Maclan
ENDLESS INNOVATIONS

DRK 160+ TSR Edition ESC
Quick Installation Guide

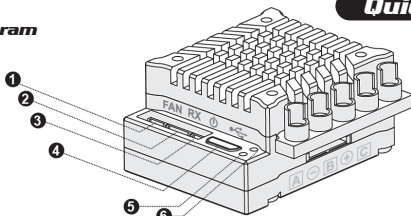## 1. DRK ESC Physical Diagram

1. Fan power port
2. RX receiver port
3. Power switch port
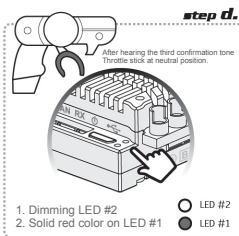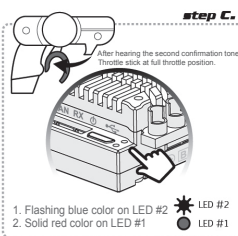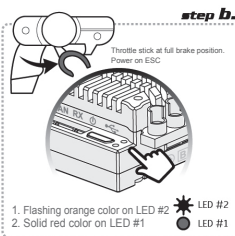4. Micro USB host port
5. LED #1
6. LED #2

2. Power on DRK ESC

There are 2 ways to power on and off DRK ESC; with the included slide switch plugged into the ESC, it will be controlled by the switch. If the slide switch is not installed, the ESC power is controlled by the battery connection and the ESC will power on as soon as the battery is plugged in. It will then power off when the battery is unplugged.

3. Radio Calibration

a. Power on your transmitter with the ESC off.

step b.
Throttle stick at full brake position.
Power on ESC

1. Flashing orange color on LED #2 — LED #2
2. Solid red color on LED #1 — LED #1

step c.
After hearing the second confirmation tone
Throttle stick at full throttle position.

1. Flashing blue color on LED #2 — LED #2
2. Solid red color on LED #1 — LED #1

step d.
After hearing the third confirmation tone
Throttle stick at neutral position.

1. Dimming LED #2 — LED #2
2. Solid red color on LED #1 — LED #1

b. Hold FULL BRAKE on your transmitter while powering on the ESC. You will get a confirmation tone. You will see a solid RED on LED #1 with flashing ORANGE LED #2. (The flashing ORANGE LED means the ESC is capturing the FULL BRAKE position)

c. When the ORANGE LED turns solid, you will get a second confirmation tone. The LED #2 will begin flashing BLUE. Apply FULL THROTTLE now. (The flashing BLUE LED #2 means the ESC is capturing the FULL THROTTLE position)

d. When the BLUE LED turns off with a third confirmation tone, release the throttle to neutral position. The ESC is now capturing the neutral position.

e. You will get a power-on tone to confirm the calibration process is complete.

**A complete radio calibration video could be found from Maclan Racing web site and its YouTube channel. Visit the web site to view the complete process.*

4. Programming DRK ESC

There are some options to program your Maclan DRK ESC. You can connect the DRK ESC to Maclan ProLink (sold separately) via the receiver (RX) port on the ESC, or to the micro USB port to change settings. You can connect DRK ESC to a Windows 7/10 PC via its micro USB port to change settings. You will need to download Maclan Panel PC software from Maclan-Racing.com web site. You can also connect DRK ESC to an Android based mobile device (Android OS version 5.0 and up) to change settings by Maclan Link app with USB connection. Or, you can use Maclan AirLink WiFi module to wirelessly connect your Android based mobile device (Android OS version 5.0 and up) or Apple iPhone (iOS 13 and up) by Maclan Link app.

5. Firmware Update

1. Download the latest firmware from www.maclan-racing.com
2. Connect MMax Pro USB to a Windows 7 or Windows 10 PC
3. Run the firmware updating software and follow the instruction on the screen

6. LED Indicators

	LED 1	LED 2	Actions
Power on & no receiver signal	Red	Blue	LED 1 & 2 flash every sec simotaniously
Power on & ROAR blinky mode	Red	Blue & Orange	LED 1 (solid) + LED 2 (alternating blue & orange)
Power on & race open mode	Red	Blue	LED 1 (solid red) + LED 2 (solid blue)
Power on & vehicle runs forward	Red	Blue	LED 1 (solid Red) + LED 2 flashes blue rapidly to solid (full throttle)
Power on & vehicle brakes	Red	Orange	LED 1 (solid Red) + LED 2 flashes orange rapidly to solid (full brake)
Low voltage cut off	Red	Blue	LED 1 & 2 flash every sec alternatly with motor beeping
ESC temperature cut off	Red	Orange	LED 1 & 2 flash twice every sec alternatly with motor beeping
Motor temperature cut off	Red	Orange	LED 1 & 2 flash 3 times every sec alternatly with motor beeping

1. Introduction

The DRK 160+ TSR Edition ESC is the ultimate in engineering design from Maclan Racing. Our commitment to quality and exhaustive track testing ensures that the DRK 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 DRK system.

2. What's New on the DRK 160+ TSR Edition ESC

- Specifically designed for No Prep Drag Race with proven results and extended track testing with Team DRK racers.
- In collaboration with Tim Smith.
- All new 7-STAGE LAUNCH POWER CONTROL along with over-boost 70 degrees top speed timing.
- 10 AWG power wires to handle more power.
- All new DRK Super Capacitor module.

3. Precautions

- For the best performance, we recommend using DRK ESC with Maclan Racing DRK series motors.
- Never operate your DRK ESC without the capacitor module. It will cause permanent damage to the ESC and void factory warranty.
- DRK 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 for assistance.
- Maclan Racing allows control of turbo/boost timing set up in the ESC. Any ESC damage caused from excessive turbo/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.
- Pay attention to the motor and ESC timing. More timing will generate more heat on both the ESC and the motor.
- 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.
- DRK ESC adapts a high performance switching BEC. This requires a high quality radio system. **2.4G and higher quality FM radio systems** are the most suitable to work with the DRK system. AM radio systems can cause noise that results in poor performance or operation failure of the DRK system.

4. Features

- High performance 32-bit CPU for high speed and accurate processing.
- All new DRK firmware algorithms for the strongest ever throttle and drag race launch performance.
- Upgraded Hi-Res data logging
- All new DRK Super Capacitor module for the best performance and protection.

- All aluminum structure with omni directional heat sink for maximum airflow and optimum cooling performance.
- All detachable connectors with several optional length cables.
- Adjustable throttle and brake PWM frequency for fine tuning.
- Advanced Boost/Turbo/Over-Boost system for top level drag racing.
- Motor/ESC temperature protection and low voltage protection.
- MS Windows compatible software for data logging, programing, and firmware updating.

5. Specifications

Scale: 1/10th Brushless Sensored/Sensorless ESC
Continuous Current: 160A
MOSFET Rated current: 400A/phase
Power input: 2S Li-Po
BEC output: Linear Mode 6V to7.4V, 4A
Wire input: Black-10AWG-200mm*2
Wire output: Black-10AWG-200mm*3
Cooling Fan: 30x30x10mm high voltage turbo fan
Motor Limit: Brushless Sensored 3.5T
Dimension: 40x30x19mm (without fan)
Net Weight: 48g (without wires and capacitor module)

6. DRK 160+ TSR Edition Programming Parameters

Parameter 1: Run Mode
Options are Drag Open and Drag Blinky
The Drag Open mode allows advanced turbo timing.
The Drag Blinky mode is for stock class without advanced turbo timine.

Parameter 2: SBEC Voltage
Options are from 5.0V 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 3: Forward Power
Options are from 50% to 100% in 1% Increments. This setting allows you to limit the forward power.

Parameter 4: Reverse Power
Options are from 0% to 100% in 1% Increments. This setting allows you to limit the reverse power.

Parameter 5: Sensor Mode
Options are Full Sensored and Smart Sense
The Full Sensored mode will operate the ESC in sensored only mode. It will provide the highest performance and smoothest power at all times. The Smart Sense mode will allow the Esc to operate with either a sensorless or sensored motor. This option can be helpful in the case of sensor wire malfunction or failure.

Parameter 6: 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 7: Battery Cut Off
Options are Disable, 2.9V to 7.4V in 0.1V increments.
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 to 230 degrees F
This parameter displays both Fahrenheit and Celsius (℉ and ℃) 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 to 230 degrees F.
This parameter displays both Fahrenheit and Celsius (℉ and ℃) 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: 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 12: Throttle Punch
Options are 1% to 100% 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 13: Dead Band
Options are 1% to 10% in 1% Increments
This is the amount of "play" when the throttle is engaged. A setting of 'Off' will make the throttle engage more instantaneously, while 'Wide' would require more trigger movement.

Parameter 14: Turbo Position
Options are 70% to 100%, in 1% Increments.
This function sets the top speed turbo timing kick in position according to the throttle position. The lower value will allow top speed turbo to kicker sooner. It is extremely dangerous and can cause permanent damage to the ESC. It is not covered by the warranty if it was set at lower than 100%.

Parameter 15: Turbo Timing
Options are 0 (Disable) to 70 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 16: Turbo Up Slew Rate
Options are Level 1 to 10.
This sets how fast the ESC reaches the maximum advanced top speed timing. The larger number will have more aggressive top speed acceleration while the smaller number will have smoother feeling.

Parameter 17: Turbo Delay
Options are 0/0.05/0.1/0.15/0.2/0.25/0.3/0.35/0.4/0.45/0.5/0.55/0.6/0.65/0.7/0.75/0.8/0.85/0.9 sec.
When this parameter is set to 0, the Turbo will be activated right after the throttle trigger is moved to the full throttle position. When it is set to a value, the turbo will be held for the selected delay period. This will provide flexibility for different track layouts.

Parameter 18 to 30: Stage Power and Time
Options are 1% to 100% in 1% Increments.
It sets the power output of each stage launch power control.
Options are 0.2 sec to 2.5 sec in 0.05sec Increments
It sets the time duration of each stage launch power control.

Warning: Turbo function is an advanced features for experienced users, and if used incorrectly can damage the ESC or motor system. Make sure to monitor temperature levels in both the speed controller and motor carefully, and adjust gearing as needed. Any system damage caused by boost/turbo/over boost will not be covered by our factory warranty.

DRK 160+ TSR Edition ESC Parameters Table

	Parameters	Values
General & Protections	1. Run Mode	Drag Open/Drag Blinky
	2. SBEC Voltage	6.0V to 7.4V
	3. Forward Power	50% to 100%
	4. Reverse Power	0% to 100%
	5. Sensor Mode	Full Sensored/ Smart Sense
	6. Motor Rotation	Normal/ Reverse
	7. Battery Cut Off	Disable/ 3.0V to 7.4V
	8. Motor Temperature Cut	Disable/ 160° F (71° C) to 220° F(104° C)
	9. ESC Temperature Cut	Disable/ 160° F (71° C) to 220° F(104° C)
Brake Settings	10. Brake Strength	0% (disable) to 100%
	11. Drag Brake	0% to 100%
Throttle Settings	12. Throttle Punch	1% to 150%
	13. Dead Band	1% to 10%
Advanced Timing Settings	14. Turbo Position	70% to 100%
	15. Top Speed Turbo	0° to 70°
	16. Up Slew Rate	2.3°@0.1 sec to 20.3°@0.1 sec
	17. Turbo Delay	0 sec to 0.9 sec
Launch Power Control	18. 1st Stage Power	1% to 100%
	19. 1st Stage Time	0.05 sec to 2.50 sec
	20. 2nd Stage Power	1% to 100%
	21. 2nd Stage Time	0.05 sec to 2.50 sec
	22. 3rd Stage Power	1% to 100%
	23. 3rd Stage Time	0.05 sec to 2.50 sec
	24. 4th Stage Power	1% to 100%
	25. 4th Stage Time	0.05 sec to 2.50 sec
	26. 5th Stage Power	1% to 100%
	27. 5th Stage Time	0.05 sec to 2.50 sec
	28. 6th Stage Power	1% to 100%
	29. 6th Stage Time	0.05 sec to 2.50 sec
	30. 7th Stage Power	1% to 100%

7. Factory Profiles

The DRK ESC has 6 preset profiles that was designed for 3.5T/4.0T/4.5T motors in low or high traction conditions. You can select a corresponding profile for your application, then make fine adjustments for the actual track condition. You can also reload factory default settings for each profile via the ProLink, Maclan Link app, or a PC. You can also fine tune all parameters in each profile to meet your needs.

8. Data logging

The Maclan data logging function records system info in the ESC's CPU memory. This includes throttle/ brake position (on mobile Maclan Link App only), motor RPM, ESC and motor temperature. The DRK ESC data logging is designed to display high resolution with 0.1 sec / line recording. When viewing data through the Maclan ProLink or the Maclan Panel software, it will show you the maximum and minimum of all values. When viewing data through the mobile Maclan Link App, you will receive much more detailed information broken down into sessions.

9. Service & Warranty

Your Maclan DRK ESC is guaranteed to be free from defects in materials and workmanship for a period of 30 days. 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 DRK ESC is not a toy. This product is not intended for use by a child under age of 14 without adult supervision. The DRK 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.

Manufacture disclaimer:
- If the ESC was able to power on, calibrate, and run a motor, it is free of factory manufacturing defect.
- Reverse polarity damage is not a warranty.
- Tire burnout is controlled by the racer. It can damage the ESC. It is not a warranty.
- Due to the nature of the drag race application, Maclan Racing only guarantee free from manufacturing defect. Any damage during a race is not a manufacturing defect. It is not a warranty.

For service, please visit **www.hadrma.com** and follow the service instructions for the quickest turnaround time.

For all technical questions, please visit www.maclan-racing.com for the corresponding FAQ, or e-mail your question to **service@hobbyauthority-dist.com**

Maclan Racing offers a product trade-in program and reserves the right for all warranty applications. Please visit **www.maclan-racinng.com** for details.

DRK

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