

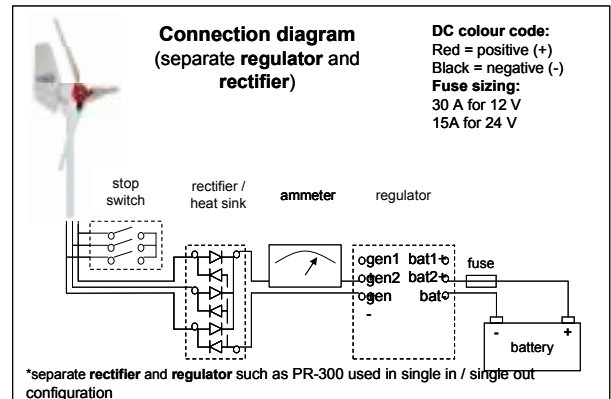
Ampair Regulator Instructions: Model PR 300

Description

This regulator is a dual input or dual output single input channel and single output channel regulator designed for use with the Ampair 300 wind turbine and other sources such as solar photovoltaic panels (solar PV). It can be selected to either 12 volt or 24 volt usage. The regulator is designed to accept rectified 12v or 24v DC sources and so the Ampair 300 turbine must be fitted with a separate bridge rectifier & heatsink if it is to be used with the PR-300. The regulator uses advanced three stage pulse width modulated (PWM) temperature compensated charging.

Installation – positioning the regulator

Install the regulator in the cable run between the wind turbine and the battery as shown in the connection diagram on the right. Ideally locate the regulator close to the batteries so that it is sensing the battery voltage and temperature. However the regulator and the recommended external fuse should not be mounted inside an unventilated battery compartment. If an external stop switch is fitted it should be located in the cable run between the wind turbine and the regulator.



Installation – opening the regulator

It is important not to break the LED status lights in the regulator front panel. To access the regulator first remove the top panel (four screws) and then carefully set aside the LEDs still on their ribbon cable. Then remove the bottom panel (four screws) and set it aside with the temperature probe still on its ribbon cable. Slip out the circuit board protection cover from below, and then slide the case front panel upwards to expose the circuit board.



Installation – setting the links

The operation of the regulator is controlled by the links inside. There are eight possible arrangements as follows:

12v, single generator input, single battery output
 12v, single generator input, twin battery outputs

12v, twin generator inputs, single battery output
 12v, twin generator inputs, twin battery outputs



24v, single generator input, single battery output 24v, twin generator inputs, single battery output
 24v, single generator input, twin battery outputs 24v, twin generator inputs, twin battery outputs

Mixed voltages of 12v & 24v are not possible. A generator can be either a wind turbine or a solar panel. This regulator is not for use as engine-driven alternator regulator.

1. Set the voltage range

In the centre of the circuit board are LINK 14 and LINK 15 which select for either 12v or 24v operation. **They must both be set for the same voltage range.**

LINK 14	Channel 1 (right side)	Top = 12v; bottom = 24v
LINK 15	Channel 2 (left side)	Bottom = 12v; top = 24v

2. Set the control voltages

After selecting the voltage range the exact battery set point should be selected using the four low power control links in two groups LINK 11 and LINK 12 which are also in the centre of the circuit board. This is the precise voltage at which the generator is disconnected from the battery.

LINK 11	Channel 1 (right side)	Top row: position 1 = 13.8v position 2 = 14.0v position 3 = 14.2v position 4 = 14.4v Bottom row: position 1 = 27.6v position 2 = 28.0v position 3 = 28.4v position 4 = 28.8vv
LINK 12	Channel 2 (left side)	Top row: position 1 = 13.8v position 2 = 14.0v position 3 = 14.2v position 4 = 14.4v Bottom row: position 1 = 27.6v position 2 = 28.0v position 3 = 28.4v position 4 = 28.8vv

If it is necessary to adjust these voltages then there are four trim pots along the base of the circuit board. These set the 13.6v and 27.2v reference voltages for each channel. By adjusting them up or down the respective channel will rise or fall for all the position 1, 2, 3, and 4 settings.

VR1 trim potentiometer	Channel 2 x 12v	Ordinarily set to 13.6v
VR2 trim potentiometer	Channel 2 x 24v	Ordinarily set to 27.2v
VR3 trim potentiometer	Channel 1 x 12v	Ordinarily set to 13.6v
VR4 trim potentiometer	Channel 1 x 24v	Ordinarily set to 27.2v

2. Set the LED display voltages

The LED displays need to be set to the correct voltage range. The four links are generally on the right side of the board: LINK 10 is on the top right; LINK 9 is on the centre right; LINK 16 is on the bottom right; and LINK 7 is just to the right of centre.

LINK 10	Generator 1	Left = 12v; right = 24v
LINK 9	Generator 2	Left = 12v; right = 24v
LINK 16	Battery 1	Left = 12v; right = 24v
LINK 7	Battery 2	Top = 12v; bottom = 24v

3. Set the high side driver

In the top centre of the left side is the LINK 3 which controls the high side driver.



LINK 3	High side driver	Left = 12v; right = 24v
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Channel drive together

On the left side, halfway up the lower section is LINK 6 which enables or disables dual channel control. It should be used when there are two different charging sources which need to be controlled at the same voltages (this prevents high solar voltages holding out low wind voltages, or vice versa).

LINK 6	Channel 1 and Channel 2 control	Left = drive Ch2 from Ch1 Right = drive Ch2 separately
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The left setting should only be used when there is only one battery bank. Ordinarily leave it in the right setting unless you have two charging sources which you want to follow a common regulation strategy.

Fuse set up

The fuses are all located in the topmost section, above the terminal blocks. Some of the fuses are used as fuses in which case – select the right rating for 12v or 24v operation. Other fuses are used as high current links and should be included or omitted to enable or disable various channels.

FUSE 1	Channel 1 input	25 Amp for 12v & 15 Amp for 24v
FUSE 2	Channel 2 input	25 Amp for 12v & 15 Amp for 24v

Systems with solar modules of rating less than 300W should use lower fuse values. For example, use 15 Amps for 200w at 12v, 7.5 Amp for 100W at 12v.

LINK 1 (25A)	For future development (sense)	Include always
LINK 2 (25A)	For future development (sense)	Include always

LINK 5 (25A)	Channel 1 = 12v or 24v generator	Include 12v; omit if 24v
LINK 4 (25A)	Channel 2 = 12v or 24v generator	Include 12v; omit if 24v

LINK 8 (25A)	One or two generators	Include if one generator Omit if two generators
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LINK 13 (25A)	Channel 1 = 12v or 24v generator	Left = 12v; right = 24v
LINK 17 (25A)	Channel 2 = 12v or 24v generator	Left = 12v; right = 24v

LINK 18 (25A)	One or two battery banks	Include if one battery bank
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Fixing the regulator

Mark and mount regulator using 3 internal holes, 2 at top, 1 at base.

Connection

Stop generator before connecting, i.e. brake wind generator, cover solar module.

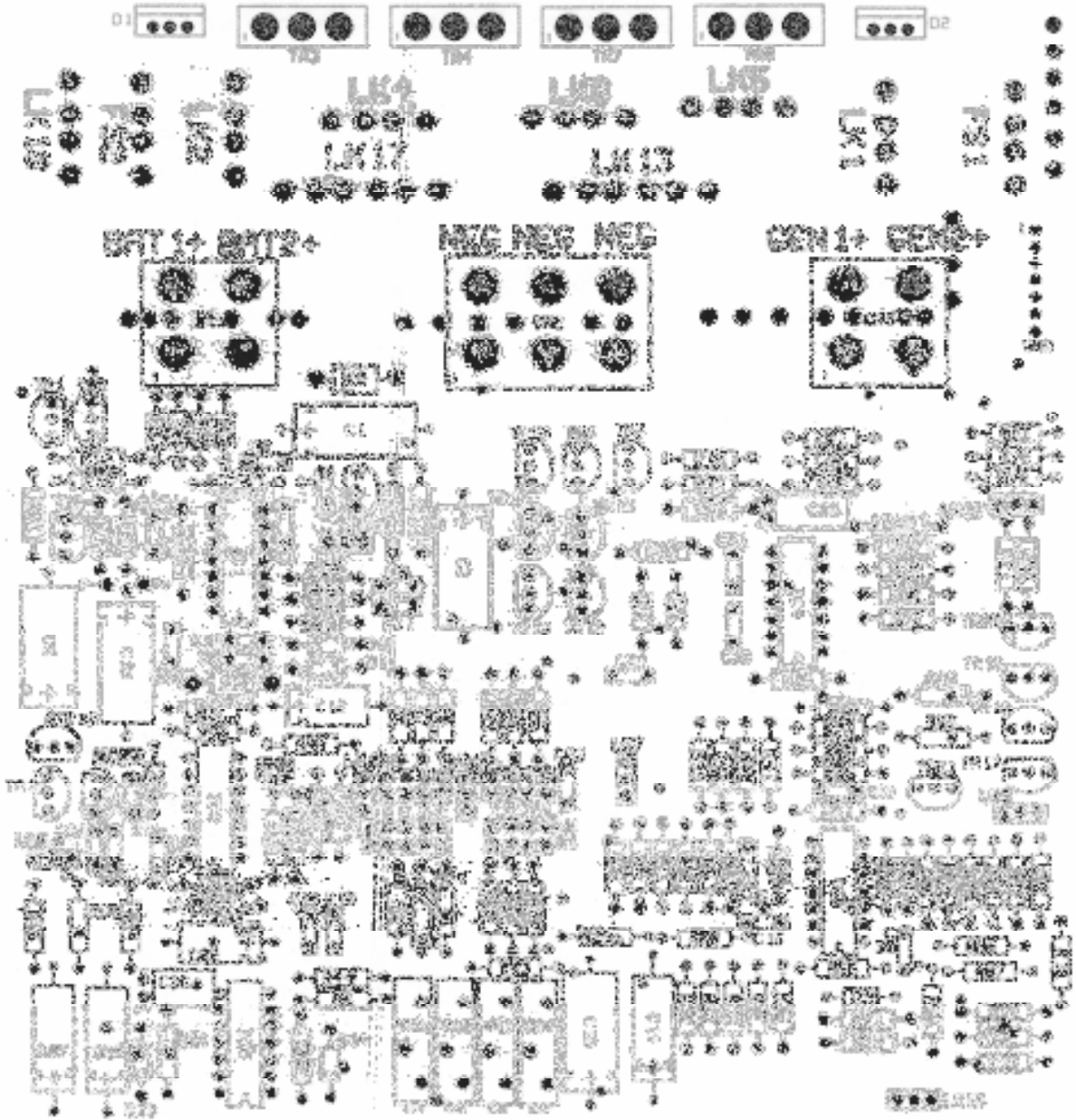
Slide the circuit protection cover back into place. Replace the bottom cover plate and feed the power cables through the glands in the bottom cover. Feed the power cables through the glands and then connect the positive wire of the wind turbine rectifier outputs, and any solar panel outputs to GEN1 and GEN2 terminal. Connect the negative to the NEG terminal. Similarly connect the battery bank(s) positives to BAT1 and BAT2 and connect the battery negative to the common negative.

Operation

No manual intervention is required. The regulator will allow the turbine to spin freely when the battery is at the charge voltage. The charge voltage is adjusted automatically depending on the charge state of the battery: the float voltage is 13.2V; the PWM absorption voltage is 13.7V; and the equalisation voltage is 14.1V (double these numbers for 24 volt systems).

The SAE automotive fuses in the regulator are designed to protect the regulator, not the circuit. It is recommended that an additional fuse be installed external to the regulator.

Circuit board layout



Link diagram

