

# Combo T-REX 550E

# ALIGN

## INSTRUCTION MANUAL

## 使用說明書

KX021002T

Programmable

# 3G

Flybarless System



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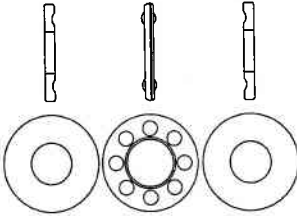
Thank you for buying ALIGN products. The **T-REX 550E 3G** is the latest technology in Rotary RC models. Please read this manual carefully before assembling and flying the new **T-REX 550E 3G** helicopter. We recommend that you keep this manual for future reference regarding tuning and maintenance.

承蒙閣下選用亞拓遙控世界系列產品，謹表謝意。進入遙控世界之前必須告訴您許多相關的知識與注意事項，以確保您能夠在學習的過程中較得心應手。在開始操作之前，請務必詳閱本說明書，相信一定能夠給您帶來相當大的幫助，也請您妥善保管這本說明書，以作為日後參考。

55FLH1

Apply a little amount of T43 thread lock when fixing a metal part.  
 裝螺絲和於金屬件時使用適量T43(螺絲膠)

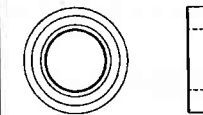
**Linkage ball A(M3.5x4.5)**  
 球頭A(M3.5x4.5) (φ5x29.77mm) x 2



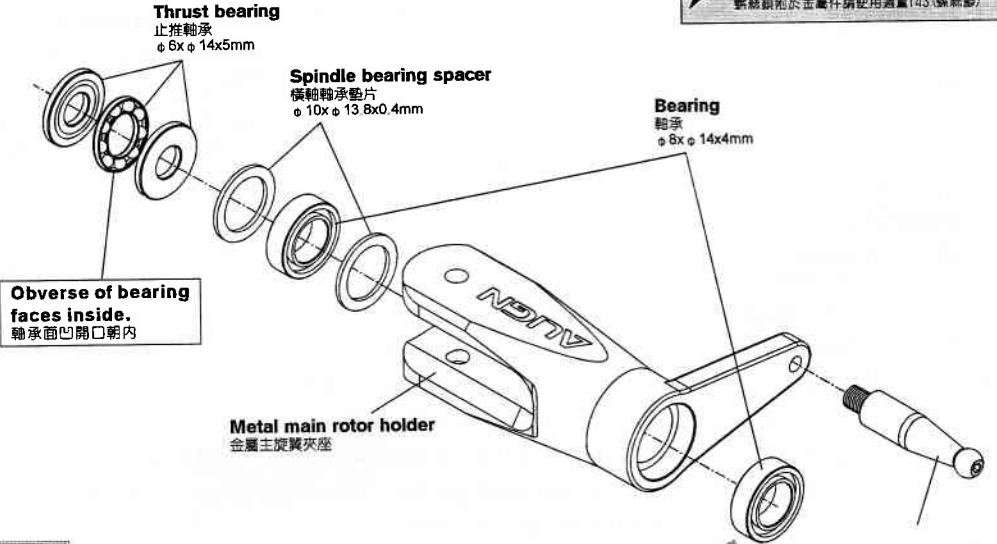
**Thrust bearing**  
 止推軸承(φ6xφ14x5mm) x 2



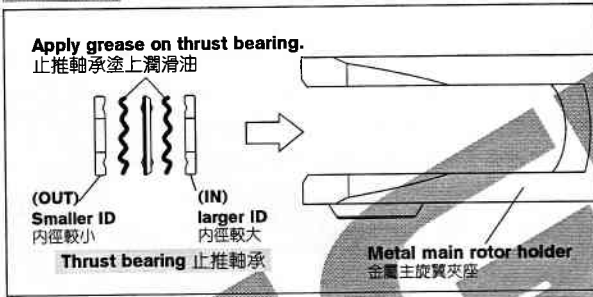
**Spindle bearing spacer**  
 橫軸軸承墊片(φ10xφ13.8x0.4mm) x 4



**Bearing**  
 軸承(φ8xφ14x4mm) x 4



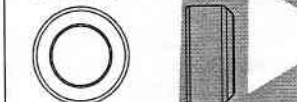
CAUTION 注意



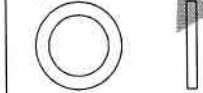
55FLH1

CAUTION 注意  
 ALIGN logo on the top 字樣朝上

**Feathering shaft sleeve**  
 橫軸支撐套(φ8xφ10x31mm) x 1



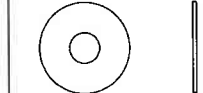
**Damper rubber-black 80°**  
 橫軸墊圈 黑色80° (φ7.9xφ13x6.5mm) x 2



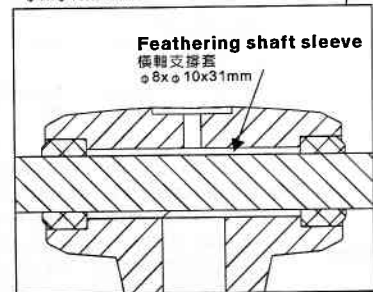
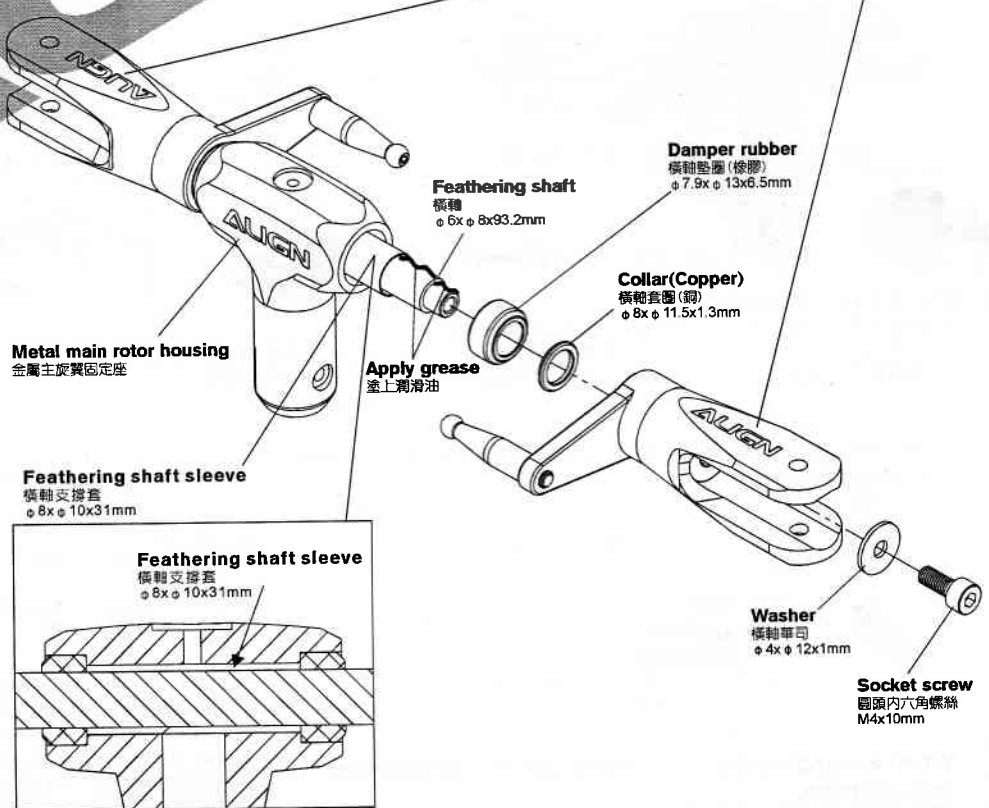
**Collar**  
 橫軸套圈(φ8xφ11.5x1.3mm) x 2



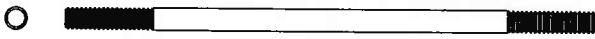
**Socket screw**  
 圓頭內六角螺絲(M4x10mm)x2



**Washer**  
 橫軸華司(φ4xφ12x1mm)x2

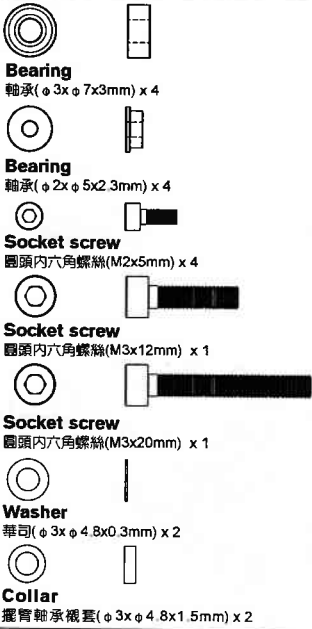


## 55FLZ2



**Linkage rod (A)**  
連桿(A)  $\phi 2.5 \times 61 \text{mm} \times 2$

## 55FLH1



**Linkage rod (A)**  
連桿(A)  
 $\phi 2.5 \times 61 \text{mm}$



## 55FLH2

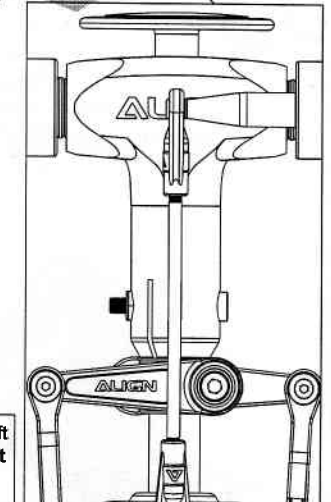
**Linkage ball B (M3x4)**  
球頭B (M3x4)  
 $\phi 5 \times 12 \text{mm}$

**Long linkage ball (M3x3)**  
導板長球頭 (M3x3)  
 $\phi 4.75 \times 24.59 \text{mm}$

**Linkage ball B (M3x3)**  
球頭B (M3x3)  
 $\phi 4.75 \times 9.77 \text{mm}$

**Main shaft**  
主軸  
 $\phi 6 \times \phi 10 \times 177 \text{mm}$

**3G Flybarless system uses 550FL Main shaft**  
**Standard Flybar system uses 550 Main shaft**  
3G無平衡翼系統使用550FL主軸  
有平衡翼系統使用標準550主軸



Apply a little amount of T43 thread lock when fixing a metal part.  
螺絲鎖劑於金屬件固定時使用適量T43 (螺絲膠)

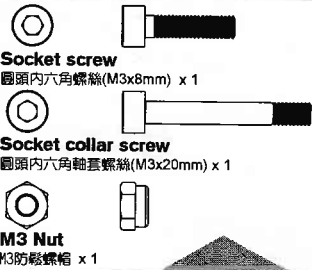
**Socket screw**  
圓頭內六角螺絲  
M3x8mm

**Metal head stopper**  
金屬旋翼頭制動器

**M3 Nut**  
M3的鬆螺帽

**Socket collar screw**  
圓頭內六角軸套螺絲  
M3x20mm

## 55FLH1A

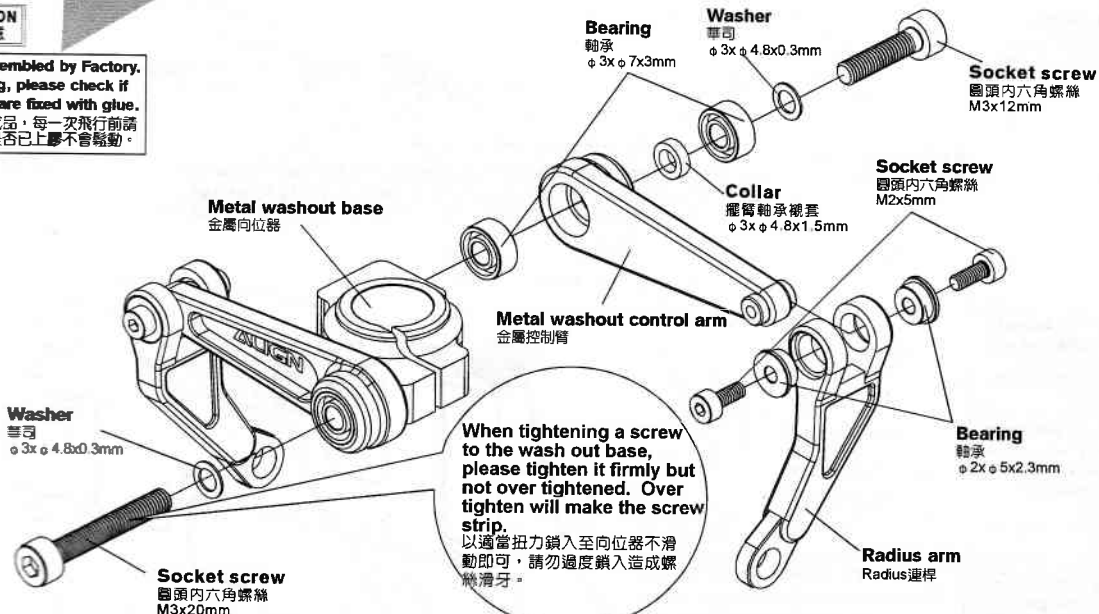


## 55FLH2



### CAUTION 注意

Already assembled by Factory.  
Before flying, please check if the screws are fixed with glue.  
原裝組裝完成品，每一次飛行前請先確認螺絲是否已上膠不會鬆動。



### 55HB2



**Bearing**  
軸承(φ10xφ19x5mm) x 2

### 55HB2A

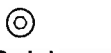


**Socket collar screw**  
圓頭內六角軸套螺絲(M3x6mm) x 24



**Socket button head screw**  
半圓頭內六角螺絲(M3x6mm) x 2

### 55HG1A



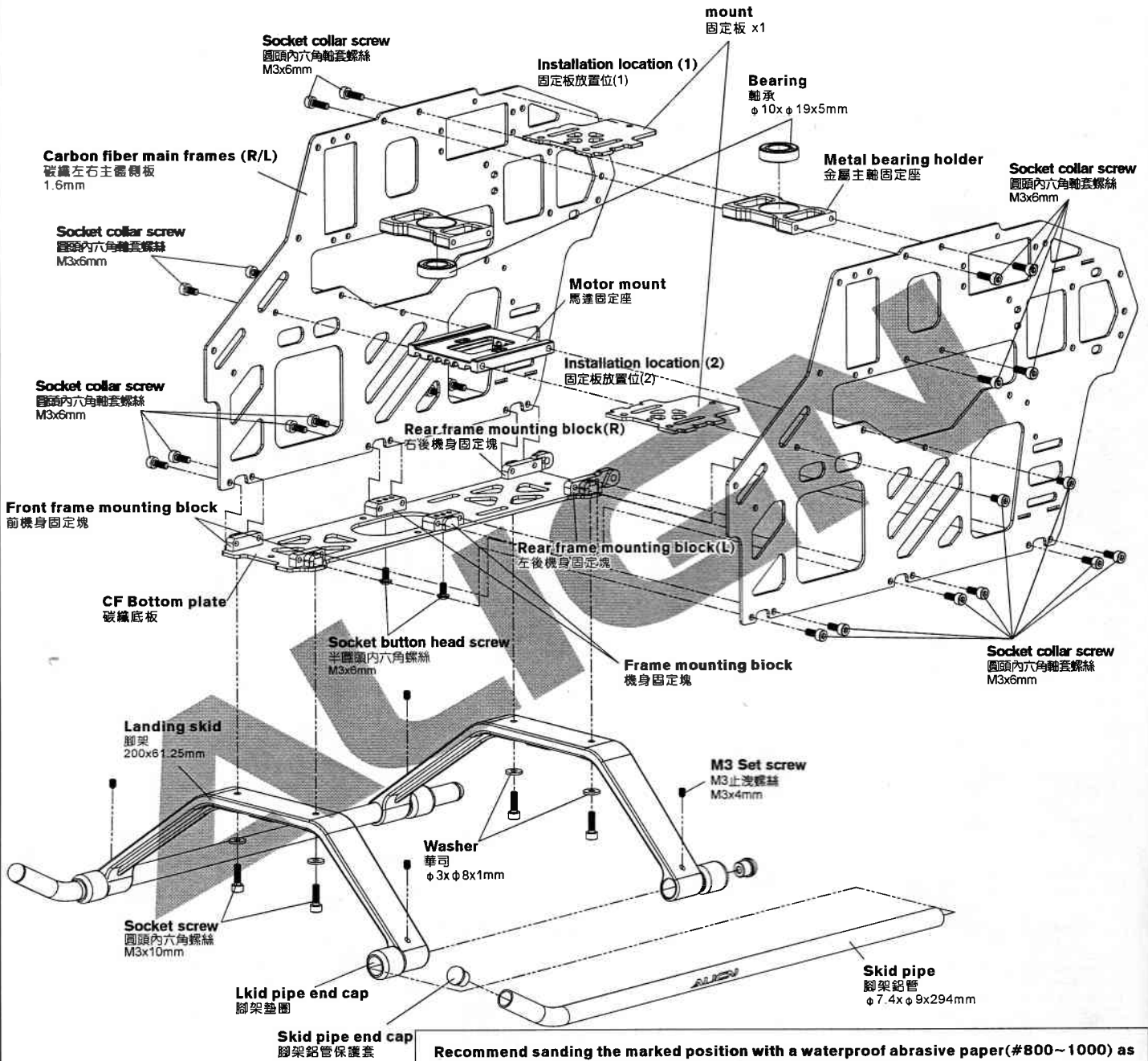
**Socket screw**  
圓頭內六角螺絲(M3x10mm) x 4



**Washer**  
華司(φ3xφ8x1mm) x 4

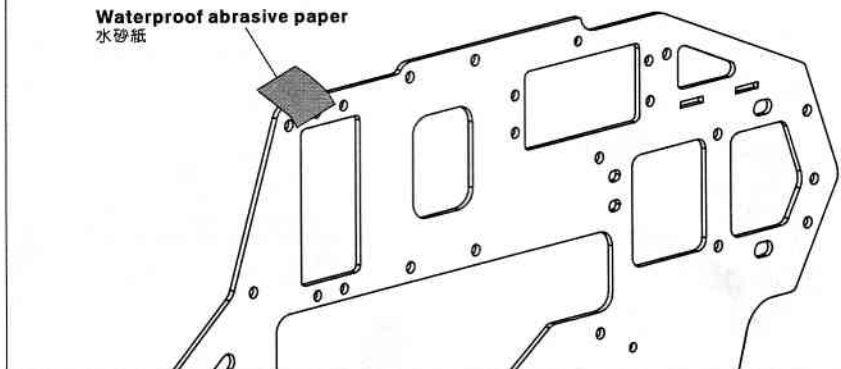


**M3 Set screw**  
M3止淺螺絲(M3x4mm) x 4



**Recommend sanding the marked position with a waterproof abrasive paper(#800~1000) as below illustration to avoid the wires of electric parts to be cut.**  
建議於下圖色塊標示處，可使用#800~1000水砂紙打磨，可防止電子設備電線被割破。

**Waterproof abrasive paper**  
水砂紙



**CAUTION**  
注意

**When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.**  
螺絲鎖入塑膠件請務必注意，適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

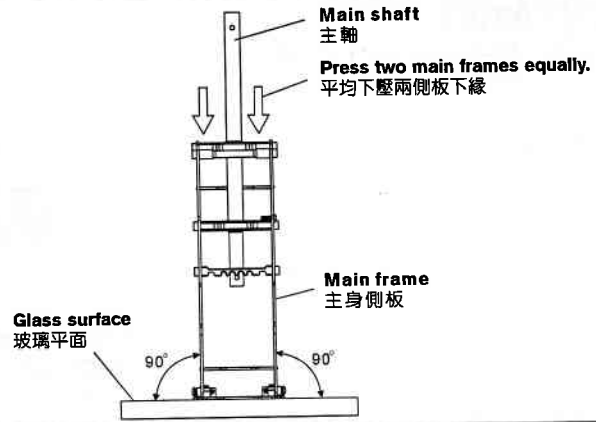
**For original factory package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.**  
原廠零件出廠包裝如果是組裝品，請再確認各螺絲是否鎖緊上膠。

**Apply a little amount of T43 thread lock when fixing a metal part.**  
螺絲鎖附於金屬件請使用適量T43(螺絲膠)

**Main frame assembly point:**

First do not fully tighten the screws of main frames.  
Put the main shaft through the two bearings and check if the movements (up/down) are smooth. The bottom bracket must be firmly touched the level table top (glass surface); please keep the smooth movements on main shaft and level bottom bracket, then slowly tighten the screws. A correct assembly can help for the power and flight performance.

機身側板組立重點：  
側板螺絲先不完全鎖緊，放入主軸貫穿二顆軸承確認上下移動必需滑順，主體底板必須與水平桌面(玻璃平面)踏實緊貼；請保持主軸滑順與底板平行桌面後慢慢鎖緊螺絲。正確側板的組裝對動力與飛行性能有顯著幫助。



**55H24**

- Linkage ball A(M2x3.5)  
球頭A(M2x3.5)( $\phi$  4.75x8.18mm) x 2
- Linkage ball B(M2x2.5)  
球頭B(M2x2.5)( $\phi$  4.75x12.18mm) x 2
- Socket button head self tapping screw  
半圓頭內六角自攻螺絲(T2.6x14mm) x 16
- M2 Nut  
M2螺帽 x 4

Apply a little amount of T43 thread lock when fixing a metal part.  
螺絲鎖附於金屬件請使用適量T43(螺絲膠)

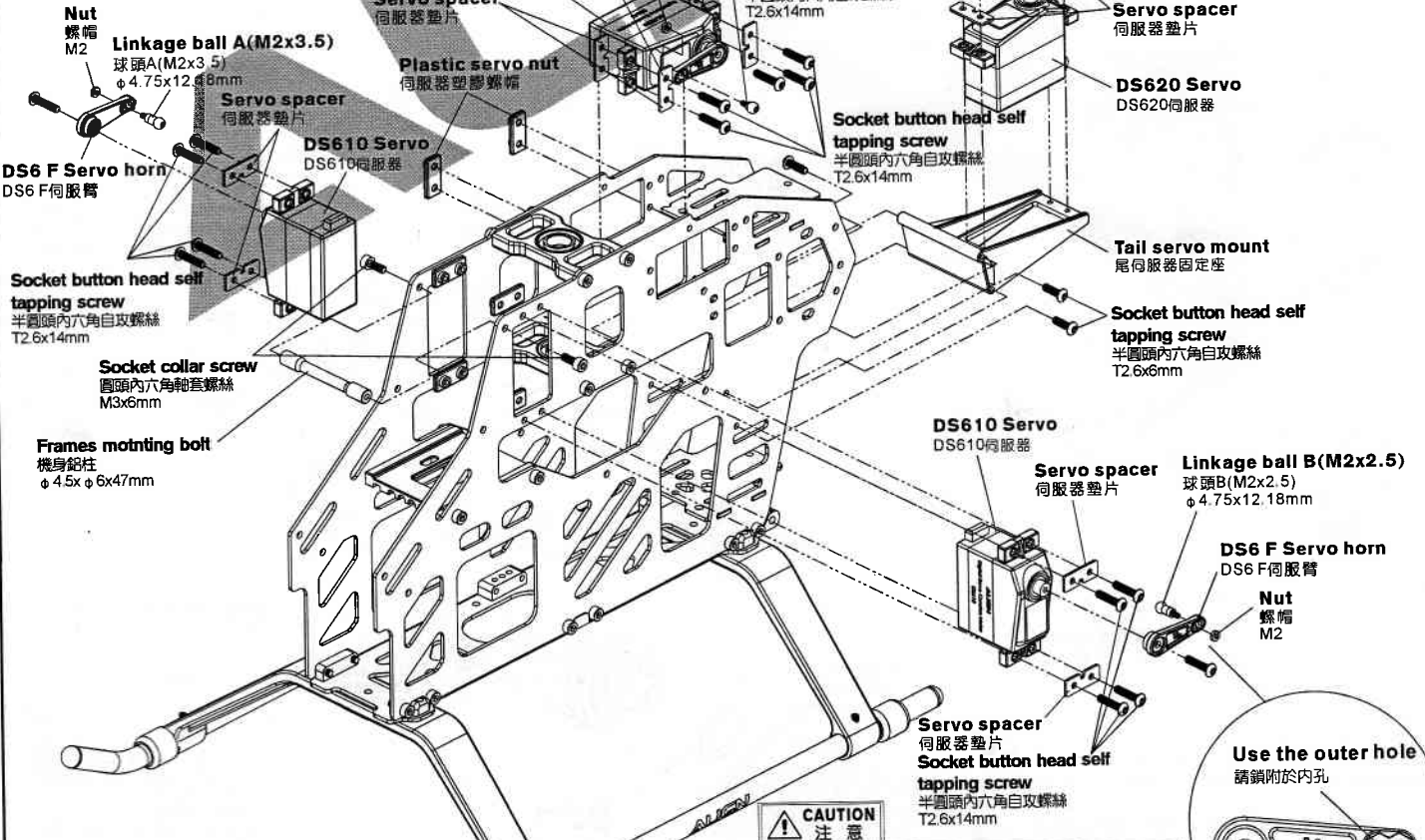
**CAUTION**  
注意  
When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.  
螺絲鎖入塑膠件請務必注意，適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

For original manufacturing package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.  
原廠零件包裝包裝如果是組裝品，請再確認各螺絲是否鎖緊上膠。



**55HB2A**

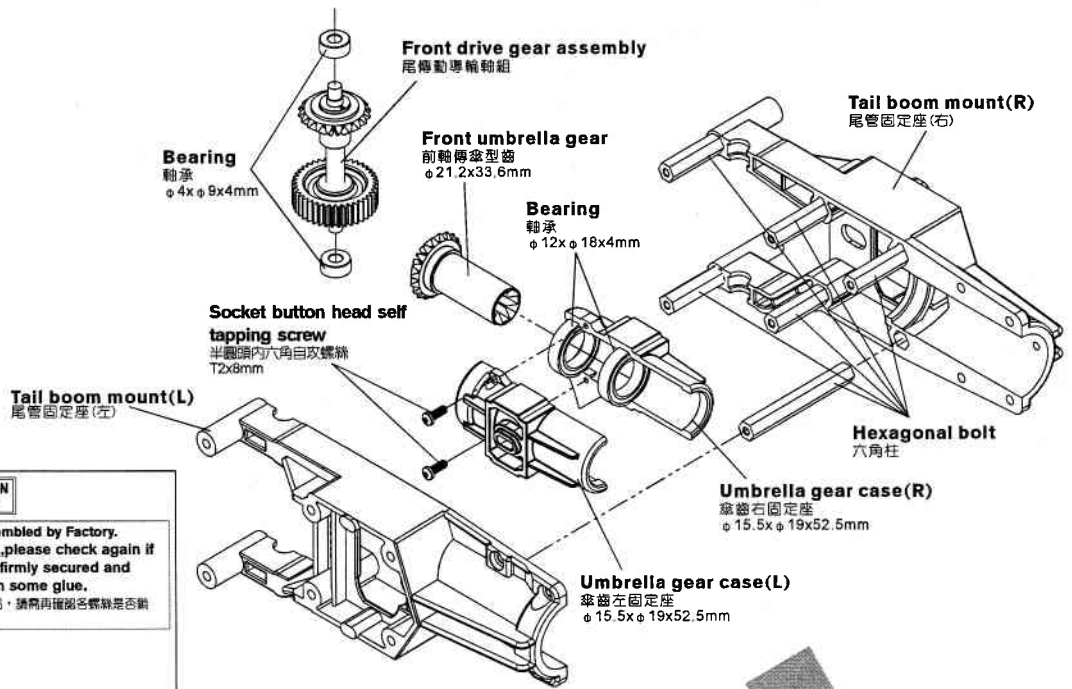
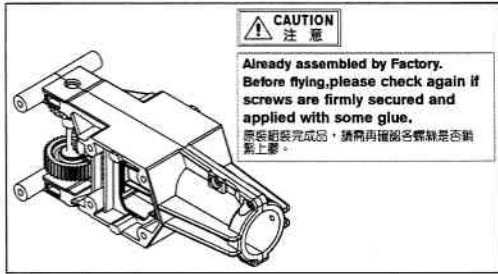
- Socket collar screw  
圓頭內六角軸套螺絲(M3x6mm) x 2



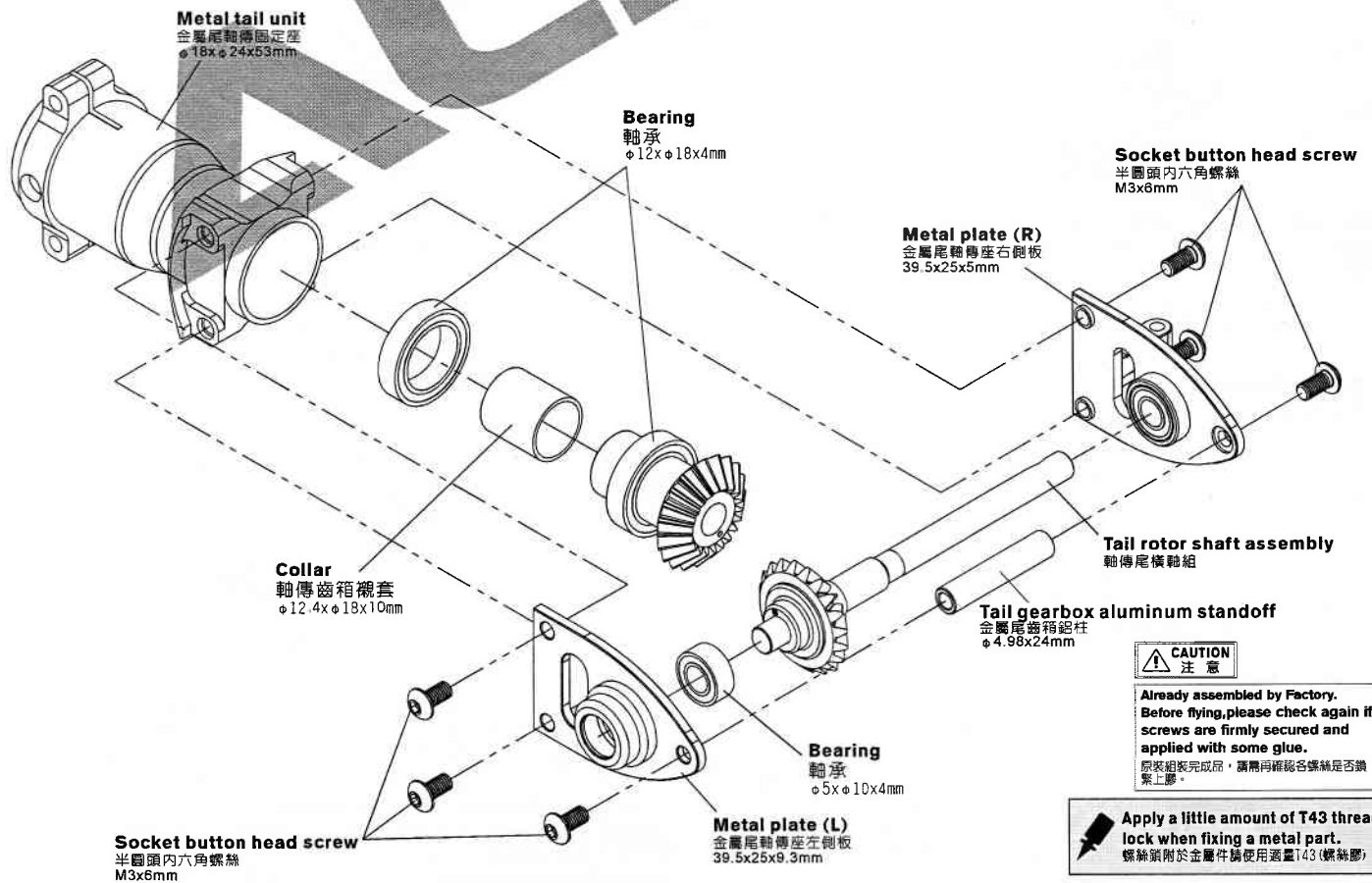
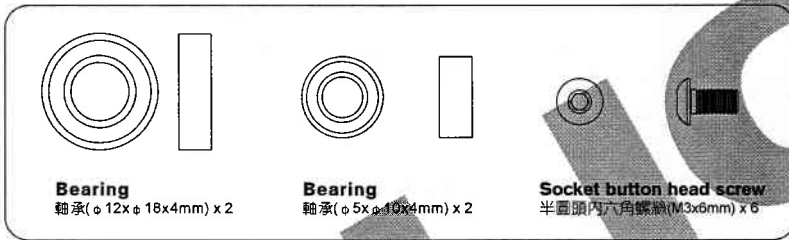
**CAUTION**  
注意  
3G Flybarless system uses inner hole(A)  
Flybar system uses outer hole(B)  
3G無平衡翼系統使用內孔(A)  
有平衡翼系統使用外孔(B)



# 50HT012



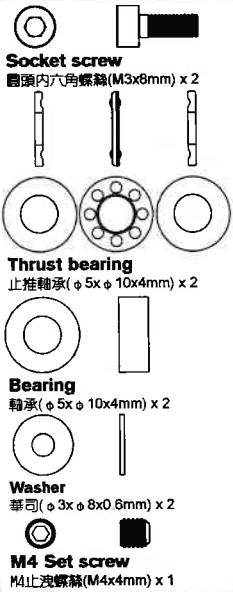
# 600NT2A



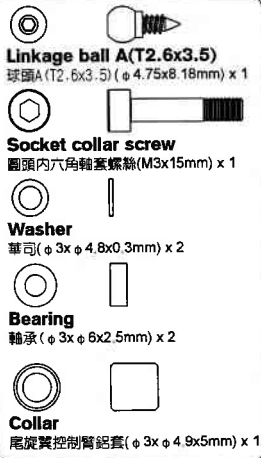
**CAUTION 注意**  
 Already assembled by Factory. Before flying, please check again if screws are firmly secured and applied with some glue.  
 原裝組裝完成品，請飛前再確認各螺絲是否鎖緊上膠。

**Apply a little amount of T43 thread lock when fixing a metal part.**  
 螺絲鎖附於金屬件請使用適量T43(螺絲膠)

### 55HT5



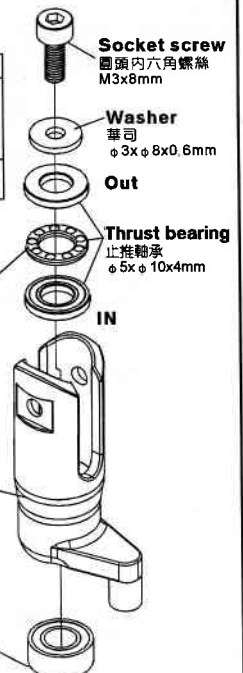
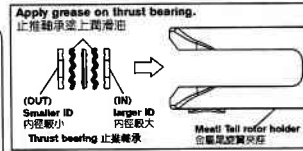
### 600NT2C



### 55HT6



**CAUTION**  
注意



**Obverse of bearing faces inside.**  
軸承面凹開口朝內

**Metal Tail rotor holder**  
金屬尾旋翼夾座

**Bearing**  
軸承 φ5xφ10x4mm

**M4 Set screw**  
M4止洩螺絲 M4x4mm

**Collar screw**  
軸套螺絲 M2x8mm

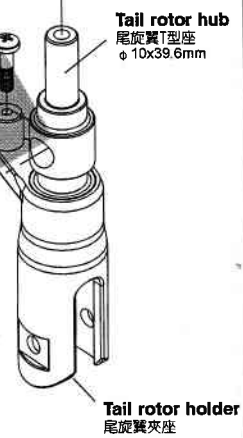
**Metal T type arm**  
金屬尾旋翼控制組T型臂

**Control link**  
尾控制連桿頭

**Collar A**  
尾連桿頭鋼套A φ2xφ3x4mm

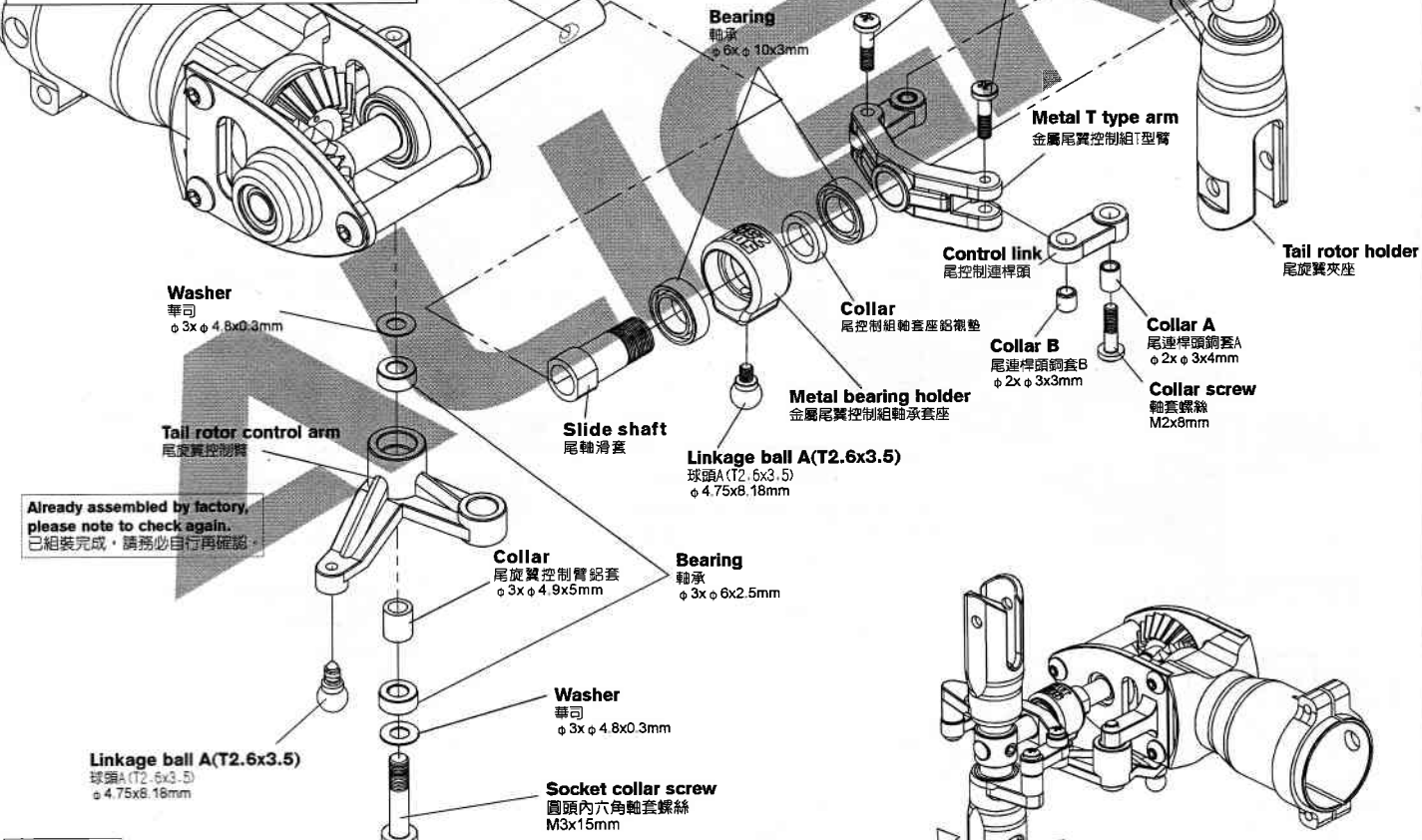
**Collar B**  
尾連桿頭鋼套B φ2xφ3x3mm

**Collar screw**  
軸套螺絲 M2x8mm



**CAUTION**  
注意

**Aim tail rotor hub at the concave of tail rotor shaft and fix it, please apply a little glue on the set screw.**  
尾旋翼T型座瞄準尾旋翼軸的凹刻並鎖上，請確認止洩螺絲上膠。



**Already assembled by factory, please note to check again.**  
已組裝完成，請務必自行再確認。

**CAUTION**  
注意

**When tightening a linkage ball to a plastic part, please note to use a little CA glue and tighten it firmly, but not over tightened, or they will strip.**  
球頭鎖入塑膠件時務必注意，使用少量CA膠並適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

**When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.**  
螺絲鎖入塑膠件時務必注意，適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

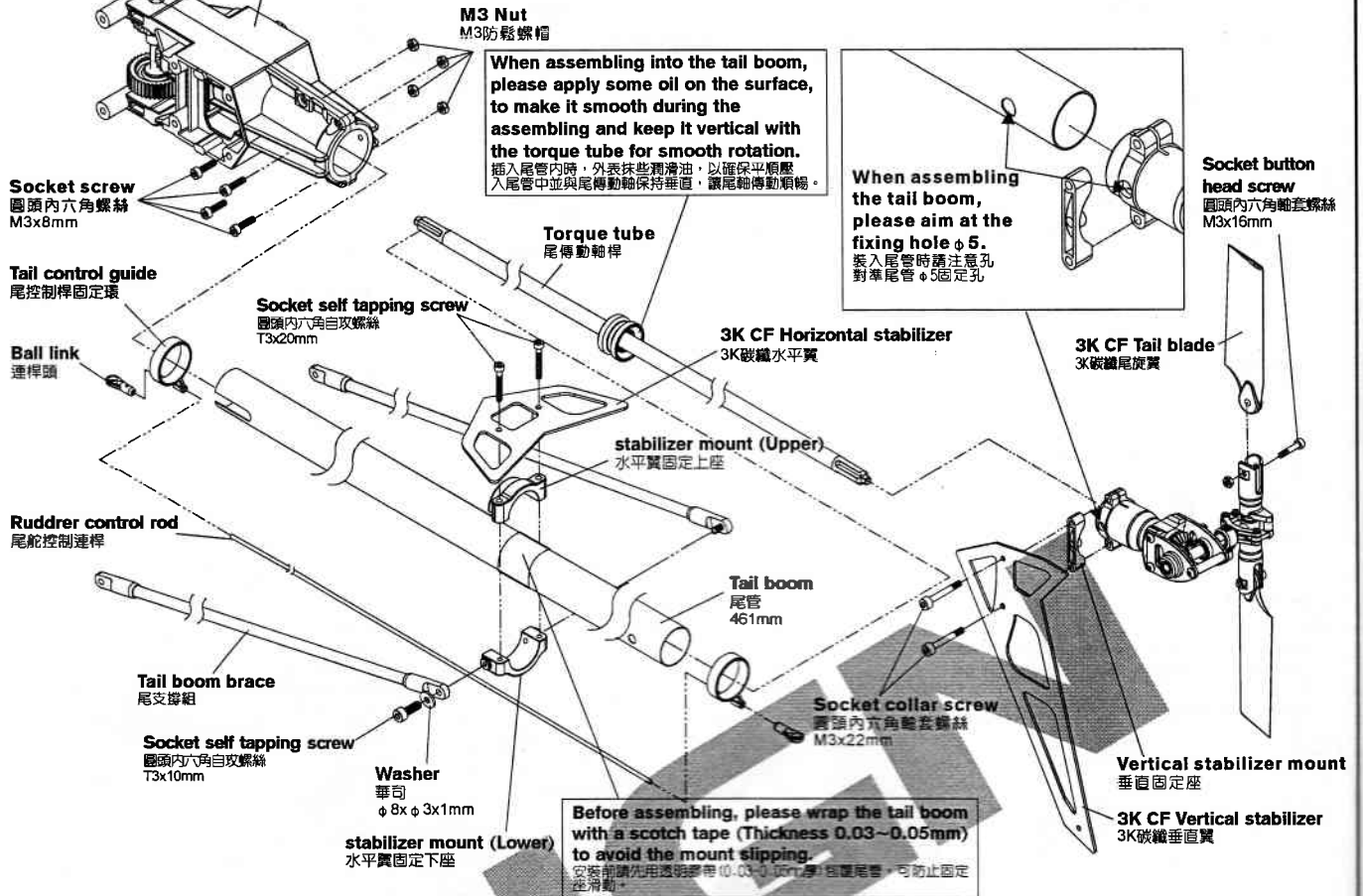
**For original manufacturing package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.**  
原廠零件出廠包裝如是組裝品，請再確認各螺絲是否鎖緊上膠。

**After complete the tail rotor assembly, please check if it rotates smoothly. (If not, please properly adjust the part gap.)**  
尾旋翼組裝完成後需確認尾旋翼夾座轉動滑順(如有不順請適當調整零件間隙)

**Apply a little amount of T43 thread lock when fixing a metal part.**  
螺絲鎖附於金屬件時請使用適量T43(螺絲膠)

Already assembled by factory, please note to check again.  
已組裝完成，請務必自行再確認。

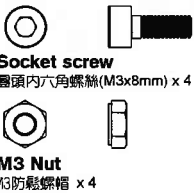
Apply a little amount of T43 thread lock when fixing a metal part.  
螺絲鎖附於金屬件時使用適量T43(螺絲膠)



**600NT2A**



**55HT4A**




**55HT3A**





# 50HT4A

# 55HB2B

 Apply a little amount of T43 thread lock when fixing a metal part.  
螺絲鎖附於金屬件請使用適量T43(螺絲膠)

 CAUTION  
注意

When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.  
螺絲鎖入塑膠件請務必注意，適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

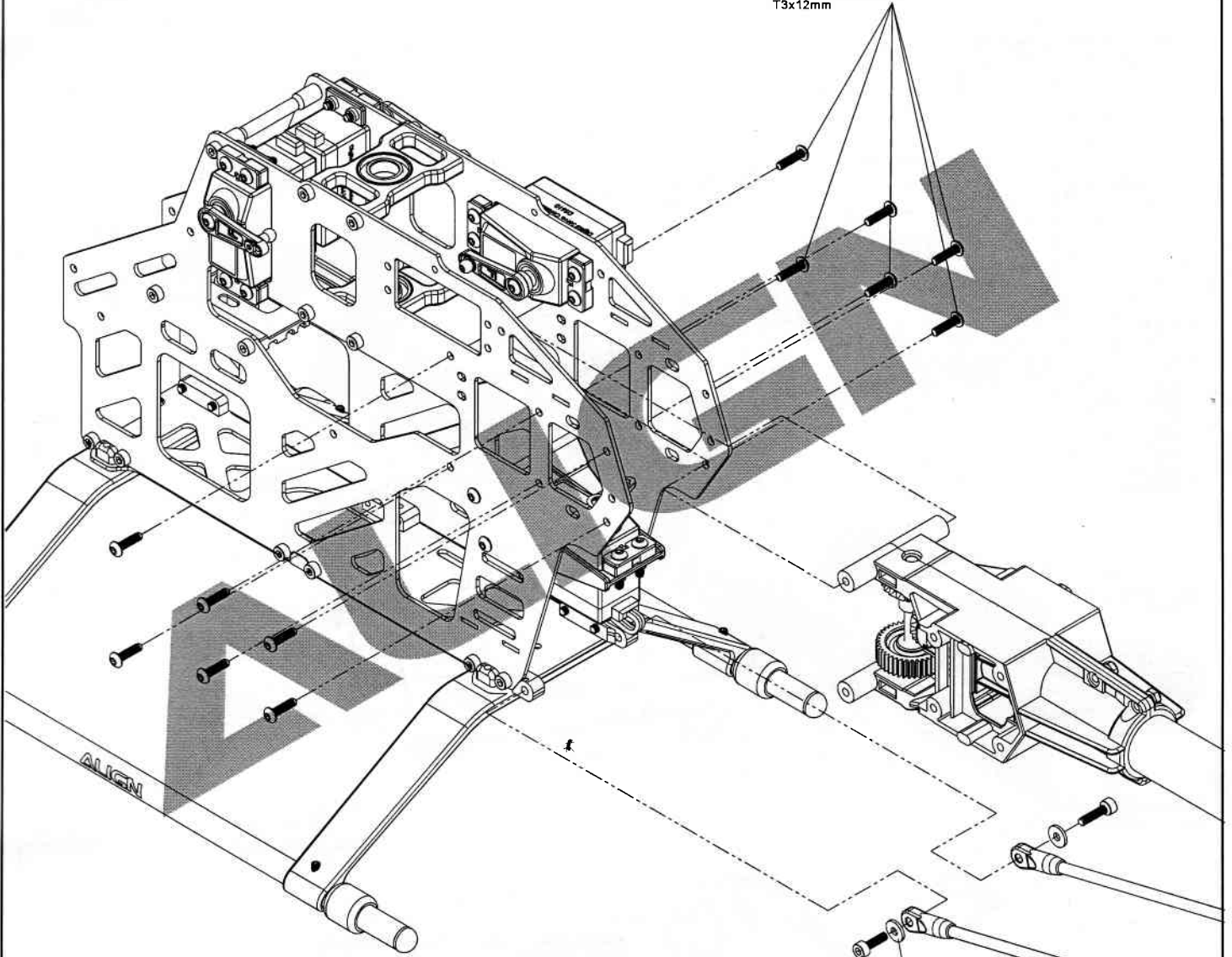
For original manufacturer package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.  
原廠零件出廠包裝如果是組裝品，請再確認各螺絲是否鎖緊上膠。

 **Socket button head screw**  
半圓頭內六角螺絲(M3x5mm) x 1

 **Socket button head self tapping screw**  
半圓頭內六角自攻螺絲(T3x10mm) x 12

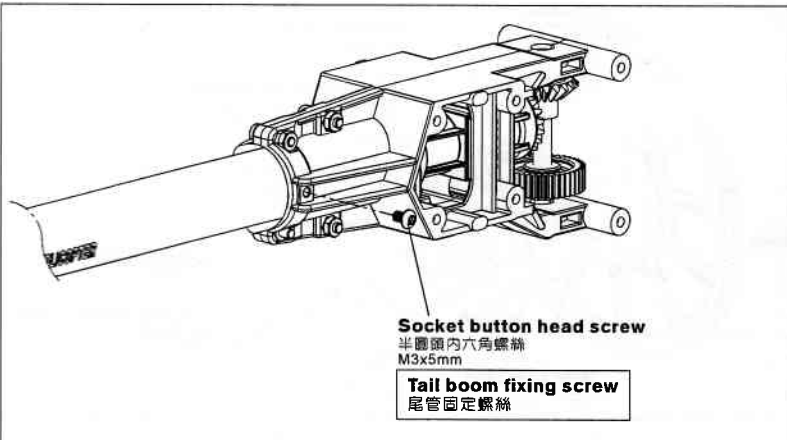
 **Socket screw**  
圓頭內六角螺絲(M3x10mm) x 2

**Socket button head self tapping screw**  
半圓頭內六角自攻螺絲  
T3x12mm



**Socket screw**  
圓頭內六角螺絲  
M3x10mm

**Washer**  
華司  
φ 8x φ 3x1mm



# 55HB2A



**M3 Set screw**  
M3止洩螺絲(M3x15mm) x 1

# 55HB2B



**Socket button head self tapping screw**  
半圓頭內六角自攻螺絲(T3x6mm) x 2

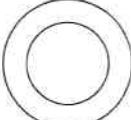
# 55HB3



**Hex socket self tapping screw**  
圓頭內六角自攻螺絲(T3x7mm)x5



**One-way bearing**  
單向軸承(φ12xφ18x16mm)x1



**Washer**  
單向軸承墊司(φ11.5xφ18x0.8mm)x1

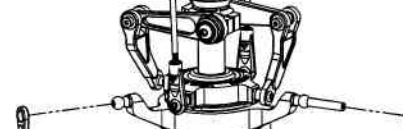


**Socket collar screw**  
圓頭內六角軸套螺絲(M3x20mm)x1

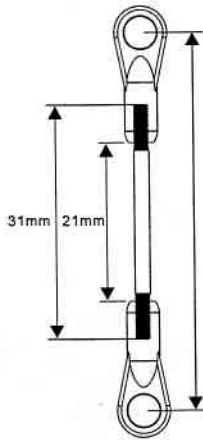


**M3 Nut**  
M3防鬆螺帽x1

Apply a little amount of T43 thread lock when fixing a metal part.  
螺絲鎖附於金屬件請使用適量T43(螺絲膠)



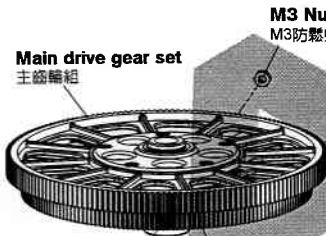
**Linkage rod (D)**  
連桿(D)



**Linkage rod (D)**  
Approx. 50mm x 3  
連桿(D)約50mm x 3

**Standard Equipment :**  
Main shaft spacer(0.5)  
Main shaft spacer(0.3)

標準品：主軸墊片(0.5)  
φ 10.1xφ 14x0.5mm  
主軸墊片(0.3)  
φ 10.1xφ 14x0.3mm



**Main drive gear set**  
主齒輪組

**Socket collar screw**  
圓頭內六角軸套螺絲  
M3x20mm

**M3 Nut**  
M3防鬆螺帽

**Gyro mount**  
陀螺儀固定座

**M3 Set screw**  
M3止洩螺絲  
M3x15mm

**Canopy mounting bolt**  
機頭罩固定柱

**Socket button head self tapping screw**  
半圓頭內六角自攻螺絲  
T3x6mm

**Autoration tail drive gear**  
尾驅動主齒  
180T

**M3 Nut**  
M3防鬆螺帽

**Socket collar screw**  
圓頭內六角軸套螺絲  
M3x20mm

**Main drive gear**  
主齒輪  
170T

**One-way bearing**  
單向軸承  
φ 12xφ 18x16mm

Already assembled by factory,  
please note to check again.  
已組裝完成，請務必自行再確認。

**Hex socket self tapping screw**  
圓頭內六角自攻螺絲  
T3x7mm

**Apply grease**  
塗上潤滑油

**One-way bearing shaft**  
單向軸承蓋  
φ 9xφ 12xφ 15.5x34.7mm

**Washer**  
單向軸承墊司  
φ 11.5xφ 18x0.8mm

**Main gear case**  
主齒中心座



**CAUTION 注意**  
When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.  
螺絲鎖入塑膠件請務必注意，適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

For original manufactory package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.  
原廠零件出廠包裝如果是組裝品，請再確認各螺絲是否鎖緊上膠。



**Apply a little amount of T43 thread lock when fixing a metal part.**  
 裝每項用於金屬件請使用適量T43 (螺絲膠)

**CAUTION**  
 注意

When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.  
 螺絲鎖入塑膠件請務必注意，適量扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

For original manufactory package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.  
 原廠包裝上之產品如果是組裝品，請需再確認螺絲鎖入塑膠件上是否適量，並請再確認螺絲膠是否已塗抹。

**55FLH1A**

-  **Socket collar screw**  
圓頭內六角軸套螺絲(M4x27mm) x 2
-  **M4 Nut**  
M4防鬆螺帽 x 2

**55HZ5**

-  **M4 Set screw**  
M4止洩螺絲(M4x4mm) x 1

**520 Carbon fiber blade**  
520破織主旋翼

**Socket collar screw**  
圓頭內六角軸套螺絲  
M4x27mm

**M4 Nut**  
M4防鬆螺帽

**Socket screw**  
圓頭內六角螺絲  
M3x10mm  
**For motor fixing**  
馬達固定螺絲

**Battery mount**  
電池固定座

**M3 Washer**  
M3華司  
φ3xφ8x1mm

**Socket btton head self tapping screw**  
半圓頭內六角自攻螺絲  
T3x6mm

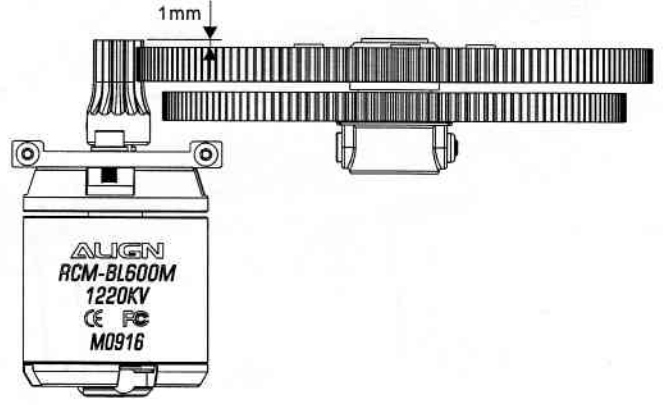
**Motor pinion gear 16T**  
馬達齒輪 16T

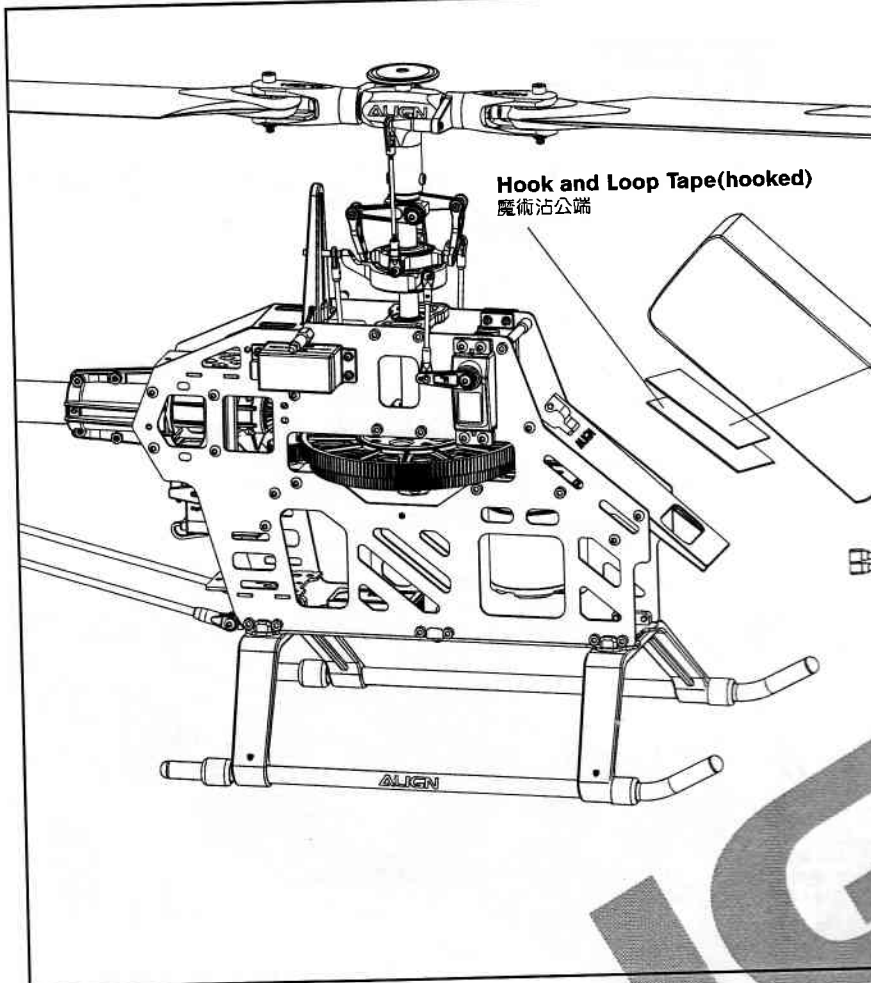
**M4 Set screw**  
M4止洩螺絲  
M4x4mm



When fixing the screw of pinion gear, please aim at the fixing point on motor shaft.  
 馬達齒輪固定螺絲鎖緊時，請對準馬達心軸固定槽。

After assembling the motor pinion gear and main drive gear, the horizontal distance must be within 1mm and keep the gear mesh at a proper distance.  
 馬達齒輪與主齒盤組立後平行距離不可超過1mm，並保持兩齒咬合有適當間距。





Hook and Loop Tape(hooked)  
魔術沾公端

Use attached Hoop and Loop Tape, tape the Hoop side (hooked) on the battery mountingplate and the Loop side (fuzzy) on the battery to fix the battery in order to prevent any slip.

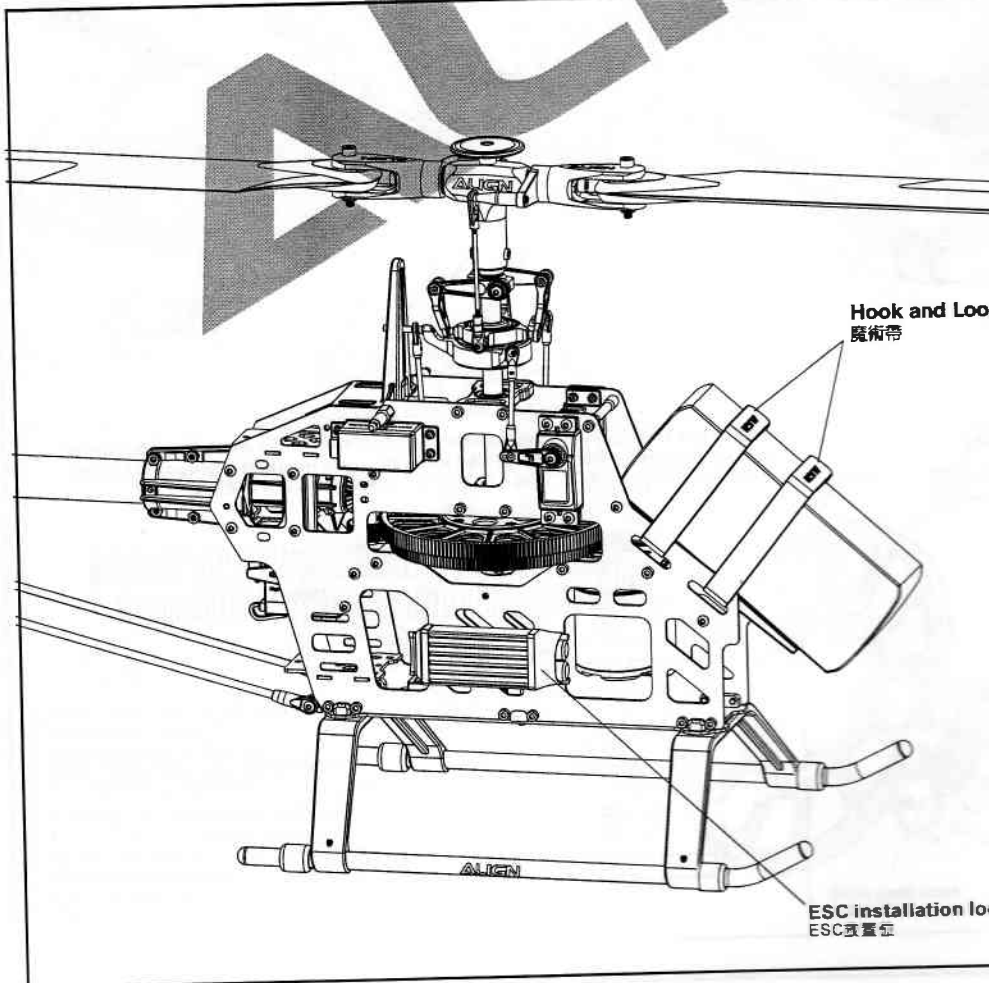
以附贈的魔術沾膠帶，將公端的魔術沾(勾狀)黏貼於電池座上，母端的魔術沾(纖毛狀)黏貼於電池上，可有效固定電池避免滑動。

Hook and Loop Tape(fuzzy)  
魔術沾母端

Use Adhesive foam or Hoop & Loop tape to fix.  
以泡棉雙面膠或魔術沾固定。

**NOTE: When installing the speed controller, please keep a distance at least 5cm from the receiver to avoid any interference.**

注意：安裝ESC時請與接收器保持至少5cm以上的距離，避免干擾接收器。



Hook and Loop Tape  
魔術帶

ESC installation location  
ESC裝置位

**Directional Arrow**  
方向指示

**Connector latch**  
連接器卡榫

**Flybarless Sensor**  
無平衡翼感應器

**Sensor mounting foam**  
感應器固定泡棉

**Flybarless control unit**  
無平衡翼控制器

**CAUTION**  
注意

Sensor must be installed with arrow pointing to front or rear of the helicopter as shown in diagram, level, and away from vibration sources. If excess vibration from helicopter frame is affecting flybarless sensors causing instability, two sensor foams can be used to mount the sensor. If problem persists, attempts should be made to eliminate vibration source, or reduce headspeed.

感應器擺放方向請參照圖示箭頭指向機頭或機尾，水平擺放於陀螺儀固定座，並避開震動源。  
機體震動會影響感應器偵測，造成飛行不穩定，可於感應器下方貼附2片泡棉減震，若仍未改善，請檢查機體排除震動或降低主旋翼轉速。

**CAUTION**  
注意

When connecting the wire harness between control box and sensor, push the connector all the way in, and make sure the connector latch engages the unit with a "click" sound. The connection needs to have sufficient slack to avoid vibrations induced disconnects. Disconnects during flight will result in loss of control and crash of the model.

插入連接器時務必將連接器完全推至最底部，使卡榫確實卡入母座發出「喀答」聲響，以確保緊密連接；訊號線須預留適當的緩衝長度，勿將線材綁緊固定，避免飛行中的震動或激烈的飛行，可能造成損壞感測器而產生失控的危險。

9. CANOPY ASSEMBLY 機頭罩安裝

**55HC1**  
Canopy  
機頭罩 x 1

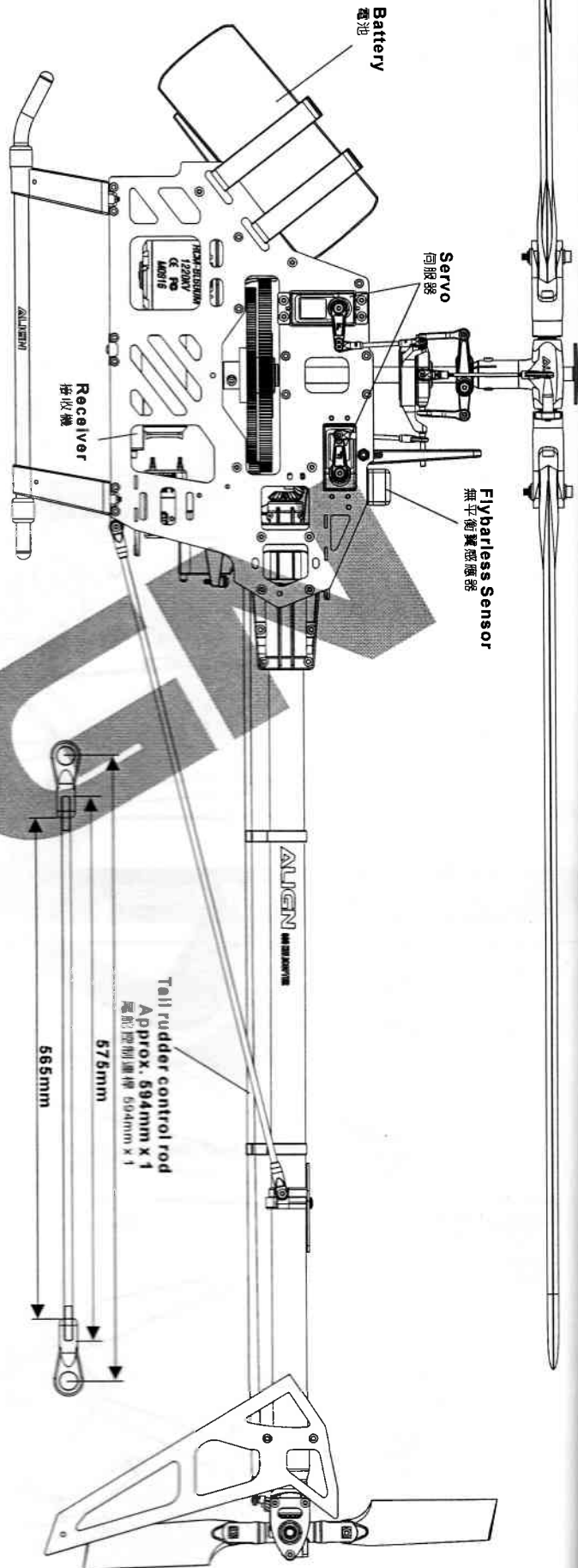
**55HZ1**  
Canopy nut  
機頭罩固定套 x 2

CA

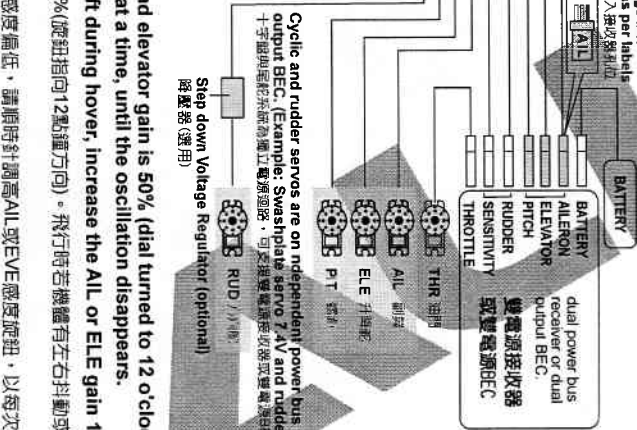
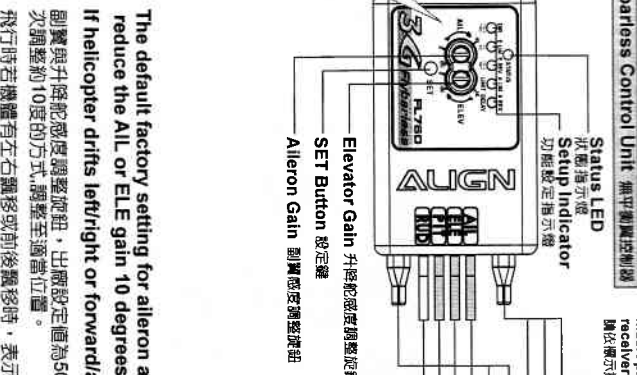
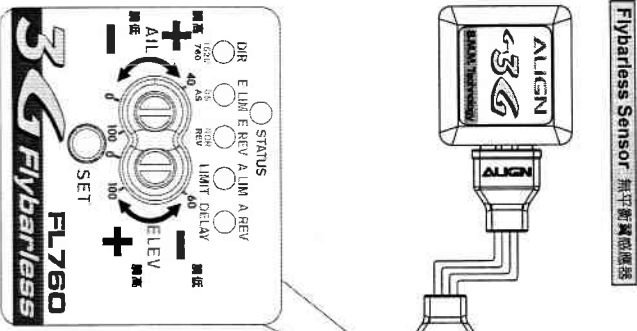
Canopy protector  
機頭罩墊片 x 2

**Socket button head self tapping screw**  
半圓頭內六角自攻螺絲  
T3x6mm

When assembling the canopy to the unit, please completely wedge into the groove of the bottom plate.  
機頭罩組裝於機體時，請完全卡入主體底板的溝槽內。



PARTS IDENTIFICATION AND CONNECTION ILLUSTRATION 各組位名稱與接線示意圖



The default factory setting for aileron and elevator gain is 50% (dial turned to 12 o'clock position). If left/right or forward/aft oscillation is noticed, reduce the AIL or ELE gain 10 degrees at a time, until the oscillation disappears.

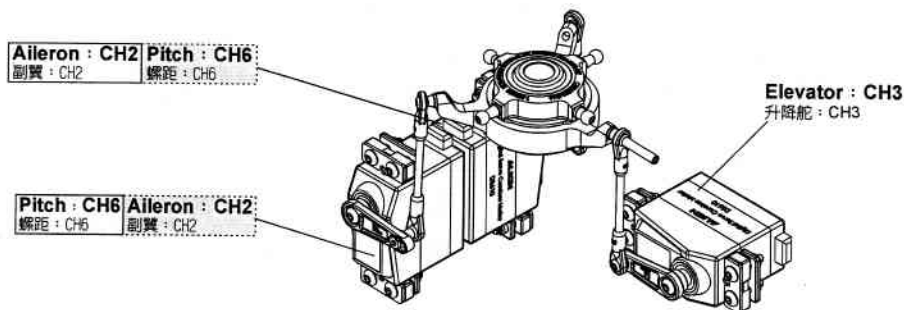
If helicopter drifts left/right or forward/aft during hover, increase the AIL or ELE gain 10 degrees at a time until drifting is eliminated.

副翼與升降舵感度調整旋鈕，出廠設定值為50% (旋鈕指向12點鐘方向)。飛行時若機體有左右抖動或前後抖動時，表示感度偏高，請逆時針調低AIL或ELE感度旋鈕，以每次調整約10度的方式，調整至適當位置。

飛行時若機體有左右飄移或前後飄移時，表示感度偏低，請順時針調高AIL或ELE感度旋鈕，以每次調整約10度的方式，調整至適當位置。

To set this option is to turn on the transmitter and connect to BEC power.  
此項設定只要開啓發射器，接上BEC電源即可進行操作。

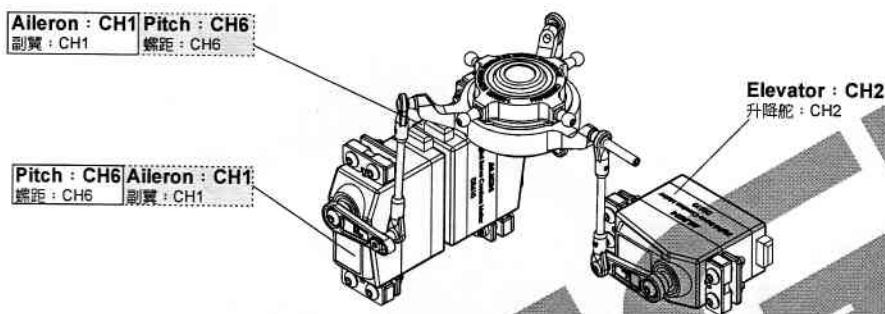
## JR Transmitter/Servo JR遙控器對應伺服器關係



Positions of CH2 - CH6 are exchangeable. After assembling as photo (Note: Set the transmitter under CCPM 120 degrees mode), pull throttle stick (pitch) upward. If one swashplate servo (or two servos) moves downward, adjust reverse switch (REV) on the transmitter to make it moves upward. If three servo move downward, adjust the travel value (+-) of SWASH CH6 on the transmitter to make them move upward. When the actions of Aileron and Elevator are opposite, adjust travel values of SWASH CH2 and CH3.

CH2、CH6可互換配置，依圖連結後(注意：遙控器須設定於CCPM 120°十字盤模式)，將油門搖桿(Pitch)往上推，若十字盤伺服器有1個或2個往下移時，請調整遙控器的反轉開關(REV)使伺服器往上，若3個伺服器同時往下移時，請調整遙控器 SWASH CH6 行程量的正負值，使伺服器同時往上移，副翼與前後動作相反時，同樣調整 SWASH CH2、CH3 行程量正負值。

## FUTABA/HITEC Transmitter/Servo FUTABA/HITEC遙控器對應伺服器關係



Positions of CH1 - CH6 are exchangeable. After assembling as photo (Note: Set the transmitter under CCPM 120 degrees mode), pull throttle stick (pitch) upward. If one swashplate servo (or two servos) moves downward, adjust reverse switch (REV) on the transmitter to make it moves upward. If three servo move downward, adjust the travel value (+-) of SWASH CH6 on the transmitter to make them move upward. When the actions of Aileron and Elevator are opposite, adjust travel values of SWASH CH1 and CH2.

CH1、CH6可互換配置，依圖連結後(注意：遙控器須設定於CCPM 120°十字盤模式)，將油門搖桿(Pitch)往上推，若十字盤伺服器有1個或2個往下移時，請調整遙控器的反轉開關(REV)使伺服器往上，若3個伺服器同時往下移時，請調整遙控器 SWASH CH6 行程量的正負值，使伺服器同時往上移，副翼與前後動作相反時，同樣調整 SWASH CH1、CH2 行程量正負值。

# 12.ADJUSTMENTS FOR GYRO AND TAIL NEUTRAL SETTING 陀螺儀與尾翼中立點設定調整

Recommend to choose Head Lock type for Gyro and turn off Revolution mixing(RVMX) mode on the transmitter, then set the gain switch on the transmitter and the gyro to Head lock mode. The gain setting is about 70%, and after transmitter setting, connect to BEC power to work on tail neutral setting.

**Note:** When turn on BEC power, please do not touch tail rudder stick and the helicopter. Then wait for 3 seconds, make tail servo arm and tail servo at a right angle(90 degrees), tail pitch assembly must be correctly fixed about in the middle of the travel of tail rotor shaft for standard neutral setting.

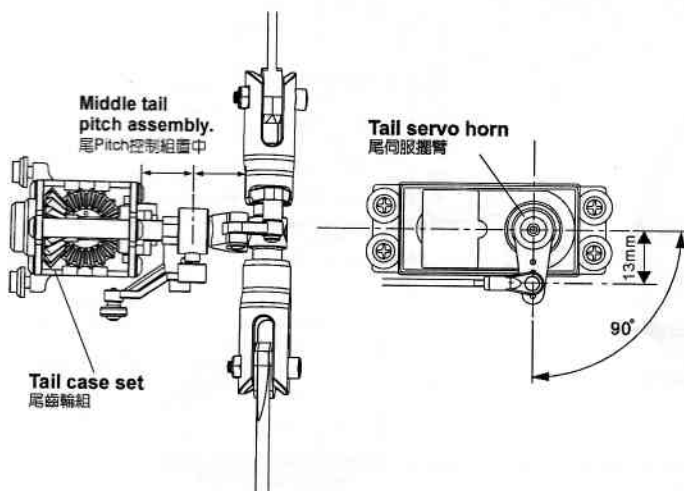
陀螺儀選擇，建議選用鎖定式陀螺儀，其發射器內陀螺儀設定請關閉轉軸混控模式，並將發射器上的感度開關與陀螺儀切至鎖定模式，感度設約 70% 左右，發射器設定完成後接上BEC接收電源，即可進行尾中立點設定。

注意：當啟動BEC電源時請勿撥動尾舵搖桿或碰觸機體，待3秒陀螺儀鎖定後尾伺服器需與尾尾伺服器約成90°，尾旋翼控制組須正確置於尾橫軸行程約中間位置，即為標準尾中立點設定。

## TAIL NEUTRAL SETTING 尾中立點設定

After setting Head Lock mode, correct setting position of tail servo and tail pitch assembly is as photo. If the tail pitch assembly is not at the neutral position, please adjust the length of rudder control rod to trim.

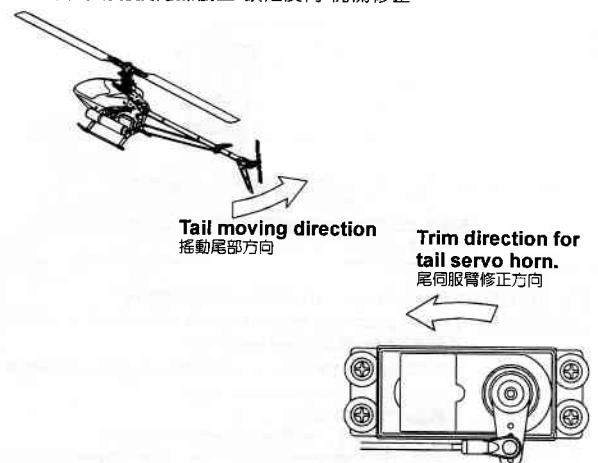
陀螺儀鎖定後尾伺服器與尾Pitch控制組正確擺置位置。若尾Pitch控制組未置中時請調整尾控制連桿的長度來修正。



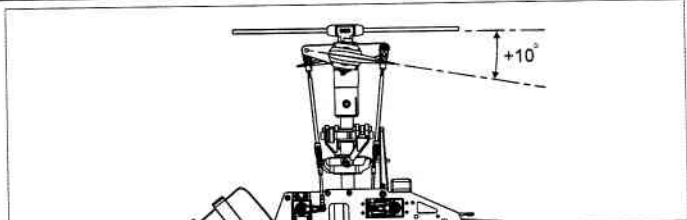
## HEAD LOCK DIRECTION SETTING OF GYRO 陀螺儀鎖定方向設定

To check the head lock direction of gyro is to move the tail counterclockwise and the tail servo horn will be trimmed clockwise. If it trims in the reverse direction, please switch the gyro to "REVERSE".

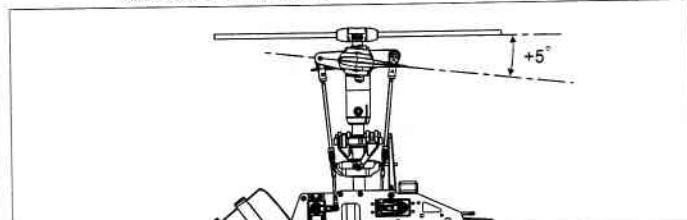
陀螺儀鎖定方向確認，當手搖尾部反時鐘擺動，尾伺服器應順時鐘修正，反向時請切換陀螺儀上“鎖定反向”開關修正。



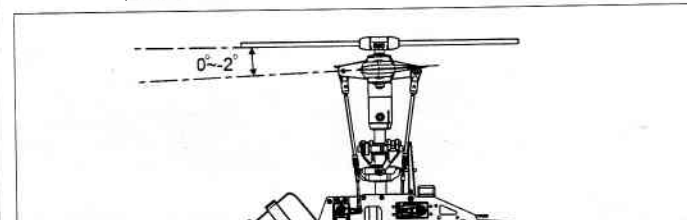
GENERAL FLIGHT 一般飛行模式



Stick position at high/Throttle 100%/Pitch +10°  
搖桿高速/油門100%/Pitch+10°



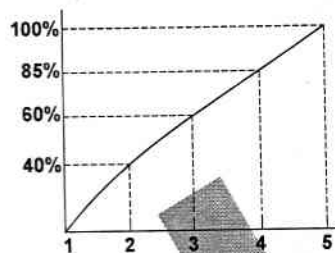
Stick position at Hovering/Throttle 60%/Pitch +5°  
搖桿停懸/油門60%/Pitch+5°



Stick position at low/Throttle 0%/Pitch 0~-2°  
搖桿低速/油門0%/Pitch0~-2°

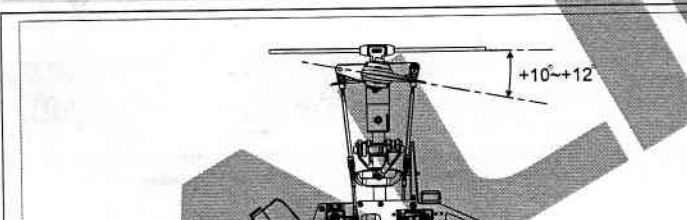
GENERAL FLIGHT  
一般飛行模式

	Throttle 油門	Pitch 螺距
5	100% High speed 100% 高速	+10°
4	85%	
3	60% Hovering 60% 停懸	+5°
2	40%	
1	0% Low speed 0% 低速	0~-2°

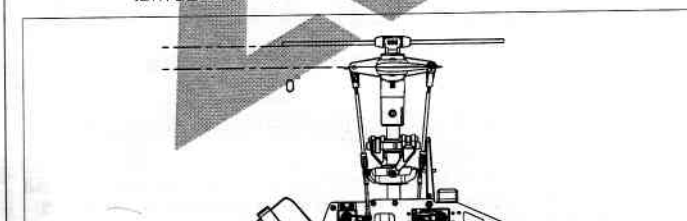


Throttle Curve (Hovering Flight)  
停懸模式油門曲線

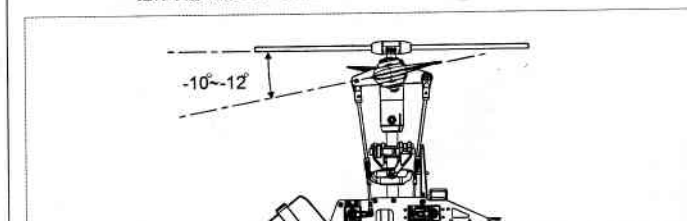
3D FLIGHT 3D特技飛行模式



Stick position at high/Throttle 100%/Pitch +10~-+12°  
搖桿高速/油門100%/Pitch+10~-+12°



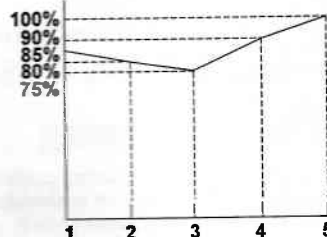
Stick position at middle/Throttle 85%/Pitch 0°  
搖桿中速/油門60~65%/Pitch 0°



Stick position at low/Throttle 100%/Pitch -10~-12°  
搖桿低速/油門100%/Pitch-10~-12°

IDLE 1 : SPORT FLIGHT

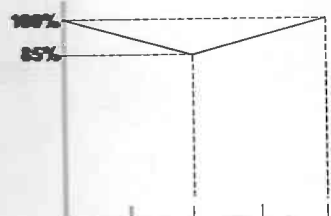
	Throttle 油門	Pitch 螺距
5	100%	+10~-+12°
4	90%	
3	75%	+5°
2	80%	
1	85%	-5°



Throttle Curve (Simple Aerobatic Flight)  
空中飛行模式油門曲線

IDLE 2 : 3D FLIGHT

	Throttle 油門	Pitch 螺距
5	100% High 100% 高	+10~-+12°
3	85% Middle 85% 中	0°
1	100% Low 100% 低	-10~-12°



Throttle Curve (3D Flight)  
特技飛行模式油門曲線



1. Pitch range : Approx. ±15 degrees.  
2. If the pitch is set too high, it will result in shorter flight duration and poor motor performance.  
3. Setting the throttle to provide a higher speed is preferable to increasing the pitch too high.
1. 螺距(Pitch)總行程約 ±15°  
2. 過大螺距設定, 會導致動力與飛行時間降低。  
3. 動力提昇以較高轉速的設定方式, 優於螺距調大的設定。

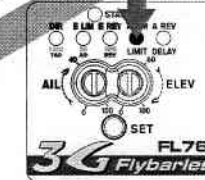


**FEATURES 產品特色**

- 3Axis** 3-axis gyroscopic flybarless system to simulate the stability of mechanical flybar system, yet at the same time achieving agile 3D performance.  
3軸陀螺儀無平衡翼系統，可模擬有平衡翼系統的穩定性，更有靈活的3D性能。
- SMM** Utilizes Silicon Micro Machine (SMM) sensors for excellent stability.  
採用S.M.M. Silicon Micro Machine技術感應器，具有極佳的穩定性。
- 12bit** 12 bit processors providing ultra high resolution, resulting in highly precise controls  
採用12位元處理器，超高解析度，控制細膩精準。
- Easy** Software upgradable through PC interface adapter (sold separately)  
具備可升級程式化介面，可透過傳輸線更新軟體（傳輸線另購）。
- Easy** Simplistic setup process without the need of external devices. Setup is done through 5 steps and 2 sensitivity adjustments. Rudder setup is identical to GP780 gyro, minimizing learning curve.  
設定簡單不需額外的介面，只需五個步驟、兩個感度調整即可完成所有設定，尾舵設定和GP780相同，設定輕鬆上手。
- Energy** Flybarless system dramatically improves 3D power output and efficiency, resulting in reduced fuel or electricity consumption.  
無平衡翼系統，可大幅降低3D大動作飛行能量消耗，提供直昇機更大的動力輸出且更加節省燃油或電力。
- Stable** Highly sensitive gyroscopic sensors combined with advanced control detection routine providing higher hovering and aerobatic stability than other flybarless system.  
高感度陀螺儀感測器及先進選路設計，可提供比一般平衡翼系統更佳的靜態及動態穩定性。
- Stable** Suitable for all CCPM and mechanical mixing system.  
適用於任何比例之對稱式三伺服器CCPM系統及傳統十字盤系統。
- T-REX 250-700** Compatible with helicopter of all sizes from T-Rex 250 to T-Rex 700.  
3G Flybarless電子設備相容迷你型直昇機至大型直昇機T-REX250~T-REX700。
- 300Hz** Innovative pitch gauge as an aid to facilitate pitch adjustments.  
創新設計的螺距量測器，藉以模擬有平衡翼系統之螺距量測。
- 300Hz** High frame rate signal output for faster and higher precision servo response.  
高頻數位輸出訊號，使伺服器的反應更加精準、迅速。
- 3V~8.4V** Capable to operate between 3V to 8.4V, compatible with high voltage servos.  
適用電壓3V~8.4V，支援高電壓伺服器。
- ES9** Small footprint, light weight, minimalists and reliable design.  
體積小、重量輕，構造簡單可靠，提供操控者高性能的飛行樂趣。

**3G FLYBARLESS SETUP INDICATORS 功能設定指示燈說明**

Flybarless system setup mode 無平衡翼系統設定模式：

<b>DIR</b>	<b>E.LIM</b>	<b>E.REV</b>	<b>A.LIM</b>	<b>A.REV</b>
				

Direct mode bypassing gyro, for mechanical travel and neutral point setup.  
機械行程與中立點設定

Collective mixing type recognition and elevator endpoint settings  
混控辨識及升降舵行程設定

Elevator reverse settings  
升降舵正反設定

Aileron endpoints settings  
副翼行程設定

Aileron reverse settings  
副翼正反設定

Rudder gyro setup mode 尾舵陀螺儀設定模式：

<b>1520/760</b>	<b>DS/AS</b>	<b>NOR/REV</b>	<b>LIMIT</b>	<b>DELAY</b>
				

Servo frame rate settings (1520 μs and 760 μs)  
寬頻1520 μs及窄頻 760 μs 伺服器設定

Digital/Analog servo settings  
數位及類比伺服器設定

Rudder Servo Reverse settings  
尾舵陀螺儀正反設定

Rudder endpoints settings  
尾舵行程設定

Rudder servo delay, and helicopter size settings  
尾舵延遲量及大小直昇機模式設定

**SETUP PRE-CHECK 設定前注意事項**



**While using 3G FBL system, be sure to turn off the following functions in the transmitter**  
使用3G系統若是遙控器有下列功能時請勿開啓功能

- \* Swash Ring \* Linkage Compensation \* Swash Mix
- \* Mixing \* Acceleration

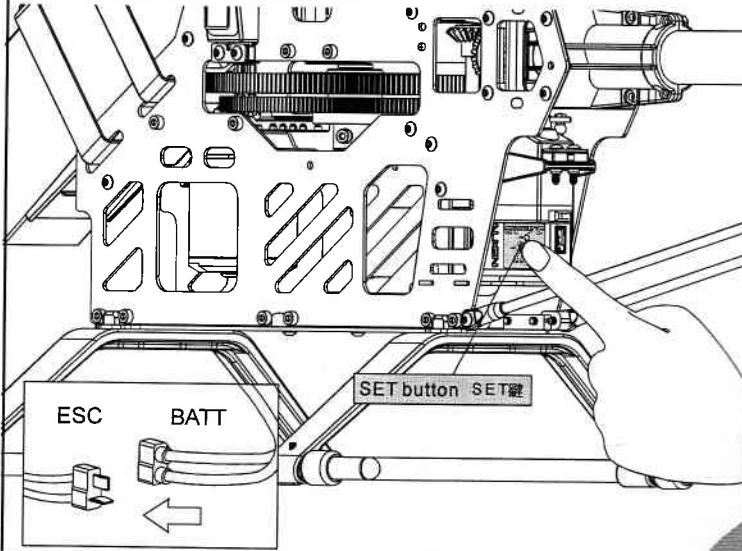
1. Connect the receiver and servos to the flybarless control unit as per diagram found on page 17.
  2. Digital servos must be used on cyclic to avoid damage to servos.  
Recommended servo spec: minimum speed 0.10 sec/60, torque 12kg.cm or higher.
  3. Transmitter trim tabs must be centered before entering the setup process. It can be moved after setup is complete to trim the heli.
  4. 3G Flybarless contains two independent power circuits to enable the use of different voltage sources through the receiver (For example, 7.4V to the cyclic servos, 5V to the gyro and rudder servo). If there is only one 7.4V power source, a step down voltage regulator is required (available separately) to prevent rudder servo from burning out.
- CAUTION 注意** To prevent voltage instability, do not use step down voltage regulator if power source is already at 5V.  
Please consult your servo manuals and ensure proper voltage are supplied to the servos.
5. When the 3G flybarless system is installed for the first time, a few simple setup steps and fly tests need to be performed in the flybarless setup mode. These steps need to be performed only during initial setup, and does not need to be repeated for subsequent flights. Just power up the system normally, check the proper servo operations, and fly. The initial setup procedure only need to be repeated after software upgrade, pitch range reset, or subtrims are added in the transmitter.

1. 將接收器及伺服器依接線示意圖連接 (請參照第 17 頁)。
2. 十字盤必須安裝數位伺服器, 否則會造成伺服器損毀。  
建議規格: 速度 0.10 秒/60° 以內; 扭力 12kg.cm 以上。
3. 進入設定時必須將遙控器的外微調歸零, 飛行時再根據飛行狀況調整微調。
4. 3G Flybarless 的伺服器輸入電源具有兩組獨立迴路設計, 可支援具有雙電源輸出的接收器分開供給不同電壓 (例如: 十字盤伺服器輸出 7.4V / 陀螺儀、尾舵伺服器輸出 5V)。當接收器電源僅有 7.4V, 無提供獨立尾舵 5V 電源時, 可將尾舵伺服器降壓器 (選購品) 依接線圖之方式接上, 以防止尾舵伺服器因電壓過高而燒毀。  
**CAUTION 注意** 如原本接收器電源為 5V, 請勿接上尾舵伺服器降壓器, 以防止電壓不穩。  
各型號伺服器允許之工作電壓不盡相同, 請依該伺服器所建議的電壓下使用。
5. 第一次安裝 3G Flybarless 無平衡翼系統時, 必須進入無平衡翼設定模式, 進行幾項簡易的安裝設定與飛行測試, 完成後即不須再進入此設定模式, 只要正常開機, 檢查伺服器動作正確後即可飛行; 除非要更新程式、重設螺距或有更動遙控器內微調 (sub trim) 時, 必須進入設定模式重設無平衡翼系統。

## FLYBARLESS SYSTEM INITIAL SETUP STEPS 無平衡翼系統設定

### 1. DIR: Direct mode to bypass gyro for mechanical travel and neutral point setup

#### DIR 機械行程與中立點設定模式



#### Step 1.1: Enter the DIR settings 步驟 1.1: 進入 DIR 設定

Please unplug the motor power cord before connecting the battery to avoid motor operating while you are doing the setting. Connect the motor power cord after the setting is finished.

接上電池前請先將馬達電源線拔開, 避免設定過程中推動油門搖桿使馬達運轉, 設定完成後再將馬達電源線接上。

Press and hold the SET button while powering up the receiver. Release the button when LED 1-5 begin to cycle. The DIR green LED will light up indicating the gyro has been bypassed for neutral and mechanical travel range setup.

按下 "SET" 鍵不放, 並將電池接上電子調速器 ESC, 接著 LED 1~5 (DIR~A, REV) 會循序亮起, 此時即可以放開按鍵, "DIR" 綠燈亮起, 則進入 3G Flybarless 機械行程與中立點設定模式。

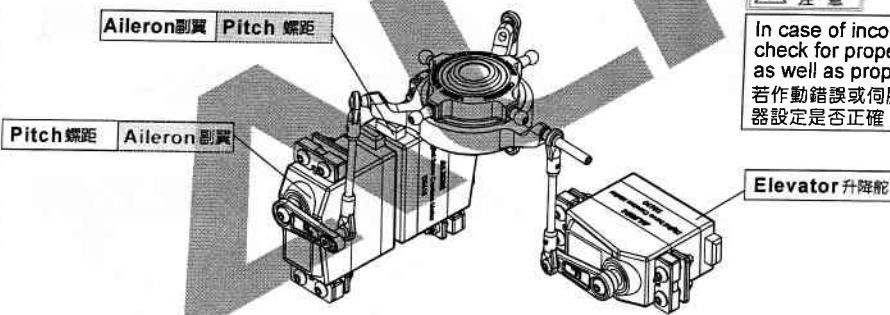
#### CAUTION 注意

If "STATUS" led flashes in red indicating error entering DIR settings, check connections to the sensor and restart the process.

若 "STATUS" 亮紅燈閃爍, 無法進入 DIR 模式時, 請檢查感應器訊號線連接是否確實後, 重新進入 DIR 設定。



#### Transmitter function to servo mapping 遙控器對應伺服器關係



#### Step 1.2: Swashplate function check 步驟 2: 十字盤動作確認

Verify the correct swashplate movements for PIT, AIL, and ELE inputs. 確認十字盤動作 PIT、AIL、ELE 是否正確。

#### CAUTION 注意

In case of incorrect servo movement or no movement at all, please check for proper connection between 3G Flybarless connection to servos, as well as proper setup on transmitter.

若動作錯誤或伺服器無動作, 請檢查 3G Flybarless 伺服器訊號線連接以及遙控器設定是否正確。



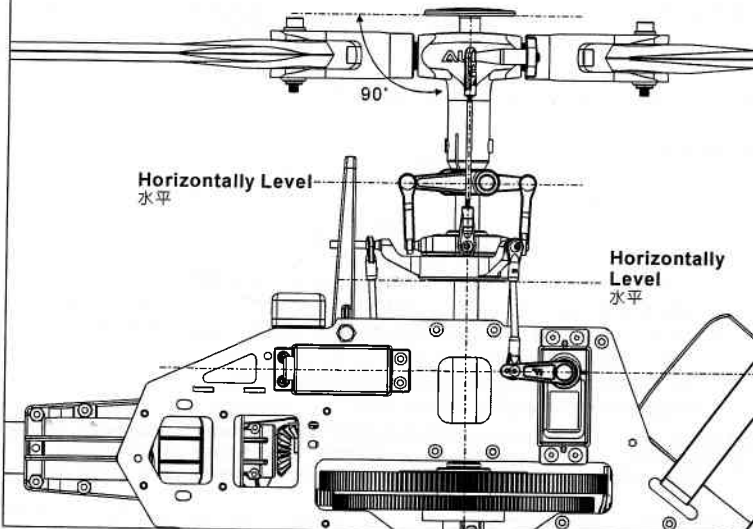
#### Step 1.3: Mechanical Setup 步驟 1.3: 機械結構設定

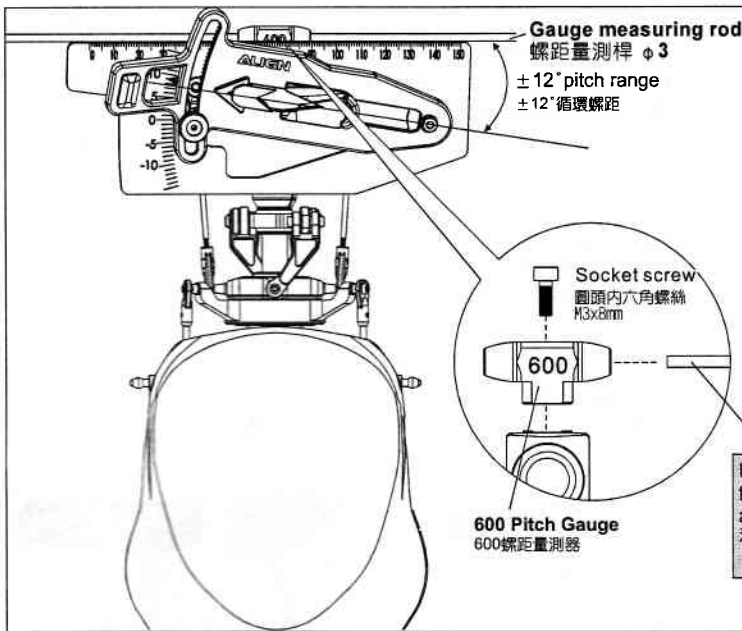
Adjust the servo neutral point, mixing base position, and main blade pitch. 請調整伺服器中立點、向位器固定位置與主旋翼角度 (如圖示)。

#### CAUTION 注意

Pay extra attention to these setup steps. Incorrect neutral points will affect flight stability, and worse lead to loss of control.

本步驟請確實設定, 若中立點不正確, 不但影響飛行穩定性, 更可能造成失控的危險。





### Step 1.4 : Collective pitch setup 步驟1.4 : 主旋翼螺距(集體螺距)設定

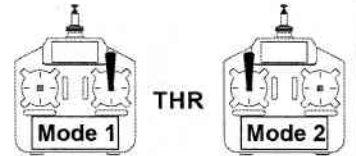
Adjust the maximum collective pitch using the transmitter's swashplate mixing function (pitch swash AFR). Recommended pitch range is  $\pm 12^\circ$ , maximum pitch range for advanced pilot shall not exceed  $\pm 14^\circ$ . 建議螺距設定  $\pm 12^\circ$ ，高階使用者不超過  $\pm 14^\circ$  為限。



Do not adjust individual servos endpoints through the servo ATV/AFR function, use only swashplate mixing adjustments. Should any changes made to the endpoints or subtrims on the transmitter in the future, the flybarless system initial setup must be performed again.

CCPM系統調整行程量時，須從遙控器Swash十字盤混控比率 (Pitch swash AFR) 調整，勿去調整個別伺服器的ATV行程量。爾後遙控器的內微調如有變更，必須重新進行Flybarless各項設定。

Use the included pitch gauge and the gauge measuring rod to aid the adjustment of pitch. 利用隨附的螺距量測器與螺距量測桿，模擬有平衡翼系統之螺距量測。

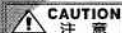


### Step 1.5 : Cyclic pitch setup 步驟1.5 : 循環螺距設定

Maximum cyclic pitch setup: With main blade parallel to helicopter body, move the transmitter aileron stick all the way left, and adjust the AIL mixing percentage in SWASH settings until main blade pitch are 12 to 14 degrees. 十字盤循環螺距最大角度設定：主旋翼方向與機體方向相同，油門搖桿置於主旋翼角度0度的位置不動，撥動副翼搖桿至最左，調整遙控器Swash中AIL比率，使主旋翼的攻角為原廠建議值  $\pm 12$  度。

※Recommended pitch range  $\pm 12^\circ$ , maximum pitch range for advanced pilot shall not exceed  $\pm 14^\circ$ .

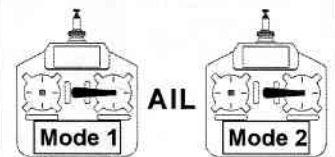
※建議一般設12度、高階使用者不超過14度為限。



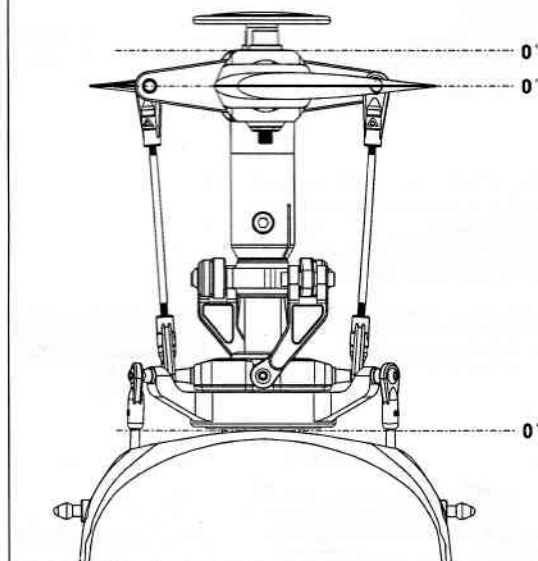
Adjustments to the CCPM servos endpoints should be done through transmitter's swashplate mixing function (AIL swash AFR). Do not adjust individual servos endpoints through the servo ATV/AFR function. Should any changes made to the endpoints or subtrims on the transmitter in the future, the flybarless system initial setup must be performed again. CCPM系統調整行程量時，從遙控器Swash十字盤混控比率做調整，勿去調整個別伺服器的ATV行程量。爾後遙控器內微調如有變更，必須重新進行Flybarless各項設定。

While using 3G FBL system, be sure to turn off the following functions in the transmitter 使用3G系統若是遙控器有下列功能時請勿開啓功能

- \* Swash Ring
- \* Mixing
- \* Swash Mix
- \* Linkage Compensation
- \* Acceleration



## 2.E.LIM swashplate mixing type recognition and elevator endpoint setup : E.LIM十字盤混控辨識及升降舵行程量設定模式 :



### Step 2.1 : Entering E.LIM setup mode 步驟2.1 : 進入E.LIM設定

While keeping swashplate level and main pitch at zero degrees, press the SET button to register the neutral point and enter E.LIM setup mode. The E.LIM LED will lit up after DIR turns off.

保持十字盤為水平、旋翼角度為零度的狀態下，接著按下"SET"鍵DIR燈將熄滅，E.LIM燈將會亮起，進入"E·LIM升降舵行程量"設定模式。



The throttle stick position where main pitch is 0 degree must be maintained through this setup process.

油門搖桿須置於主旋翼角度0度的位置，不可再移動。



## Step 2.2 : Swashplate mixing type recognition and elevator endpoint setup

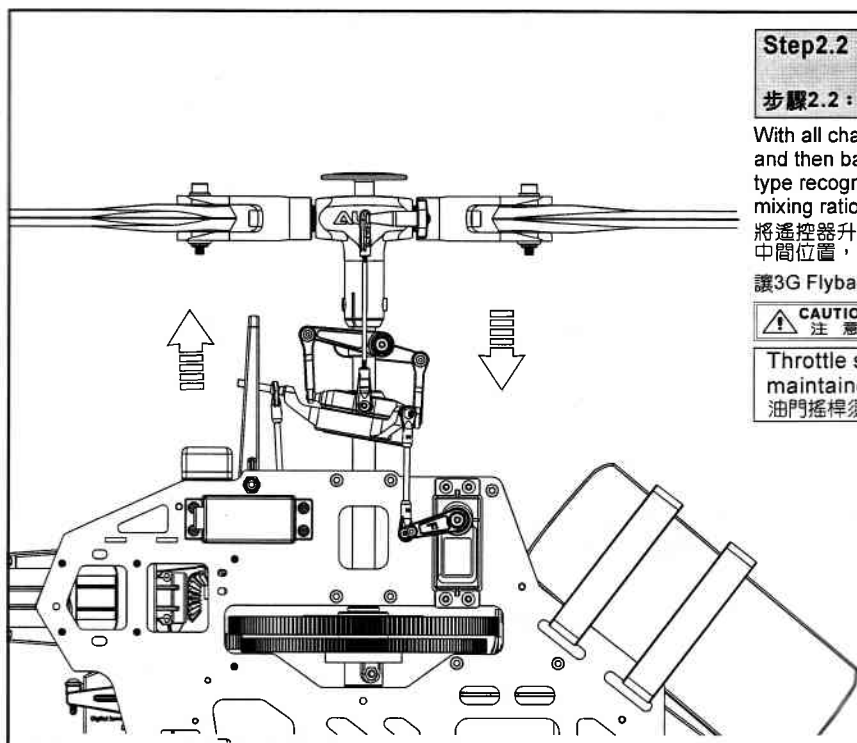
### 步驟 2.2 : 十字盤混控辨識與升降舵行程量設定

With all channels stationary, move the transmitter elevator stick forward, and then back to center position. This completes the swashplate mixing type recognition process. The control unit will determine the CCPM mixing ratio or traditional mechanical mixing maximum elevator endpoints. 將遙控器升降舵推至最前方(請勿動到其他舵面動作), 再將升降舵搖桿放回中間位置, 完成此模式設定。

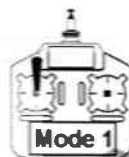
讓3G Flybarless解算CCPM混控比例或傳統十字盤模式及前後可用行程。



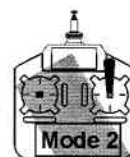
Throttle stick position where main pitch is 0 degree must be maintained through this setup process. 油門搖桿須置於主旋翼角度0度的位置, 不可再移動。



Throttle stick must be maintained  
油門搖桿固定



ELE



E.LIM settings  
E.LIM模式



## 3. E.REV elevator reverse setup mode :

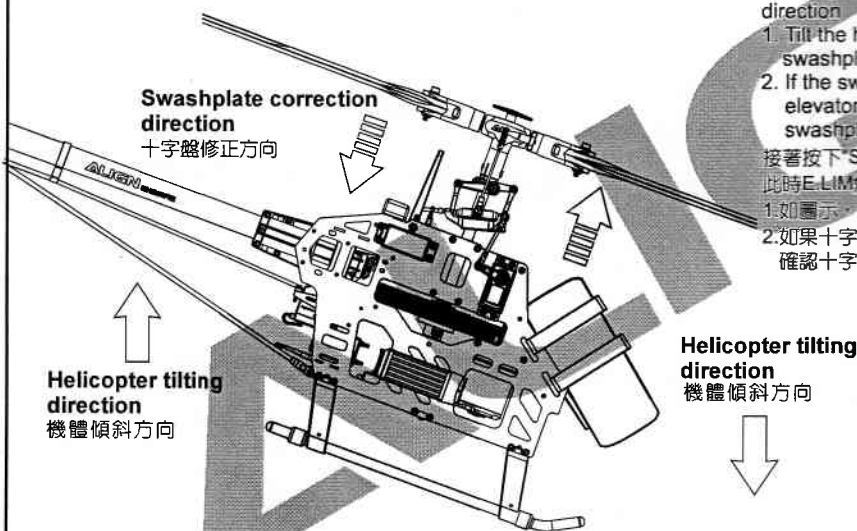
### E.REV升降舵陀螺螺修正反向設定模式 :

Press the SET button to enter E.REV setup mode. The E.REV LED will lit up after E.LIM turns off. This setup mode sets the elevator gyro direction

1. Tilt the helicopter forward as shown in diagram, and check if swashplate is tilting correctly toward the back.
2. If the swashplate is tilting in the wrong direction, move the transmitter elevator stick until STATUS LED changes color, and re-check the swashplate tilting direction.

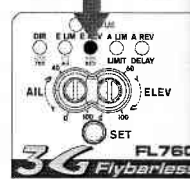
接著按下"SET"鍵, 讓設定模式進入"E.REV 升降舵陀螺螺修正反向"設定模式, 此時E.LIM燈熄滅, E.REV燈亮起。此模式設定升降舵陀螺螺修正方向

1. 如圖示, 將機身向前傾斜, 檢查十字盤的修正方向是否正確。
2. 如果十字盤方向修正錯誤, 請撥動升降舵搖桿改變STATUS燈顏色後, 再次確認十字盤修正方向是否正確。



Helicopter tilting direction  
機體傾斜方向

E.REV settings  
E.REV模式

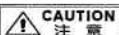


## 4. A.LIM aileron endpoints setup :

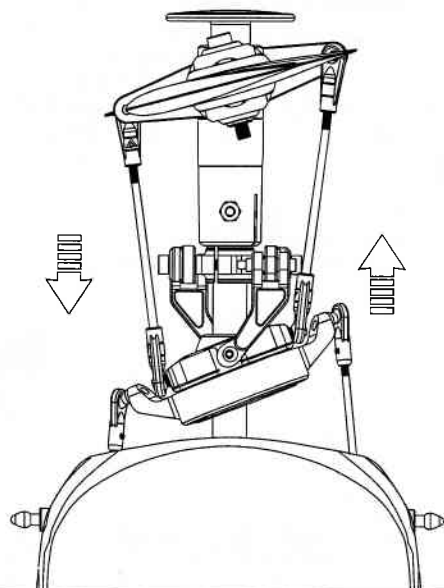
### A.LIM副翼行程量設定模式 :

Press the SET button to enter A.LIM setup mode. The A.LIM LED will lit up after E.REV turns off. With all channels stationary, move the transmitter aileron stick to the right, and then back to center position. This completes the aileron endpoint setup process. The control unit will determine the maximum aileron endpoints

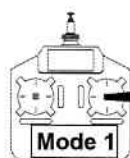
接著按下"SET"鍵, 讓設定模式進入"A.LIM副翼行程量"設定模式, 此時E.REV燈熄滅, A.LIM燈亮起。將副翼搖桿向右推到底, 完成後將搖桿置中, 完成此模式設定, 讓3G Flybarless解算副翼可用行程。



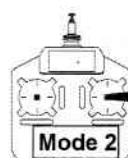
The throttle stick position where main pitch is 0 degree must be maintained through this setup process. 油門搖桿須置於主旋翼角度0度的位置, 不可再移動。



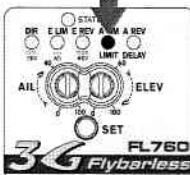
Throttle stick must be maintained  
油門搖桿固定



AIL

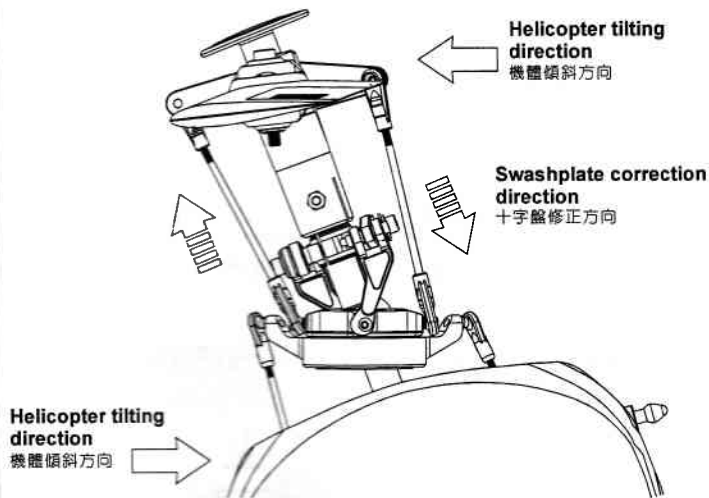


A.LIM settings  
A.LIM模式



## 5. A.REV aileron reverse setup mode :

### A.REV 副翼陀螺儀正反向設定模式 :



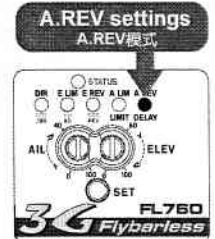
Press the SET button to enter A.REV setup mode. The A.REV LED will lit up after A.LIM turns off. Tilt the helicopter right as shown in diagram, and check if swashplate is tilting correctly toward the left. If the swashplate is tilting at the wrong direction, move the transmitter aileron stick until STATUS LED changes color, and re-check the swashplate tilting direction. Press the SET button again, and the control unit will restart with all LED's flashing. This completes the flybarless portion of the setup process.

接著按下"SET"鍵，讓設定模式進入"A.REV副翼陀螺儀正反向"設定模式，此時A.LIM燈熄滅，A.REV燈亮起。此模式設定副翼陀螺儀修正方向，如果將直昇機往右傾，3G Flybarless應將十字盤向左傾修正，如果反向，可向左或向右推動副翼搖桿，變換"STATUS"不同顏色燈號，更換陀螺儀修正方向。接著按下"SET"鍵完成無平衡翼系統設定，所有LED將閃動，重新開機。



3G Flybarless system must remain stationary during startup. Do not move the helicopter until the swashplate jumps up and down slightly 3 times, indicating the completion of initialization. (please refer to page 31 step 3)

3G Flybarless 開機時會進入初始化狀態，此時請勿移動機身，當初始化完成後，十字盤會保持水平上下小幅跳動3次，表示開機完成。(請參考P.31步驟3)



## RUDDER GYRO SETUP 尾舵陀螺儀設定

After the system reboots, flybarless setup is completed. Now the rudder gyro needs to setup with similar procedure as Align's GP780 gyro. Push and hold the SET button for 2 seconds to enter the rudder gyro setup mode.

If your transmitter has the following settings, please disable it or set the value to zero.

完成開機後Flybarless部分已設定完成，接著要設定尾舵陀螺儀，所有設定如同GP780。於待機狀態下持按"SET"鍵2秒進入尾舵陀螺儀設定。

如果您的遙控器有下列功能時，請設定為關閉(OFF)或數值設定為零。

- ATS
- Pilot authority mixing
- Throttle to rudder mixing
- Rudder to gyro mixing
- Pitch to rudder mixing
- Revolution mixing



3G Flybarless rudder gyro has the factory setting of 1520  $\mu$ s and DS digital servo. Double check your servospec and change the gyro setting as needed to avoid damages to the servo.

3G Flybarless 尾舵陀螺儀出廠設定值為：1520  $\mu$ s寬頻與DS數位伺服器模式，安裝時請確認您的伺服器規格，避免設定值不同而造成伺服器損壞。

### 1.1520 $\mu$ s (standard) or 760 $\mu$ s (narrow band) servo frame rate setup.

#### 1520 $\mu$ s (標準)或760 $\mu$ s (窄頻)伺服器設定

3G Flybarless system is compatible with both the 760  $\mu$ s narrow frame rate servos (such as Futaba S9256, S9251, BLS251), as well as the standard 1520  $\mu$ s frame rate servos (most others). Proper frame rate must be selected based on your servo's specifications.

**To enter the setup mode :** Press and hold the SET button for 2 seconds until STATUS LED flashes. The 1520/760 LED will light up indicating servo frame rate setup mode. Push the transmitter rudder stick left or right to select the frame rate. For example, if rudder is pushed to the left (or right) and STATUS LED turns green, the frame rate is set to 1520  $\mu$ s. To set it to 760  $\mu$ s, the rudder stick need to be pushed from the center to the opposing end 3 times for the STATUS LED to turn red, indicating frame rate set to 760  $\mu$ s.

**3G Flybarless panel :** Each setting value is labeled on the 3G flybarless control unit with either green or red lettering, which corresponds to the STATUS LED color. Subsequent setup mode is entered by a single press of the SET button. Setup mode will exit if no activity is detected in 10 seconds.

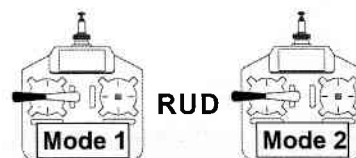
3G Flybarless相容兩種寬頻控制系統，若您使用的伺服器屬於760  $\mu$ s系統(如Futaba S9256、S9251、BLS251)，則必須將3G Flybarless設定於760的模式，其他未標示760  $\mu$ s規格的伺服器，一般皆為1520  $\mu$ s系統，須設定為1520的模式。

**進入功能設定模式：**持按面板上的"SET"設定鍵約2秒，此時"STATUS"狀態指示燈會開始閃爍，且"1520/760"的功能設定指示燈會亮起，表示進入標準/窄頻伺服器選項，利用遙控器方向舵搖桿的左右方向來選擇設定值，例如方向舵搖桿往左(或右)時，"STATUS"指示燈為綠色，表示設定值為1520  $\mu$ s系統；若要設定為窄頻760  $\mu$ s系統時，必須將搖桿由中立點往相反方向連續撥動3次，使"STATUS"指示燈亮紅色，才會進入760  $\mu$ s系統。

**3G Flybarless的面板：**標籤上已使用綠/紅色的字體提示"STATUS"燈色所代表的設定值。設定完成後按"SET"鍵一次可進入下一個設定，或是10秒內不做任何設定，系統會自動離開設定模式。



Select by moving the rudder stick left and right  
左右撥動方向舵選擇



## 2.DS (digital) / AS (analog) servo selection

### DS數位/AS類比伺服器選擇

There is a direct correlation between servos' speed to gyro's performance. Faster servos are able to execute commands from the gyro at faster and higher precision. Due to the high performance gyro sensors used in the 3G flybarless system, premium high speed digital rudder servos are mandatory for optimal tail performance. Some of the recommended rudder servos include Align DS650, DS620, DS520, DS420, Futaba S9257, S9256, S9254, S9253, or other servos with similar specifications.

**Setup method :** Press and hold the SET button for 2 seconds to enter the setup mode, then press the SET button to select DS/AS setup mode as indicated by the lighting of DS/AS LED. Using the transmitter's rudder stick, select either digital servo DS mode (STATUS LED is green), or analog servo AS mode (STATUS LED is red).

伺服器動作速度與陀螺儀的性能，伺服器動作愈快，就能立即反應陀螺儀送出的指令，發揮快速精準的效能；由於3G Flybarless具有相當快速的反應時間與靈敏度，所以建議您搭配高速型數位伺服器，如ALIGN DS650、DS620、DS520、DS420、Futaba S9257、S9256、S9254、S9253或其他相同規格伺服器，以獲得最佳效能。

**設定方式：**持按"SET"鍵2秒進入功能設定模式，再按"SET"鍵選擇DS/AS選項，(DS/AS指示燈亮起)，利用方向舵搖桿選擇數位DS (STATUS為綠燈)或類比AS (STATUS為紅燈)伺服器。

Green LED : DS digital servo  
Red LED : AS analog servo  
綠燈 : DS數位伺服器  
紅燈 : AS類比伺服器



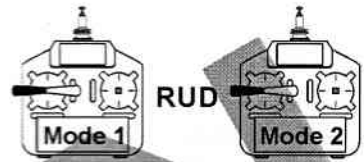
digital / analog mode  
數位/類比模式



**CAUTION 注意** Using an analog servo in DS mode will cause damages to the servo.

在DS模式下連接"AS類比伺服器"將導致伺服器燒毀。

Select by moving the rudder stick left and right  
左右撥動方向舵選擇



## 3. Rudder servo direction check and link adjustment

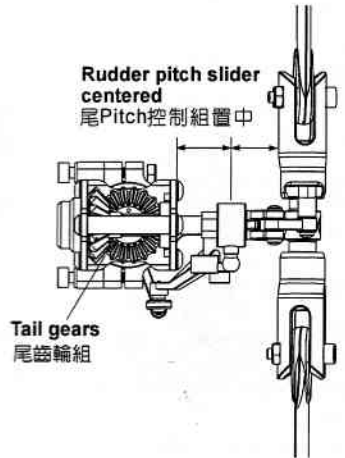
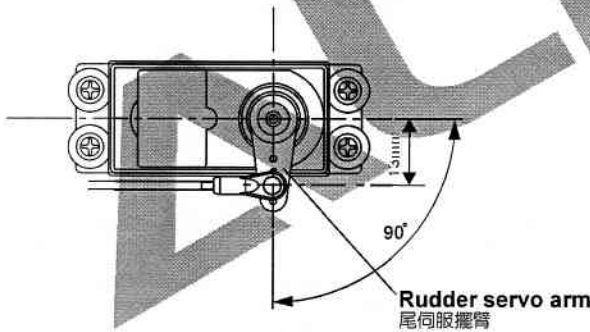
### 檢查尾舵伺服器正逆轉方向與調整連桿

Move the transmitter rudder stick left/right, and check for the correct direction of the rudder servo. If needed, servo reverse is done from the transmitter's REV (reverse) function.

For tail pitch adjustment, center the rudder servo by either setting the 3G flybarless to normal rate mode (non-heading lock), or press and hold the SET button for 2 seconds. With the rudder servo centered and servo horn at 90 degrees, adjust the linkage length until tail pitch slider is centered on the tail output shaft as shown in diagram.

左右撥動尾舵搖桿，確認尾舵伺服器移動的方向是否正確，若不正确請更改遙控器上的尾舵伺服器正逆轉方向。

將3G Flybarless切換成非鎖定模式或持按"SET"鍵2秒，使尾舵伺服器保持在中立點的位置上，調整尾舵舵片，盡可能使尾舵連桿與伺服器臂呈90度，接著調整連桿長度使尾Pitch控制組置中。



## 4. Gyro NOR/REV setting

### NOR/REV陀螺儀正反向開關設定

Lift up the helicopter by hand, and turn it to the left (yaw). Check if the rudder servo is applying correct compensation to the right. If reversed, set the NOR/REV setting as follow.

**Setup method :** Press and hold the SET button for 2 seconds to enter the setup mode, then press the SET button to select NOR/REV setup mode, as indicated by the lighting of NOR/REV LED. Using the transmitter's rudder stick, select either NOR (STATUS LED is green), or REV (STATUS LED is red).

提起直昇機，將機頭往左擺動，若尾舵伺服器的擺動方向與遙控器的方向舵搖桿打右舵同方向時，表示陀螺儀的動作方向設定正確，若不正确時請更改正反向設定。

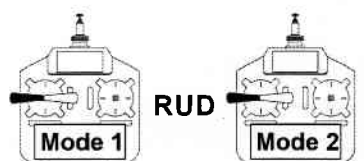
**設定方式：**持按"SET"鍵2秒進入功能設定模式，選擇NOR /REV選項，以方向舵選擇NOR (STATUS為綠燈)或REV (STATUS為紅燈)。

Green LED : normal direction  
Red LED : reverse direction  
綠燈 : NOR正向  
紅燈 : REV反向



gyroscope direction settings  
陀螺儀正反向設定

Select by moving the rudder stick left and right  
左右撥動方向舵選擇

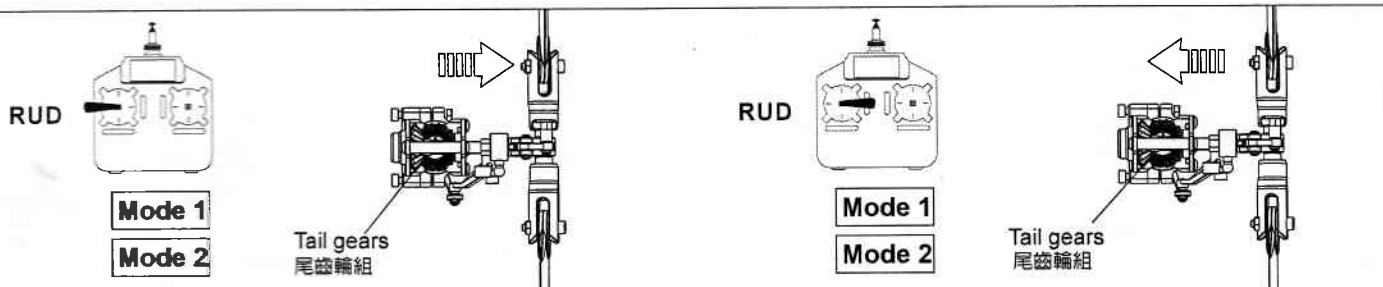


## 5. LIMIT rudder servo endpoint setting

### LIMIT尾舵伺服器行程調整

Press and hold the SET button for 2 seconds to enter the setup mode, then press the SET button repeatedly to select LIMIT setup mode, as indicated by the lighting of LIMIT LED. Push the transmitter rudder stick left until tail pitch slider reaches the end, then center the rudder stick and wait 2 seconds for the STATUS LED to flash red. Then push the rudder stick right until tail pitch slider reaches the end, then center the rudder stick and wait 2 seconds for the STATUS LED to flash red. This completes the left and right endpoint limit adjustment of servo travel. Insufficient servo travel will degrade helicopter performance, while excessive travel will cause binding and damage rudder servo.

持按"SET"鍵2秒進入功能設定模式，此時尾舵伺服器會保持在中立點的位置上，選擇LIMIT選項，接著將方向舵搖桿慢慢的往左移動，使尾控制組達到該側的大行程限度後，將搖桿回歸中立點不動，待2秒後"STATUS"指示燈會亮紅燈閃爍，表示左側行程量已記憶；接著將尾舵搖桿向右移動至控制組最大行程限度後，再將搖桿回歸中立點不動，待2秒後"STATUS"指示燈亮紅燈閃爍，即完成左右行程量設定，行程量不足時會影響陀螺儀與直昇機的性能，行程量過大易造成伺服器損壞。



Push the transmitter rudder stick left until tail pitch slider reaches the end, then center the rudder stick and wait 2 seconds for the STATUS LED to flash red. This completes the rudder endpoint limit adjustment for the left side.

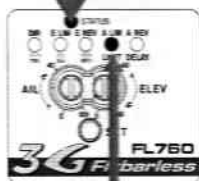
將方向舵慢慢往左撥動，使控制組達到左舵最大行程限度後，將搖桿回歸中立點不動，待2秒後"STATUS"紅燈閃爍表示左舵行程記憶量完成。

Push the rudder stick right until tail pitch slider reaches the end, then center the rudder stick and wait 2 seconds for the STATUS LED to flash red. This completes the rudder endpoint limit adjustment for the right side.

將方向舵慢慢往右撥動，使控制組達到右舵最大行程限度後，將搖桿回歸中立點不動，待2秒後"STATUS"指示燈表示右舵行程記憶量完成。

Flashing red LED indicates settings have been registered

紅燈閃爍時表示記憶完成



Endpoint limit settings  
行程量設定



Rudder travel limit setting lower than 50% will not be registered. Mechanical fix (moving link ball closer to center of servo horn) is needed for excessive servo travel when LIMIT function is below 50%.

尾舵行程量設定不可低於50%，否則3G Flybarless將不予記憶，若發生行程量設定後，尾控制組仍會超過最大行程，請將尾伺服臂的球頭向內移動，避免行程不足影響陀螺儀性能。

## 6. Helicopter size and DELAY settings

### 直昇機模式與DELAY控制延遲量調整

This setting includes two functions:

- (1) For small helicopters such as T-Rex 250/450, set this setting to small helicopter (STATUS LED red). For larger helicopters such as T-Rex 500/550/600/700 set this setting to large helicopter (STATUS LED green).

此設定結合兩項功能：

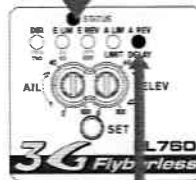
- (1) 3G Flybarless支援小型/迷你型室內電直，請依您直昇機的類型選擇適合的模式，如：T-REX250/450請選擇小型/迷你型模式（設定時"STATUS"指示燈為紅色）；T-REX500/550/600/700請選中大型直昇機模式（設定時"STATUS"指示燈為綠色）。

Green LED: suitable for larger helicopters such as T-REX500/550/600/700

Red LED: suitable for smaller helicopter such as T-REX 250/450

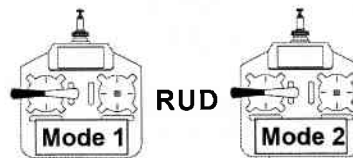
綠燈：適用T-REX500/550/600/700大型直昇機

紅燈：適用T-REX250/450小型直昇機



Helicopter size selection  
大小直昇機模式與延遲量設定

Select by moving the rudder stick left and right  
左右撥動方向舵選擇



- (2) The DELAY function is utilized when slower rudder servo causes tail hunting (wagging). This can be observed after a hovering pirouette comes to a stop. If tail hunting occurs, gradually increase DELAY value to eliminate it. For best performance, DELAY value should be kept as low as possible without tail hunting.

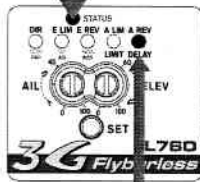
Setup method: Press and hold the SET button for 2 seconds to enter the setup mode, then press the SET button to select DELAY setup mode, as indicated by the lighting of DELAY LED. The choice of small or large helicopter is done by moving the transmitter rudder stick left or right while observing the color of the STATUS LED. For small helicopters STATUS LED will be red, and large helicopter will be green. The amount of servo delay is set by how far you push the rudder stick, followed by pushing the SET button.

- (2) 使用速度較慢的尾舵伺服器較容易產生追蹤現象，當直昇機停懸時，打方向舵使直昇機快速自轉，當方向舵回到中立點使直昇機停止自轉時，此時若發生追蹤現象，請增加控制延遲的設定量，一般而言在不產生追蹤現象的原則下控制延遲的設定量愈小愈好，否則尾舵的動作會變得遲緩。

設定方式：持按"SET"鍵2秒進入功能設定模式，選擇至DELAY選項，以方向舵搖桿選擇小型/迷你型電直，

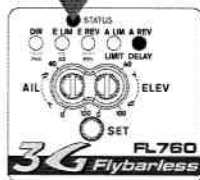
如：T-REX 250/450 (STATUS為紅燈)，或中大型直昇機如T-REX500/550/600/700 (STATUS為綠燈)，若要同時設定DELAY控制量時，則利用方向舵搖桿的位置來設定，搖桿由中立點推至"DELAY"燈開始閃爍時為0%，推至最大行程時控制量為100%，將搖桿推至所需的延遲量時保持不動，並按下"SET"鍵確認，即可同時設定直昇機模式與延遲量。

Green LED for T-REX550  
T-REX550設定為綠燈

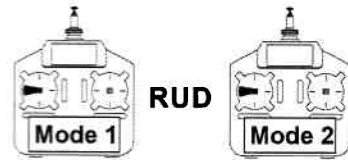


0% when DELAY LED  
begins flashing  
DELAY燈開始閃爍時為0%

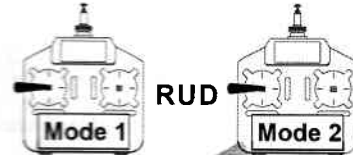
Green LED for T-REX550  
T-REX550設定為綠燈



Gradually move the transmitter rudder stick until DELAY LED begins to flash, the delay value is 0% at this point.  
輕推方向舵搖桿至"DELAY"燈開始閃爍時，延遲量為0%



Continue to move the rudder stick until desired delay value is needed, then press the SET button to register the setting. Maximum is 100% delay, with rudder stick pushed to the end.  
方向舵推至最大行程時，延遲量為100%，將搖桿推至所需的延遲量，按下"SET"鍵確認



### 7. Sensitivity Adjustment 感度調整

For radio with built in gyro gain settings, gain can be adjusted directly. For example, 50%-100% setting on the radio translates to 0% - 100% gain in the heading lock mode; 50%-0% setting on the radio translates to 0%-100% gain in the normal (non-heading) lock mode.

Actual gain value differs amongst servos and helicopters. The goal is to find the maximum gain without tail hunting. This can only be done through actual flight tests.

The recommended starting point for transmitter's gyro gain setting should be 70~80% for hovering, 60~70% for idle-up. Value should be tuned under actual flight conditions by increasing to the maximum gain without tail hunting.

一般具有陀螺儀感度設定功能的遙控器，可直接進入GYRO功能選項進行感度值的設定，設定值50%到陀螺儀感度為0，設定值50%~100%，則陀螺儀感度值為鎖定狀態的0~100%；設定值50%~0%，則陀螺儀感度值為非鎖定狀態的0~100%。

感度值的大小會隨著伺服器與直昇機的不同而有所差異，一般而言，在不產生追蹤現象（直昇機尾槳出現左右搖擺的情況）的前提下感度值愈高愈好，所以只能透過實際飛行的狀況來進行調整。

進入遙控器感度設定的選項，剛開始停懸時建議先設定在70~80%左右，Idle up飛行時設定在60~70%左右，之後再依實際飛行的狀態再行修正，如果沒有追蹤現象發生時可再調整高感度，若發生追蹤現象時，則調低感度。



For radios (IE Futaba) using 0-100% as heading lock gain scales, the recommended gain setting is 30% to 35%.

For radio that uses the 50 -100% scale (such as JR and Hitec), the recommended gain setting is 70% to 75%.

鎖定感度值為0~100%的遙控器，如Futaba，建議設定在30~35%左右；鎖定感度值為50~100%的遙控器，如JR、HITEC，建議感度值設定在70~75%左右。

### Specifications 產品規格

- |   |                                   |                         |                          |
|---|-----------------------------------|-------------------------|--------------------------|
| 1. Operating voltage range : DC 3V~8.4V         | 7. Operating humidity : 0%~95%    | 1. 適用電壓 : DC 3V~8.4V    | 7. 操作濕度 : 0%~95%         |
| 2. Operating current consumption : <80mA @ 4.8V | 8. Dimension/Weight :             | 2. 消耗電流 : <80mA @ 4.8V  | 8. 尺寸/重量                 |
| 3. Rotational detection rate : ±300°/sec        | Control unit : 42x26.5x14.5mm/16g | 3. 旋轉檢測角速度 : ±300°/sec  | 控制器 : 42x26.5x14.5mm/16g |
| 4. Rudder yaw detection rate : ±500°/sec        | Sensor : 22.3x21.7x14mm/9g        | 4. 偵測尾槳角速度 : ±500°/sec  | 感應器 : 22.3x21.7x14mm/9g  |
| 5. Sensor resolution : 12bit                    | ● RoHS certification stamp        | 5. 感測器解析度 : 12bit(12位元) | ● 符合RoHS限用規章             |
| 6. Operating temperature : -20°C~65°C           |                                   | 6. 操作溫度 : -20°C~65°C    |                          |

## 15.RCM-BL600M 1220KV POWER COLLOCATION REFERENCE 原裝動力數據參考表



### BATTERY 電池 : ALIGN Li-Poly 22.2V 5200mAh

Motor Pinion Gear 馬達齒輪	Main Rotor Blade 主旋翼規格	Pitch 螺距	Current(A) approx. 電流(A)大約值	Throttle Curve 油門曲線	RPM approx. 主旋翼轉速大約值
16T	520 Carbon Fiber Blades 520破纖主旋翼	Hover 停懸	+5° 15	0/50/65/85/100%	1800~1900
		Idle 1	0° 23	85%Middle中	2620
			0° 26	100/100/100/100/100%	2800 ⚠
			±12° 50		2600
16T	550 Carbon Fiber Blades 550破纖主旋翼	Hover 停懸	+5° 16	0/50/65/85/100%	1800~1900
		Idle 1	0° 24	85%Middle中	2580
			0° 28	100/100/100/100/100%	2750 ⚠
			±12° 52		2550

NOTE: 1. Please use a pitch gauge to adjust the pitch value. Incorrect excess pitch setting will result poor helicopter performance and reduce ESC's life and battery's life.

⚠ 2. For the safeties of flight and helicopter structure, please do not equip the power of main blade over 2600 RPM.

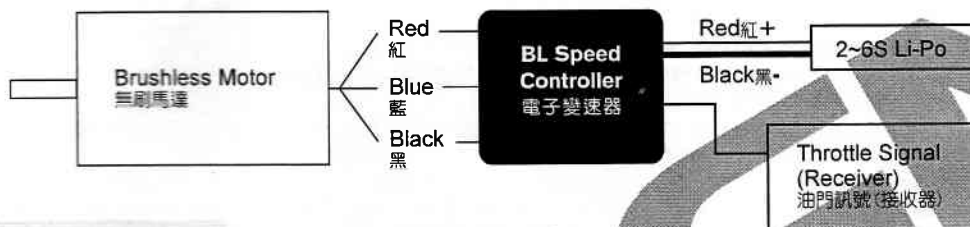
註：1. 請務必使用螺距規來量測調整螺距，不正確的過大螺距設定不但無法發揮直昇機的特性，反會影響到無刷調速器與電池的壽命。

⚠ 2. 為了飛行安全與機體結構安全，主旋翼轉速設定禁止超過2600RPM。



**PRODUCT FEATURES 產品特色**

1. 5-6V 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 5A.
  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. 5-6伏特無段可調式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5A。
  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Governor 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。

**WIRING ILLUSTRATION 接線示意圖****SPECIFICATION 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-BL70G	70A	110A 5sec	Output voltage: 5-6V step-less adjustment Continuous current 3A; Burst current 5A 輸出電壓: 5-6V無段可調式 承受電流: 持續3A、瞬間5A	65x28x15.5mm	64g

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: 5.5V ~ 25.2V(2-6S Li-Po)

NOTE: 1. When setting to the Quick throttle response speed, the accelerative peak current will increase.

2. To minimize possible radio interference induced by switching power system, BEC should be installed at least 5cm away from the receiver. The use of PCM receiver is recommended.

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式無碳刷馬達。
3. 支援最高轉速: 二極→190,000rpm; 六極→63,000rpm。
4. 輸入電壓: 5.5V-25.2V (2-6S Li-Po)

注意: 1. 設定為高油門反應速度時，加速瞬間電流會有增大情形。

2. 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PCM系統接收器)。

**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 11.1V/3cells Lithium battery, the full charged voltage will be approximately 12.6V. According to this input voltage, CPU will determine that this is a 3cell battery.
 

First step protection: 3.2V x 3cell=9.6V

Second step protection: 3.0V x 3cell= 9.0V

When the voltage drops to 9.6V, the power will be reduced. When the voltage drops to 9.0V, 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.

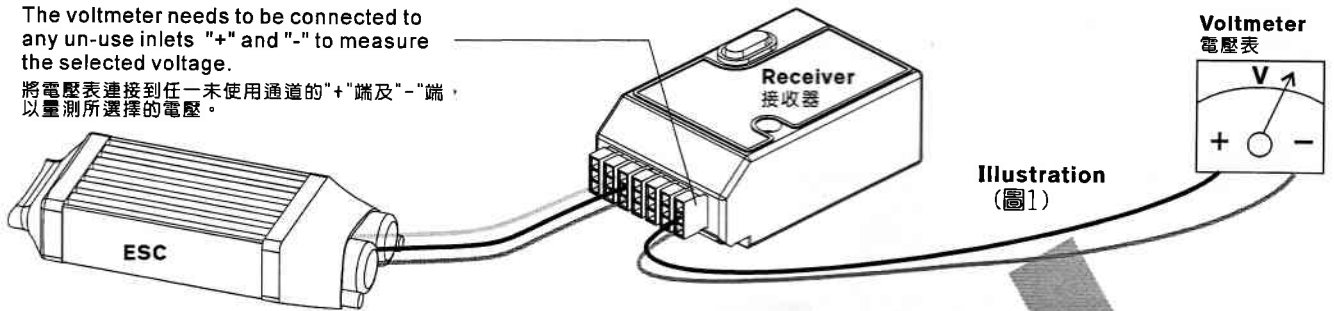
The default setting is "quick speed". Use this option to adjust the setting according to flight character. For example, setting at Medium or Quick speed for 3D and powerful flight to make the power response more quickly, but note the accelerative peak current and power expense will increase.

**6. BEC output voltage setting:** 5-6V step-less adjustment.

This option allows custom voltage setting. Default setting is 5.5V; 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 (6V).

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。



**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，避免造成何伺服器損壞。

**7. Thermal Protection:** When the ESC temperature reaches 80°C 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. Safe 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

設定時機分為二極及以上無碳刷馬達、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壓降達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11.1V 3cell鋰電池之系統而言11.1V鋰電池充電電壓約12.6V，此輸入電壓CPU會自動判定為3cell鋰電。

第一階段保護:  $3.2V \times 3cell = 9.6V$  第二階段保護:  $3.0V \times 3cell = 9.0V$  當電壓降至9.6V時，動力會間歇性中斷，當壓降達到9.0V時則完全限制動力輸出。

3-2 Li-Ion/Li-Po中截止電壓保護: 向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

設定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Governor 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:** 5~6V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5.5V，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，請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6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°C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，並實際使用電流量表測輸出電流，以達到電變之最佳效率。

**8. 開機防震提醒功能:** 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:** 當飛機降落若再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。

**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. Please refer the attached flow chart for details.
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警響。請參考第二頁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 Airplane/Glider(4-1) 一般飛機 / 滑翔機(4-1)	● Helicopter 1 (Soft Start)(4-2) 直升機模式1(緩啟動功能)(4-2)	Helicopter 2 (Soft Start+ Governor Mode)(4-3) 直升機模式2(緩啟動+Governor 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	● 5.5V	6.0V

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  
升空使用模式響音提示

First mode sound (Brake)  
Second mode sound (Timing)  
Third mode sound (Battery protection)  
Fourth mode sound (Aircraft)  
Fifth mode sound (Throttle response speed)  
No sound for BEC output voltage

第一個響音為煞車(低/中/高)  
第二個響音為進角(低/中/高)  
第三個響音為電池保護(高/中/低)  
第四個響音為飛機模式(一般飛機/直昇機)  
第五個響音為油門反應速度(標準/中速/快速)  
BEC輸出電壓無響音/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/out runner 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+Governor 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

#### Normal Airplane/Glider Mode (Option 4-1):

This option is applied to general airplanes and gliders.

#### 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.

#### 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.

一般飛機模式 (選項4-1): 適用於一般飛機及滑翔機。

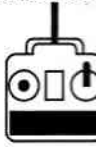
直昇機模式1 (選項4-2): 具有緩啟動功能, 適用於Normal、Idle1、Idle2等飛行模式, 當切換至Idle1或Idle2模式, 如有較高轉速造成陀螺儀有輕微的追蹤現象, 此時應將陀螺儀的感度設定分別降低。

直昇機模式2 (選項4-3): 具有緩啟動及Governor 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 程式化設定模式

Minimum 4 channel radio is required 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 sound  
開機確認音

Enter Setup Mode  
進入設定模式


**3** Throttle channel adjustment process, the highest position acknowledge sound.  
油門校正程序 最高點確認音




**4** Place the throttle stick to the lowest sound. Position, the lowest position acknowledge sound.  
油門搖桿撥到最低點確認音




**5** Use throttle stick to set preferred Brake Mode within the 5 tones. A confirmation sound will kick in when finish.  
於5音節之音響響音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 kick in when finish.  
於5音節之音響響音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 kick in when finish.  
於5音節之音響響音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 kick in when finish.  
於5音節之音響響音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 kick in when finish.  
於5音節之音響響音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 kick in when finish.  
於5音節之音響響音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



**Step1 步驟1**

Turn on Transmitter, and then receiver power.  
先開啓遙控器電源，再開啓接收器電源。

**Step2 步驟2**

3G Flybarless system will go through initialization process, as indicated by flashing of all LED's. Do not move the helicopter or transmitter sticks until initialization process completes.  
此時3G Flybarless系統各指示燈STATUS及DIR~A.REV會閃動，請勿移動直昇機與撥動搖桿，以利陀螺儀感應器進入初始化程序。

**Step3 步驟3**

The completion of initialization process is indicated by the rapid up and down motion of swashplate 3 times while remaining level. Should the swashplate jumps up and down at a tilted position, the flybarless system initial setup need to be performed again. (Refer to page 21: Flybarless system initial setup)

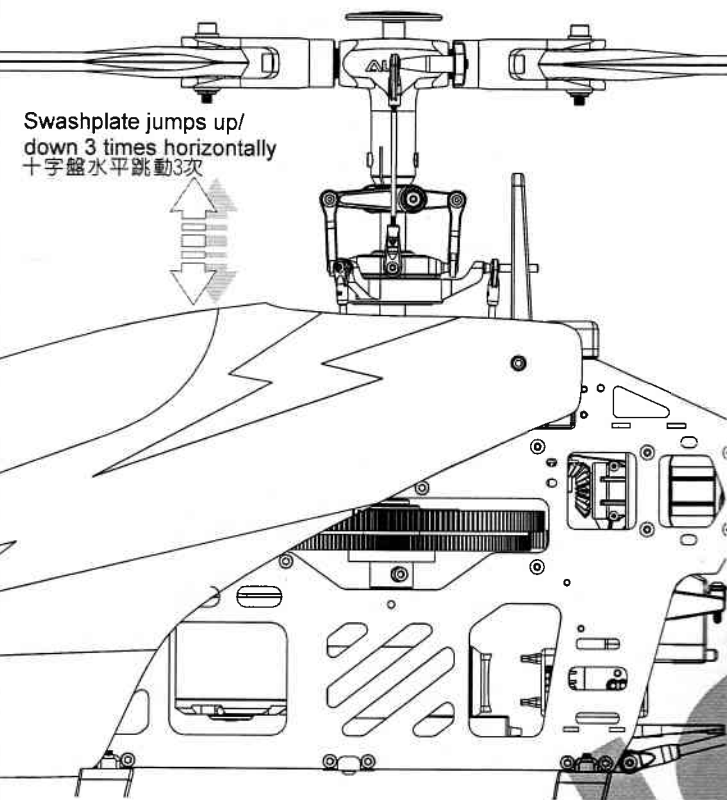
The pitch of helicopter will remain locked until successful initialization. If the initialization process is unable to complete, with STATUS LED blinking red. Re-check all connections, and perform another reboot with helicopter remain stationary.

Following successful initialization process, green STATUS LED indicates rudder is in heading lock mode, while red LED indicates normal non-heading mode. (Refer to P.27 Gain Adjustment)

如左圖示，初始化完成後，十字盤會保持水平上下小幅跳動三次，表示完成開機程序；如十字盤為傾斜跳動三次，則表示設定錯誤，須進入無平衡翼系統重新設定。（參考P21無平衡翼系統設定）

完成開機前直昇機旋翼被固定無法動作，如果一直無法完成開機程序STATUS紅燈閃爍，請檢查旋翼時有異機是否靜止或感應器訊號線未接妥，確認後重新開機，正常開機後，STATUS亮綠燈表示尾舵為鎖定模式，亮紅燈為非鎖定模式。（請參閱P27感度調整）

Swashplate jumps up/down 3 times horizontally  
十字盤水平跳動3次



○ Swashplate jumps up and down 3 times horizontally represents successful initialization.  
十字盤水平跳動三次代表正常開機

✗ Swashplate jumps up and down 3 times tilted represents setup error.  
十字盤傾斜跳動三次代表設定錯誤

Green = rudder in heading lock mode  
Red = rudder in normal mode  
綠燈為尾舵鎖定模式  
紅燈為尾舵非鎖定模式



**Step4 步驟4**

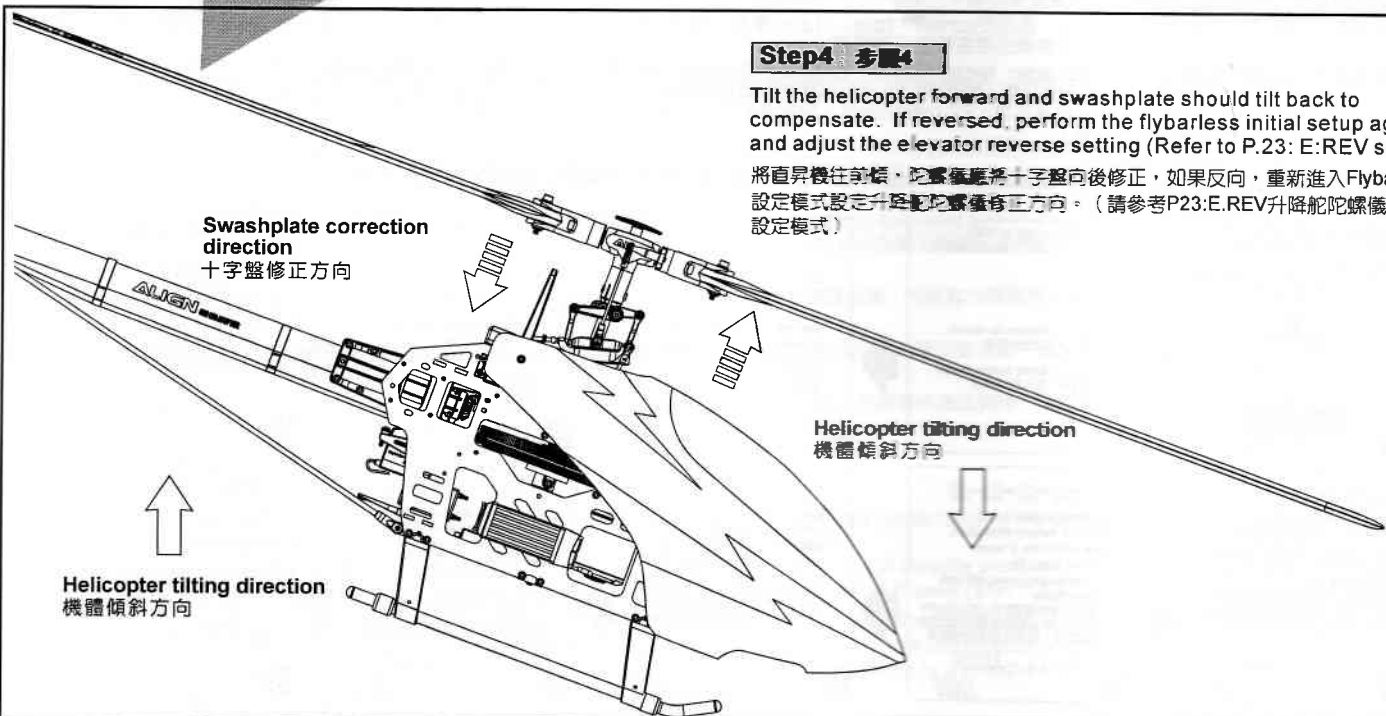
Tilt the helicopter forward and swashplate should tilt back to compensate. If reversed, perform the flybarless initial setup again and adjust the elevator reverse setting (Refer to P.23: E:REV setup)

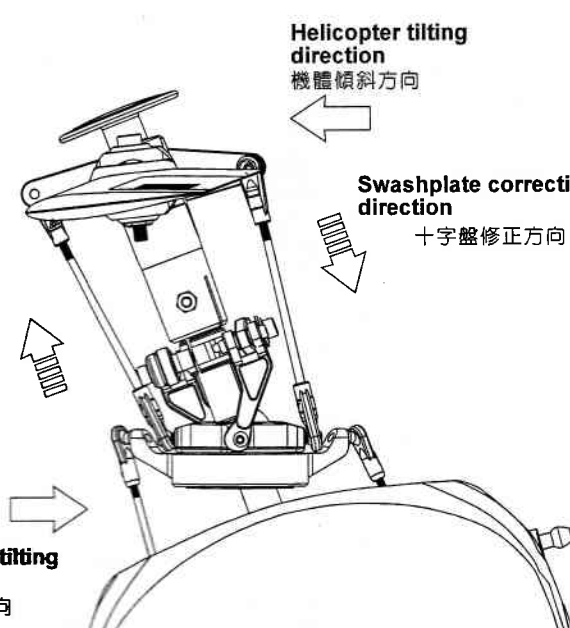
將直昇機往前傾，陀螺儀應將十字盤向後修正，如果反向，重新進入Flybarless設定模式設定升降舵陀螺儀修正方向。（請參考P23:E.REV升降舵陀螺儀正反向設定模式）

Swashplate correction direction  
十字盤修正方向

Helicopter tilting direction  
機體傾斜方向

Helicopter tilting direction  
機體傾斜方向





**Helicopter tilting direction**  
機體傾斜方向

**Swashplate correction direction**  
十字盤修正方向

**Helicopter tilting direction**  
機體傾斜方向

**Step5 步驟5**

Tilt the helicopter to the right and swashplate should tilt left to compensate. If reversed, perform the flybarless initial setup again and adjust the aileron reverse setting (Refer to P.24: A:REV setup) 將直昇機往右傾，陀螺儀應將十字盤向左修正，如果反向，重新進入Flybarless設定模式設定副翼陀螺儀修正方向。（如左圖所示：參考P.24 A:REV副翼陀螺儀修正反向設定模式）

**Step6 步驟6**

With throttle stick all the way up (and down), and cyclic stick all the way left/right and up/down, check for any binding on the swashplate. If binding occurs, perform the flybarless initial setup again and adjust the endpoint limits. 將油門搖桿推到最高及最低，並將搖桿左右及前後推到底，十字盤動作是否流暢，如果不是必須重新進入Flybarless設定模式裏設定行程。

**Step7 步驟7**

Check the center of gravity (CG) and adjust component placement until CG point is right on the main shaft of the helicopter. 檢視直升機重心是否適當請先調整直昇機重心位置至主軸中心線下方位置。

**Step8 步驟8**

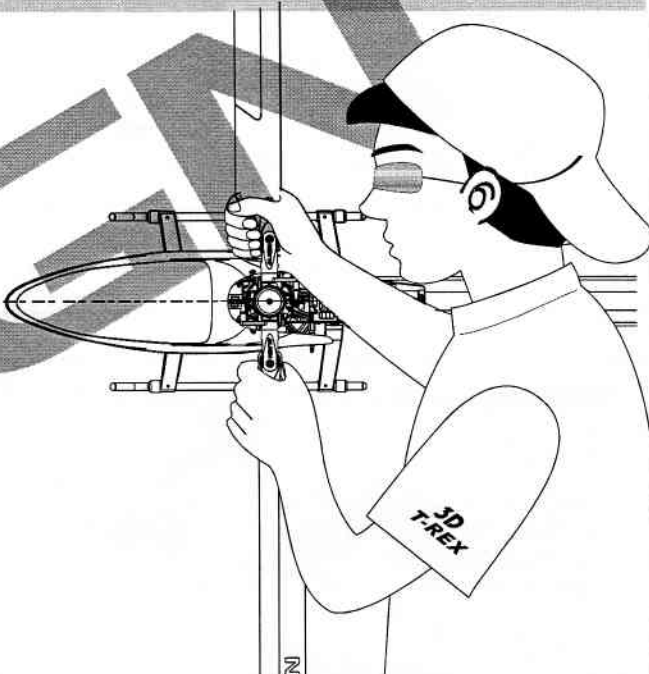
With all above steps checked, restart the system and begin flight test. 確定所有功能正常，重新開機，完成開機程序後啟動引擎進入飛行測試。

### HELICOPTER CG CHECK PROCEDURE 直昇機機體重心檢視方式

After the battery is assembled, hold the helicopter as shown. Once the helicopter stops rotating, the helicopter's CG can be seen at where the head is pointing relative to the main shaft.

將電池固定於電池座後，將直昇機如圖示舉起，等待直昇機停止轉動後檢視機頭方向，正確重心應落在機身（主軸附近）位置。

Helicopter head should be level with main shaft, or slightly lower than the main shaft to ensure the center of gravity is maintained during flight. 機頭應與主軸中心線水平，確保飛行重心。



## 18. FLIGHT ADJUSTMENT AND SETTING 飛行動作調整與設定


**Please practice simulation flight before real flying 飛行前請事先熟練電腦模擬飛行**

A safe and effective practice method is to use the transmitter flying on the computer through simulator software sold on the market. Do a simulation flight until you familiarize your fingers with the movements of the rudders, and keep practicing until the fingers move naturally.

- Place the helicopter in a clear open field and the tail of helicopter point to yourself.
- Practice to operate the throttle stick (as below illustration) and repeat practicing "Throttle high/low", "Aileron left/right", "Rudder left/right", and "Elevator up/down".
- The simulation flight practice is very important, please keep practicing until the fingers move naturally when you hear operation orders being call out.

在還沒瞭解直昇機各動作的操控方式前，嚴禁實機飛行，請先進行電腦模擬飛行的練習，一種最有效、最安全的練習方式，就是透過市面販售的模擬軟體，以遙控器在電腦上模擬飛行，熟悉各種方向的操控，並不斷的重複，直到手指可熟練的控制各個動作及方向。

- 將直昇機放在空曠的地方，並將直昇機的機尾對準自己。
- 練習操作遙控器的各搖桿（各動作的操作方式如下圖），並反覆練習油門高/低、副翼左/右、升降舵前/後及方向舵左/右操作方式。
- 模擬飛行的練習相當重要，請重複練習直到不需思索，手指能自然隨著喊出的指令移動控制。

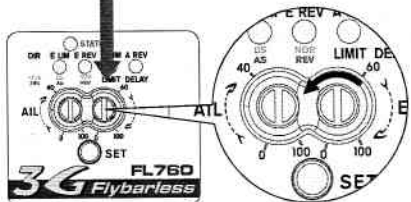


With the helicopter hovering, observe for any rapid left/right or forward/aft oscillations. If forward/aft oscillation is observed, land the helicopter, turn the ELE gain dial counterclockwise gradually, and test again. Do this until oscillation disappears.

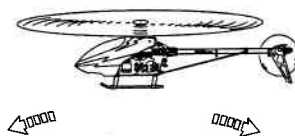
先將直昇機以停懸飛行，觀察直昇機左右及前後是否有不正常快速抖動現象，如果前後有抖動情形，則逆時針調降升降舵感度調整旋鈕，以減少陀螺儀前後修正感度。

Set the dial to 12 o'clock position as starting point  
建議初次飛行設於12點鐘方向

**Elevator gain adjustment dial**  
升降舵感度調整旋鈕



Decrease ELE gain  
調降ELE感度



Forward/back oscillation  
前後晃動

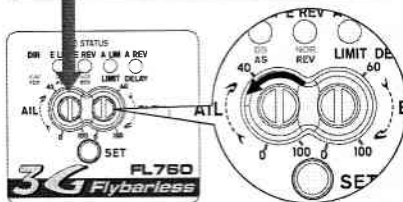


If left/right oscillation is observed, land the helicopter, turn the AIL gain dial counterclockwise gradually, and test again. Do this until oscillation disappears.

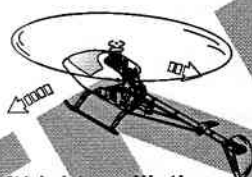
如果為左右抖動，逆時針調降副翼感度調整旋鈕，以減少陀螺儀左右修正感度。

Set the dial to 12 o'clock position as starting point  
建議初次飛行設於12點鐘方向

**Aileron gain adjustment dial**  
副翼感度調整旋鈕



Decrease AIL gain  
調降AIL感度



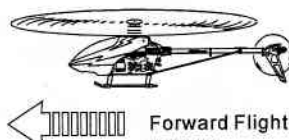
Left/right oscillation  
左右晃動



**FORWARD STRAIGHT LINE FLIGHT** 前進直線航道飛行

Put the helicopter into fast forward flight from hovering. If similar oscillation is observed, reduce the elevator gyro gain. If the helicopter pitches up, or responds slowly, increase the elevator gyro gain. Repeat test until the oscillation is eliminated. Similar method is used for aileron gyro gain. After gyro gain adjustments are completed, the helicopter cyclic rate can be tuned using transmitter's swash AIL and ELE mixing ratio. Higher the percentage, faster the roll/flop rate. Exponential can also be added on the transmitter to soften the sensitivity for stable hover.

停懸完後可快速前進飛行。同樣的如果有不正常抖動時，請將升降舵感度調小，飛行時如果有機頭向上仰起或反應慢現象時，請將感度調大，重複測試將感度調整至最理想值，同樣方式可調整副翼感度旋鈕。調整完陀螺儀感度，可依據飛行習慣調整Swash AIL及ELE比率，比率調高，前後及左右滾轉速度越快，使用者也可依據個人經驗調整舵面EXP以增加停懸穩定性。完成所有調整後，就可享受Flybarless所提供低速飛行的穩定性及高速時的靈活性。



Forward Flight  
前進飛行



20、SETUP EXAMPLES 飛行特性設定對照表

Using Futaba 12ZH transmitter as an example 以Futaba 12ZH遙控器為例

	With emphasis on stability 穩定特性	With emphasis on agility 靈活特性
Main blade pitch Settings(Collective Pitch Settings) 主旋翼螺距設定 (集體螺距設定)	Main blade pitch : 10°~12° 主旋翼螺距 : 10°~12° swash pitch : 38%~43%	Main blade pitch : 12°~14° 主旋翼螺距 : 12°~14° swash pitch : 43%~48%
Cyclic pitch settings (Adjust while in DIR mode using AIL/ELE swash AFR) 循環螺距設定 (須在DIR模式下設定)	Cyclic Pitch 12° 循環螺距12° swash Aileron : 65% Elevator : 65%	Cyclic Pitch 14° 循環螺距14° swash Aileron : 75% Elevator : 75%
Aileron and Elevator swashplate mixing ratio settings 副翼與升降舵滾轉速率設定	swash Aileron : ≤65% Elevator : ≤65%	swash Aileron : ≤75% Elevator : ≤75%
Aileron and Elevator gyro gain settings 副翼與升降舵鎖定感度設定	12 o'clock direction(50%) 12點鐘方向(50%)	11 o'clock direction(40%) 11點鐘方向(40%)



While in DIR setup mode, the transmitter's CCPM swash mixing values for aileron and elevator represent CYCLIC pitch values. These values affect the cyclic roll rates on the aileron and elevator in flying condition. Higher values translate to faster cyclic roll rates. If cyclic roll rate is not improved with increased swash mixing values, this is due to insufficient cyclic pitch. When this happens, cyclic pitch can be increased through the flybarless setup procedure. Maximum cyclic pitch should be limited at 14 degrees.

遙控器上的CCPM十字盤混控SWASH於"DIR"模式設定循環螺距時，Aileron與Elevator比率值的大小代表循環螺距角度的大小，比率愈高循環螺距的角度愈大；而在飛行模式下Aileron與Elevator比率值的大小代表滾轉速率的大小，比率愈高滾轉速率愈快，但若比率調高仍無法提升滾轉速率時表示循環螺距不足，請進入無平衡系統設定模式，將循環螺距加大，但以不超過14°為限。

	Problem 狀況	Cause 原因	Solution 對策
<b>Blade Tracking</b> 雙槳平衡	<b>Tracking is Off</b> 雙槳	Pitch linkage rods are not even length PITCH連桿長度與角度不平均	Adjust length of pitch linkage rods (A) 調整連桿(A)長度
<b>Hover</b> 停懸	<b>Head speed too low</b> 主旋翼轉速偏低	Excessive pitch 主旋翼的PITCH偏高	Adjust pitch linkage rods (A) to reduce pitch by 4 to 5 degrees. Hovering head speed should be around 1600RPM. 調整連桿(A)降低Pitch約+4~5度 (停懸時主旋翼轉速為約1600RPM)
		Hovering throttle curve is too low 停懸點油門曲線過低	Increase throttle curve at hovering point on transmitter (around 60%) 提高停懸點油門曲線(約60%)
	<b>Head speed too high</b> 主旋翼轉速偏高	Not enough pitch 主旋翼的PITCH偏低	Adjust pitch linkage rods (A) to increase pitch by 4 to 5 degrees. Hovering head speed should be around 1600RPM. 調整連桿(A)提高Pitch約+4~5度 (停懸時主旋翼轉速為約1600RPM)
		Hovering throttle curve is too high 停懸點油門曲線過高	Decrease throttle curve at hovering point on transmitter (around 60%) 降低停懸點油門曲線(約60%)
<b>Rudder Response</b> 尾舵反應	<b>Drifting of tail occurs during hovering, or delay of rudder response when centering rudder stick.</b> 停懸時尾翼向某一邊偏移，或撥動方向舵並回復到中立點時，尾翼產生延遲，無法停頓在所控制位置上。	Rudder neutral point improperly set 尾中立點設定不當	Reset rudder neutral point 重設尾中立點
	<b>Tail oscillates (hunting, or wags) at hover or full throttle</b> 停懸或全油門時尾翼在左右來回搖擺。	Rudder gyro gain too low 尾舵陀螺感度偏低	Increase rudder gyro gain 增加尾舵陀螺感度
<b>Oscillation during flight</b> 飛行抖動	<b>Forward/aft oscillation when elevator is applied</b> 升降舵打舵動作時，機體前後抖動	Elevator gyro gain too high. 升降舵陀螺感度過高，產生過度反應	Turn the ELE gain dial on control box counterclockwise, 10 degrees at a time until oscillation is eliminated. 逆時針調整控制盒上的升降舵感度調整旋鈕，以每次調整約10度的方式，調整至適當位置
	<b>Helicopter front bobbles (nods) during forward flight.</b> 直線飛行時，機頭點頭	Worn servo, or slack in control lines 伺服器老化，控制線有鬆動	Replace servo, ball link, or linkage balls. 更換伺服器、連桿頭、球頭
	<b>Left/right oscillation when aileron is applied</b> 副翼打舵動作時，機體左右抖動	Aileron gyro gain too high 副翼陀螺感度過高，產生過度反應	Turn the AIL gain dial on control box counterclockwise, 10 degrees at a time until oscillation is eliminated. 逆時針調整控制盒上的副翼感度調整旋鈕，以每次調整約10度的方式，調整至適當位置
	<b>Elevator input causes helicopter to drift</b> 升降舵動作飄移	Worn servo, or slack in control lines 伺服器老化，控制線有鬆動	Replace servo, ball link, or linkage balls. 更換伺服器、連桿頭、球頭
<b>Drifting during flight</b> 飛行飄移	<b>Helicopter pitches up during forward flight</b> 直線飛行機頭上揚	Elevator gyro gain too low 升降舵陀螺感度偏低	Turn the ELE gain dial on control box clockwise, 10 degrees at a time until drifting is eliminated. 順時針調整控制盒上的升降舵感度調整旋鈕，以每次調整約10度的方式，調整至適當位置
	<b>Aileron input causes helicopter to drift</b> 副翼動作飄移	Aileron gyro gain too low 副翼陀螺感度偏低	Turn the AIL gain dial on control box clockwise, 10 degrees at a time until drifting is eliminated. 順時針調整控制盒上的升降舵感度調整旋鈕，以每次調整約10度的方式，調整至適當位置
<b>Control Response</b> 動作反應	<b>Slow Forward/Aft/Left/Right input response</b> 前後左右飛行動作反應偏慢	Roll rate too low 滾轉速率偏低	Increase the swashplate AFR in transmitter 調整遙控器內Swash AFR值，提高滾轉速率
		Roll rate still slow after swash plate adjustment, cyclic pitch too low 已經調整滾轉速率但滾轉速率仍慢，循環螺距偏低	Go back through the DIR setup procedure and increase the cyclic pitch. 重新進入DIR模式，設定較大的循環螺距角度
	<b>Sensitive Forward/Aft/Left/Right input response</b> 前後左右飛行動作反應偏快	Roll rate too high 滾轉速率偏快	Decrease the swashplate AFR in transmitter 調整遙控器內Swash AFR值，降低滾轉速率
		Roll rate still too fast after swash plate adjustment, cyclic pitch too high 已經調整滾轉速率但滾轉速率仍快，循環螺距偏高	Go back through the DIR setup procedure and decrease the cyclic pitch. 重新進入DIR模式，設定較小的循環螺距角度

If above solution does not resolve your issues, please check with experienced pilots or contact your Align dealer.

※在做完以上調整後，仍然無法改善情況時，應立即停止飛行並向有經驗的飛手諮詢或連絡您的經銷商。

**Q&A 1** **Pitches up during fast forward flight.**  
 (1) Elevator gyro gain too low, increase the elevator gain by gradually turning the ELE dial clockwise.  
 (2) Elevator trim not centered. Check if helicopter is tilting backwards during hover.

快速飛行時直昇機機頭會上揚？

- (1) ELE感度不足，請稍微將ELE感度旋鈕順時針方向調高。
- (2) ELE中立點不對，請測試停懸時，直昇機中立點是否朝後。

**Q&A 2** **Insufficient gain during flight, but increasing gain results in oscillation.**  
 (1) Check and resolve possible mechanical vibration from helicopter.  
 (2) Use softer sensor mounting foam, or double up the stock sensor foam.  
 (3) Relocate the sensor to location less prone to vibration.

飛行時感度不足，將感度調高直昇機卻會抖動？

- (1) 檢查直昇機是否有異常震動，如果是請先修復機體。
- (2) 用材質較軟或兩片雙面膠泡棉固定三軸陀螺儀感應器。
- (3) 將感應器換裝於直昇機較不震動的位置。

**Q&A 3** **Drifting during 3D maneuvers.**  
 (1) Increase AIL and ELE gain by turning both dials clockwise.  
 (2) Check if cyclic servos are too slow (minimum 0.1sec / 60 degrees)

3D飛行時有飄移現象？

- (1) 將升降與副翼感度旋鈕順時針方向調高。
- (2) 檢查推動十字盤的伺服器是否過慢（建議選擇動作速度0.1sec/60度以內規格）。

**Q&A 4** **Unstable hover, control inputs are too sensitive.**  
 Decrease the aileron and elevator ATV(AFR) value on the transmitter. For CCPM machines, decrease swashplate mixing percentage on the transmitter. In addition, exponential can be added to aileron and elevator channels.

停懸時不穩定，有動作過靈敏現象？

可調低遙控器AIL及ELE的ATV (AFR) 值（CCPM模式，請調降Swash比率），並增加EXP的設定，以提高停懸的穩定性。

**Q&A 5** **After increasing the ATV(AFR) of aileron and elevator, 3D roll rates are still not enough.**  
 Go back through the DIR setup procedure and use larger cyclic pitch.

已調高AIL及ELE的ATV (AFR)，但3D飛行的滾轉速率卻無法提高？  
 重新進入DIR模式，設定較大的循環螺距角度。

**Q&A 6** **Helicopter oscillates after fast forward flight or after tumbles.**  
 (1) Gradually reduce both AIL and ELE gain by turning them counterclockwise, 10 degrees at a time.  
 (2) Use harder head dampener.

直昇機高速飛行或滾轉後停止時，機身會有輕微抖動現象？

- (1) 逆時針調整控制器上的升降舵感度調整旋鈕，以每次調整約10度的方式，調整至適當位置。
- (2) 主旋翼橫軸及主軸連結的橡膠過軟，請換用較硬的橡膠。

**Q&A 7** **While in flybarless setup mode, unable to complete ELE/AIL endpoint and reverse settings.**  
 Disable all trims/subtrims on the transmitter.

進入Flybarless設定，無法順利完成ELE、AIL行程、ELE或AIL的REV燈號？  
 未取消遙控器的內外微調。

**Q&A 8** **Incorrect CCPM mixing after initial flybarless setup.**  
 (1) Trim/subtrims not zeroed out on transmitter.  
 (2) After any trim adjustments are done on transmitter, the initial flybarless setup procedure need to be performed again.

完成Flybarless設定，但CCPM混控動作不正常？

- (1) 進入Flybarless設定時未將外微調歸零。
- (2) 遙控器變更內微調，未重新進行Flybarless設定。

**Q&A 9** **3G flybarless system unable to power up.**  
 (1) Check proper voltage source.  
 (2) Check AIL/ELE/PIT connections between flybarless control unit and receiver.  
 (3) Check for connection between flybarless control unit and sensor.

3G Flybarless無法開機？

- (1) 檢查系統電源是否正確。
- (2) 檢查AIL、ELE及PIT的訊號線和接收器是否正確連接。
- (3) 檢查感應器與控制器訊號線是否正確連接。

**Q&A 10** **3G flybarless system powers up with LED flashing, but swashplate did not jump 3 times, pitch is locked, unable to complete the initialization process.**

- (1) Possible movement during initialization process. Make sure helicopter is absolutely stationary.
- (2) If STATUS LED flashes red, check the connection between flybarless controller and sensor.

3G Flybarless開機後閃燈正常，十字盤未跳動，PIT被鎖定，無法順利完成開機動作？

- (1) 開機時直昇機必須完全靜止，才可順利開機。
- (2) 檢查如果STATUS紅綠燈號一直閃爍，請檢查控制器和感應器之間是否連接良好。

**Q&A 11** **I noticed swashplate tilts slightly at extreme pitch due to servo interactions, should I make efforts to level it out?**  
 No. Level the swashplate at 0 degrees using subtrims ONLY in DIR setup mode. (please refer to page 21 step 1.3)  
 End point swashplate interactions are automatically compensated by the 3G system while in flight.

十字盤移動到最高與最低位置時會有微傾斜，我能嘗試將它修正調整到水平嗎？

否。在DIR模式時利用內微調(Subtrims)將十字盤0度時調整至水平(參閱第21頁 步驟1.3)，實際飛行時，3G系統會自動修正十字盤的混控位差。

**Q&A 12** **I want to trim the heli differently for different flight conditions.**  
 After initial DIR setup is complete, the trim tabs on your TX can be used to trim the heli. Use your TX's flight condition functions to have multiple trim settings. Do not adjust the subtrim unless you are in the DIR setup mode!

如何針對不同飛行模式做個別的微調設定？

在DIR模式設定完成後，依個別飛行模式(一般3D/F3C)，使用遙控器外微調，調整停旋時的水平，非DIR模式下，不可調整內微調(Subtrims)。

**Q&A 13** **What adjustments can I make on the transmitter after the DIR setup has been completed?**  
 You can adjust the trim tabs, dual rates, exponential, collective pitch, and ail/elev swash AFR (for roll rate). Again do NOT adjust the subtrims unless followed by repeating of DIR setup steps.

在離開DIR模式後，有哪些調整功能是我能使用的？

一般開機模式下，你仍然可以使用以下幾個功能調整直昇機：外微調(trim tabs)、舵面大小動(dual rates, exponential)、集體螺距(collective pitch)、升降/副翼混控速率(ail/elev swash AFR (for roll rate))。

**Q&A 14** **During step 5 of DIR setup mode, only aileron swash mixing was mentioned. Should I set elevator swash mixing as well?**  
 No. The 3G system automatically calculates a cyclic ring based on the aileron swash mix percentage. Setting of elevator swash mix has no effect on the 3G system. Set the cyclic pitch by the aileron swash mix & just use the same value for elevator.

在步驟五-循環螺距設定時，為何只測量副翼的角度？

3G系統在實際飛行時，會自動給定十字盤一個限圈運行，所以在測量副翼循環螺距角度後，設定相同數值的升降循環角度即可。



# ALIGN

## Specifications & Equipment/規格配備:

Length/機身長:1042mm

Height/機身高:364mm

Main Blade Length/主旋翼長:520mm(550mm Option另購)

Main Rotor Diameter/主旋翼直徑:1188mm(1248mm)

Tail Rotor Diameter/尾旋翼直徑:254mm

Motor Pinion Gear/馬達齒輪:16T

Main Drive Gear/傳動主齒:170T

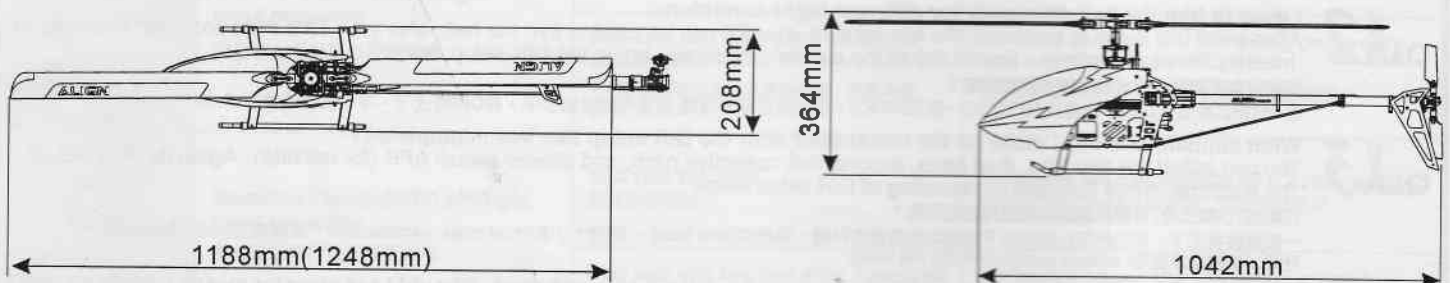
Autorotation Tail Drive Gear/尾驅動主齒:180T

Tail Drive Gear/尾翼傳動齒:40T

Drive Gear Ratio/齒輪傳動比:1:10.62:4.5

Weight/空機重:1800g

Flying Weight/全配重:Approx. 2800g



Apply a little amount of T43 thread lock when fixing a metal part.  
螺絲鎖附於金屬件請使用適量T43(鐵線膠)

### 55FLZ2

Linkage rod(D)  
連桿(D)  $\phi 1.96 \times 39.5 \text{mm} \times 3$

### 55FLZ2A

Ball link  
連桿頭  $\times 6$

### 55HB2A

M3 Set screw  
M3止波螺絲(M3x15mm)  $\times 1$

### 55HB2B

Socket button head self tapping screw  
半圓頭內六角自攻螺絲(T3x6mm)  $\times 2$

### 55HB3

Hex socket self tapping screw  
圓頭內六角自攻螺絲(T3x7mm)  $\times 5$

One-way bearing  
單向軸承( $\phi 12 \times \phi 18 \times 16 \text{mm}$ )  $\times 1$

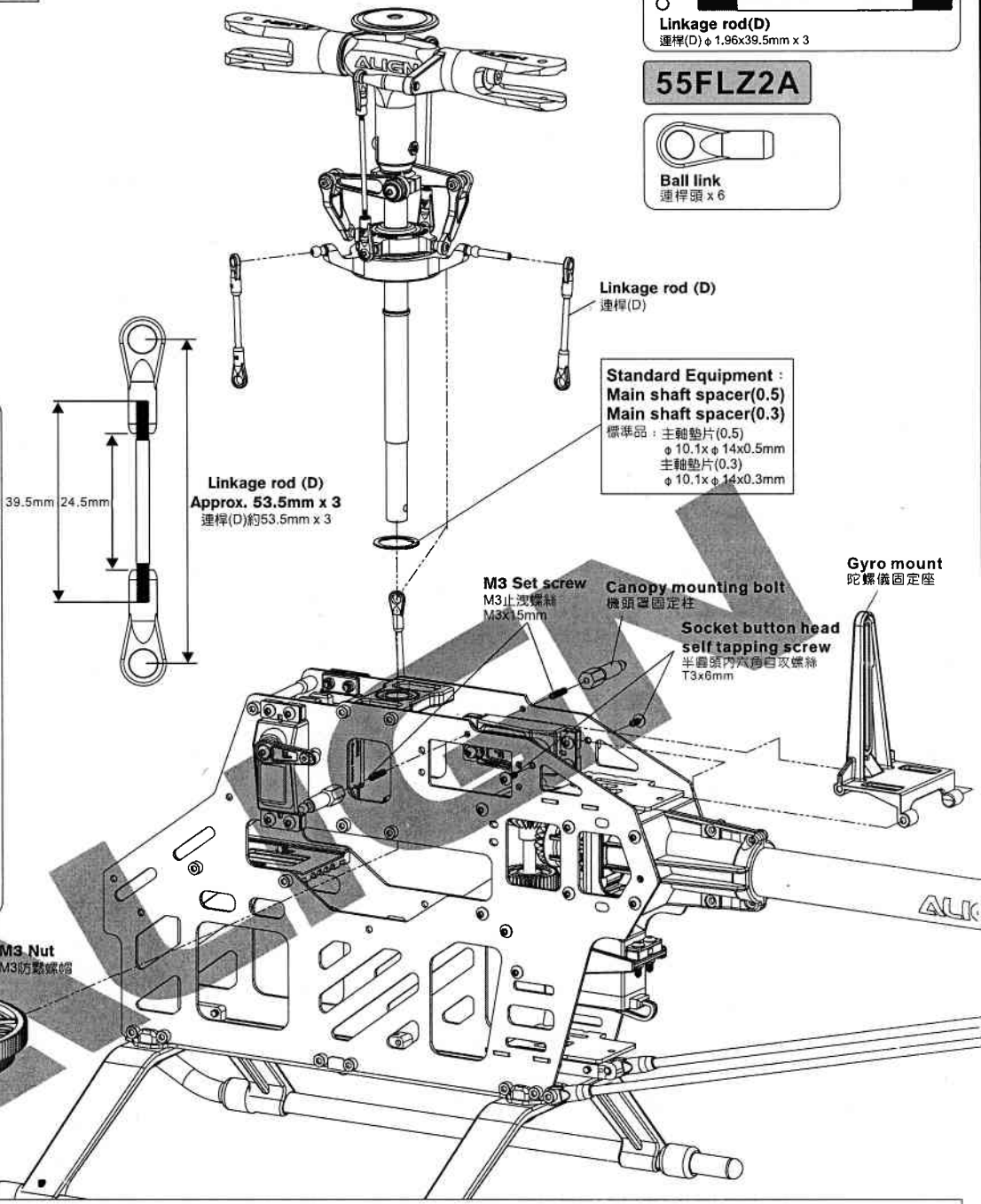
Washer  
單向軸承華司( $\phi 11.5 \times \phi 18 \times 0.8 \text{mm}$ )  $\times 1$

Socket collar screw  
圓頭內六角軸套螺絲(M3x20mm)  $\times 1$

M3 Nut  
M3防鬆螺帽  $\times 1$

Main drive gear set  
主齒輪組

Socket collar screw  
圓頭內六角軸套螺絲  
M3x20mm



Autorotation tail drive gear  
尾驅動主齒  
180T

M3 Nut  
M3防鬆螺帽

Socket collar screw  
圓頭內六角軸套螺絲  
M3x20mm

Main drive gear  
主齒盤  
170T

One-way bearing  
單向軸承  
 $\phi 12 \times \phi 18 \times 16 \text{mm}$

Already assembled by factory,  
please note to check again.  
已組裝完成，請務必自行再確認。

Hex socket self tapping screw  
圓頭內六角自攻螺絲  
T3x7mm

Apply grease  
塗上潤滑油

One-way bearing shaft  
單向軸承套  
 $\phi 9 \times \phi 12 \times \phi 15.5 \times 34.7 \text{mm}$

Washer  
單向軸承華司  
 $\phi 11.5 \times \phi 18 \times 0.8 \text{mm}$

Main gear case  
主齒中心座

#### CAUTION 注意

When tightening a screw to a plastic part, please tighten it firmly, but not over tightened, or they will strip.  
螺絲鎖入塑膠件請務必注意，適當扭力鎖緊即可，而過緊的扭力可能會導致滑牙。

For original manufactory package, if the product is already assembled by Factory, please check again if screws are firmly secured and applied with some glue.  
原廠零件出廠包裝如果是組裝品，請帶再確認各螺絲是否鎖緊上膠。