

BN440S AUTOMATIC VOLTAGE REGULATOR (AVR)

1. Technical parameters:

Project	Parameter content
Sensing and power input	Voltage: 200(180~220)/400(360~440)VAC Single phase two wire jumper copper strip selection Frequency: 50/60Hz selectable.
Output	Voltage 82 VDC@ 200VAC Electric current: continuity 4A, Intermittent 7.5A for 10 secs Output impedance: 10ohms minimum
Voltage regulation accuracy	≤ ±1% @Engine speed varies between4%
Response time	20ms, 80ms @ 90% excitation output
Temperature stability	Voltage drift 0.02% per °C change
External voltage regulation	±8% with 1 k ohm 1 watt trimmer
Analog input	Maximum ± 5V/input impedance 1K Ω, generating voltage change 5% @ 1V
DROOP	Maximum sensitivity 5% voltage drop @ PF=0, 0.07A, maximum input 0.33A
Low frequency protection inflection point/slope	90~92% of rated operating frequency, and the generating voltage drops by 12VAC/HZ
Overexcitation voltage protection point	65~70VDC、10~15S
Slow voltage build up time	2S
Minimum build up voltage	Residual magnetic voltage above 4 VAC is required at AS440B input terminal
Frequency compensation	Built in frequency protection circuit with output voltage dropping when engine speed drops
Installation dimensions	145mm L * 110mm W * 39mm H
Operating temperature/humidity	-40°C~70°C / <95%@ 0-70°C
Weight	0.4KG ±2%

2. Function adjustment description:

Controller	Function	Describe
VOLTS	Adjust generator output voltage	Increase the output voltage clockwise
STAB	Prevent voltage swing	Clockwise increases stability
UFRO	Set low-frequency protection point	Reduce the frequency of protection point clockwise
DROOP	et droop to 5% under full load OPF	Increase droop clockwise
TRIM	Optimize sensitivity to analog input	Increase the control of accessories on AVR clockwise
EXC	Set overexcitation protection voltage value	Increase the protection point voltage clockwise

3.Commissioning:

Set low frequency protection(UFRO)

- 3.1. When using at 50Hz, insert the "jumper copper" between C and 50Hz, and when using at 60Hz, insert the "jumper copper" between C and 60Hz.
- 3.2. UFRO knob is used to set the frequency inflection point value of low-frequency protection, and the setting steps are as follows:
 - (1) Allow the engine to start and the voltage to build.
 - (2) Adjust the engine speed to the required low frequency value.
 - (3) Slowly adjust the UFRO knob to make the red low frequency indicator light on (the factory setting is 45Hz at 50Hz and 55Hz at 60Hz).

Voltage regulation(VOLTS)

- 3.3. Adjust the "voltage adjusting knob" to the rated value (increase clockwise).
- 3.4. When using external adjustment, please connect a potentiometer 1000 Ω /1W between "1" and "2"
- 3.5. Before running the generator, turn the VOLTS "voltage adjusting knob" counterclockwise to the bottom.
- 3.6. If the remote voltage regulation function is used, adjust the external potentiometer to the middle position.
- 3.7. Adjust to the middle position stably.
- 3.8. Connect a voltmeter to the generator output terminal (the scale of the voltmeter must be greater than the rated voltage of the generator).
- 3.9. Start the generator and make the speed reach the rated frequency of 50~53Hz or 60~63Hz under no-load condition.
- 3.10. If the red indicator on AVR lights up, it indicates that the frequency is too low
- 3.11. Slowly adjust the VOLT button on the BN440S (clockwise) to the rated voltage. If the voltage is unstable, slowly adjust the STAB button on the BN440S to stabilize the voltage

Stable regulation (STAB)

- 3.12. The regulation of "stable regulation" can stabilize the output voltage of the generator, but excessive regulation will increase the instantaneous voltage variation rate of the generator under heavy load.
- 3.13. It is recommended to use a multimeter (pointer type) DC voltage range to detect the magnetic field voltage, and slowly adjust the "stable adjustment" to stop the adjustment at the lowest point of the magnetic field voltage wobble. This is the best "stable" coordination point between the generator and BN440S.

Droop adjustment(DROOP)

- 3.14. It has the function of load current compensation. When the remote voltage will drop slightly under load, it can be compensated through S1 and S2 of CT. When the CT secondary S1 and S2 generate 1A, and PF0.8, DROOP can compensate 0~5% of the rated voltage
- 3.15. Voltage trimming: Apply the output signal of VAR/PF controller to the A1 and A2 terminals on the BN440S to correct the set voltage of the BN440S. Adjust TRIM clockwise to the maximum range, and vice versa.

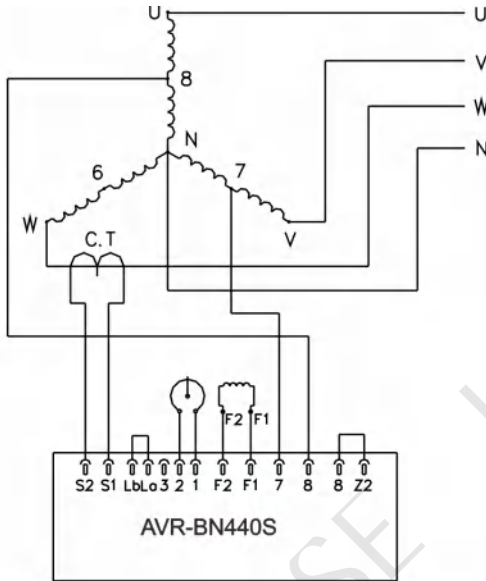
Excitation(EXC)

When the generator set is used for the first time or the remanence disappears or the + and - poles of the magnetic field connecting line are reversed, the remanence voltage is less than 5VAC, which is not enough to make the regulator plate establish voltage. Please stop the generator and perform the following operations.

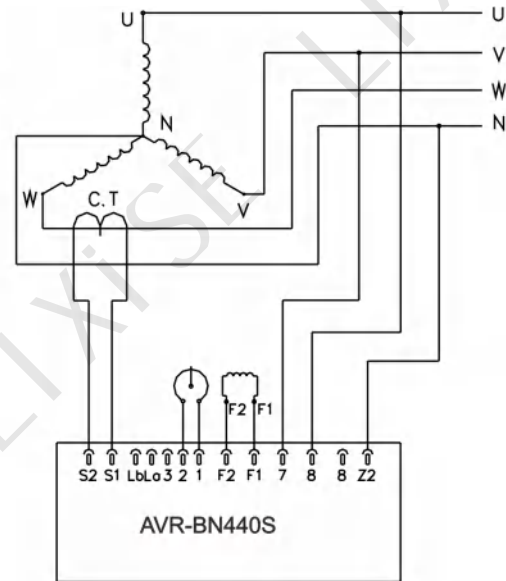
- 3.16. Stop the generator set, remove the BN440S magnetic field connecting wire+, - and connect the positive pole of a set of DC power supply (3~12VDC) to the generator magnetic field+, and connect the negative pole with a current limiting resistance of 3~5 Ω /20W (the battery can be used as the DC power supply).
- 3.17. For example, the above current on time is about three seconds.
- 3.18. Remove the AC power connection line on the BN440S, and start the generator (to the rated speed) to detect whether the remanence voltage (generator output terminal) is greater than 5VAC. If yes, restore all BN440S wiring, and restart the generator to successfully establish the voltage. If the remanence is still less than 5VAC, repeat 3.16 - 3.17.

Warning: Over excitation may damage BN440S or generator excitation coil.

4.Wiring:

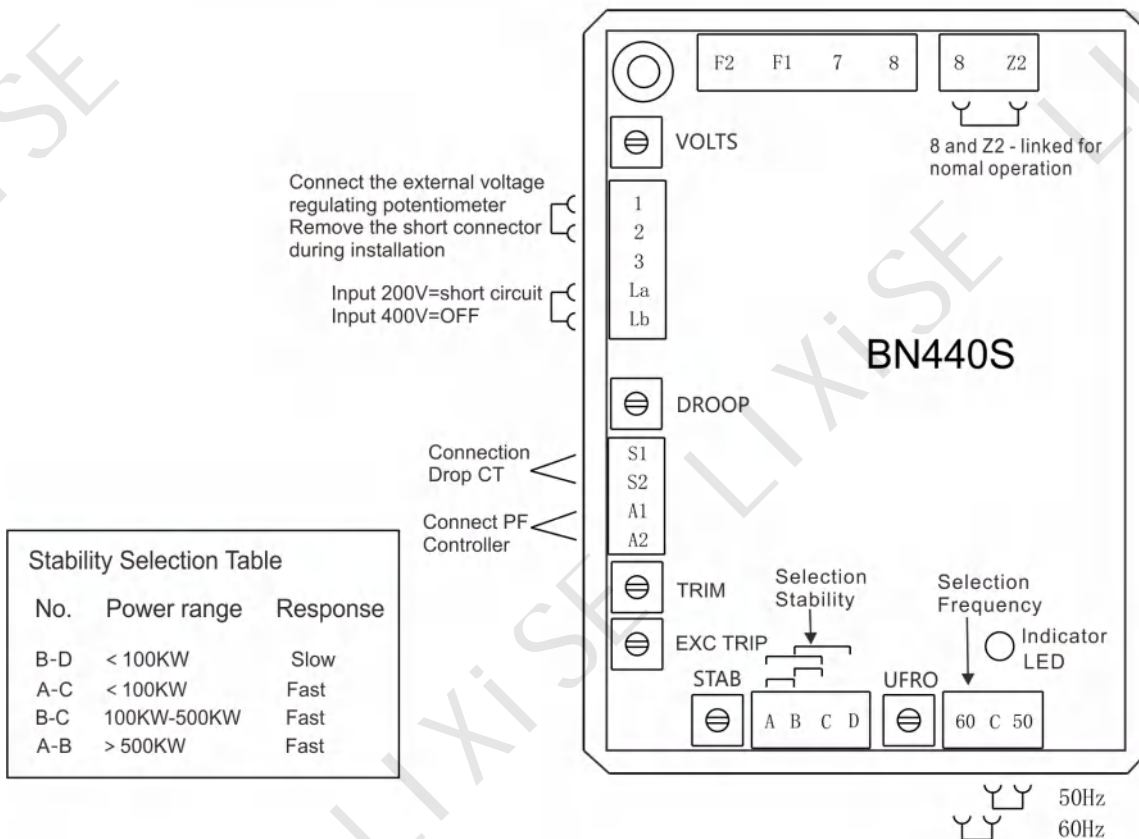


12-head lead motor, 240/415V or 277/480V
three-phase four-wire connection diagram



6-head lead motor, 240/415V
3-phase 4-wire connection diagram

Warning! Power input voltage is not allowed to exceed 264Vac



Stability Selection Table

No.	Power range	Response
B-D	< 100KW	Slow
A-C	< 100KW	Fast
B-C	100KW-500KW	Fast
A-B	> 500KW	Fast

Refer to wiring diagram

Be careful!

1. When there is no external VR, 1 and 2 must be short circuited across.
2. When the red (LED) indicator lights up, it means that the output voltage will drop due to the action of the low-frequency protection circuit if the frequency is insufficient in this condition, so as to prevent excessive excitation current from damaging the magnetic field stator coil.