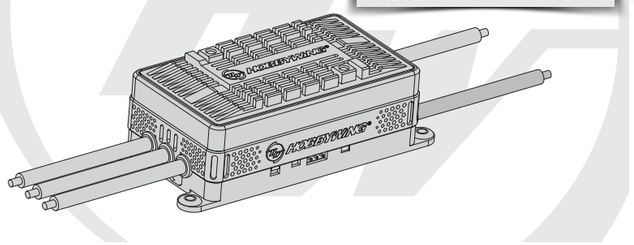
USER MANUAL
PLATINUM
Brushless Electronic Speed Controller
Platinum HV-160A 20170331



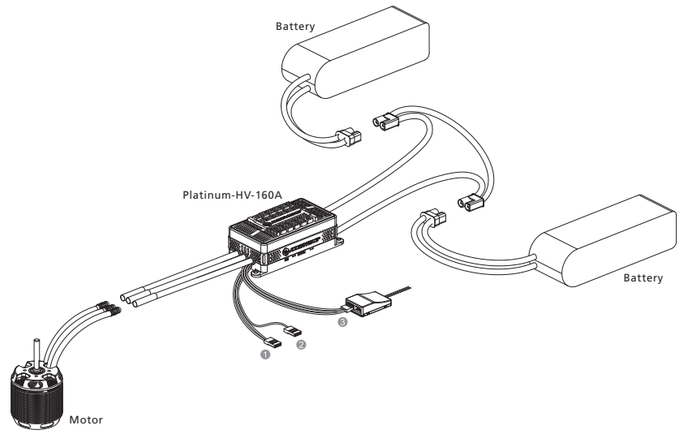
Thank you for purchasing this HOBBYWING product! Brushless power systems can be very dangerous. Any improper use may cause personal injury and damage to the product and related devices. We strongly recommend reading through this user manual before use. Because we have no control over the use, installation, or maintenance of this product, no liability may be assumed for any damages or losses resulting from the use of the product. We do not assume responsibility for any losses caused by unauthorized modifications to our product. We, HOBBYWING, are only responsible for our product cost and nothing else as result of using our product.

01 Features

- High performance microprocessor with a running frequency of up to 120MHz for excellent motor speed-governing and super soft startup.
- Microprocessor powered by independent DC regulator has better anti-interference performance, which greatly reduces the risk of losing control.
- Multiple flight modes: Fixed-wing, Heli (Linear Throttle Response), Heli (Elf Governor), and Heli (Store Governor).
- Data logging records the standardized RPM, minimum voltage, maximum current and maximum temperature of the flight.
- "Restart in auto rotation" can manually interrupt the auto rotation and quickly restart the motor to avoid crashes caused by incorrect operations.
- WIFI module (sold separately) for programming the ESC wirelessly with your smart phone (ios or Android).
- Internal anti-spark circuitry effectively eliminates electric sparks produced when the ESC is powered on.
- Independent output port for RPM (that is: motor speed) signals.
- Separate programming port for ESC programming or parameter setting.
- Multiple protections like thermal shutdown protection, overload protection, over-current protection, etc.
- BEC is separated from other circuits of the ESC, it will keep its normal output when the MOSFET board of the ESC is burnt down.
- Online firmware upgrade via HOBBYWING multifunction LCD program box or WiFi module.

02 Begin to Use the New Brushless ESC

1 Connections



❶ **BEC Output Wire (red, brown):** Plug the extra BEC output wire (or wire 1) into the special battery channel or any unoccupied channel on the receiver.
❷ **RPM Signal Wire (yellow):** Plug this wire (or wire 2) into the RPM input channel on the flybarless system. (User can use the RPM signal wire to provide the RPM signal input when using an external governor.)
❸ **Throttle Signal Wire (white, red and black):** Plug this wire (wire 3) into the throttle channel on the receiver or the corresponding channel on the flybarless system like the RX B channel on the VBAR system. Which channel you should plug the wire in depends on the specific kind of receiver and flybarless system you use. The White wire is for transmitting throttle signals, the Red and Black wires are respectively connected to the output end of the built-in BEC (Red wire = BEC output, Black wire = Ground).

Specifications

Model	Platinum 160A HV V4
Main Application	700-800 class Helis
Input Voltage	6S-14S Lipo
Cont. / Peak Current	160A / 200A
BEC Voltage	5-8V (Step: 0.1V)
BEC Current (Cont. / Peak)	10A / 25A
Programming (PRG) / Cooling fan Port	For connecting the LCD program box / WiFi module or Cooling fan
Throttle Signal/RPM Signal Transmission	Via Optical Coupler
Input / output Wires	10AWG / 10AWG
Weight / Size	282g (with input & output wires soldered to ESC) / 106x50x34mm

2 Throttle Range Calibration

Attention! The default throttle range of this ESC is from 1100μs to 1940μs, so you need to re-calibrate the throttle range when the first time you use this ESC or after you replace the transmitter.
1.Connections before the Throttle Range Calibration: As shown above (Wiring Diagram 1)
2.ESC/Radio Calibration

Turn on the transmitter, move the throttle stick to the top position, and connect the ESC to a battery. The motor will emit "♪123" indicating the ESC is powered on normally. → 2 seconds later, the motor will emit two short beeps indicating the maximum throttle position has been successfully calibrated and accepted. → Move the throttle stick to the bottom position in 3 seconds. 1 second later, the motor will start to beep and keep beeping to indicate the number of LiPo cells you have plugged in. (A long beep represents 5, a short beep represents 1. E.g. The ESC will beep two long beeps and two short beeps to indicate a 12S LiPo pack.) → ESC/radio calibration completed, the power system is ready to go.

During the ESC/Radio calibration, please set the throttle curve to NORMAL and ensure the corresponding throttle amounts to the maximum throttle endpoint and the minimum throttle endpoint on your transmitter are respectively 100% and 0%.

03 Programmable Item List

"*"in the form below indicate factory defaults.

Programmable Items	Parameter Values						
	Option 1	Option 2	Option 3	Option 4	Option 5	Option 6	Option 7
1. Flight Mode	Fixed-wing	Helicopter (Linear Throttle)	*Helicopter (Elf Governor)	Helicopter (Store Governor)			
2. LiPo Cells	*Auto Calculation	6S	8S	10S	12S	14S	
3. Voltage Cutoff Mode	*Soft Cutoff	Hard Cutoff					
4. Cutoff Voltage	2.7-3.7V (*3.0V)	Disabled					
5. BEC Voltage	5-8V (*7.4V)						
6. Start-up Time	4-25s (*15s)						
7. Governor Parameter P	0-9 (*2)	You can increase the governor sensitivity (P, I) if you think the governor feel is weak. However, extremely high sensitivity will cause unstable RPM. To be specific, the RPM will float up/down around the preset value.					
8. Governor Parameter I	0-9 (*5)						
9. Auto Restart Time	0-90s (*25s)						
10. Timing	0-30° (*15°)						
11. PWM Frequency	8Khz	15Khz	20Khz	*30Khz			
12. Brake Force/Amount	0-100% (*0)						
13. Motor Rotation	CW	CCW					
14. Restart Acceleration Time	1s	1.5s	*2s	2.5s	3s		
15. Con.Freewheel	Activated	Disabled	This item can only be disabled in Fix-wing mode and Heli (Linear Throttle Response) mode.				
16. Start-up Power/Force	1-7 (*3)						

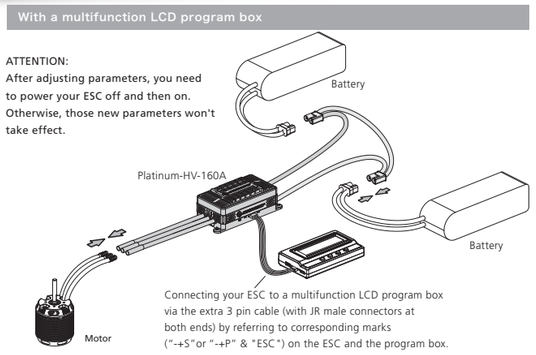
04 Explanations for Programmable Items

1. **Flight Mode**
   1.1 In "Fixed Wing" mode, the motor will start up when the throttle amount reaches 5% or above. There is no soft start-up, the motor responds to the throttle increase rapidly.
   1.2 In "Helicopter (Linear Throttle)" mode, the motor will start up in a soft way with the throttle (from 0 to 100%) acceleration time is fixed to 3.5 seconds . And it will accelerate to the RPM corresponds to the specific throttle amount at the fixed rate.
   1.3 In "Helicopter (Elf Governor)" mode, the motor will start up when the throttle amount reaches 40% or above, it will start up in a very soft way. And it will complete the speed standardization and enter the speed-governing operation in the preset start-up time. In this mode, the motor will standardize its speed every time it starts up. Due to different discharge rates/capabilities of different batteries, the RPM you standardize each time may be a little different.
   In consequence, at the same throttle amount, the RPM may be a bit different when using different batteries.
   1.4 In "Helicopter (Store Governor)" mode, the motor will start up when the throttle amount reaches 40% or above. It will also start up in a very soft way. And it will also complete the speed standardization and enter the speed-governing operation in the preset start-up time. In this mode, the motor will only standardize its speed the first time when it starts up. When performing RPM standardization for the first time, we recommend using a fully-charged battery with good discharge capability. After the RPM standardization, while you change another battery to fly your aircraft, at the same throttle amount, the RPM will always be the same as the RPM of the first flight. For consistent control feel, we recommend using this mode.
   Explanations for RPM Standardization
   1.1. The motor will enter the soft start-up when user switches the throttle amount from 0 to 40% or above (50% throttle is recommended). The pitch of main blades should be 0 degree during the soft start-up process, the RPM standardization completes when the soft start-up ends, and the ESC enters the speed-governing state. In "Helicopter (Store Governor)" mode, if user wants to re-standardize the speed, he needs to set the flight mode to "Helicopter (Elf Governor)" and save this mode first, and then reset the flight mode back to "Helicopter (Store Governor)", then the ESC will re-standardize the motor speed when the motor rotates for the first time after the ESC is re-powered on.
   1.2. For ensuring the speed-governing effect, we recommend setting the throttle amount to 90% or below in both speed-governing modes Helicopter (Store Governor) & Helicopter (Elf Governor), so there will be sufficient compensating room to maintain the consistency of the RPM. We recommend replacing the motor or adjusting the gear ratio if the expected RPM still cannot be reached when the throttle amount exceeds 90%. (**Note**: You need to re-standardize the RPM after replacing the motor, blades, body frame or adjusting the gear ratio.)
   1.3. In "Heli Store Governor" mode, if you fly your aircraft with another battery pack that has poor discharge capability after the RPM standardization (with a pack which has good discharge capability), the pack has poor discharge capability may be get damaged.
2. **LiPo Cells:** the ESC will automatically calculate the number of LiPo cells you have plugged in as per the "3.7V/Cell" rule if "Auto Calculate" is selected. Or user can set this item manually.
3. **Voltage Cutoff Mode:** the ESC will gradually reduce the output to 50% of the full power in 3 seconds after the voltage cutoff protection is activated, if soft mode is selected. It will immediately cut off all the output when hard mode is selected.
4. **Cutoff Voltage:** 2.7V-3.7V (custom), 3.0V (default).
5. **BEC Output:** 5-8V (adjustable), 0.1V (step), 7.4V (default).
6. **Start-up Time:** 4-25s (adjustable), 1s (step), 15s (default).
7. **Governor Parameter P:** Control the ESC maintaining the stability of the current motor speed.
8. **Governor Parameter I:** Control the dynamic response. To be specific, control the supplement extent when the actual motor speed is below expectation. If you choose a very big value, then the supplement may be too much. If select a very small value, then the supplement may not sufficient.
9. **Auto Restart Time:** the ESC will cut off its output when the throttle amount is between 25% and 40%. If you increase the throttle amount to above 40% within preset time period (0-90s), the motor will rapidly start up and accelerate to the speed (in 1s) corresponds to the specific throttle amount, complete the shutdown and restart up.If you move the throttle stick to over 40% beyond the preset time period, the ESC will enter the soft start-up process. (Note: This function only effects in "Heli Governor Elf/Store" mode.)
10. **Timing:** 0-30° (adjustable), 1° (step), 15° (default).
11. **PWM Frequency:** 8KHz/15KHz/20KHz/30KHz (adjustable), 30KHz (default).
12. **Brake Force:** 0-100% (adjustable), 1% (step), 0 (default).
13. **Motor Rotation:** CW/CCW. User can adjust this item via a multifunction LCD program box.
14. **Restart Acceleration Time:** 1s / 1.5s / 2s / 2.5s / 3s (adjustable), 2s (default). This item controls the time the motor accelerates from standstill to full speed after the Auto Restart is triggered and your helicopter restarts its flight.
15. **Con. Freewheel:** User can decide this function "Activated" or "Disabled" in "Fixed Wing" mode or in "Heli (Linear Throttle Response" mode. This item has been preset to "Activated" and cannot be adjusted in "Helicopter (Elf Governor/Store Governor) mode. This function can brings better throttle linearity.
16. **Start-up Power/Force:** User can adjust the start-up force of the motor through this item. It's adjustable from 1 to 7 (default: 3), the higher the value, the bigger the force.

05 How to Program Your ESC

With a multifunction LCD program box

ATTENTION:
After adjusting parameters, you need to power your ESC off and then on. Otherwise, those new parameters won't take effect.



Connecting your ESC to a multifunction LCD program box via the extra 3 pin cable (with JR male connectors at both ends) by referring to corresponding marks ("-+S"or "-+P" & "ESC") on the ESC and the program box.

ESC programming

Connect the LCD program box and a battery to your ESC as shown above.
↓
Press the "OK" button to connect the program box to your ESC. The current firmware version will show up after the program box is successfully connected to the ESC.
↓
Press the "ITEM" button to browse all the programmable items, and then press the "OK" button to enter any programmable item you want to set.
↓
Press the "Value" button to browse all parameter values after entering the specific programmable item.
↓
Press the "OK"button to save the new parameter value you just selected.

With a WiFi Module: Please refer to the user manual of the Hobbywing WiFi module.

06 Data Checking and Normal Start-up Process

Data Checking

The ESC will record the standardized RPM, minimum voltage, maximum current, maximum temperatures of the current flight but won't save these data, so you need to keep the ESC on if you want to check the information of the current flight.

Connect the LCD program box and a battery to your ESC as shown above.
↓
Press the "OK" button to connect the program box to your ESC. The current firmware version will show up after the program box is successfully connected to the ESC.
↓
Press the "R/P" button to browse all running information relates to the ESC.

Notes: 1. you can only check the standardized RPM in "Helicopter (Store Governor)" mode, this record won't disappear after you turn off the ESC.
2. The recorded revs are electric revs. If the electric rev is R, the actual rev of blades=R ÷ Motor Poles ÷ 2 ÷ Gear Ratio x throttle amount(%).

Normal Start-up Process

Turn on the transmitter, and then move the throttle stick to the bottom position.
↓
After connected to a battery, the ESC will emit "♪123" indicating it's normally powered on.
↓
The motor will emit several beeps to indicate the number of LiPo cells.
↓
The motor emits a long beep indicating the ESC is ready to go.

During the normal running process, the Blue LED on the ESC will turn solid after the start-up completes. The Red LED will also come on at full throttle and it dies out at partial throttle.

07 Troubles & Status LEDs/Motor Beeps

Trouble(s)	LED Status & Motor Beeps	Possible Causes
The Abnormal Input Voltage protection is activated.	The Red LED blinks 2 times, and the motor keeps beeping "BB, BB……"	The input voltage is not within the operating voltage range of the ESC.
The Throttle Signal Loss protection is activated.	The Red LED blinks 1 time, and the motor keeps beeping "B, _, B, _ ……"	The ESC doesn't detect any throttle signals.
The Start-up Throttle Input Protection is activated.	The Red LED blinks 1 time, and the motor keeps beeping "B, B, B, B……"	The throttle stick is not at the bottom (0% throttle) position. Setting the throttle range too
The Narrow Throttle Range protection is activated.		narrow during the throttle calibrating process causes the throttle range calibration to fail.
The ESC Thermal protection is activated.	The Blue LED blinks 1 time, and there is no motor beep.	The ESC temperature exceeds the regulated threshold.
The Low-voltage Cutoff protection is activated.	The Blue LED blinks 2 times, and there is no motor beep.	The input voltage is below the preset voltage threshold.
The Over-current protection is activated.	The Red LED turns on solid, and there is no motor beep.	The operating current exceeds the current threshold of the ESC.

Multiple Protections

Abnormal Input Voltage Protection	The ESC will measure the input voltage when it's connected to a battery, the motor will beep and the Red LED on the ESC will blink if the voltage is not within the operating voltage range. The ESC will resume the normal operation when connecting another battery to it and the input voltage is within the range.
Throttle Signal Loss Protection	The motor will beep and the Red LED on the ESC will blink when the ESC does not detect any throttle signals. It cannot function normally at this moment and will not resume the normal operation until it detects normal throttle signals.
Start-up Throttle Input Protection	The motor will beep and the Red LED on the ESC will blink if the throttle stick is not at the bottom position when the ESC is connected to a battery. The ESC cannot function normally at this moment and will resume the normal operation after you move the throttle stick to the 0% throttle position.
Narrow Throttle Range Protection	The motor will beep and the Red LED on the ESC will blink when the throttle range you set is too narrow during the throttle calibrating process to indicate this range setting is void and you need to set it again.
Start-up Protection	The ESC will measure the motor speed during the start-up process and take it's a start-up failure if the speed stops increasing or the speed increase is instable. At this moment, if the throttle input is below 15%, the ESC will try to restart automatically; if it is over 20%, you need to move the throttle stick back to the bottom position first and then restart the ESC.
Overload Protection	The ESC will cut off the output first and then automatically restart when the load suddenly increases to a very big value or the motor and the ESC are out of sync.
ESC Thermal Protection	The ESC will gradually reduce the output to 50% of the full power for protection when the operating temperature exceeds 110℃. The motor will beep and the Blue LED on the ESC will blink when the aircraft lands and the throttle stick is moved back to the bottom position. At this moment, the ESC cannot function normally. After the ESC cools down and reconnect it to the pack, then it will resume the normal operation. The ESC temperature cannot exceeds 70℃ when connecting it to a battery, otherwise it cannot be started. (Note: this is about "Soft Cutoff", and the output will be directly cut off if "Hard Cutoff" is selected.)
Over-current Protection	The ESC will cut off the output immediately first and then resume it quickly when the current goes above the regulated threshold. The ESC will cut off the output completely and won't resume it if the current exceeds the threshold again. The ESC will not resume the normal operation until you disconnect and reconnect it to the battery.
Low-voltage Cutoff Protection	The ESC will gradually reduce the output to 50% of the full power for protection when the operating voltage goes below the preset threshold. The motor will beep and the Blue LED on the ESC will blink after the aircraft lands and the throttle stick is moved back to the bottom position (with the battery is still connected to the ESC). At this moment, the ESC cannot function normally and will not resume the normal operation until you replace the battery with a new pack.