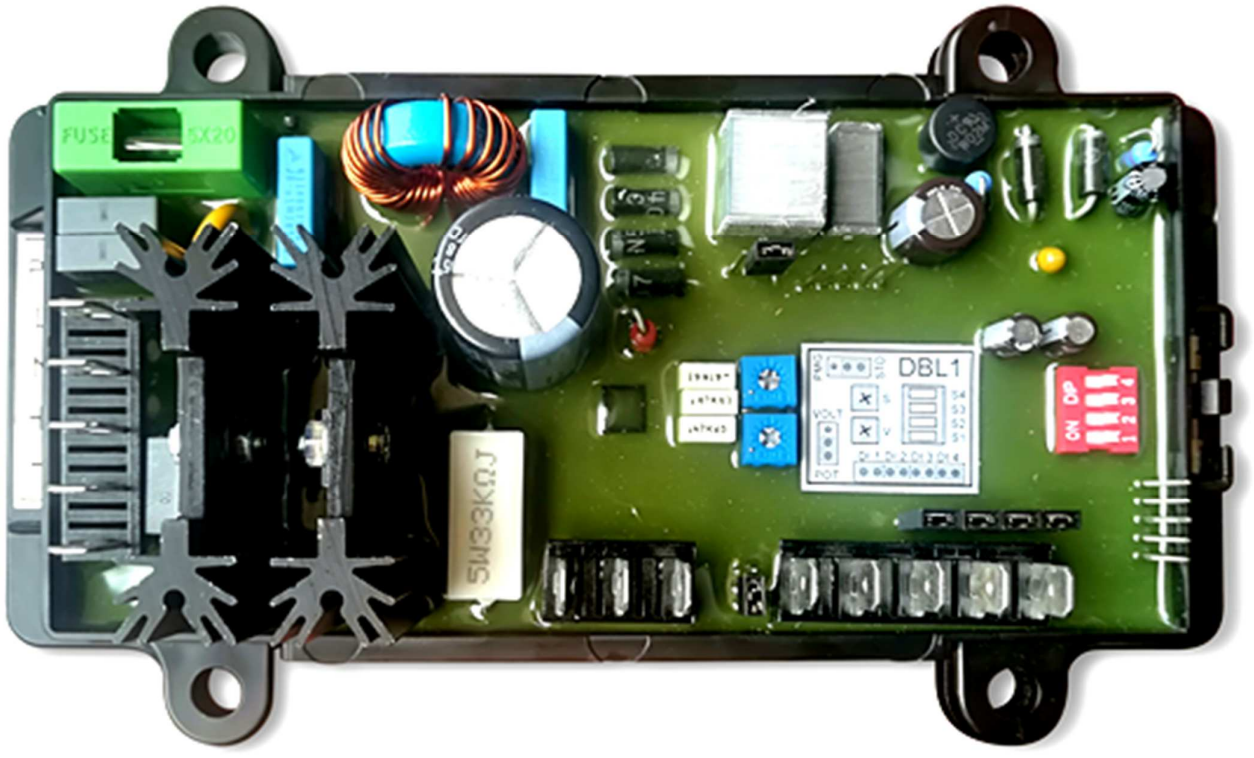
DBL1

Digital AVR

Automatic Voltage Regulator

OPERATION MANUAL



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GENERAL FEATURES

SINCRO DBL1 AVR is member of a family of digital microprocessor-based voltage regulators designed for using on 50/60Hz brushless alternators. DBL1 regulates the output voltage of an alternator by controlling the current into the alternator exciter field. Modular architecture enables optimization for different applications.

- Automatic voltage regulation.
- EMI filter.
- Fuse and spare fuse included.
- Protection against overvoltage.
- Under frequency selection and adjustment.
- 1 phase or 3 phase sensing.
- Excitation limit.
- Digital Inputs – jumpers.
- Communication port.
- Remote voltage regulation.
- Programmable by OEM: Set point, Under frequency, Excitation limit.
- Optional Sincro AVRTerm communication software to configure the controller, get alerts and know the voltage evolution real-time
- Setting of excitation type (standard or PMG)
- Adjustment of Set Point also with trimmer.
- Adjustment of Control Gains with trimmer.

UNDER FREQUENCY SELECTION AND ADJUSTMENT

When generator frequency drops below the selected knee frequency set point, the regulator automatically adjusts the voltage set point so that generator voltage follows V/Hz curve.
When operating on the V/Hz curve, the UNDERFREQUENCY ACTIVE indicator lights (see AVRTerm software).
The knee frequency is adjustable from 40 to 58Hz in 0,5Hz increments.

OVER VOLTAGE PROTECTION

The regulator monitors the sensed generator output voltage.
If voltage is over the limit value, the AVR is in the GENERATOR OVERVOLTAGE alarm status in Windows software.

EXCITATION LIMITING

The excitation limit is adjustable from 0 to 100% in 0.1% increments.
When the over excitation limit is exceeded, the AVR is in the EXCITATION LIMIT alarm status in Windows software.
During alternator short-circuit, excitation is at maximum limit value.

COMMUNICATION PORT

The communication port provides the interface for user programming (set up), supervision and test with PC or any another HOST computer.

WINDOWS COMMUNICATION SOFTWARE

SINCRO AVRterm is a PC software for communication with a family of digital microprocessor-based voltage regulators using Windows operating system.
It is user friendly, multi language with interactive WIN Help.
When supplied, it is ready for immediate use.

3-PHASE SENSING INPUT

Generator voltage is monitored at terminals A, B, and C. Nominal voltages of up to 500 Vac may be sensed at these terminals. Voltage applied to these inputs is scaled and conditioned before being applied to the input of the ADC.
The voltage signal from phase C and A (VC-A) of the generator is used by the ADC to calculate the Rms value of generator voltage across phases C and A.
Likewise, the voltage signal from phase C and B (VC-B) of the generator is used by the ADC to calculate the Rms value of generator voltage across phases C and B.
The Rms value of generator phase B to phase A voltage (VB-A) is calculated by the microprocessor from the phase C to phase A signal (VC-A) and the phase C to phase B (VC-B) signal.
Additionally, the generator phase C to phase A (VC-A) signal is applied to a filtered zero cross detector circuit. This signal is applied to the microprocessor and is used to calculate generator frequency.

OPERATING TEMPERATURE

-25°C to +70°C

STORAGE TEMPERATURE

-40°C to +85°C

ELECTRICAL SPECIFICATIONS

DC OUTPUT POWER
5 Adc at 75 Vdc (375W) maximum continuous
8 Adc at 120 Vdc (960W) forcing 10s.

EXCITER FIELD DC RESISTANCE
10 ohms, minimum; 50 ohms maximum.

AC POWER INPUT
Operating range: 95 Vac to 140 Vac, ±10%, Single phase, 50/60 Hz.

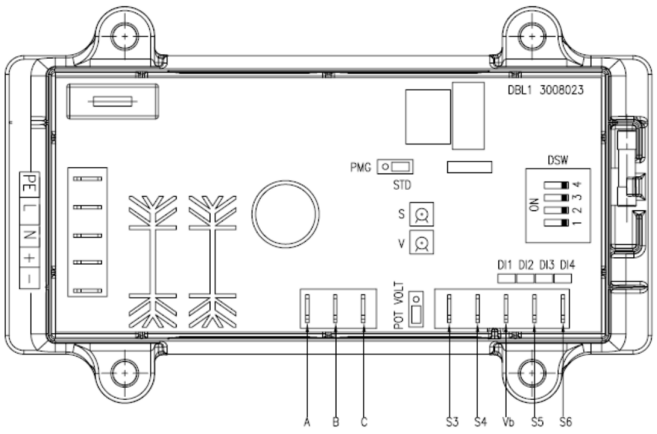
SENSING INPUT
90 to 500Vac, 50/60 Hz.

VOLTAGE ADJUST RANGE
Set point is from 115 to 430Vac.
With on board trimmer or external potentiometer is possible change voltage in a range more than 20%.

REGULATION ACCURACY
Better than ±0,5% no load to full load.

SELF EXCITATION WAKE UP VOLTAGE
Less than 4V.

CONNECTIONS



PE - Ground of Power Section
L, N - Input for Power
+, - - Field Output

A, B, C - PHASES OF SENSING (U, V, W); For single phase (1F) sensing one of the phases should be connected to A and B and another to C.

S3, S4 - EXTERNAL POTENTIOMETER (20K Ohm) or ANALOG INPUT for remote control.
To configure S3, S4 as ANALOG INPUT put jumper POT VOLT in position VOLT.
S4 is ground and S3 + voltage.
Range is adjustable with the trimmer V, up to 10Vdc.
Standard range is 0 to 3Vdc.
To adjust range, put V trimmer in max CW position. Turn on the alternator.
Alternator voltage will be minimal. Connect half of voltage range on S4 S3 input.
With V trimmer adjust alternator voltage to middle of range.
For example, to adjust 0 to 5V range at 400V alternator, connect 2.5V and adjust alternator voltage to 400V.

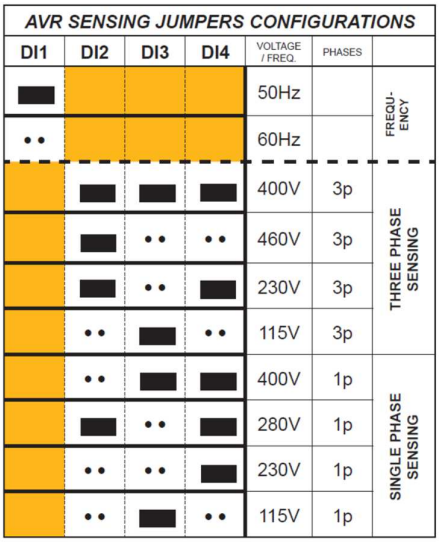
Vb - Plus pole of 9V – 12V battery. Minus pole of battery is at S4.
Battery supply is ONLY for setting, programming and testing AVR.

S5, S6 - For future use.

PMG configuration jumper is for using PMG excitation system.

VOLT configuration jumper for remote control ANALOG INPUT.

Sensing configuration jumpers **DI1, DI2 DI3** and **DI4**:



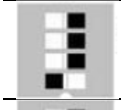
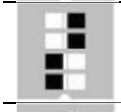
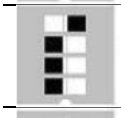
AVR SENSING JUMPERS CONFIGURATIONS						
DI1	DI2	DI3	DI4	VOLTAGE / FREQ.	PHASES	
▬				50Hz		FREQU-ENCY
••				60Hz		
	▬	▬	▬	400V	3p	THREE PHASE SENSING
	▬	••	••	460V	3p	
	▬	••	▬	230V	3p	
	••	▬	••	115V	3p	
	••	▬	▬	400V	1p	SINGLE PHASE SENSING
	▬	••	▬	280V	1p	
	••	••	▬	230V	1p	
	••	▬	••	115V	1p	

TRIMMERS

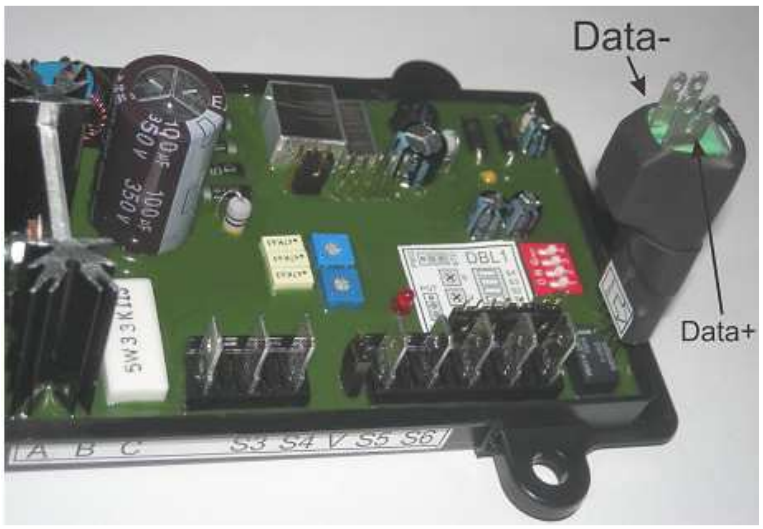
V - Voltage or range for remote control input.

S - Trimmer for adjusting stability. Rotating in CCW direction, value of Control Gains decreasing, output alternator voltage is more stable, but the response to the load is slower and transition time is longer (recommended for big alternator).

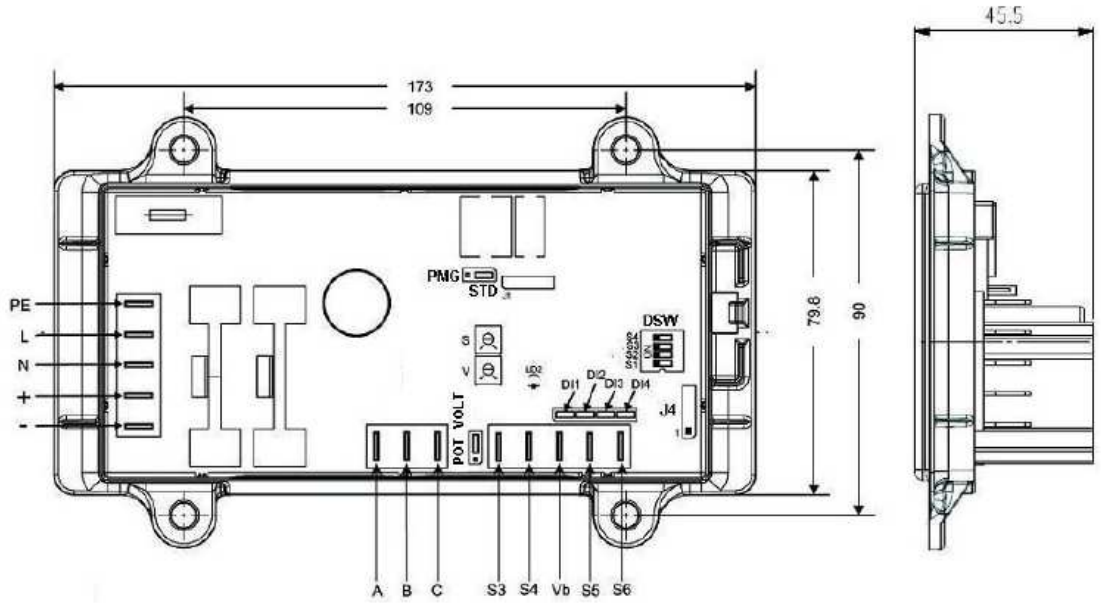
DSW is DIP switch for changing stability range:

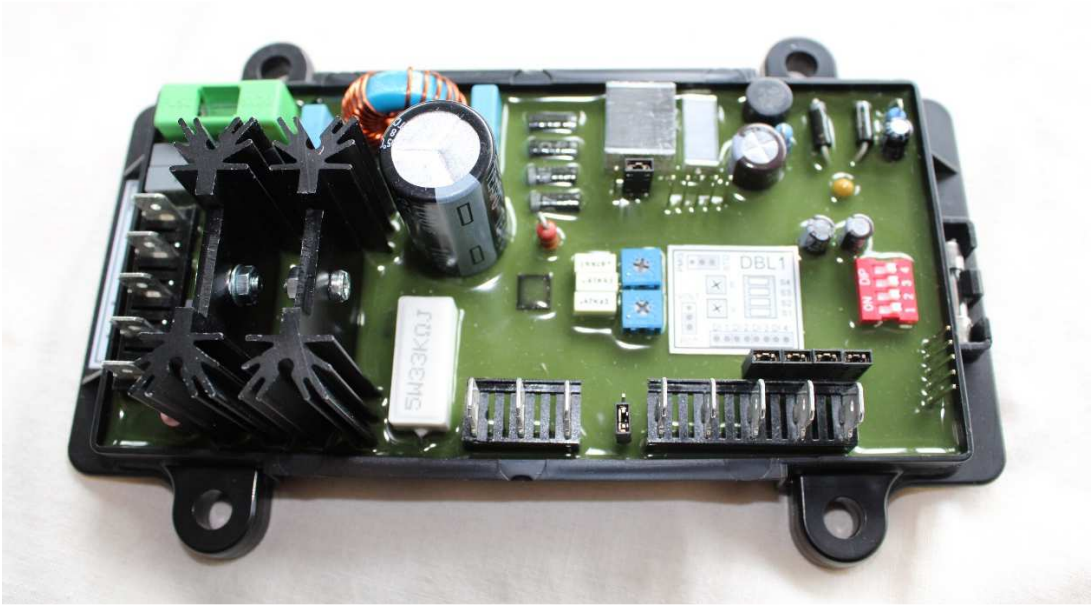
	Stability range 1, alternators up to 300 kVA
	Stability range 2, alternators from 350 to 650 kVA
	Stability range 3, alternators from 800 to 1600 kVA
	Stability range 4, alternators from 1600 to 3000 kVA
	Control gains is possible to change using communication protocol

J4 - Universal Communication Port. For connection via RS485 protocol, use special interface, connected as on the figure below.



DIMENSIONS


45.5
173
109
79.8
90
PE
L
N
+
-
PMG
STD
DSW
DI1
DI2
DI3
DI4
J4
POT VOLT
A
B
C
S3
S4
Vb
S5
S6


DBL1
5W33KΩJ

SINCRO has been manufacturing trustable alternators for over 30 years.
At the core of your best energy up to 2.6 MVA. Standard and custom.
Proudly 100% Made in Europe.

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