



INSTRUCTION MANUAL

More documents:

[Quick Start Guide](#) | [Blinky/Modified User Guide](#)

Thank you for the purchase of the multi-time US National Champion HMX® Technology speed controller, incorporating the latest brushless speed controller technology.

WARNINGS

- Do not let children use this product without the supervision of an adult.
- Never leave the ESC unsupervised while it is powered on.
- The ESC might get hot during use, be careful when handling it.
- Always disconnect the battery after use, do not store with the battery connected.
- Do not use near flammable materials.
- If the ESC overheats, emits smokes or burns, immediately discontinue use, disconnect the battery and seek assistance.
- Setup of this ESC requires the use of mobile devices and/or computers. Team Orion does not guarantee that your current devices or USB cables are compatible for use with the HMX ESC. Team Orion takes no responsibility for eventual damage to these devices, persons or surroundings resulting of their use with the HMX ESC.

WARRANTY

Team Orion guarantees this product to be free from manufacturing and workmanship defects. The warranty does not cover incorrect installation, components worn by use, or any other problem resulting from incorrect use or handling of the product. No liability will be accepted for any damage resulting from the use of this product. By the act of connecting and operating this product, the user accepts all resulting liability. Is considered incorrect use:

- Failure to follow instructions.
- Improper use of the product (abusive use, out of spec, etc.)
- Failure to adapt settings for proper function (improper connections, wrong gearing, installation, setup, etc.).
- Overload, overheating (desoldering, melting, etc.).
- Running in inadequate conditions (damage or rust from rain, humidity, etc.).
- Improper maintenance (presence of dirt, etc.).
- Disassembly, modification by the user (modifying original connectors, wires, components, etc.).
- Mechanical damage due to external causes.

CONNECTION

The HMX ESC is intended for use with motors equipped with sensors only, the ESC will not work without a working sensor connection. You must respect the A-B-C wire connection order or the ESC will not work. **Note:** The motor rotation direction cannot be changed in the software.

CALIBRATION AND SETUP

The HMX ESC requires the use of a mobile device or a Windows PC to calibrate and setup. Always power the HMX ESC with a battery when connecting it to a mobile device or PC.

MOBILE DEVICES

For wired connection Android devices must have OTG (On-The-Go) capability, this allows for direct device to device connections. Most Android devices have this feature, refer to you device manufacturer literature if you need further information. For IOS devices a Bluetooth dongle is in development and will be released soon. Android devices will also be able to use this Bluetooth dongle when it's released. To connect the HMX ESC to your Android device, use the OTG Micro USB cable supplied with the ESC. Connect the cable to the Micro USB connector on the ESC and to your Android device. **Note:** the HMX will draw power from your Android device when it is connected with the cable. Make sure that the device's battery is charged.

WINDOWS PC

You can connect the HMX ESC to a Windows PC using a standard USB to Micro USB cable. When you connect the ESC to your PC for the first time, you need to be online and a driver should be automatically installed. After installation, the HMX ESC should show has a COM PORT in your device manager. You can find the mobile device APP from their respective official stores, the Windows app and firmwares can be downloaded from our website www.hmstechnology.com

CALIBRATION

You will find the calibration function inside the apps. Once your ESC is connected, powered ON and functional, simply launch the app (Mobile or PC), find the calibration function and follow the onscreen information. **Note:** switch ON your transmitter before powering ON the ESC and starting the calibration

LED FUNCTION

The LED located on the ESC gives information about the current status of the ESC.

LED FLASHES EXPLANATION

DISABLED	GREEN THEN RED REPEATEDLY (FAST)
RECOVERY MODE	GREEN THEN RED REPEATEDLY (SLOW)
NORMAL MODE ON/NEUTRAL	BOTH LED ON
BLINKY MODE ON/NEUTRAL	RED FLASHING
MOVING FORWARD/REVERSE	RED LED ON
MAX THROTTLE	GREEN LED ON
MAX BRAKES	GREEN LED FLASHING

ERROR LED (BOTH LED FLASHING)

RADIO SIGNAL ISSUE	ONE FLASH
SENSOR ISSUE	TWO FLASH
ESC OVERHEATING	THREE FLASH
BATTERY LOW VOLTAGE	FOUR FLASH
BATTERY OVER VOLTAGE	FIVE FLASH

TROUBLESHOOTING / PC APP STATUS MONITOR

The PC app has a monitoring tab that shows the current status of the ESC. It displays realtime information such as battery voltage and temperatures and also if there are any issues. The PC app is our preferred method for troubleshooting the ESC. Faults are separated in two columns, history for a fault that exists or existed since the last time the ESC was powered ON and Realtime for faults that currently exist.

NO FAULTS (ALL GREEN) SHOULD BE PRESENT FOR THE ESC TO FUNCTION!

- If there are no Realtime faults but there is some historic faults, it may indicate an intermittent issue with the radio, sensor, cooling or battery.
- Radio, indicates an issue with the radio signal that the ESC receives. Make sure that your radio equipment is functional.
- Sensor, indicates a sensor issue, either with the motor sensor or with the sensor cable. Replace the motor sensor or sensor cable.
- Overheat, indicates that the ESC is overheating, temperature limit is set at 110°C. Make sure that the cooling fan is functional and/or improve the air flow around the ESC.
- Low voltage, indicates that the battery voltage has gone below the preset cut-off voltage. Use a charged or functional battery to fix the issue. With a damaged/worn/low power battery, If the load on the motor/ESC is too high the battery voltage can also go below this limit, even if the battery is charged.
- High voltage, indicates that the battery voltage is over the physical limit of the ESC or the limit fixed in the firmware. Depending on the ESC type we have fixed different limits for maximum battery voltage.

GENERAL SETTINGS

SETTINGS	
Drive mode	<ol style="list-style-type: none">1. "Forward Only with Brake" this mode is meant for competition use. In this mode the car can go forward and brake, there is no reverse.2. "Forward/Reverse with Brake" this is the basic all-around mode. In this mode the car can go forward and reverse and can also brake. When you move the throttle to the reverse position while the car is moving forward, brakes are applied until the car stops, reverse cannot engage while the car is moving. To engage reverse, once the car has stopped, release the brakes and move the throttle to the reverse position again. While braking or in reverse, if the throttle is moved to the forward position, the car will immediately accelerate forward.3. "Forward/Reverse" this mode is meant for Rock Crawler use. In this mode there is no brake, the car can go from forward to reverse immediately without any pause. Do not use this mode with other car types as it can overload and/or damage the ESC.
Drag Brake	Sets the amount of brake automatically applied when the throttle is returned to the neutral position. This simulates the engine braking effect of a real car.
Low Voltage Cut-off	This function helps to prevent battery over-discharge. The ESC continuously monitors the battery's voltage. If the voltage becomes lower than the threshold for a preset amount of time, the power output of the ESC is reduced to prevent over-discharging the battery. Use a higher setting for better battery preservation and a lower setting if the ESC is cutting the power too soon. Depending on the conditions of use the results may vary.
Punch	This setting adjusts the strength of the acceleration. A higher setting gives a stronger acceleration throughout the rpm range. Remember that other settings like timing and max torque also affect the acceleration.

Max torque	This setting affects the initial acceleration. A higher value gives more instant power when you open the throttle. More useful for slower motors.
Max brake	This setting sets the maximum braking power. A higher setting increases the braking power. You need to adjust this setting to the track/grip conditions. Warning! Brakes can cause the motor and ESC to overheat.
Initial brake	This settings sets the minimum braking power used when the brakes engage. With a higher value you will need less brake travel to obtain more braking power, the maximal braking power remains the same.
Brake frequency	The brake frequency affects the feeling of the brakes. A lower value will give the brakes more bite and more power. 4wd or heavier cars can usually use a lower frequency for more braking performance, 2WD usually require higher frequencies.
Neutral range	This setting adjusts the throttle sensitivity around the neutral point. A higher value means that the throttle will have to be moved further for the car to move forward, backward or brake, it makes the ESC less sensitive to throttle inputs.
Blinky mode	You can use this setting to switch the ESC into blinky mode when you are using the modified motor firmware (1.xx versions). In blinky mode all the timing functions of the ESC are disabled. If you are using a blinky firmware (2.xx versions), this box is greyed out, blinky mode is ON by default and the timing functions are always deactivated. Modified and blinky firmwares do not use the exact same performance settings within the firmware. To achieve the best possible blinky performance, we recommend using the blinky firmware. For sanctioned blinky races you must use an official blinky firmware of the 2.xx series, this are the only ones which are submitted to IFMAR/ROAR/EFRA for approval.
BEC voltage	This setting controls the power receiver and servo power supply. There are two options 6V or 7.4V. 7.4V make the steering servo perform better, but you need to be sure the receiver and servo are compatible with a 7.4V power supply.
Number of cells	This setting is used by the low voltage cut-off system to calculate the cut-off limit for the battery. Adjust the number to the number of cells making up your battery (value fixed in certain firmwares).
Overheat protection	This setting disables the integrated system that protects the ESC from damage it may sustain if it gets too hot. We recommend leaving this setting always ON, disabling this protection may results in permanent damage to the ESC.
Number of poles	This setting needs to be set to the number of poles of the motor. Generally 2 poles for 1/10 and 4 poles for 1/8th.

TIMING

TIMING SETTINGS

2 Timing Functions	The HMX ESC has two timing functions, one based on motor RPM (boost timing) and one based on throttle position (turbo timing). Combined with the punch/torque settings, you can totally change the feel of the ESC. Remember that depending on the conditions, you might only need a little timing or no timing at all to achieve satisfactory performance, more timing does not always mean better lap times.
Boost Timing	Boost timing uses a start RPM and an increase (scale) RPM. There are two settings (Timing1 and Timing 2) which work in the same way. Timing 1 should be enough for most users but you can also use timing 2 for further fine tuning. Both can be active at the same time, with timing 2 adding itself to timing 1.
Turbo Timing	Turbo timing is only active when you are at full throttle, its main function is too increase top speed, especially when increasing boost timing would impact the car handling negatively, such as giving too much low end power causing the car to loose traction. Boost timing and turbo timing can be active simultaneously.
Max Timing	There is only one maximum timing degrees setting (timing angle) for both boost timing and Turbo timing (max timing = RPM timing + Turbo timing). This means that the max timing will be reached either by motor RPM of full throttle time or a combination of the two.

GENERAL USAGE

General usage:	<ul style="list-style-type: none"> • Boost timing (Increases performance throughout the RPM range and increases top speed) • Lower start and scale RPM = stronger acceleration, less time to reach top speed and more top speed. • Higher start and scale RPM = softer acceleration, more time to reach top speed, more top speed. <p>Note: The motor RPM need to be high enough for the boost timing to activate or be fully applied.</p>
Example:	With these setting, timing1 start 10000rpm, timing1scale 2500rpm, max timing 10deg. This means that timing1 will activate at 10000rpm and 1deg of timing will be applied then an extra degree of timing will be applied every 2500rpm. This means that the 10deg of timing will be applied at 10000rpm + 10x2500rpm = 35000rpm. Of course if turbo is active it will also add timing and then the 10deg of total timing might be achieved earlier.
Turbo timing (increases performance when at full throttle only)	Shorter delay and higher scale = stronger acceleration, less time to reach top speed and more top speed. Longer delay and lower scale = softer acceleration, more time to reach top speed, more top speed.

SETTINGS	
Timing 1 start RPM	This setting determines the motor RPM at which the boost timing 1 will activate. Lower setting = earlier activation and more low end power higher setting = later activation and less low end power
Timing 1 scale RPM/DEG	This setting determines the motor RPM required to increase timing by 1deg. Lower setting = more low end power higher setting = less low end power
Timing2start RPM	Same as for timing1start above
Timing2scale RPM/DEG	Same as timing1scale above
Max timing DEG	This is the maximum timing degrees that will be used. More timing usually results in more performance, but it also causes the ESC and motor to run hotter and reduces runtime. Higher timing = more power and speed, but more heat generation and less runtime lower timing = less power and speed, but less heat and more runtime
Turbo delay SEC	This is the amount of time you need to hold full throttle before the turbo timing activates. Shorter delay = earlier activation Higher delay = later activation
Turbo slope DEG/0.1SEC	This is the amount of degrees of timing added for each 0.1sec at full throttle Lower scale = less performance increase from the turbo function Higher scale = more performance from the turbo function