

DM Hi-Volt

Drag Racing Speed Control

Purpose

DM Hi-Volt is for high voltage/high current motor operation from a standard radio. It is primarily designed for 1/10th scale drag racing. With a maximum current rating of 90 Amps, it is possible to drive 4,000 Watts (4.0 kW).

Features

- High Voltage (45 Vdc **maximum**.)
- High variable current (120Amps for 10 secs, 90Amps continuous)
- Programmed for maximum power output and quick response.
- Very low on resistance (1.2m Ω or 0.0012 Ω) for minimum heat loss.
- Brake resistance of 2.4 m Ω or 0.0024 Ω and continuous current of 35 Amps.
- Small package, lightweight. (~7g without leads)
- Has AACT (Advanced Active Commutation Technology) exclusive to DM Hi-Volt Speed Controls. Makes circuit boards smaller, and produces less heat than conventional commutation methods.
- Micro controller controlled full digital operation for proper performance under adverse conditions (dust, moisture, electrical interference and vibration).
- 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.
- 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. 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.

Mounting

DM Hi-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.

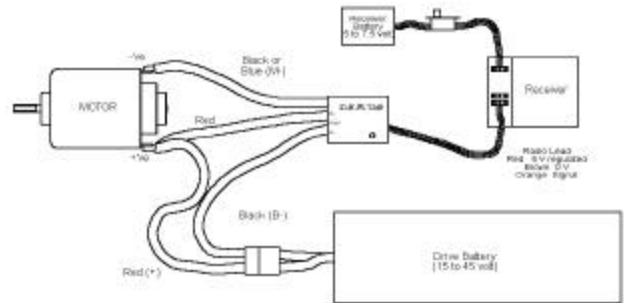
Connections

Important :- It is extremely important that the motor has RF capacitors to prevent radio interference and damage to DM Hi-Volt. If you have any doubt as to whether your motor has capacitors inbuilt, or as to their condition, solder a capacitor from each motor terminal to the motor casing & one between the terminals. Capacitors are supplied with DM Hi-Volt for this purpose. Tip:- The tidiest method is to lay out the three

capacitors in a triangle with the legs crossed. Twist the crossed legs together to form a star. Solder one star point to positive, one to negative and one to the casing.

DM Hi-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. **A Receiver Battery is required.** Due to the large voltage drop on a BEC, the drive currents available would be useless for servo operation.

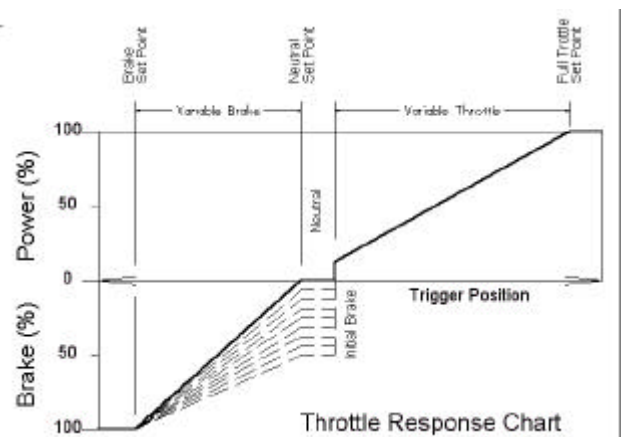


DM Hi-Volt Wire Connections

Programming

DM Hi-Volt has been programmed and tested, but will require reprogramming to suit your radio.

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



To program DM Hi-Volt follow this procedure:-

1. Turn on the transmitter and apply full throttle.
2. Whilst still applying full throttle, turn on DM HV. (DM HV will need to have been turned off for at least 3 seconds prior to this step {can be up to 10 seconds}. If any voltage is stored in DM HV, DM Hv will do a brown out quick start up and avoid the programming sequence).
3. DM HV 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 DM HV saves the Neutral setting and responds with 1 flash.

5. Move the throttle to where you want full throttle to occur. After 2 seconds DM HV saves the Full Throttle setting and responds with 1 flash.
6. Move the throttle where you want Full Brake to occur. After 2 seconds DM HV saves the Full Brake setting and responds with 3 flashes.
7. Programming is finished and DM HV 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, DMHV 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. DMHV counts 1 step of Ramp. You can skip this step or repeat it up to 8 counts. Each count programs DMHV with approx. 0.07 second ramp (it will take DM 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. DMHV 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. DMHV 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, DMHV will automatically proceed to the next Step without waiting for the 1 second of Neutral.

Specs

Dimensions	30 x 28 x 13 mm.
Weight	~7g without leads
Rating	15-45Vdc, 120 Amp (10 seconds)
On Resistance	1.2 mΩ or 0.0012Ω
Brake On Resistance	2.4 mΩ or 0.0024Ω
Max. current	420 Amp continuous, 1680 peak (mosfet spec.)
Tested continuous current	90 Amps
Suitable Motor	Any
BEC radio connection	Nil, Requires separate battery
PWM frequency	4 kHz fixed
Throttle	Fully variable from 12% to full
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

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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.

Warning - DM Hi-Volt may not be isolated. Prevent shorts with motor or battery terminals.

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