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1.   INTRODUCTION

The Sincro AVR DBL1 is member of a family of Digital Microprocessor Based Voltage Regulators designed for use on 50/60Hz brushless generators. It regulates the output voltage of a generator by controlling the current into the generator exciter field. Modular architecture enables optimisation for different applications.

2.   GENERAL CHARACTERISTICS

- Automatic Voltage Regulation.
- EMI filter.
- Fuse and spare fuse included.
- Under frequency selection and adjustment.
- Excitation Limit.
- Digital Inputs - jumpers.
- RS485 Communication Port.
- Windows Communication Software.
- Remote voltage regulation.
- Programmable by OEM: Set Point, Under Frequency, Excitation Limit.
- Adjustment of Set Point also with trimmer.
- Adjustment of Control Gains with trimmer.
- Single or 3 phase sensing.

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 Windows 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 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 Generator Short-circuit excitation is at maximum limit value.

RS485 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:

The Sincro AVRterm is 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.

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 (V_{C-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 (V_{C-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 (V_{B-A}) is calculated by the microprocessor from the phase C to phase A signal (V_{C-A}) and the phase C to phase B (V_{C-B}) signal. Additionally, the generator phase C to phase A (V_{C-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

3. 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 90 to 500Vac. With on board trimmer or external potentiometer is possible change voltage in a range more than 20%
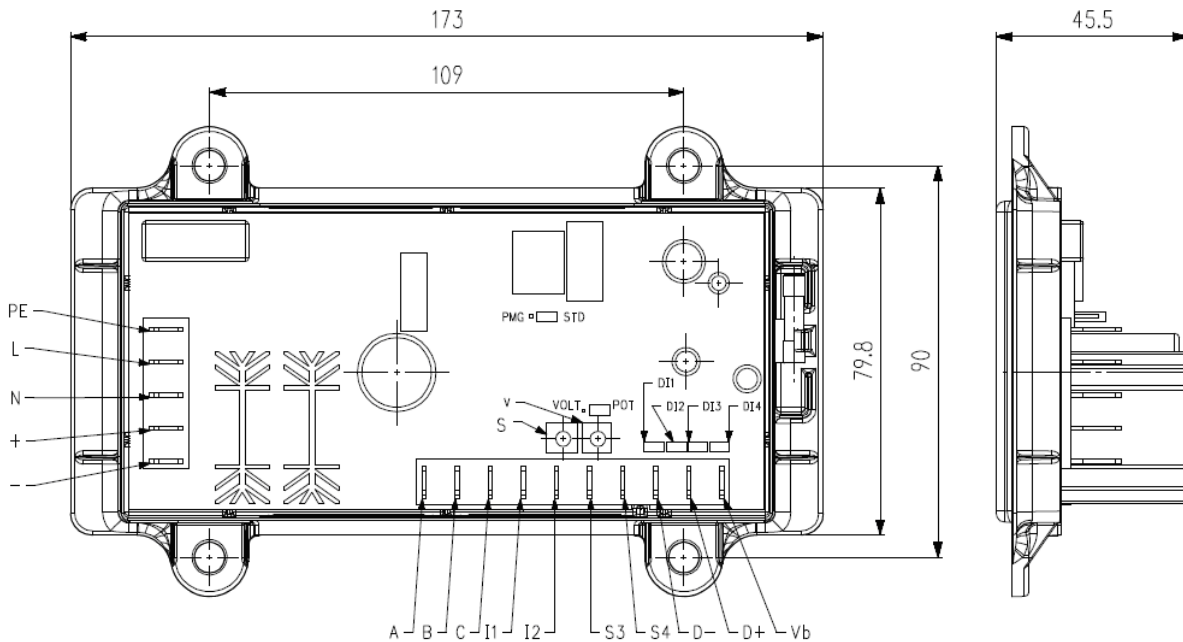
Regulation Accuracy:
Better than ±0,5% no load to full load

Self Excitation Wake Up Voltage:
Less than 3,8V

4. DIMENSIONS AND CONNECTIONS

Connections:

PE   **- Ground of Power Section**
L, N   **- Input for Power**
Ex+,Ex- **- 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.
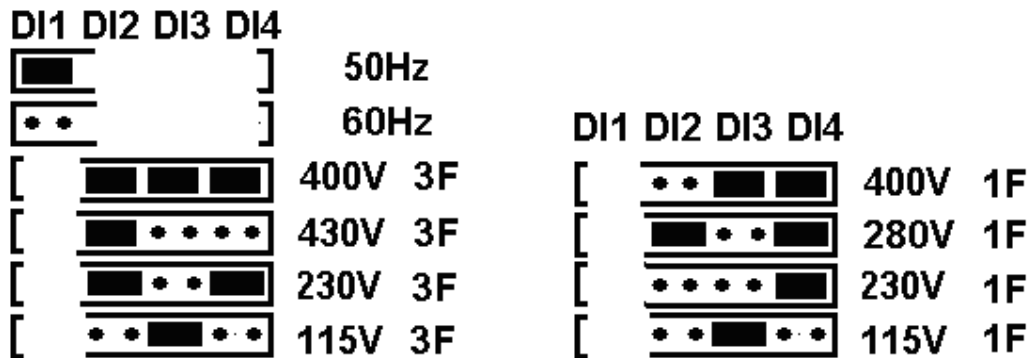
I1, I2   **- INPUT OUT OF USE**

S3, S4   - EXTERNAL POTENTIOMETER (20K Ohm) or INPUT for remote control if jumper VOLT is closed. 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 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.

D-   **- RS485, - DATA**
D+   **- RS485, + DATA**
Vb   **- Plus pole of 9V – 12V battery. Minus pole of battery is at S4. Battery supply is ONLY for setting, programming and testing AVR.**

PMG configuration jumper is to use PMG excitation system.
VOLT configuration jumper for remote control INPUT.

Sensing configuration jumpers DI1, DI2 DI3 and DI4:

DI1 DI2 DI3 DI4

50Hz
60Hz
400V 3F
430V 3F
230V 3F
115V 3F

DI1 DI2 DI3 DI4

400V 1F
280V 1F
230V 1F
115V 1F

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).