RCE-BL50X BRUSHLESS SPEED CONTROLLER INSTRUCTION MANUAL RCE-BL50X 無刷定速調速器使用說明 ALIGN

PRODUCT FEATURES 產品特色

1. 5V~8.4V step-less adjustable BEC output allowing custom voltage setting to match servo specification.
2. BEC output utilizing switching power system, suitable for 7.4-22.2V (2S-6S) Li battery,with continuous current rating of 3A, and burst rating of 6A.
3. Three programmable throttle speed settings to support quick throttle response.
4. Include soft start and governor mode.
5. Small and compact PCB design for lightweight and simple installation.
6. Large heat sink for optimum thermal performance.
7. Highly compatible to work with 98% of all brushless motors currently on the market.
8. Ultra-smooth motor start designed to run with all kinds of brushless motors.
9. The power inlet utilizes a Japanese made "Low ESR" capacitor in order to provide stable power source.
10. The throttle has more than 200 step resolution that provides great throttle response and control.

1. 5V~8.4V無段可調式BEC輸出，可依伺服器規格與所需的特性自行設定電壓。
2. BEC輸入端採用交換式電源設計，適用7.4～22.2V(2S～6S)鋰電，持續耐電流3A，瞬間6A。
3. 三段可程式油門反應速度，使動力的反應隨傳隨到。
4. 具緩啟動及Govener Mode定速功能。
5. 體積小，窄型設計，安裝於機身容易。
6. 有散熱片設計，可延長電變壽命。
7. 超高相容性，可對應市面上 98% 無碳刷馬達。
8. 絕佳起步設計，無論國產、進口、內轉、外轉無刷馬達皆起步順暢。
9. 電池電源端採用日製 Low ESR 低阻抗電解電容，大幅提高電源之穩定性。
10. 油門達 200 段以上解析度，無格數之油門感覺。

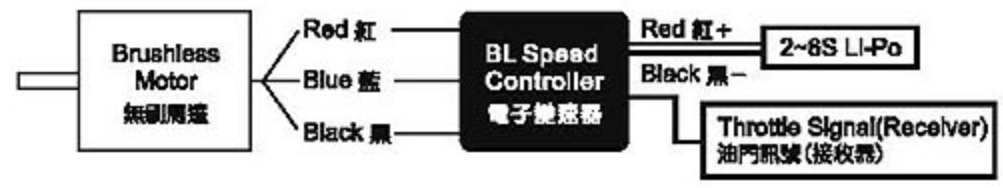
SPECIFICATION 產品規格

Model 型號	Continuous Current 持續	Peak Current 瞬間	BEC Output BEC輸出	Dimension 尺寸	Weight 重量
RCE-BL50X	50A	70A	Output voltage: 5V-8.4V step-less adjustment Continuous current 3A; Burst current 6A 輸出電壓:5V~8.4V無段可調式；承受電流:持續3A、瞬間6A	66x32x18.5mm	62g

1. Good temperature situation for working at the maximum current
2. Supporting motor types: 2 ~10 pole in/outrunner brushless motors.
3. Supporting maximum RPM: 2 pole → 190,000 rpm ; 6 pole → 63,000 rpm.
4. Input voltage: 7.4V ~ 22.2V(2~6S Li-Po)

1. 持續最大電流需在機體散熱良好情況下。
2. 支援馬達型式：二極至十數極之內外轉子無碳刷馬達。
3. 支援最高轉速：二極→190,000rpm;六極→63,000rpm。
4. 輸入電壓:7.4V-22.2V(2～6S Li-Po)

WIRING ILLUSTRATION 接線示意圖



NOTE: When setting to the Quick throttle response speed, the accelerative peak current will increase. To minimize possible radio interference induced by switching power system, BEC should be installed at least 5cm away from the receiver. The use of 2.4G receiver is recommended.

注意：設定為高油門反應速度時，加速瞬間電流會有增大情形。內建Switching BEC，安裝時請與接收器保持至少5cm以上的距離以避免干擾接收器(建議使用較穩定的2.4G系統接收器)。

PRODUCT FUNCTIONS 產品功能

1.Brake Option - 3 settings that include Brake disabled/Soft brake/Hard brake.

2.Electronic Timing Option - 3 settings that include Low timing/Mid timing/High timing. Generally, 2 pole motors are recommended to use low timing, while 6 or more poles should use Mid timing. High timing gives more power at the expense of efficiency. Always check the current draw after changing the timing in order to prevent overloading of battery.

3.Battery Protection Option- 2 settings that include Li-ion, Li-poly High/Middle cutoff voltage protection. The default setting is high cutoff voltage protection. CPU will automatically determine cell number of input Lithium battery (2S~6S). This option will prevent over-discharge of the battery. The following reference is the guideline for setting the Battery Protection option.

3-1 Li-ion/Li-poly High cutoff voltage protection-When the voltage of single cell drops to 3.2V, the first step of battery protection mode will be engaged by the ESC resulting in reduced power. The pilot should reduce the throttle and prepare landing. If the voltage of single cell drops to 3.0V, the second step of battery protection mode will be engaged resulting in power cutoff. (*Note 1) For 22.2V/6cells Lithium battery, the full charged voltage will be approximately 25.2V. According to this Input voltage, CPU will determine that this is a 3cell battery. First step protection: 3.2V x 6cell=19.2V;Second step protection: 3.0V x 6cell= 18V When the voltage drops to 19.2V, the power will be reduced. When the voltage drops to 18V, the power will be cut off.

3-2 Li-ion/Li-poly Middle cutoff voltage protection- This option is same as instruction 3-1, but when the voltage of single cell drops to 3.0V, the first step of battery protection will be engaged. When the voltage of single cell drops to 2.8V, the second step of battery protection will be engaged. (*Note 1)

Note 1: Second step of battery protection only works when Aircraft mode is setting to the option 4-1.

Note: this option is only suitable for a fully charged battery pack in good working condition.

4.Aircraft Option: 3 settings that include Normal Airplane / Helicopter 1 / Helicopter 2. Normal Airplane Mode is used for general airplanes and gliders. When flying Helicopters, you can choose Helicopter 1 Mode, or Helicopter 2 Mode. Helicopter 1 Mode provides Soft Start feature. Helicopter 2 Mode provides Soft Start and Governor Mode.

5.Throttle response speed: 3 settings that include standard/ Medium/ Quick throttle response speed. The default setting is "quick speed". Use this option to adjust the setting according to flight character. For example, setting at Medium or Quick speed for 3D and powerful flight to make the power response more quickly, but note the accelerative peak current and power expense will increase.

6.BEC output voltage setting: 5-8.4V step-less adjustment. This option allows custom voltage setting. Default setting is 6.5V; please adjust the voltage according to the specification of the servo (speed and resistance). Prior to entering the setup mode, a voltmeter needs to be connected to the power inlet of the receiver (as illustration) to monitor the selected voltage. The voltage is set by varying the throttle stick position from low (5V) to high (8.4V).

7.Thermal Protection: When the ESC temperature reaches 80 ℃ for any reason, it will engage the battery protection circuit, reducing power to the ESC. We recommend mounting the ESC in a location with adequate air flow and ventilation.

8.afe Power On Alarm: When the operator turns on the ESC, it will automatically detect the transmitter signal. The ESC will emit a confirmation tone and enter normal operation mode if the throttle is set to the lowest position. If the throttle position is at full throttle, it will begin to enter Setup Mode. If the throttle is in any other position, the ESC will emit an alarm and not enter into user mode for safety precautions.

9.Aircraft Locator: If the aircraft should land or crash in an unexpected location and become lost, the pilot can enable the Aircraft Locator Option. The aircraft locator option is engaged by turning off the transmitter. When the ESC does not receive a signal from the transmitter for 30 seconds, it will start to send an alarm to the motor. The sound of the alarm will aid the pilot to locate the aircraft. This option will not work with a PCM receiver that has SAVE function enabled, or with low noise resistant PPM receivers.

1. 煞車設定：三段選擇分為無煞車 / 軟性煞車 / 急煞車
2. 進角設定：三段選擇分為低進角 / 中進角 / 高進角，設定時機分為二極以及六極以上無碳刷馬達，二極無碳刷馬達一般適用低進角，若希望馬達轉速提高，可將進角設定為中進角。六極以上無碳刷馬達一般適 用中進角，若希望馬達轉速提高，可將進角設定為高進角。然而進角之調整需要注意電流之變化，避免電池過載，影響電池及馬達壽命。
3. 電池保護電壓設定：二段選擇分為 Li-Ion、Li-Po 高截止電壓保護/中截止電壓保護出廠設定為高截止電壓保護；此功能會自動判定所輸入鋰電池的cell數(2～6S)，並提供使用者對該電池之放電保護，以避免因放電電壓過低而造成電池損壞，以下為設定值之解說：

3-1 Li-Ion/Li-Po高截止電壓保護：當鋰電單cell壓降至3.2V時，電變會啟動第一階段保護，使動力間歇性中斷，此時使用者應將油門收小，準備降落；而當單cell電壓持續壓降達到3.0V時則會啟動第二階段保護，完全限制動力輸出(註1 僅在4-1選項"一般飛機模式"下才會啟動第二階段保護)。例 以一個使用22.2V 6cell鋰電池之系統而言22.2V鋰電池充飽電壓約25.2V，此輸入電壓CPU會自動判定為6cell鋰電，第一階段保護 3.2Vx6cell=19.2V；第二階段保護 3.0Vx6cell=18V 當電壓降至19.2V時，動力會間歇性中斷，當壓降達到18V時則完全限制動力輸出。

3-2 Li-Ion/Li-Po中截止電壓保護：同3-1功能說明，但單cell壓降達到3.0V時，會啟動第一階段保護，單cell壓降達到2.8V時啟動第二階段保護(註1)。

注意 以上功能僅適用於充飽電，且功能正常的鋰電池。

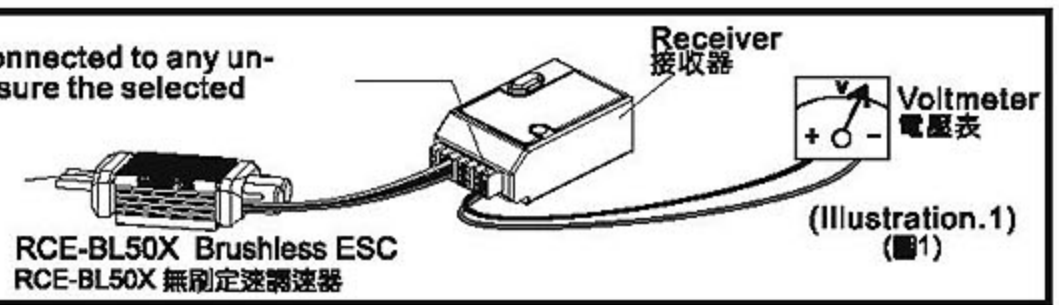
4. 飛機模式設定：三段式選擇分為：一般飛機模式/直昇機模式1/直昇機模式2，使用於一般飛機或滑翔機時，請設定於一般飛機模式，使用於直昇機時可選擇直昇機模式1：具有緩啟動功能，或直昇機模式。2：具有緩啟動及Govener Mode 定速功能。
5. 油門反應速度設定：三段選擇分為標準/中速/快速，出廠設定值為"快速"油門反應速度，此功能提供使用者依所需的飛行特性來作適當的調整，例如3D飛機與劇烈的3D直昇機飛行時可設定為中速或快速，使動力 反應更加快速、靈敏，但須注意提高油門反應速度時，加速瞬間電流與耗電量會有增大的情形。
6. BEC輸出電壓設定：5～8.4V無段調整，本功能提供使用者自行設定BEC輸出電壓，初始電壓為6.5V，使用者可依伺服器的規格與所需的特性(速度與扭力)自行更改設定；進入此項設定前，需先將電壓表連接到接收器的電源端(如圖1)，用以監看所選擇的電壓，設定時以油門搖桿的位置來決定輸出電壓，油門搖桿最低為5伏特，最高為8.4伏特，之間的電壓值可移動搖桿的位置任意設定。
7. 溫度保護：當電變因不良之空氣對流或是過載輸出導致溫度上升達80℃時，電變會啟動溫度保護，而使動力間歇性中斷，建議將電變裝置在機艙內空氣對流之位置，並實際使用電流表量測輸出電流，以達到電變之最佳效率。
8. 開機防暴衝提醒功能：當使用者開啟電變電源時，系統會自動偵測發射機之設定，如果發射機油門未置於最低點，或未置於最高點準備進入設定模式，馬達將不會轉動，同時會有警示聲響提醒。
9. 尋機功能：當飛機降落在長草區無法以目視定位時，使用者可將發射機關閉，當電變無法接收來自接收機信號時，電變會於三十秒後使馬達發出警示聲響，以利定位。此功能不適用於設定了SAVE功能之PCM接收機，或抗雜訊低之PPM接收機。

NOTE: Certain servos are designed to work with high voltage, while other servos are designed for lower voltage. To avoid damage to servos, please follow the servo's factory specification to determine the proper voltage setting.

注意：部份伺服器不適合較高的電壓下操作，請依原廠適用電壓規格設定，避免造成伺服器燒毀。

The voltmeter needs to be connected to any un-use inlets "+" and "-" to measure the selected voltage.

將電壓表連接到任一未使用通道的"+"端及"-"端以量測所選擇的電壓。



RCE-BL50X Brushless ESC
RCE-BL50X 無刷定速調速器

(Illustration.1)
(圖1)

SETUP MODE 設定模式

1. Setup mode: Make sure to connect the ESC to the throttle channel of the receiver. Please refer to the user manual of your radio system. The second step is to connect the 3 power-out signal pins to the brushless motor. Before you turn on the transmitter, please adjust the throttle stick to the maximum full throttle position. Proceed to connect the battery to the ESC. You will hear confirmation sounds as soon as you enter the SETUP MODE.
2. Throttle stick positions in Setup mode: Setup mode includes six settings: Brake, Electronic Timing, Battery Protection, Aircraft,Throttle Response Speed and BEC output voltage. Every setting has three options. Simply place the throttle stick in the highest, middle,and lowest positions for each setting. For example, first brake setting (Hard): move the stick to the highest position. Then timing setting (mid): move the throttle stick in the middle position.

1. **進入設定模式**:將電變與接收器之油門 Channel 連接，不同之遙控系統請參閱您遙控系統之使用手冊，馬達之三條線亦與電變連接，將發射器之油門搖桿推到最高點，使之於全油門狀態，先開啓發射器電源，再將電源連接至電變，進入設定模式後，馬達將有設定模式之提示聲響。請參考程式化設定模式說明。
2. **設定模式中之動作**:設定模式共含有六項設定，分別為煞車、馬達進角、電池保護、飛機模式、油門反應速度級 BEC 輸出電壓等設定，詳細內容請參考產品功能之解說。每一項設定中各含三段設定，各項設定以油門搖桿之上、中、下位置來決定其設定值。例如:煞車設定時，油門搖桿撥至最高，則設定為急煞車，進入第二項進角設定時，油門搖桿撥至中間，則設定為中進角。

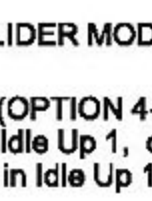
Mode 設定模式 / Throttle position 油門搖桿	Low 低	Middle 中	High 高
Brake 煞車設定	●Brake disabled(1-1) 無煞車(1-1)	Soft brake(1-2) 軟性煞車(1-2)	Hard brake(1-3) 急煞車(1-3)
Electronic Timing 進角設定	Low-timing(2-1) 低進角(2-1)	●Mid-timing(2-2) 中進角(2-2)	High-timing(2-3) 高進角(2-3)
Battery Protection 電池保護電壓設定	●High cutoff voltage protection(3-1) 高截止電壓保護(3-1)	Middle cutoff voltage protection(3-2) 中截止電壓保護(3-2)	—
Aircraft 飛機模式設定	Normal Airpane/Glider(4-1) 一般飛機 / 滑翔機 (4-1)	●Helicopter 1 (Soft Start)(4-2) 直升機模式1(緩啓動功能)(4-2)	Helicopter 2 (Soft Start+ Governor Mode)(4-3) 直升機模式2(緩啓動+Govener Mode定速功能)(4-3)
Throttle response speed 油門反應速度設定	Standard(5-1) 標準(5-1)	Medium speed(5-2) 中速(5-2)	●Quick speed(5-3) 快速(5-3)
BEC output voltage BEC輸出電壓設定	5.0V	●6.5V	8.4V

Note: "●" Default setting 註: "●" 表示出廠設定值

Chart A 表A

ESC START-UP INSTRUCTION 開機使用模式

1 Ensure the throttle stick is at the lowest position.Switch on transmitter.
打開電源，油門搖桿置於最低點，準備進入使用操作模式



2 Connect battery power to ESC
變速器接上電源，馬達響音提示

♪ ♪ ♪ Power on sound 開機確認音

♪♪♪♪ Transmitter detected sound
♪♪♪♪ 系統偵測OK

3 Current Settings Indicator Beeps 升空使用模式聲響提示

1.First mode sound (Brake)
2.Second mode sound (Timing)
3.Third mode sound (Battery protection)
4.Fourth mode sound (Aircraft)
5.Fifth mode sound (Throttle response speed)
6.No sound for BEC output voltage

1.第一個模式響音提示(煞車)
2.第二個模式響音提示(進角)
3.第三個模式設定響音提示(電池保護)
4.第四個模式響音提示(飛機模式)
5.第五個模式響音提示(油門反應速度)
6.BEC輸出電壓不會以響音提示

CURRENT SETTINGS INDICATOR BEEPS EXPLANATION 開機模式設定響音提示說明

First Beep Group
Brake Status
第一個響音
煞車設定狀態提示
♪= Brake disabled 無煞車
♪ ♪= Soft brake 軟性煞車
♪ ♪ ♪= Hard brake 急煞車

Second Beep Group Electronic Timing
第二個響音 進角設定狀態提示
♪= Low timing(apply to 2 pole inrunner motors) 低進角(適合2級內轉子馬達)
♪ ♪= Mid timing(apply to 6 pole in/outr unner motors) 中進角(適合6級內外轉子馬達)
♪ ♪ ♪= High timing(apply to high power output) 高進角(適用於高功率輸出) High-timing/big power/power expense 高進角模式有較大功率與耗電特性

Third Beep Group
Battery protection Cutoff
第三個響音
電池保護設定狀態提示
♪ = High cutoff voltage protection 高截止電壓保護
♪ ♪ = Middle cutoff voltage protection 中截止電壓保護

Fourth Beep Group Aircraft Status
第四個響音 飛機模式設定狀態提示
♪= Normal airplane/Glider 一般飛機/滑翔機
♪ ♪= Helicopter 1 (Soft start) 直昇機模式1(緩啟動功能)
♪ ♪ ♪= Helicopter 2(Soft start + Governor Mode) 直昇機模式2(緩啟動功能 +Govener Mode定速功能)

Fifth Beep Group
Throttle Response
第五個響音
油門反應速度設定狀態提示
♪= Standard 標準
♪ ♪= Medium speed 中速
♪ ♪ ♪= Quick speed 快速

INSTRUCTIONS ON AIRCRAFT MODE SETTINGS 飛機模式設定使用說明

1.NORMAL AIRPLANE/GLIDER MODE (OPTION 4-1):This option is applied to general airplanes and gliders.
2.HELICOPTER 1 MODE (OPTION 4-2): This option provides a soft start feature and is applied to Helicopters for Normal, Idle Up 1, or Idle Up 2 modes. Please note that the sensitivity of the gyro should be set lower when flying in Idle Up 1 or Idle Up 2 modes if tail hunting (wag) occurs due to higher rotor speed.
3.HELICOPTER 2 MODE (OPTION 4-3):This option supports soft start as well as Governor Mode features and is applied to Helicopters for Idle Up 1 and Idle Up 2 modes (not suitable for Normal Flight Mode). When Governor Mode is in use, the throttle should be set between 75% and 85%. Again if tail wag occurs, lower the sensitivity of the gyro to eliminate the hunting effect. The Governor Mode may not work properly in cases of insufficient rotor speed (due to improper gear ratio), poor battery discharge capability, and Improper setting of gyro sensitivity and the blade pitch, etc. Please make sure all the proper adjustments have been done when using Governor Mode.

1.一般飛機模式(選項4-1)：適用於一般飛機及滑翔機。
2.直昇機模式1(選項4-2)：具有緩啟動功能，適用於Normal、Idle1、Idle2等飛行模式，當切換至Idle1或Idle2模式，如有較高轉速造成陀螺儀有輕微的追蹤現象，此時應將陀螺儀的感度設定分別降低。
3.直昇機模式2(選項4-3)：具有緩啟動及Govener Mode定速功能，適用於Idle1、Idle2特技飛行模式(不適合Normal飛行模式下選用)，選擇定速功能時，油門應定速在75%~85%之間，如果飛行時發現有輕微的追蹤現象時，應降低陀螺儀的感度；由於轉速不足(齒比搭配不當)，電池效能不佳，陀螺儀感度設定不當，Pitch設定錯誤，皆會導致無法發揮定速的功能，甚至產生尾部偏擺的情形，所以選擇此模式時應針對相關條件 進行確認。

SETUP MODE(MINIMUM 4 CHANNEL RADIO IS REQUIRED) 程式化設定模式(四動以上標準發射器均可執行設定)

1 Place the throttle stick to the highest position. Switch on transmitter.
打開電源，油門搖桿置於最高點準備進入程式化功能設定模式

2 Connect battery to ESC
變速器接上電源，馬達響音提示

Power on entering setup mode
開機進入設定模式確認音 ♪ ♪ ♪

3 ESC will automatically calibrate the throttle high position. Sound confirms acceptance.
變速器自動進入油門校正程序，記憶油門最高點位置

4 Place the throttle stick to the lowest position. ESC will automatically calibrate the throttle low position. Sound confirms acceptance.
再將油門搖桿撥到最低點，此時記憶油門最低點位置

5 ♪—♪—♪—♪—♪
Use throttle stick to set preferred Brake Mode within the 5 tones. A confirmation sound will play acknowledging acceptance of selected setting.
於5音節之音樂聲響時以發射器油門搖桿設定，設定值請參考表A煞車設定，結束時將有連續響音確認

6 ♪♪—♪♪—♪♪—♪♪—♪♪
Use throttle stick to set preferred Timing Mode within the 5 tones. (Refer to Chart A) A confirmation sound will play acknowledging acceptance of selected setting.
於5音節之音樂聲響時以發射器油門搖桿設定，設定值請參考表A進角設定，結束時將有連續響音確認

7 ♪♪♪ —♪♪♪ —♪♪♪ —♪♪♪ —♪♪♪
Use throttle stick to set preferred Battery Protection Mode within the 5 tones. (Refer to Chart A) A confirmation sound will play acknowledging acceptance of selected setting.
於5音節之音樂聲響時以發射器油門搖桿設定，設定值請參考表A電池保護電壓設定，結束時將有連續響音確認

8 ♪♪♪♪—♪♪♪♪—♪♪♪♪—♪♪♪♪—♪♪♪♪
Use throttle stick to set preferred Aircraft Mode within the 5 tones. (Refer to Chart A) A confirmation sound will play acknowledging acceptance of selected setting.
於5音節之音樂聲響時以發射器油門搖桿設定，設定值請參考表A飛機模式設定，結束時將有連續響音確認

9 ♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪
Use throttle stick to set preferred Throttle Response Speed Mode within the 5 tones. (Refer to Chart A) A confirmation sound will play acknowledging acceptance of selected setting.
於5音節之音樂聲響時以發射器油門搖桿設定，設定值請參考表A油門反應速度設定，結束時將有連續響音確認

10 ♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪—♪♪♪♪♪
Use throttle stick to set preferred BEC Output Voltage Mode within 5 tones. (Refer to Chart A) A confirmation sound will play acknowledging acceptance of selected setting.
於5音節之音樂聲響時以發射器油門搖桿設定，設定值請參考表A BEC輸出電壓設定，結束時將有連續響音確認

After setup is completed, place the stick to the lowest position. and then take off the battery and plug it on to enter user mode(or wait until the User mode beeps finish). The ESC is ready for use.
完成模式設定將搖桿撥於最低點，將電池拔除再重新接上電池即可進入使用模式(或待使用模式確認響音完成，即可使用) 祝 飛行愉快

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