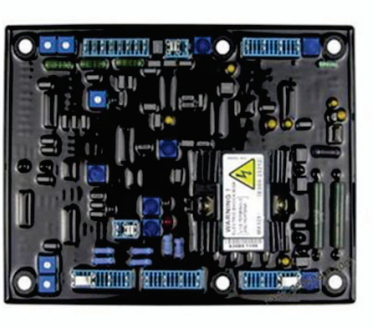
MX321 Voltage Regulator

BLUE STAR Power Systems Inc.

MX321 is a three phase sensed Automatic Voltage Regulator and forms part of the excitation system for a brush-less generator. Excitation power is derived from a three-phase permanent magnet generator (PMG), to isolate the AVR control circuits from the effects of nonlinear loads and to reduce radio frequency interference on the generator terminals. Sustained generator short circuit current is another feature of the PMG system.



Voltage Adjustment

The screwdriver adjustable potentiometer adjusts the generator output voltage. Adjustment clockwise increases the generator output voltage.

When using a remote voltage adjust rheostat, remove the jumper wire across terminals 1 and 2 and install a 1k ohm 1 watt rheostat. This will give ±10% voltage variation from the nominal.

Stability Adjustment

The AVR includes a stability or damping circuit to provide good steady state and transient performance of the generator.

A jumper link selector is provided to optimize the response of the stability circuit to various size generators. The link should be positioned as shown in the diagram according to the kW rating of the generator.

The correct setting of the Stability adjustment can be found by running the generator at no load and slowly turning the stability control anti-clockwise until the generator voltage starts to become unstable.

The optimum or critically damped position is slightly clockwise from this point (i.e. where the machine volts are stable but close to the unstable region).

Under Frequency Roll Off (UFRO) Adjustment

The AVR incorporates an underspeed protection circuit which gives a volts/Hz characteristic when the generator speed falls below a presettable threshold known as the “knee” point.

The red Light Emitting Diode (LED) gives indication that the UFRO circuit is operating.

The UFRO adjustment is preset and sealed and only requires the selection of 50 or 60Hz and 4 pole or 6 pole, using the jumper link as shown in the diagram.

For optimum setting, the LED should illuminate as the frequency falls just below nominal, i.e. 47Hz on a 50Hz system or 57Hz on a 60Hz system.

Specifications

Sensing Input	
Voltage	190 to 264VAC max, 1 or 3 phase
Frequency	50 to 60 Hz Nominal
Power Input (PMG)	
Voltage	170 to 220VAC, 3 phase
Current	3A
Frequency	100 to120 Hz Nominal
Output	
Voltage	max 120VDC
Current	Continuous 3.7A Intermittent 6A for 10 secs
Resistance	15 ohms Minimum
Regulation +/- 0.5% RMS	
Thermal Drift 0.02% per 1ºC change in AVR ambient	
Soft Start Ramp Time 0.4 - 4 seconds	
Typical System Response	
AVR Response	10 ms
Field current to 90%	80 ms
Machine Volts to 97%	300 ms
External Voltage Adjustment +/-10% with 1k ohm 1 watt trimmer	
Under Frequency Protection	
Set point	95% Hz
Slope	100 to 300% down to 30 Hz
Max. Dwell	20% volts/S Recovery
Unit Power Dissipation 18 watts Maximum	
Analog Input	
Maximum input	+/- 5VDC
Sensitivity	1V for 5% Generator Volts (Adjustable)
Input resistance	1k ohm
Quadrature Droop Input 10 ohms Burden	
Max. sensitivity	0.22A for 5% Droop 0PF
Max. input:	0.33A
Current Limit Input 10 ohms burden	
Sensitivity range	0.5 to 1A
Over Voltage Detection Input 10 ohms Burden	
Set point	300V Time Delay: 1 sec (Fixed)
CB trip coil volts	10 to 30VDC
CB trip coil resistance	20 to 60 ohms
Time delay	1 second (Fixed)
Over Excitation Protection	
Set point	75VDC
Time delay	8 to 15 seconds (Fixed)