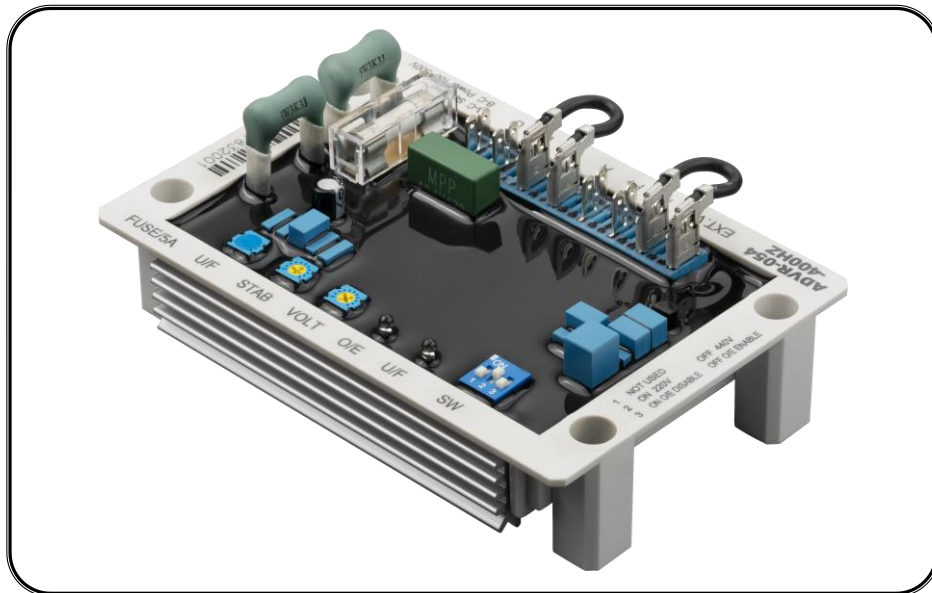


ADVR-054-400HZ

Universal Hybrid Analog-Digital Voltage Regulator Operation Manual



Universal 400Hz Intermediate Frequency
5 Amp Analog / Digital Voltage Regulator
For Aviation and Military Spec 400Hz Generators
Use with Kutai EP200 Paralleling Module for parallel operation



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WARNING

1. Some generators even when working at high voltage are factory set to sense at lower voltages. Remember to set the DIP SW 2 to the sensing voltage not the working voltage of the generator even do sometimes it can be the same. If you have a 480/277V generator but you have the sensing wires C and A connected to 240 Volts move DIP SW 2 to ON.

Another example are rental units with multi-voltage output with a switches for Y, YY, Delta & ZZ output, but sensing is always at 240V from T7 and T9 even though the generator is running sometimes at 480/277V.

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. 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 1 : SPECIFICATION

Sensing Input (A, C) Average Reading

Voltage	170 – 260 Vac @ 220 Vac 1 phase 2 wires 340 – 520 Vac @ 440 Vac 1 phase 2 wires 220/440 Vac, DIP switch setting
Frequency	320 – 420 Hz

Power Input (B, C)

Voltage	100 – 300 Vac, 1 phase 2 wires
Frequency	250 – 420 Hz

Excitation Output (F+, F-)

220V 1 phase Continuous	63 Vdc 5A Max. 90 Vdc 7A for 10 secs.
Resistance	Min. 15 ohms Max. 100 ohms
Fuse Spec.	Slow blow 5 x 20mm S505-5A

External Voltage Adjustment (EXT.VR)

Max. +/- 3.5% @ 1K ohms 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

3 seconds +/- 10%

Typical System Response

Less than 20 milliseconds

EMI Suppression

Internal electromagnetic interference filtering

Static Power Dissipation

Max.8 watts

Under Frequency Protection (Factory Presets)

400 Hz system presets knee point at 360 Hz

Over Excitation Voltage Protection

When excitation output is greater than 40% of the Power Input, O/E protection will activate and shutdown excitation output after 5 seconds. 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	5.0 Gs @ 60 Hz

Dimensions

121.0 (L) x 81.0 (W) x 44.5 (H) mm
4.76 (L) x 3.19 (W) x 1.75 (H) inch

Weight

270 g +/- 2%
0.6 lb +/- 2%

SECTION 2 : APPEARANCE / DIMENSIONS / INSTALLATION DRAWING

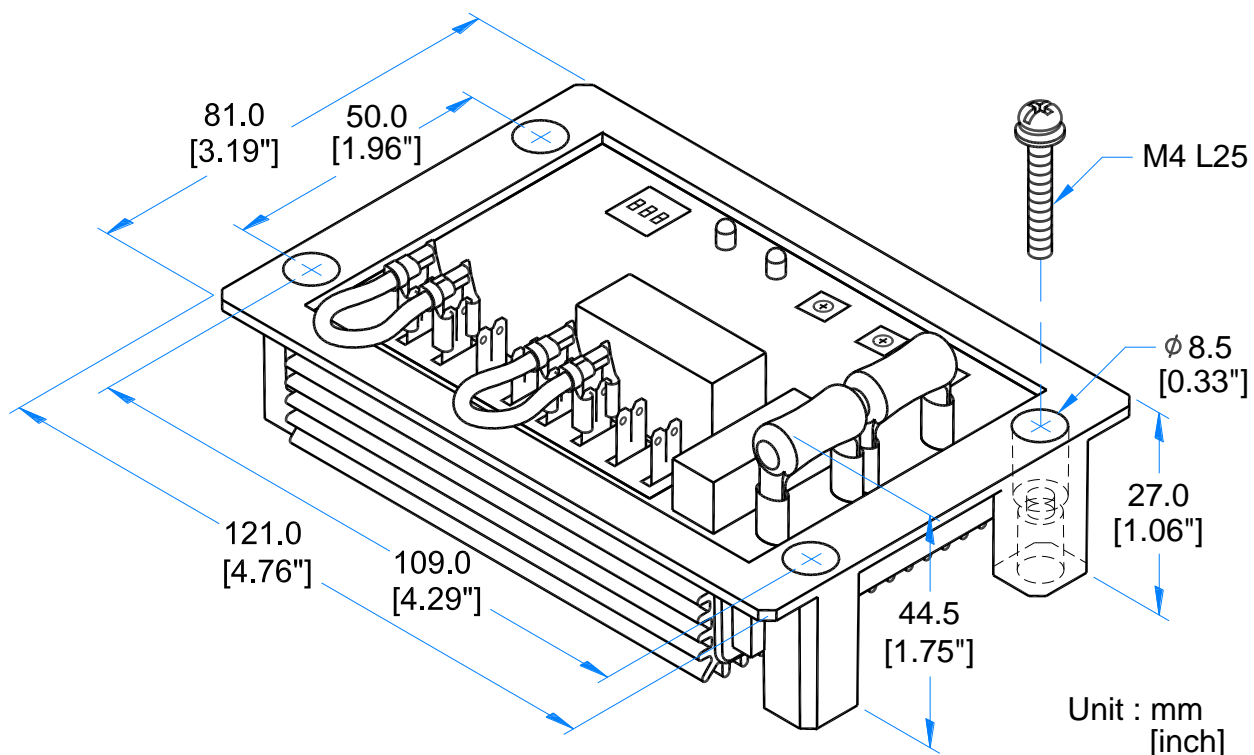


Figure 1 Outline Drawing

ATTENTION

1. Only qualified technicians should install and operate the AVR.
2. The voltage regulator may be installed at any suitable location on the generator set (dimensions are shown in Figure 1). It is recommended that unit is mounted vertically with the green resistors on the regulator upwards to achieve the best cooling effect.
3. All AC voltage sensing readings are average value only.

SECTION 3 : DIP SWITCH SETTINGS, LED INDICATORS AND ADJUSTMENTS

Over Excitation (O/E) LED

When the excitation voltage is greater than 35% of input power voltage, the LED will lit after 5 sec. If the DIP switch SW3 set at OFF then it will also shut off excitation output at the same time.

U/F LED

Under Frequency Protection status.

DIP Switches

SW1 no function

Sensing Input **SW2 ON:220V, OFF:440V**

O/E Protection **SW3 ON:Disable, OFF:Enable**

VOLT Voltage Adjustment

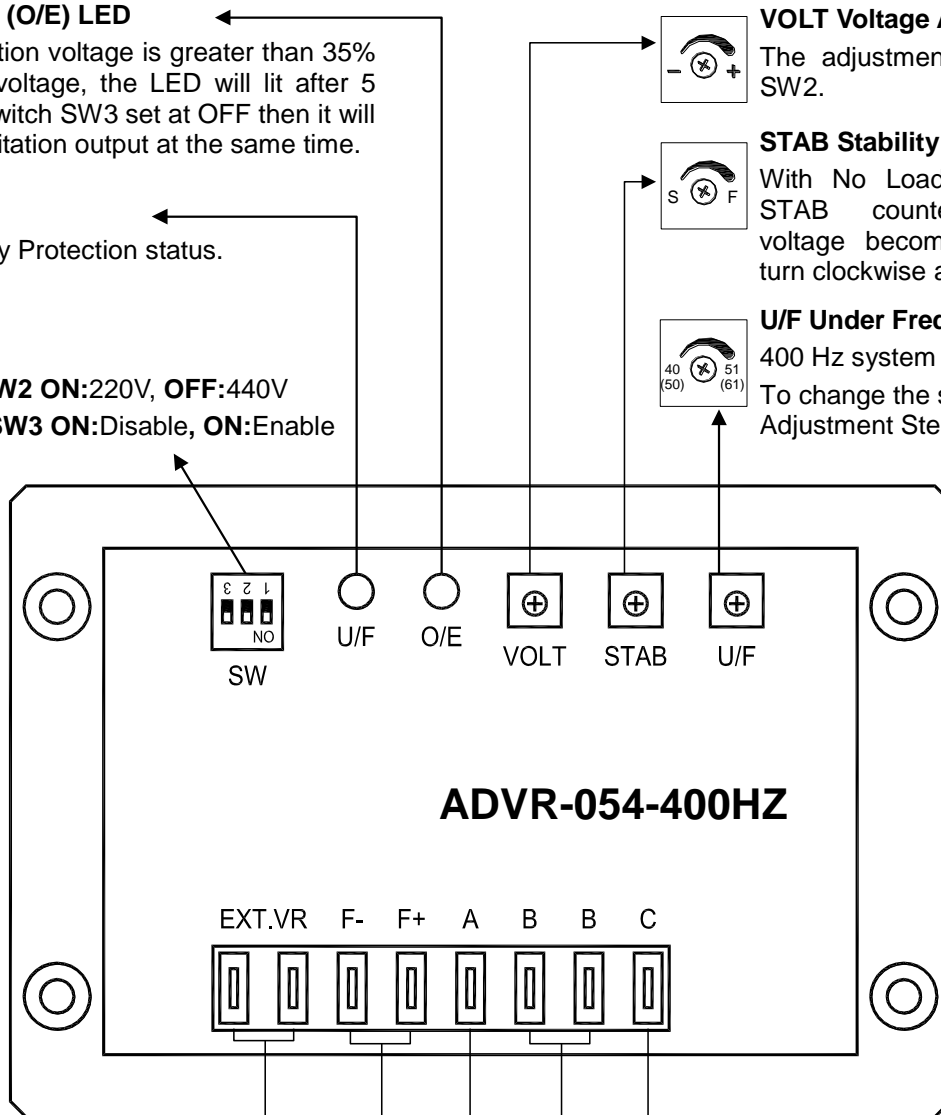
The adjustment range is set by SW2.

STAB Stability Setting

With No Load, slowly turn the STAB counterclockwise until voltage becomes unstable then turn clockwise about 1/5 turn.

U/F Under Frequency Protection

400 Hz system preset at 360 Hz, To change the setting, see the Adjustment Step 3.



EXT.VR Ext Potentiometer,

1K ohm 1W. Keep shorted when not in use.

F+ , F- : Connect to generator excitation field.

C : Sensing Input and Power Input terminals

B : Power Input terminal
B to C: always less than 300 Vac

A : Sensing Input terminal
A to C: 170 - 520 Vac

ADJUSTMENTS AFTER GENERATOR IS STARTED :

1. First, turn VOLT and STAB trim pots fully counterclockwise before starting the generator. Set the engine governor to 50 or 60 Hz. Start the generator and wait till it reaches rated speed. Now slowly turn VOLT trim pot clockwise to increase the working voltage. (If you use an external potentiometer, set it to the center position). Keep EXT. VR shorted when not in use.
2. Next, slowly adjusting the STAB trim pot setting (clockwise), this change the response time of the AVR to changing loads. If the setting is too high the voltage is unstable but if set too low the response is sluggish. We recommend using an analog DC voltage meter on F, F+ and adjust STAB for the lowest amount of voltage fluctuation (needle movement).
3. Last, Under Frequency (U/F) adjustment. (The U/F is Factory preset and needs no adjustments) put in rare applications. Use the U/F LED as a guide. When this LED is ON the circuit is operational turning off the regulators output. To recalibrate, adjust the generator speed to the new U/F kneel point, usually 5 Hz under rated speed (Hz) then set the U/F trim-pot to the point at which the U/F LED just changes from off to on rated speed (Hz) then set the U/F trim pot to the point at which the U/F LED just changes from off to on. Adjustment range for 400Hz system is 420 to 320 Hz.

SECTION 4 : CONNECTION DIAGRAMS

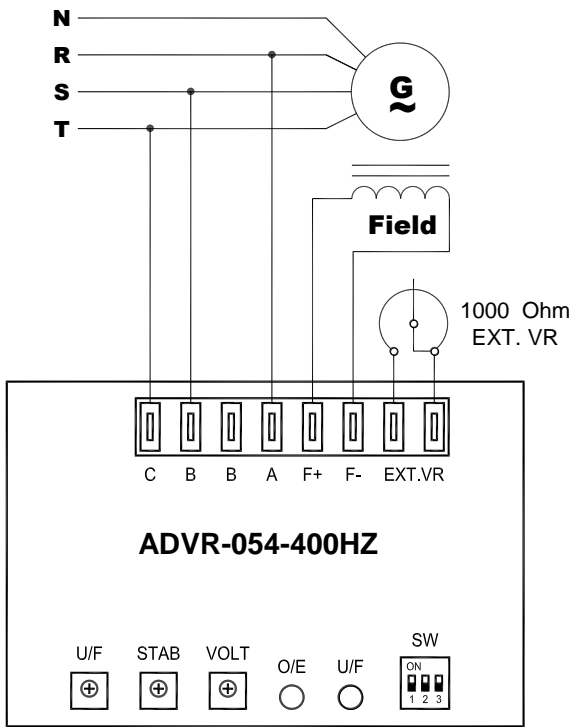


Figure 3 208/220V sensing connection

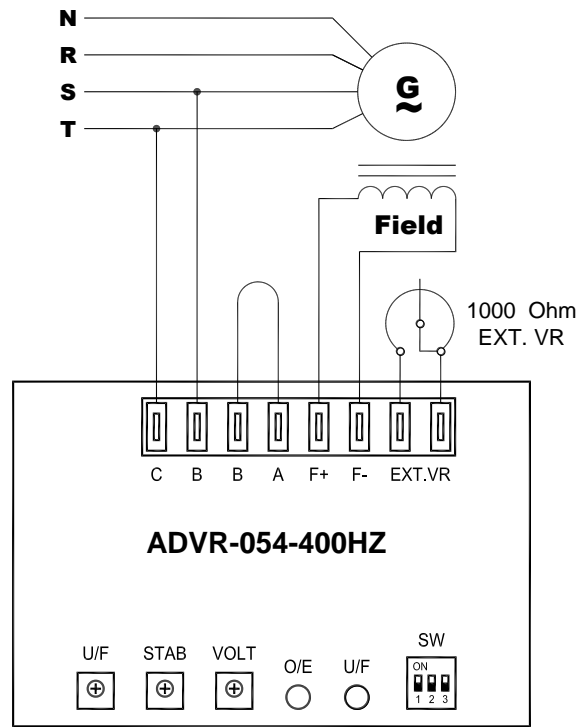


Figure 4 220/240V sensing connection

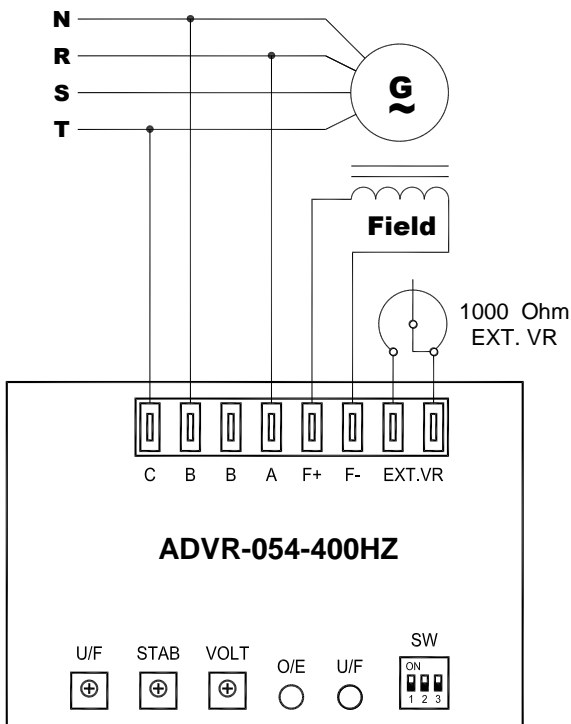


Figure 5 380/440/480V sensing connection

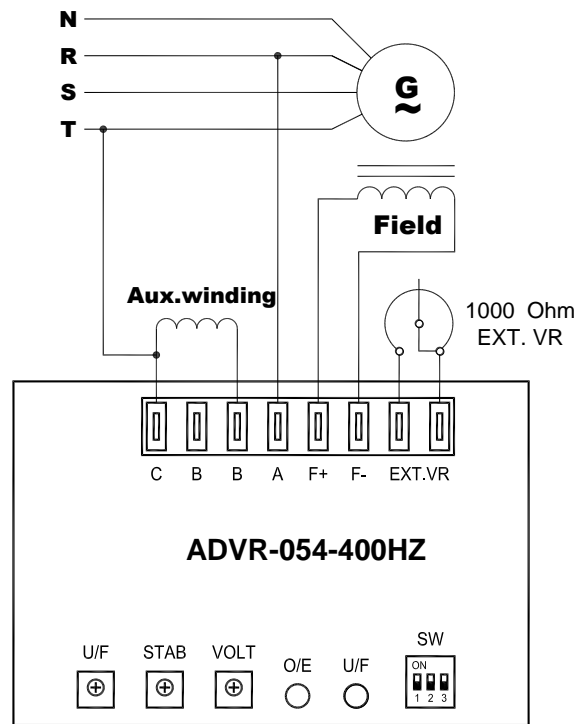


Figure 6 Auxiliary Winding connection

- ※ Package include 4 pcs of M4 L25 Round head bolts and 2 pcs of terminal jumpers.
- ※ Use only replacement fuses specified in this user manual.
- ※ Appearance and specifications of products are subject to change for improvement without prior notice.