

1. SUMMARY

The ADVR-073 is an advance (Hybrid Analog/Digital Voltage Regulator) design for general-purpose isochronous applications. The ADVR-073 uses an reliable CPU (Central Processing Unit) in its design. This eliminates complex analogue components and circuits that are inherently over sensitive to temperature eliminating voltage instabilities and drift. In addition, we added over excitation and loss of

sensing shutdown protections, with matching U/F, O/E LED indicator lights. Consequently, this AVR prevents the generator from excitation overload, preventing exciter and regulator damage. It is easy to install and flexible for use in both shunt type and generators with auxiliary windings.

2. SPECIFICATION

Sensing Input

Voltage	170 ~ 520 VAC, 1 phase 2 wire DIP switch selectable
Frequency	50 / 60 Hz, DIP switch selectable

Power Input

Voltage	100 ~ 300 VAC, 1 phase 2 wire
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Output

Voltage	Max. 63 VDC @ 220 VAC input
Current	Continuous 7A Intermittent 15A for 10 sec
Resistance	9 to 100 ohm

Voltage Regulation

< $\pm 0.5\%$ (with 4% engine governing)

Voltage Build-up

Residual voltage at AVR terminal > 5 VAC

Thermal Drift

0.03% per $^{\circ}\text{C}$ change in AVR ambient

External Volts Adjustment

7% with 1K ohm 1 watt trimmer

EMI Suppression

Internal electromagnetic interference filtering

Unit Power Dissipation

Max. 8 watt

Under Frequency Protection (Factory Setting)

At 50 Hz - knee point set at 45 Hz
At 60 Hz - knee point set at 55 Hz

Over Excitation Protection

78 \pm 5VDC @220VAC 5sec

Soft Start Ramp Time

3 sec.

Dimensions

150mm L * 115mm W * 51.5mm H

Weight

430g \pm 2%

3. WIRING

3.1 A to C: Sensing Input

Y **DIP SW-2** is switch **ON**, voltage sensing from 170 to 260V (See Figure 2 & 3)

Y **DIP SW-2** is switch **OFF**, voltage sensing from 340 to 520V (See Figure 4)

3.2 B to C: Power Input

Power Input terminals from B to C use 100 to 300VAC shunt or from an auxiliary windings.

3.3 Power Input Voltage Selection

If generator rated voltage is 220VAC (Line to line phase voltage), the power input B, C and sensing input A, C can be joined (See Figure 3) or separately (See Figure 2).

9. TROUBLE SHOOTING

SYMPTOM	CAUSE	CORRECTION
No Voltage Output	Engine under speed	Please refer to generator service manual
	Low residual voltage	Please refer to section 7 "Field Flashing"
	B, C, F+, F-, Terminal connection Reference from Figure 2 ~ Figure 4 not properly connected	
	Defective generator	Please refer to generator service manual
Low Voltage Output	A, C, B, C, Terminal incorrect Reference from Figure 2 ~ Figure 4 connection	
	Defective VR or not properly connected	Check connection and VR
	Under frequency	Please refer to generator service manual
	Incorrect exciter specification	Please refer to generator service manual
	AVR Incorrect voltage selected	Please refer to section 3 "DIP Switch setting"
Blown Fuse	Over excitation current / incorrect Reference from Figure 2 ~ Figure 4 wiring	
Over Voltage Output	A, C, terminals not properly connected or incorrectly connected	Reference from Figure 2 ~ Figure 4
	AVR Incorrect voltage selected	Please refer to section 3 "DIP Switch setting"
Unstable Voltage Output	"STAB" Stability incorrectly adjusted	Please refer to section 5 "Adjustment"

ATTENTION

1. AVR can be mounted directly on the engine, genset, switchgear, control panel, or any position that will not affects 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.

10. FIGURE AND SIZE

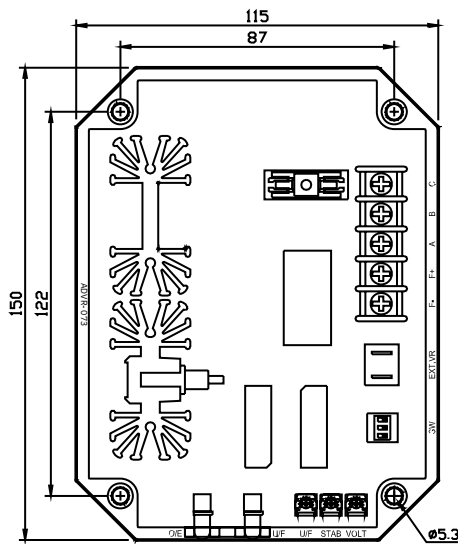
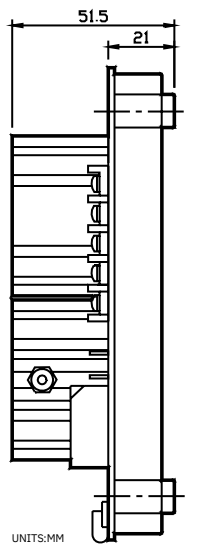
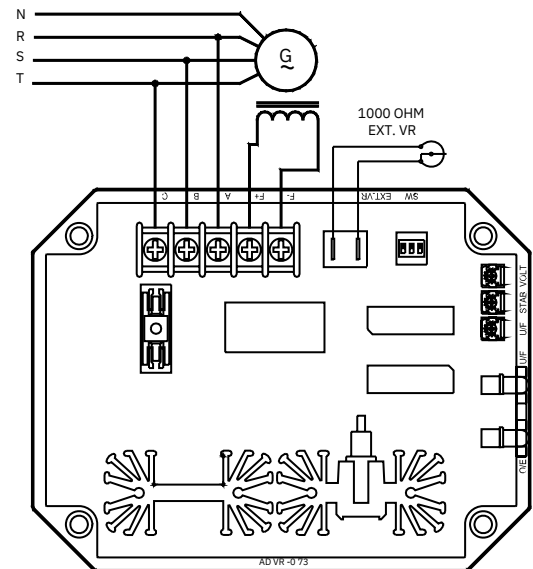


Figure 1



UNIT :mm



SW-2 ON 170 ~ 260VAC

Figure 2

3.4 F+, F- Connect generator field wires

Y F+ and F- are the positive and negative excitation output terminals.

Y EXT.VR are used to connect the external voltage adjustment rheostat, use a (1K ohm 1W) Rheostat. Keep terminals shorted, when not used.

Always use high quality wire AWG16 or 1.25mm2 85-degrees C, 600V to connection terminals A, B, C, F+ and F-.

4. DIP SWITCH SETTING

4.1 SW-1 Frequency

Y DIP SW-1 switch ON, for use in 50 Hz Y DIP SW-1 switch OFF, for use in 60 Hz

4.2 SW-2 Sensing Voltage Selection

Y DIP SW-2 switch ON, input voltage 170 to 260V
Y DIP SW-2 switch OFF, input voltage 340 to 520V

4.3 SW-3 Activate Over-Excitation Protection

Y DIP SW-3 switch ON the over Excitation Protection is disabled. If over excitation occurs, the O/E LED turns-on, but the ADVR will not shutdown and protect.

Y DIP SW-3 switch OFF Over Excitation Protection is activated. If over excitation occurs, the O/E LED turns-on and the ADVR will shutdown excitation.

5. System Protection

5.1 Under Frequency Protection (Roll off)

Y To prevent over excitation, or if the generator runs at the wrong speed the ADVR activates the under frequency protection and decreases field excitation.

Y (Factory preset @ 45Hz). Dip switch 1 together with the U/F adjustment, sets the Knee-Point frequency where activation takes place. This adjustment is already factory preset.

Y When engine frequency falls under the Knee-Point frequency setting, the U/F protection indication LED turn on. However, when the Generator frequency is higher than the Knee-Point frequency the LED turns off.

5.2 Why Over Excitation Protection?

Y If you are using a standard AVR and you overload the generator or the sensing wires get disconnected (when using the auxiliary powered winding) , the excitation voltage rapidly increase, causing severe damage to the AVR or exciter. The ADVR-053 has over excitation protection shutdown that cuts excitation at once.

Y When over excitation protection is activated and the excitation voltage exceeds $78 \pm 5\text{VDC}$ @220V for over 5 seconds, the AVR immediately shutdown the excitation output, leaving only the residual voltage output and turning on the O/E shutdown LED. To reset, the engine must come to a complete stop for at least 10 seconds and then restarted.

Y If over excitation protection is disabled, the warning LED indication turn on, but the excitation output is not disconnected.

6. ADJUSTMENT

6.1 VOLT: Voltage Adjustment

Y DIP SW-2 switch ON, input voltage 170 to 260V
Y DIP SW-2 switch OFF input voltage 340 to 520V

6.2 STAB: Stability Adjustment

Y careful adjust the STAB (Stability) adjustment, improves the AVR and generator feedback time to improve voltage stability.

6.3 U/F: Setting the under-frequency knee point

Y **DIP SW-1** set on **OFF**, set for 60Hz operation.
Y U/F adjustment range at 60Hz is from 50 to 60Hz
(Factory preset @ 55Hz).

Y **DIP SW-1** set to **ON**, set for 50Hz operation.
Y U/F adjustment range at 50Hz is from 40 to 50Hz