

# PM Lo Volt Mk I

## Unlimited Speed Controller

### Purpose

PM Lo Volt is the ultimate speed control for 4 cell classes of model cars and will run unlimited motors with ease. It will operate on 2 to 5 cells and has incredible performance in power and braking.

### Features

- Low Voltage (2.5V to 7.5V dc)
- High variable current (190Amps for 10 secs, 120Amps continuous)
- Programmed for maximum power output and quick response.
- Very low on resistance (0.7mΩ or 0.0007Ω) for minimum loss and high available currents.
- Brake resistance of 3 mΩ or 0.003Ω and continuous current of 25 Amps.
- Small package, lightweight. (~ 6g without leads)
- Micro controller controlled full digital operation for proper performance under adverse conditions (dust, moisture, electrical interference and vibration).
- Has AACT (Advanced Active Commutation Technology) exclusive to Power Master Speed Controls. Makes circuit boards smaller, and produces less heat than conventional commutation methods.
- Uses the very latest and best available surface mount components for the highest possible power output from the smallest package.
- Programmable for brake, power, neutral positions, ramp up & initial brake (brake during neutral).
- No Radio Signal failsafe. Applies brake after 1/8th sec. without radio signal, and flashes LED.
- LED which shows radio signal failure, full throttle, neutral, full brake, and assists in programming.
- Programmable soft power up to assist in preventing wheel spin. Ramping can be from 0 sec to approx. 0.6 sec. for full throttle range.
- Programmable Initial Brake. Initial Brake from 0 to 50% of full brake
- Switch less programming.
- Brown Out detection provides almost instant restart and prevents reprogramming caused by bad battery connections or short circuits for small time intervals.

### Mounting

PM Lo Volt can be attached to the car with double-sided tape or with cable ties. Find a ventilated position if very high currents are required.

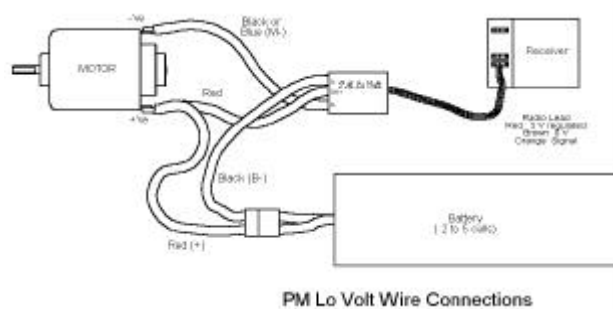
### Connections

PM Lo Volt requires no external schottky diode, as it is included in the device.

Keep motor and battery wires as short as possible to reduce power loss and radio interference and keep radio wires away from power leads. Wire battery, motor and radio lead as per the following diagram.

**Note** :- Receiver runs directly on drive battery voltage, which can be very low voltage, and has large amounts of voltage

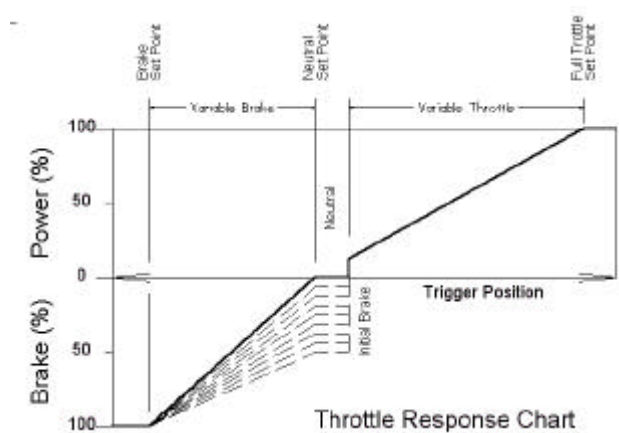
variations due to the motor switching. It has been found through testing that not all receivers can handle this sort of noise or voltage levels. If you experience any glitching or poor response, replace the receiver or run a receiver battery. If you run a receiver battery the red wire in the PMLV receiver plug must be removed and folded back.



### Programming

**PM Lo Volt has been programmed and tested, but will require reprogramming to suit your radio.**

PM Lo Volt is programmable for Full Throttle, Neutral, and Full Brake positions, Ramp Up and Initial Brake. The following graph shows PM Lo Volt's response after programming.



To program PM Lo Volt follow this procedure:-

1. Turn on the transmitter and apply full throttle.
2. Whilst still applying full throttle, plug in the controller to the battery. (PM LV will need to have been unplugged for at least 3 seconds prior to this step {can be up to 10 seconds}. If any voltage is stored in PM LV, PM LV will do a brown out quick start up and avoid the programming sequence).
3. PM LV replies with two (2) flashes on the LED. (If 2 flashes aren't received, increase the throttle trim and repeat steps 1 & 2 again. If still no response, reverse the throttle output from the radio repeat steps 1 & 2 again. Most radios have reversing switches for this).
4. After receiving 2 flashes, return the throttle to Neutral. After 2 seconds PM LV saves the Neutral setting and responds with 1 flash.
5. Move the throttle to where you want full throttle to occur. After 2 seconds PM LV saves the Full Throttle setting and responds with 1 flash.
6. Move the throttle where you want Full Brake to occur. After 2 seconds PM LV saves the Full Brake setting and responds with 3 flashes.
7. Programming is finished and PM LV is programmed with no ramping and no Initial Brake.

So normal sequence is :-

**F. Throttle \*\* \_ \_ Neutral \* \_ \_**

**F. Throttle \* \_ \_ F. Brake \*\*\* ready**

where (\*) = LED flash and ( \_ ) = 1 second

#### Ramping & Initial Brake

- i. If after step 3 above the throttle is held at Full Throttle for a further 2 seconds, PM LV will reply with two (2) more flashes on the LED.
- ii. Return the throttle to Neutral and re-apply within 1 second. The LED goes off and then back on. PM LV counts 1 step of Ramp. You can skip this step or repeat it up to 8 counts. Each count programs PM LV with approx. 0.07 second ramp (it will take PM LV 0.07 sec to achieve full throttle from neutral if full throttle is applied suddenly) up to a max. ramp time of ~0.6 seconds.
- iii. Return the throttle to Neutral. PM LV will wait 1 second and flash 3 times as before.
- iv. Apply the throttle again during the next 1 second and Step ii will be repeated but this time for Initial Brake. As before, this step can be skipped or repeated up to 8 times giving a maximum of 50% brake during Neutral.
- v. Return the throttle to Neutral. PM LV will wait 1 second and flash 3 times. Ramping and Initial Brake are now programmed.

Sequence is :-

**F. Throttle \*\* \_ \_ maintain F. Throttle \*\*  
Pulse throttle (0 to 8 times for Ramping)  
Neutral \_ \*\*\* Pulse throttle (0 to 8  
times for Initial Brake) Neutral \_ \*\*\*  
ready**

where (\*) = LED flash and ( \_ ) = 1 second

Note :- Both the previous sequences can be repeated as often as you wish, each one being completely independent of the other, so that Ramping & Initial Brake can be readily reprogrammed without effecting the throttle positions.

If either of Ramping or Initial Brake is programmed to 8 steps, PM LV will automatically proceed to the next Step without waiting for the 1 second of Neutral.

**Warning** - PM Lo Volt casing/heatsink may not be isolated. Prevent contact with motor or battery terminals.

**Warranty** - PM Lo Volt is warranted for life against faulty parts or workmanship. Abuse, reverse connections & exceeding maximum ratings are not covered.

#### Specs

Dimensions	29 x 25 x 10 mm
Weight	~7g without leads
Rating	2.5 – 7.5Vdc, 190 Amp (10 seconds)
Max. current	644 Amp continuous, 2480 peak (mosfet spec.)
Tested continuous current	120 Amps
Suitable Motor	Any
BEC radio connection	nil, direct connection
PWM frequency	4 kHz fixed
Throttle	Fully variable from 12% to full (12% will just move most cars)
Ramping	Adjustable 0 to 0.6 seconds (8 steps)
Brake	Fully variable from Initial Brake to Max
Initial Brake	Adjustable 0 - 50% (8 steps)
Maximum mosfet temp.	60°C

#### Contact

Ian Armstrong  
Email [iarmstrong@austarnet.com.au](mailto:iarmstrong@austarnet.com.au)  
Web <http://home.austarnet.com.au/iarmstrong>  
Mob. 0403 403 145

#### Disclaimer

*Although great care was taken in designing, programming and assembly of this speed controller, the end user will take all responsibility for any damage or injury caused by any device containing this controller. Due to the nature of radio control, no guarantees can be given as to the safe use of this product.*