

# Mini P2 & Mini P2 max

## Miniature Speed Controllers

### General

Mini P was specifically designed for 1/18th scale electric cars running 6 to 7 cells, and will handle currents in excess of 40 Amps (P2) and 70 Amps (P2 max) on variable throttle from 6V to 15Vdc (5 to 10 cells).

### Features

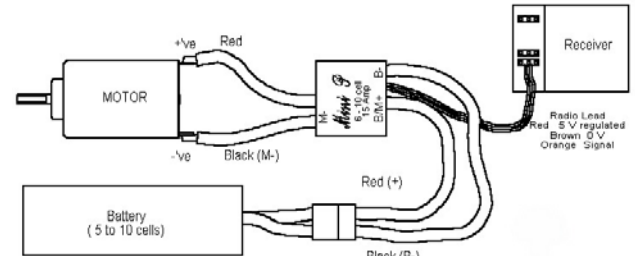
- High variable current for such a small package (40 Amps 10 seconds, 25 Amps continuous) (70 Amps 10 secs, 45 Amps continuous for P2 max)
- BEC with supply voltage monitoring.
- Very low on resistance ( $\sim 3m\Omega$  (P2)) ( $\sim 1.6m\Omega$  (P2 max) for minimum loss.
- Small package (19 x 17 x 12), extremely lightweight.
- Micro controller controlled full digital operation for proper performance under adverse conditions (dust, moisture, electrical interference and vibration).
- Innovative design.
- 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).
- Accommodates all radios, allowing complete control over power and brake spans.
- 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. New algorithm provides better response out of corners and those that like to "pump" the throttle.
- Programmable Initial Brake allows for quick controlled speed reduction into corners. Initial Brake from 0 to 50% of full brake
- Switchless programming.
- Dual Brown Out detection provides protection for radio & Mini P by reducing power drawn from battery when the loaded voltage is below  $\sim 5V$ . Provides almost instant restart and prevents reprogramming caused by bad battery connections or short circuits for small time intervals.
- Ramp Up and Initial Brake are now programmed in a separate programming sequence, so that variables effecting handling can easily be changed without effecting throttle positions programming.

### Mounting

Mini P can be attached to the car with double-sided tape or with cable ties. Find a position that allows some exposure to the passing air.

### Connections

Mini P 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.

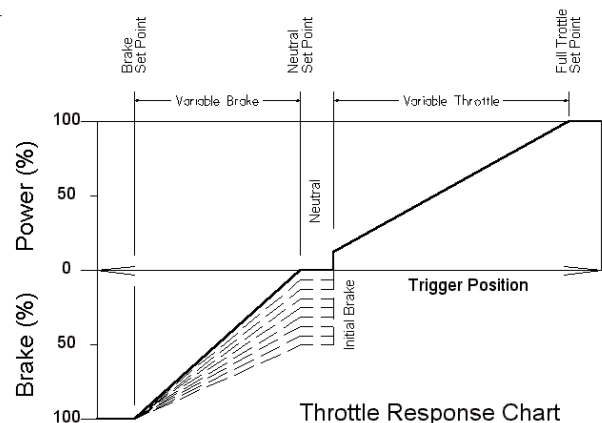


Mini P Wire Connections

### Programming

**Mini P has been programmed and tested, but will require reprogramming to suit your radio.**

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



Throttle Response Chart

To program Mini P follow this procedure: -

4. Turn on the transmitter and apply full throttle.
5. Whilst still applying full throttle, plug in the controller to the battery. (Mini P will need to have been unplugged for at least 3 seconds prior to this step. If any voltage is stored in Mini P, Mini P will do a brown out quick start up and avoid the programming sequence).
6. Mini P 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.
7. After receiving 2 flashes, return the throttle to Neutral. After 2 seconds Mini P saves the Neutral setting and responds with 1 flash.

8. Move the throttle to where you want full throttle to occur. After 2 seconds Mini P saves the Full Throttle setting and responds with 1 flash.
9. Move the throttle where you want Full Brake to occur. After 2 seconds Mini P saves the Full Brake setting and responds with 3 flashes.
10. Programming is finished and Mini P 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

- a) If after step 3 above the throttle is held at Full Throttle for a further 2 seconds, Mini P will reply with two (2) more flashes on the LED.
- b) Return the throttle to Neutral and reapply within 1 second. The LED goes off and then back on. Mini P counts 1 step of Ramp. You can skip this step or repeat it up to 8 counts. Each count programs Mini P with approx. 0.07 second ramp (it will take Mini P 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.
- c) Return the throttle to Neutral. Mini P will wait 1 second and flash 3 times as before.
- d) 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.
- e) Return the throttle to Neutral. Mini P 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, Mini P will automatically proceed to the next Step without waiting for the 1 second of Neutral.

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

### Specs

Dimensions	19 x 17 x 12 mm
Rating	6 - 15Vdc, 40Amp (P2 ) 70 Amp (P2 max)
Max. current (from spec sheet)	161 Amp continuous, 620 peak 322 Amp cont, 1240 peak for P2 max
Tested continuous current	25 Amp (P2), 45 Amp (P2 max)
On Resistance	0.0032 Ω (P2), 0.0016 Ω (P2 max)
BEC radio connection	5Vdc, 800 mAmp cont., 1.5Amp peak
PWM frequency	4kHz
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)

### Contact

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### 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.*