



**Maclan**  
ENDLESS INNOVATIONS

**MDP**  
Competition ESC

**MDP 160**  
**DRIFT ESC**

# User Manual

## 1. Introduction

It is purposely designed for 1/10th scale drift applications. The MDP 160 sensed Electronic Speed Controller is the ultimate in engineering design from Maclan Racing. Our commitment to quality and exhaustive track testing ensures that the M ESC gives you the smoothest power band and reliable performance in the most demanding R/C conditions.

**Please read the following instructions carefully before installing your new MDP system.**

## 2. Precautions

- Please make sure to connect/solder motor wires in correct A/B/C sequence in between ESC and motor. Incorrect sequence will damage ESC permanently.
- MDP 160 ESC is a high-end racing product that offers many tuning parameters. If you are not well versed in ESC setup, we have numerous factory default profiles to get you started. If you need help with detailed settings, please contact Maclan directly online for assistance.
- MDP 160 ESC allows control of turbo timing set up in the ESC. However, it must to use with correct gearing and motor KV. Any ESC damage caused from excessive boost will not be covered under warranty. This method of tuning the ESC should be done with EXTREME caution and a good knowledge of boost profiles.
- Never “free rev” and “brake” the motor and ESC system with no load. It can cause extreme spikes that can damage both the motor and ESC, and moreover, will void the factory warranty.
- Do not connect reversed voltage. This will damage the ESC and void the factory warranty.
- Do not leave batteries plugged into the ESC when not in use. This will prevent short circuits and over discharging of the battery.
- Always monitor both the ESC and motor temperature after running them. Temperature should never exceed 180 degrees Fahrenheit.

## 3. Features

- High performance 32-bit CPU for high speed and accurate processing.
- All new design firmware algorithms for the ultimate throttle and brake performance for drift applications.
- On board Type-C USB host for the ease of connectivity and unlimited extensibility.
- Dual ‘power-on’ options for ease of operation. (can be controlled by a switch or direct to battery)
- All aluminum structure with omnidirectional heatsink for maximum airflow and optimum cooling performance.
- All detachable connectors with several optional length cables.
- Adjustable throttle and brake PWM frequency for fine tuning.
- All new motor rev limit function.
- Motor/ESC temperature and low voltage protection.
- Android and iOS (Require a Bluetooth Link, sold separately) app for programming, data logging, and firmware updating.

## 4. Specifications

**Scale:** 1/10th Brushless Sensored/Sensorless ESC

**Continuous Current:** 160A

**Peak Current:** 800A

**Power input:** 2S Li-Po

**BEC output:** 6V to 7.4V, 4A

**Pre-soldered Wires:** Black-13AWG-200mm\*5

**Cooling Fan:** 30x30x10mm

**Motor:** Brushless Sensored Motor

**Dimension:** 38x30x19mm (without cooling fan)

**Net Weight:** 45g (without wires and cooling fan)

## 5. MDP 160 ESC Programming Parameters

	Parameters	Values
General Settings	<b>SBEC Voltage</b>	6.0V to 7.4V
	<b>Forward Power</b>	50% to 100%
	<b>Reverse Power</b>	25% to 100%
	<b>Motor Rotation</b>	Normal/ Reverse
	<b>Reverse Mode</b>	No Reverse/ Stop Then Reverse/ Double Tap Then Reverse
	<b>Phase A/C Swap</b>	Disable/ Enable
Protection Settings	<b>Battery Cut Off</b>	Disable/ 3.0V to 7.4V
	<b>Motor Temperature Cut</b>	Disable/ 160 degrees F (71 degree C) to 220 degrees (104 degrees C)
	<b>ESC Temperature Cut</b>	Disable/ 160 degrees F (71 degree C) to 220 degrees (104 degrees C)
Brake Setting	<b>Brake Strength</b>	0% (disable) to 100%
	<b>Brake PWM</b>	600Hz to 12KHz
	<b>Brake Curve</b>	100% ~ 10% / Linear / -10% ~ -100%
	<b>Drag Brake</b>	0% to 50%

<b>Throttle Setting</b>	<b>Throttle PWM</b>	6.4KHz to 56KHz
	<b>Throttle Punch</b>	1% to 150%
	<b>Throttle Curve</b>	100% ~ 10% / Linear / -10% ~ -100%
	<b>Throttle Smooth Range</b>	1% to 75%
	<b>Throttle Smooth Value</b>	Disable, Level 1 to 10
	<b>Dead Band</b>	1%~10%
<b>Advanced Timing Settings</b>	<b>Acceleration Boost</b>	0 to 60 Degrees (1 degree incremental)
	<b>Boost Start RPM</b>	500 to 30000 RPM (500 RPM incremental)
	<b>Boost Finish RPM</b>	500 to 50000 RPM (500 RPM incremental)
	<b>Turbo Position</b>	70 to 100% Throttle Position
	<b>Top Speed Turbo</b>	0 to 60 Degrees (1 degree incremental)
	<b>Up Slew Rate</b>	2 to 23 Degrees/0.1sec
<b>Rev Limit Effect</b>	<b>Rev Limit</b>	Disable/ Enable
	<b>Rev Limit Trigger</b>	10000 to 127500 RPM (500 RPM incremental)
	<b>Rev Limit Value</b>	50 to 100%
	<b>Rev Limit Sensitivity</b>	0.05 to 0.5 sec (0.01 sec incremental)

#### Parameter 1: SBEC Voltage

Options are from 6.0V to 7.4V in 0.1V increments.

A higher voltage will make servos react faster at the expense of a shorter life span. However, do not set SBEC Voltage above the servo manufacturer's recommended voltage.

#### Parameter 2: Forward Power

Options are from 50% to 100% in 1% Increments. This setting allows you to limit the forward power.

#### Parameter 3: Reverse Power

Options are from 25% to 100% in 1% increments. This setting allows you to limit the reverse power.

#### Parameter 4: Motor Rotation

Options are normal and reverse.

This allows for the changing of motor rotation for some specific chassis that require to run a reversed motor rotation.

#### Parameter 5: Reverse Mode

Options are no reverse, stop then reverse, and double tap then reverse.

The stop then reverse requires the motor to a complete stop for one second then the ESC will engage reverse power. The double tap then reverse option requires double tapping brake then the ESC will engage reverse power.

#### Parameter 6: Phase A/C Swap

Options are disable and enable.

When this parameter is set to disable, the motor wiring is normal. The ESC A/B/C phases connect to motor A/B/C tabs. When this parameter is set to enable, the ESC allows phase A and C to swap for user's wiring needs.

Note: incorrect setup and wiring will cause ESC damage. Please ensure this setting and the actual ESC and motor wiring matches to avoid damage.

#### Parameter 7: Battery Cut Off

Options are Disable, 3.0V~7.4V

This parameter monitors the Li-Po pack voltage. If the voltage drops to the setup value, the ESC will reduce the power output to the motor to avoid battery damage.

#### Parameter 8: Motor Temperature Cut

Options are Disable/ 160 degrees F (71 degrees C) to 230 degrees (110 degrees C).

This parameter displays both Fahrenheit and Celsius (°F and °C) for easier reading. When the motor reaches the setup temperature value, the ESC will reduce the power output to the motor to 30% to avoid overheat damage.

Note: This temperature is read from the sensor unit circuit inside the motor can. There can be discrepancies between the temperature that you capture on the outside of the motor can and what the sensor board is indicating.

#### Parameter 9: ESC Temperature Cut

Options are Disable/ 160 degrees F (71 degrees C) to 230 degrees (110 degrees C).

This parameter displays both Fahrenheit and Celsius (°F and °C) for easier reading. When the ESC reaches the setup temperature value, the ESC will reduce the power output to the motor to 30% to avoid overheat damage.

Note: This temperature is read from the CPU temperature sensor. It may be different from the temperature that you capture from the ESC heat sink.

#### Parameter 10: Brake Strength

Options are 0% (Disabled) to 100%, in 1% increments.

A lower Brake Strength percentage will have less powerful brakes, while a higher percentage will have stronger brakes.

#### Parameter 11: Brake PWM

Options are 600Hz to 12KHz

PWM stands for Pulse Width Modulation and is rated in Hertz, meaning cycles per second. A lower frequency will have a more aggressive braking feel. A higher frequency results in smoother braking, is more precise, and increases the ESC temperature.

#### Parameter 12: Brake Curve

Options are 100% ~ 10% / Linear / -10% ~ -100%.

A negative % Brake Curve will have a softer brake feel at the beginning of the brakes being engaged and get more aggressive as the brake is fully engaged. A linear Brake Curve will be uniform throughout the whole brake range. A positive % Brake Curve has strong brakes initially and then becomes softer.

**Parameter 13: Drag Brake**

Options are 0 (disable) to 100% in 1% increments.

This function will provide a drag force when the throttle is released to the neutral position.

**Parameter 14: Throttle PWM**

Options are 6.4KHz to 56KHz

PWM stands for Pulse Width Modulation and is rated in Hertz, meaning cycles per second. A lower frequency will have a more aggressive throttle feel and have less motor RPM. A higher frequency results in smoother throttle, is more precise, produces more motor RPM, but will increase ESC temperatures.

**Parameter 15: Throttle Punch**

Options are 1% to 150% in 1% increments.

A lower Throttle Punch percentage will have a slower throttle response and feel softer initially. A higher Throttle Punch percentage will have a faster throttle response.

**Parameter 16: Throttle Curve**

Options are 100% ~ 10% / Linear / -10% ~ -100%.

A negative % Throttle Curve will have a softer throttle feel at the beginning of the throttle being engaged and get more aggressive as it is fully engaged. A linear Throttle Curve will be uniform throughout the whole throttle range. A positive % Throttle Curve has strong throttle initially and then becomes softer.

**Parameter 17: Throttle Smooth Range**

Options are 1 % to 75%

This parameter defines the effective range of the Throttle Smooth System. If it is set at 30%, the Throttle Smooth System will work at the first 30% of throttle range. The entire throttle will be remapping according to the setup.

**Parameter 18: Throttle Smooth Value**

Options are Level 1 to 10

This parameter defines how much smoothen effect the system applies in the setup Throttle Smooth Range. The higher value will have smoother effect.

**Parameter 19: Dead Band**

Options are 1% to 10% in 1% increments

This is the amount of "play" when the throttle is engaged. A setting of lower % will make the throttle engage more instantaneously, while higher % would require more trigger movement.

**Parameter 20: Acceleration Boost**

Options are 0 (Disable) to 60 degrees in 1-degree increments.

This sets the maximum advanced boost timing at the time the motor reaches the user's selected Finish RPM.

**Parameter 21: Boost Start RPM**

Options are 500 to 30000 RPM in 500 RPM increments.

This sets the start RPM that acceleration timing engages. This parameter should be based on the motor KV and the track condition.

**Parameter 22: Boost Finish RPM**

Options are 500 to 50000 RPM in 500 RPM increments.

This sets the start RPM that acceleration timing finishes.

**Parameter 23: Turbo Position**

Options are 70% to 100% in 1 % increments.

This sets when the Turbo Timing would kick in. It defines by the throttle position. The lower value will kick in sooner. It can affect the smoothness of the power and increase the temperature of ESC and motor.

**Parameter 24: Top Speed Turbo**

Options are 0 (Disable) to 60 degrees in 1-degree increments.

This sets the maximum advanced timing at the time of full throttle. It often is utilized on long straightaways to reach higher top speed.

**Parameter 25: Up Slew Rate**

Options are 2 to 23 degrees/ 0.1 sec

This sets how fast the ESC reaches the maximum advanced top speed timing. The larger number will have more aggressive top speed acceleration.

**Parameter 26: Rev Limit**

Options are disable and enable

This sets the RPM rev limit disable or enable.

**Parameter 27: Rev Limit Trigger**

Options are 10000 to 127500 RPM in 500 RPM increments.

This sets the rev limit trigger point. For example, if it was set to 50000 RPM, the ESC will top the RPM at 50000 RPM.

**Parameter 28: Rev Limit Value**

Options are 50% to 100% in 1% increments.

This parameter is designed to mimic the rev limiter noise of a combustion engine. This value defines how much throttle would fall back when the rev limit RPM kicks in. For example, when Rev Limit is set to 50000 RPM with Rev Limit Value is set to 80%, the ESC will reach to top 50000 RPM then drop 20% throttle for the period that Rev Limit Sensitivity is set to.

**Parameter 29: Rev Limit Sensitivity**

Options are 0.05 to 0.5 sec in 0.01 sec incremental

This sets how long the Rev Limit Value effect plays.

## 6. Factory Profiles

The MDP 160 ESC provides 6 profiles. You can select a corresponding profile for your application. You can also reload factory default settings for each profile via the mobile app or Windows Panel software. You can also fine tune all parameters in each profile to meet your needs.

Parameters	Values	Profile 1	Profile 2	Profile 3	Profile 4	Profile 5	Profile 6	Profile 7	Profile 8	Profile 9	Profile 10	Profile 11	Profile 12
		Off Road 2WD Blinky	Off Road 4WD Blinky	Off Road 2WD Mod Dirt Surface	Off Road 4WD Mod Dirt Surface	Off Road 2WD Mod EOS Carpet	Off Road 4WD Mod EOS Carpet	TC Blinky	TC 13.5 Open Boost	TC Mod Outdoor Asphalt	TC Mod Indoor Carpet	Drift	Custom
1. Run Mode	Practice/Race Blinky/Race Open	Blinky	Blinky	Open	Open	Open	Open	Blinky	Open	Open	Open	Open	Practice
2. SBEC Voltage	5.0V to 7.4V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V
3. Forward Power	50% to 100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
4. Reverse Power	25% to 100%	-	-	-	-	-	-	-	-	-	-	-	50%
5. Sensor Mode	Full Sensored/ Smart Sense	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Full Sensored	Smart Sense
6. Motor Rotation	Normal/ Reverse	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal	Normal
7. Battery Cut Off	Disable/ 3.0V to 7.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V	6.4V
8. Motor Temperature Cut	Disable/ 160° F (71° C) to 220° F(104° C)	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C
9. ESC Temperature Cut	Disable/ 160° F (71° C) to 220° F(104° C)	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C	220°F/104°C
10. Brake Strength	0% (disable) to 100%	100%	100%	85%	85%	100%	100%	100%	100%	95%	95%	100%	100%
11. Brake PWM	600Hz to 12KHz	2KHz	2KHz	2.5K	2.5K	5KHz	1.6KHz	2KHz	1.6KHz	1.6KHz	1.6KHz	1.6KHz	2KHz
12. Brake Curve	100% ~ 10% / Linear / -10% ~ -100%	Linear	Linear	-10%	-10%	Linear	Linear	20%	20%	Linear	Linear	Linear	Linear
13. Drag Brake	0% to 100%	0%	0%	5%	5%	10%	8%	5%	5%	10%	8%	0%	0%
14. Drag PWM	600Hz to 12KHz	-	-	2.5K	2.5KHz	1.6KHz	1.6KHz	-	1.6KHz	1.6KHz	1.6KHz	1.6KHz	-
15. Dynamic Brake RPM	10000 to 60000 RPM	15000RPM	17000RPM	40000RPM	38000RPM	45000RPM	40000RPM	17000RPM	30000RPM	30000RPM	30000RPM	30000RPM	15000RPM
16. Dynamic Brake PWM	600Hz to 16KHz	8KHz	8KHz	8KHz	9.6KHz	8KHz	9.6KHz	8KHz	1.6KHz	1.6KHz	1.6KHz	1.6KHz	8KHz
17. Initial Brake	0% to 50%	-	-	5%	5%	10%	8%	-	10%	10%	10%	10%	-
18. Throttle PWM	1KHz to 32KHz	4KHz	4KHz	9.6KHz	9.6KHz	5KHz	6.4K	4KHz	8k	8k	8k	8k	4KHz
19. Throttle Punch	1% to 150%	150%	150%	120%	120%	125%	125%	150%	130%	100%	100%	75%	150%
20. Throttle Curve	100% ~ 10% / Linear / -10% ~ -100%	Linear	Linear	Linear	Linear	Linear	Linear	Linear	20%	-30%	-10%	-10%	Linear
21. Throttle Smooth Range	1% to 40%	-	-	-	-	20%	20%	-	25%	25%	25%	25%	-
22. Throttle Smooth Value	Level 1 to 10	-	-	-	-	Level 4	Level 5	-	Disable	Disable	Disable	Disable	-
23. Neutral Position Range	1% to 10%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%	6%
24. Acceleration Boost Timing	0° to 60° (1° incremental)	-	-	8°	5°	15°	17°	-	35°	5°	2°	0°	-
25. Acceleration Boost Start RPM	500 to 30000 RPM (500 RPM incremental)	-	-	3000RPM	5000RPM	5000RPM	5000RPM	-	5000RPM	2500RPM	1500RPM	1500RPM	-
26. Acceleration Boost Finish RPM	1000 to 50000 RPM (500 RPM incremental)	-	-	20000RPM	22000RPM	20000RPM	27500RPM	-	30000RPM	20500RPM	20500RPM	20500RPM	-
27. Turbo Position	70% to 100%	-	-	100%	100%	100%	100%	-	88%	88%	88%	80%	-
28. Turbo Timing	0° to 60° (1° incremental)	-	-	10°	10°	18°	20°	-	45°	27°	24°	40°	-
29. Turbo Up Slew Rate	Level 1 to 10	-	-	3	3	6	6	-	10	5	3	8	-
30. Turbo Down Slew Rate	Level 1 to 10	-	-	10	10	10	10	-	2	8	6	3	-
31. Turbo Delay (sec)	0 to 0.9 sec (0.05 sec incremental)	-	-	0	0	0	0	-	0	0	0	0	-
32. Overboost	Level 1 to 10	-	-	-	-	-	-	-	5	-	-	-	-

## 7. Data Logging

The MDP 160 data logging function records major system info in the CPU memory. That includes throttle/ brake position, motor RPM, ESC and motor temperature. The ESC memory can record a total of 12 minutes of data (subject to change due to software management without notice). When viewing data through the Maclan ProLink or the Maclan Panel Windows software, it will show you the maximum and minimum of all values. When viewing data through the mobile Smart Link App, you will receive much more detailed information broken down into sessions.

## 8. Service & Warranty

Your Maclan MDP 160 ESC is guaranteed to be free from defects in materials and workmanship for a period of 30 days. It is counted by the date of purchase. Your **original receipt** showing the item and the date and place of purchase is required with your warranty service application. An ESC that is found to have been mishandled, abused or used incorrectly, including use in an application other than that for which the ESC is intended, will not be covered under the warranty. Maclan Racing has no control over the use of the ESC application with other electronic devices such as motors and batteries. Maclan Racing is not liable for any loss or damage, whether direct or indirect, incidental, or consequential, or any situation from the use, misuse or abuse of the product. Your MDP 160 ESC is not a toy. This product is not intended for use by a child under age of 14 without adult supervision. The MDP 160 ESC generates a lot of power that could result in physical injuries. By setting up, connecting or operating the product, the user accepts all related liabilities. Maclan Racing's liability shall never exceed the product's original cost.

For all technical questions, please visit [www.maclan-racing.com](http://www.maclan-racing.com) to fill out a contact inquiry form, or e-mail your question to [service@hobbyauthority-dist.com](mailto:service@hobbyauthority-dist.com)

Maclan Racing offers a product trade-in program and reserves the right for all warranty applications. Please visit [www.maclan-racing.com](http://www.maclan-racing.com) for details.



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