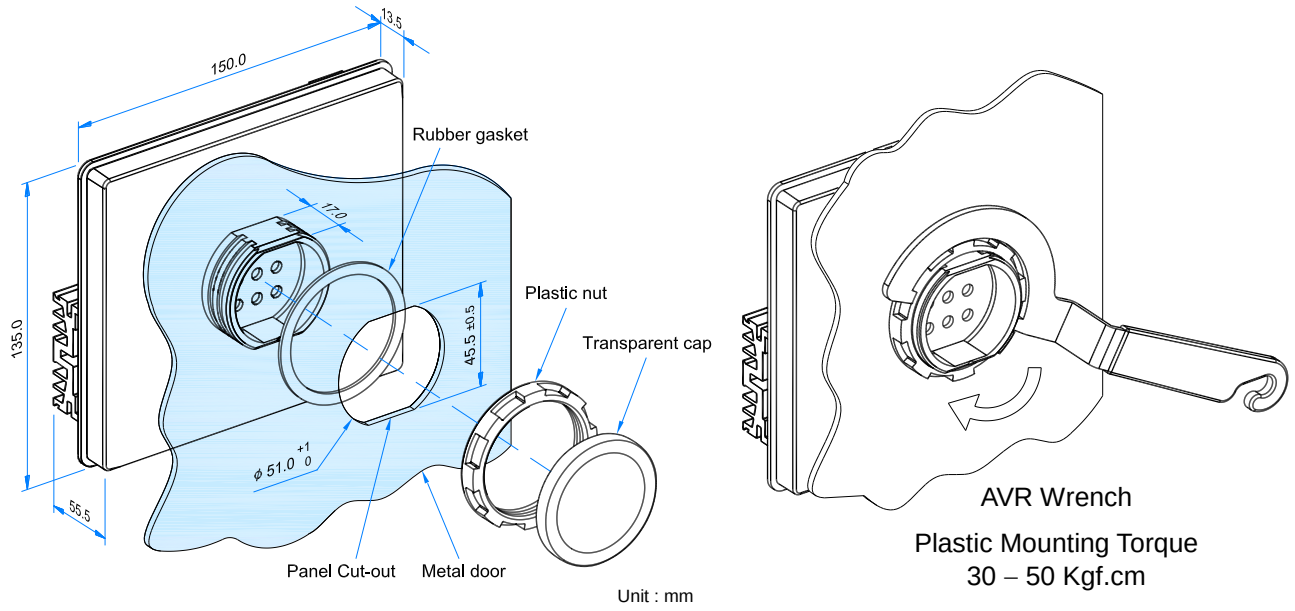
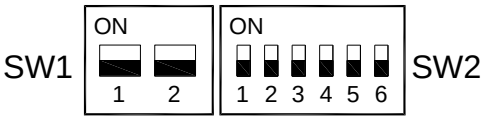


Figure 1 Outline Drawing

ATTENTION

1. **AVR can be mounted directly on the engine, genset, switchgear, control panel, or any position that will not affect operation. For dimension reference, please see Figure 1.**
2. **All voltage readings are to be taken with an average-reading voltmeter Meggers and high-potential test equipment must not be used. Use of such equipment could damage the AVR.**
3. **Terminal：“Fast-On” terminals 6.35 mm (1/4 inch).**
4. **Improper setting of under-frequency protection could cause the output voltage of the unit to drop or become unstable under with changes in load. Avoid making any changes to the U/F setting unless necessary.**

SECTION 3 : DIP SWITCH PROGRAMMING



SW1	1.OFF	2.OFF	220V	SW2	4.OFF 5.OFF <90KW
	1.OFF	2.ON	380V		4.ON 5.OFF 90~500KW
	1.ON	2.ON	480V		4.ON 5.ON >500KW

		OFF	ON
SW2	1	1 PHASE	3 PHASE
	2	60Hz	50Hz
	3	O/E PROTECT ON	O/E PROTECT OFF
	6	CT 1A	CT 5A

SW1
SW1-1 & SW1-2 Sets the Generators Sensing Voltage
SW2
SW2-1 Set Sensing for 1 or 3 Phase
SW2-2 Set Generator Frequency
SW2-3 Set Over Excitation Protection ON or OFF
SW2-4 & 5 Sets Generator Capacity
SW2-6 Sets Capacity of Droop CT

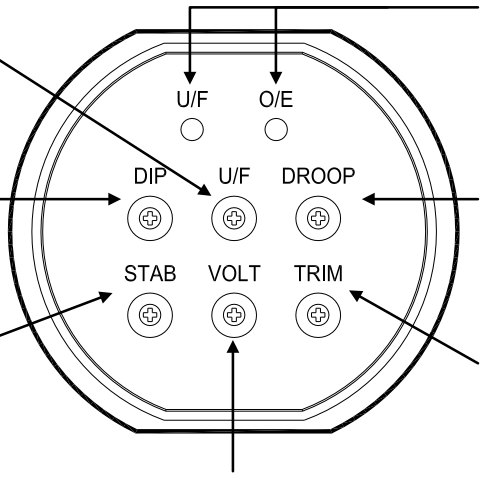
SECTION 4 : ADJUSTMENTS

U/F Under Frequency Protection Adjustment When generator speed falls below the knee point, the under frequency protection circuit will activate and the voltage and frequency begin to decrease in linear descend.

Select frequency 50 or 60 Hz according to the generator in use.

DIP U/F Dip Adjustment
When U/F protection is activated, the voltage droop ratio can be adjusted via this DIP (POT). The adjustable range is 3–10 V/Hz.

STAB Stability Adjustment
Correct stability adjustment must be conducted while the generator is operating without load. First adjust the STAB potentiometer (POT) anti-clockwise until the voltage becomes unstable, and then slightly adjust it clockwise (About1/5 turn). When the voltage just reaches the critical point (Knee point) of stabilization, where the voltage is stable yet very close to becoming unstable.



LED Indicator lit up when the generator is in U/F (Under Frequency Protection) and O/E (Over Excitation Protection).

DROOP Droop Adjustment
When paralleling, the AVR increase or decrease its voltage output, when phase current leads or lag the voltage. The increase and decrease range can be preset by the DROOP adjustment.

TRIM Trim Adjustment
When terminal A1 and A2 are biased with a DC voltage (0–10V), the TRIM is then used to adjust the influence on the output voltage of the AVR. If the TRIM (POT) is adjusted fully counter-clockwise, any bias voltage will not cause any influence. On the contrary if the TRIM is adjusted fully clockwise, then any signal will produce a maximum 10% effect.

VOLT Voltage Adjustment
Generator rated output voltage adjustment.

Must be in accordance with the DIP Switch SW1-1 & 2 voltage range setting.

Figure 2

SECTION 5 : WIRING CONNECTIONS

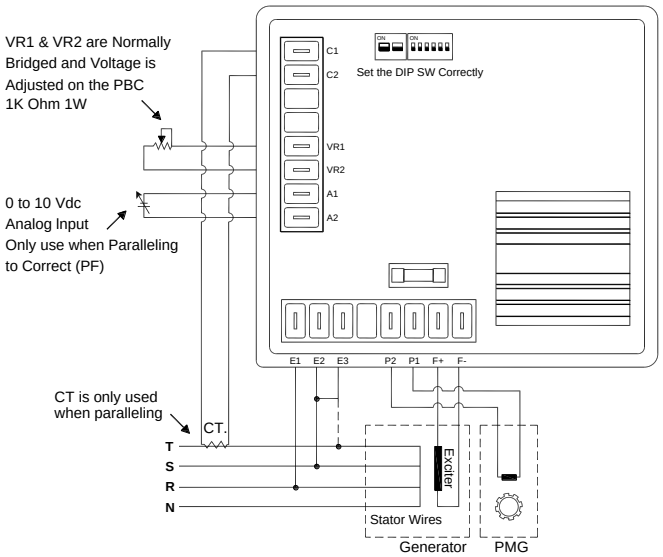


Figure 3 PMG Connection

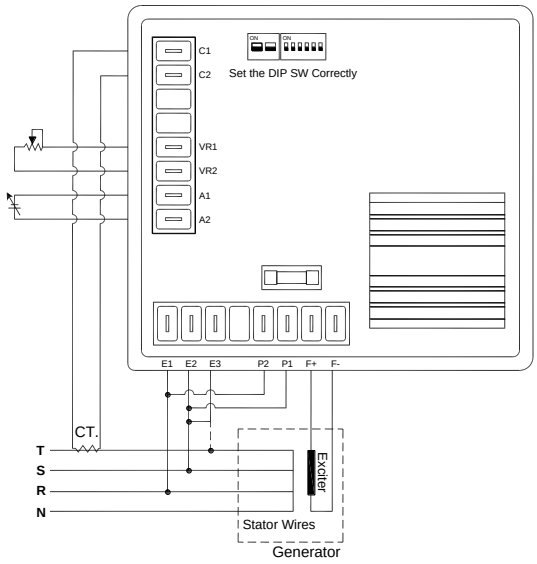


Figure 4 Shunt Connection (220V)

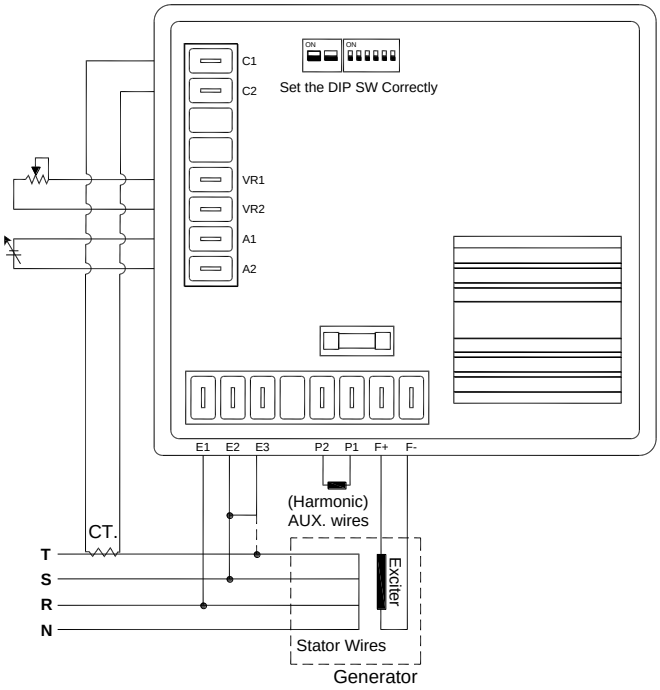


Figure 5 Auxiliary Winding (AUX.) Connection

ATTENTION

1. **All AC voltage readings are average value only.**
2. **Use a remote 500 ohms 1 watt external VR for +/- 5% adjustment range. (keep shorted if not used)**
3. **Use a remote 1K ohm 1 watt external VR for +/- 10% adjustment range.**
4. **Sensing Voltage can be set from 220 – 600 Vac Program SW1-1 & 2 correctly.**
5. **For single phase sensing bridge E2 & E3 and move SW2-1 to OFF.**
6. **If your PMG is not working you can also power the AVR in shunt using terminals P1 & P2 connected to the output of the generator as long as it's less than 277 Vac.**

※ Use only the replacement fuses specified in this user manual.

※ Appearance and specifications of products are subject to change for improvement without prior notice.