

User Manual

1. Introduction

The M32t Pico100 sensored Electronic Speed Controller is the ultimate in engineering design from Maclan Racing. It is based on the successful platform of Maclan Racing ESCs. Our commitment to quality and exhaustive track testing ensures that the M32t Pico100 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 M32t Pico100 system.

2. Precautions

- Reverse polarity to the ESC will cause permanent damage. It is not covered by the factory limited warranty.
- For the best performance, we recommend using M32t Pico100 ESC with Maclan Racing MRR series motors.
- Never operate your M32t Pico100 ESC without the capacitor module. It will cause permanent damage to the ESC and void factory warranty.
- M32t Pico100 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.
- 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.
- 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 discharge of the battery.
- Always monitor both the ESC and motor temperature after running them. Temperature should never exceed 180 degrees Fahrenheit.
- M32t Pico100 ESC requires a high-quality radio system. 2.4G radios are the most suitable to work with the M32T Pico100 system. AM radio systems can cause noise that results in poor performance or operation failure of the M32T Pico100 system.

3. Features

- High performance 32-bit CPU for high speed and accurate processing.
- New generation firmware algorithms for the strongest ever throttle and brake performance.
- X2 size of memory for improved HD data logging function.
- Smaller footprint over previous generation.
- On board Type-C USB host for the ease of connectivity and unlimited extensibility.
- Dual 'power-on' options for the 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.
- Motor/ESC temperature protection and low voltage protection.
- Multiple programing options.

4. Specifications

Scale: 1/10th Stock Class Brushless Sensored/Sensorless ESC

Continuous Current: 100A

Power input: 2S Li-Po

BEC output: Linear Mode 6V to 7.4V, 4A

Wire input: Black-13AWG-200mm*2

Wire output: Black-13AWG-200mm*3

Cooling Fan: 30x30x10mm high voltage turbo fan

Motor: Brushless Sensored/sensorless motor down to 3.5T

Dimension: 38x30x19mm (without cooling fan)

Net Weight: 30g (without wires and capacitor module)

6. Programming Parameters

Parameters	Values
1. Run Mode	Practice/Race Blinky
2. SBEC Voltage	5.0V to 7.4V
3. Forward Power	50% to 100%
4. Reverse Power	25% 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)
10. Brake Strength	0% (disable) to 100%
11. Brake PWM	600Hz to 12KHz
12. Brake Curve	100% ~ 10% / Linear / -10% ~ -100%
13. Drag Brake	0% to 100%
14. Drag PWM	600Hz to 12KHz
15. Dynamic Brake RPM	10000 to 60000 RPM
16. Dynamic Brake PWM	600Hz to 16KHz
17. Initial Brake	0% to 50%
18. Throttle PWM	1KHz to 32KHz
19. Throttle Punch	1% to 150%
20. Throttle Curve	100% ~ 10% / Linear / -10% ~ -100%
21. Neutral Position Range	1% to 10%

Parameter 1: Run Mode

Options are Practice/Race Blinky

Practice allows all settings to be adjusted on the ESC. Also, it allows reverse. Race Blinky locks out reverse and does not allow any boost, turbo, or over boost to be enabled.

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 25% 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 Pico100vide 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°F (71°C) to 230°F (110°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°F (71°C) to 230°F (110°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

500Hz/1KHz/1.5KHz/2KHz/2.5KHz/3.2KHz/4KHz/5KHz/6.4Hz8KHz/9.6KHz/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 Pico100vide a drag force when the throttle is released to the neutral position.

Parameter 14: Drag Brake PWM

Options are

500Hz/1KHz/1.5KHz/2KHz/2.5KHz/3.2KHz/4KHz/5KHz/6.4Hz8KHz/9.6KHz/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.

This parameter allows to setup the PWM when drag brake kicks in. It differentiates from the regular bake PWM as a customize option.

Parameter 15: Dynamic Brake RPM

Options are 10000RPM to 60000RPM in 500RPM increments.

The Dynamic Brake allows the ESC to have a customized brake PWM in a predefined range. It allows the ESC to brake with a different brake PWM frequency when the motor RPM reaches the setup RPM. We'd suggest using this function at the high speed section with higher Dynamic Brake PWM value in order to have a mellower brake to avoid traction rolling.

It has 2 parameters to work, Dynamic Brake RPM and Dynamic Brake PWM. The Dynamic Brake RPM defines what RPM the Dynamic Brake PWM would engage.

Parameter 16: Dynamic Brake PWM

Options are

500Hz/1KHz/1.5KHz/2KHz/2.5KHz/3.2KHz/4KHz/5KHz/6.4Hz8KHz/9.6KHz/12KHz/16KHz

The Dynamic Brake allows the ESC to have a customized stage brake PWM setting. It allows the ESC to brake with a different brake PWM frequency when the motor RPM reaches the setup RPM. We'd suggest using this function at the high speed section with higher Dynamic Brake PWM value in order to have a mellower brake to avoid traction rolling.

It has 2 parameters to work, Dynamic Brake RPM and Dynamic Brake PWM. The Dynamic Brake PWM defines what PWM to engage.

Parameter 17: Initial Brake

Options are 0% to 50% in 1% increments.

This will set the minimum brake force when pushing the throttle trigger from neutral point to the initial brake position. A higher value will Pico100vide stronger brake strength when it engages.

Parameter 18: Throttle PWM

Options are

1KHz/1.6KHz/2KHz/2.5KHz/3.2KHz/4KHz/6.4KHz/8KHz/9.6KHz/12KHz/16KHz/32KHz

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, Pico100duces more motor RPM, but will increase ESC temperatures.

Parameter 19: 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.

This parameter has been refined from the previous generation firmware. It is now up to 150% maximum with more resolutions to fine tune in different applications.

Parameter 20: 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 21: Neutral Position Range

Options are 1% to 10%

This is the amount of "play" when the throttle is engaged. With some radio transmitters, they require a larger range so the ESC can work properly.

7. Factory Profiles

The M32t Pico100 ESC has 12 profiles. You can select a corresponding profile for your application. You can also reload factory default settings for each profile via the ProLink, a Windows PC, or the smart phone app. 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
		Off Road 2WD Blinky	Off Road 4WD Blinky	TC Blinky	Custom	Custom	Custom
1. Run Mode	Practice/Race Blinky	Blinky	Blinky	Blinky	Practice	Practice	Practice
2. SBEC Voltage	5.0V to 7.4V	6.0V	6.0V	6.0V	6.0V	6.0V	6.0V
3. Forward Power	50% to 100%	100%	100%	100%	100%	100%	100%
4. Reverse Power	25% to 100%	-	-	-	50%	50%	50%
5. Sensor Mode	Full Sensored/ Smart Sense	Full Sensored	Full Sensored	Full Sensored	Smart Sense	Smart Sense	Smart Sense
6. Motor Rotation	Normal/ Reverse	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
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
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
10. Brake Strength	0% (disable) to 100%	100%	100%	100%	100%	100%	100%
11. Brake PWM	600Hz to 12KHz	2KHz	2KHz	2KHz	2KHz	2KHz	2KHz
12. Brake Curve	100% ~ 10% / Linear / -10% ~ -100%	Linear	Linear	20%	Linear	Linear	Linear
13. Drag Brake	0% to 100%	0%	0%	5%	0%	0%	0%
14. Drag PWM	600Hz to 12KHz	-	-	-	-	-	-
15. Dynamic Brake RPM	10000 to 60000 RPM	15000RPM	17000RPM	17000RPM	15000RPM	15000RPM	15000RPM
16. Dynamic Brake PWM	600Hz to 16KHz	8KHz	8KHz	8KHz	8KHz	8KHz	8KHz
17. Initial Brake	0% to 50%	-	-	-	-	-	-
18. Throttle PWM	1KHz to 32KHz	4KHz	4KHz	4KHz	4KHz	4KHz	4KHz
19. Throttle Punch	1% to 150%	150%	150%	150%	150%	150%	150%
20. Throttle Curve	100% ~ 10% / Linear / -10% ~ -100%	Linear	Linear	Linear	Linear	Linear	Linear
21. Neutral Position Range	1% to 10%	6%	6%	6%	6%	6%	6%

8. Data Logging

The Maclan data logging function records major system info in the ESC's CPU memory. This includes throttle/ brake positions, motor RPM, ESC and motor temperature. You may check the data logging by all programming devices.

9. Service & Warranty

Your Maclan M32t Pico100 ESC is guaranteed to be free from defects in materials and workmanship for a period of 90 days. Your **original receipt** showing the item and the date and place of purchase is required with your warranty service application. Due to the extreme 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 M32t Pico100 ESC is not a toy. This product is not intended for use by a child under age of 14 without adult supervision. The M32t Pico100 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.

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-racing.com for details.

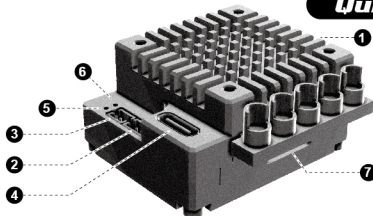
Made in Taiwan

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1. M32t Physical Diagram

- 1 Fan power port
- 2 RC receiver port
- 3 Power switch port
- 4 Type-C USB port
- 5 LED #1
- 6 LED #2
- 7 Motor sensor port

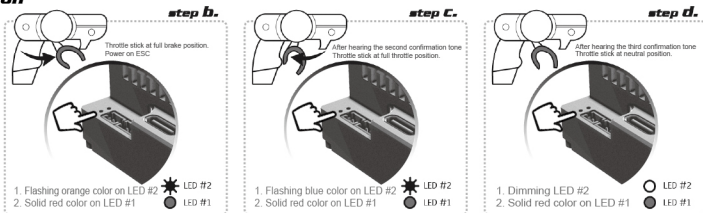


2. Power on M32t ESC

There are 2 ways to power on and off M32t ESC: with the included slide switch plugged into the ESC power switch port, 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. Throttle/ Radio Calibration

- a. Power on your transmitter with the ESC off.



- 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 M32t ESC

There are some options to program your Maclan M32t Pro/Pico ESC.

1. You can connect the M32t ESC to Maclan ProLink (sold separately) via the USB port with a Maclan P/N MCL4188 cable.
2. You can connect M32t ESC to a MS Windows 10 PC via its Type-C USB port to change settings with a Maclan P/N MCL4240 cable. You will need to download the latest Maclan Panel PC software from Maclan Racing web site.
3. You can connect M32t ESC to an Android phone (Android OS version 5.0 or later) via its USB port with a Maclan P/N MCL4188 cable to change settings and view data log by Maclan Smart Link app.
4. You can connect M32t ESC to an Android phone (Android OS version 5.0 or later) or an Apple iPhone (iOS 13 or later) via a Maclan Wireless Link device (sold separately, P/N MCL4220) to change settings and view data log by Maclan Smart Link app.

5. Firmware update

1. Download the latest Maclan Panel software for Windows 10 from Maclan-Racing.com
2. Power on the ESC with battery, connect the M32t ESC to a Windows 10 PC via its USB port with a Maclan P/N MCL4240 cable.
3. Run the Maclan Panel software and follow the instruction on the screen to update firmware.

6. LED Indicators

	LED 1	LED 2	Actions
Power on & no receiver signal	Red	Blue	LED 1 & 2 flash every sec simultaneously
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 alternately with motor beeping
ESC temperature cut off	Red	Orange	LED 1 & 2 flash twice every sec alternately with motor beeping
Motor temperature cut off	Red	Orange	LED 1 & 2 flash 3 times every sec alternately with motor beeping