DOMINATOR

T-REX 450LP ARTF

ALMOST READY TO FLY

INSTRUCTION MANUAL

使用說明書

ALIGN

RH45E32XT
RH45E33XT
RH45E35XT

Much precise control feeling for more fun.

Mini Compact GRS
FLYBARLESS SYSTEM

3S POWER SYSTEM

A10
2.4GHz 10 Channel
Radio Control System

Thank you for purchasing Align products. Please read the manual carefully before installing and be sure to retain the manual for future reference. All pictures shown are for illustration purpose only. Actual product may vary due to product enhancement. Specifications, contents of parts and availability are subject to change, ALIGN RC is not responsible for inadvertent errors in this publications.

承蒙閣下選用亞拓遙控世界系列產品，謹表謝意。
使用前，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，以做為日後參考。本公司將不對此印刷物之異動負責，也無法主動通知消費者任何更新或異動。所有圖片僅用於展示目的。產品可能因改良而有些不同。本說明書內記載的材質、規格或零件包裝之內容物如有異動，請依亞拓官網公告為主。

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INTRODUCTION 前言

Thank you for buying ALIGN Products. The T-REX 450LP ARTF Helicopter is designed as an easy to use, full featured Helicopter R/C model capable of all forms of rotary flight. Please read the manual carefully before assembling the model, and follow all precautions and recommendations located within the manual. Be sure to retain the manual for future reference, routine maintenance, and tuning. The T-REX 450LP ARTF is a new product developed by ALIGN. It features the best design available on the R/C helicopters market to date, providing flying stability for beginners, full aerobatic capability for advanced fliers, and unsurpassed reliability for customer support.

感謝您選購亞拓產品，為了讓您容易方便的使用**T-REX 450LP ARTF**直昇機、請您詳細的閱讀完這本說明書之後再進行組裝以及操作這台直昇機，同時請您妥善的保存這本說明書、作為日後進行調整以及維修的參考。**T-REX 450LP ARTF**是由亞拓自行研發的新產品，不論您是需求飛行穩定性的初學者或是追求性能的飛行愛好者。**T-REX 450LP ARTF**將是您最佳的選擇。

WARNING LABEL LEGEND 標誌代表涵義

FORBIDDEN 禁 止	**Do not attempt under any circumstances.** 在任何禁止的環境下，請勿嘗試操作。
WARNING 警 告	**Mishandling due to failure to follow these instructions may result in damage or injury.** 因為疏忽這些操作說明，而使用錯誤可能造成財產損失或嚴重傷害。
CAUTION 注 意	**Mishandling due to failure to follow these instructions may result in danger.** 因為疏忽這些操作說明，而使用錯誤可能造成危險。

IMPORTANT NOTES 重要聲明

R/C helicopters, including the T-REX 450LP ARTF are not toys. R/C helicopter utilize various high-tech products and technologies to provide superior performance. Improper use of this product can result in serious injury or even death. Please read this manual carefully before using and make sure to be conscious of your own personal safety and the safety of others and your environment when operating all ALIGN products. Manufacturer and seller assume no liability for the operation or the use of this product. Intended for use only by adults with experience flying remote control helicopters at a legal flying field. After the sale of this product we cannot maintain any control over its operation or usage.

As the user of this product, you are solely responsible for operating it in a manner that does not endanger yourself and others or result in damage to the product or the property of others.

T-REX 450LP ARTF遙控直昇機並非玩具，它是結合了許多高科技產品所設計出來的休閒用品，所以商品的使用不當或不熟悉都可能會造成嚴重傷害甚至死亡，使用之前請務必詳讀本說明書，勿輕忽並注意自身安全。注意！任何遙控直昇機的使用，製造商和經銷商是無法對使用者於零件使用的損耗異常或組裝不當所發生之意外負任何責任，本產品是提供給有操作過模型直昇機經驗的成人或有相當技術的人員在旁指導於當地合法遙控飛行場飛行，以確保安全無虞下操作使用，產品售出後本公司將不負任何操作和使用控制上的任何性能與安全責任。
做為本產品的使用者，您，是唯一對於您自己操作的環境及行為負全部的責任之人。

We recommend that you obtain the assistance of an experienced pilot before attempting to fly our products for the first time. A local expert is the best way to properly assemble, setup, and fly your model for the first time. T-REX 450LP ARTF requires a certain degree of skill to operate, and is a consumer item. Any damage or dissatisfaction as a result of accidents or modifications are not covered by any warrantee and cannot be returned for repair or replacement. Please contact our distributors for free technical consultation and parts at discounted rates when you experience problems during operation or maintenance.
As Align Corporation Limited has no control over use, setup, final assembly, modification or misuse, no liability shall be assumed nor accepted for any resulting damage or injury. By the act of use, setup or assembly, the user accepts all resulting liability.

模型商品屬於需高操作技術且為消耗性之商品，如經拆裝使用後，會造成不等情況零件損耗，任何使用情況所造成商品不良或不滿意，將無法於保固條件內更換新品或退貨，如遇有使用操作維修問題，本公司全省分公司或代理商將提供技術指導、特價零件供應服務。對使用者的不當使用、設定、組裝、修改、或操作不良所造成的破損或傷害，本公司無法控制及負責。任何使用、設定、組裝、修改、或操作不良所造成的破損、意外或傷害，使用者應承擔全部責任。

SAFETY NOTES 安全注意事項

CAUTION 注 意

- **Fly only in safe areas, away from other people. Do not operate R/C aircraft within the vicinity of homes or crowds of people. R/C aircraft are prone to accidents, failures, and crashes due to a variety of reasons including, lack of maintenance, pilot error, and radio interference. Pilots are responsible for their actions and damage or injury occurring during the operation or as of a result of R/C aircraft models.**
- **Prior to every flight, carefully check rotorhead spindle shaft screws and tail blade grip screws, linkage balls and screws, ensure they are firmly secured.**

- 遙控模型飛機、直昇機屬高危險性商品，飛行時務必遠離人群，人為組裝不當或機件損壞、電子控制設備不良，以及操控上的不熟悉、都有可能 導致飛行失控損傷等不可預期的意外，請飛行者務必注意飛行安全，並需了解自負疏忽所造成任何意外之責任。
- 每趟飛行前須仔細檢查，主旋翼夾座橫軸螺絲、尾旋翼夾座螺絲，以及機身各部位球頭、螺絲，確實上膠鎖緊才能升空飛行。

FORBIDDEN 禁止 LOCATE AN APPROPRIATE LOCATION 遠離障礙物及人群

R/C helicopters fly at high speed, thus posing a certain degree of potential danger. Choose a legal flying field consisting of flat, smooth ground without obstacles. Do not fly near buildings, high voltage cables, or trees to ensure the safety of yourself, others and your model. For the first practice, please choose a legal flying field. Do not fly your model in inclement weather, such as rain, wind, snow or darkness.

直昇機飛行時具有一定的速度，相對的也潛在著危險性，場地的選擇也相對的重要，請需遵守當地法規到合法遙控飛行場地飛行，務必選擇在空曠合法專屬飛行場地，並必須注意周遭有沒有人、高樓、建築物、高壓電線、樹木等等，避免操控的不當造成自己與他人財產的損壞。請勿在下雨、打雷等惡劣天候下操作，以確保本身及機體的安全。

FORBIDDEN 禁止 NOTE ON LITHIUM POLYMER BATTERIES 鋰聚電池注意事項

Lithium Polymer batteries are significantly more volatile than alkaline or Ni-Cd/Ni-MH batteries used in RC applications. All manufacturer's instructions and warnings must be followed closely. Mishandling of Li-Po batteries can result in fire. Always follow the manufacturer's instructions when disposing of Lithium Polymer batteries.

鋰聚電池跟一般在RC使用的鹼性電池、鎳鎘電池、鎳氫電池比較起來是相對危險的。請嚴格遵守鋰聚電池說明書之使用注意事項。不恰當使用鋰聚電池，可能造成火災並傷及生命財產安全，切勿大意！

FORBIDDEN 禁止 PREVENT MOISTURE 遠離潮濕環境

R/C models are composed of many precision electrical components. It is critical to keep the model and associated equipment away from moisture and other contaminants. The introduction or exposure to water or moisture in any form can cause the model to malfunction resulting in loss of use, or a crash. Do not operate or expose to rain or moisture.

直昇機內部也是由許多精密的電子零組件組成，所以必須絕對的防止潮濕或水氣，避免在浴室或雨天時使用，防止水氣進入機身內部而導致機件及電子零件故障而引發不可預期的意外！

FORBIDDEN 禁止 PROPER OPERATION 勿不當使用本產品

Please use the replacement of parts on the manual to ensure the safety of instructors. This product is for R/C model, so do not use for other purpose.

請勿自行改造加工，任何的升級改裝或維修，請使用空拓產品目錄中的零件，以確保結構的安全。
請確認於產品限界內操作，請勿過載使用，並勿用於安全、法令外其它非法用途。

WARNING 警告 OBTAIN THE ASSISTANCE OF AN EXPERIENCED PILOT 避免獨自操控

Before turning on your model and transmitter, check to make sure no one else is operating on the same frequency. Frequency interference can cause your model, or other models to crash. The guidance provided by an experienced pilot will be invaluable for the assembly, tuning, trimming, and actual first flight or unforeseen danger may happen. (Recommend you to practice with computer-based flight simulator.)

至飛行場飛行前，需確認是否有相同頻率的同好正進行飛行，因為開啓相同頻率的發射器將導致自己與他人立即干擾等意外危險。遙控飛機操控技巧在學習初期有著一定的難度，要盡量避免獨自操作飛行，需有經驗的人士在旁指導，才可以操控飛行，否則將可能造成不可預期的意外發生。(勤練電腦模擬器及老手指導是入門必要的選擇)

WARNING 警告 SAFE OPERATION 安全操作

Make sure to always be aware to keep your eyes and body away from blades rotation. Do not attempt to grab or make contact with the helicopter while the main blades are in motion. During take-off, landing, and flight, be sure to keep the helicopter away from all obstacles. Operators must stand at least 10 meters away from the helicopter. Never take your eyes off the model or leave it unattended while it is turned on, and Immediately turn off the model and transmitter when you have landed the model. Operate this unit within your ability, do not fly under tired condition, improper operation may cause in danger, and always to avoid injury caused by loose parts due to improper assembly or any unforeseen dangers.

請隨時注意，無論在任何時候，都不能將運轉中的旋翼對著眼睛，嚴禁用手抓取運行中的直昇機，當主旋翼轉動後，或起飛／試飛時，務必遠離障礙物，站立位置必需距離5公尺以上，不可在視線範圍外進行飛行，降落後也請馬上關掉直昇機和遙控器電源。操作這台直昇機需要一定操控技術及能力，避免因人為組裝不當造成零件脫落，而引發不可預期的財物及人員損傷，並請衡量自身情況，過於疲勞、精神不佳或不當操作，都可能引請不可預期的意外發生。

CAUTION 注意 ALWAYS BE AWARE OF THE ROTATING BLADES 遠離運轉中零件

During the operation of the helicopter, the main rotor and tail rotor will be spinning at a high rate of speed. The blades are capable of inflicting serious bodily injury and damage to the environment. Be conscious of your actions, and careful to keep your face, eyes, hands, and loose clothing away from the blades. Always fly the model a safe distance from yourself and others, as well as surrounding objects.

直昇機主旋翼與尾旋翼運轉時會以高轉速下進行，在高轉速下的旋翼會造成自己與他人在身體上或環境上的嚴重損傷，請勿觸摸運轉中的主旋翼與尾旋翼，並保持安全距離以避免造成危險及損壞。

⚠ CAUTION 注意 KEEP AWAY FROM HEAT 遠離熱源

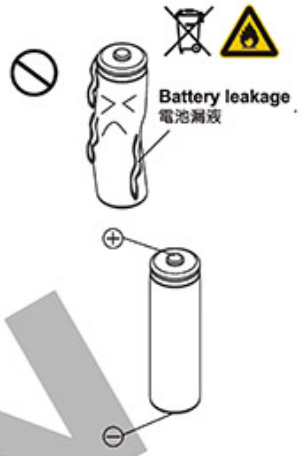
R/C models are made of various forms of plastic. Plastic is very susceptible to damage or deformation due to extreme heat and cold climate. Make sure not to store the model near any source of heat such as an oven, or heater. It is best to store the model indoors, in a climate-controlled, room temperature environment.

遙控飛機多半是以 PA 纖維或聚乙烯、電子商品為主要材質，因此要盡量遠離熱源、日曬，以避免因高溫而變形甚至熔毀損壞的可能。

SAFETY ON THE USE OF DRY CELL BATTERIES 乾電池使用安全

The AA carbon-zinc batteries are one time use, they should not be charged for repetitive use. Please read and follow the guidelines below prior to use. The manufacturer cannot be held liable for accidents and damages as result of improper usage.

- **These are one time use battery, and should not be recharged.**
- **Ensure proper polarity and installation method during use.**
- **Do not mix battery of different age or different model. Doing so may affect battery life, and even cause fire danger.**
- **If the product is not used for long period of time, please remove the batteries to prevent damaged caused by battery leaks. Do not use batteries which exhibits symptoms of leaks.**
- **Please follow local law and ordinances when disposing used batteries. Do not dispose them improperly.**



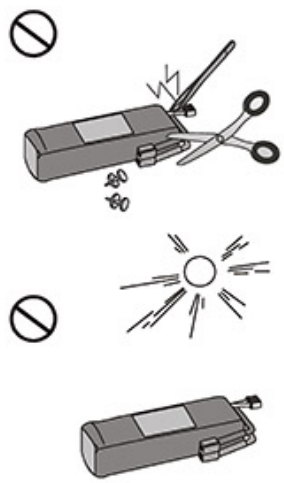
3號(AA)碳鋅電池，不可重覆充電使用，使用碳鋅電池前請務必詳讀並遵照下列事項，本公司將不對任何不當使用所造成的損害及意外負責。

- 碳鋅電池為一次性電池，嚴禁重覆充電使用。
- 安裝使用時，請確認電池正負極位置及安裝方式。
- 嚴禁新舊或不同型號電池混用，以免影響電池使用壽命，甚至造成電池起火燃燒的危險。
- 產品長時間不使用時，請取出電池，以免造成電池電力流失或電池漏液而損壞主機。若電池已經有漏液情況，請勿再繼續使用。
- 廢棄電池，請依照該使用國家或地區的廢棄物清理法令回收，切勿任意丟棄以免汙染環境。

SAFETY ON THE USE OF LITHIUM POLYMER (LIPO) BATTERIES 鋰聚電池使用安全

Lithium batteries have higher degree of risk when compared to other batteries. Please read and follow the guidelines below prior to use. The manufacturer cannot be held liable for accidents and damages as result of improper usage.

- **Do not charge past 4.2v/cell; do not discharge past 3.0v/cell.**
- **Avoid over charging/discharging lipo batteries. Doing so may cause internal damages and affect the battery's discharge performance.**
- **Avoid continuous use under high temperature environment, or when battery exhibits high temperature. Doing so may shorten battery life, causing puffing of battery, or even danger of explosion.**
- **Discharge the batteries to 60-70% of full capacity for long term storage. Too low of voltage may result in over-discharging over time. Therefore, we recommend periodic charge of battery in long term storage, this will reduce chance of over-discharge damage.**
- **To avoid the danger of explosion and fire, use of third party charger to charge these batteries are prohibited.**
- **Avoid impact, disassembly, incorrect polarity, and burning of batteries. Avoid shorting of battery terminal by metallic objects. Avoid puncture of battery with sharp material.**
- **Charging error could result in battery explosion, fire, and other unexpected danger or property loss. Please always charge batteries with equipment in sight, do not leave charger unattended. Should you need to leave the charging area, please remove the battery and abort charging process.**
- **Should the battery exhibit excessive heat after use, do not charge immediately. Doing so may cause battery to puff, deform, explode, or even start a fire.**
- **Please follow local law and ordinances when disposing used batteries. Do not dispose them improperly.**



鋰聚電池較其他電池有更高的危險性，使用前請務必遵照下列注意事項，本公司將不對任何不當使用所造成的損害負責。

- 充電時不得高於最大充電電壓4.2V/cell，放電時不得低於最低放電電壓3.0V/cell。
- 鋰聚電池要避免過充與過放的情形發生，過充或過放會對電池內部造成損傷並影響電池放電性能。
- 避免在高溫的環境或電池已經產生高溫而繼續使用，這會使電池壽命減短，嚴重者可能會使電池膨脹甚至爆炸的危險。
- 如果長期不用時，請以60%～70%的充電量儲存。電量過低時，可能因自放電導致過放，因此，存放不使用的鋰聚電池時，建議定期充電，以防止自放電低於最小工作電壓而老化，避免電池充飽存放，充飽存放常會導致電池的膨脹。
- 嚴禁使用原廠以外的充電器進行充電，以免發生爆炸起火的危險。
- 嚴禁撞擊、拆解、正負極反接、焚燒電池，避免金屬品碰觸電池正負極造成短路。並請防止尖銳的物品刺穿電池，以避免電池起火的危險。
- 充電時務必在視線範圍內進行，不可在無人看管的情形下充電，以避免因充電異常造成電池爆裂、燃燒甚至引發火災等不可預期的危險及損失。若需離開看管範圍時應將電池取出，停止對電池充電。
- 電池使用後如有發熱情況，嚴禁充電。否則會造成電池膨脹、變型、爆炸甚至起火燃燒，危害生命財產的安全。
- 廢棄電池，請依照該使用國家或地區的廢棄物清理法令回收，切勿任意丟棄以免汙染環境。

BALANCE CHARGER SAFETY PRECAUTIONS 充電器使用注意事項

FORBIDDEN 禁 止

- **ALIGN RCC-3SX battery charger is suitable to 2-3cell, 1000mAh and more lithium batteries. Please do not dismantle or change it for other purpose.**
- **If there is any unusual deformation of the surface of battery, please do not charge it anymore. If the battery becomes hot while charging, stop charging and check if the battery is broken.**
- **Do not let this machine drench to the rain/water or uses under the heavy moisture, in order to avoid the interior short-circuits and accidents.**
- **For short-circuits battery, the indicating light of the charger will be off, so please stop charging.**
- **Charging error could result in battery explosion, fire, and other unexpected danger or property loss. Please always charge batteries with equipment in sight, do not leave charger unattended. Should you need to leave the charging area, please remove the battery and abort charging process.**

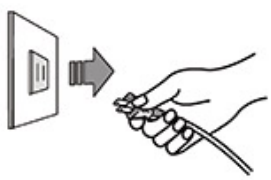
- 亞拓RCC-3SX充電器適用2-3cell，容量1000mAh以上之鋰電池，請勿自行拆卸，改裝或作為其他用途。
- 外觀已膨脹的電池不可再充電使用；損壞的電池於充電過程中會有發熱的情形，應停止對該電池進行充電。
- 勿讓本機淋到雨水或在重濕氣下使用，以免內部發生短路等不可預期的故障及意外。
- 內部短路的電池，當接上充電器時指示燈會熄滅予以警示，應停止對該電池進行充電。
- 充電時務必在視線範圍內進行，不可在無人看管的情形下充電，以避免因充電異常造成電池爆裂、燃燒甚至引發火災等不可預期的危險及損失。若需離開看管範圍時應將電池取出，停止對電池充電。

WARNING 警 告

- **Do not use the charger at place near heater or expose of sunshine.**
- **Keep the vent unimpeded.**
- **While using, put the charger at a stable place and avoid falling down or colliding.**

- 避免靠近熱源或電器產品或在陽光直射環境下使用。
- 散熱口須保持暢通不可堵塞，以免影響散熱效果。
- 使用時請放置於平穩的場所並避免摔落或受到外力撞擊。

CAUTION 注 意

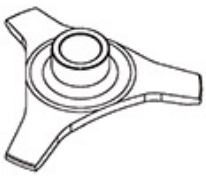


- **The battery being in use may be a little hot. Please do not charge the battery right away. It might cause the battery broken, even an accident.**
- **Prevent liquid and anything into the device. If so, please unplug the charger and take out the battery and send it to our distributors to repair.**
- **Before connecting the charge to batteries, please notice the positive and negative pole of the battery. When the reverse polarity protection beeps, please take out the battery immediately. (The beeps should be stopped in 15 seconds, or the charger will be broken.)**
- **If there is an unusual temperature increase, swell, or other unusual occurrences, please unplug the battery and AC plug immediately.**
- **The electronic components of RCC-3SX can withstand a maximum input current of 0.4Amps, excess current may burned the charger and even cause a fire.**

- 當電池剛使用過且表面溫度尚未冷卻時，請勿立即充電，否則將造成電池損壞，甚至引發意外。
- 不要讓異物或任何液體進入機體，如有尖細異物或任何液體進入機體時，請儘快將電源及電池拔除，並送至經銷商或本公司處理。
- 連接電池與充電器之前，請確認電池與充電器的極性是否相符，若極性錯誤將啓動鳴叫警示，此時應立即將電池拔下〈鳴叫時間勿超過15秒，以避免充電器損壞〉。
- 當充電過程中發生電池溫度升高、電池膨脹或其他異常情形時，請立即拔除電池與充電器電源插頭。
- 本產品能夠承受的最大輸入電流為0.4安培，如果電流超過可能導致本產品燒毀。

EQUIPMENT REQUIRED FOR ASSEMBLY 自備設備

ADDITIONAL TOOLS REQUIRED FOR ASSEMBLY 自備工具



[H45191]
Swashplate Leveler
十字盤校正器

[HET80001]
AP800 Digital Pitch Gauge
AP800 數位螺距規

[HETMT901]
Multi-function Tester
多功能檢測計

Philips Screw Driver
十字螺絲起子
ϕ 3.0/ ϕ 1.8mm

Cutter Knife
刀子

Hexagon Screw Driver
六角螺絲起子
3mm/2.5mm/
2mm/1.5mm

Needle Nose Pliers
尖嘴鉗

Oil
潤滑油

CA Glue
瞬間膠

Grease
潤滑油

Anaerobic Retainer (R48)
缺氧膠 (R48)

PACKAGE ILLUSTRATION 包裝說明

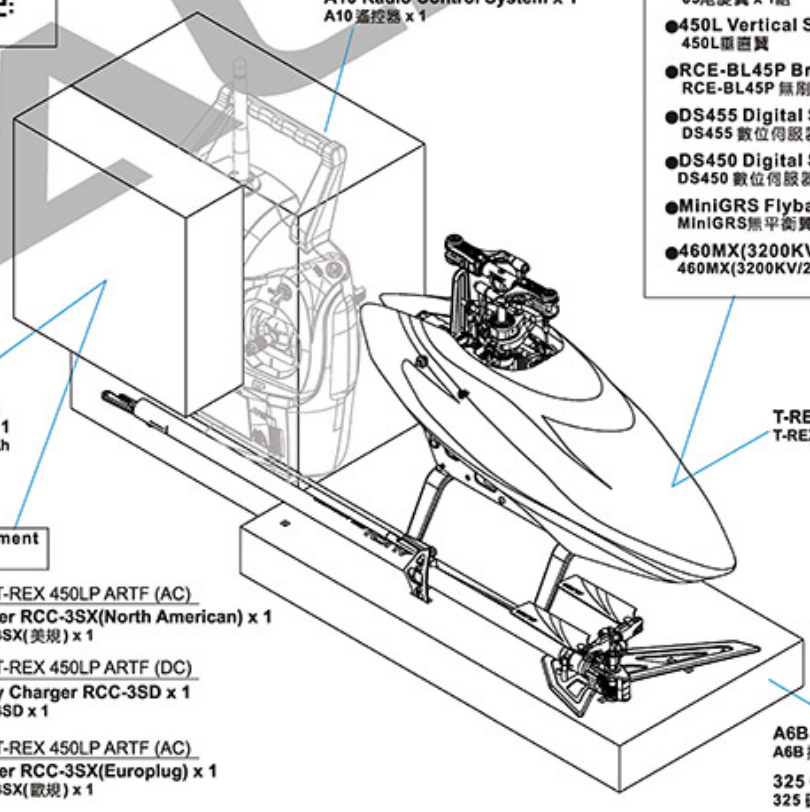
Quick Finder
零件快速購

AA Carbon-zinc Batteriesx 4
3號(AA)碳鋅電池x 4

A10 Radio Control System x 1
A10 遙控器 x 1

Already Assembled
已組裝

- **450L Dominator Painted Canopy x 1**
  450L Dominator彩繪機頭罩 x 1
- **450 Landing Skid x 1**
  450腳架 x 1
- **65 Tail Blade x 1set**
  65尾旋翼 x 1組
- **450L Vertical Stabilizer x 1**
  450L垂直翼
- **RCE-BL45P Brushless ESC x 1**
  RCE-BL45P 無刷定速調速器 x 1
- **DS455 Digital Servo x 1**
  DS455 數位伺服器 x 1
- **DS450 Digital Servo x 3**
  DS450 數位伺服器 x 3
- **MiniGRS Flybarless System x 1**
  MiniGRS無平衡翼系統組 x 1
- **460MX(3200KV/2222)Brushless Motor x 1**
  460MX(3200KV/2222)無刷馬達 x 1



11.1V 2800mAh Li-Po Battery x 1
11.1V 3S 2800mAh
Li-Po電池 x 1

T-REX 450LP Kit x 1 set
T-REX 450LP 空機套件組 x 1組

Option Equipment
選購品

[RH45E32XT] T-REX 450LP ARTF (AC)
Balance Charger RCC-3SX(North American) x 1
分壓充電器 RCC-3SX(美規) x 1

[RH45E33XT] T-REX 450LP ARTF (DC)
Lithium Battery Charger RCC-3SD x 1
分壓充電器 RCC-3SD x 1

[RH45E35XT] T-REX 450LP ARTF (AC)
Balance Charger RCC-3SX(Europlug) x 1
分壓充電器 RCC-3SX(歐規) x 1

A6B Receiver x 1
A6B 接收機 x 1

325 Carbon Fiber Blades x 1set
325 碳纖主旋翼 x 1組

There are many versions of T-REX 450LP for your choice. The ARTF includes additional electronics and other equipment. The Instruction Manual will refer to the T-REX 450LP ARTF. You may purchase any additional items referenced in the instruction manual or any spare parts for other 450LP ARTF version by referring to more product information in this manual.

T-REX 450LP系列商品有多種版本可作為選擇，除標準配備會因您購買的商品版本而有些微不同，在組裝、設定上都是一致的，在此我們以ARTF作為操作範例，您也可依照書面上的商品資訊來增添其他選購商品。

T-REX 450LP ARTF (AC) STANDARD EQUIPMENT T-REX 450LP ARTF(AC)標準配備 [RH45E32XT] [RH45E35XT]

 T-REX 450LP ARTFx 1	 325 Carbon Fiber Blades x 1set 325 碳纖主旋翼 x 1組	 A10 Radio Control System x 1 A10遙控器 x 1	 A6B Receiver x 1 A6B接收機 x 1
 Lithium Battery ChargerRCC-3SX x 1 分壓充電器 RCC-3SX x 1	[RH45E32XT] Option Equipment 選購品  North American Power Cord x 1 美規電源線 x 1	[RH45E35XT] Option Equipment 選購品  Europlug Power Cord x 1 歐規電源線 x 1	 MiniGRS Flybarless System x 1 MiniGRS無平衡翼系統組 x 1
 11.1V 2800mAhLi-Po Battery x 1 11.1V 3S 2800mAh Li-Po電池 x 1	 AA Carbon-zinc Batteriesx 4 3號(AA)碳鋅電池x 4	 Hook and Loop Fastening Tape 電池用魔術帶	 Hook and Loop Tape 魔術沾

T-REX 450LP ARTF (DC) STANDARD EQUIPMENT T-REX 450LP ARTF(DC)標準配備 [RH45E33XT]

 T-REX 450LP ARTF x 1	 325 Carbon Fiber Blades x 1set 325 碳纖主旋翼 x 1組	 A10 Radio Control System x 1 A10遙控器 x 1
 A6B Receiver x 1 A6B接收機 x 1	 Lithium Battery ChargerRCC-3SD x 1 分壓充電器 RCC-3SD x 1	 Charger DC Power Cord x 1 充電器電源線 x 1
 11.1V 2800mAhLi-Po Battery x 1 11.1V 3S 2800mAh Li-Po電池 x 1	 AA Carbon-zinc Batteriesx 4 3號(AA)碳鋅電池x 4	 Hook and Loop Fastening Tape 電池用魔術帶

 Hook and Loop Tape 魔術沾

CAREFULLY INSPECT BEFORE REAL FLIGHT 請嚴格執行飛行前之檢查義務

- Before flying, please check to make sure no one else is operating on the same frequency for the safety.
- Before flight, please check if the batteries of transmitter and receiver are enough for the flight.
- Before turn on the transmitter, please check if the throttle stick is in the lowest position. IDLE switch is OFF.
- When turn off the unit, please follow the power on/off procedure. Power ON- Please turn on the transmitter first, and then turn on receiver. Power OFF- Please turn off the receiver first and then turn off the transmitter. Improper procedure may cause out of control, so please to have this correct habit.
- Before operation, check every movement is smooth and directions are correct. Carefully inspect servos for interference and broken gear.
- Check for missing or loose screws and nuts. See if there is any cracked and incomplete assembly of parts. Carefully check main rotor blades and rotor holders. Broken and premature failures of parts possibly cause a dangerous situation.
- Check all ball links to avoid excess play and replace as needed. Failure to do so will result in poor flight stability.
- Check if the battery and power plug are fastened. Vibration and violent flight may cause the plug loose and result in out of control.

- 每次飛行前應先確認所使用的頻率是否會干擾他人，以確保您自身與他人的安全。
- 每次飛行前確定您發射器與接收器電池的電量是在足夠飛行的狀態。
- 開機前確認油門搖桿是否位於最低點，熄火降落開關，定速開關(IDLE)是否於關閉位置。
- 關機時必須遵守電源開關機的程序，開機時應先開啟發射器後，再開啟接收器電源；關機時應先關閉接收器後，再關閉發射器電源。不正確的開關程序可能會造失控的現象，影響自身與他人的安全，請養成正確的習慣。
- 開機請先確定直昇機的各個動作是否順暢，及方向是否正確，並檢查伺服器的動作是否有干涉或崩齒的情形，使用故障的伺服器將導致不可預期的危險。
- 飛行前確認沒有缺少或鬆脫的螺絲與螺帽，確認沒有組裝不完整或損毀的零件，仔細檢查主旋翼是否有損壞，特別是接近主旋翼夾座的部位。損壞或組裝不完整的零件不僅影響飛行，更會造成不可預期的危險。注意：每次飛行前的安全檢查、保養、及更換損耗零件，請確實嚴格執行以確 保安全。
- 檢查所有的連桿頭是否有鬆脫的情形，過鬆的連桿頭應先更新，否則將造成直昇機無法操控的危險。
- 確認電池及電源接頭是否固定牢靠，飛行中的震動或激烈的飛行，可能造成電源接頭鬆脫而造成失控的危險。

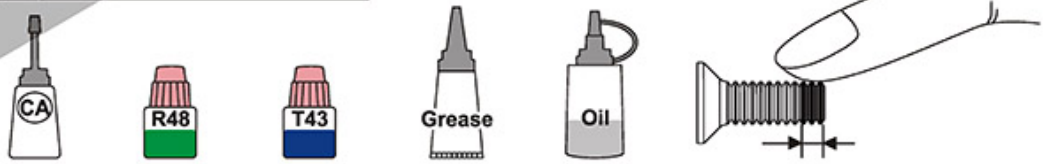
When you see the marks as below, please use relative glue or grease to ensure flying safety.
標有以下符號之組裝步驟，請配合上膠或上油，以確保鎖附零件使用之可靠度。

- **CA ： Apply small amount of CA Glue to fix.**
  瞬間膠：使用適量瞬間膠固定
- **R48 ： Apply small amount of Anaerobic Retainer to fix.**
  缺氧膠：使用適量缺氧膠固定
- **T43 ： Apply small amount of Thread Lock to fix.**
  螺絲膠：使用適量螺絲膠
- **OIL ： Add small amount of OIL.**
  潤滑油：添加適量潤滑油
- **Grease ： Add small amount of Grease.**
  潤滑油：添加適量潤滑油

When assembling ball links, make sure the "A" character faces outside.
各項塑膠製連桿頭扣接時，"A"字請朝外。

CAUTION 注意

Keep plastic parts away from heat.
塑膠件避免接近熱源。



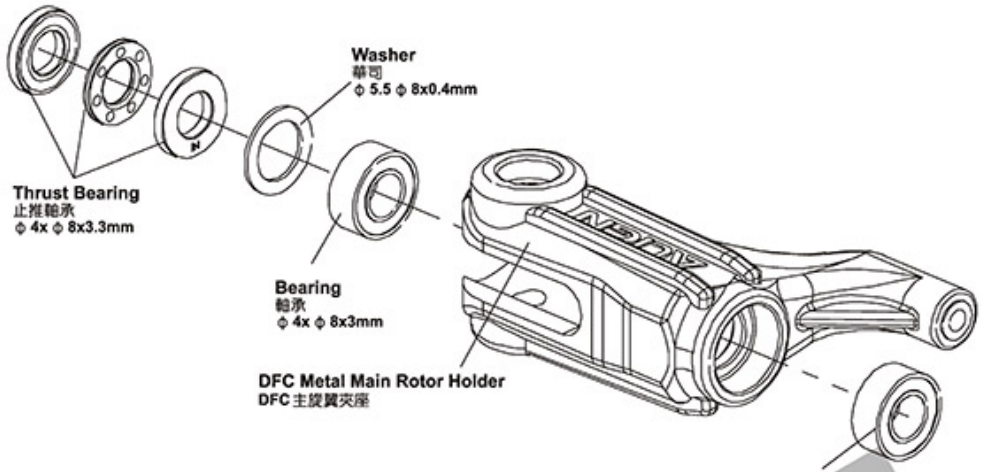
CA Glue 瞬間膠 | Anaerobic Retainer 缺氧膠 | Thread Lock 螺絲膠 | Grease 潤滑油 | Oil 潤滑油 | T43 Glue width：approx. 1mm T43上膠寬度約1mm

1. Anaerobic Retainer (R48)is green penetrating threadlocker and is used to fix the metal tube before assembly at temperatures up to +180˚C。
2. Thread Lock(T43) is blue low strength threadlocker and is applied to the small screw(threads) or metal parts before assembly to prevent loosening. Ensure to apply only a small amount and wipe surplus off. When disassembling, recommend to heat the metal joint about 15 Seconds.
3. Grease is kind of lubricant additive which is applied to the one-way bearings or thrust bearing.

◎Based on parts physical attributes, please apply small amount of the relative glue or grease accordingly to prevent any parts damage or loosening or unexpected danger happened.

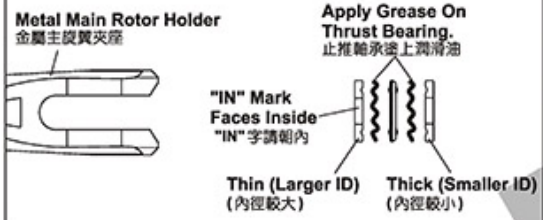
1.缺氧膠 (R48) 為綠色高強度快速固化的缺氧膠，適合於金屬管狀固定用，可耐高溫至 180 ˚C。
2.螺絲膠 (T43) 為藍色低強度螺絲膠，適合小型螺絲；使用於金屬內外徑或膠合螺絲時，請務必適量使用，必要時請用手去除多餘膠量，欲拆卸時可於金屬接合部位熱烤約 15 秒。
3.潤滑油 (Grease) 為膏狀潤滑油，適用於單向軸承或止推軸承。

◎上述各類功能膠(油)請依零件屬性需求自行準備並斟酌其用量，以達到最佳組裝狀態，避免因使用不當造成零件損壞或不可預期的意外發生。



CAUTION 注意

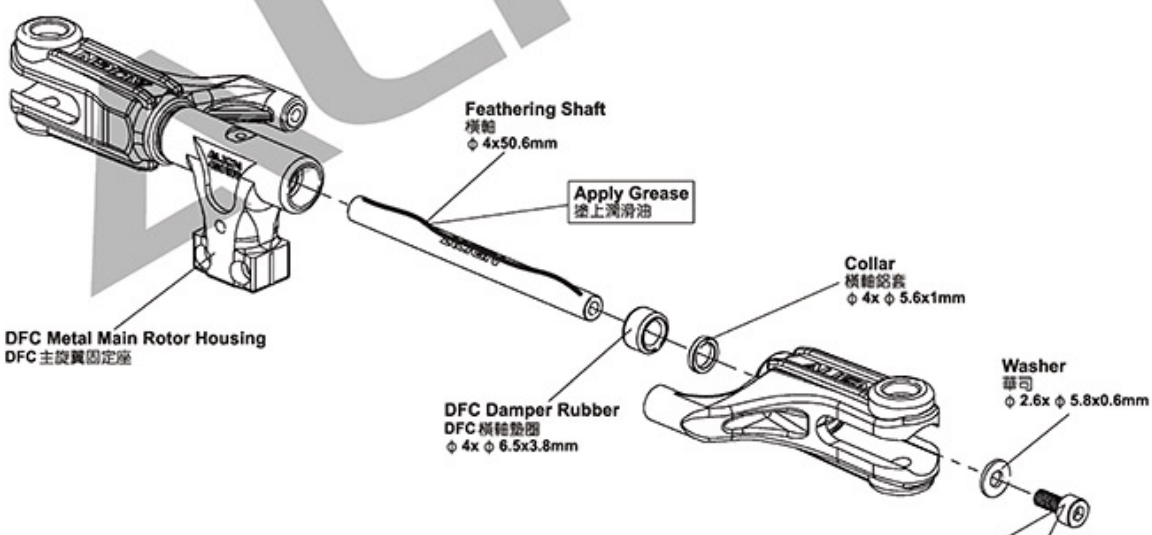
THRUST BEARING 止推軸承



CAUTION 注意

Thrust bearing and washer for radial bearing are wear items; therefore, it is recommended to inspect after every 20 flights and replaced as necessary. For flights with high headspeed, the inspection interval should be reduced to ensure flight safety.

止推軸承及橫軸墊圈屬於飛行消耗品，建議每 20 趟定期檢查及更換，高主旋翼轉速飛行時，請縮短定期檢查之趟數，以確保飛行安全。



Apply a small 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

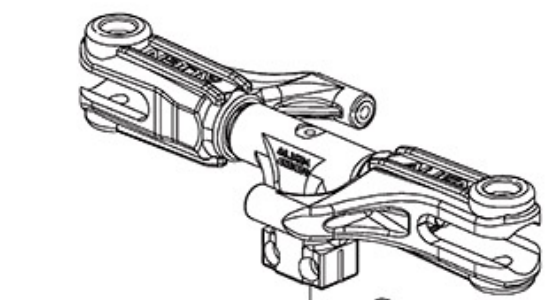
Original manufactory packages contains product already assembled, please confirm every screw is firmly secured with T43. Do not use T43 on any plastic part.

原裝零件出廠包裝如果是組裝品，請需再確認各螺絲是否鎖緊上膠。請注意T43不可塗在任何的塑膠材質上。

CAUTION 注意

Please apply a small amount of T43 when tightening the feathering shaft socket screws and make sure to tighten firmly, but not over tighten. Suggest using a torque wrench or torque lock when tightening screws. Torque value 5.0kg.cm

橫軸螺絲鎖附時需注意鎖附之緊度與使用適量的螺絲膠，建議搭配扭力扳手或扭力機鎖附螺絲，鎖定扭力值為 5.0kg.cm。



Apply a small 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

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Linkage Ball A
球頭A(M2x2.5)
ϕ 4.75x7.18mm

Linkage Ball G
球頭G(M2x2.5)
ϕ 4.75x11.18mm

Long Linkage Ball
導板長球頭(M2x2.5)
ϕ 4.75x23.68mm

DFC CCPM Swashplate
DFC CCPM 十字盤組

Linkage Ball A
球頭A(M2x2.5)
ϕ 4.75x7.18mm

Washer
華司
ϕ 2x ϕ 3.6x0.2mm

Socket Collar Screw
圓頭內六角頭軸套螺絲
M2x15mm

Bearing
軸承
ϕ 2x ϕ 4.5x2mm

M2 Nut
M2 螺帽

DFC Linkage Bearing Sleeve
DFC 連桿軸承套
ϕ 2x ϕ 3x ϕ 4.5mm

Main Rotor Grip Arm Integrated Control Link
主旋翼夾座連桿組

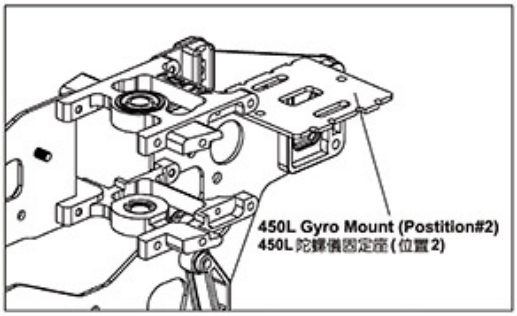
Socket Collar Screw
圓頭內六角軸套螺絲
M2x12mm

Socket Screw
圓頭內六角螺絲
M2x6mm

DFC Ball Link
DFC 連桿頭

DFC Main Shaft
DFC 主軸 ϕ 5x111mm

You may adjust the length of ball link when tracking is off while flight .
若飛行中有雙槳情形，可適當調整連桿頭長短改善。

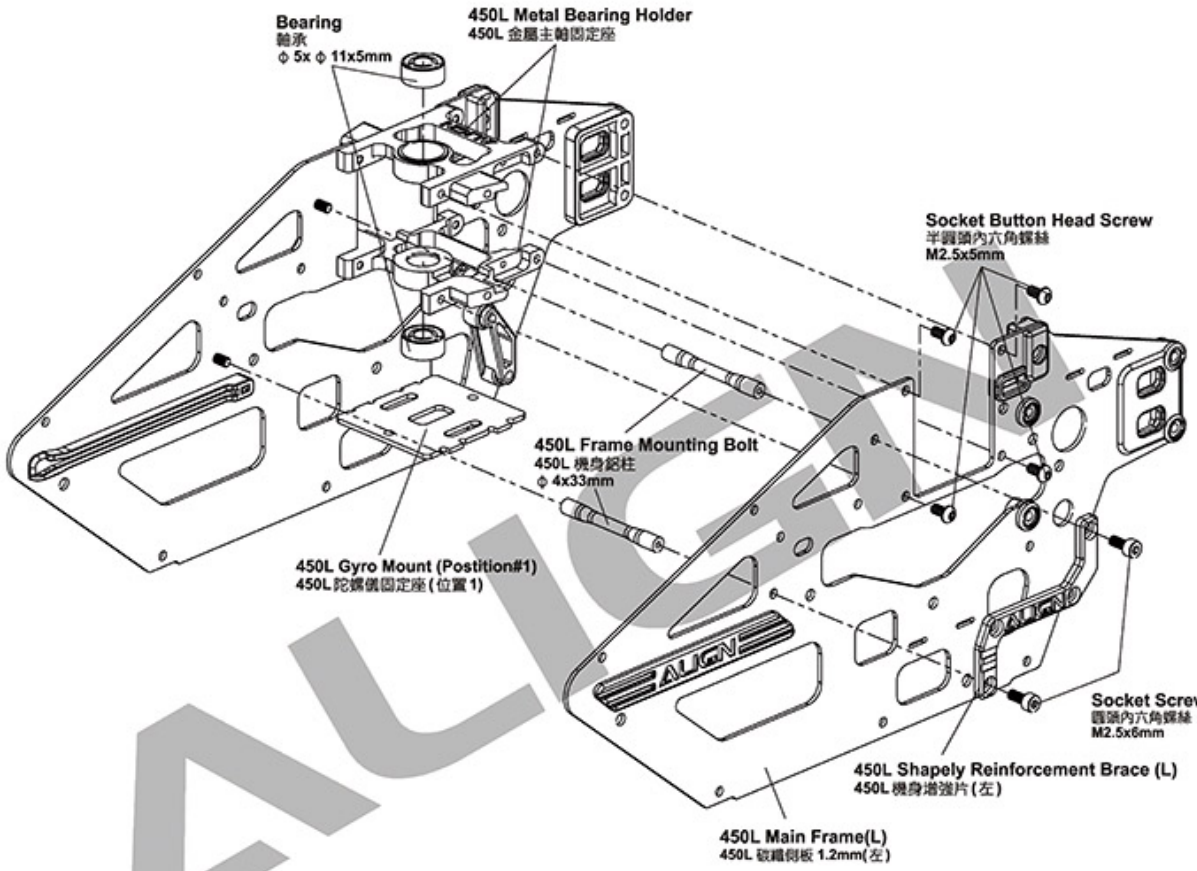


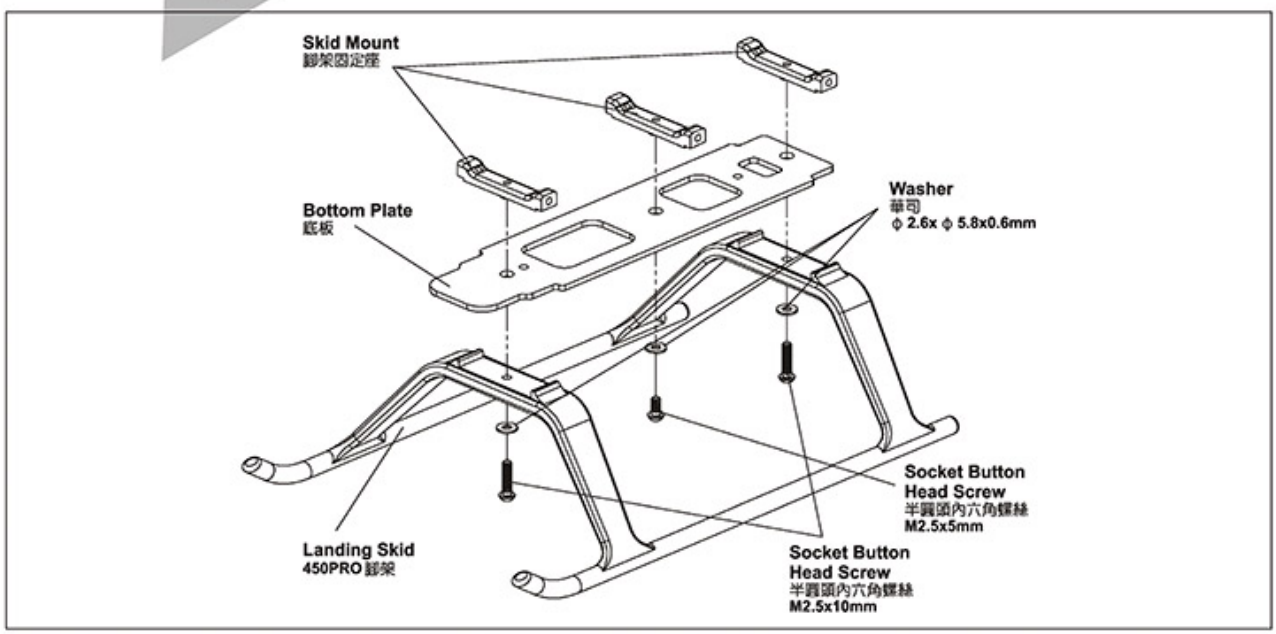
Apply a small amount of T43 thread lock when fixing a metal part.
螺絲鎖附於金屬件請使用適量T43(螺絲膠)。

CAUTION 注 意

Original manufactory packages contains product already assembled, please confirm every screw is firmly secured with T43. Do not use T43 on any plastic part.

原裝零件出廠包裝如果是組裝品，請需再確認各螺絲是否鎖緊上膠。請注意T43不可塗在任何的塑膠材質上。

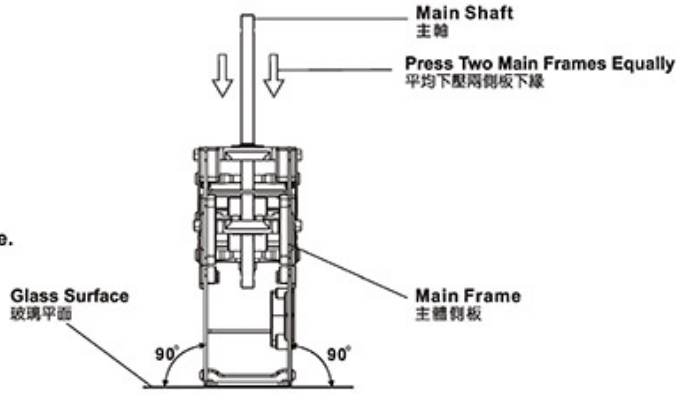




CAUTION 注 意

Main frame assembly key point：
First do not fully tighten the screws of main frames and put two bearings through the main shaft to check if the movements 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. This 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。

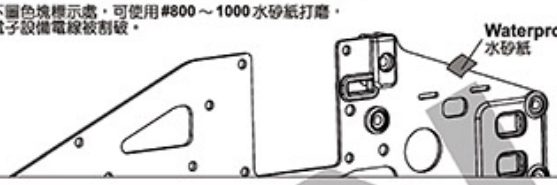


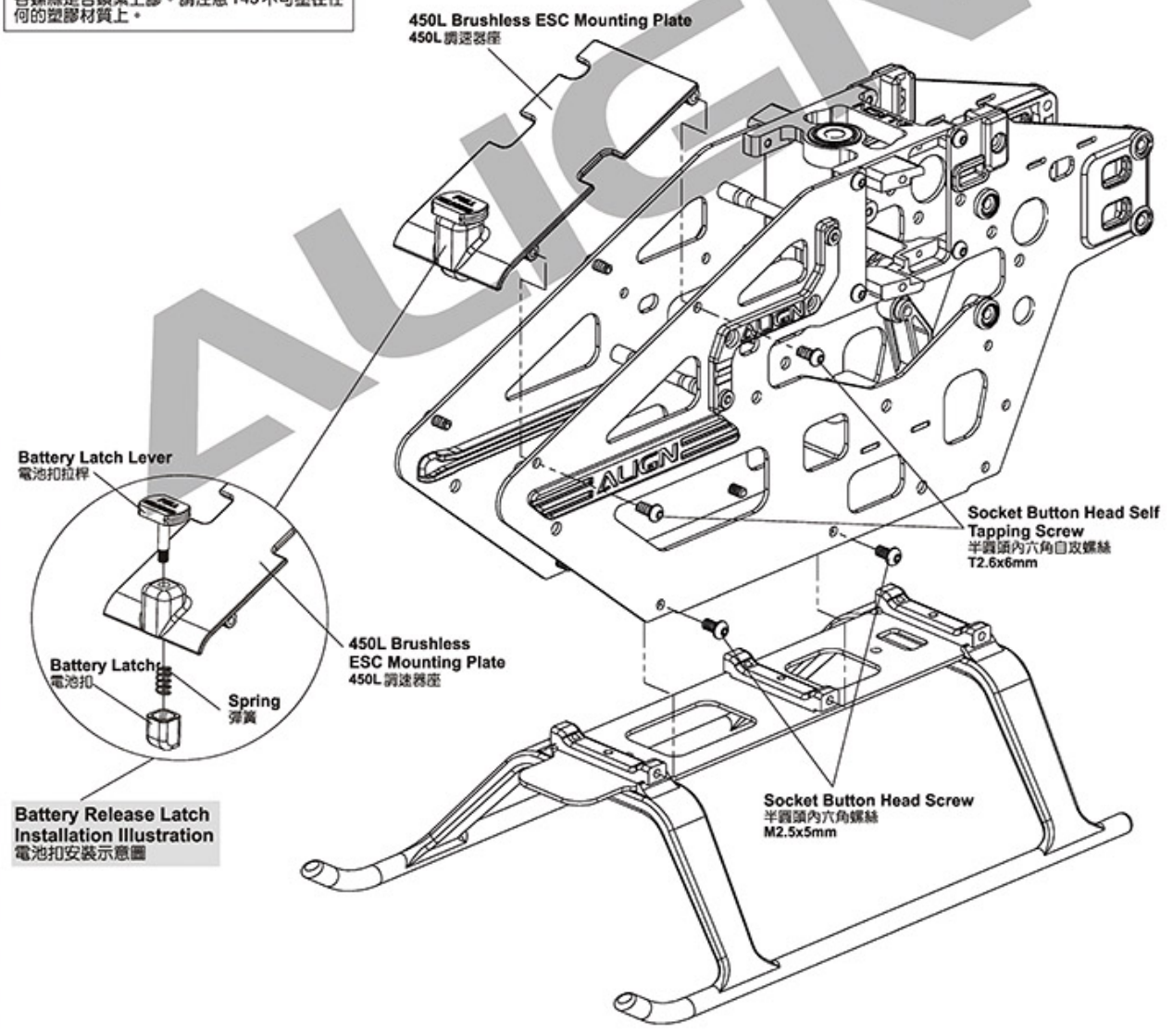
Apply a small amount of T43 thread lock when fixing a metal part.
螺絲鎖附於金屬件請使用適量T43(螺絲膠)。

CAUTION 注 意

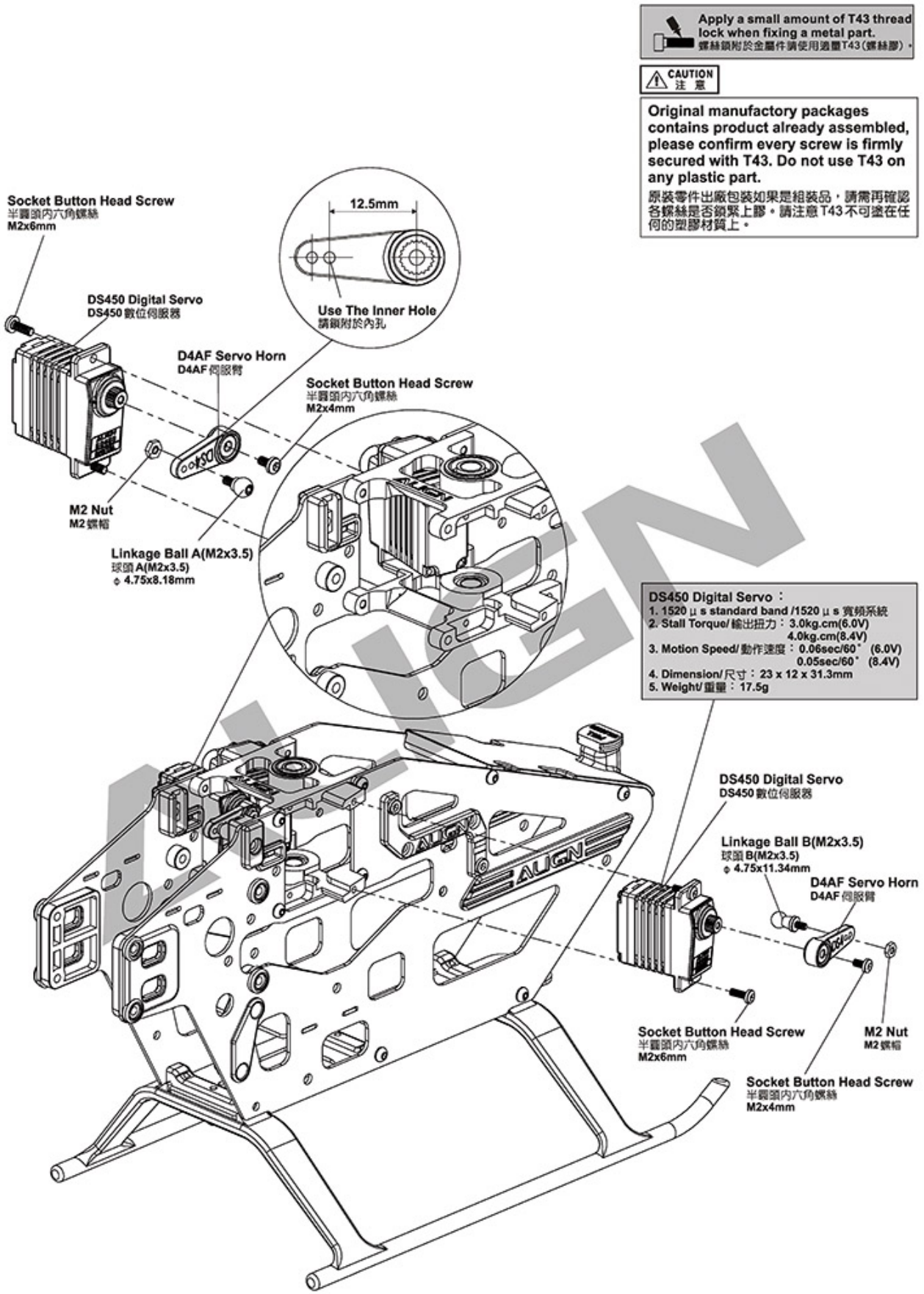
Original manufactory packages contains product already assembled, please confirm every screw is firmly secured with T43. Do not use T43 on any plastic part.
原裝零件出廠包裝如果是組裝品，請需再確認各螺絲是否鎖緊上膠。請注意T43不可塗在任何的塑膠材質上。

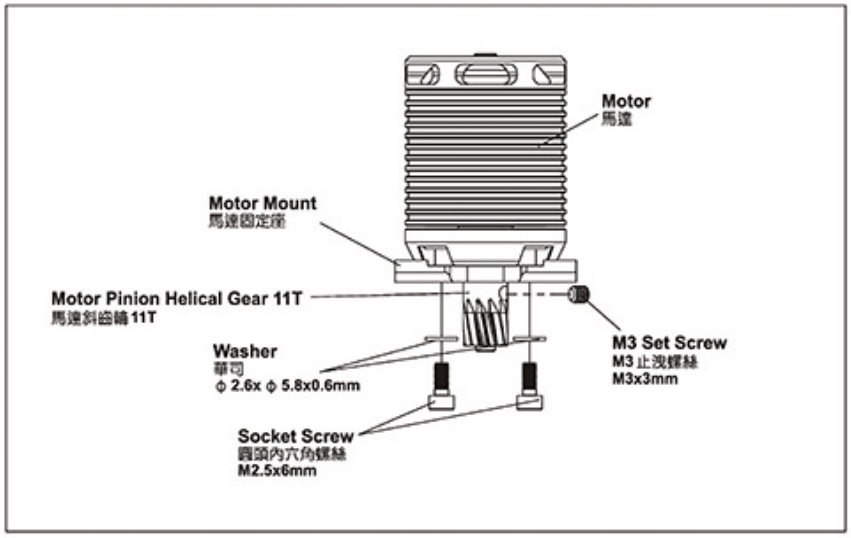
Recommend sanding the marked position with a waterproof abrasive paper (#800-1000) as below illustration to avoid the wires of electric parts to be cut.
建議於下圖色塊標示處，可使用#800～1000水砂紙打磨，可防止電子設備電線被割破。





Battery Release Latch Installation Illustration
電池扣安裝示意圖


Apply a small 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
Original manufactory packages contains product already assembled, please confirm every screw is firmly secured with T43. Do not use T43 on any plastic part.
原裝零件出廠包裝如果是組裝品，請需再確認各螺絲是否鎖緊上膠。請注意T43不可塗在任何的塑膠材質上。
Socket Button Head Screw
半圓頭內六角螺絲
M2x6mm
12.5mm
Use The Inner Hole
請鎖附於內孔
DS450 Digital Servo
DS450 數位伺服器
D4AF Servo Horn
D4AF 伺服臂
Socket Button Head Screw
半圓頭內六角螺絲
M2x4mm
M2 Nut
M2 螺帽
Linkage Ball A(M2x3.5)
球頭 A(M2x3.5)
ϕ 4.75x8.18mm
DS450 Digital Servo：
1. 1520 μ s standard band /1520 μ s 寬頻系統
2. Stall Torque/ 輸出扭力：3.0kg.cm(6.0V)
4.0kg.cm(8.4V)
3. Motion Speed/ 動作速度：0.06sec/60˚ (6.0V)
0.05sec/60˚ (8.4V)
4. Dimension/ 尺寸：23 x 12 x 31.3mm
5. Weight/ 重量：17.5g
DS450 Digital Servo
DS450 數位伺服器
Linkage Ball B(M2x3.5)
球頭 B(M2x3.5)
ϕ 4.75x11.34mm
D4AF Servo Horn
D4AF 伺服臂
Socket Button Head Screw
半圓頭內六角螺絲
M2x6mm
M2 Nut
M2 螺帽
Socket Button Head Screw
半圓頭內六角螺絲
M2x4mm



Apply a small 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

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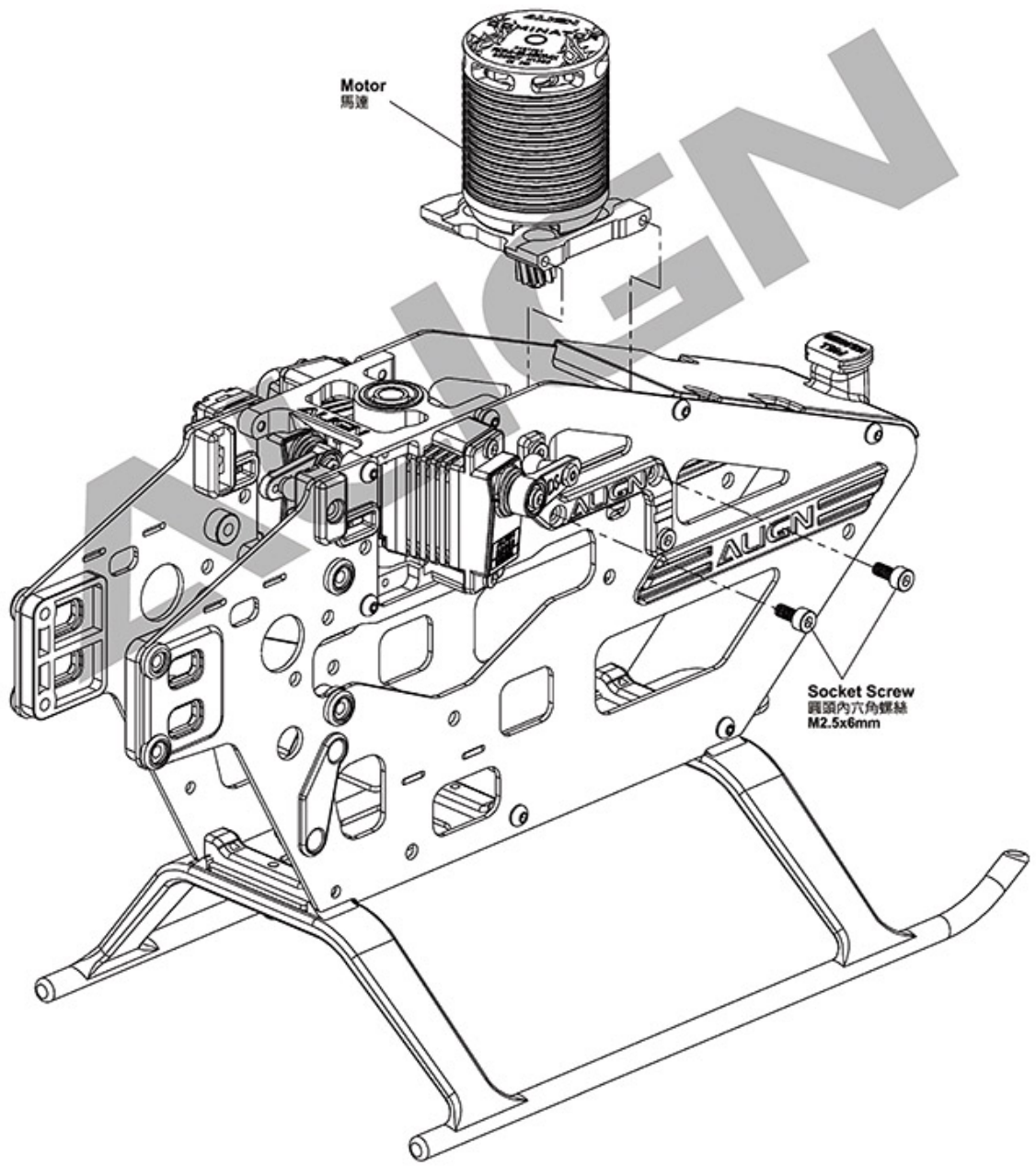

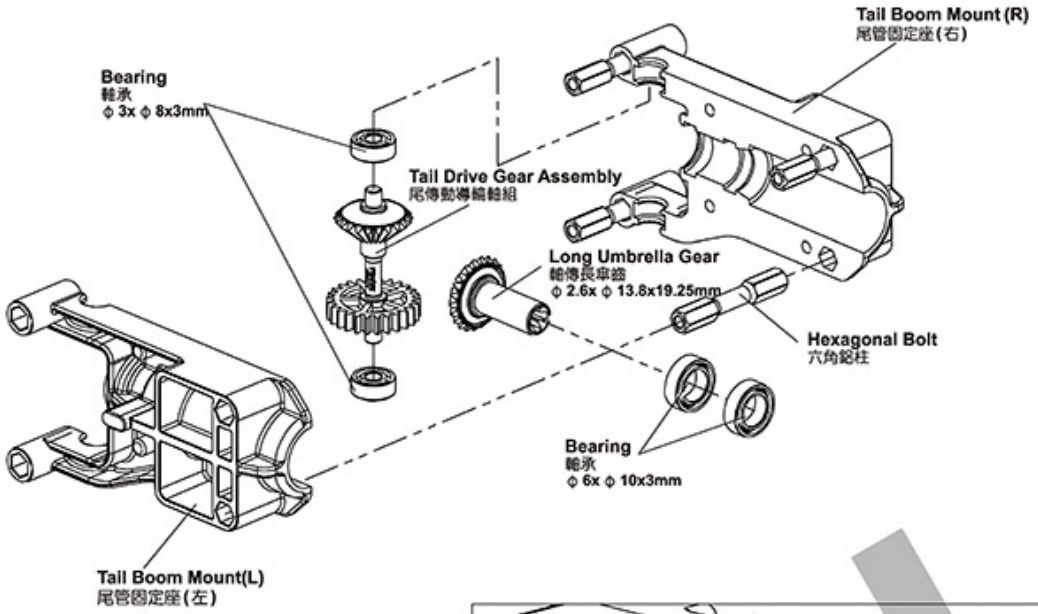

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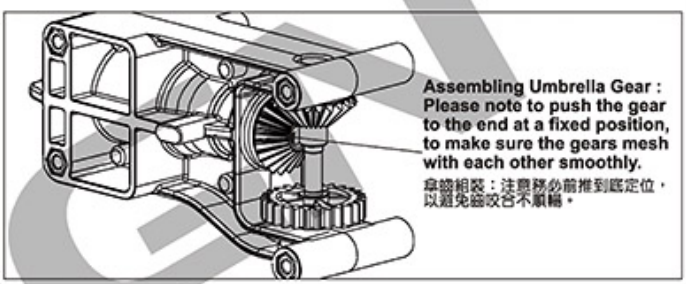
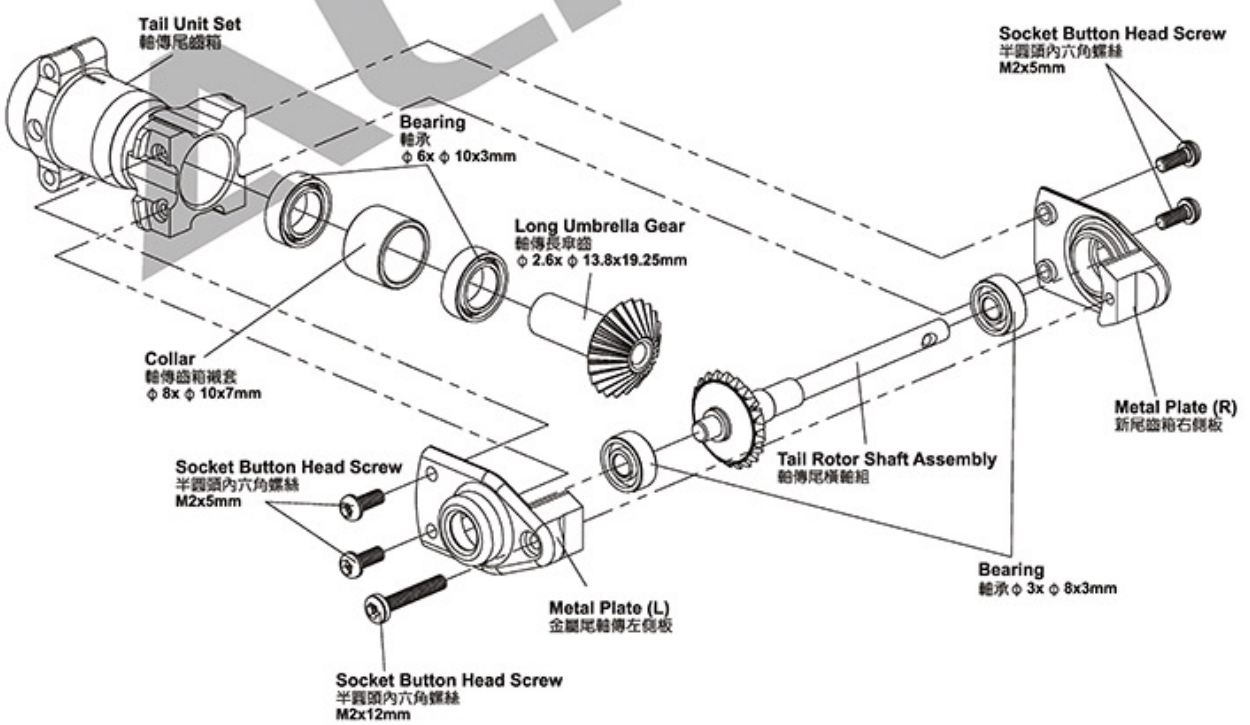


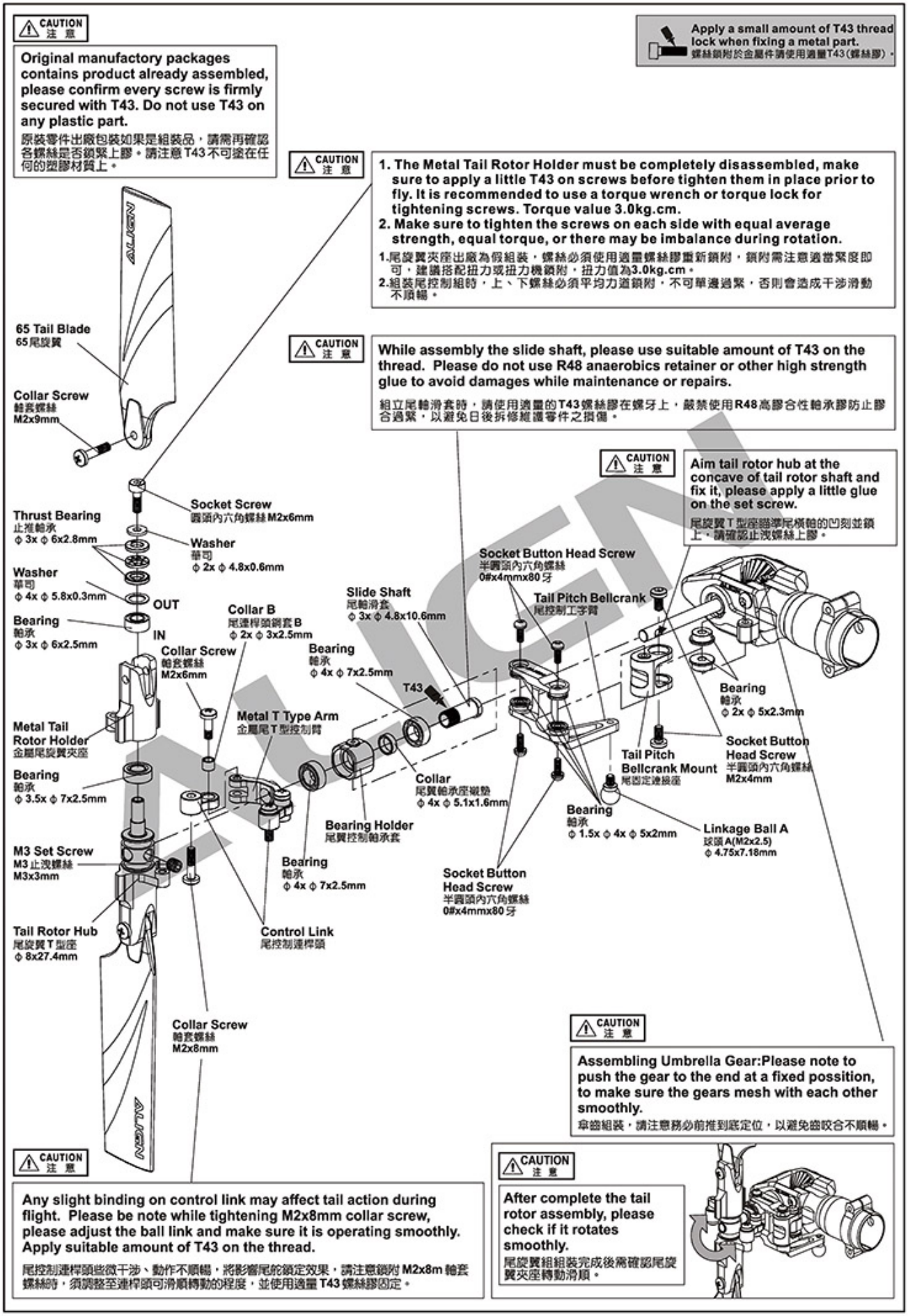
Assembling Umbrella Gear : Please note to push the gear to the end at a fixed position, to make sure the gears mesh with each other smoothly.

傘齒組裝：注意務必前推到底定位，以避免齒咬合不順暢。



Apply a small 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)。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原裝零件出廠包裝如果是組裝品，請需再確認各螺絲是否鎖緊上膠。請注意T43不可塗在任何的塑膠材質上。
Apply a small 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
1. The Metal Tail Rotor Holder must be completely disassembled, make sure to apply a little T43 on screws before tighten them in place prior to fly. It is recommended to use a torque wrench or torque lock for tightening screws. Torque value 3.0kg.cm.
2. Make sure to tighten the screws on each side with equal average strength, equal torque, or there may be imbalance during rotation.
1.尾旋翼夾座出廠為假組裝，螺絲必須使用適量螺絲膠重新鎖附，鎖附需注意適當緊度即可，建議搭配扭力或扭力機鎖附，扭力值為3.0kg.cm。
2.組裝尾控制組時，上、下螺絲必須平均力道鎖附，不可單邊過緊，否則會造成干涉滑動不順暢。
CAUTION 注 意
While assembly the slide shaft, please use suitable amount of T43 on the thread. Please do not use R48 anaerobics retainer or other high strength glue to avoid damages while maintenance or repairs.
組立尾軸滑套時，請使用適量的T43螺絲膠在螺牙上，嚴禁使用R48高膠合性軸承膠防止膠合過緊，以避免日後拆修維護零件之損傷。
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型座瞄準尾槓軸的凹刻並鎖上，請確認止洩螺絲上膠。
65 Tail Blade
65尾旋翼
Collar Screw
軸套螺絲
M2x9mm
Socket Screw
圓頭內六角螺絲 M2x6mm
Thrust Bearing
止推軸承
ϕ 3x ϕ 6x2.8mm
Washer
華司
ϕ 2x ϕ 4.8x0.6mm
Washer
華司
ϕ 4x ϕ 5.8x0.3mm
OUT
IN
Bearing
軸承
ϕ 3x ϕ 6x2.5mm
Collar Screw
軸套螺絲
M2x6mm
Collar B
尾連桿頭鋼套B
ϕ 2x ϕ 3x2.5mm
Slide Shaft
尾軸滑套
ϕ 3x ϕ 4.8x10.6mm
Bearing
軸承
ϕ 4x ϕ 7x2.5mm
T43
Socket Button Head Screw
半圓頭內六角螺絲
0#x4mmx80牙
Tail Pitch Bellcrank
尾控制工字臂
Bearing
軸承
ϕ 2x ϕ 5x2.3mm
Socket Button Head Screw
半圓頭內六角螺絲
M2x4mm
Tail Pitch Bellcrank Mount
尾固定連接座
Metal Tail Rotor Holder
金屬尾旋翼夾座
Metal T Type Arm
金屬尾T型控制臂
Bearing
軸承
ϕ 3.5x ϕ 7x2.5mm
Collar
尾翼軸承座墊
ϕ 4x ϕ 5.1x1.6mm
Bearing
軸承
ϕ 1.5x ϕ 4x ϕ 5x2mm
Linkage Ball A
球頭A(M2x2.5)
ϕ 4.75x7.18mm
Bearing Holder
尾翼控制軸承套
M3 Set Screw
M3 止洩螺絲
M3x3mm
Bearing
軸承
ϕ 4x ϕ 7x2.5mm
Socket Button Head Screw
半圓頭內六角螺絲
0#x4mmx80牙
Tail Rotor Hub
尾旋翼T型座
ϕ 8x27.4mm
Control Link
尾控制連桿頭
Collar Screw
軸套螺絲
M2x8mm
CAUTION 注 意
Assembling Umbrella Gear:Please note to push the gear to the end at a fixed possition, to make sure the gears mesh with each other smoothly.
傘齒組裝，請注意務必前推到底定位，以避免齒咬合不順暢。
CAUTION 注 意
Any slight binding on control link may affect tail action during flight. Please be note while tightening M2x8mm collar screw, please adjust the ball link and make sure it is operating smoothly. Apply suitable amount of T43 on the thread.
尾控制連桿頭些微干涉、動作不順暢，將影響尾舵鎖定效果，請注意鎖附 M2x8m 軸套螺絲時，須調整至連桿頭可滑順轉動的程度，並使用適量 T43 螺絲膠固定。
CAUTION 注 意
After complete the tail rotor assembly, please check if it rotates smoothly.
尾旋翼組組裝完成後需確認尾旋翼夾座轉動滑順。

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

When assembling into the tail boom, please apply some oil on the surface,to make it smooth during the assembling and keep it vertical with the torque tube for smooth rotation.
插入尾管內時，外表抹些潤滑油，以確保平順壓入尾管中並與尾傳動軸保持垂直，讓尾軸傳動順暢。

Apply a small 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)。

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When assembling the tail boom, please aim at the fixing hole ϕ 3.
裝入尾管時請注意孔對準尾管ϕ3固定孔

Tail Control Guide
尾控制桿固定環

Ball Link
連桿頭

Tail Boom
尾管 387mm

Socket Screw
圓頭內六角螺絲
M2x12mm

Torque Tube
尾傳動軸桿

Horizontal Stabilizer
水平翼

Stabilizer Mount (Upper)
水平翼固定上座

Tail Boom Brace Set
尾管支撐組

Rudder Control Rod
尾舵控制連桿
ϕ 1.3x375mm

Metal Stabilizer Mount (Lower)
金屬水平翼固定下座

Socket Button Head Screw
半圓頭內六角螺絲
M2.5x6mm

Vertical Stabilizer Mount
垂直固定座

Socket Screw
圓頭內六角螺絲
M2x18mm

470 Vertical Stabilizer
470 垂直翼

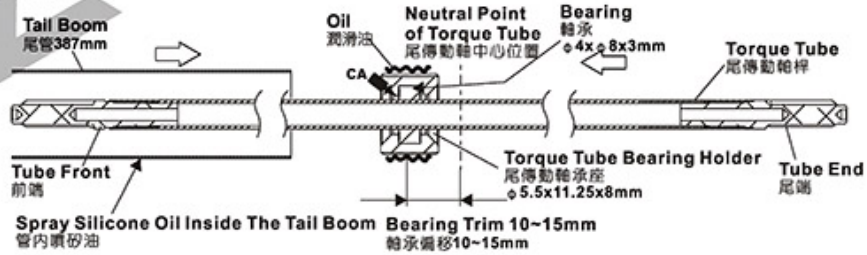
Ball Link
連桿頭

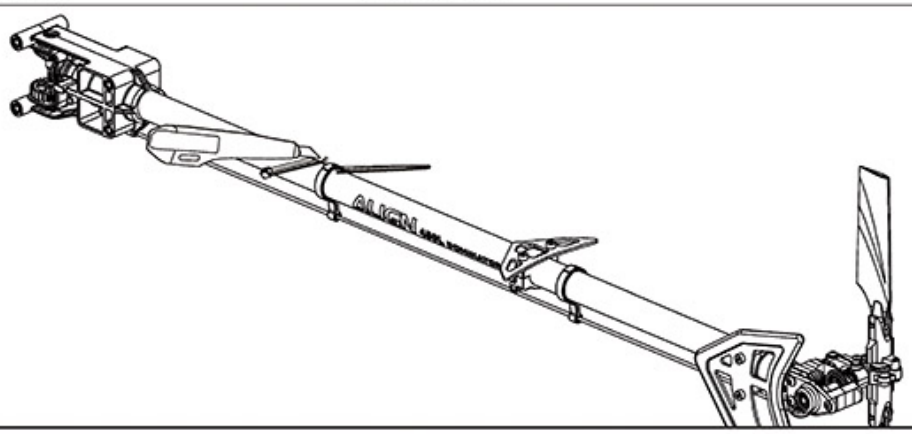
Before assembling, please wrap the tail boom with a scotch tape (Thickness 0.03~0.05mm) to avoid the mount slipping.
安裝前請先用透明膠帶(0.03~0.05mm厚)包覆尾管，可防止固定座滑動。

TIP TO FIX THE TORQUE TUBE 傳動軸軸承固定位要領

Please apply some CA glue to fix bearing on the torque tube, avoid CA glue from the dust or may cause the bearing stuck. When assembling into the tail boom, please apply some oil and use the attached torque tube mount helper to press the bearing holder of the torque tube into the tail boom horizontally.

請以少量CA將軸承固定於尾傳動軸上，避免CA沾到軸承的防塵蓋而導致軸承卡死，插入尾管內時，尾傳動軸承墊圈外表抹些潤滑油，利用隨附軸承座安裝套管將尾傳動軸承墊圈平行壓入尾管中不可歪斜。





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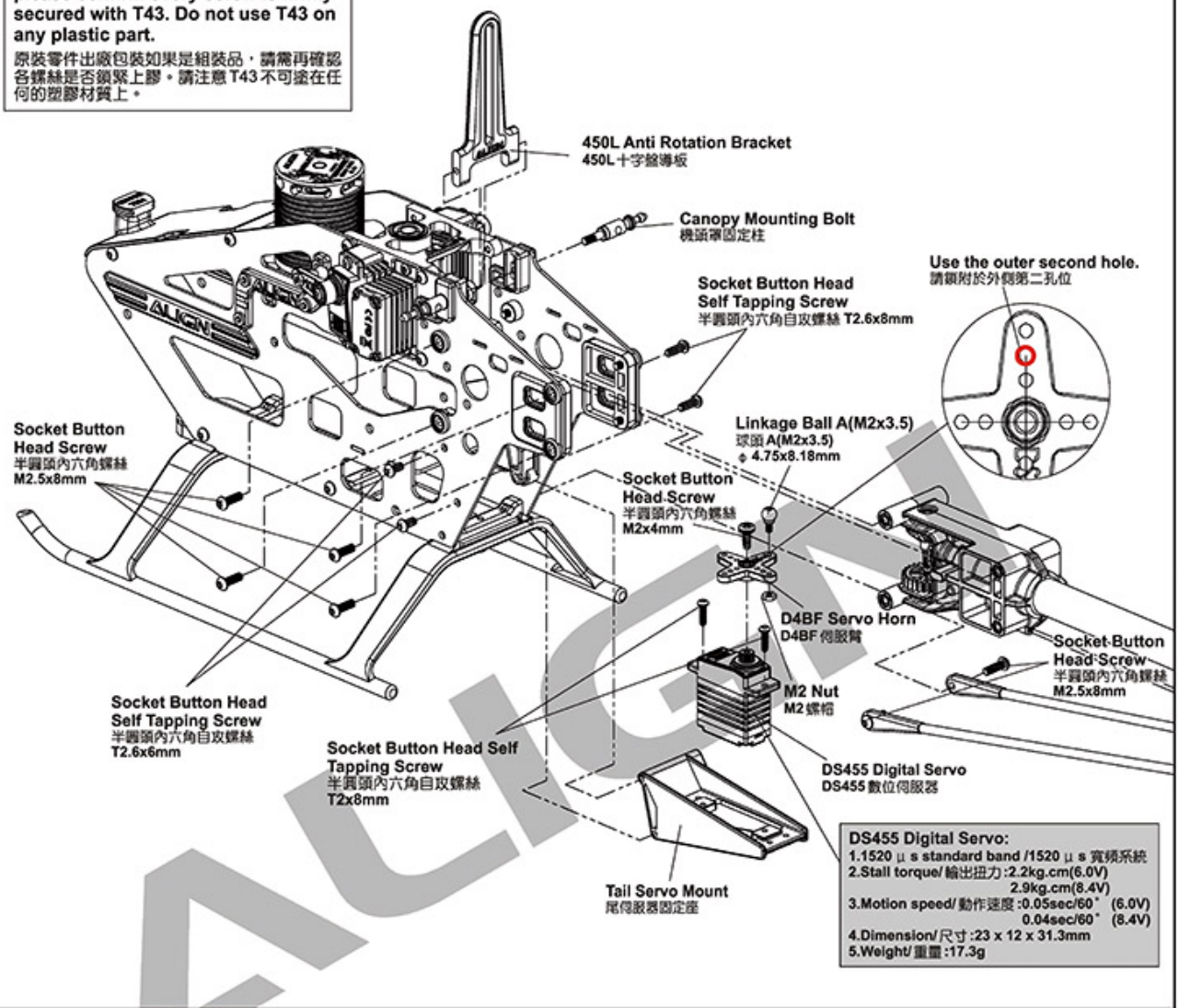
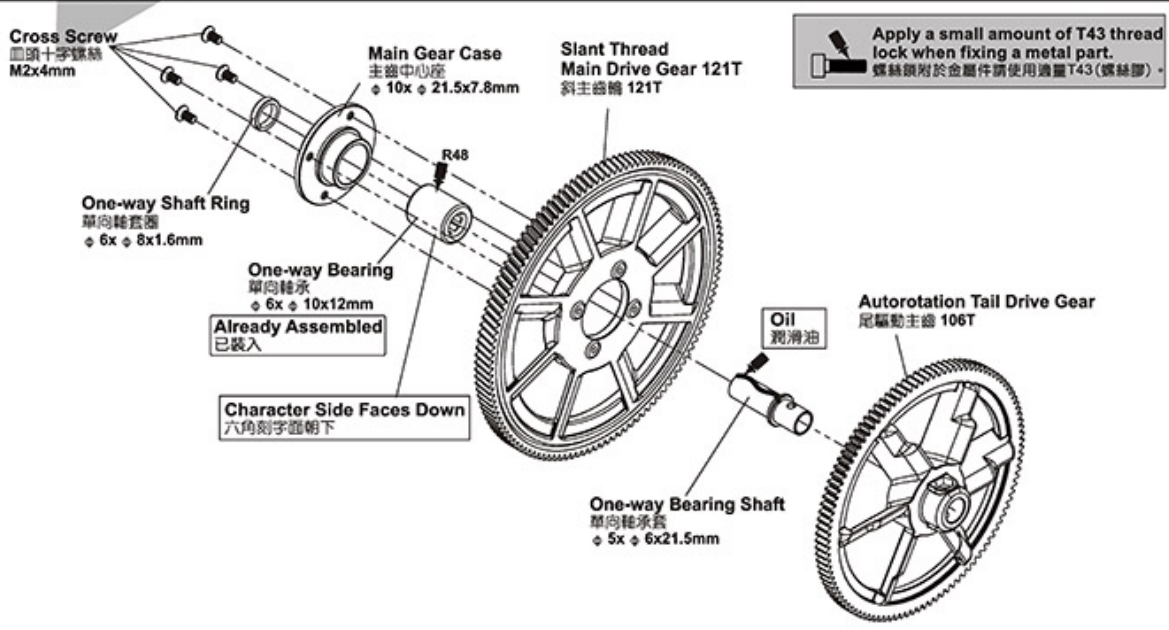


DS455 Digital Servo:
1.1520 μ s standard band /1520 μ s 寬頻系統
2.Stall torque/ 輸出扭力:2.2kg.cm(6.0V)
2.9kg.cm(8.4V)
3.Motion speed/ 動作速度:0.05sec/60° (6.0V)
0.04sec/60° (8.4V)
4.Dimension/ 尺寸:23 x 12 x 31.3mm
5.Weight/ 重量:17.3g



When tightening the main blade fixing screw, please tighten it firmly, but not over tighten, or it may cause the damage of main blade holder and result in danger.
鎖緊主旋翼螺絲須注意適當緊度即可，過緊可能導致主旋翼夾座受損，飛行意外發生。

Apply a small 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)。

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Socket Collar Screw
圓頭內六角輪套螺絲
M3x16mm

325 Carbon Fiber Blades
325 碳纖主旋翼

M3 Nut
M3防鬆螺帽

Linkage Rod (M)
連桿(M)

Linkage Rod (M)
Approx. 32.5mm x 3
連桿(M)約32.5mm x 3

10.5mm

19mm

Please add a main shaft spacer if necessary.
依需求加裝主軸墊片
ϕ 5x ϕ 9 x 0.1mm
ϕ 5x ϕ 9 x 0.2mm

[H45191]
Swashplate Leveler
十字盤校正器
Optional Equipment
另購品

Main Shaft
主軸

Horizontally Level
水平

Swashplate
十字盤

CAUTION 注意

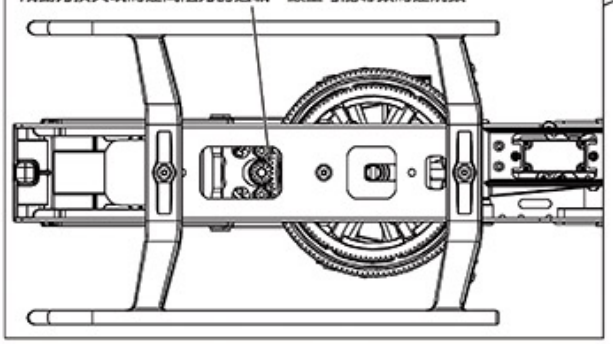
While using Flybarless system, please use the swashplate leveler to calibrate swashplate. Adjust the length of servo linkage rod to make sure the swashplate is leveled before start setting up to ensure the gyro provides the best performance.
使用無平衡系統，請務必使用十字盤調整器校正十字盤，調整伺服器連桿長度，確保十字盤達到水平狀態，再進基本機體設定，這樣才能確保飛行性能達到最佳效果。

Slant Thread Main Drive Gear Set
斜主齒輪組

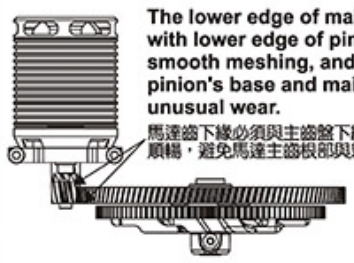
Socket Collar Screw
圓頭內六角輪套螺絲
M2x12mm

M2 Nut
M2螺帽

Set the motor pinion gear to main drive gear mesh to approximately 0.1mm to avoid excess power consumption motor burnt due to overload.
馬達前後可移動以保持兩齒輪咬合處約有0.1mm間隙，過緊齒咬合將造成動力損失或馬達高阻力的過載，嚴重可能導致馬達燒毀。



Please do not over tighten, a over tighten may cause the autorotation tail drive gear deformed.
請以適當扭力鎖附即可，過度鎖緊易造成尾驅動主齒變形。



The lower edge of main gear need to be lined up with lower edge of pinion gear. This will ensure smooth meshing, and avoid interference between pinion's base and main gear which can lead to unusual wear.
馬達齒下緣必須與主齒盤下緣水平切齊，如此才能確保齒輪傳動順暢，避免馬達主齒根部與新型斜主齒輪產生異常干涉磨損。

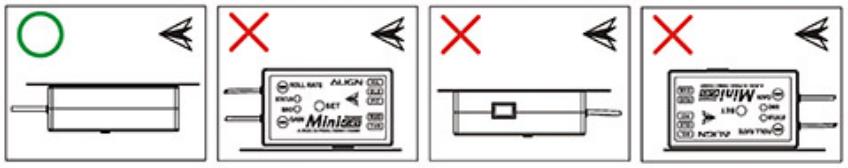
CAUTION 注意

A MOUNTING ORIENTATION OF MINIGRS FLYBARLESS SYSTEM MINIGRS無平衡翼系統的安裝方向

Please visit Align download area to get the completed instruction manual at Align website.

更多詳細的設定操作說明請至官網下載專區下載。

http://www.align.com.tw/download-en/minigrs/



1. MiniGRS Flybarless System can only be installed face down, with antenna point towards front of the helicopter.
2. Incorrect installation will cause incorrect compensation of the helicopter swashplate. Flying with incorrect installation will result in crash.

1. MiniGRS 無平衡翼系統的安裝方式只有一種，必須為面板朝下且天線朝向機頭方向。
2. 安裝錯誤會造成直昇機十字盤修正錯誤，強行飛行會有墜機的危險。

Apply a small 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)。

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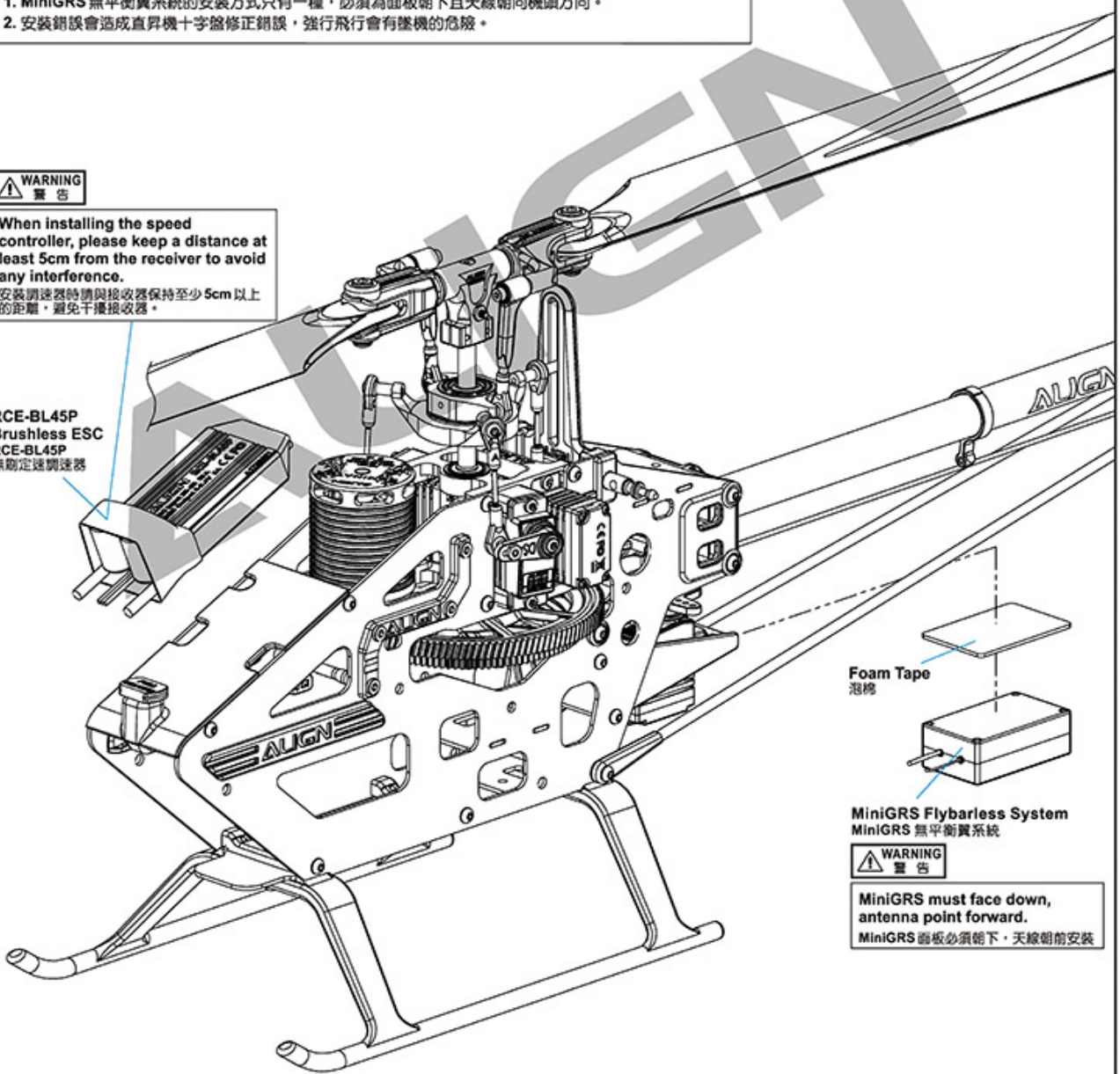
WARNING 警告

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

安裝調速器時請與接收器保持至少 5cm 以上的距離，避免干擾接收器。

RCE-BL45P
Brushless ESC
RCE-BL45P
無刷定速調速器



Foam Tape
泡棉

MiniGRS Flybarless System
MiniGRS 無平衡翼系統

WARNING 警告

MiniGRS must face down, antenna point forward.

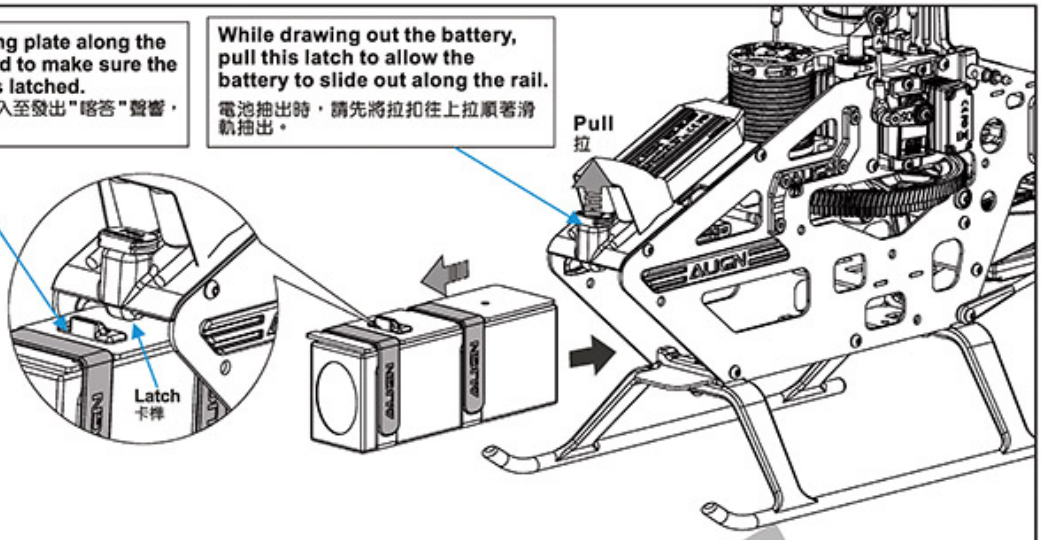
MiniGRS 面板必須朝下，天線朝前安裝

BATTERY INSTALLATION ILLUSTRATION 電池安裝示意圖

ALIGN

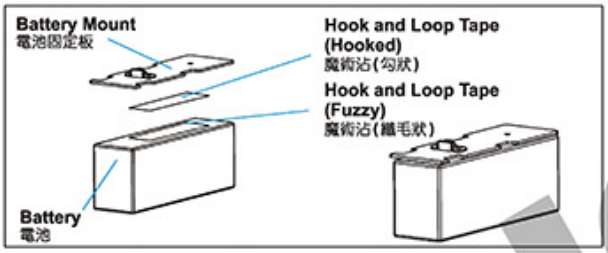
Slide the battery mounting plate along the rail until a "click" is heard to make sure the battery mounting plate is latched.
將電池固定板順著電池滑軌裝入至發出"喀答"聲響，使電池固定板卡入卡榫。

While drawing out the battery, pull this latch to allow the battery to slide out along the rail.
電池抽出時，請先將拉扣往上拉順著滑軌抽出。



CAUTION 注意

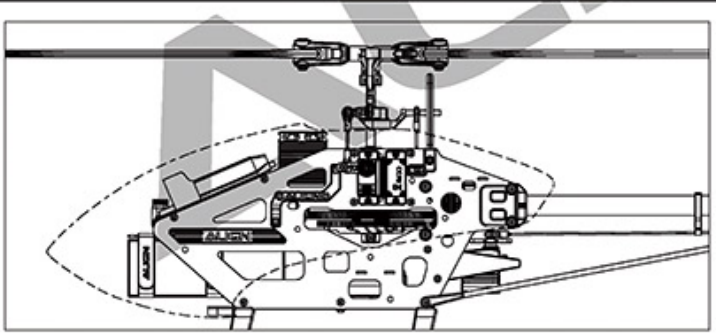
Please attach the hook & loop tape to narrow side of battery.
魔術沾請黏貼在電池的較窄面。

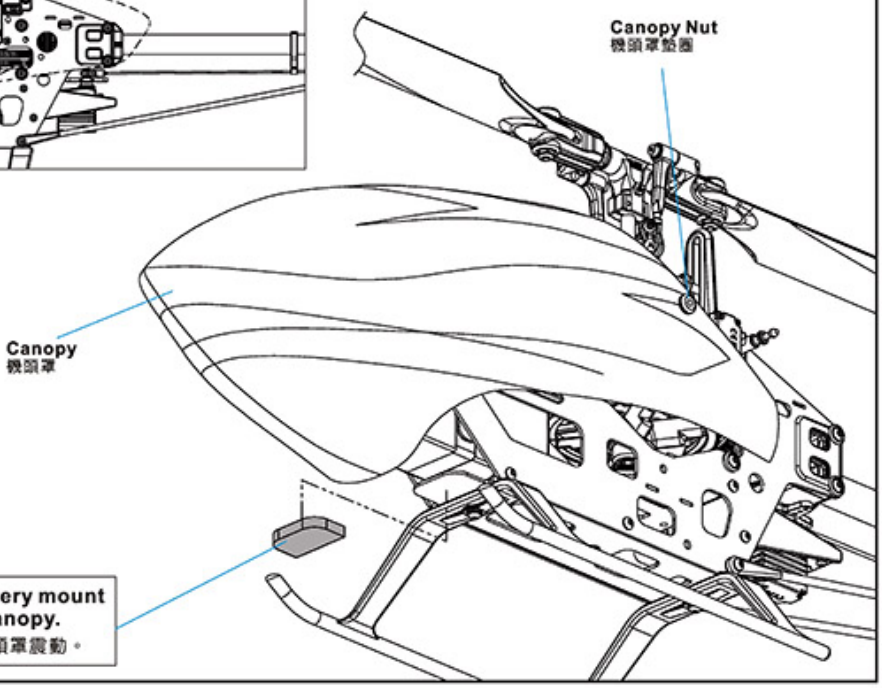


Use the included hook & loop strap to fix the battery in place. Start the strap 1cm below the battery mounting plate, go down along the battery until it wraps around completely. The end of the strap also needs to be 1 cm away from the battery mounting plate.
以附贈的魔術束帶來固定電池。束帶需從電池板下方1公分處，沿電池由下往上方式綁，最後束帶末端也要離電池板1公分。

CANOPY ASSEMBLY 機頭罩安裝

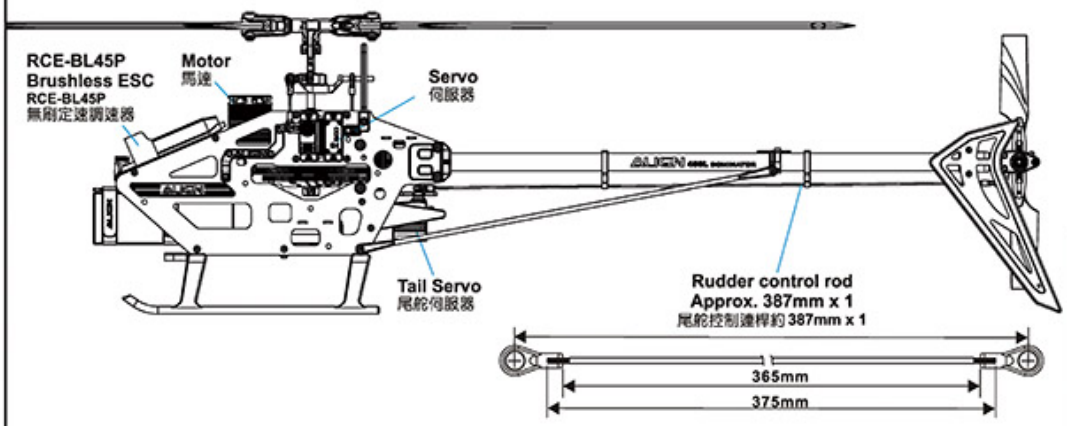
ALIGN





Using the included foam tape on battery mount will effectively reduce vibration of canopy.
以隨附泡棉膠固定於電池座，能有效降低機頭罩震動。

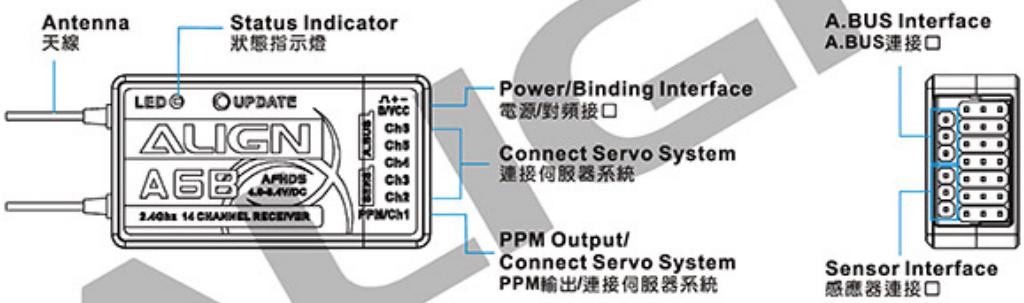
ELECTRIC EQUIPMENT ILLUSTRATION 電子設備建議配置圖示



Quick Finder
零件快速購

A6B RECEIVER USER MANUAL A6B接收機使用說明

RECEIVER SETUP INDICATORS 接收機各部位名稱



PPM/CH1 : Connect CH1 servo or PPM output signal.
CH2~CH6 :The interface connect servo, power and other accessories.
B/VCC : Using binding wire when binding; using power cord when normal operating, power range is 4.0~8.4V.
A.BUS: For output A.BUS signal.
SENS : for connecting sensor.

PPM/CH1：連接CH1通道的伺服器或輸出PPM信號
CH2~CH6：接口可以連接伺服器、電源或其他零件
B/VCC：對頻時用於連接對頻線，正常操作時用於連接電源線，供電範圍值在4.0~8.4V。
A-BUS：用於連接A-BUS接收機擴充通道。
SENS：用於連接各感應器。

USER NOTICE 使用注意事項

WARNING 警告

1. **After the linking is done, please cycle receiver power and check if the receiver to be linked is really under the control by the transmitter to be linked.**
2. **Please do not perform the linking procedure with motor's main wire is connected as it may result in serious injury.**
3. **To ensure signal receiption quality, please make sure to keep electronics governor and other metal parts away when installing receiver.**

1. 完成對頻後，請重開接收器電源，並確認接收器是否與遙控器完成正確對頻。
2. 在對頻的過程中，請勿將馬達主電源接上，馬達可能會意外運轉造成嚴重傷害。
3. 為確保訊號質量，安裝接收器時請盡量避開電子調速器及其他金屬零件。

RECEIVER ANTENNA 接收機天線

To ensure signal receiption quality, please make sure to keep electronics governor and other metal parts away when installing receiver.

為確保訊號質量，安裝接收機時請盡量避開電子調速器及其他金屬零件。

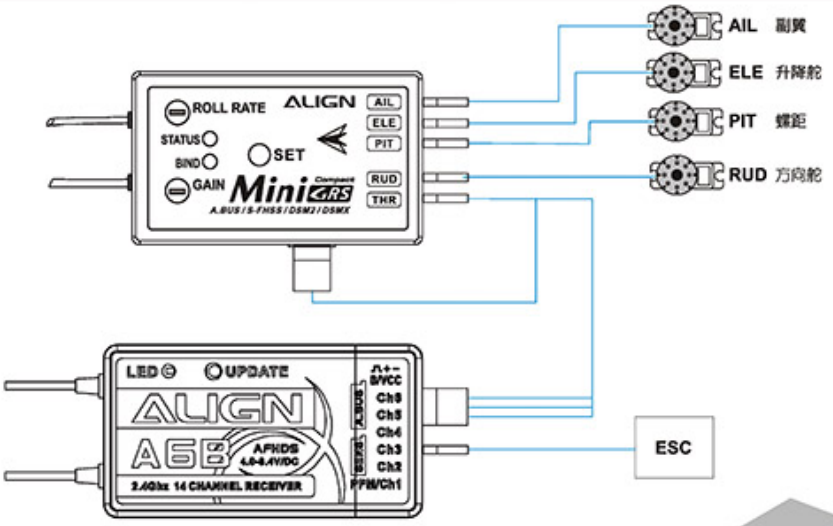
STATUS INDICATOR 狀態指示燈

The status indicator showes current battery voltage and work status of the receiver.

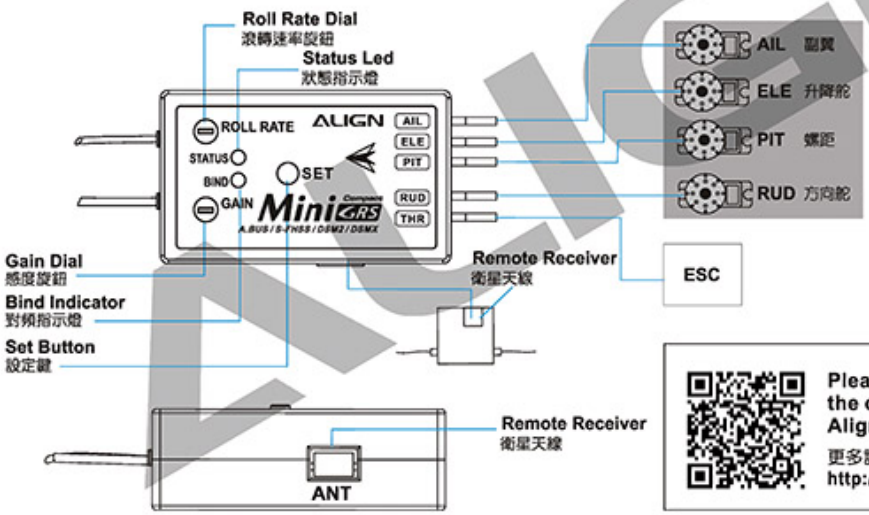
狀態指示燈用於指示接收器電源以及工作狀態

LED Off 燈號熄滅	**Power disconnected.** 接收器電源未連接
Red Solid Light 紅燈恆亮	**Power on and working.** 接收器已連接電源，並正常運作。
Fast Flashing 快速閃爍	**Binding** 接收器處於對頻狀態。
Flashing Slowly 慢速閃爍	**The pairing transmitter is off or loss of signal.** 已配對的遙控器未開機，或訊號遺失。

ALIGN A10 TRANSMITTER、MINIGRS FLYBARLESS SYSTEM WIRING & A6B RECEIVER WIRING
ALIGN A10遙控器、A6B接收機與MINIGRS無平衡翼系統接收器接線示意圖



FUTABA TRANSMITTER、REMOTE RECEIVERS & MINIGRS FLYBARLESS SYSTEM WIRING DIAGRAM
FUTABA遙控器、衛星天線與MINIGRS無平衡翼系統接收器接線示意圖



Please visit Align download area to get the completed instruction manual at Align website.

更多詳細的設定操作說明請至官網下載專區下載。
http://www.align.com.tw/download-en/minigrs/

USER NOTICE 使用注意事項

WARNING 警告

1. Gain rate dial is set to 50% as factory default (dial at 12 o'clock position ; 6 o'clock position for the antenna). Roll rate dial is set to minimum value (dial at 7 o'clock position). Should there be any oscillation on aileron or elevator during flight, reduce the gain by turning the dial counter-clockwise approximately 10 degrees at a time.
2. Should there be any drift front/rear/left/right during flight, increase the gain by turning the dial clockwise approximately 10 degrees at a time.
3. Roll rate dial is used to adjust the roll rate of helicopter's elevator and aileron; turning clockwise will increase roll rate, with faster elevator and aileron response; turning counter-clockwise will decrease roll rate, with slower elevator and aileron response. We recommend novice pilots to fly with lower roll rate.
4. Any over use, incorrect setup, missassembly, incorrect modification or misuse will lead to abnormal voltage, electronic devices damage, structural interference, and insufficient power supply. Make sure to carefully check every assembly and setup refer to the manual instruction prior to every flight to prevent any unforeseen danger.

1. 感度旋鈕出廠設定值為50%(旋鈕指向12點鐘方向、天線位置為6點鐘方向)，滾轉速度旋鈕出廠設定值為最小(旋鈕指向7點鐘方向)，飛行時若機體有左右或前後抖動，表示感度偏高，請逆時針調整感度旋鈕，以每次調整約10度方式，調整至適當位置。
2. 飛行時若機體有左右或前後飄移時，表示感度偏低，請順時針調高感度旋鈕，以每次10度方式調整至適當位置。
3. 滾轉速率旋鈕為調整直昇機升降、副翼滾轉速率，往順時針調大滾轉速率，升降與副翼反應會變快，往逆時針調低滾轉速率，升降與副翼反應會變慢，初階入門者建議把滾轉速率調低飛行。
4. 任何電子配件、零件的設定、組裝、修改或操作不良所造成的電壓異常、電子零件損壞，即可能造成供電不穩定等問題，每趟飛行前須注意仔細檢查，防止機件及電子零件故障而引發不可預期的意外。

FEATURES 產品特色

- **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。
- **Utilizes MEMS gyro sensors, which feature small footprint, high reliability, and excellent stability.**
  採用MEMS（Micro Electro Mechanical Systems）微機電系統技術感測器，具有體積小，可靠性高，穩定性佳的優點。
- **Sensor with 12 bit ultra high resolution, resulting in highly precise controls.**
  感測器12位元，超高解析度，控制細膩精準。
- **Supports Futaba S-FHSS 2.4GHz transmission protocol.**
  支援Futada S-FHSS 2.4GHz傳輸系統。
- **Supports ALIGN A10 Radio Control System.**
  支援ALIGN A10遙控器。
- **Supports Spektrum and JR satellite receivers.**
  支援SPEKTRUM與JR衛星天線。
- **Simplistic setup process without the need of external devices. Setup is done through 6 steps and 2 sensitivity adjustments.**
  設定簡單不需額外的介面，只需六個步驟、兩個感度調整即可完成所有設定。
- **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。
- **Highly sensitive gyroscopic sensors combined with advanced control detection routine providing higher hovering and aerobatic stability than other flybarless system.**
  高感度陀螺感測器及先進環路設計，可提供比一般平衡翼系統更佳的靜態及動態穩定性。
- **Designed specifically for T-REX 250 、T-REX 450 、T-REX 470and T-REX 500, contains optimal flight parameters, no adjustments is needed out of the box to achieve superior flight performance.**
  針對T-REX 250、T-REX 450、T-REX 470、T-REX 500設計，內建最佳飛行參數，不需調整即有優異性能表現。
- **Capable to operate between 3.5V to 8.4V, compatible with high voltage servos.**
  適用電壓3.5V～8.4V，支援高電壓伺服器。
- **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。
- **RoHS certified.**
  符合RoHS限用規章。

MINIGRS FLYBARLESS SYSTEM SETUP INDICATORS MINIGRS無平衡翼系統功能設定指示燈說明

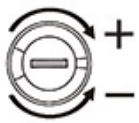
FLYBARLESS SYSTEM SETUP MODE 無平衡翼系統設定模式

Flash 1 time: Aileron neutral point	閃爍頻率一次：副翼伺服器中立點設定
Flash 2 times: Elevator neutral point	閃爍頻率二次：升降伺服器中立點設定
Flash 3 times: Pitch neutral point	閃爍頻率三次：螺距伺服器中立點設定
Flash 4 times: Rudder neutral point	閃爍頻率四次：尾舵陀螺儀正反向設定
Flash 5 times: Rudder left travel limit setting	閃爍頻率五次：尾舵左舵行程設定
Flash 6 times: Rudder right travel limit setting	閃爍頻率六次：尾舵右舵行程設定

BIND LED 對頻燈號

STEADY LIT GREEN LED :Radio binding successfully	綠燈恆亮：對頻成功
FLASHING GREEN LED : Radio binding failed	綠燈閃爍：對頻失敗
STEADY LIT RED LED : No signal detected	紅燈恆亮：無發射訊號

ROLL RATE ADJUSTMENT DIAL 滾轉速率調整鈕

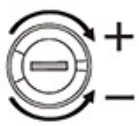


Roll Rate Dial
滾轉速率旋鈕

Roll rate dial is used to adjust the roll rate of helicopter's elevator and aileron; turning clockwise will increase roll rate, with faster elevator and aileron response; turning counter-clockwise will decrease roll rate, with slower elevator and aileron response. We recommend novice pilots to fly with lower roll rate.

滾轉速率旋鈕為調整直昇機升降、副翼滾轉速率，往順時針調大滾轉速率，升降與副翼反應會變快，往逆時針調低滾轉速率，升降與副翼反應會變慢，初階入門者建議把滾轉速率調低飛行。

GAIN ADJUSTMENT DIAL 感度調整旋鈕



Gain Dial
感度旋鈕

Should there be any oscillation on aileron or elevator during flight, reduce the gain by turning the dial counter-clockwise approximately 10 degrees at a time.
Should there be any drift front/rear/left/right during flight, increase the gain by turning the dial clockwise approximately 10 degrees at a time.

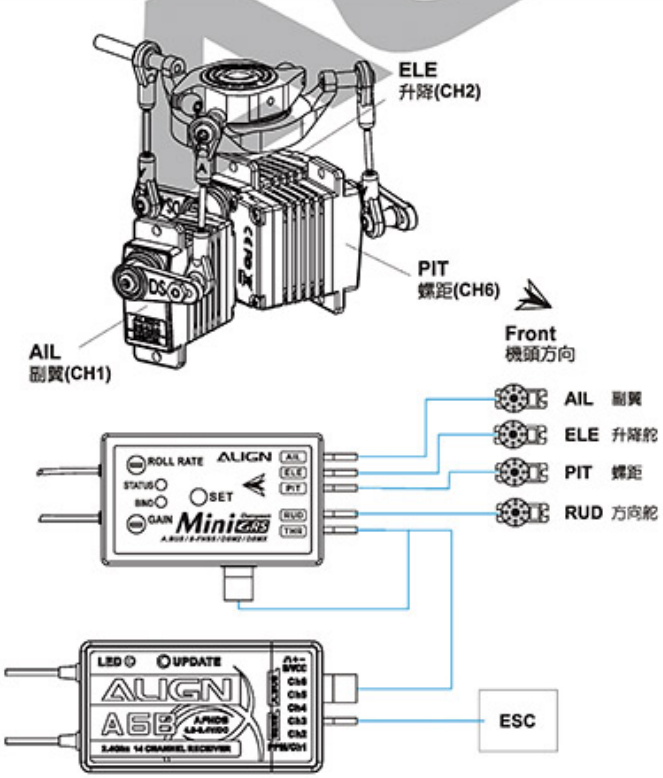
飛行時若機體有左右或前後抖動，表示感度偏高，請逆時針調整感度旋鈕，以每次調整約10度方式，調整至適當位置。飛行時若機體有左右或前後飄移時，表示感度偏低，請順時針調高感度旋鈕，以每次10度方式調整至適當位置。

SETUP PRE-CHECK 設定前注意事項

1. During pre-flight check, please ensure MiniGRS Flybarless System is securely mounted, and there are sufficient battery in the transmitter.
2. There is only one way to mount MiniGRS Flybarless System on the helicopter. Do not alter the mounting direction, otherwise incorrect compensation may result in danger of crashing.
3. After MiniGRS Flybarless System has bounded with transmitter, please ensure MiniGRS Flybarless System power indicator is lit correctly, and that swashplate and rudder is compensating the correct direction.
4. To ensure proper initialization of MiniGRS Flybarless System, please keep the helicopter stationary during power up, do not move any transmitter sticks.
5. Please ensure the swashplate setting in transmitter is set to H-1 prior to making any setting changes.
6. While setting neutral position of servos, all steps must be completed before power is turned off, otherwise servos neutral setting will fail. To ensure optimal flight performance, please ensure swashplate is level during swashplate neutral setting.
7. Adjustment of elevator and aileron roll rate must be done with the dials on MiniGRS Flybarless System, do not adjust elevator and aileron travel end points on transmitter. On the other hand, rudder speed is adjusted through rudder end points.
8. To achieve optimal flight performance, pitch (CH6) and rudder (CH4) travel can be adjusted on the transmitter, but do not adjust elevator and aileron end points on transmitter.
9. Elevator and Aileron gyro gain must be adjusted through the dials on MiniGRS unit. Rudder gyro gain is adjusted through transmitter's GYRO SENS function.
10. To ensure optimal signal reception, MiniGRS Flybarless System antennas should be at least 1/2 inch away from conductive material, and should not be bent excessively. Try to keep the transmitter close to MiniGRS Flybarless System during binding. Should it unintentionally bind to another transmitter, just perform binding process again.

1. 在每次飛行之前，請確認 MiniGRS 無平衡翼系統是否固定良好，並且檢查發射器電力是否足夠。
2. MiniGRS 無平衡翼系統安裝在直昇機上的方式只有一種，請勿任意更改安裝方向，以免修正錯誤造成危險。
3. 發射器和 MiniGRS 無平衡翼系統完成對頻後，請確認 MiniGRS 無平衡翼系統開機燈號以及十字盤和尾舵的修正是否正確。
4. 開機時請保持直昇機靜止，且不要動發射器任何搖桿，避免 MiniGRS 無平衡翼系統初始化錯誤。
5. 在進入所有設定之前，請確認發射器的十字盤類型須為 H-1 模式。
6. 在設定伺服機中立點位置時，必須把全部步驟完成才可將電源關閉，否則設定值將不被記憶。設定伺服器中立點位置時請將十字盤調成水平以 獲得最佳飛行性能。
7. 調整升降及副翼的滾轉速率時只能用 MiniGRS 無平衡翼系統上的旋鈕來調整，不可利用發射器上的升降和副翼行程選項來調整。調整尾舵速率時則必須利用發射器上的尾舵行程來調整。
8. 為獲得最佳飛行性能，可以調整發射器上的螺距 (CH6) 以及尾舵 (CH4) 的行程，但不可調整發射器上的升降和副翼行程。
9. 升降及副翼的陀螺感度必須用 MiniGRS 無平衡翼系統上的旋鈕調整，尾舵的陀螺感度請利用發射器的 GYRO SENS 選項來調整。
10. MiniGRS 無平衡翼系統的天線位置應遠離導電材料至少半英吋的距離，且不要過度彎曲，以獲得最佳的射頻信號。發射器和 MiniGRS 無平衡翼系統對頻時，請盡量靠近。若對到別組發射器時，重新對頻即可。

MINIGRS FLYBARLESS SYSTEM INSTALLATION MINIGRS 無平衡翼系統接線方式



CAUTION 注 意

Please ensure the swashplate setting in transmitter is set to H-1 prior to making any setting changes.
請確認發射器的十字盤類型須為H-1模式。

1. Servo can only be installed in this orientation when MiniGRS Flybarless System is used: with head point forward, right forward is aileron (CH1), left forward is pitch (CH6), mid-rear is elevator (CH2). CH1 and CH6 cannot be interchanged, otherwise helicopter will not function correctly.
2. Swashplate type setting on the transmitter should be set to H1 traditional swashplate type.
3. If swashplate movement is incorrect after assembly per instruction, please double check to see if MiniGRS Flybarless System model setting is set to T-REX 450 Sport/PLUS DFC.
4. To avoid damages to system, digital servos must be used for swashplate. Recommend servo specification: speed of 0.09s/60 degrees or faster; torque 2.2kg or higher.

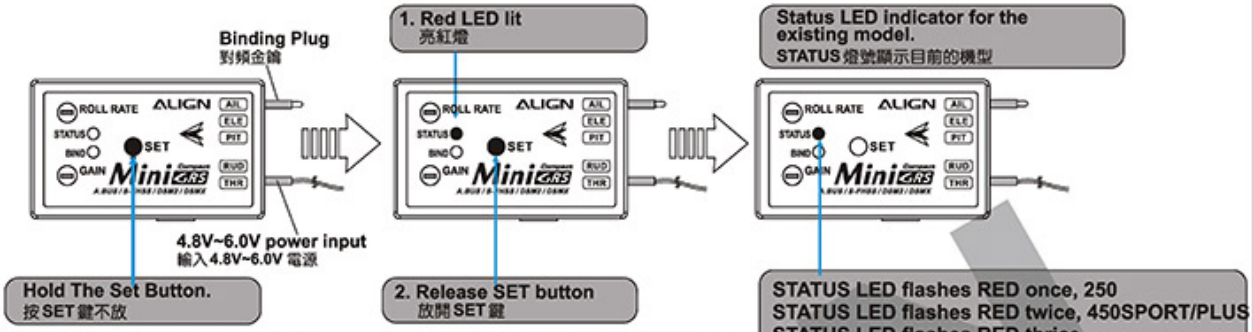
1. 使用 MiniGRS 無平衡翼系統 伺服器的安裝方式只有一種。當機頭朝前時，右前為副翼 (CH1) ；左前為螺距 (CH6) ；中後為升降 (CH2) 。CH1 、 CH6 不可換。如果沒依照圖示連結，直昇機動作會不正確。
2. 遙控器十字盤類型，必須選擇 H1 十字盤模式。
3. 依照圖式安裝完畢，如果十字盤動作不正確，請檢查 MiniGRS 無平衡翼系統機型設定是否為 T-REX450 SPORT /PLUS DFC
4. 十字盤必須安裝數位伺服器，否則會造成損壞。
   建議規格：速度 0.09 秒 /60 度以內；扭力 2.2kg 以上。

MODEL SELECTION 機型選擇

MiniGRS is a Flybarless Stabilization System designed specifically for Align's smaller helicopters, with integrated basic setup parameters for T-REX 250 、T-REX 450 SPORT/PLUS DFC 、T-REX 450 PRO 、T-REX 450LP 、T-REX 470L 、T-REX 500 and T-REX 500X. The MiniGRS Flybarless System unit bundled with T-REX 450LP ARTF comes already configured for the specific helicopter, If you wish to use the MiniGRS Flybarless System in other ALIGN helicopters, follow the steps below to reconfigure the helicopter type.

MiniGRS是特別針對亞拓小型直昇機設計的無平衡翼系統，內建T-REX 250 、T-REX 450 SPORT/PLUS DFC 、T-REX 450 PRO 、T-REX 450LP 、T-REX 470L 、T-REX 500 、T-REX 500X七種機型的基本參數設定，並為此四種機型專用的無平衡翼系統。T-REX 450LP ARTF出廠時MiniGRS無平衡翼系統已經為該機型的參數設定，如果您要將MiniGRS無平衡翼系統使用到其他機型時，可以參照下列方式來做機型更改。

STEP1. MODEL DISPLAY 步驟1. 機型顯示



Hold The Set Button.
按SET鍵不放

Insert binding plug into AIL port, press and hold SET, then insert 4.8~6.0V power into RUD of THR port.

對頻金鑰接上AIL端，按著SET鍵不放。
接著從RUD或THR端送入4.8V~6.0V電源。

2. Release SET button
放開SET鍵

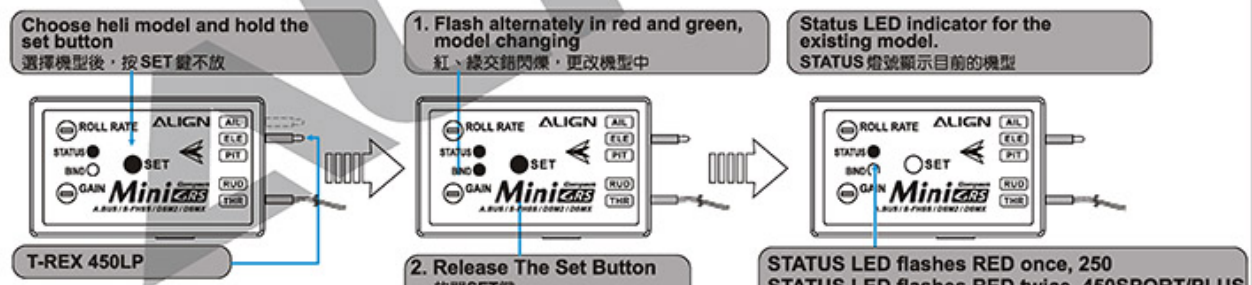
When STATUS LED is lit steady red, release SET button and MiniGRS Flybarless System will display current model.

當STATUS燈呈現紅燈恆亮後，放開SET鍵
MiniGRS無平衡翼系統就會開始顯示目前機型。

STATUS LED flashes RED once, 250
STATUS LED flashes RED twice, 450SPORT/PLUS
STATUS LED flashes RED thrice, 450PRO/470L/500X
STATUS LED flashes RED four times, 500

STATUS紅燈閃爍頻率1次，250
STATUS紅燈閃爍頻率2次，450 SPORT / PLUS
STATUS紅燈閃爍頻率3次，450 PRO /470L /500X
STATUS紅燈閃爍頻率4次，500

STEP2.MODEL SELECTION 步驟2. 選擇機型



Pull out the binding plug, connect to the channel corresponding to the model.
AIL :T-REX 250
ELE:T-REX 450SPORT / PLUS DFC
PIT :T-REX 450 PRO/470L /500X
RUD :T-REX 500

將對頻金鑰拔下，接到對應機型的頻道上。
AIL :T-REX 250
ELE:T-REX 450SPORT / PLUS DFC
PIT :T-REX 450 PRO/ 470L/ 500X
RUD :T-REX 500

2. Release The Set Button
放開SET鍵

When STATUS and BIND LED's flash alternately in red and green, release the SET button.

選擇好機型後按SET鍵不放，當STATUS與BIND燈紅、綠交錯閃爍，表示更改機型設定完成，設定完成後就可放開SET鍵。

STATUS LED flashes RED once, 250
STATUS LED flashes RED twice, 450SPORT/PLUS
STATUS LED flashes RED thrice, 450PRO/470L/500X
STATUS LED flashes RED four times, 500

STATUS紅燈閃爍頻率1次，250
STATUS紅燈閃爍頻率2次，450 SPORT / PLUS
STATUS紅燈閃爍頻率3次，450 PRO/ 470L/ 500X
STATUS紅燈閃爍頻率4次，500

STATUS LED will flash to indicate the selected model type. Pull out power and binding plugs to complete setting.

此時STATUS燈就會呈現所選機型的燈號，最後拔掉電源與對頻金鑰就完成設定。

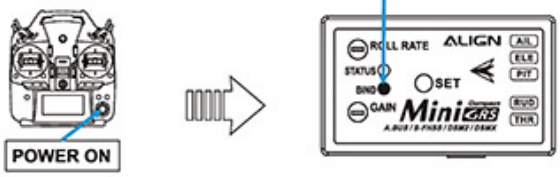
TRANSMITTER BINDING 遙控器對頻

The MiniGRS Flybarless System in the T-REX 450LP ARTF contains a built in S-FHSS 2.4 GHz receiver, support Spektrum DSM2/DSMX/JR DSM2 satellite receiver, and is compatible only with similar S-FHSS' s transmitter. Please follow the instruction below to bind your radio to the MiniGRS Flybarless System.

T-REX 450LPARTF版本直昇機，採用最新款MiniGRS無平衡翼系統，支援亞拓A10遙控器，此外內建S-FHSS 2.4 GHz系統接收，可以搭配S-FHSS SPEKTRUM DSM2/ DSMX與JR DSM2衛星天線跟遙控器使用。您可以依照下列說明來與MiniGRS無平衡翼系統對頻。

USING FUTABA S-FHSS SATELLITE RECEIVERS 使用FUTABA S-FHSS衛星天線

STEADY LIT GREEN LED :Radio binding successfully
FLASHING GREEN LED : Radio binding failed
STEADY LIT RED LED : No signal detected
綠燈恆亮：對頻成功
綠燈閃爍：對頻失敗
紅燈恆亮：無發射訊號



STEP 1. 步驟1.

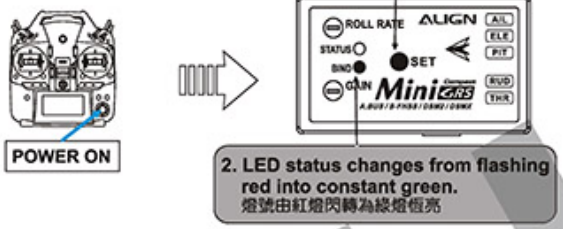
Turn on transmitter, connect MiniGRS Flybarless System to power source. If signal is detected, BIND LED will flash green, otherwise it will flash red. If transmitter is turned on, but BIND is still steady red, then power cycle MiniGRS Flybarless System so it will restart transmitter signal search.

打開遙控器，將MiniGRS無平衡翼系統接上電源後，若偵測到遙控器訊號，但未完成對頻BIND燈號會綠燈閃爍。若已開啟發射器，但BIND燈為紅燈恆亮，請將MiniGRS無平衡翼系統重新給電源，重新尋找遙控器訊號。

CAUTION 注意

If the LED status appears steady lit green, it means the binding is successful. Please skip Step 2.
If the LED status appears flashing green or steadies lit red, it means the binding is failed. Please proceed Step 2 for rebind.

若燈號為綠燈恆亮，代表對頻成功，不須進行步驟2重新對頻；
若燈號為綠燈閃爍或紅燈恆亮，代表對頻失敗，則進行步驟2重新對頻。

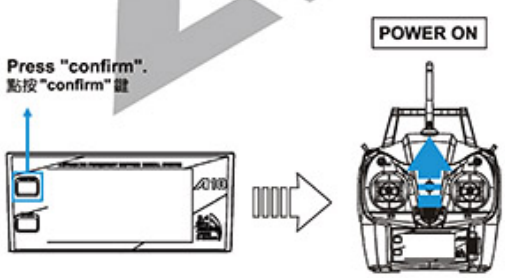


STEP 2.步驟2.

Press and hold SET button, at this time BIND LED will be flashing red, hold the SET button until BIND LED shows steady green, then release SET button to complete binding.

按著SET鍵不放，此時BIND燈號會紅燈閃爍，直到BIND燈號顯示綠燈恆亮後，放開SET鍵即完成對頻。

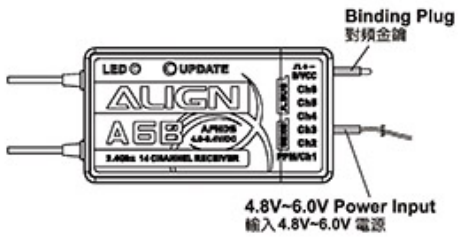
USING ALIGN A10 TRANSMITTER 使用ALIGN A10遙控器



STEP 1.步驟1.

Turn on transmitter while simutaneoulsy pressing "Confirm" button to enter the bind process.

打開遙控器電源，同時長按住"confirm"鍵，遙控器則自動進入對頻程序。



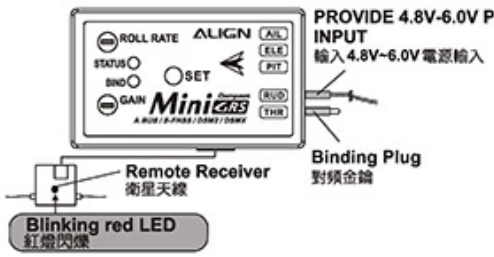
STEP 2.步驟2.

1.Connect the Binding Plug on ALIGN A6B B/VCC port.

2.Supply power to A6B receiver. LED light will flash and start binding, then solid light after completed binding. Remove Binding Plug to finish binding process.

1.先將對頻金鑰接到ALIGN A6B接收機上的B/VCC。
2.接收機供給電源，A6B接收機上的LED燈號會快閃進入對頻，對頻完成後LED會呈現恆亮。移除對頻金鑰即完成對頻。

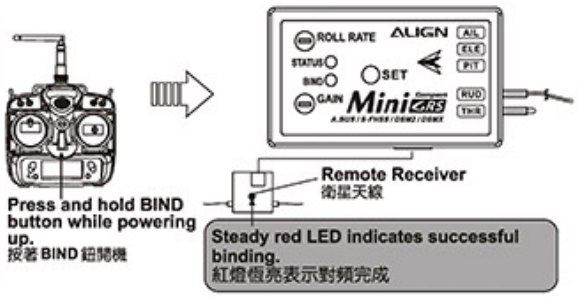
USING DSM2 SATELLITE RECEIVERS 使用DSM2 衛星天線



STEP 1.步驟1.

1. Plug the satellite receiver into ANT port, and the binding plug on THR channel.
2. After feeding 5-6V power through RUD or any other channels, BIND LED will turn steady red, while satellite LED flashes red.

1. 先將衛星天線接到ANT插槽，並且把對頻線接在THR通道。
2. 由RUD或其於通道供給5~6V電源後，此時BIND燈為紅燈恆亮，衛星天線為紅燈閃爍。

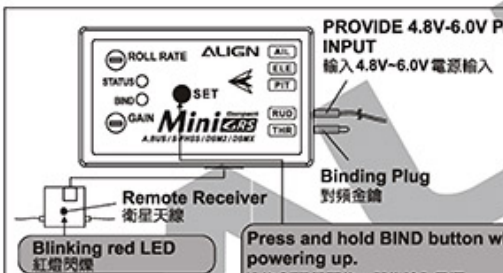


STEP 2.步驟2.

1. Press and hold the BIND button on Spektrum/JR transmitter, power on the transmitter, wait for transmitter to display inding "Binding,"then release BIND button.
2. When satellite receiver LED shows steady lit RED, remove the binding plug from THR channel.
3. When STATUS and BIND LEDs turn into steady green, this indicates binding complete and MiniGRS Flybarless System is initialized successfully. The system is ready for use.

1. 壓住SPEKTRUM/JR發射器的BIND按鈕後，打開發射器電源， 直到發射器面板上 顯示Binding字樣，在放開BIND。
2. 等到衛星天線為紅燈恆亮後，將接在THR通道的對頻線移除。
3. 等到STATUS和BIND燈為綠燈恆亮時，表示對頻已完成且MiniGRS無平衡翼系統開機成功，可正常執行功能。

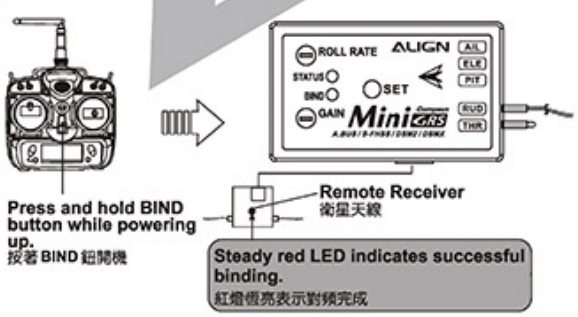
USING DSMX SATELLITE RECEIVERS 使用DSMX 衛星天線



STEP 1. 步驟1.

1. Plug the satellite receiver into ANT port, and the binding plug on THR channel.
2. Press and hold the SET button on MiniGRS Flybarless System , and feed 5-6V power through RUD or any other channels, BIND LED will turn steady red, while satellite LED flashes red.

1. 先將衛星天線接到ANT插槽，並且把對頻線接在THR通道。
2. 按著MiniGRS無平衡翼系統的SET鍵後，再由RUD或其餘通道供給5~6V電源，此時BIND燈為紅燈恆亮，衛星天線為紅燈閃爍。



STEP 2. 步驟2.

1. Press and hold the BIND button on JR Spektrum transmitter, power on the transmitter, wait for transmitter to display "Binding," then release BIND button.
2. When satellite receiver LED shows steady lit RED, remove the binding plug from THR channel.
3. When STATUS and BIND LEDs turn into steady green, this indicates binding completely and MiniGRS is initialized successfully. The system is ready for use.

1. 壓住SPEKTRUM/JR發射器的BIND按鈕後，打開發射器電源， 直到發射器面板上顯示Binding字樣，在放開BIND。
2. 等到衛星天線為紅燈恆亮後，將接在THR通道的對頻線移除。
3. 等到STATUS和BIND燈為綠燈恆亮時，表示對頻已完成且MiniGRS無平衡翼系統開機成功，可正常執行功能。

CAUTION 注意

1. If both Spektrum and Futaba transmitters are powered up (both have previously bound to MiniGRS), and a satellite receiver is connected to MiniGRS, the MiniGRS will select Spektrum system after power up. If no satellite receivers are connected, MiniGRS will select Futaba system.
2. If a satellite receiver is connected to MiniGRS, and only Futaba transmitter is powered up, MiniGRS will select Futaba system after power up. If Spektrum transmitter is powered up afterwards, MiniGRS will not switch over to Spektrum system.
3. On the other hand, if Spektrum transmitter is powered up and MiniGRS has already selected Spektrum system, subsequent power up of Futaba transmitter will not cause MiniGRS to switch over to Futaba system.

1. 如果Spektrum發射器和Futaba發射器都在開啟狀態(先前都已經和MiniGRS對頻)，且MiniGRS有接衛星天線，若此時將MiniGRS開機，MiniGRS會選擇Spectrum系統。如果沒有接衛星天線， MiniGRS會選擇Futaba系統。
2. 如果MiniGRS有接衛星天線，且只有Futaba發射器先開啟，若此時將MiniGRS開機， MiniGRS會選擇Futaba系統。即便後來 再將Spektrum發射器開啟， MiniGRS也不會轉到Spektrum系統上。
3. 反之，若Spektrum發射器先開啟， MiniGRS選擇Spektrum系統後，即便再將Futaba發射器開啟， MiniGRS也不會轉到Futaba系統上。

FAILSAFE(LAST POSITION HOLD) 失控保護(保留最後指令)

When helicopter lost connectivity with your radio under this setting, all channels will hold at the last command position except throttle channel which goes to a preset position.

1. **Push throttle stick to the desired fail safe position.**
2. **Please refer to P.26 binding method, and perform radio binding steps.**
3. **After successful binding, do not power off the MiniGRS, unplug the binding plug and allow MiniGRS to enter initializing process. The last position hold function will be active after the MiniGRS initializes.**
4. **Test Method: Power off transmitter. The throttle channel should move to preset position, while all other channels should hold in their last position.**

在此模式下，若您的直昇機與遙控器失連，除油門頻道為預設位置，其餘頻道皆為最後指令位置。

1. 將油門搖桿放置於您所需要的預設安全位置。
2. 依照26頁的對頻方式，執行與遙控器的對頻動作。
3. 與遙控器完成對頻動作後，不要關閉MiniGRS無平衡翼系統電源，先將對頻接頭拔除， MiniGRS會進入開機狀態，待MiniGRS無平衡翼系統開機完成後，即完成保留最後指令設定。
4. 測試方法：將遙控器關機，除了油門頻道為預設安全位置外，其餘頻道都為失連前的最後命指令位置。

FAILSAFE (PRE-SET POSITION HOLD) 失控保護(回復預設值)

When helicopter lost connectivity with your radio under this setting, all channels will move to the pre-set position.

1. **Please refer to P.26 binding method, and power up the MiniGRS. After the rapid flash of satellite's LEDs, pull the binding plug off.**
2. **Power up radio transmitter, and perform radio binding steps. After radio is bound, LED on the satellite antennas will end the rapid flash, following by slower flash.**
3. **Move the transmitter sticks to the desired failsafe position while the LED is flashing in slower mode.**
4. **Satellite antenna's LED will lit up after 5 seconds, and MiniGRS Flybarless System goes through initializing process. The failsafe position will be set after the MiniGRS Flybarless System initializes.**
5. **Test Method: Power off transmitter, and all channels should move to the pre-set failsafe position.**

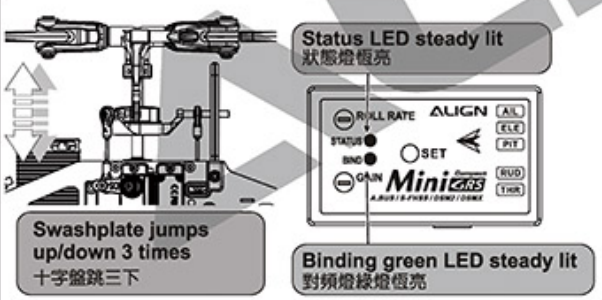
在此模式下，若您的直升機與遙控器失連，所有頻道為預設安全位置。

1. 依照26頁的對頻方式，先開啟MiniGRS無平衡翼系統電源，待衛星天線上LED快速閃爍後，將對頻接頭拔除。
2. 開啟遙控器電源，執行與遙控器的對頻動作，對頻完成瞬間衛星天線上LED會由快速閃爍狀態熄滅，之後再亮起改為慢速閃爍。
3. 在慢速閃爍狀態時，將遙控器上的所有搖桿放置於您所需要的預設安全位置。
4. 5秒後衛星天線LED燈為恆亮，MiniGRS無平衡翼系統進入開機狀態，待MiniGRS無平衡翼系統開機完成後，即完成失控保護設定。
5. 測試方法：將遙控器關機，所有頻道為預設安全位置。

MINIGRS SETTINGS MINIGRS設定

WARNING 警告 **In order for the settings to stick, all 6 setting parameters for MiniGRS Flybarless System must be completed followed with a press of SET button, regardless if any changes are made for each settings.**

MiniGRS無平衡翼系統的六項設定，不論有無更動，皆須逐一完成，並按下SET鍵退出設定，否則MiniGRS無平衡翼系統將不會記憶設定。



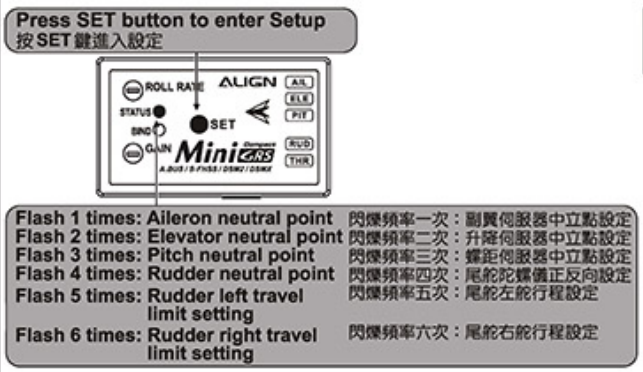
MINIGRS FLYBARLESS SYSTEM INITIALIZATION
MINIGRS無平衡翼系統開機

Connect power, if transmitter binding is successful, BIND LED will light solid green; otherwise it will flash green. At this time, STATUS LED lights green indicates successful power up, steady green means rudder is in heading lock mode; steady red means rudder is in non-heading lock mode. Swashplate will jump up and down 3 times after power up.

接上電源，若和遙控器對頻成功後，BIND燈為綠燈恆亮，否則綠燈閃爍。此時STATUS燈號亮起代表開機成功，綠燈恆亮，代表尾舵為鎖定。紅燈恆亮，代表尾舵為非鎖定。開機完成時，十字盤會跳三下。

Power up transmitter, connect power to MiniGRS Flybarless System. When STATUS and BIND LEDs are light steady green, SET button is used to enter setup mode.

先打開遙控器，將MiniGRS無平衡翼系統接上電源後，當STATUS和BIND燈號為綠燈恆亮時，表示開機完成，此時按SET鍵一次即可進入設定。



ENTERING MINIGRS FLYBARLESS SYSTEM SETUP
進入MINIGRS無平衡翼系統 設定

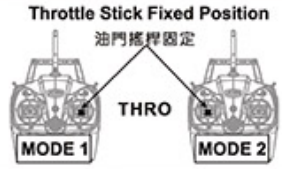
After system initializes, press SET once to enter MiniGRS setup mode. While in setup mode, STATUS LED will flash a number of times indicating the current setting selection. Press SET button to skip to next setting selection. MiniGRS must complete all 6 setting selections before the settings are memorized.

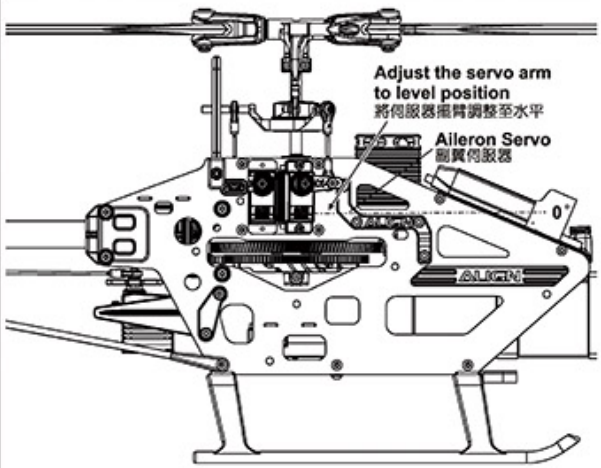
開機完成後，按SET鍵一次就會進入MiniGRS無平衡翼系統設定。進入設定後STATUS燈會以閃爍次數代表所進入的設定選項。接續按SET鍵就會跳往下個設定選項，MiniGRS無平衡翼系統必須完成6項設定才會記憶設定內容。

CAUTION 注意

1. Disconnect motor to ESC to prevent accidental start-up during setup.
2. The throttle stick must remain in center position during setup(or Switch HOLD), pitch curve must be at 50% position and remain fixed.

1. 設定前先拔除馬達線，避免設定中使馬達運轉造成危險。
2. 設定時油門搖桿需置於中間，螺距曲線 50% 輸出的位置（或切入 HOLD 模式），不可再移動。

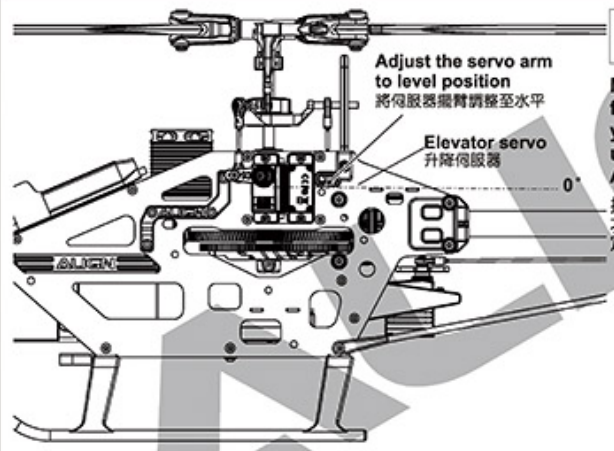




1. AILERON SERVO NEUTRAL POINT SETTING
副翼伺服器中立點設定

Momentarily press SET button first time, if STATUS LED flashes once continuously and BIND LED is off, this indicates you are in neutral setting mode of servo 1. At this time you can use RUD on transmitter to trim the neutral position of servo 1. After completing this setting it will proceed into next step.

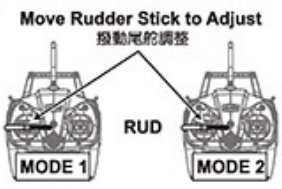
進入 MiniGRS 設定的第一個設定為副翼伺服器中立點設定，STATUS 燈為持續閃爍綠燈一次且 BIND 燈號為恆暗。此時可用遙控器尾舵搖桿微調副翼伺服器中立點位置，完成後進入下個步驟。

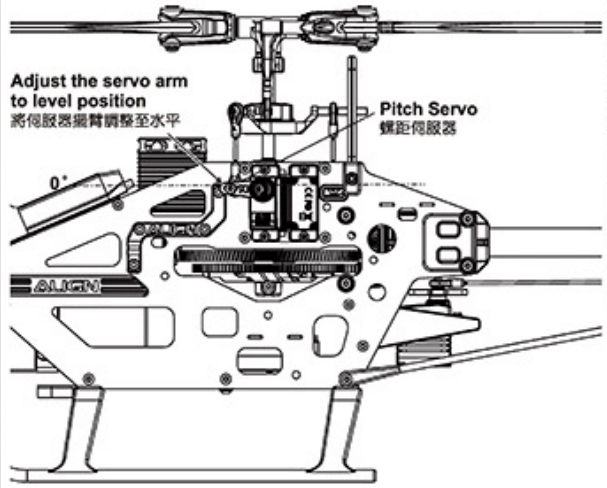


2. ELEVATOR SERVO NEUTRAL POINT SETTING
升降伺服器中立點設定

Momentarily press SET button second time, if STATUS LED flashes twice continuously and BIND LED is off, this indicates you are in neutral setting mode of servo 2. At this time you can use RUD on transmitter to trim the neutral position of servo 2. After completing this setting it will proceed into next step.

接著按 SET 鍵一次進入升降伺服器中立點設定，STATUS 燈號為持續閃爍綠燈二次且 BIND 燈號為恆暗。此時可用遙控器尾舵搖桿微調升降伺服器中立點位置，設定完成後進入下個步驟。





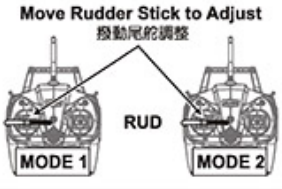
3. PITCH SERVO NEUTRAL POINT SETTING
螺距伺服器中立點設定

Momentarily press SET button third time, if STATUS LED flashes three times continuously and BIND LED is off, this indicates you are in neutral setting mode of servo 3. At this time you can use RUD on transmitter to trim the neutral position of servo 3. After completing this setting it will proceed into next step.

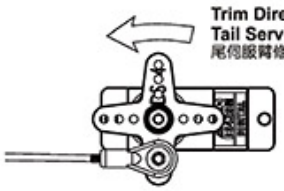
接著按 SET 鍵一次進入螺距伺服器中立點設定，STATUS 燈號為持續閃爍綠燈三次且 BIND 燈號為恆暗。此時可用遙控器尾舵搖桿微調螺距伺服機中立點位置，設定完成後進入下個步驟。

Adjust aileron, elevator, and pitch servos' neutral point so that servo arms and swashplate remain horizontal (with throttle stick at 50% position). How level your swashplate is will directly affect how well the flight characteristic of MiniGRS is.

調整副翼、升降、螺距伺服器中立點，使伺服器擺臂與十字盤皆保持水平位置（此時油門搖桿須置於 50% 位置），十字盤的水平與與否將會直接影響 MiniGRS 的飛行表現與穩定性。



Tail Moving Direction
搖動尾部方向



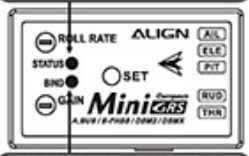
Trim Direction for
Tail Servo Horn.
尾伺服臂修正方向

4. RUDDER GYRO DIRECTION SETTING
尾舵陀螺儀修正方向設定

Momentarily press SET button fourth time, if STATUS LED flashes four times continuously and BIND LED is steady lit green, this indicates you are in rudder compensation direction setting mode. If compensation direction is correct, then skip this step. If compensation direction is reversed, use RUD on transmitter to reverse the direction, and BIND LED will change to steady lit red. After completing this setting it will proceed into next step.

接著按 SET 鍵一次進入尾舵陀螺儀修正方向設定，STATUS 燈號為持續閃爍綠燈四次且 BIND 燈號為綠燈恆亮。修正方向錯誤，利用遙控器尾舵搖桿改變陀螺儀修正方向，此時 BIND 燈號改變為紅燈恆亮，設定完成後進入下個步驟。

Flash Green 4 times
閃爍綠燈四次



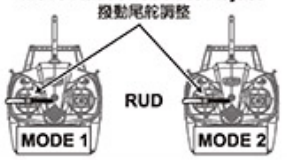
Green LED : normal direction
Red LED : reverse direction
450LP ARTF is Green Light
綠燈：正向　紅燈：反向
450LP ARTF 為綠燈

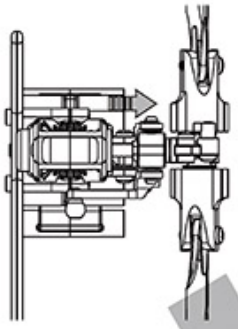
CAUTION 注意

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

尾舵陀螺儀修正方向確認：當手搖直昇機尾部朝逆時鐘方向移動時，尾舵伺服臂應往逆時鐘修正，修正錯誤時，撥動尾舵搖桿改變尾舵陀螺儀修正方向。

Move Rudder Stick to Adjust
撥動尾舵調整





5. RUDDER LEFT TRAVEL LIMIT SETTING
尾舵左舵行程設定

Momentarily press SET button fifth time, if STATUS LED flashes five times continuously and BIND LED is off, this indicates you are in left rudder end point adjustment mode. At this time rudder will drift to one side. Use RUD on transmitter to set the maximum end point on left side. After completing this setting it will proceed into next step.

接著按 SET 鍵一次進入尾舵左舵行程設定，STATUS 燈號為持續閃爍綠燈五次且 BIND 燈號為熄滅。此時尾舵會偏向單邊，利用遙控器尾舵搖桿設定尾舵伺服器向左最大的行程，設定完成後進入下個步驟。

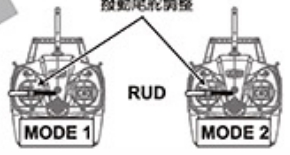
Flash Green 5 times
閃爍綠燈五次

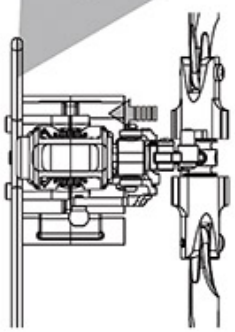
CAUTION 注意

Adjust the rudder travel limit to the maximum without mechanical binding will result in better rudder gyro compensation effect.

在機構不干涉的情形下，設定較大的尾舵行程可使尾舵陀螺儀有較好的修正反應。

Move Rudder Stick to Adjust
撥動尾舵調整





6. RUDDER RIGHT TRAVEL LIMIT SETTING
尾舵右舵行程設定

Momentarily press SET button sixth time, if STATUS LED flashes six times continuously and BIND LED is off, this indicates you are in right rudder end point adjustment mode. At this time rudder will drift to one side. Use RUD on transmitter to set the maximum end point on right side. After completing this setting it will proceed into next step.

再按 SET 鍵一次進入尾舵右舵行程設定，STATUS 燈號為持續閃爍綠燈六次且 BIND 燈號為熄滅。此時尾舵會偏單邊，利用遙控器尾舵搖桿設定尾舵伺服機向右最大的行程，設定完成後按 SET 鍵完成 MiniGRS 無平衡翼系統設定。

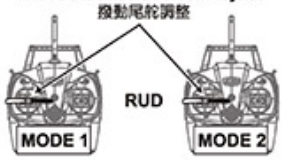
Flash Green 6 times
閃爍綠燈六次

CAUTION 注意

Adjust the rudder travel limit to the maximum without mechanical binding will result in better rudder gyro compensation effect.

在機構不干涉的情形下，設定較大的尾舵行程可使尾舵陀螺儀有較好的修正反應。

Move Rudder Stick to Adjust
撥動尾舵調整

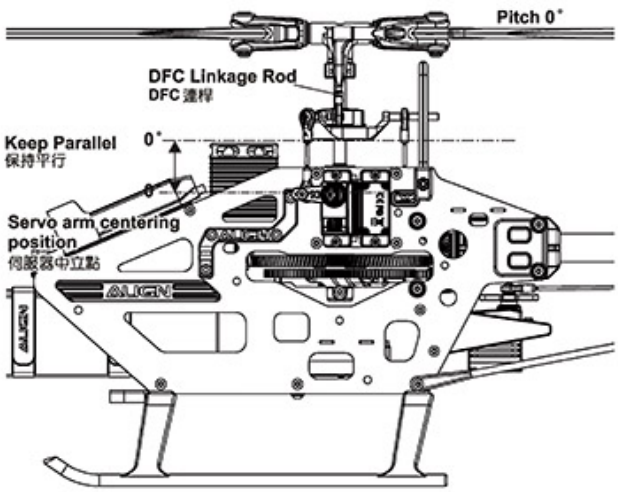


WARNING 警告

In order for the settings to stick, all 6 setting parameters for MiniGRS must be completed followed with a press of SET button, regardless if any changes are made for each settings.

MiniGRS 無平衡翼系統的六項設定，不論有無更動，皆須逐一完成，並按下 SET 鍵退出設定，否則 MiniGRS 無平衡翼系統將不會記憶設定。

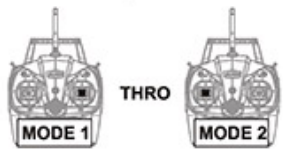
MAIN ROTOR PITCH ADJUSTMENT 主旋翼螺距調整



1. Press SET button to enter MiniGRS Flybarless System setup mode. This setting will eliminate any swashplate interaction which may affect pitch precision.
2. Move throttle stick to enter, pitch curve at 50% position. Pitch should be at 0 degrees during this setting.
3. If servo arms and swashplate is already level at 0 degrees, but main rotor blades pitch is not at 0 degree, please adjust the length of DFC linkage rods to achieve 0 degrees pitch.

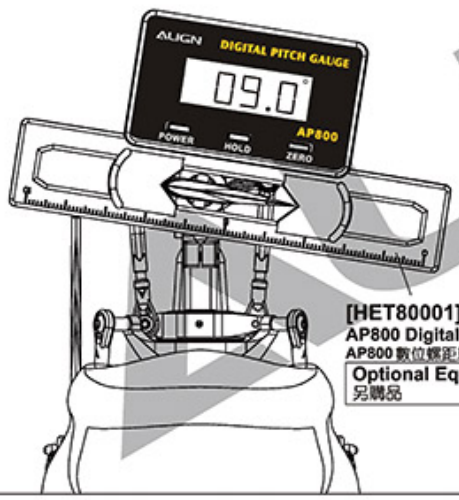
1. 按 SET 鍵進入 MiniGRS 無平衡翼系統設定，此時會關閉 MiniGRS 無平衡翼系統的陀螺儀，以避免對十字盤的修正而影響螺距的量測。
2. 將油門搖桿置中，螺距曲線 50% 輸出位置，請調整主旋翼螺距為 0 度。
3. 如果伺服器擺臂及十字盤已經是水平 0 度，但主旋翼螺距不為 0 度時，請調整 DFC 連桿長度使螺距為 0 度。

CAUTION 注 意 Disconnect motor from ESC prior to setup.
設定前，請先將馬達線拔除。



COLLECTIVE PITCH ADJUSTMENT 集體螺距調整

The collective pitch for MiniGRS Flybarless System must be adjusted in radio's EPA (End Point) function.
MiniGRS 無平衡翼系統集體螺距必須從遙控器 CH6 (PIT) 通道的 EPA(END POIND) 功能中調整。

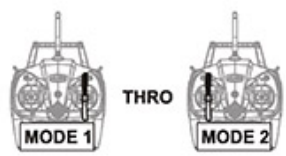


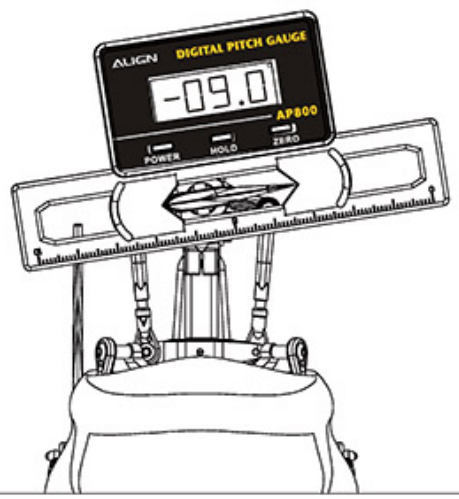
[HET80001]
AP800 Digital Pitch Gauge
AP800 數位螺距規
Optional Equipment
另購品

1. MAX. COLLECTIVE PITCH ANGLE 最大集體螺距角度

Push the throttle stick to the maximum, adjust maximum collective pitch value through radio's EPA function on CH6.
將遙控器油門遙桿推至最高，使用 EPA 功能調整 CH6 (PIT) 通道的最大集體螺距角度。

CAUTION 注 意 Disconnect motor from ESC prior to setup.
設定前，請先將馬達線拔除。

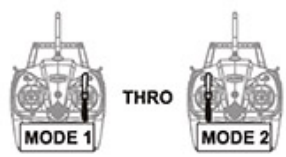


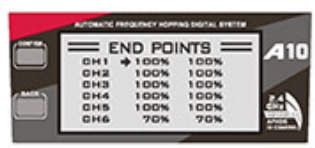


2. MIN. COLLECTIVE PITCH ANGLE 最小集體螺距角度

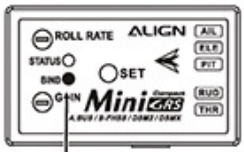
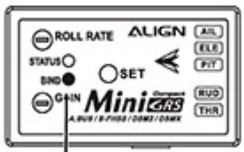
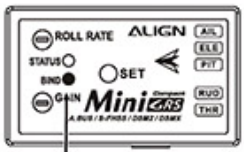
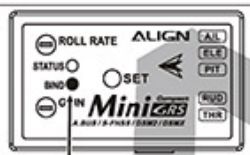
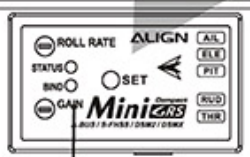
Push the throttle stick to the minimum, adjust minimum collective pitch value through radio's EPA function on CH6.
將遙控器油門遙桿推至最低，使用 EPA 功能調整 CH6 (PIT) 通道的最小集體螺距角度。

CAUTION 注 意 Disconnect motor from ESC prior to setup.
設定前，請先將馬達線拔除。





MINIGRS FLYBARLESS SYSTEM INDICATOR LED　MINIGRS無平衡翼系統指示燈說明

BIND \ STATUS	STATUS Constant Green STATUS 綠燈恆亮	STATUS Constant Red STATUS 紅燈恆亮	STATUS Off STATUS 不亮
 BIND Constant Green BIND 綠燈恆亮	Successful initialization and radio bounded, rudder in heading lock mode. 完成對頻且開機成功，尾舵為鎖定狀態	Successful initialization and radio bounded, rudder in non-heading lock mode. 完成對頻且開機成功，尾舵為非鎖定狀態	———
 BIND Flashing Green BIND 綠燈閃爍	Revert back to original transmitter signal that was lost during usage, rudder is in head locking mode, and detected other transition signals. 使用過程中失去原本發射器訊號，尾舵為鎖定狀態，且偵測到其它發射訊號	Revert back to original transmitter signal that was lost during usage, rudder is in non-head locking mode, and detected other transition signals. 使用過程中失去原本發射器訊號，尾舵為非鎖定狀態，且偵測到其它發射訊號	MiniGRS Flybarless System detects radio signal, but is not bound to the radio. MiniGRS 無平衡翼系統偵測到發射器訊號，但未完成對頻
 BIND Constant Red BIND 紅燈恆亮	Successful initialization but radio binding failed, rudder in heading lock mode. MiniGRS 無平衡翼系統對頻失敗，但開機成功，尾舵為鎖定	Successful initialization but radio binding failed, rudder in non-heading lock mode. MiniGRS 無平衡翼系統對頻失敗，但開機成功，尾舵為非鎖定	No signal detected from radio, please check if transmitter is powered on. MiniGRS 無平衡翼系統未偵測到發射訊號，請確認發射器是否開啟
 BIND Flashing Red BIND 紅燈閃爍	———	———	Signal detected from radio, and set button was pressed for binding. MiniGRS 無平衡翼系統偵測到發射器訊號，且使用者正按SET鍵對頻中
 BIND Off BIND 不亮	———	———	No power connecting to MiniGRS Flybarless System MiniGRS無平衡翼系統 未連接電源

SPECIFICATIONS 產品規格

1. Operating voltage range：DC 3.5 ~ 8.4V
2. Operating current consumption：<100mA @ 4.8V
3. Rotational detection rate： ±300°/sec
4. Rudder yaw detection rate： ±600°/sec
5. Sensor resolution：12 bit
6. Operating temperature：-20℃ ~ 65℃
7. Operating humidity：0% ~ 95%
8. Swashplate support：Mode H-1
9. Receiver support：
   ALIGN A.BUS、FUTABA S-FHSS 、DSM2 / DSMX

1. 操作電壓範圍：DC 3.5 ~ 8.4V
2. 工作電流：<100mA @ 4.8V
3. 側滾及前滾角速度範圍：±300°/sec
4. 尾舵角速度範圍：±600°/sec
5. 感測器解析度： 12 bit
6. 操作溫度：-20℃ ~ 65℃
7. 操作濕度：0% ~ 95%
8. 支援十字盤類型：Mode H-1
9. 支援發射機類型：
   ALIGN A.BUS、FUTABA S-FHSS 、DSM2 / DSMX

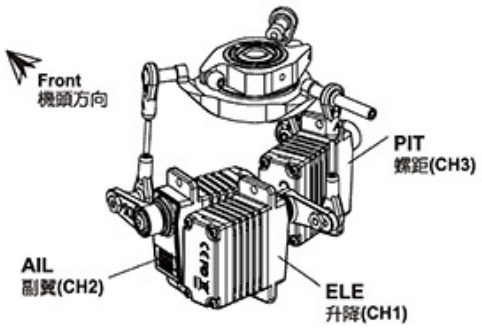
SERVO SETTING AND ADJUSTMENT 伺服器設定與調整

To set this option is to turn on the transmitter and connect to BEC power.
Note: For the safety, please do not connect ESC to the brushless motor in order to prevent any accident caused by the motor running during the setting.

此項設定只要開啟發射器，接上BEC電源即可進行操作。
注意:為了安全起見，設定前請先不要將無刷調速器與無刷馬達三條線接上，以免調整時啟動馬達而發生危險。

FUTABA/ALIGN A10 TRANSMITTER/SERVO FUTABA/ALIGN A10 遙控器對應伺服器關係

Following the servo configuration diagram on right, plug the servos to Gyro.
請依照右圖圖示的伺服器名稱，將伺服器接到陀螺儀。



CAUTION 注意

1. **Servo can only be installed in this orientation when MiniGRS Flybarless System is used: with head point forward, right forward is aileron (CH1), left forward is pitch (CH6), mid-rear is elevator (CH2). CH1 and CH6 cannot be interchanged, otherwise helicopter will not function correctly.**
2. **Swashplate type setting on the transmitter should be set to H-1 traditional swashplate type. If swashplate movement is incorrect after assembly per instruction, please double check to see if MiniGRS Flybarless System model setting is set to T-REX 450 Sport/PLUS DFC.**

1. 使用MiniGRS無平衡翼系統伺服器的安裝方式只有一種，當機頭朝前時，右前為副翼(CH1)；左前為螺距(CH6)；右後為升降(CH2)。CH1、CH6不可換，如果沒依照圖示連結，直昇機動作會不正確。
2. 遙控器十字盤設定，必須選擇H-1傳統十字盤模式。依照圖示安裝完畢，如果十字盤動作不正確，請檢查MiniGRS無平衡翼系統機型設定是否為T-REX450 SPORT /PLUS DFC。

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

Turn off Revolution mixing (RVMX) mode on the transmitter, then set the gain switch on the transmitter and the gyro to non-head lock mode, or disable gain completely. After setting the transmitter, connect the helicopter power and proceed with rudder neutral point setting.

Note : When connecting to the helicopter power, please do not touch tail rudder stick and the helicopter, wait for 3 seconds for gyro to enable, and the rudder servo horn should be 90 degrees to the tail control pushrod. Tail pitch slider should be halfway on the tail output shaft. This will be the standard rudder neutral point. After completing this setting, set the gain switch back to heading lock mode, with gain at around 70%.

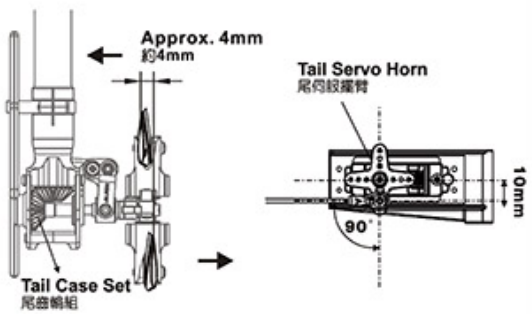
發射器內陀螺儀設定請開閉根輪混控模式，並將發射器上的感度開關與陀螺儀切至"非鎖定模式"或將陀螺儀感度關閉。發射機設定完成後接上直昇機電源，即可進行尾舵中立點設置。

注意：當接上直昇機電源時請勿撥動尾舵搖桿或碰觸機體，待3秒陀螺儀開機完成後，尾伺服臂需與尾伺服器約成90度，尾旋翼控制組須正確置於尾橫軸約中間位置，即為標準尾舵中立點設定，設定完成後，切換至"鎖定模式"，感度設約 70% 左右。

TAIL NEUTRAL SETTING 尾中立點設定

After the gyro is enable and under non-head lock mode, correct setting photo. If the tail pitch assembly is not in the middle position, please adjust the length of rudder control rod to trim.

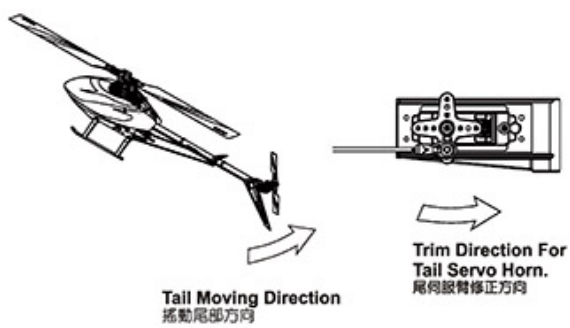
陀螺儀開機後，在非鎖定模式下，尾伺服器與尾 Pitch控制組正確擺置位置。若尾 Pitch控制組未置中時請調整尾控制連桿的長度來修正。



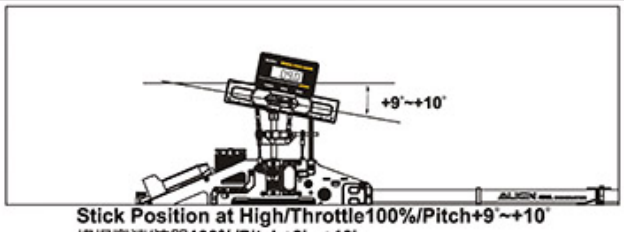
HEAD LOCK DIRECTION SETTING OF GYRO 陀螺儀鎖定方向設定

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".

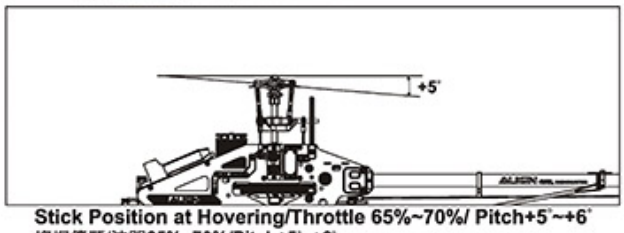
陀螺儀鎖定方向確認，當手搖尾部反時鐘擺動，尾伺服臂應反時鐘修正，反向時請切換陀螺儀上"鎖定反向"開關修正。



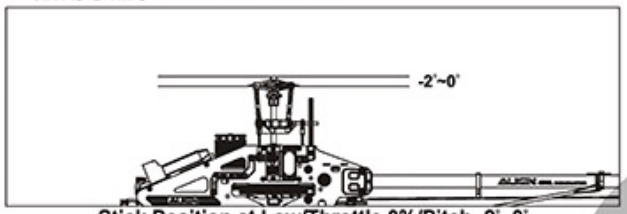
GENERAL FLIGHT 一般飛行模式



Stick Position at High/Throttle100%/Pitch+9°~+10°
搖桿高速/油門100%/Pitch+9°~ +10°

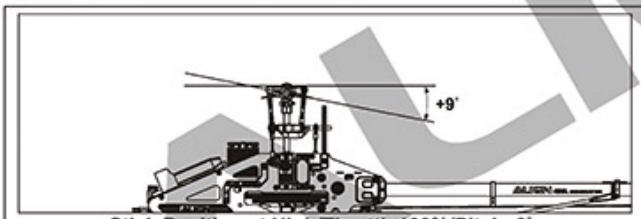


Stick Position at Hovering/Throttle 65%~70%/ Pitch+5°~+6°
搖桿停懸/油門65%~70%/Pitch+5°~+6°

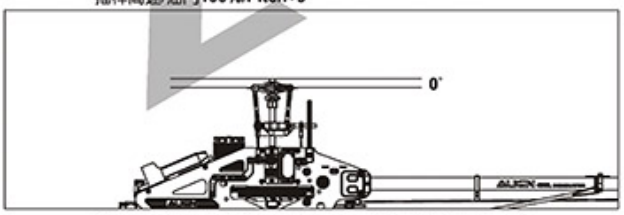


Stick Position at Low/Throttle 0%/Pitch -2°~0°
搖桿低速/油門0%/Pitch -2°~0°

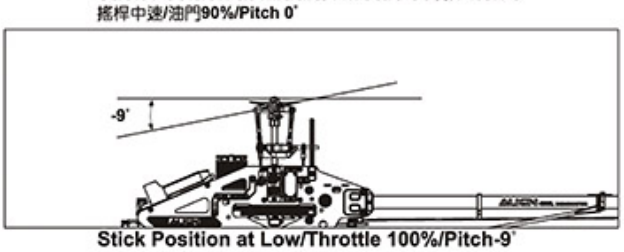
3D FLIGHT 3D特技飛行模式



Stick Position at High/Throttle100%/Pitch+9°
搖桿高速/油門100%/Pitch+9°



Stick Position at Middle/Throttle 90%/Pitch 0°
搖桿中速/油門90%/Pitch 0°



Stick Position at Low/Throttle 100%/Pitch-9°
搖桿低速/油門100%/Pitch-9°

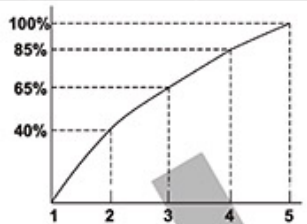
CAUTION 注意

1. Pitch range: Approx. 25 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 25°
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。

GENERAL FLIGHT 一般飛行模式

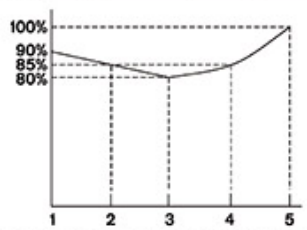
	Throttle 油門	Pitch 螺距
5	100%High Speed 100%高速	+9°~+10°
4	85%	
3	65%~70%Hovering 65%~70%停懸	+5°
2	40%	
1	0% Low Speed 0%低速	-2°~0°



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

IDLE 1:SPORT FLIGHT

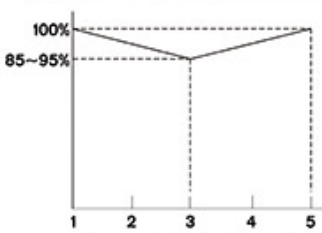
	Throttle 油門	Pitch 螺距
5	100%	+9°
4	85%	
3	80%	+5°
2	85%	
1	90%	-5°



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	+9°
3	90% Middle 90%中	0°
1	100% Low 100%低	-9°



Throttle Curve(3D Flight)
特技飛行模式油門曲線

T-REX 450LP ARTF complete package was assembled and tuned at the factory, including all parameters in the MiniGRS Flybarless System. Just use your capable of binding with ALIGN A10(A6B)transmitter 、 FUTABA S-FHSS 2.4GHz transmitter or Spektrum DSM2/DSMX and JR DSM2 radios, complete the following transmitter settings, and bind it to start flying.

T-REX 450LP ARTF 整機全部是由原廠組裝調整完成，其中包括 MiniGRS 無平衡翼系統所有的參數設定。您只要搭配 ALIGN A10(A6B) 遙控器、FUTABA S-FHSS 2.4GHz 系統遙控器或 SPEKTRUM DSM2/DSMX 、JR DSM2 衛星天線跟遙控器，並完成下列遙控器設定以及對頻就可以飛行了。

1. COMPATIBLE TRANSMITTER 適用遙控器

The MiniGRS Flybarless System in the T-REX 450LP ARTF contains a built in S-FHSS 2.4 GHz receiver, support Spektrum DSM2/DSMX/JR DSM2 satellite receiver, and is compatible only with similar S-FHSS' s transmitter. Please follow the instruction below to bind your radio to the MiniGRS Flybarless System.

T-REX 450LP ARTF 版本直昇機，採用最新款 MiniGRS 無平衡翼系統， 支援亞拓 A10 遙控器，此外內建 S-FHSS 2.4 GHz 系統接收，可以搭配 S-FHSS SPEKTRUM DSM2/ DSMX 與 JR DSM2 衛星天線跟遙控器使用。您可以依照下列說明來與 MiniGRS 無平衡翼系統對頻。

Uae ALIGN A10(A6B) transmitter
使用 ALIGN A10(A6B) 遙控器

Using FUTABA S-FHSS 2.4GHz transmitter、Spektrum DSM2/DSMX and JR DSM2 Radio's Satellite Receivers
使用 FUTABA S-FHSS 2.4GHz 系統、SpektrumDSM2/DSMX 、JR DSM2 衛星天線遙控器

2. SELECT SWASHPLATE TYPE 選擇十字盤類型

MiniGRS Flybarless System supports H-1 type swashplate layout. Set the swashplate mode to H-1 in the transmitter's setting. ALIGN A10(A6B)transmitter select "VARIABLE PITCH". If swashplate type is not setup properly, the control movement will not be correct, making the helicopter unflyable.

MiniGRS 無平衡翼系統支援 H-1 十字盤。請將遙控器的十字盤選項，設定為 H-1 十字盤類型；ALIGN A10 遙控器請選擇 "VARIABLE PITCH" 。若十字盤選擇錯誤，會造成直昇機動作不正確無法飛行。

3.TRANSMITTER SETUP PARAMETERS DIAGRAM 遙控器設定表

T-REX 450LP ARTF already has all MiniGRS Flybarless System parameters configured at the factory. Just follow the diagram below and enter all parameters into the transmitter and bind the radio, the helicopter will be ready to fly. The parameters in diagram below is suitable for beginners and general 3D flying, but can be adjusted to suit personal flying preference.

T-REX 450LP ARTF 出廠時已經完成 MiniGRS 無平衡翼系統所有設定，只要將下表的遙控器各項參數輸入到遙控器中，以及完成對頻動作就可以進行飛行。下表參數適用初學基礎飛行以及一般 3D 飛行使用，您也可以依照個人飛行習慣來調整遙控器參數。

ALIGN A10 TRANSMITTER SYSTEM ALIGN A10 遙控器系統

	AIL 副翼	ELE 升降	THR 油門	RUD 尾舵	GYRO 感度	PIT 螺距
Servo Reverse 伺服器正反轉	Normal 正向	Reverse 反向	Normal 正向	Normal 正向	Normal 正向	Reverse 反向
D / R 雙重比率	▲ 100 %	▲ 100 %		▲ 100 %		
	▼ 100 %	▼ 100 %		▼ 100 %		
EXP 動作曲線	▲ -30 %	▲ -30 %		▲ 0 %		
	▼ -20 %	▼ -20 %		▼ 0 %		
End Point Adjust 伺服器行程量	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 70 %
	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 70 %

Swash Type 十字盤類型	VARIABLE PITCH				
Gyro Gain 尾舵感度	Normal Flight / 一般飛行			3D Fight / 3D飛行	
	78 %			75 %	
Normal Throttle Curves 一般飛行油門曲線	P1	P2	P3	P4	P5
	0 %	65 %	65 %	65 %	65 %
Normal Pitch Curves 一般飛行螺距曲線	P1	P2	P3	P4	P5
	40 %	55 %	65 %	75 %	100 %
IDLE-UP Throttle Curves 3D飛行油門曲線	P1	P2	P3	P4	P5
	90 %	90 %	90 %	90 %	90 %
IDLE-UP Pitch Curves 3D飛行螺距曲線	P1	P2	P3	P4	P5
	0 %	25 %	50 %	75 %	100 %

FUTABA SYSTEM FUTABA 系統

	AIL 副翼	ELE 升降	THR 油門	RUD 尾舵	GYRO 感度	PIT 螺距
Servo Reverse 伺服器正反轉	Normal 正向	Normal 正向	Reverse 反向	Normal 正向	Normal 正向	Normal 正向
D / R 雙重比率	▲ 100 %	▲ 100 %		▲ 100 %		
	▼ 100 %	▼ 100 %		▼ 100 %		
EXP 動作曲線	▲ -30 %	▲ -30 %		▲ -15 %		
	▼ -30 %	▼ -30 %		▼ -15 %		
End Point Adjust 伺服器行程量	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 60 %
	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 60 %

Swash Type 十字盤類型	H-1				
Gyro Gain 尾舵感度	Normal Flight / 一般飛行			3D Fight / 3D飛行	
	45 % (AVCS)			40 % (AVCS)	
Normal Throttle Curves 一般飛行油門曲線	P1	P2	P3	P4	P5
	0 %	44 %	65 %	85 %	100 %
Normal Pitch Curves 一般飛行螺距曲線	P1	P2	P3	P4	P5
	44 %	52 %	74 %	84 %	93 %
IDLE-UP Throttle Curves 3D飛行油門曲線	P1	P2	P3	P4	P5
	90 %	90 %	90 %	90 %	90 %
IDLE-UP Pitch Curves 3D飛行螺距曲線	P1	P2	P3	P4	P5
	0 %	25 %	50 %	75 %	100 %

SPEKTRUM SYSTEM SPEKTRUM 系統

	THR 油門	ELE 升降	AIL 副翼	RUD 尾舵	GYRO 感度	PIT 螺距
Servo Reverse 伺服器正反轉	Normal 正向	Reverse 反向	Reverse 反向	Reverse 反向	Normal 正向	Reverse 反向
D / R 雙重比率		▲ 100 %	▲ 100 %	▲ 100 %		
		▼ 100 %	▼ 100 %	▼ 100 %		
EXP 動作曲線		▲ 30 %	▲ 30 %	▲ 15 %		
		▼ 30 %	▼ 30 %	▼ 15 %		
End Point Adjust 伺服器行程量	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 60 %
	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 60 %

Swash Type 十字盤類型	1-Servo-Normal				
Gyro Gain 尾舵感度	Normal Flight / 一般飛行 55 %			3D Flight / 3D飛行 50 %	
Normal Throttle Curves 一般飛行油門曲線	P1	P2	P3	P4	P5
	0 %	42 %	65 %	78 %	100 %
Normal Pitch Curves 一般飛行螺距曲線	P1	P2	P3	P4	P5
	44 %	52 %	74 %	84 %	93 %
IDLE-UP Throttle Curves 3D飛行油門曲線	P1	P2	P3	P4	P5
	90 %	90 %	90 %	90 %	90 %
IDLE-UP Pitch Curves 3D飛行螺距曲線	P1	P2	P3	P4	P5
	0 %	25 %	50 %	75 %	100 %

CAUTION 注意

These are the standard channel mapping when satellite receivers are used.
（1）THR（2）AIL（3）ELE（4）RUD（5）GAIN（6）PIT
使用衛星天線時，內部通道已指定為：（1）THR（2）AIL（3）ELE（4）RUD（5）GAIN（6）PIT

JR SYSTEM JR 系統

	THR 油門	ELE 升降	AIL 副翼	RUD 尾舵	GYRO 感度	PIT 螺距
Servo Reverse 伺服器正反轉	Normal 正向	Reverse 反向	Reverse 反向	Reverse 反向	Normal 正向	Reverse 反向
D / R 雙重比率		▲ 100 %	▲ 100 %	▲ 100 %		
		▼ 100 %	▼ 100 %	▼ 100 %		
EXP 動作曲線		▲ 30 %	▲ 30 %	▲ 15 %		
		▼ 30 %	▼ 30 %	▼ 15 %		
End Point Adjust 伺服器行程量	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 100 %	▲ 60 %
	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 100 %	▼ 60 %

Swash Type 十字盤類型	1-Servo-Normal				
Gyro Gain 尾舵感度	Normal Flight / 一般飛行 75 %			3D Flight / 3D飛行 70 %	
Normal Throttle Curves 一般飛行油門曲線	P1	P2	P3	P4	P5
	0 %	42 %	65 %	78 %	100 %
Normal Pitch Curves 一般飛行螺距曲線	P1	P2	P3	P4	P5
	44 %	52 %	74 %	84 %	93 %
IDLE-UP Throttle Curves 3D飛行油門曲線	P1	P2	P3	P4	P5
	90 %	90 %	90 %	90 %	90 %
IDLE-UP Pitch Curves 3D飛行螺距曲線	P1	P2	P3	P4	P5
	0 %	25 %	50 %	75 %	100 %

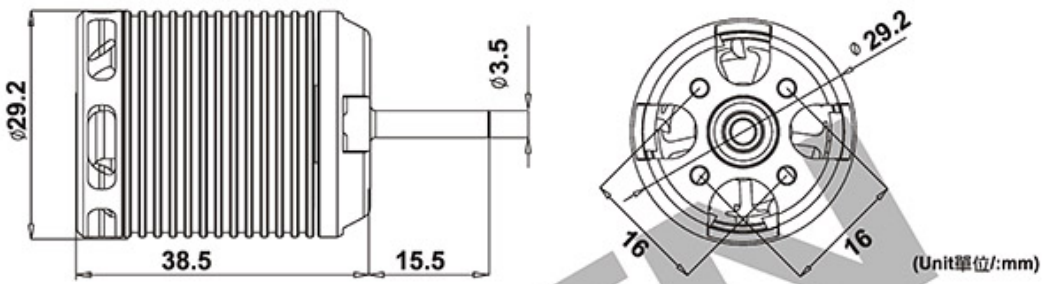
CAUTION 注意

These are the standard channel mapping when satellite receivers are used.
（1）THR（2）AIL（3）ELE（4）RUD（5）GAIN（6）PIT
使用衛星天線時，內部通道已指定為：（1）THR（2）AIL（3）ELE（4）RUD（5）GAIN（6）PIT

RCM-BL460MX MOTOR 無刷馬達

This new Brushless motor developed by the ALIGN POWER R&D TEAM, is packed with the latest, cutting edge technology available today. It features exceptional levels of high-torque power. The 460MX utilizes an 6-pole outrunner stator-rotor and unrivaled Ndfeb extra strong magnets that traditional magnets cannot compare to. Also included is a high temperature, wear-resisting, low friction, double ZZ high efficiency bearing. The 460MX will be the most revolutionary motor operating on low current amperage, and delivering high torque to RC models.

由亞拓動力團隊獨家研發出新款的無刷馬達，具有超高扭力特色，採用9槽矽鋼片、6極外轉子以及傳統磁鐵無法比擬的釹鐵鏑超強磁鐵，搭配高溫耐磨的雙ZZ超高效能精密軸承設計，電流低、扭力強，將是下一波動革命中的最具代表性的一顆星。



SPECIFICATION 尺寸規格

KV	KV值	3200KV(RPM/V)	Input Voltage	輸入電壓	3S
Stator Diameter	定子外徑	22 mm	Stator Thickness	定子高度	22mm
Stator Arms	矽鋼片槽數	9	Magnet Poles	磁鐵極數	6
Max Continuous Current	最大持續電流	46A	Max Instantaneous Current	最大瞬間電流	68A(5sec/5秒)
Max Continuous Power	最大持續功率	500W	Max Instantaneous Power	最大瞬間功率	730W(5sec/5秒)
Dimension	尺寸	Shaft 軸 ø3.5x29.2x54mm	Weight	重量	Approx. 87g

PRODUCT FEATURES 產品特色

1. 5-8.4V step-less adjustable BEC output allows 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 3A, and surge current 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. 5～8.4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Govener Mode定速功能。
5. 體積小，窄型設計，安裝於機身容易。
6. 有散熱片設計，可延長電變壽命。
7. 超高相容性，可對應市面上 98% 無碳刷馬達。
8. 絕佳起步設計，無論國產、進口、內轉、外轉無刷馬達皆起步順暢。
9. 電池電源端採用日製 Low ESR 低阻抗電解電容，大幅提高電源之穩定性。
10. 油門達 200 段以上解析度，無格數之油門感覺。

WIRING ILLUSTRATION 接線示意圖

The motor rotates in different direction with different brand ESCs. If the wrong rotating direction happens, please switch any two cables to make the motor rotates in right direction.
由於各品牌電子變速器的馬達啓動轉向不盡相同，若發生轉向錯誤時，請將馬達與電子速器的接線任兩條對調即可。

SPECIFICATION 尺寸規格：

Model 型號	Continuous Current 持續	Peak Current 瞬間	BEC Output BEC輸出	Dimension 尺寸	Weight 重量
RCE-BL45P	50A	60A	Output voltage: 5-8.4V step-less adjustment Continuous current 3A; Burst current 6A 輸出電壓:5~8.4V無段可調式 承受電流:持續3A、瞬間6A	58x29.3x21mm	47g

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

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 2.4G 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子無碳刷馬達。
3. 支援最高轉速：二極→190,000rpm; 六極→63,000rpm。
4. 輸入電壓:7.4V-22.2V(2～6S Li-Po)

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 2.4G 系統接收器)。

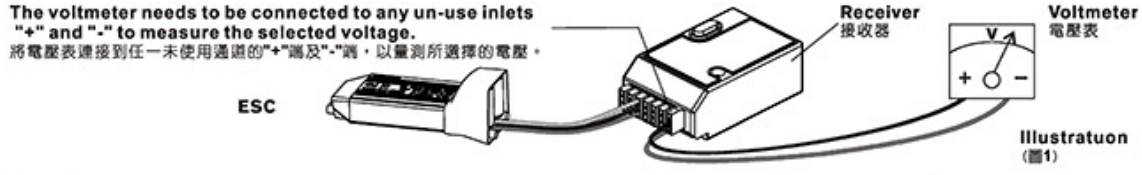
FUNCTIONS 產品功能

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 22.2V/6Cells Lithium battery, the full charged voltage will be approximately 25.2V.
According to this input voltage, CPU will determine that this is a 6Cell battery.
First step protection: 3.2V x 6Cell=19.2V
Second step protection: 3.0V x 6Cell= 18V
When the voltage drops to 19.2V, the power will be reduced. When the voltage drops to 18V, the power will be cut off.

3-2 Li-ion/Li-poly Middle cutoff voltage protection- This option is same as instruction 3-1, but when the voltage of single Cell drops to 3.0V, the first step of battery protection will be engaged. When the voltage of single Cell drops to 2.8V, the second step of battery protection will be engaged. (*Note 1)
Note 1: Second step of battery protection only works when Aircraft mode is setting to the option 4-1.
Note: this option is only suitable for a fully charged battery pack in good working condition.

4. Aircraft Option: 3 settings that include Normal Airplane / Helicopter 1 / Helicopter 2.
Normal Airplane Mode is used for general airplanes and gliders. When flying Helicopters, you can choose Helicopter 1 Mode, or Helicopter 2 Mode. Helicopter 1 Mode provides Soft Start feature. Helicopter 2 Mode provides Soft Start and Governor Mode.
5. Throttle response speed: 3 settings that include Standard/ Medium/ Quick throttle response speed.
The default setting is "quick speed". Use this option to adjust the setting according to flight character. For example, setting at Medium or Quick speed for 3D and powerful flight to make the power response more quickly, but note the accelerative peak current and power expense will increase.
6. BEC output voltage setting: 5-8.4V step-less adjustment.
This option allows custom voltage setting. Default setting is 6.5V; please adjust the voltage according to the specification of the servo (speed and resistance). Prior to entering the setup mode, a voltmeter needs to be connected to the power inlet of the receiver (as illustration) to monitor the selected voltage. The voltage is set by varying the throttle stick position from low (5V) to high (8.4V).



Illustratuon
(圖1)

NOTE : Certain servos are designed to work with high voltage, while other servos are designed for lower voltage. To avoid damage to servos, please follow the servo's factory specification to determine the proper voltage setting.
注意 ： 部份伺服器不適合較高的電壓下操作，請依原廠適用電壓規格設定，避免造成伺服器燒毀。

7. **Thermal Protection: When the ESC temperature reaches 80℃ for any reason, it will engage the battery protection circuit, reducing power to the ESC. We recommend mounting the ESC in a location with adequate air flow and ventilation.**
8. **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
   設定時機分為二極以及六極以上無碳刷馬達，二極無碳刷馬達一般適用低進角，若希望馬達轉速提高，可將進角設定為中進角。六極以上無碳刷馬達一般選用中進角，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，電變會啓動第一階段保護，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** 時則會啓動第二階段保護，完全限制動力輸出 **(註 1:** 僅在 **4-1** 選項 **"** 一般飛機模式 **"** 下才會啓動第二階段保護 **)**。
   例：以一個使用 **22.2V 6Cell** 鋰電池之系統而言 **22.2V** 鋰電池充飽電壓約 **25.2V**，此輸入電壓 **CPU** 會自動判定為 **6Cell** 鋰電。
   第一階段保護 **:3.2Vx6Cell=19.2V**
   第二階段保護 **:3.0Vx6Cell=18V** 當電壓降至 **19.2V** 時，動力會間歇性中斷，當壓降達到 **18V** 時則完全限制動力輸出。
   3-2 Li-Ion/Li-Po 中截止電壓保護：同 **3-1** 功能說明，但單 **Cell** 壓降達到 **3.0V** 時，會啓動第一階段保護，單 **Cell** 壓降達到 **2.8V** 時啓動第二階段保護 **(註 1)**。
   注意：以上功能僅適用於充飽電，且功能正常的鋰電池。
4. 飛機模式設定：三段式選擇分為：一般飛機模式 / 直昇機模式 **1**/ 直昇機模式 **2**
   使用於一般飛機或滑翔機時，請設定於一般飛機模式，使用於直昇機時可選擇直昇機模式 **1** ：具有緩啓動功能，或直昇機模式 **2:** 具有緩啓動及 **Govener Mode** 定速功能。
5. 油門反應速度設定：三段選擇分為標準 / 中速 / 快速
   出廠設定值為 **"** 快速 **"** 油門反應速度，此功能提供使用者依所需的飛行特性來作適當的調整，例如 **3D** 飛機與劇烈的 **3D** 直昇機飛行時可設定為中速或快速，使動力反應更加快速、靈敏， 但須注意提高油門反應速度時，加速瞬間電流與耗電量會有增大的情形。
6. **BEC** 輸出電壓設定 **:5～8.4V** 無段調整
   本功能提供使用者自行設定 **BEC** 輸出電壓，初始電壓為 **6.5V**，使用者可依伺服器的規格與所需的特性 **(** 速度與扭力 **)** 自行更改設定：進入此項設定前，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 **8.4** 伏特，之間的電壓值可移動搖桿的位置任意設定。
7. 溫度保護：當電變因不良之空氣對流或是過載輸出導致溫度上升達 **80**℃時，電變會啓動溫度保護，而使動力間歇性中斷，建議將電變裝置在機艙內空氣對流之位置，並實際使用電流表量測 輸出電流，以達到電變之最佳效率。
8. 開機防暴衝提醒功能：當使用者開啓電變電源時，系統會自動偵測發射機之設定，如果發射機油門未置於最低點，或未置於最高點準備進入設定模式，馬達將不會轉動，同時會有警示聲響提醒。
9. 尋機功能：當飛機降落在長草區無法以目視定位時，使用者可將發射機關閉，當電變無法接收來自接收機信號時，電變會於三十秒後使馬達發出警示聲響，以利定位。此功能不適用於設定了 **SAVE** 功能之 **PCM** 接收機，或抗雜訊低之 **PPM** 接收機。

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 to page 37 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.**

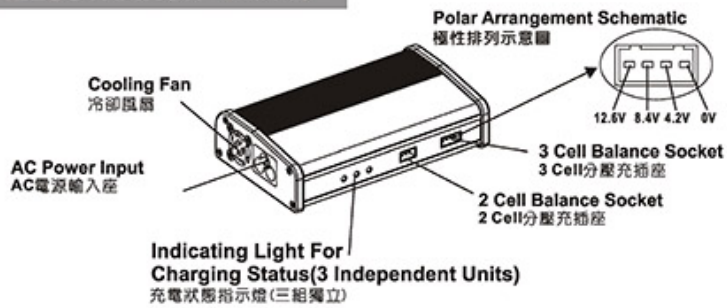
1. 進入設定模式：將電變與接收器之油門 **Channel** 連接，不同之遙控系統請參閱您遙控系統之使用手冊，馬達之三條線亦與電變連接，將發射器之油門搖桿推到最高點，使之於全油門狀態，先開啟發射器電源，再將電源連接至電變，進入設定模式後，馬達將有設定模式之提示聲響。請參考第 **37** 頁程式化設定模式說明。
2. 設定模式中之動作：設定模式共含有六項設定，分別為煞車、馬達進角、電池保護、飛機模式、油門反應速度及 **BEC** 輸出電壓等設定，詳細內容請參考產品功能之解 說。每一項設定中各含三段設定，各項設定以油門搖桿之上、中、下位置來決定其設定值。
   例如：煞車設定時，油門搖桿撥至最高，則設定為急煞車，進入第二項進角設定時，油門搖桿撥至中間，則設定為中進角。

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

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

Chart A
表 A

ILLUSTRATION 各部名稱



[RH45E32XT] Option Equipment 選購品

EC3SXB3

North American Power Cord 美規電源線

or 或

[RH45E35XT] Option Equipment 選購品

EC3SXB4

Europlug Power Cord 歐規電源線

FEATURES 功能介紹

1.AC 100-240V exchange switch for international specification.
2.Apply to 3.7V/3.6V 2-3 Cell Li-polymer/Li-ion batteries.
3.Balance charging is good to prevent the situation of over-charging or under-charging for a single Cell.
4.Auto-detected charge status display.
(Red light: while charging/Green light: end of charging).
5.Cooling fan and multi-circuit protection to avoid the dangerous of charging.
6.The auto-detected function of low voltage for power storage.
7.Reverse polarity protection and short circuit protection.

1.採用AC 100-240V交換式國際通用電源，輸入電壓世界通用。
2.適用3.7V/3.6V規格之 2-3Cell Li-polymer/Li-ion充電電池。
3.分壓採平衡充電，有效防止單Cell過充危險或充電不足情況。
4.自動偵測充電狀態燈號顯示。(充電中顯示紅燈，待充/充電完成顯示綠燈)。
5.內置整合式冷卻風扇及多迴路保護設計，可有效避免充電危險發生。
6.具自動偵測電壓不足補償充電功能，有效發揮電池最大蓄電功能。
7.具電池極性錯誤與短路保護功能。

INSTRUCTIONS 使用說明

1. Connect the power cord to AC power input on the main body and the power supply socket on the wall. (Apply to 100-240V alternating current)
2. Once the power is on, the three indicating lights will turn green. The waiting mode shows ready to charge.
3. Charging for DC 11.1V/10.8V 3-Cell Li-ion/Li-polymer batteries:
Insert the adapters of Li-ion batteries for balance charging to 3-Cell sockets in correct directions.
The 3 indicating lights will be red, showing charging status of each Cell.
4. Charging for DC 7.4V 2-Cell Li-polymer batteries:
Insert the adapters of Li-polymer batteries for balance charging to 2-Cell sockets in correct directions.
The 2 indicating lights on the side will be red showing "on charging".
5. When the indicating lights turn green, it means charging completed. Please remove the batteries.
6. If the lights are still green when the batteries connect to the charger, it means the batteries are full of electricity. The charger will not work on the batteries.
7. Standard charging methods:
(1)Charge one set of 3-Cell Li-polymer battery each time; Fully changed battery voltage: 12.6V
(2)Charge one set of 2-Cell Li-polymer battery each time; Fully changed battery voltage: 8.4V
8. The charger has the function of supply. After the lights turn green, the charger will detect voltage of the batteries, and give a few more time of charging, until the power is full.

1. 依所附的電源線一端連接在機電的AC電源輸入做；另一端插在牆壁的電源插座上（適用100-240V交流電）。
2. 當電源接入時，機體的三顆充電狀態指示燈會顯示綠色，進入待機狀態。
3. 使用DC 11.1V/10.8V 3Cell Li-ion/Li-polymer充電：將鋰電池分壓充電線的接頭,依防呆缺口的方向插入標示3Cell的分壓充插座上，此時二個只是燈顯示紅色，分別代表每Cell充電的狀態。
4. 使用DC 7.4V 2Cell Li-ion/Li-polymer充電：將鋰電池分壓充電線的接頭,依防呆缺口的方向插入標示2Cell的分壓充插座上二個顯示燈會顯示紅色，進入充電狀態。
5. 當充電狀態指示燈逐一顯示為綠燈時，表示電池以充飽電，即可將電池取下。
6. 若電池連接製充電器仍為飽電狀態，此時充電器不會對電池進行充電。
7. 標準充電方式：
(1)每次僅充一組3Cell的鋰電池;電池充飽後的電壓為12.6V
(2)每次僅充一組2Cell的鋰電池;電池充飽後的電壓為8.4V
8. 本充電器距充電補償功能，當充電顯示至顯示綠燈後，充電器會自動偵測電池電壓，若不足時將自動給予短時間的充電補償，使電池完全充飽電。

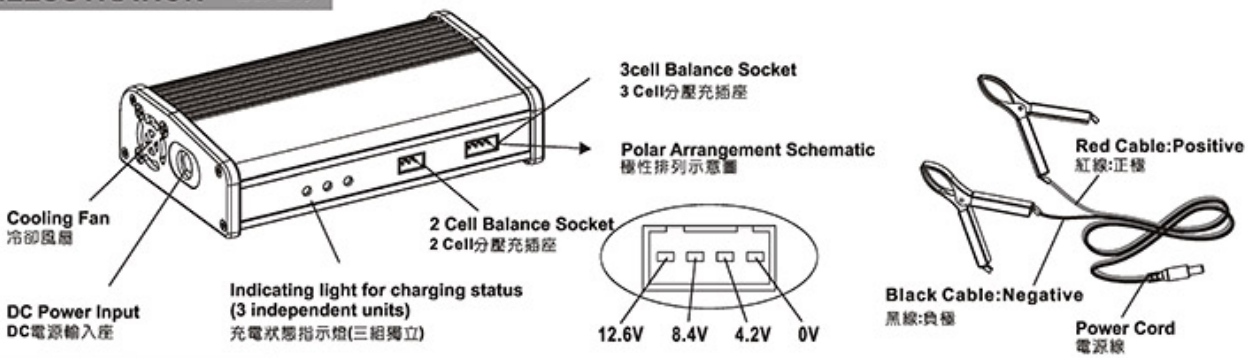
CHARGING COMBINATION 充電組合方式

Charging Combination 每次充電組合方式	3 Cell Balance 3 Cell分壓充	2 Cell Balance 2 Cell分壓充	Charging Time 充電所需時間
Standard Mode 1 標準 Mode 1	○		Battery capacity ÷2000mA(Approx.) 充電時間約：電池容量 ÷2000mA
Standard Mode 2 標準 Mode 2		○	

SPECIFICATION 規格表

Model 型號	Voltage Input 輸入電壓	Voltage Output 輸出電壓	Current Output 輸出電流
RCC-3SX	AC 100-240V 50-60Hz	2 Cell DC 7.4V 3 CCell DC 11.1V	2000 mA

ILLUSTRATION 各部名稱



FEATURES 功能介紹

1. Suitable for DC 10V~15V power input .
2. Apply to 3.7V/3.6V 2-3 cell Li-polymer/Li-ion batteries.
3. Balance charging is good to prevent the situation of over-charging or under-charging for a single cell.
4. Auto-detected charge status display. (Red light: while charging/Green light: end of charging).
5. Cooling fan and multi-circuit protection to avoid the dangerous of charging.
6. The auto-detected function of low voltage for power storage.
7. Reverse polarity protection and short circuit protection.

1.適用DC 10V~15V輸入電源。
2. 適用3.7V/3.6V規格之 2-3cell Li-polymer/Li-ion充電電池。
3. 分壓採平衡充電，有效防止單cell過充危險或充電不足情況。
4. 自動偵測充電狀態燈號顯示。(充電中顯示紅燈，待充/充電完成顯示綠燈)。
5. 內置整合式冷卻風扇及多迴路保護設計，可有效避免充電危險發生。
6. 具自動偵測電壓不足補償充電功能，有效發揮電池最大蓄電功能。
7. 具電池極性錯誤與短路保護功能。

INSTRUCTIONS 使用說明

1. Connect the included power cord between DC power input on the main body and the polarized power supply socket on DC power (Suitable for 10V~15V DC power).
2. Once the power is on, the three indicating lights will turn green. The waiting mode shows ready to charge.
3. Charging for DC 11.1V/10.8V 3-cell Li-ion/Li-polymer batteries: Insert the adapters of Li-ion batteries for balance charging to 3-cell sockets in correct directions. The 3 indicating lights will be red, showing charging status of each cell.
4. Charging for DC 7.4V 2-cell Li-polymer batteries: Insert the adapters of Li-polymer batteries for balance charging to 2-cell sockets in correct directions. The 2 indicating lights on the side will be red showing "on charging".
5. When the indicating lights turn green, it means charging completed. Please remove the batteries.
6. If the lights are still green when the batteries connect to the charger, it means the batteries are full of electricity. The charger will not work on the batteries.
7. Standard charging methods:
   (1)Charge one set of 3-cell Li-polymer battery each time; Fully changed battery voltage: 12.6V
   (2)Charge one set of 2-cell Li-polymer battery each time; Fully changed battery voltage: 8.4V
8. The charger has the function of supply. After the lights turn green, the charger will detect voltage of the batteries, and give a few more time of charging, until the power is full.

1. 依所附的電源線一端連接在機體的DC電源輸入座；另一端依極性接上DC電源（適用10V-15V直流電)。
2. 當電源接入時，機體的三顆充電狀態指示燈會顯示綠色，進入待機狀態。
3. 使用DC 11.1V/10.8V 3cell Li-ion/Li-polymer充電:將鋰電池分壓充電線的接頭，依防呆缺口的方向插入標示3cell的分壓充插座上，此時三個指示燈顯示紅色，分別代表每cell充電的狀態。
4. 使用DC 7.4V 2cell Li-polymer充電：
   將鋰電池分壓充電線的接頭，依防呆缺口的方向插入標示 2cell的分壓充插座上，此時二個顯示燈會顯示紅色，進入充電狀態。
5. 當充電狀態指示燈逐一顯示為綠燈時，表示電池已充飽電，即可將電池取下。
6. 若電池連接至充電器時仍然顯示綠燈，表示電池仍為飽電狀態，此時充電器不會對電池進行充電。
7. 標準充電方式：每次僅充一組3cell的鋰電池;電池充飽後的電壓為12.6V每次僅充一組2cell的鋰電池：電池充飽後的電壓為8.4V。
8. 本充電器具充電補償功能，當充電至顯示綠燈後，充電器會自動偵測電池電壓，若不足時將自動給予短時間的充電補償，使電池完全充飽電。

CHARGING COMBINATION 充電組合方式

Charging Combination 每次充電組合方式	3 Cell Balance 3 Cell分壓充	2 Cell Balance 2 Cell分壓充	Charging Time 充電所需時間
Standard Mode 1 標準 Mode 1	○		Battery capacity : ÷2000mA(Approx.) 充電時間約： 電池容量 ÷2000mA
Standard Mode 2 標準 Mode 2		○	

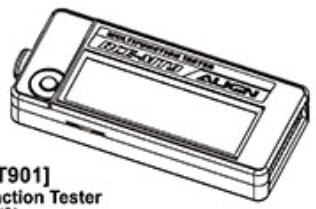
SPECIFICATION 規格表

Model 型號	Voltage Input 輸入電壓	Voltage Output 輸出電壓	Current Output 輸出電流
RCC-3SD	DC 10V-15V	2 Cell DC 7.4V 3 CCell DC 11.1V	2000 mA

Recommend you to use a multi-function tester to measure the cell voltage, total voltage, and remaining capacity before each flight; also ensure to test other electric device function for safety flight.

建議您飛行前使用多功能檢測計去量測電壓、總電壓與剩餘容量並檢測其他電子產品的功能是否正常，確保您有良好的飛行。

Please check ALIGN Website for more multi-function tester detail.
更多多功能檢測計詳細說明請上官網
Instruction Manual Download
多功能檢測計說明書下載

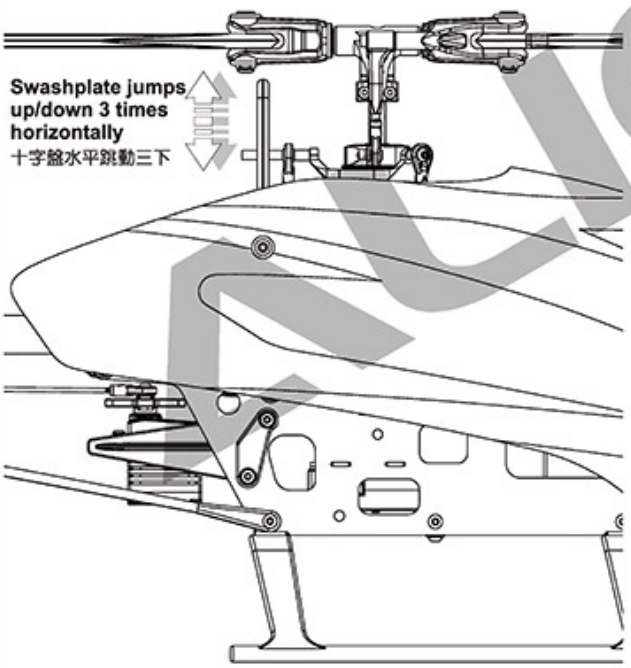


[HETMT901]
Multi-function Tester
多功能檢測計
Optional Equipment
另購品

FEATURES 功能介紹

1. With 3A BEC Output.
2. For RC model electrical equipment diagnostic and measurement use.
3. High precision display of individual cell voltage for 2 to 8S lithiumpacks. In addition to individual cell voltage, it also displays total pack voltage as well as percentage of pack's remaining capacity.
4. Displays serial cell count in a pack, as well as highest and lowest cell voltage, and the voltage difference.
5. Servo diagnostic feature. Displays BEC output voltage and receiver signal output.
6. Digital tachometer to display 2 to 7 propeller rotating speed as well as memory for highest RPM attained.
7. Reverse polarity protection for cell input.

1. 具備3A BEC輸出
2. 整合遙控模型系列商品量測與檢測之多功能產品。
3. 高精度顯示2~8S電池組每CELL電壓、總電壓與剩餘容量百分比。
4. 顯示電池之串聯數量與最高、最低CELL電壓、壓差值。
5. 具有伺服機測試器功能，亦可量測BEC輸出電壓與接收機輸出訊號。
6. 量測2到7槳的螺旋槳轉速並記憶最高轉速值。
7. CELL電壓輸入反接保護。



STEP1 步驟1

Turn on Transmitter, and then MiniGRS Flybarless System power.
先開啟遙控器電源，再開啟MiniGRS無平衡翼系統電源。

STEP2 步驟2

At this time, MiniGRS Flybarless System BIND LED will lit steady green, and STATUS will be lit steady green or steady red.
此時MiniGRS無平衡翼系統 BIND燈會綠燈恆亮，STATUS會綠或紅燈恆亮。

STEP3 步驟3

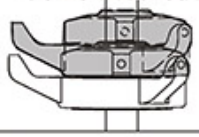
As shown in diagram to the left, the swashplate will twitch up and down 3 times after initialization to signal successful startup. If swashplate twitches up and down 3 times with swashplate tilted, check for correct servo installation as per instruction.

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.

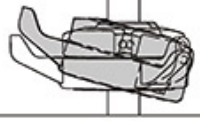
如左圖示，初始化完成後，十字盤會保持水平行下小幅跳動三下，表示完成開機程序，如十字盤為傾斜跳動三次，請檢查伺服器是否依照指示安裝。

完成開機前直昇機螺距被固定無法動作，如果一直無法完成開機程序STATUS紅燈閃爍，請檢查開機時直昇機是否靜止或訊號線未接妥，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。

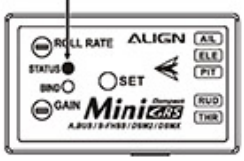
Swashplate jumps up and down 3 times horizontally represents successful initialization.
十字盤水平跳動三次代表正常開機



Swashplate jumps up and down 3 times tilted represents setup error.
十字盤傾斜跳動三次代表
伺服器安裝錯誤



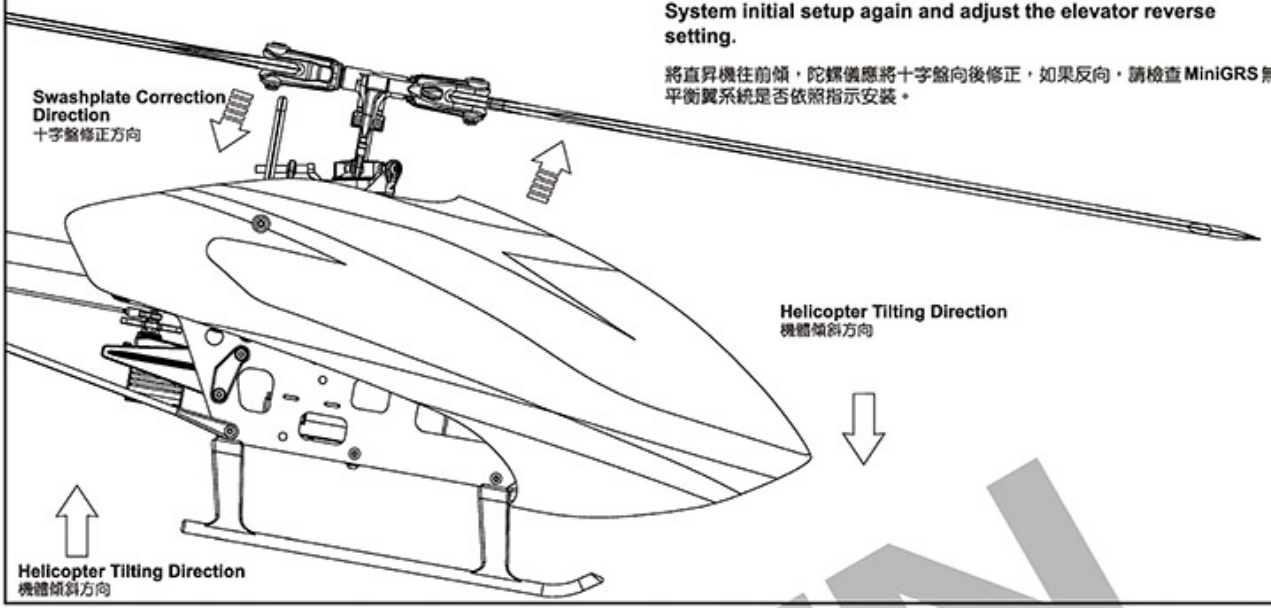
Green LED indicates rudder lock mode
Red LED indicates non-rudder lock mode
綠燈為尾舵鎖定模式
紅燈為尾舵非鎖定模式

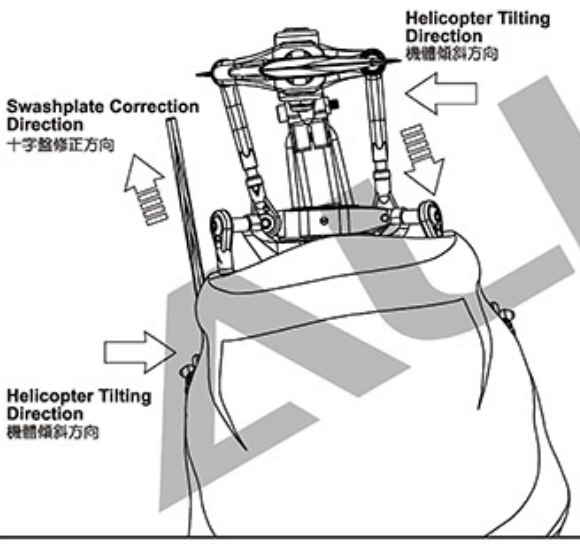


STEP4 步驟4

Tilt the helicopter forward and swashplate should tilt back to compensate. If reversed, perform the MiniGRS Flybarless System initial setup again and adjust the elevator reverse setting.

將直昇機往前傾，陀螺儀應將十字盤向後修正，如果反向，請檢查MiniGRS無平衡翼系統是否依照指示安裝。





STEP5 步驟5

Tilt the helicopter right, gyro should tilt the swashplate left to compensate. If reversed, please check for the correct installation direction of MiniGRS Flybarless System.

將直昇機往右傾，陀螺儀應將十字盤往左修正，如果反向，請檢查MiniGRS無平衡翼系統是否依照指示安裝。

STEP6 步驟6

Check for proper CG location. CG needs to be at the center point below the main shaft.

檢視直昇機重心是否適當，請先調整直昇機重心位置至主軸中心線下方位置。

STEP7 步驟7

Confirm all functions are normal, power cycle the system, and begin flight test after initialization.

確定所有功能正常，重新開機，完成開機程序後進入飛行測試。

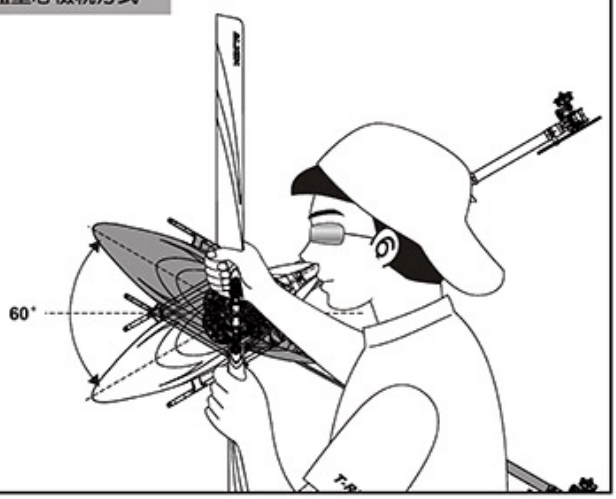
HELICOPTER CG CHECK PROCEDURE 直昇機機體重心檢視方式

After installed the battery, 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.

電池固定後，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。

Adjust the frame's CG within +/- 60 degrees from level.

以水平線上下夾角 60° 內為適當的範圍來調整機體的重心。



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.

1. Place the helicopter in a clear open field (Make sure the power OFF) and the tail of helicopter point to yourself.

2. 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".

3. 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。

1.將直昇機放在空曠的地方(確認電源為關閉)，並將直昇機的機尾對準自己。

2.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。

3.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。

Mode 1	Mode 2	Illustration 圖示
Aileron 副翼		Move Left 左移 / Move Right 右移 / Rotate Left 左翻 / Rotate Right 右翻
Elevator升降/前後		Fly Forward 前進 / Fly Backward 後退 / Forward Rotate 前翻 / Backward Rotate 後翻
Throttle 油門		Ascent 上升 / Descent 下降
Rudder 方向		Turn Right 右旋 / Turn Left 左旋

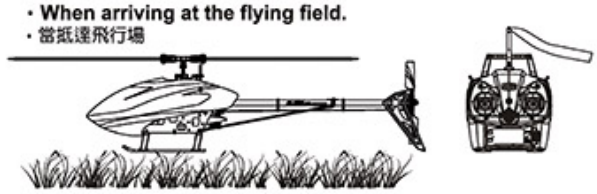
FLIGHT ADJUSTMENT AND NOTICE 飛行調整與注意

CAUTION 注意

◎Check if the screws are firmly tightened.
◎Check if the transmitter and receivers are fully charged.
◎再次確認→螺絲是否鎖固?
◎發射器和接收器電池是否足夠。

CAUTION 注意

- When arriving at the flying field.
- 當抵達飛行場



If there are other radio control aircraft at the field, make sure to check their frequencies and tell them what frequency you are using. Frequency interference can cause your model, or other models to crash and increase the risk of danger.
假使飛行場有其他遙控飛機，請確認他們的頻率，並告知他們您正在使用的頻率，相同的頻率會造成干擾導致失控和大大地增加風險。

STARTING AND STOPPING THE MOTOR 啓動和停止馬達

CAUTION 注意

First check to make sure no one else is operating on the same frequency. Then place the throttle stick at lowest position and turn on the transmitter.
首先確認附近沒有其他相同頻率的使用，然後打開發射器將油門搖桿推到低點。

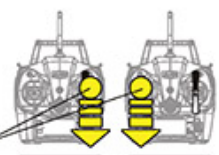
- Check the movement.
- 動作確認

ON! Step1
First turn on the transmitter.
先開啟發射器

ON! Step2
Connect to the helicopter power
接上直昇機電源

CAUTION 注意

Check if the throttle stick is set at the lowest position.
確認油門搖桿是在最低的位置。

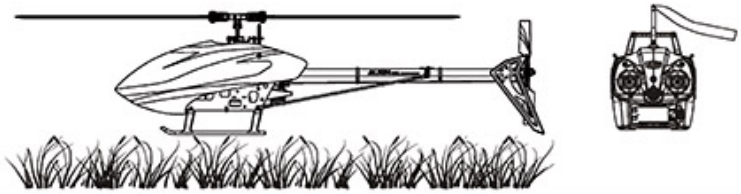


◎Are the rudders moving according to the controls?
◎Follow the transmitter's instruction manual to do a range test.
◎方向舵是否隨著控制方向移動?
◎根據發射器說明書進行距離測試。

OFF! Step3
Reverse the above orders to turn off.
關閉電源時請依上述操作動作反執行。

This procedure is best performed on soft surfaces such as grass. The use of rubber skid stopper is recommended on hard surface to prevent vibration feedback from the ground to Gyro, resulting in over-corrections.

將直升機置於柔軟地面上，建議硬地起飛腳架裝上避震墊圈。避免升空前腳架與過硬的地面震動太大反饋至機身上的陀螺儀，影響無平衡翼系統升空前過度修正。



CAUTION 注意

If swashplate should tilt prior to lift off, do not try to manually trim the swashplate level. This is due to vibration feedback to the Gyro, and will disappear once helicopter lifts off the ground. If manual trim is applied, helicopter will tilt immediately after liftoff.

直昇機離地前，十字盤可能因陀螺儀受震動的反饋，使十字盤有傾斜的情形，此時請勿刻意將十盤修正為水平狀態，此現象只要離地升空時立即解除，可平穩升空；若刻意將十字盤修正為水平時，反而會造成感應器過度修正，一離地即偏往修正方向的危險。

MAIN ROTOR ADJUSTMENTS 主旋翼雙槳平衡調整

1.Before adjusting, apply a red piece of tape on one blade, or paint a red stripe with a marker or paint to identify on blade.
2.Raise the throttle stick slowly and stop just before the helicopter lifts-off ground. Look at the spinning blades from the side of the helicopter.
3.Look at the path of the rotor carefully. If the two blades rotate in the same path, it does not need to adjustment. If one blade is higher or lower than the other blade, adjust the tracking immediately.

1.調整前先在其中一支主旋翼的翼端，貼上有顏色的貼紙或畫上顏色記號，方便雙槳調整辨識。
2.慢慢的推起油門搖桿到高點並且停止，在飛機離開地面前，從飛機側邊觀察主旋翼轉動。
3.仔細觀察旋翼軌跡(假如兩支旋翼移動都是相同軌跡，則不需要調整;可是如果一支旋翼較高或較低產生"雙槳"的情形時，則必須立刻調整軌跡)。

a.When rotating, the blade with higher path means the pitch is too big. Please shorten DFC ball link for regular trim.
b.When rotating, the blade with lower path means the pitch is too small. Please lengthen DFC ball link for regular trim.

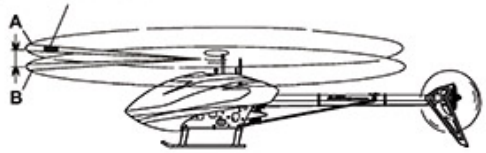
a.旋翼轉動時較高軌跡的主旋翼表示螺距(PITCH)過大，請調短DFC連桿頭修正。
b.旋翼轉動時較低軌跡的主旋翼表示螺距(PITCH)過小，請調長DFC連桿頭修正。

CAUTION 注意

Tracking adjustment is very dangerous, so please keep away from the helicopter at a distance of at least 10m.
調整軌跡非常危險，請於距離飛機最少10公尺的距離。

Incorrect tracking may cause vibrations. Please repeat adjusting the tracking to make sure the rotor is correctly aligned. After tracking adjustment, please check the pitch angle is approx. +5~6° when hovering.
不正確的旋翼軌跡會導致震動，請不斷重複調整軌跡，使旋翼軌跡精準正確。
在調整軌跡後，確認一下Pitch角度在停旋時應為大約+5～6°。

Color Mark 有標示記號的主旋翼



FLIGHT ADJUSTMENT AND NOTICE FOR BEGINNERS 初學飛行調整與注意

FORBIDDEN 禁止

◎Do not attempt to grab or make eye contact with the helicopter while the main blades are in motion and keep your eyes away from the helicopter. During take-off, landing, and flight, be sure to keep the helicopter away from all obstacles. Operators must stand at least 10 meters away from the helicopter to avoid injury caused by loose parts due to improper assembly or any unforeseen dangers.

◎嚴禁用手抓取運行中的直昇機，並禁止將直昇機對著眼睛，當主旋翼轉動後，或起飛／試飛時，務必遠離障礙物，站立位置必需距離10公尺以上，避免因人為組裝不當造成零件脫落，而引發不可預期的財物及人員損傷。

CAUTION 注意

◎Make sure that no one or obstructions in the vicinity.
◎For flying safety, please carefully check if every movement and directions are correct when hovering.
◎確認鄰近地區沒有人和障礙物。
◎為了飛行安全，您必須先確認停懸時各項操控動作是否正常。

CAUTION 注意

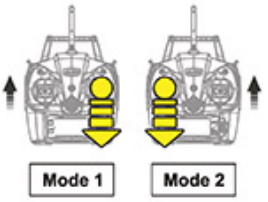
Do not attempt to fly until you have some experiences with the operation of helicopter.
嚴禁無熟練操控飛行經驗者操控飛行。

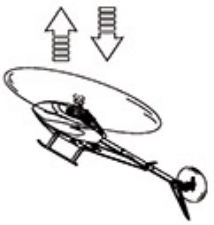
Beginner may install a training landing gear to avoid any crash caused by offset effect while landing.
必要時初學者可以在腳架下方安裝練習架，可避免降落時因重心偏移導致主旋翼或直昇機損毀。

STEP 1 THROTTLE CONTROL PRACTICE 油門控制練習

◎When the helicopter begins to lift-off the ground, slowly reduce the throttle to bring the helicopter back down. Keep practicing this action until you control the throttle smoothly.

◎當直昇機開始離地時，慢慢降低油門將飛機降下。持續練習飛機從地面上升和下降直到您覺得油門控制很順。

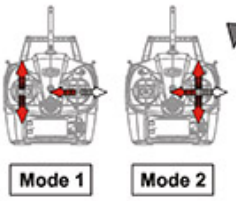


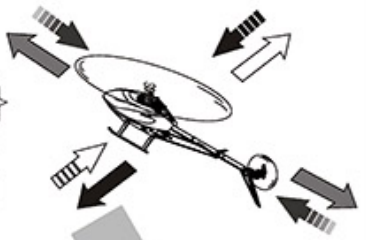


STEP 2 AILERON AND ELEVATOR CONTROL PRACTICE 副翼和升降控制練習

1.Raise the throttle stick slowly.
2.Move the helicopter in any direction back, forward, left and right, slowly move the aileron and elevator sticks in the opposite direction to fly back to its original position.

1.慢慢升起油門搖桿。
2.使直昇機依指示:移動向後/向前/向左/向右，慢慢的反向移動副翼和升降搖桿並將直昇機開回到原來位置。





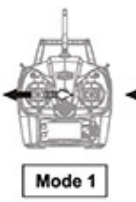
CAUTION 注意

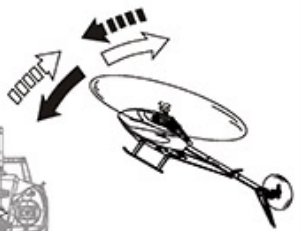
◎If the nose of the helicopter moves, please lower the throttle stick and land the helicopter. Then move your position diagonally behind the helicopter 10M and continue practicing.
◎If the helicopter flies too far away from you, please land the helicopter and move your position behind 10M and continue practicing.
◎當直昇機機頭偏移時，請降低油門並且降落，然後移動自己的位置到直昇機的正後方10公尺再繼續練習。
◎假如直昇機飛離你太遠，請先降落直昇機，並到直昇機後10公尺再繼續練習。

STEP 3 RUDDER CONTROL PRACTICING 方向舵操作練習

1.Slowly raise the throttle stick.
2.Move the nose of the helicopter to right or left, and then slowly move the rudder stick in the opposite direction to fly back to its original position.

1.慢慢升起油門搖桿。
2.將直昇機機頭移動左或右，然後慢慢反向移動方向舵搖桿並將直昇機飛回原本位置。



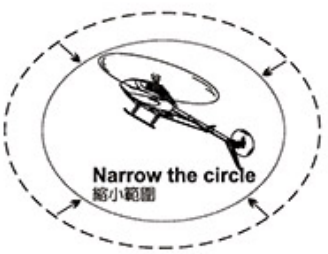


STEP 4

After you are familiar with all actions from STEP1 to 3, draw a circle on the ground and practice within the circle to increase your accuracy.

當你覺得 STEP1~3 動作熟悉了，在地上畫圈圈並在這個圈圈的範圍內練習飛行，以增加你操控的準確度。

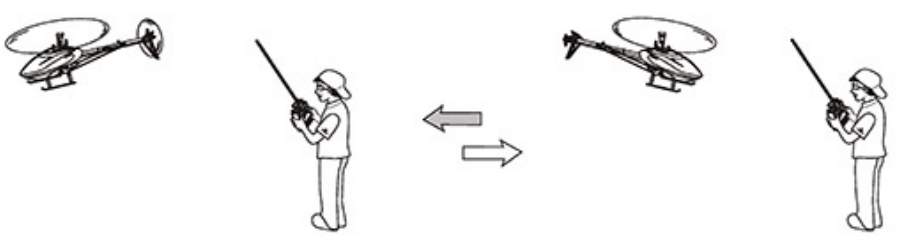
◎You can draw a smaller circle when you get more familiar with the actions.
◎當你更加習慣操作動作，你可以畫更小的圈圈。



STEP 5 DIRECTION CHANGE AND HOVERING PRACTICE 改變直昇機方向和練習停旋

After you are familiar with STEP1 to 4, stand at side of the helicopter and continue practicing STEP1 to 4. Then repeat the STEP1 to 4 by standing right in front of the helicopter.

當你覺得STEP1~4動作熟悉了，站在面對直昇機側邊並繼續練習STEP1~4。之後，站在直昇機機頭右邊重複步驟練習。

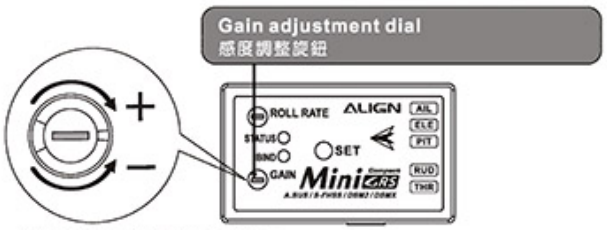


ELEVATOR AND AILERON GAIN ADJUSTMENT 升降及副翼陀螺儀感度調整

Hover the helicopter and observe if there are any left / right or forward / backward fast oscillation. If oscillation exists, turn the gain dial counter-clockwise to reduce the gyro gain.

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，如果前後或左右有抖動，請將感度旋鈕逆時鐘調低，以減少陀螺儀修正感度。

SET THE DIAL TO 12 O'CLOCK POSITION AS STARTING POINT 建議初次飛行設於12點鐘方向



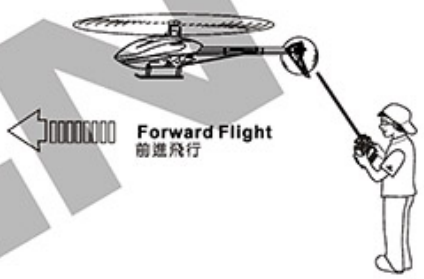
Decrease lock gain sensitivity
調降鎖定感度

Forward/back oscillation · Left/right oscillation
前後晃動 / 左右晃動

FORWARD STRAIGHT LINE FLIGHT 前進直線航道飛行

After hovering, proceed to fast forward flight. Should there be similar oscillation, please reduce gain. Should the helicopter pitch up or experience slow response during flight, increase elevator gain. Repeat this process until ideal gain value is achieved. After adjusting gyro gains, adjust the roll rate In MiniGRS Flight Mode settings based on your preference. Higher the roll rate, the faster the roll/flips are. Pilot can also adjust the cyclic EXP setting for the preferred stability. After all adjustments are completes, the pilot can enjoy the stability of slow flight and the fast agility from flybarless system.

停懸完後可快速前進飛行，同樣的如果有不正常抖動時，請將感度調小，飛行時如果有機頭向上仰起或反應緩慢現象時，請將感度調大，重複測試將感度調整至最理想值。調整完陀螺儀感度，可依據飛行習慣調整滾轉速率，調整越大，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 以增加停旋穩定性。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。

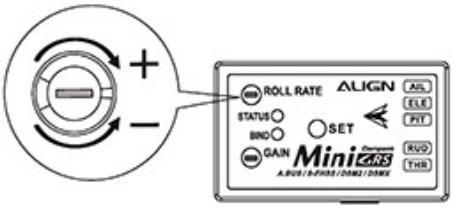


Forward Flight
前進飛行

ROLL RATE ADJUSTMENT 滾轉速率調整

Roll rate dial is used to adjust the roll rate of helicopter's elevator and aileron; turning clockwise will increase roll rate, with faster elevator and aileron response; turning counter-clockwise will decrease roll rate, with slower elevator and aileron response. We recommend novice pilots to fly with lower roll rate.

滾轉速率旋鈕調整升降，副翼滾轉速率，往順時針調大滾轉速率，升降與副翼動作反應會變快，往逆時針調低滾轉速率，升降與副翼動作反應會變慢，初接入者建議把滾轉速率調低飛行。



Adjust Counter-clockwise for less sensitive response
逆時針調整，直昇機反應較緩和

RUDDER SENSITIVITY ADJUSTMENT 尾舵感度調整

Actual gain value differs amongst servos and helicopters. The goal is to find the maximum gain without tail hunting. This can only be donethrough actual flight tests.
The recommended starting point for transmitter's gyro gain setting should be 45~50% for hovering, 40~45% for IDLE-UP. Value should be tuned under actual flight conditions by increasing to the maximum gain without tail hunting.

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（直昇機尾部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 **45~50%** 左右，**IDLE UP** 飛行時設定在 **40~45%** 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。

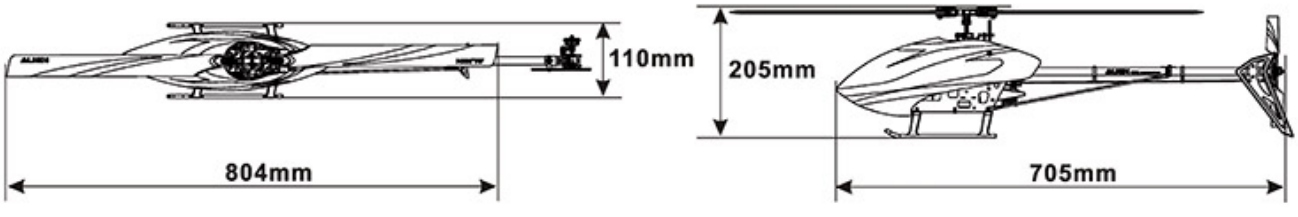
	Problem 狀況	Cause 原因	Solution 對策
Blade Tracking 雙槳平衡	Tracking is Off 雙槳	DFC linkage rods are not even length DFC 連桿長度調整不平均	Adjust length of pitch linkage rods (A) 調整 DFC 連桿頭長度
Hover 停懸	Headspeed too low 主旋翼轉速偏低	Excessive pitch 主旋翼的 PITCH 偏高	Adjust pitch linkage rods (A) to reduce pitch by 4 to 5 degrees. Hovering headspeed should be around 2800RPM. 調整連桿頭調低 Pitch 約＋ 4~5 度 (停懸時主旋翼需為約 2800RPM)
		Hovering throttle curve is too low 停懸點油門曲線過低	Increase throttle curve at hovering point on transmitter (around 65%) 調高停懸點油門曲線 (約 65%)
	Headspeed too high 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 headspeed should be around 2800RPM. 調整連桿頭調高 Pitch 約＋ 4~5 度 (停懸時主旋翼需為約 2800RPM)
		Hovering throttle curve is too high 停懸點油門曲線過高	Decrease throttle curve at hovering point on transmitter (around 65%) 調低停懸點油門曲線 (約 65%)
Rudder Response 尾舵反應	Drifting of tail occurs during hovering, or delay of rudder response when centering rudder stick. 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 Rudder gyro gain too low 尾舵陀螺儀感度偏低	Reset rudder neutral point 重設尾中立點 Increase rudder gyro gain 增加尾舵陀螺儀感度
	Tail oscillates (hunting, or wags) at hover or full throttle 停懸或全油門時尾翼左右來回搖擺。	Rudder gyro gain too high 尾舵陀螺儀感度偏高	Reduce rudder gyro gain 降低尾舵陀螺儀感度
Oscillation during flight 飛行抖動	Helicopter oscillates forward /backward/left/right while performing cyclic maneuvers. 升降舵或副翼打舵動作時，機體前後左右抖動 Helicopter front bobbles (nods) during forward flight. 直線飛行時，機頭點頭	Swashplate gyro gain is slightly too high. 十字盤陀螺儀感度偏高，產生追蹤現象	Turn the gain dial on MiniGRS counterclockwise, 10 degrees at a time until oscillation is eliminated. 逆時針調整 MiniGRS 上的感度調整旋鈕，以每次調整約 10 度的方式，調整至適當位置
		Worn servo, or slack in control links 伺服器老化，控制結構有虛位	Replace servo, ball link, or linkage balls. 更換伺服器、連桿頭、球頭
Drifting during flight 飛行飄移	pitching up or aileron drift during forward flight 直線飛行機頭上揚或副翼飄移	Swashplate gyro gain is slightly too low 十字盤陀螺感度偏低	Turn the gain dial on MiniGRS clockwise, 10 degrees at a time until drifting is eliminated. 順時針調整 MiniGRS 上的感度調整旋鈕，以每次調整約 10 度的方式，調整至適當位置
Control Response 動作反應	Slow Forward/Aft/Left/Right input response 前後左右飛行動作反應偏慢	Roll rate too low 滾轉速率偏低	Adjust MiniGRS roll rate dial clockwise . 順時針調整 MiniGRS 滾轉速率旋鈕
	Sensitive Forward/Aft/Left/Right input response 前後左右飛行動作反應偏快	Roll rate too high 滾轉速率偏快	Adjust MiniGRS roll rate dial countercolckwise. 逆時針調整 MiniGRS 滾轉速率旋鈕

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。

ALIGN

Specifications & Equipment/規格配備:

Length/機身長:705mm
Height/機身高:205mm
Main Blade Length/主旋翼長:360mm
Main Rotor Diameter/主旋翼直徑:804mm
Tail Rotor Diameter/尾旋翼直徑:171mm
Motor Pinion Gear/馬達齒輪:11T
Main Drive Gear/傳動主齒輪:121T
Autorotation Tail Drive Gear/尾驅動主齒:106T
Tail Drive Gear/尾翼傳動齒:25T
Drive Gear Ratio/齒輪傳動比:11:1:4.07
Flying Weight(without battery)/全配重(不含電池): Approx. 730g



亞拓電器股份有限公司
ALIGN CORPORATION LIMITED MADE IN TAIWAN

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