

# M690L MULTICOPTER

# ALIGN

## INSTRUCTION MANUAL

## 使用說明書

RM69005XT



**A13<sup>GST</sup>**  
高性能遙控器

  
RADIO CONTROL SYSTEM



For more detailed instructions, please check our website.  
<https://www.align.com.tw/index.php/multicopter-en/m690l/>

更詳細的組裝說明請上官網。

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

ALIGN

We appreciate your patronage of Align products. To ensure your success with this product, we would like to present the following information and important reminders.

Align Multicopter represents the latest innovation in multi-rotor aircraft design.

Amongst its design features:

Innovative, streamlined splash resistant shape at the pinnacle of power and beauty, industrial and structural design. Encompass stability control system, features light weight, strong payload, and long flight time. Superior in both high speed agility and static stability, this multi-purposed professional multicopter exceeds in all areas such as aerial photography or as leisurely sports flyer; yet its light weight allows for easy transport anywhere.

In order for you to thoroughly enjoy the Multicopter experience, please read through this manual prior to assembly and setting up the M690 Multicopter. Please keep this manual handy for future reference.

承蒙閣下選用亞拓遙控世界系列產品，謹表謝意。進入遙控世界之前必須告訴您許多相關的知識與注意事項，以確保您能夠在學習的過程中較得心應手。

亞拓多軸飛行機的設計特點為：

前衛流線防潑水造型，極致力與美，工業與結構設計，搭配穩定控制系統，輕量載重力強、飛行時間長特點，其動/靜皆強的高速運動飛行與穩定特性，兼具航拍、娛樂、休閒、攜帶輕便多用這專業多軸飛行機。

為了讓您容易方便使用，在開始操作之前，請您詳細的閱讀完這本說明書之後再進行安裝與設定，同時請您妥善保存這本說明書，作為爾後調整的參考。

## QR CODE LINKS TO INSTRUCTIONAL VIDEOS

### QR CODE教學影片

While this manual provides instructional information and references for this product, Align also produced instructional videos covering various topics pertaining to this model. The videos are available at the following link:

[Http://www.align.com.tw/m690lvid/](http://www.align.com.tw/m690lvid/)

說明書詳細介紹了本產品的使用說明，供您組裝時參考。另外，亞拓提供了各步驟的組裝教學影片，請利用下方連結處觀看，以確保您是安全且正確的使用本產品。

網頁瀏覽<http://www.align.com.tw/m690lvid/>

Assembly Tutorial 組裝教學	PC Interface Program Download Tutorial 介面下載教學	Configuration Tutorial 設定教學	Operation Tutorial 操作教學
			

# IMPORTANT NOTES

## 重要聲明

**ALIGN**

Radio Control (R/C) multicopters are not toys. R/C multicopters utilize various high-tech components to achieve superior performance. Improper use of this product can result in serious injury or even death. Please read this manual carefully before operating, and make sure to be conscious of your own personal safety and the safety of others nearby when operating all ALIGN products. Manufacturer and seller assume no liability for the operation or the use of this product. This product is intended for use only by adults with experience flying remote control aircraft at legal flying fields. After the sale of this product we cannot be held liable over its operation or usage.

We recommend that you seek 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. This product requires a certain degree of skill to operate, and is an expendable item. Any damage or dissatisfaction as a result of accidents or modifications are not covered by any warranty 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 the use, setup, 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.

In addition, R/C multicopters and its components are precision electronics susceptible to interferences from external forces such as magnetic field and radio signal. Should the multicopter or any onboard photographic equipment suffers loss or crash damage as result of external magnetic or radio interferences, Align cannot be held liable as the cause is beyond our control.

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




遙控飛行機包括遙控昇昇機與多軸飛行機（以下簡稱遙控飛行機）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！任何遙控飛行機的使用，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遙控飛行機經驗的成人或有相當技術的人員在旁指導，並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。

遙控飛行機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，本公司全部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。且遙控飛行機與配件之精密電子產品，易受外力、磁場、訊號干擾，在使用過程中如外力、磁場、訊號干擾，導致飛行機本身、及其搭載之攝影設備、器材之損壞或滅失，本公司亦無法控制及負責。

做為本產品的使用者，您，是單一對於您自己操作的環境及行為負全部的責任之人。

## WARNING LABEL LEGEND

標誌代表涵義

 <b>FORBIDDEN</b> 禁止	Do not attempt under any circumstances. 在任何禁止的環境下，請勿嘗試操作。
 <b>WARNING</b> 警告	Mishandling due to failure to follow these instructions may result in serious 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。
 <b>CAUTION</b> 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。

# SAFETY NOTES

## 安全注意事項

**ALIGN**

- Fly only in safe areas, away from other people. Do not operate R/C aircraft indoors or 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 a result of R/C aircraft models.
- Prior to every flight, carefully check all parts such as blades, screws, frame, arms, etc; ensure they are firmly secured and show no unusual wears, or unforeseen danger may happen.
- 遙控飛行機屬高危險性商品，飛行時務必遠離人群，禁止於室內飛行。人為組裝不當或未定期檢修造成的機件損壞、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機身各部位之零/配件/電子設備之性能是否正常，及無損耗老化現象，並確實將螺絲鎖緊才能升空飛行。並做好定期檢修，避免零件或電子產品異常所造成不可預期意外。

**禁止**

### LOCATE AN APPROPRIATE LOCATION

#### 遠離障礙物及人群

R/C aircraft can 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. Avoid location with magnetic and radio interferences. Please choose a legal flying field. Do not fly your model in inclement weather, such as rain, wind, snow or darkness.

遙控飛行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，請遵守當地法規到合法遙控飛行場地飛行，必須注意周遭有沒有人、高樓、建築物、高壓電線、樹木等等，避免磁場干擾、外力訊號干擾及操控的不當造成自己與他人財產的損壞。請務必選擇在空曠合法專屬飛行場地。請勿在下雨、打雷、沙塵等惡劣天候下操作，以確保本身及機體的安全。

**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 commonly 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！

**禁止**

### PREVENT MOISTURE

#### 遠離潮濕環境

R/C aircraft 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.

遙控飛行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！





## PROPER OPERATION

勿不當使用本產品

Do not attempt to modify the aircraft to alter its intended design. Please use only designated replacement parts listed in the manual to ensure its design structure integrity. Operate this product within its intended design parameters; do not overload it with excess cargo. This product is limited to personal hobby use, and pilot should be proficient with operation of this model. Follow all local law and ordinances when operating. Do not use this product for purposes which may violate others' personal privacy, and respect other's intellectual properties. Do not use this product for illegal purposes or beyond the bonds of common safety.

請勿自行改造加工，任何的升級改裝或維修，請使用亞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，本產品為休閒娛樂專用之精密電子遙控飛行產品，僅限熟練遙控飛行者使用，使用時請遵守當地法律規定，並嚴禁在任何違反公共安全區域操作，請勿利用本產品侵犯他人隱私/公開權，並尊重他人智慧財產權、著作權，勿用於安全、法令外之其它非法用途。並充分了解您任何的使用與操作必須負完全的責任。



## DO NOT FLY ALONE

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 experienced pilots or with computer-based flight simulator firstly.)

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機將導致自己與他人立即干擾等意外危險。遙控飛行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在場指導是入門必要的選擇)



## SAFE OPERATION

安全操作

Operate this unit within your ability. Do not fly while feeling impaired, as improper operation may result in danger. Never take your eyes off the model or leave it unattended while it is turned on. Immediately turn off the model and transmitter when you have landed the model.

請於自己能力內及需要一定技術範圍內操作這台遙控飛行機，過於疲勞、精神不佳或當操作，意外發生風險將可能會提高。不可在視線範圍外飛行，降落後也請馬上關掉遙控飛行機和遙控器電源。



## ALWAYS BE AWARE OF THE ROTATING BLADES

遠離運轉中零件

During the operation of the multicopter, the rotor will be spinning at a high rate of speed. The blades are capable of inflicting serious bodily injury and damage to surrounding properties. 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.

遙控飛行機主旋翼/螺旋槳運轉時會以高轉速下進行，在高轉速下的主旋翼/螺旋槳會造成自己與他人身上或環境上的嚴重損傷，請勿觸摸運轉中的主旋翼/螺旋槳，並保持安全距離以避免造成危險及損壞。





## KEEP AWAY FROM HEAT

遠離熱源

R/C aircraft are made of various forms of plastics, such as carbon fiber and polyethylene. Plastics are very susceptible to damage or deformation from extreme heat and cold climate. Make sure not to store the model near any source of heat such as oven or heater. It is best to store the model indoors, in a climate-controlled, room temperature environment.

遙控飛行機多半是以碳纖維、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。



## EQUIPMENT REQUIRED

自備設備

ALIGN



Tablet or Mobile Phone  
平板電腦或手機

- The Ap1 Multicopter Flight Controller supports iOS V9.0 and higher ; Android V7.0 and higher.
- Considering the best working efficiency, the specifications of the tablet or mobile phone are recommended as follows: 4GB RAM, and more than 20GB ROM storage space; in order to keep the best and fast performance quality.
- The max. dimension of screen bracket is 240x169mm.
- AP1 多軸飛行控制器支援 iOS 版本 9.0 以上、Android 版本 7.0 以上系統。
- 考量最佳使用效率，平板或手機的規格要求建議如下：搭配記憶體 (RAM) 4GB，以及儲存空間 (ROM) 20GB 以上；避免因平板或手機效能不足影響作業品質。
- 可相容平板手機最大尺寸為 240x169mm

## MODEL STANDARD EQUIPMENT DIFFERENCE

標準配備版本說明

ALIGN

The M690L Super Combo includes additional electronics and other equipment. The Instruction Manual will refer to the M690 Super Combo. You may purchase any additional items or spare parts referenced in the instruction manual.

M690L 系列商品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 Super Combo 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。





# STANDARD EQUIPMENT

標準配備

ALIGN



M690 Multicopter  
M690 六軸飛行機

Quick finder  
零件快速購



Multicopter Canopy  
機身外殼 x1



Clockwise x3 sets  
Counter Clockwise x3 sets  
7 Inch Main Rotor x6 Sets  
7吋主旋翼組 x6 Sets



Retract x2  
多軸起落架組 x2



AP1 Multicopter Flight Controller  
AP1多軸飛行控制器 x1



Multicopter GPS Sensor  
多軸GPS感應器 x1



PCU V2 Power Control Unit  
PCU V2 電源控制組 x1



RCM-BL4213(370KV)  
Brushless Motor x6  
RCM-BL4213(370KV) 無刷馬達 x6



Multicopter Brushless ESC x6  
多軸無刷调速器 x6



External Status LED  
外掛用模式燈 x1



VTD1 1080 HD  
Digital Video Transmitter Set  
VTD1 1080 高清數位攝傳組 x1



A13 GST  
Transmitter Set  
A13 GST遙控器組 x1



G2P Gimbal DV Set  
G2P雲台 DV組 x1



Intelligent Flight Battery  
智能電池 x1



RCC-100 Battery Charger  
RCC-100充電器 x1

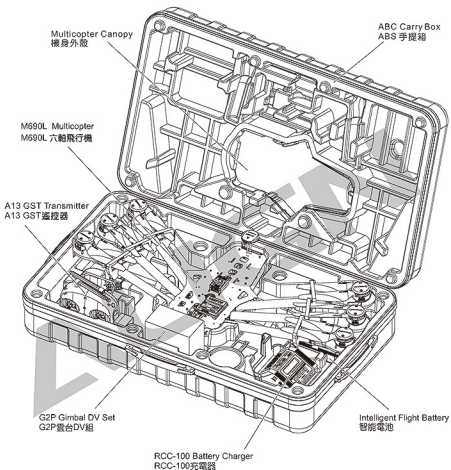


Hook Control  
多軸掛勾組 x1

# PACKAGE CONTENTS

包裝說明

ALIGN



M690L Super Combo body structure is already assembled in factory. Just need to twist off screws and adjust tube to proper position and locked well, and then install the canopy on the body firmly, ensure it will not detach during flight.

M690L Super Combo, 出廠時機身結構已組裝完成, 僅需將旋鈕螺絲轉開, 調整軸管至適當位置後鎖緊, 再將機殼確實安裝於機身, 並務必確認機殼完全卡住機身下側板, 避免飛行時脫落。

# ASSEMBLY SECTION

## 組裝說明

ALIGN

M690L Super Combo is assembled completely at factory. Please refer the manual instruction before flying and follow local rules. The helicopter and equipment require routine maintenance. Be sure to retain the manual for future reference.

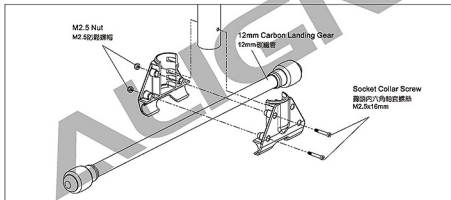
M690L Super Combo 出廠前已組裝調整完成，飛行前請詳閱操作說明，並遵守當地法規。飛行機及相關設備均需定期維護保養，請妥善保管這本說明書，以做為日後參考。

## 1 LANDING GEAR ASSEMBLY

### 腳架組裝

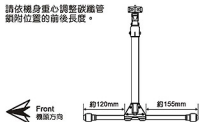
Remove landing gear assembly from box, loosen the 4 Socket Collar Screw M2.5x16mm from M2.5 hex nuts. Install the 12mm carbon landing gear into the T mount and re-tighten the screws.

取出腳架組，先鬆開腳架T座上的鎖頭內六角軸套螺絲M2.5x16mm，M2.5的鬆螺帽，將12mm碳纖維管鎖入腳架T座。



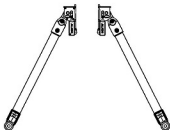
Please adjust the position of landing gear to accommodate the CG location of aircraft.

請依機身重心調整碳纖維管鎖附位置的前後長度。



Retractable Landing Gear Installation Orientation

腳架安裝方向示意圖



## 1 REMOVE CANOPY

## 拆開機殼

Remove main frame assembly from box.  
Temporarily remove canopy from frame .

1. Firstly, pull on two latching sides outwards.
2. Then gently remove the canopy upward from frame.

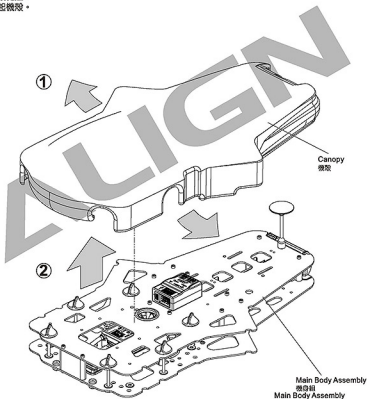
取出機身組，先將機殼拆下。

1. 先扳開機殼側邊。
2. 再往上提起機殼。



Use suitable force when removing canopy. Gently pull on two latching sides outwards to remove from frame.

機殼拆卸時請使用適當力道，將機殼兩側卡槽向外側輕輕扳開取出機身，以免造成機殼破裂損壞。

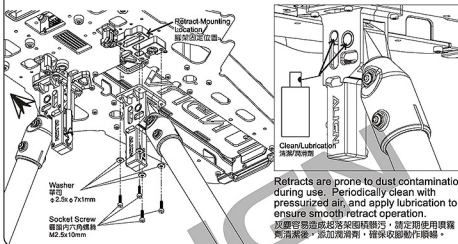


## 2 LANDING GEAR ASSEMBLY

### 腳架組裝

Retracts can be mounted in either front or rear 4 bolts pattern based on CG. Front is recommended for this aircraft.

M690L 依配重調整腳架組固定位置，請安裝於機身前側。

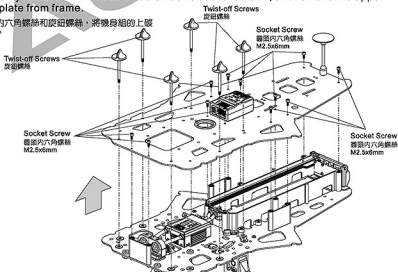


## 3 REMOVE TOP CARBON PLATE

### 拆開機身上碳纖維板

Temporarily remove all the twist-off screws and socket screws, and remove the upper carbon plate from frame.

鬆開腳架內六角螺絲和旋鈕螺絲，將機身組的上碳纖維板拆開。



# 4 PCU POWER CONTROL UNIT WIRING DIAGRAM

## PCU 電源控制組接線示意圖



Any incorrect wiring or errors in electrode connection will cause electronic burn out.  
訊號線誤插或極性錯誤將造成電子設備燒毀。



Make sure to install the wires with "UP" imprint facing up, and ensure the plug is inserted deep enough. Improper plug insertion may lead to poor connection or even malfunction of the AP1 unit.  
插線時，請務必將刻有UP字樣端口朝上，對準插座後，確實將插頭完全插入到底，若無確實插入定位，將導致接觸不良，AP1不動作問題產生！



AP1 Multicopter Flight Controller  
AP1 多軸飛行控制器



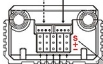
VTD1 1080 HD Digital Video Transmitter Set  
VTD1 1080P 高清數位攝像組



G2P Gimbal DV Set  
G2P 雲台DV組



Retract  
多軸起落架組



DC 5.8V Output  
DC 5.8V 輸出

Spare  
備用

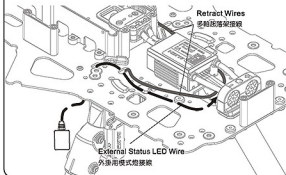
External Status LED  
外掛用模式燈

## RETRACT WIRES AND EXTERNAL STATUS LED CONNECTION

### 多軸起落架與外掛用模式燈接線

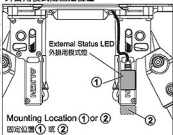
Route the retract wires up through opening in lower carbon plate. Route the External Status LED up through opening in lower carbon plate. Using double sided tape, mount the External Status LED module to the retract facing rear of frame. Insert all 3 plugs into the PCU according to PCU wiring diagram.

將多軸起落架上的訊號線，向上穿過下碳纖維孔洞；外掛用模式燈，由下往上穿過下碳纖維孔洞，沿腳架內側，黏貼於多軸起落架上（朝機尾方向）。再依PUC電源管理系統面板指示位置依序將插入接線。



### EXTERNAL STATUS LED MOUNTING LOCATION

#### 外掛用模式燈固定位置



## 3

## MOTOR ARM ASSEMBLY INSTALLATION

馬達軸管組裝

## 1 MOTOR ROTATION DIRECTION

馬達正逆轉方向



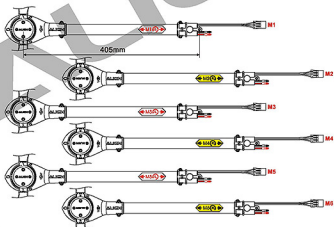
注意

Identify the direction identifier on each motor mounts: R (clockwise) rotation motor must match R rotation blades; L (counter-clockwise) rotation motor must match L rotation blades. 組裝前請確定馬達固定座上所標示的正、逆轉方向符號；R向馬達組必須搭配R向主旋翼；L向馬達組必須搭配L向主旋翼。



## 2 MOTOR ARM ASSEMBLY

馬達軸管組長度



注意

Incorrect sequence of motor tube assembly or changes made to rotational directions of motor / blades may cause immediate flip-over on takeoff, and result in unforeseen dangerous situation.

馬達軸管順序組裝錯誤或自行更改馬達、主旋翼R/L轉向，將會造成機體升空後翻滾、撞毀，嚴重的將導致不可預期的意外發生。

### 3 MOTOR ARM ASSEMBLY INSTALLATION

#### 馬達軸管組裝

Temporarily remove the socket hex screws M3x6mm from motor arm assembly. Based on the motor direction identifier label, attach the motor tube assemblies to the correct positions on the frame.

取出軸管組時，先將圓頭內六角螺絲M3x6mm鬆開，依照馬達固定座上所標示的正、逆轉方向符號，將軸管組鎖上，固定於機身下板鐵板的正確位置。



Insert a small screw driver into threaded sleeve to fix it in place while tightening the hex screws back.

可利用螺絲起子來固定鉗柱，將圓頭內六角螺絲鎖回。

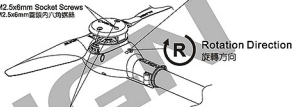


注意

Double check the sequence and blades R/L rotation direction during motor tube assembly, ensure the install matches exactly with the instruction manual. Incorrect assembly or modifications may cause unexpected result or bodily injuries.

組裝馬達軸管時，務必再次檢查及確認，馬達組編號順序及主旋翼R/L轉向是否與說明書標示一致，錯誤或任意變動機體，將會導致不可預期嚴重的意外或人員傷害。

M2.5x6mm Socket Screws  
M2.5x6mm圓頭內六角螺絲



注意

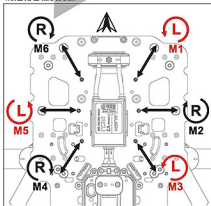
Use suitable force to tighten the M3 Socket Collar Screw and M2.5x6mm socket screws when adjusting the main rotor tightness and fixing main rotor upper cover to avoid motor winding failure.

調整主旋翼緊度及固定主旋翼上蓋時，請以適當力道鎖附M3軸套螺絲和M2.5x6mm圓頭內六角螺絲，避免鎖過緊造成馬達線圈損壞。

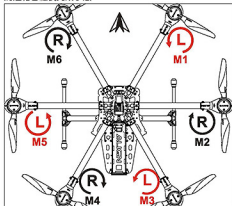
M3 Socket Collar Screw  
M3軸套螺絲



#### MOTOR ARM ASSEMBLY MOUNTING LOCATION 馬達軸管組裝孔位



#### COMPLETED MOTOR ARM ASSEMBLY INSTALL 馬達軸管組裝完成示意



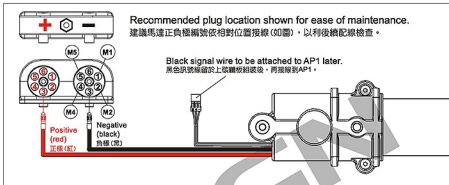


## 4 MOTOR ARM ASSEMBLY WIRING

### 馬達轉臂組接線

There are 3 wires coming out of the motor arm assembly: red (+), black(-), and signal(AP1). Connect the red(+) wire to positive power distribution cylinder, black(-) wire to negative power distribution cylinder. The signal wire will be connected to AP1 later.

每支馬達轉臂組有三條出線，分別接至：紅色電源線－正極；黑色電源線－負極；黑色訊號線－AP1。先將紅色電源線依序插入分電盤正極／黑色電源線接至分電盤負極。（黑色訊號線留於上側板組裝後再接線到AP1）。

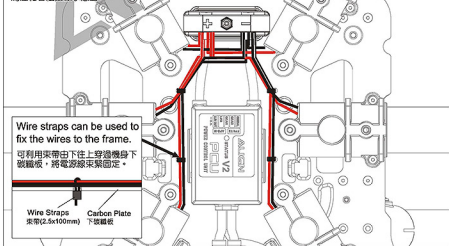


注意

Avoid pulling wires with excess force during wire management. Pulling the wires too hard may cause them to detach from ESC, resulting in problems with motor startup and navigation lights.  
整線時請勿過度拉扯，以免ESC訊號線脫落，造成馬達啟動及飛行指示燈信號異常。

### WIRING OF MOTOR ARM ASSEMBLY

馬達轉臂組接線示意圖



## 5 INSTALLATION OF TOP CARBON PLATE

### 機身上碳纖維組裝

Route the black signal wires from motor tubes through upper carbon plate. Re-install the upper carbon plate using the screws removed M2.5x6mm from earlier step. Then install the socket screw M3x6mm removed earlier from motor arm assembly.

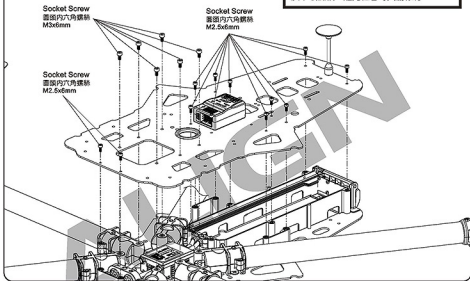
將馬達軸管中的黑色訊號線穿過機身上碳纖維，使用原拆下的圓頭內六角螺絲M2.5x6mm將上碳纖維鎖回機身；再以圓頭內六角螺絲M3x6mm固定軸管組。



注意

Prior to re-assembly, ensure upper carbon plate can lay flat onto the frame, and that all wires are neatly tucked underneath without any pinching.

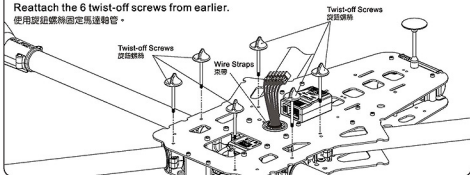
組合前，請確認上碳纖維是否能平整置於機體組合的位置，所有線材已經整齊固定於下碳纖維，避免組合時夾傷線材。



## 6 SECURING THE MOTOR ARM ASSEMBLIES

### 馬達軸管組固定

Reattach the 6 twist-off screws from earlier.  
使用旋鈕螺絲固定馬達軸管。



## 4 GIMBAL DV ASSEMBLY

### 雲台相機組組裝

Firstly, please fix the gimbal damper onto the gimbal mount, then assemble the gimbal DV set on the multicopter with four socket screws (M2.5x10mm).

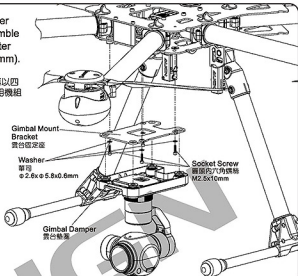
先將雲台墊圈與雲台固定座組合固定。再以四顆圓頭內六角螺絲(M2.5x10mm)將雲台相機組組裝於多軸飛行機機身。



注意

Prior to re-assembly, ensure upper plate can lay flat onto the frame, and that all wires are neatly tucked underneath without any pinching.

組合前，請確認上側板是否能平整置於機體組合的位置，所有線材已經整線固定於下側板，避免組合時夾傷線材。



## 5 HOOK CONTROL ASSEMBLY INSTRUCTION

### 多軸掛勾組組裝

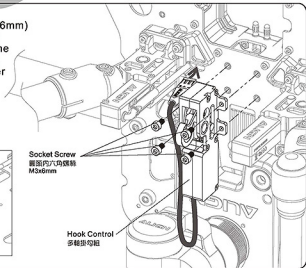
Use button head screws (M3x6mm) to install the hook control unit beneath multicopter. Follow the arrow to setup the cables and connect to AP1 flight controller AUX2 port.

將多軸掛勾組使用圓頭內六角螺絲(M3x6mm)組裝於多軸飛行機機身下方，依箭頭方向穿線接至AP1多軸飛行控制器的AUX2孔位中。



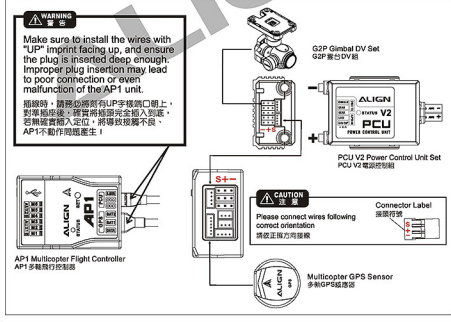
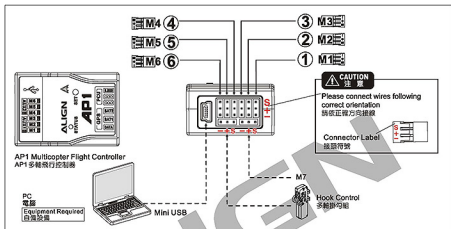
Socket Screw  
圓頭內六角螺絲  
M3x6mm

Hook Control  
多軸掛勾組



## 1 AP1 WIRING DIAGRAM

## AP1接線示意圖



## AP1 AND RECEIVER WIRING METHOD

### AP1與接收器接線方式

⑤ Connect your receiver to the appropriate AP1 port as indicated.

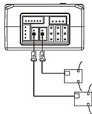
接收機接線方式，請依所使用的接收器類型接於指定孔位。

Please connect wires following correct orientation  
請依正確方向接線

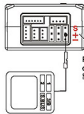
Connector Label  
接頭標籤



a) JR/Spektrum Satellite  
JR/Spektrum 衛星天線

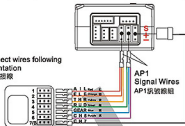


b) Futaba S.BUS/ JR X.BUS/ FS iBUS  
Futaba S.BUS/ JR X.BUS/ FS iBUS



Please connect wires following correct orientation  
請依正確方向接線

c) Standard Receiver  
傳統接收器



AP1 Signal Wires  
AP1訊號線



注意

- When using JR X.BUS connection of DMSS satellite antennas, please select MODE A in your transmitter.
- The standard receiver only support to Channel 7.
  - 使用JR X.BUS接線或DMSS衛星天線時，遙控器請選擇“MODE A”模式。
  - 使用傳統接收器，只支援至第7頻道。



禁止



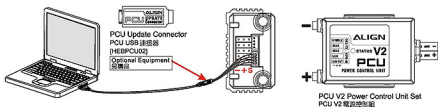
Please follow the instruction manual carefully when installing receiver. Traditional receiver channel ports are reserved specifically for the multi-colored ribbon cable. Do not directly connect standard servo plug into this port where power may be introduced into the AP1. Doing so may cause irreversible damage to the AP1.  
安裝接收器時，請遵循說明書組裝方式接線，傳統接法的接口為彩虹線專用訊號頻道，禁止接入電源否則會造成AP1多軸飛控系統損毀。

## 2 PCU UPGRADE CABLE WIRING DIAGRAM

### PCU升級更新接線示意圖

Connect the PC to PCU's AP1 (APS-M) port with USB adapter to perform firmware updates through PC interface program.

使用轉接線將USB接頭接到電腦端，另一端接PCU的AP1 (APS-M)孔位，透過電腦介面做升級更新。



PCU V2 Power Control Unit Set  
PCU V2電源控制組

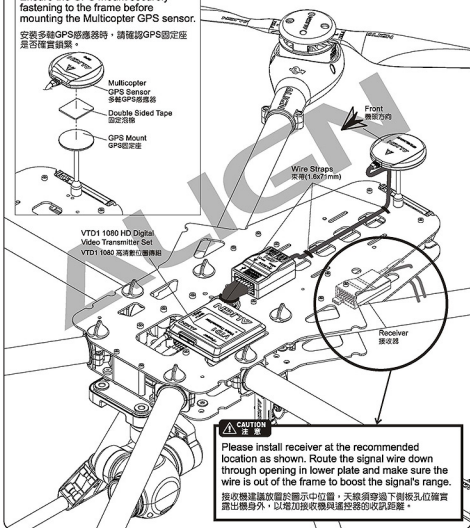
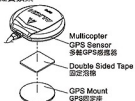
### 3 AP1 MULTICOPTER GPS SENSOR INSTALL AND AP1 WIRING

AP1多軸GPS感應器安裝及AP1接線示意圖

1. Install your radio receiver, and attach Multicopter GPS Sensor to GPS mount.
  2. Following the label on AP1, connect motor arm signal wires into M1-M6 ports, as well as receiver wire(s) to AP1.
1. 安裝接收器，並將多軸GPS感應器貼附於固定架上。  
2. 依面板指示位置依序①②③④⑤⑥將馬達軸管組訊號線接線至AP1。

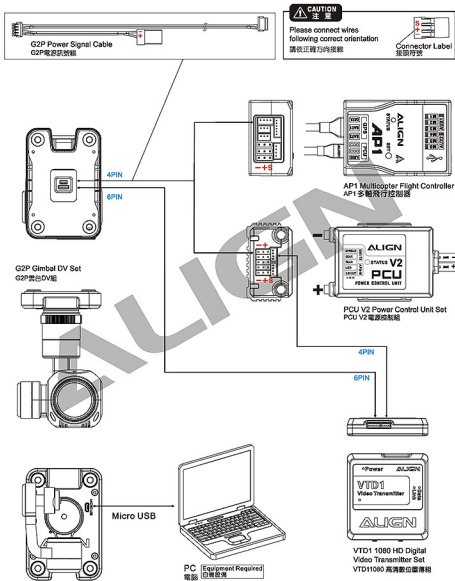
Ensure the GPS Mount securely fastening to the frame before mounting the Multicopter GPS sensor.

安裝多軸GPS感應器時，請確認GPS固定座是否確實鎖緊。



# 4 GIMBAL WIRING DIAGRAM

## 雲台接線示意圖



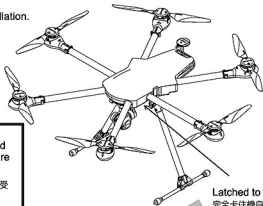
## 7

## CANOPY INSTALLATION

## 機殼組裝

Re-attach canopy to complete installation.

將機殼裝於機身即完成組裝。



Latched to frame  
完全卡住機身



注意

Canopy must be installed to avoid turbulence disturbance and ensure optimal flight performance.

飛行時必須蓋上機殼，以確保飛行機不受氣流干擾達到最佳的飛行效能。



注意

Ensure canopy is latched with the lower frame plate to prevent accidental separation during flight.

機殼裝上機身時，請務必確認機殼完全卡住機身下側板，避免飛行時脫落，而導致不可預期的意外。

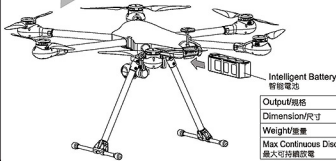
## 8

## BATTERY INSTALLATION ILLUSTRATION

## 智能電池安裝示意圖

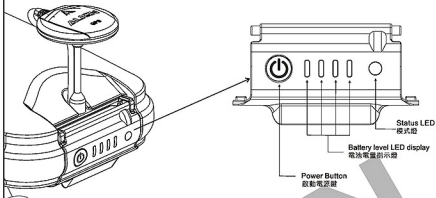
Brand new 6000mAh high efficiency battery for 16 ~ 20 working time. Delicate outfit and all-in-one quick release battery mounting plate with built-in anti-spark system at the tip to eliminates long term wear and damages to electronics from poor connections of worn plugs, and provide safe and reliable connection. The battery indicator light shows current battery capacity by pressing the power button.

全新6000mAh高效能智能電池，工作時間約16~20分鐘。精緻外觀、一體成型快拆式滑軌設計，能簡易輕鬆抽換電池。電池板內搭載新型“防火花”專利設計，能有效防止電池快拆插入時所產生的火花，降低電子設備傷害及接觸損耗接觸不良問題。具電量指示燈號，按壓開關可顯示目前電池電量。



Output/規格	22.2V 6000mAh 133.2Wh
Dimension/尺寸	168x52x48mm
Weight/重量	860g
Max Continuous Discharge 最大可持續放電	60C



**POWER ON 電源開啟**

**Battery level check:** Momentary press of power button to check remaining power.

**Power On:** Press and hold power button for 3 seconds until battery indicator LEDs light up and Status LEDs flash.

**Power Off:** Press and hold power button for 3 seconds until all LEDs shut off.

檢查電量：短按電源鍵檢視剩餘電量。

開啓電源：長按電源鍵3秒，電池電量指示燈亮起與模式燈閃爍，即完成開機動作。

關閉電源：長按電源鍵3秒，所有燈號熄滅，即完成關機動作。

**BATTERY LEVEL INDICATOR DESCRIPTION**  
電池電量指示燈說明

Battery level LED display 電池燈號顯示	Battery level indicator 電量顯示
	<b>75%~100%</b>
	<b>50%~75%</b>
	<b>25%~50%</b>
	<b>0%~25%</b>

**AUTOMATIC POWER SHUT-OFF 智慧型電源自動關閉**

Align's Power Control Unit (PCU), has intelligent power hibernation function where the multicopter will power down automatically minutes after landing. The default hibernation function is OFF, but can be adjusted according to actual needs.

亞拓PCU電源管理系統，具備智慧電源管理功能，當多軸機降落閒置時，會執行電源關閉保護。自動關閉時間原廠預設為關閉，您可以依實際需求設定關機時間。

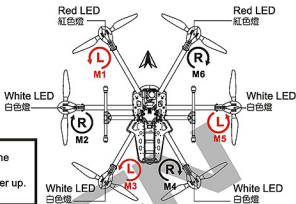
## 10

## FLIGHT NAVIGATION LIGHTS

飛行指示燈

1. Flight navigation lights will light up when power on.
2. Flight navigation lights will shut off when power off.

1. 多軸機開機後指示燈隨之全部開啓。
2. 多軸機關機後指示燈隨之全部關閉。



FORBIDDEN  
禁止

Do not operate R/C aircraft if the flight navigation lights exhibit abnormal behavior during power up.  
飛行指示燈開啓異常禁止飛行。

## 11

## COLLAPSIBLE MOTOR ARMS

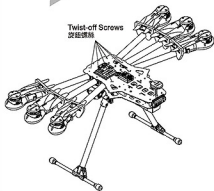
馬達軸管收納示意圖

The motor arm assemblies feature foldable design. Simply loosen the twist-off screws for the arms to swivel, reducing the footprint for ease of transport.

多軸飛行機軸管可快速收折設計，只要以手轉開旋鈕螺絲，就能輕鬆收折馬達軸管，調整軸管位置，減小體積方便攜帶，輕鬆收納不佔空間。

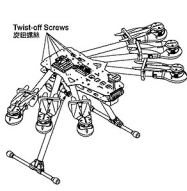
## MOTOR ARMS FOLD TOWARD THE SIDES

馬達軸管往旁邊兩側收折示意圖



## MOTOR ARMS FOLD TOWARD THE REAR

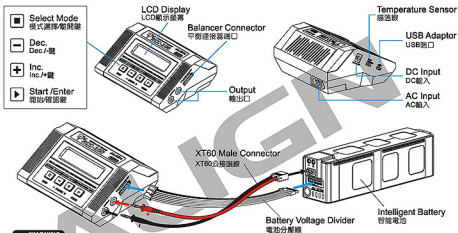
馬達軸管往後側收折示意圖



RCC-100 balance charger provides max. 100W charge, greatly reducing charging time. It combines advanced charging management technology with LCD display, and is equipped with 4 function buttons and simple button operation design. It can flexibly display the charging status and changes on the LCD display screen through the operation buttons. When charging, the charging process can monitor the battery charging status at any time.

RCC-100平衡式充電器，提供100瓦充電，大幅縮短充電時間。具備先進的充電管理技術與LCD顯示器進行結合，同時搭配4個功能按鍵、簡易按鈕操作設計，透過操作按鍵可以靈活的將充電狀態與變化顯示在LCD顯示螢幕上。當進行充電時，充電過程可隨時監控電池充電狀態。

### ILLUSTRATION & WIRING ILLUSTRATION 各部位名稱 & 接線示意圖



**ALWAYS TURN CHARGER ON FIRST.** Failure to turn on the charge prior to connecting a battery may result in damage to the charger and/or battery.

電池連接到充電器前，請保持充電器為開機狀態，避免造成充電器及電池的損毀。

### SPECIFICATION 規格表

AC Input Voltage AC 輸入電壓	100V-240V	Balance Current 平衡電流	400mA/cell
DC Input Voltage DC 輸入電壓	11.0V-18.0V	LiPo/Li-Ion/ Life Battery Cell Count 鋰系電池輸出電壓	1-6S
Charge Power 充電功率	MAX.100W	NiMH/NiCd Battery Cell Count 鎳系電池輸出電壓	1-15 cells
Charge Current 充電電流	10.0A	Pb Battery Voltage 鉛酸電池電壓	2-24V
Discharge Power 放電功率	MAX.5W	Dimension 尺寸	130x115x61mm
Discharge Current 放電電流	2.0A	Weight 重量	380g

# A13 GST RADIO FEATURE INSTRUCTION

## A13 GST 遙控器產品特色介紹

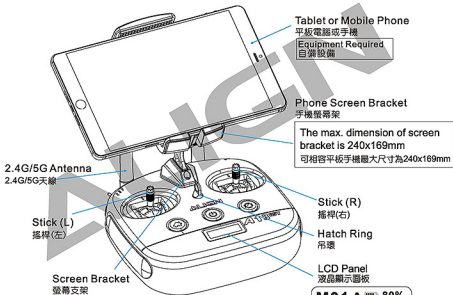
ALIGN

A13 GST is an ergonomic design with a comfortable grip and precision gimbal control. The built-in integration of this new remote control system was developed specifically to allow single button control of multiple functions and to improve flight efficiency.

Ground System APP is used to adjust the remote control parameters and custom button mode, so the Demeter maintains the best-performing state. Support for helicopter, multi-axis aircraft. Using a dual-frequency transmission system, with high-gain antenna, effectively enhancing the anti-jamming capability and picture quality.

A13GST外觀符合人體工學設計，有舒適握感與精準靈敏搖桿控制，內在是完美整合性高全新遙控系統，而它就是為了高端專業產品而量身打造。可透過簡易按鍵控制飛行器多項功能，而提升操控效率。

支援APP調整遙控器參數以及自定義按鈕模式，讓飛行器保持最佳理想狀態。支援直昇機與多軸飛行器功能。採用雙頻發射系統，搭配高增益天線，有效大幅提升抗干擾能力及畫面品質。



LCD PANEL ILLUSTRATION 液晶顯示面板圖示說明

M01	Model Selection 模型選擇
■■■■	Receive Signal (Under two bars will flash) 接收訊號(當低於兩格時，以閃爍表示)
A/G/I	A (Attitude) / G (Attitude) / I (GPS Positioning) A(姿態) / G(姿態) / I(定位)

M01 A	80%
■■■■	80%
🔌🔌	Master / Slave trainer mode connected 教練 / 主從機連線完成
🔄	Receiver Bound 接收器對頻完成
🔋	The bar is flashing in electronic scroll when charging or flashing when battery power (in digital) under 20% 充電時，格數依脈波馬燈方式閃爍。電池電量(以數字顯示)，當低於20%時，以閃爍表示

# 1 TRANSMITTER INTRODUCTION

按鍵功能說明

Switch for Flight Mode  
飛行模式開關

Flight Mode Indicator LED  
飛行模式指示燈

Return Home  
返航鍵

Power Button  
電源開關

Switch for Intelligent Mode  
智能模式開關

Retract Trainer Mode Switch  
(Need trainer cable)  
收腳架  
教飛切換 (需連接教飛線)

Hook Control  
掛勾控制

Photo/Video  
Extended Press-Video,  
Short Press-Photo  
拍照/錄影  
長按-錄影  
短按-拍照

Gimbal Pitch  
Angle Control  
雲台俯仰角度控制

Video Transmitter  
USB Pole  
圖傳USB插孔

Cable Connection Port  
(Flip Cover)  
接線孔蓋(掀蓋)



Charger Port  
充電插孔

Micro USB Port (Firmware Update)  
Micro USB插孔(程式更新)

Trainer Port  
教飛線插孔(主從遙控器)

Self-Defining  
Function-B  
自定義功能-B

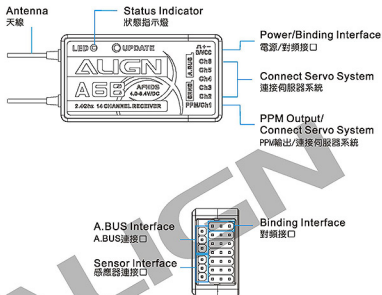
Self-Defining  
Function-W1  
自定義功能 W1

Control Box  
控制盒

## 2 A6B RECEIVER INTRODUCTION

### A6B接收器功能介紹

#### RECEIVER SETUP INDICATORS 接收器各部位名稱



PPM/CH1	Connect CH1 servo or PPM output signal. 連接CH1通道的伺服器或輸出PPM信號
CH2~CH6	The interface connect servo, power and other accessories. 接口可以連接伺服器、電源或其他零件
B/VCC	Using binding wire when binding; using power cord when normal operating, power range is 4.0~8.4V. 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	For output A.BUS signal. 用於輸出A.BUS接收器接收信號。
SENS	For connecting sensor. 用於連接各感應器。

**RECEIVER ANTENNA** 接收器天線

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

為確保訊號質量，安裝接收器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 shows 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 燈熄滅	Power disconnected. 接收器電源未連接
Red solid light 紅色恆亮	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。



To ensure quality of signal reception, the antenna should be vertical the RC model. When operating, careful to avoid pointing an antenna directly at the receiver. **DO NOT** grip transmitter antenna during operation as this will weaken the quality and intensity of radio transmission resulting in loss of control.

為確保訊號品質，天線應與遙控模型垂直放置。操控時不要將天線直接對著接收器。在使用過程中，嚴禁緊握遙控器天線，否將會減弱無線電傳播訊號的品質和強度，導致操控失靈及遙控模型失控的危險。



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

詳細的A13 GST遙控器說明介紹，請掃描QR Code連結亞拓網站下載相關資訊。完整的說明書請至官網下載專區下載。

<http://www.align.com.tw/A13/>

### SOFTWARE DOWNLOAD AND INSTALLATION A13 下載安裝

A13 Radio control system is flashed with the latest firmware version. Visit Align at [www.align.com.tw](http://www.align.com.tw) for the latest news and firmware updates.

Please scan QR Code for link to ALIGN website to find related software, or search "ALIGN A13" in iOS / Android app store.

A13 遙控器，在出廠前已是最新版本，請安心使用。您也可以連結至亞拓A13網站查詢，隨時更新亞拓發佈的最新版本及各項最新訊息。

請掃描QR Code連結亞拓網站下載相關軟體，或是在iOS/Android App store搜尋"ALIGN A13"。

<http://www.align.com.tw/a13/>

Compatible with



M690L Multicopter is assembled in the factory which includes configuration of the Ap1 flight control system. M690L requires the use of an ALIGN A13 transmitter. Follow the binding process as listed below.

M690L 六軸飛行機，包括AP1 飛行控制系統所有的參數設定，出廠前已組裝調整完成。搭配ALIGN A13 GST 遙控器，完成藍牙連線並且對頻成功即可開始使用。

## 1. POWER ON A13

### 1. 開啟A13介面



The A13 GST Transmitter system Disclaimer is displayed when the APP is launched for the first time. Please, read Align A13 GST Transmitter System Agreement in it's entirety.

聲明：

首次使用A13 GST遙控器系統，請詳讀免費聲明內容！一旦下載、安裝或使用 A13 GST 遙控器軟體或其中任何部分，即表示 貴用戶同意遵守各項條款與細則。



## 2. BLUETOOTH CONNECTION

Press "A13 Bluetooth Connection", turn on bluetooth device and search "ALIGN A13" to start connecting. Green light up when connecting successfully and then enter "A13 Radio Control System"

### 2. 藍牙連線

點擊 [A13藍牙連線]，開啟藍牙裝置，搜尋 [ALIGN A13] 進行連線。A13藍牙連線後顯示綠燈連線成功，即可進入A13遙控器設定首頁。



Default Bluetooth Password is "00000000".

藍牙預設密碼為：00000000(8個零)。



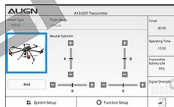
## RADIO BINDING 遙控器對頻

A13 Radio Control System home page shows valuable information including; model name and number, binding, flying mode, sub-trim, timer, sum time, radio battery power, launcher and receiver signal, system and function setting.

Please follow belows to bind radio.

進入A13遙控器設定首頁，有當前模型顯示、對頻、飛行模式、微調顯示、計時器、累計時間、遙控器電量、發射與接收訊號、以及系統設置和功能設置。

請參照下列方式進行遙控器對頻。



## 3. Select Model Type (6-axis Drone)

3. 選擇模型類型（六軸飛行機）

## 4. BINDING METHOD

### 4. 對頻方式



#### ① Power on A13

開啟遙控器電源



Operation Tutorial  
操作教學



#### ② Receiver connect with binding key

接收器接上對頻金鑰。



#### ③ Binding Method I :

對頻方式一：

Turn on APP and press "Binding" and radio screen displays "Binding"

開啟APP連線後點擊 [對頻]，此時遙控器螢幕會顯示Binding。

### ③ Binding Method II :

Other way to bind through firmware

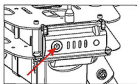
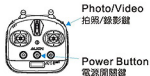
Press radio "Photo/Video" and "Power Button" simultaneously, and radio screen displays "Binding"

OR  
或

對頻方式二：

也可以通過硬體進入對頻模式。

同時按下遙控器的〔拍照/錄影〕與〔電源開關〕按鈕，此時遙控器螢幕會顯示Binding。



- ④ Power on receiver  
(Multicopter main power)

開啟接收器電源  
(多軸機主電源)

- ⑤ The monitor will show receiver signals and binding connection status after completion.

完成，此時遙控器上會顯示接收器訊號強度與連線對頻完成。

- ⑥ Solid red light on receiver after finish.

對頻成功後接收器燈號為紅燈恆亮。

## 5.SELECT MODEL

### 5.選擇模型

Enter A13 Transmitter System Setup/Select Model/Click "ALIGN M690". The model is factory defaults for ALIGN M690 Multicopter with the best parameter settings.

進入A13遙控器系統設置>>選擇模型>>選擇〔ALIGN M690〕。模型預設為亞拓M690六軸飛行機，已內建最佳化數值。



A13 GST Transmitter is adjusted in the factory, only required to confirm the bluetooth connection and binding success. The default parameter is the best value for M690 Multicopter, highly recommend not to adjust randomly by users who are unfamiliar with flight system for fear of wrong settings of transmitter to cause abnormal flight and damage the Multicopter or people get hurt. Detailed instruction and introduction please refer A13 GST radio manual.

A13 GST 遙控器在出廠前已調整完成，僅需確定對頻成功即可使用。預設的參數均專為M690多軸飛行機調整最佳化數值，強烈建議不熟悉系統操作者切勿進行調整，避免遙控器參數設定錯誤，造成飛行機飛行異常，嚴重者導致機體損壞或人員傷亡。詳細功能介紹請參閱A13 GST 遙控器使用說明。



# AP1 FEATURE INTRODUCTION

## AP1 產品特色介紹

**ALIGN**

The brand new ALIGN AP1 Multicopter Flight Controller with superior performance through cutting edge information technologies, utilizing high precision sensors and modern system control subroutines. Also AP1 has built-in supreme algorithm, six-axis fast reaction sensor, magnetic sensor and GPS sensor, providing high stability and the best aerial photography performance. Highly integrated ground station support Remote Target Route Planner and Regional Route Planner functions that the system automatic calculate its flight time and flight distance based on customers setup. The ground station will display flight status and record flight data for customer's reference. The G2P Gimbal DV Set and VTD1 1080 HD Digital Video Transmitter Set specially designed for M470/M480/M690 multicopter for optimal aerial photography mission.

亞拓AP1多軸飛行控制器，為全新、全面優化的無人機飛控系統(Flight Control System)，其中包含高精度姿態融合演算法、高速反應的控制，搭配微機電六軸陀螺儀感測、磁力感測、高度感測、GPS定位，針對航拍作業載重飛行穩定性更高。高整合性地地面站，具備遠端目標路徑規劃、區域路徑規劃功能，能自動運算所需之飛行時間，及飛行距離，執行多軸機智能自動導航的飛行任務、可即時顯示當前飛控資訊、並且記錄飛行軌跡。專為亞拓M470/M480/M690多軸飛行機開發運用，搭載G2P雲台DV組及VTD1 1080高清晰數位攝像組使用，提供最佳的航拍作業。



Supports multicopter configurations: 4 rotors + type., 4 rotors X type., 6 rotors + type., 6 rotors X type. 支援多軸飛行機：四軸+型、四軸X型、六軸+型、六軸X型。



Built-in Multicopter GPS Sensor for precise positioning function support dual GPS system (older version) and triple GPS system (new version). 內建多軸GPS感測器，提供精準的定位功能；支援舊版雙頻GPS以及新版三頻GPS。



Multiple flight modes including manual mode, attitude mode, GPS Angular mode, and GPS Velocity mode. 提供手動模式、姿態模式、GPS角度模式、GPS速度模式，可滿足玩家使用需求。



Equipped with automatic return home function with remote activation ability from R/C transmitter. Allow to set protection function that when RC transmitter signal is lost, aircraft will automatically fly back to home position or continue working mission. 具備自動返航，可由遙控器開關開啓返航；可設定當失去遙控器訊號時，飛行機繼續執行任務或返航。



Provide two kinds of mission path planners :  
1. Remote Target Route Planner. 2. Regional Route Planner.  
具備遠端目標路徑及區域路徑，兩種任務規劃方式。



AP1 provides 3 intelligent flight modes: CFO, HCL, and POI.  
具有航向鎖定、返航點鎖定、定點環繞三種智能飛行。



Features two stage battery low voltage protection system; stage 1 provides visual warning through flashing LEDs, stage 2 will initiate automatic return home.  
提供兩階段電池低電壓保護，第一階段閃爍警示，第二階段啟動自動返航。



Provides real-time OSD flight data output function.  
提供OSD飛行及時資訊輸出功能。



AP1 supports G2P gimbal control.  
AP1 支援G2P雲台控制。



Supports Spektrum and JR satellite receivers.  
支援Spektrum與JR衛星天線。



Supports ALIGN A.BUS / Futaba S.BUS / JR X.BUS / FS iBUS / Graupner Hott Sumd  
支援ALIGN A.BUS / Futaba S.BUS / JR X.BUS / FS iBUS / Graupner Hott Sumd 功能。



Configuration changes through Android APP.  
支援Android手機APP調整功能。



Configuration changes through iOS APP.  
支援iOS手機APP調整功能。



RoHS certification.  
符合RoHS限用規章。



注意

- Install Multicopter GPS Sensor with arrow pointing toward front of the multicopter on GPS mount to avoid interference with power and video transmission system.
  - Follow the instruction manual exactly for ESC signal wire connection. Incorrect connection may result in abnormal multicopter control behavior.
  - AP1 utilizes a magnetometer which is prone to interference from surrounding environment. Keep it away from servos, ESC, magnets, iron metals, batteries, power wires, and other electrical components. Any strong magnetic field will cause poor attitude stability and affect the AP1 flight performance.
  - Wireless transmission signal may cause interference to the AP1, affecting the position hold performance. It should be kept away from wireless transmitter and its antennas (such as RF module antenna).
- 安裝多軸GPS感應器時請依照面板上指示朝機頭方向安裝於GPS固定座上，以避免電池電源及無線通訊的設備互相干擾。
- 連接ESC訊號線時，請遵循說明書組裝步驟安裝，連接錯誤會影響多軸機運作異常而造成無法操控的危險。
- AP1包含磁力計，磁力計很容易受到環境的干擾，安裝時請遠離伺服機、電子變速器、磁鐵、鐵質金屬、電池、電線等影響磁場組件，避免磁力計讀取到錯誤地球磁場。
- AP1也會受到無線通訊的訊號干擾，會造成定位控制性能不佳，安裝時請遠離無線通訊設備。



注意

Directional arrow must point toward the front of multicopter.

指示箭頭朝向機頭

Multicopter GPS Sensor  
多軸GPS感應器

Wire straps  
束帶1.6x71mm

Front  
機頭方向

AP1 Multicopter Flight Controller  
AP1多軸飛行控制器

Wire straps  
束帶1.6x71mm

AP1 Multicopter  
Flight Controller  
AP1多軸飛行控制器

Multicopter  
GPS Sensor  
多軸GPS感應器

Do not mount with  
label facing down.  
面板標籤不可朝下

Do not mount with  
label facing to the  
side.  
面板標籤不可朝向側面



The AP1 flight controller supports iOS V9.0 or later ; Android V7.0 or later.

For the best working efficiency, AP1 must work with G2P Gimbal DV and VTD1 HD Digital Video Transmitter; also the specifications of the tablet or mobile phone are recommended as follows: 4GB RAM, and more than 20GB ROM storage space in order to keep the best and fast performance quality.

AP1 飛行控制系統支援iOS版本9.0以上、Android版本7.0以上系統。

考量最佳使用效率，全新AP1 須搭載G2P雲台及VTD1高清數位圖傳使用。平板或手機的規格要求建議搭配：記憶體(RAM)4GB、以及儲存空間(ROM)20GB 以上；避免因平板或手機效能不足影響作業品質。

## 1 AP1 SOFTWARE DOWNLOAD AND INSTALLATION

### AP1 下載安裝

AP1 Multicopter Flight Controller is flashed with the latest firmware version in factory. Visit Align at [www.align.com.tw](http://www.align.com.tw) for the latest news and firmware updates.

Please scan QR Code for link to ALIGN website to find related software, or search "ALIGN AP1" in iOS / Android app store.

AP1多軸飛行控制器，在出廠前已是最新版本，請安心使用。您也可以連結至亞拓AP1網站查詢，隨時更新亞拓發佈的最新版本及各項最新訊息。

請掃描QR Code連結亞拓網站下載相關軟體，或是在iOS/Android App store 搜尋"ALIGN AP1"。

[www.align.com.tw/download-en/AP1/](http://www.align.com.tw/download-en/AP1/)

Compatible with



## 1. TURN ON AP1 INTERFACE

### 1. 開啟AP1 介面



The AP1 flight control system Disclaimer is displayed when the APP is launched for the first time. Please, read Align AP1 flight control system Agreement in it's entirety.

聲明：

首次使用AP1 飛行控制系統，請詳讀免責聲明內容！一旦下載、安裝或使用AP1飛行控制系統軟體或其中任何部分，即表示貴用戶同意遵守各項條款與細則。

## 2. SELECT MODE

Select the used mode "Multicopter", press "Next"

### 2.選擇機型及雲台相機

選擇所使用的機型"Multicopter"，按〔下一步〕。

Press "Enter Ground Station" to enter ground station interface directly. Please make sure the Multicopter has been connected correctly.

點選〔進入地面站介面〕將直接進入地面站頁面。請確定已經正確連接飛行機。



Brand new AP1 Flight Controller specially designed for ALIGN M470/M480/M690 multicopters. Must work with G2P Gimbal DV and VTD1 1080 HD Digital Video Transmitter for the best aerial photography performance.

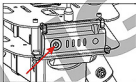
全新AP1飛控系統，專為亞拓M470/M480/M690多軸飛行機開發，需搭載G2P雲台相機組、VTD1 1080高清晰數位攝像器使用，提供最佳化功能呈現以及最優質的航拍效能。

## 3. GROUND STATION CONNECTION: TURN ON DEVICE POWER

### 3.地面站連線：開啟設備電源



Turn on the transmitter.  
開啟遙控器電源



Press and hold for 3 seconds to power up  
長按3秒開機



## 4. CONNECTING:

Turn on Wi-Fi in tablet and connect to "ALIGN XXXX" device. Enter in after finish.

### 4.進行連線：

開啟平板WiFi，選擇WiFi名稱 [ALIGN XXXX] 進行連線，完成後進入地面站。

Finish connection. Enter Ground Station.  
連線完成，進入地面站。



After finish connection, please do preflight inspection exactly. System shows current Multicopter status and equipment selected, make sure to double check all devices are used in safe range and selected correctly.

連線後應確實做好飛行前檢測。系統顯示目前飛行機狀態及設備選擇的項目，務必再一次確定設置在安全使用範圍、且飛行設備選擇正確。



## 2 GROUND STATION BASIC INTRODUCTION

地面站基本資訊介紹

The screenshot shows the ALIGN ground station software interface. At the top left, there are status indicators for 'Connected' (green) and 'Disconnected' (red). The main display area shows a map with a drone icon, a compass, and various data readouts. The interface is surrounded by numerous control buttons and icons. Red lines connect these elements to their respective labels in Chinese and English.

**Connected**  
設備已連線

**Disconnected**  
設備未連線

**Battery Power**  
電池電量

**Flight Mode**  
飛行模式

**Video Transmitter Signal**  
圖傳訊號

**GPS Signal**  
衛星數量

**Flight Time**  
飛行時間

**Universal settings**  
通用設定

**Switch Maps**  
地圖模式切換

**North**  
指向回北

**Positioning Mode**  
定位模式切換

**Switch Display**  
畫面切換  
(拍攝畫面/飛行地圖)

**HOME Position**  
HOME點位置

**You are here (Lighted Red)**  
目前位置 (紅點閃爍)  
飛行頭向指示

**Ascent/ Descent Velocity**  
上升/下降速度

**No-Fly Zone**  
禁航區

**ALIGNED/ Home Page**  
ALIGN/回首頁

**Remote Target Route Planner**  
遠端目標路徑規劃

**Regional Route Planner**  
區域路徑規劃

**Setup way point based on actual flight position**  
以飛行位置設定航點進行作業規劃

**Flight Record**  
飛行記錄開啓與編輯

**Return Home**  
返航

**Navigation Start / End**  
導航開始/結束

**Navigation Pause / Continue**  
導航暫停/繼續

**Attitude / Map Orientation**  
飛行姿態/地圖指向

**Nose Heading Direction**  
飛行頭向

**Height Info. / Setting**  
飛行高度顯示/設定

**Flight Speed Info. / Setting**  
飛行速度顯示/設定

**Flight Distance Info.**  
(How far is it from Home Position)  
飛行距離顯示(距離home點位置)

## AP1 OFFER TWO KINDS OF MISSION PLANNER:

AP1具備兩種任務規劃方式：



### 1. REMOTE TARGET ROUTE PLANNER 遠端目標路徑規劃

Use multi-point path coordinates to fly to designate location. The flight height, flight speed and flight modes can be set up on every point path (max. 50 waypoints).

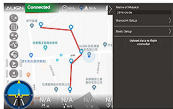
**Basic Setup:** flight height, flight speed and flight mode...etc. After setup, press "Upload data to flight controller".

**Advanced Setup:** sub-trim based on personal usage habits. It's set up to optimization in factory, basic works can be skip

利用多點式路徑座標，執行命令飛至指定的目的地，每個路徑點可設定飛行高度、速度、頭向，最多可設定50個路徑點。

**基本設置：**飛行高度、飛行速度、飛行頭向等，設定完成後，按【數據上傳至飛控】。

**進階設置：**為個人使用習慣微調，出廠時已調至最佳化，一般作業可省略不需設定。



### 2. REGIONAL ROUTE PLANNER 區域路徑規劃

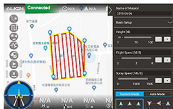
In the Ground System map, mark the designated area for spray application (max. 50 waypoints). The system operates flight path by selected shape and calculates an efficient spray route which is displayed. The spray route, height, spacing and flight mode can easily be adjusted. **Basic Setup:** flight height, flight speed and flight mode...etc. After setup, press "Upload data to flight controller".

**Advanced Setup:** sub-trim based on personal usage habits. It's set up to optimization in factory, basic works can be skip out, no needs to be set up again.

於地面站的地圖上點選所要執行飛行任務的範圍，由系統依點選的區域自動規劃，最多可設定50個路徑點，運算出涵蓋整個範圍面積的飛行路徑。可調整移動飛行路徑方向的角度、飛行路徑點的高度、間距、以及頭向模式。

**基本設置：**飛行高度、飛行速度、飛行頭向等，設定完成後，按【數據上傳至飛控】。

**進階設置：**為個人使用習慣微調，出廠時已調至最佳化，一般作業可省略不需設定。



### SETUP WAYPOINT BASED ON ACTUAL FLIGHT POSITION 飛行位置設定航點

**Regional Route Planner:** It allows to set route by drawing in AP1 ground station. Or it can set route by actual flying. Fly Multicopter above to the desired location and hover, set up the flight position in ground station one by one, then connect them to be your own regional route.

區域路徑規劃作業，除了可直接於地面站點選區域範圍，也可透過飛行位置設定；將飛行機飛行至欲規劃區域的邊界點上方，點選飛行位置設定鍵設定，依序區域邊界點。







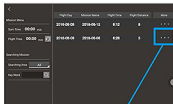
## FLIGHT RECORD 飛行記錄

Flight record can auto record every mission status in bar type display, simultaneously accumulate flight time, or re-calculate the record.

If there are lots of records, it can enter key words to narrow down search range to find out the record information rapidly and precisely.

飛行記錄可自動記錄每趟任務的執行狀況，條列式展出，同時可累計飛行時間，或將其記錄歸零重新計算。

當有多筆記錄時，亦可輸入關鍵字縮小搜尋範圍，快速精準的尋找該筆飛行資料。



## SINGAL MISSION DETAILS 單趟任務細節

Each flight mission can be saved in detail : mission content, working power energy, contact information, next working reminder...etc. Simultaneously record voltage line chart, photos, and import/export and save data for statistic analysis and future reference.

每筆飛行記錄均可詳細記錄：作業內容、作業動力、連絡資料、下次作業通知.....等等；同時記錄電壓折線圖、拍攝影像、可將資訊匯入、匯出、儲存，作為統計分析及參考數據。



## NAVIGATION CONTROL 飛行導航控制

After drawing waypoints, press "Navigation Start" to start auto flight navigation.

作業路徑規劃完成後，點選導航開始，進行自動導航作業。



## UNIVERSAL SETTINGS 通用設置

Click "General settings" then you can start set up: flight controller settings, transmitter settings, video transmitter settings, GPS satellite settings and aircraft flying information.

點選（通用設置），可開啟飛控設置、遙控器設置、圖傳設置功能、GPS衛星設置、飛行機狀態資訊。



When entering flight control setup page and adjusting the settings, it's prohibited to turn off or pull battery out to cause power off until finishing the settings and getting back to main screen of ground station; otherwise it'll cause data/parameter save failure and lead to reset settings.

進入飛控設定頁面調整設定時，過程中嚴禁關機或拔除電池斷電，必須完成設定後跳出回至地面站主畫面才可關機斷電，否則會造成設定參數儲存異常導致飛控設定重置。

## 1. FLIGHT CONTROLLER SETTINGS:

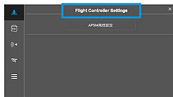
**Basic Settings :** To set up failsafe auto return home flight altitude, limited flight altitude or limited flight distance.

**Advanced Settings :** To set up sensor settings.

### 1. 飛控設置：

**基礎設置：** 設定失控保護返航高度、飛行高度限制、距離限制。

**進階設置：** 傳感器狀態。



## 2. TRANSMITTER SETTINGS:

Display stick mode, channels and EXP curve.

### 2. 遙控器設置：

顯示目前搖桿模式、頻道顯示、以及EXP曲線。



## 3. VIDEO TRANSMITTER FUNCTIONS:

Video transmitter is bound at the factory. If either the receiver or ground launcher is changed, the aircraft requires rebinding.

### 3. 圖傳設置：

圖傳設置出廠前已完成對頻。若必須更換空中接收端或地面發射器其中一端設備時，才需重新進行對頻。



### BIND METHOD :

A.) When replacing video transmitter, make sure to rebind the system. Please enter both video transmitter codes on the aircraft (receiver code) and ground (launcher code). After entering the codes, press [Binding].

B.) After binding, please turn off the aircraft at first, then turn off the transmitter. Re-power on both devices afterward for completion.

### 對頻方式：

A) 當更換任一端圖傳設備時，以空中接收端所使用的圖傳組編碼為主，對應同一組地面發射端編碼，輸入該組編碼後，按【對頻】。

B) 對頻完成後，先關閉飛行機電源再關閉遙控器電源，然後重新開機即完成。

### Video Transmitter Codes Diagram

#### 圖傳編碼示意圖



Each video transmitter code is unique.

Please refer to below diagram and enter the code.

每套圖傳都有獨立且對應的編碼序號，請參考圖傳位置，輸入您圖傳的專屬編碼。

#### Launcher Code

發射端編碼

80201-0018-A  
12:DB:01:AA:01:C9  
Align-018

#### Receiver Code

接收端編碼

80201-0018-B  
12:DB:01:BB:01:C9

#### 4. AIRCRAFT FLYING INFORMATION

Display Flight Time, Flight Mode, Flight Speed, Distance from HOME, Flight Altitude, Voltage, Currency, GPS Signal, Number of Satellites, and so on.

#### 4. 飛行機狀態資訊

顯示飛行時間、飛行模式、飛行速度、HOME點距離、飛行高度、電壓、電流、訊號強度、衛星數量...等相關資訊。



Condition			
Flight Time	N/A	Signal	N/A
Flight Mode	N/A	Satellite	N/A
Flight Speed	N/A	Throttle unlock	N/A
Distance from HOME	N/A	POV Height	N/A
Flight altitude	N/A	POV Electronic current	N/A

#### 5. LAYOUT

Select and setup voice prompt (ON/OFF), unit settings (metric or imperial), and offline map download service (Only available when using the AMAP).

#### 5. 設置

選擇語音提示開啟/關閉、單位設定(公制或英制)、以及離線地圖下載(當使用高德地圖才有此功能)。



#### MAP MODE 地圖模式

Different map versions, ways of finding north, positioning modes can be choosed :

Map Version: Earth Mode, Maps Mode, Mix Mode.

Finding North: Maps Direction, Directions North

Locating Mode: Aircraft Positioning, Maps Positioning

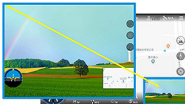
地圖模式可選擇地形顯示方式、指向回北、定位模式。  
地形顯示選項：衛星模式、地圖模式、混合模式切換。  
指向回北選項：地圖方向、地圖回北切換。  
定位模式選項：多軸輪定位位置中、地圖定位位置中。



#### SWITCH SCREENS 畫面切換

Switch screens by clicking the picture-in-picture on the bottom right for Camera Mode or Map Mode.

點擊右下方子母畫面，可切換主畫面為相機模式或地圖模式。



#### CAMERA MODE 相機模式

Camera Mode only support ALIGN G2P 4K DV which featuring photo/record mode, shutter/print screen, and camera function settings.

1. Photo/Record : Switch photo or record mode by pressing the button.

2. Shutter : During video recording, it allow to print screen by pressing the shutter button.

3. Function Settings : Brightness, Saturation, Contrast,

相機模式功能僅支援ALIGN G2P 4K DV操作，具有拍照/錄影切換、快門/螢幕截圖、以及相機功能設定。

1. 拍照/錄影切換鍵：切換相機為拍照模式或錄影模式。

2. 快門鍵：相機模式快門鍵於錄影模式中可做為螢幕截圖快捷鍵。

3. 相機設定鍵：可調整亮度、飽和度、對比度、銳利度、EV值、拍照模式、影像解析度、影像格式，以及格式化SD卡、重置相機參數。



## 2

## AP1 FLIGHT CONTROLLER SETUP

AP1 飛控設定

## 1 MODEL SELECTION

選擇模型

1. Select either Airplane or Multicopter model type on RC transmitter. AP1 will only work with transmitter set to either Airplane or Multicopter model type.

遙控器選擇飛機或多軸模式：使用AP1時，遙控器必須選擇飛機或多軸模式，才能與AP1正確搭配使用。



## MODEL TYPE 遙控模型類型

Please refer to A13 Transmitter Installation and Setup Instruction, ensure to select 6-axes drone then bind with transmitter.

請參閱A13遙控器安裝與設定，確認模型類型為六軸飛行機，並且已進行遙控器對頻完成。



## 2 RC TRANSMITTER SETUP

遙控器設定

## MODEL TYPE

Please select receiver type. A13 Transmitter has built-in with ALIGN A.BUS system.

遙控器與接收器：

請選擇所使用接收器類型。A13遙控器內建ALIGN A.BUS。

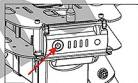


## SATELLITE ANTENNA BINDING 使用衛星天線對頻方式

- 1) Binding : (Hold last command)
- 2) Binding with Failsafe: (Reset to default settings).
  - a) Power on M690, select the satellite receiver type and failsafe type.
  - b) Reboot power to M690, satellite receiver's LED will blink, indicating entering binding mode.
  - c) Enter the receiver binding mode on your transmitter. Once binding is complete satellite receiver's LED will be steady lit.

- 1) 對頻：(保留最後指令)
- 2) 對頻與失控保護：(回復預設值)

- a) 將M690 電源開啟，選擇所使用的衛星天線及失控保護方式。
- b) 重新開啟M690 電源，此時衛星天線LED燈會開始閃爍進入對頻狀態。
- c) 將遙控器開啓對頻模式，對頻完成衛星天線LED燈會恆亮。



Reboot Power  
重新開啟電源



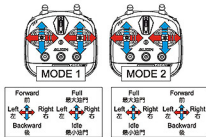
In binding with failsafe mode, receiver's LED will go from fast blink to off immediately after successful binding, followed by slow blinks. Move the transmitter sticks to desired position to set the failsafe position, which will be confirmed with steady lit of LED in 5 seconds.

如果選擇“對頻與失控保護”，遙控器對頻完成時，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；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，5秒後LED燈會恆亮，完成對頻。

### 3 RC TRANSMITTER STICK DIRECTION AND TRAVEL RANGE CALIBRATION 遙控器搖桿方向、行程校正

- 1) Before starting, set all EPA / Travel ADJ max and min value on your TX to default 100%, and neutralize all subtrims to 0.
- 2) Move your RC transmitter sticks and confirm travel direction on aileron/ elevator/ rudder/ throttle correctly matches the PC interface display. Select the "Reverse" on corresponding channels that need reversing.

- 1) 設定此項目前，所有頻道EPA、Travel ADJ最大最小變為預設值100%，所有微調設為“0”。
- 2) 確認遙控器各動作，副翼、升降、尾舵、油門搖桿方向是否正確，如果介面圖上顯示方向與搖桿方向相反，可點選該頻道上的“正反向”，讓介面與遙控器一致。



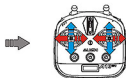
- 3) Select "Calibrate" and move all sticks on RC transmitter to maximum and minimum position, then click on "Complete" to finish.

- 3) 點選“遙控器行程校正”將遙控器搖桿都推至最大、最小，然後按下“完成”來結束校正。



- 1 Click on RC Travel Range Calibraton.  
點選遙控器行程校正

- 2 Click on "Calibrate"  
點選開始進行遙控器行程校正



- 3 Move all sticks on RC transmitter to maximum and minimum position.  
將遙控器搖桿推至最大及最小

- 4 Click on "Complete"  
完成

## 4 CHANNEL FUNCTIONS 各類道動作定義

Attitude, GPS (Velocity), GPS (Angular), Manual, Return Home, Intelligent Flight, as well as Retract functions can all be assigned to individualized switches on your RC transmitter.

AP1具備多種飛行模式，姿態、GPS(速度)、GPS(角度)、手動、自動返航、智能飛行與收腳架，可以依喜好習慣選擇指定開關使用。

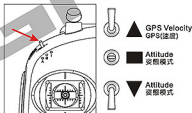


### 1. FLIGHT MODES:

- 1) AP1 Flight mode control is on CH5. Assign a 3-step switch on your RC transmitter to CH5.
- 2) Flip the switch and see if correct mode is selected. If slider falls outside the correct position, adjust the EPA/Travel ADJ subtrim in RC transmitter until correct mode is achieved.

#### 1. 飛行模式：

- 1) AP1 飛行模式設置於CH5，請先選擇一個三段開關對應CH5飛行模式。
- 2) 切換開關，查看操作介面上指標是否正確對應到正確位置。如果指標位置錯誤，可用微調與EPA/Travel ADJ功能，將指標調整至正確位置。



#### CAUTION 注意

Switch settings vary between different transmitter models, and can be set according to user preference.

各型號遙控器開關配置設定不相同，可依使用習慣選擇開關。

Flight Mode

Attitude Attitude GPS Velocity

#### CAUTION 注意

1. Default for first and second position is Attitude mode, but can be changed to Manual using the pull down menu.
2. GPS mode can be switched between velocity and angular GPS mode.
3. Beginners should not select Manual mode on first position. Inexperiences with manual flying may lead to control difficulties or even crash.

1. 出廠預設值開關第一、二段為姿態模式，可依使用需求，下拉選擇手動模式或姿態模式。
2. GPS模式則有GPS速度模式與GPS角度模式兩種選擇。
3. 初學者不建議設定第一段為手動模式，手動模式在不熟練飛行控制者的操作下飛行，可能會造成不可預期的意外發生。

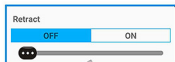
## 2.RETRACT SETTING

- 1) AP1 Retract function is on CH7 which is retract activation button.
- 2) Flip the switch and see if correct mode is selected. If slider falls outside the correct position, adjust the EPA/Travel ADJ subtrim in RC transmitter until correct mode is achieved.



### 2. 收腳架開關設定

- 1) AP1 收腳架功能設置於CH7，對應收腳架按鍵。
- 2) 切換開關，查看操作介面上指標是否正確對應到正確位置。如果指標位置錯誤，可用微調與EPA/Travel ADJ功能，將指標調整至正確位置。



## 3.RETURN HOME

- 1) AP1 Return Home function is on CH6 which is Return Home button.
- 2) Flip the switch and see if correct mode is selected. If slider falls outside the correct position, adjust the EPA/Travel ADJ subtrim in RC transmitter until correct mode is achieved



### 3. 自動返航

- 1) AP1 返航功能設置於CH6，對應於返航按鍵。
- 2) 切換開關，查看操作介面上指標是否正確對應到正確位置。如果指標位置錯誤，可用微調與EPA/Travel ADJ功能，將指標調整至正確位置。



CAUTION  
注意

Failsafe protection and low voltage protection can only be activated with aircraft at least 30M away from home position.

在HOME點半徑30M之內，不執行失控返航、低電壓返航功能。



## FAILSAFE PROTECTION

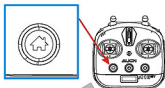
AP1 failsafe protection must work in conjunction with the RC transmitter's failsafe function.

- 1) Activate automatic return home button. Adjust transmitter's CH6 Endpoint (EPA) function so the indicator is in the Failsafe region. Write down this Endpoint value for next step.

### 失控保護

AP1失控保護設定必須搭配遙控器 Failsafe 功能。

- 1) 將返航按鍵開啟，接著調整遙控器 Endpoint(EPA) 功能中的 CH6 頻道，將指標調整至 "Failsafe" 區間。

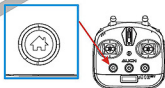


- 2) Enter the transmitter's Failsafe menu, activate Failsafe on CH6, and enter the Endpoint value obtained in last step.

- 2) 進入遙控器 "Failsafe" 功能，將 CH6 頻道 Failsafe 開啟，並將上述調整數值設定至 CH6。

- 3) Then adjust CH6 Endpoint (EPA) function on transmitter so indicator returns to the "ON" region.

- 3) 接著將遙控器 Endpoint(EPA) 功能中的 CH6 頻道，將指標調回 "ON" 區間。



4) Failsafe Test : It's allowed to power on/off transmitter. If failsafe is correctly set, the Return Home indicator in the Program Interface will move to the "Failsafe" icon.

4) 失控保護測試，此時可開關遙控電源，設定成功時，介面 Return Home 指標會移動至 "Failsafe" 區間。



**WARNING**  
警告

This operation should only be used for testing of failsafe. Do not turn off transmitter while airborne, otherwise loss of aircraft control or other dangerous scenarios may occur.

此操作僅供保護設定測試用，嚴禁在飛行中將遙控器關機，以免遙飛行機失控與發生不可預期的危險。

#### 4. INTELLIGENT FLIGHT

- 1) AP1 Intelligent flight mode selection is on CH8. Assign a 3-step switch on your RC transmitter to CH8 for the Intelligent Flight Mode feature.
- 2) Flip the switch and see if correct mode is selected. If slider falls outside the correct position, adjust the EPA/Travel ADJ subtrim in RC transmitter until correct mode is achieved.
- 3) AP1 provides 3 intelligent flight modes: POI(Point of Interest), HCL(Home Course Lock), and CFO(Carefree Orientation). The flight mode can be selected through pulling down menu.

#### 4. 智能飛行

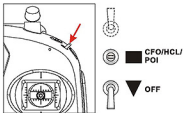
- 1) AP1 智能飛行設置於 CH8，請先選擇一個三段開關對應 CH8 智能飛行。
- 2) 切換開關，查看操作介面上指標是否正確對應到正確位置。如果指標位置錯誤，可用微調與 EPA/Travel ADJ 功能，將指標調整至正確位置。
- 3) AP1 提供三種智能飛行：定點環繞、返航點鎖定及航向鎖定，可依使用需求下拉選擇。

Note: 1) The default setting under GPS mode are POI(Point of Interest) and HCL(Home Course Lock).

2) For explanation of Point of Interest, Course Lock, and Home Lock function, please refer pre flight checklist and warnings.

註：1. 出廠預設值為 GPS 狀態下為定點環繞及返航點鎖定兩種功能。

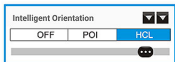
2. 定點環繞、返航點鎖定及航向鎖定功能，請參考飛行前檢查與注意。



**CAUTION**  
注意

Switch settings vary between different transmitter models, and can be set according to user preference.

各型號遙控器開關配置設定不相同，可依使用習慣選擇開關。



## 5 GIMBAL CONTROL SETTINGS

### 雲台控制設定

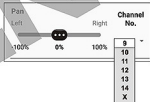
When AP1 is used with G2P gimbals, now you will have full 6 function controls with single RC transmitter: Pan, Roll, Tilt, Shutter Trigger. User can customize switches on RC transmitter for each of the functions. If you use dual RC transmitter, please pass over to next setting.

AP1搭配G2P雲台使用時，也具備單一遙控器可控制雲台六項功能：Pan軸、Roll軸、Tilt軸、拍照/錄影、環景拍照、一鍵回中，可以依喜好習慣選擇開關使用。使用雙遙控器則跳過此設定。

- 1) First assign the desire function to an RC channel.
- 2) On the RC transmitter select the applicable switch, dial, or slider to map to these 6 functions. We recommend using a dial or slider for gimbal's Pan/Tilt/Roll controls.
- 3) Correct direction for each function. Use the reverse function on RC transmitter to reverse direction if needed.



- 1) 先將所需要使用的功能配置到所要使用的頻道上。
- 2) 在遙控器選擇開關、旋鈕開關或滑軌開關來對應此六項功能。雲台的Pan軸、Tilt軸與Roll軸控制建議設置在旋鈕開關或滑軌開關。
- 3) 確認各功能是否有正常動作，如果動作有反向，可由遙控器的正反向功能切換更改。



The four gimbal control functions can all be assigned to individualized channel on your RC transmitter.

可依喜好將操作介面上的四項雲台控制功能分別配置到所使用的頻道上。



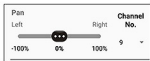
Please set the unused functions to X or N/A.  
沒使用到的功能請切換到X或N/A。

### GIMBAL CONTROL SETTING INSTRUCTION

雲台控制設定說明：

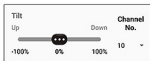
1. Pan control: Control gimbal's pan movement through a designated stick or switch on the RC transmitter.

Pan軸控制：透過遙控器指定一個撥桿或開關，可以控制雲台Pan軸方向動作。



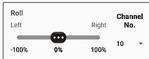
2. Tilt control: Control gimbal's tilt movement through a designated stick or switch on the RC transmitter.

Tilt軸控制：透過遙控器指定一個撥桿或開關，可以控制雲台Tilt軸方向動作。



3. Roll control: Control gimbal's roll movement through a designated stick or switch on the RC transmitter.

Roll 軸控制：透過遙控器指定一個撥桿或開關，可以控制雲台 Roll 軸方向動作。



4. Shutter control: When camera is connected to gimbal's trigger port with optional cable, controls camera's shutter or start/stop recording through a designated stick or switch on the RC transmitter.

拍照/錄影：透過遙控器指定一個撥桿或開關，且雲台與相機需搭配快門線，可以使用遙控器開關來控制相機拍照/錄影功能。



#### CAUTION 注意

These gimbal control settings are applicable for single RC transmitter controlling the multicopter and G2P gimbal. RC transmitter and receiver must be 8 or more channels. 此雲台控制設定是運用在單一遙控器控制多軸機與G2P雲台時，遙控器與接收機必須具備8動作以上。

## 6 MULTICOPTER TYPE 多軸機類型

Please select the correct multicopter layout from the following Four types. Select 6 rotor X configuration for M690.

支援四種多軸機類型(四軸、六軸)，請依所使用的多軸機選擇正確的類型。M690多軸機請選擇六軸X。

#### WARNING 警告

Arrow points toward the nose of aircraft. Incorrect type selection may lead to unflyable multicopters or even crash.

指示箭頭朝向機頭，如果多軸機類型選擇錯誤，會造成多軸機無法飛行且有摔毀的危險。

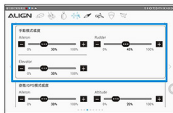


## 7 GAIN SETTING 感度設定

### 1. GAIN ADJUSTMENT 感度調整

Suitable flight gain is needed for proper operation of AP1. AP1 provides gain adjustments for each of the controls in each of the manual/attitude modes, plus an adjustment for GPS locking gain. Excess or insufficient gain values may result in degrading stability or uncontrollability of the aircraft.

使用AP1需設定適當的飛行感度。AP1提供手動、姿態，模式各動作的感度調整與GPS定位感度。感度過大或過小會造成穩定性或操控性變差。



## 2. GAIN AND FLIGHT CHARACTERISTICS ADJUSTMENTS

感度與飛行特性調整說明

		Gain too high 感度過大	Gain too low 感度過小
Manual Mode 手動模式	Aileron 副翼	Fast lateral oscillation 機體左右快速抖動	Lateral drift 機體左右不安定滑動
	Elevator 升降	Fast forward/aft oscillation 機體前進/後退快速抖動	Forward/aft drift 機體前進/後退不安定滑動
	Rudder 尾舵	Fast oscillation of the tail 機尾左右快速抖動	Lateral drift of tail 機尾左右不安定滑動
Attitude Mode 姿態模式	Aileron 副翼	Fast lateral oscillation 機體左右快速抖動	Lateral drift 機體左右不安定滑動
GPS Mode GPS模式	Elevator 升降	Fast forward/aft oscillation 機體前進/後退快速抖動	Forward/aft drift 機體前進/後退不安定滑動
	Rudder 尾舵	Fast oscillation of the tail 機尾左右快速抖動	Lateral drift of tail 機尾左右不安定滑動
	Altitude 高度	Fast up/down oscillation during altitude hold, unable to hold altitude 機體高度定位快速抖動	Vertical drift during altitude hold, unable to hold altitude 機體高度上下飄移
GPS Stopping Power GPS煞車		Shorter distance after airframe come to a stop from rapid position holding action 機體停止定位急煞反應，煞車距離較短	Longer distance after airframe come to a stop from delayed position holding action 機體停止定位緩煞反應，煞車距離較長

(Diagram-1) (表-1)

Below are some recommended gain settings and adjustment instructions

以下列出多軸機感度出廠設定與感度調整表

	Manual Mode 手動模式			Attitude Mode 姿態模式				GPS Stopping Power GPS煞車
	Aileron 副翼	Elevator 升降	Rudder 尾舵	Aileron 副翼	Elevator 升降	Rudder 尾舵	Altitude 高度	
M470/M480L multicopter M470/M480L 多軸飛行機	30	30	45	30	30	45	20	0
M690L multicopter M690L 多軸飛行機	30	30	45	30	30	45	20	0

(Diagram-2) (表-2)

## 8 MAGNETIC FIELD DEVIATION SETTING

### 磁場偏差值設定

In GPS mode, the multicopter may not fly straight in forward flight because GPS angle will vary from different Magnetic Field Deviation, which means angle on the horizontal plane between magnetic north and true north, and its positive when magnetic north is east of true north, and negative when it is to the west. To correct the angle value accordingly, AP1 system will automatically adjust the GPS angle value base on where your geographic location is. So please refer to below link of N.O.A.A. Calculator and select your located deviation as following request.

GPS實際飛行路徑會受地磁偏角影響產生偏差值。地磁偏角是地球上任一處的地磁方向和正北方向之間的夾角，當地磁北向實際偏東時，地磁偏角為正，反之為負。

請根據您目前所在之國家位置，設定相對的GPS偏差角度，系統會自動為您修正偏差值。否則，在GPS的模式下做直線飛行時，可能會產生不同程度的偏斜現象。

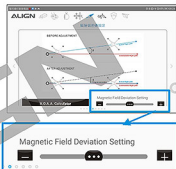


Magnetic declination requires correct positive or negative polarity.

磁場偏差值有正、負值之分，請輸入正確偏差值。



N.O.A.A. Calculator  
計算當地磁場偏差數值參考網站  
<http://www.ngdc.noaa.gov/geomag-web/#declination>



## 9 AP1 MULTICOPTER GPS SENSOR LOCATION

### AP1多軸GPS感應器位置

1. After AP1 and AP1 Multicopter GPS Sensor are installed onto multicopter, the distance between the two units need to be entered into the system relative to the X, Y, and Z axis, along with the correct direction. The default location values for factory installed AP1 is X: -170, Y:0, Z:-40.

AP1與AP1多軸GPS感應器安裝完畢後，需填入GPS感應器與AP1的相對距離，請依照圖示正確填入X、Y與Z軸距離，並注意方向。出廠時，AP1已安裝完成，預設值為X:-170、Y:0、Z:-40。



Incorrect value or directional polarity of AP1 Multicopter GPS Sensor mounting location will affect aircraft stability or induce drifts.

如果多軸GPS感應器數值方向填寫錯誤，會直接影響飛行器穩定性或飄移。

## 10 VOLTAGE CALIBRATION 電壓校正

AP1 additional function PCU Voltage Deviation Calibration, the interface shows the latest voltage value detected from PCU. If there is voltage gap between PCU and actual battery voltage, click on 'calibration' and correct actual value accordingly.

AP1提供PCU電壓校正功能，操作介面上顯示的數據為目前PCU偵測到的電壓。如果介面上電壓與您使用電池電壓不同時，請點選校正鈕，輸入目前電池實測的電壓數據。



Make sure to turn the multicopter on and firmly connect to AP1 software while testing actual battery voltage by voltage tester (Multi-function Tester RCE-MT9).

測量電池電壓時，請使用電壓檢測器(多功能檢測計 RCE-MT9)，且必須是在多軸飛行器並連上操作介面情況下測量。



## 11 LOW VOLTAGE PROTECTION 低電壓保護

AP1 PROVIDES TWO METHODS FOR LOW VOLTAGE PROTECTION.

### 1. First Stage Protection : low voltage warning light

Low voltage warning light: Sets the trigger voltage for low voltage warning. Recommended value is 3.625V, at which point the aircraft will have approximately 200M range left (around 1 minute). When voltage drops below the set value, AP1 LED will be flashing red.

### 2. Second Stage Protection : low voltage trigger for automatic go home

Low voltage Return Home : Sets the trigger voltage for low voltage return home. We highly recommend the value of 3.60V to be used, at which point the aircraft will have approximately 100M range left (around 30 seconds). When voltage drops below the set value, AP1 will initiate automatic return home feature.

AP1提供兩種低電壓保護

#### 1. 第一階保護：低電壓警示閃燈

設定低電壓警示閃燈電壓，出廠設定為3.625V(建議值)，此電壓預估可安全飛行距離能力為(約1分鐘)200M，當飛行中電池電壓低於此設定電壓時，AP1即會閃爍紅燈提醒。

#### 2. 第二階保護：低電壓自動返航

設定低電壓自動返航電壓，出廠設定為3.60V(建議值)，此電壓預估可安全飛行距離能力為(約30秒)100M，當飛行中電池電壓低於此設定電壓時，AP1即會執行自動返航。



Low voltage protection features require the use of Align PCU.

強烈建議開啓此功能，提供飛行機安全保護。

## 12 FAILSAFE PROTECTION SETUP 失控保護設定

### Failsafe Protection Setup:

- When to activate failsafe protection function :
  - While lost transmitter signal
  - While lost video transmitter signal
  - While mission completed
- Set up auto return home function:
  - Raise altitude then return home. (Altitude up to 10M as default setting.)
  - Self-defined flight altitude for return home.
- Return home mode selection:
  - Direct straight home
  - Return home along same flight path
- Self-defined flight altitude for return home: Range between 5 ~ 30M.

### 失控保護設定

- 選擇失控保護啟動的依據，選項為：
  - 遙控器訊號
  - 圖傳訊號
  - 飛行任務完成。
- 設定自動返航為：
  - 升高返航-內建升高10M
  - 自訂高度返航。
- 選擇自動返航模式為：
  - 直線返航
  - 原路徑返航。
- 自訂返航上升高度為：5~30M。



Low voltage protection features require the use of Align PCU.

強烈建議開啓此功能，提供飛行機安全保護。

## 13 AUTO RETURN HOME HEADING SELECTION 自動返航頭向

Select the multicopter heading toward home position during auto return home.

Front : Nose of multicopter points to home position.

Rear : Tail of multicopter points to home position.

Automatic return home heading default is tail in.

選擇在執行自動返航時，多軸機朝向Home點飛行的頭向

頭：多軸機頭部朝Home點返航。

尾：多軸機尾部朝Home點返航。

預設為多軸機尾部朝Home點返航。





# 14 SETTING DISPLAY AND MOTOR TEST FUNCTION

## 設定顯示與馬達檢測

When performing motor test function, configuration interface will display the multicopter type, receiver type, low voltage protection parameters, and Multicopter GPS Sensor position. Please double check the settings match that of multicopter before performing motor test function.

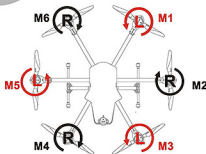
在執行馬達檢測功能時，介面會顯示所設定的多軸機類型與接收器類型、低電壓保護設定參數、多軸GPS感應器位置；請再檢查是否與目前多軸機的實際狀況相同。

確認無誤後再執行檢測動作。



When this function is activated, motor will sequentially rotate approximately 0.5 seconds. Ensure each motor is turning the correct direction, as any incorrect rotating direction may lead to immediate flip-over on takeoff. Rotating motor poses certain danger, so please ensure there are no obstacles or people nearby when performing this test.

使用此功能時，馬達會逐一M1、M2、M3、M4、M5、M6慢速轉動約0.5秒，測試時務必仔細檢視各馬達轉向是否正常，錯誤的轉向將導致起飛時翻機意外，馬達主旋翼轉動過程有危險性，檢測時請先確認多軸機旁無雜物，並且人要離開主旋翼轉動範圍，以免發生危險。



### WARNING 警告

During the test, confirm motor is spinning in sequence from M1、M2、M3、M4、M5、M6, and double check the rotating direction matches the imprint on motor mounting pod. Do not fly if any inconsistency is observed.

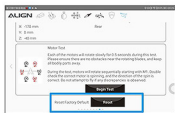
檢測時，請確認馬達是否由 M1、M2、M3、M4、M5、M6 依序轉動，請核對是否與馬達座印刷轉動方向正確，如果不正確，請勿飛行。

### REVERT TO FACTORY DEFAULT.

This function will revert all AP1 multicopter flight controller settings back to factory default.

#### 恢復原廠預設值

使用此功能，AP1多軸飛行系統會將您所設定的內容，恢復為原廠出廠時的預設值。



# GIMBAL POWER ON AND SELF-TEST

雲台供電啟動與開機自行檢測

ALIGN

## 1. POWER UP PROCEDURE WHEN MOUNTED TO ALIGN MULTICOPTERS

Connect the 12V output from Align's PCU with the PCU port on gimbal.

### 1. 搭配亞拓多軸機開機步驟

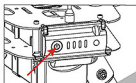
由亞拓多軸機PCU輸出DC12V電壓與雲台PCU埠連接。

Turn on RC transmitter power  
開啟遙控器電源



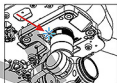
Power ON  
電源開啟

Turn on multicopter power  
開啟多軸機電源



Press and hold for 3 seconds  
to power up  
長按3秒開機

Gimbal power up  
雲台電源啟動



Successful power up is  
indicated by gimbal  
status LED shows blue.

雲台狀態指示燈顯示藍燈，  
代表開機完成。

## 2. GIMBAL AUTOMATIC POWER ON TEST.

After power is applied, gimbal will automatically perform 3-axis neutral point calibration. The process takes about 10 seconds, ends with the gimbal locking its heading direction to the front and the camera lens will be down 20 degree.

### 2. 雲台開機自行檢測回中立點

開啟電源後，雲台會自動校正三軸中立定位點檢測，過程約10秒鐘自檢完成，鎖定頭向朝前，鏡頭會向下20度。



G2P gimbal DV system is flashed with the latest firmware version in factory. Visit Align at [www.align.com.tw](http://www.align.com.tw) for the latest news and firmware updates.

G2P雲台DV組，出廠前已是最新版本，請安心使用，您也可以連結至亞拓G2P網站查詢，隨時更新亞拓發佈的最新本及各項最新訊息。

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

完整的說明書請至官網下載專區下載。

<http://www.align.com.tw/aerial-equip-en/multicopter/g2p/>



# PRE-FLIGHT CHECKLIST AND WARNINGS

## 飛行前檢查與注意

ALIGN

### 1 LOCATE AN APPROPRIATE LOCATION

遠離障礙物與人群

R/C aircraft can 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. Avoid location with magnetic and radio interferences. Please choose a legal flying field. Do not fly your model in inclement weather, such as rain, wind, snow or darkness.

遙控飛行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，請遵守當地法規到合法遙控飛行場地飛行。必須注意周遭有沒有人、高樓、建築物、高壓電線、樹木等等，避免磁場干擾、外力訊號干擾及操控的不當造成自己與他人財產的損壞。請務必選擇在空曠合法專屬飛行場地。請勿在下雨、打雷、沙塵等惡劣天候下操作，以確保本身及機體的安全。



### 2 DO NOT FLY ALONE

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機將導致自己與他人立即干擾等意外危險。遙控飛行機操控技巧在學習初期有著一定的難度，盡量避免獨自操作飛行，需有經驗的人士在旁指導，才可以操縱飛行，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在場指導是入門必要的選擇)



### 3 CENTER OF GRAVITY ADJUSTMENT

重心調校

The aircraft needs to be balanced at the Center of Gravity (CG) point with full payload onboard. Improper CG balance may cause flight instability and/or uneven power consumption of the motors, and may even leads to crash in worse case scenario.

飛行前務必確認，並調整好全載重機體的重心位置，偏移的重心容易導致飛行不穩與馬達受力不均的耗電、損傷，嚴重將導致不可預期的失衡摔機。

Center of Gravity (CG)  
重心位置

M690 Center of Gravity (CG)  
M690 重心位置



### 4 CHECK THE WIRE DIRECTION

檢查插線

Make sure to install the wires with "UP" imprint facing up, and ensure the plug is inserted deep enough. Improper plug insertion may lead to poor connection or even malfunction of the AP1 unit.

插線時，請務必將刻有UP字樣端口朝上，對準插座後，確實將插頭完全插入到底，若無確實插入定位，將導致接觸不良、AP1動作時趨產生！



Safety feature to allow spin-up of motors only when specific transmitter stick movement is executed, so that accidental start/stop is prevented.

### 1. To Start Motor

- 1) Turn on transmitter power.
- 2) Press and hold power button for 3 seconds to turn on multicopter power.
- 3) Start the motor by pushing both RC transmitter control sticks toward lower inner or lower outer position.

Safety Mode 1: Motors will power off if throttle is not raised within 5 seconds. To re-start Motor by pushing both RC transmitter control sticks toward lower inner or lower outer position.

Safety Mode 2: Motors will power off automatically after landing and throttle is lowered, even without the shutoff routine.

馬達具備安全保護裝置，必須執行遙控器動作才能啟動或關閉馬達電源，避免因誤開電源而啟動或關閉馬達。

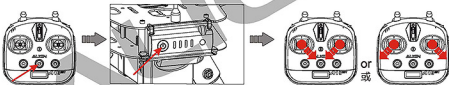
#### 1. 開啓馬達電源

- 1) 開啓遙控器電源。
- 2) 啓動機身主電源，長按電源鍵3秒開機。
- 3) 將遙控器兩支搖桿同時向內向下45°或向外向下打45°，才會啓動主馬達。

安全模式1：當啓動馬達後若5秒內未推升油門，系統會自動關閉馬達電源停止運轉。

如欲再開啓馬達電源，將遙控器兩支搖桿同時向內向下45°或向外向下打45°，才會啓動主馬達。

安全模式2：當飛行完後降落地面，油門降至最低點時，如果未手動關閉馬達主電源，5秒後系統會自動關閉馬達主電源停止運轉。



① Power ON  
電源開啓

② Press and hold 3 seconds to turn on  
長按3秒開機

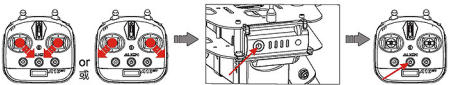
③ Control stick movement diagram  
搖桿指示方向示意圖

### 2. To Stop Motor

- 1) Push both RC transmitter control sticks toward lower inner or lower outer position.
- 2) Press and hold the power button for 3 seconds to turn off multicopter power.
- 3) Turn off transmitter power.

#### 2. 關閉馬達電源

- 1) 將遙控器兩支搖桿同時向內向下45°或向外向下打45°，才會關閉主馬達。
- 2) 關閉機身主電源，長按電源鍵3秒關機。
- 3) 關閉遙控器電源。



① Control stick movement diagram  
搖桿指示方向示意圖

② Press and hold 3 seconds to turn off  
長按3秒關機

③ Power OFF  
電源關閉

## 6

## MOTOR SPIN TEST

## 馬達運轉測試

1. When motor spin test is activated, motor will sequentially rotate approximately 0.5 seconds. Check and correct motor location and whether spin direction is correct.
2. Rotating motor poses certain danger, so please ensure there are no obstacles or people nearby when performing this test.

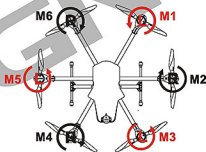
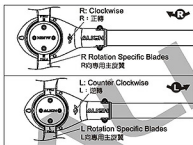
1. 馬達運轉測試功能開啓時，馬達會依序慢速轉動約0.5秒，檢查安裝位置及主旋翼/螺旋槳旋轉方向是否一致。
2. 馬達主旋翼/螺旋槳旋轉過程有危險性，檢測時請先確認多軸機旁無雜物，並避開主旋翼/螺旋槳旋轉範圍，以免發生危險。

## 1 MOTOR ROTATION DIRECTION

## 馬達正逆轉方向

Incorrect sequence of motor tube assembly or changes made to rotational directions of motor / blades may cause immediately flip-over on takeoff.

組裝前請確定馬達固定座上所標示的正、逆轉方向符號，以及前後軸管組長度。

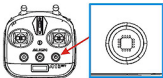


## 2 RETRACT TEST

## 腳架收放測試

Test the retract switch on RC transmitter and do retracting for 2 to 3 times prior to flight.

飛行前應測試腳架收放功能，切換收腳架按鍵開關做腳架收放動作2-3次，確定收合動作正常。



**CAUTION**  
注意



To avoid getting your hands pinched, do not touch retracts while in motion.

請勿觸碰正在進行收放腳架的收折處，避免夾手。

Objects on multicopter can interfere with magnetometer's readings, lowering AP1's heading precision, and even affect position hold ability. To reduce the environmental effect on magnetometer, AP1 must be calibrated prior to use to ensure correct and stable operations. Calibration must be performed whenever one of the following condition occurs:

- The initial install of AP1 modules.
- Changes to the GPS module.
- Additions or removal to electronic equipment near the magnetometer (Servos, ESC, etc).
- When flying location differs from last compass calibration position by **100 km or more**.

磁力計在AP1裡面是扮演辨別頭向與多軸機姿態的角色，而多軸機上的電子變速器、馬達、電線、鐵性物質等會干擾磁力計，影響AP1頭向控制的準確度，甚至影響定位控制的效果。為了減少環境對磁力計的影響，所以使用AP1前務必執行磁力計校正的工作，才能讓AP1有正確與穩定運作。在以下情況，必須做磁力計的校正：

- 第一次安裝AP1時。
- 更換或移動GPS感應器時。
- 增加或減少磁力計附近的電子裝置（伺服器、電子變速器等）時。
- 當變更飛行場地，位於上一次做磁力計校正動作的位置，兩地相隔距離100公里以上時，請必須重新校正一次。



警告

Please perform calibration in open space, at least 10 meters away from strong magnetic field and conductive materials (magnets, metal table, metal buildings, concrete floors, high voltage electrical tower etc). External environment factors may affect the accuracy of magnetometer. Should multicopter experience poor position holding performance while in AP1 flight mode, please perform magnetometer calibration steps again.

請在空曠且遠離強磁和導磁物質10公尺以上（磁鐵、鐵桌、鐵皮屋、鋼筋水泥地板、高電壓線路等）的地方校正。外在環境的改變會影響磁力計的準確度，當多軸機於AP1飛行模式下，發生定位效果不佳時，請重新校正磁力計。

- AP1 requires a minimum of 10 satellites.
- Red LED indicates insufficient or no satellite signals. Do not fly under this condition.
- 在正常的情况下，AP1所需衛星數量為10顆。
- 若亮紅燈表示接收不到衛星訊號，或衛星強度不足，禁止飛行。

#### 1. Two methods to enter calibration mode.

有兩種方式可以進入校正程序

**Method1:** Press the SET button on AP1 to enter calibration mode.

方式1：按AP1多軸飛行控制系統SET鍵，進入校正程序。

**Method2:** Quickly flip the flight mode switch 2 times within 2 seconds to enter calibration mode.

方式2：飛行模式開關在2秒時間內，來回切換2次，進入校正程序。

External status LED will light up red when entering calibration mode.

進入校正程序外掛用模式燈會紅燈恆亮。

#### Operation Tutorial 操作教學



or  
或

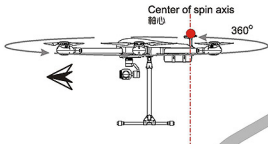


2. Pick up the multicopter. With the Multicopter GPS Sensor as center of axis, rotate 360° horizontally until both red and green external status LED light up.

拿起多軸飛行機，且以多軸GPS感應器為軸心，水平旋轉360度直到外掛用模式燈，紅/綠燈同時恆亮。

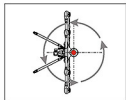


Operation Tutorial  
操作教學



3. With the nose of multicopter pointing up, and Multicopter GPS Sensor as center of axis, rotate 360° horizontally until external status LED flash green.

將多軸飛行機朝上立起，以多軸GPS感應器為軸心，再水平旋轉360度直到外掛用模式燈，綠燈閃爍。

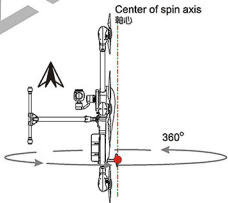


Operation Tutorial  
操作教學



4. Please power cycle after complete.

完成後，請重新開機。





## HOME POSITION SETTING

### 返航點設定(HOME)

Setting the home position is a necessary and important step during pre-flight check. The goal of home position setting is for multicopter to properly perform intelligent flight modes and return home feature.

1. After performing magnetometer calibration, the power must be turned off. Once the power is turned back on and satellite lock is acquired, the Home location is recorded for this flight.
2. Power on multicopter. Do not move the multicopter until external status LED turns green.

多軸機Home點設定是必要且是執行飛行前相當重要步驟之一，主要目的讓多軸機在GPS飛行模式下能正確執行各項智能飛行及必要時能安全返航Home點。

1. 第一次飛行執行完磁力計校正後，必須關閉電源，再次開機後，當接收到衛星定位後，此為這次飛行的Home點。
2. 開啓啓動電源，直到外掛用模式燈亮綠燈前，請勿晃動機體。

#### CAUTION 注意

Avoid setting Home location while indoor, or at location near obstacles within 15 meter such as trees or houses.

禁止於室內、屋簷下、樹下，周遭務必遠離障礙物15公尺以上的地方設定為Home點。

#### WARNING 警告

Before flying, ensure battery is fully charged, magnetometer calibration has been performed, and confirm HOME position has been registered. If HOME position has not been registered before each flight, and automatic return home or low voltage / failsafe return home was activated during flight, the system will not be able to recognize and accurately fly back to the home position, resulting in deviation from intended path and unexpected fly away, causing damages and unforeseen danger.

起飛前請檢查電源是否足夠，並做好磁力校正，及確實執行HOME點設定。若每次飛行前未確實執行HOME點設定，在飛行時將啟動自動駕駛中的自動返航、低電壓自動返航、失控自動返航之功能時，系統將無法辨識並準確的飛回起飛地之HOME點，進而導致飛行軌道偏離而飛失，將可能造成財產損失及不可預期的意外發生。

## GPS SATELLITE SIGNAL GPS衛星訊號收訊

Flying field 飛行場地	Satellite Signal 衛星訊號	Satellite Count 衛星數量	Time to Satellite Lock 鎖定時間	Status 狀況	Suitable Flight Mode 通用飛行模式
City high rises 高樓市區	Initial Time to Acquire Satellites 第一次接收	10 or more satellites 10以上	60~90sec	Normal 正常	Altitude 姿態
	Succeeding Time to Acquire Satellites 第二次接收	10 or more satellites 10以上	30~60sec		Altitude / GPS 姿態/GPS
Open field with no obstructions 空曠無遮蔽物	Initial Time to Acquire Satellites 第一次接收	10 or more satellites 10以上	30~90sec	Normal 正常	Altitude / GPS 姿態/GPS
		10 or more satellites 10以上	15~30sec		Altitude / GPS 姿態/GPS
	Succeeding Time to Acquire Satellites 第二次接收	10 or more satellites 10以上	Exceeded 90 sec. 超過90秒		Abnormal, poor or no GPS signal, may lead to incorrect flight position or home position shift. 異常，衛星訊號差或無訊號，會 導致飛行定位及 HOME 點偏移





## GPS LED INDICATOR












### GPS訊號顯示器燈號說明

During initial power up, GPS status indicator will be flashing red. Allow the GPS to remain stationary in open space to acquire GPS signal. The location where initial GPS signal is acquired will become the Home location.

剛開機時，GPS訊號顯示器燈號會紅燈閃爍，在空曠的地方接收GPS訊號需要靜置一段時間，待收到GPS訊號時，首次接收到GPS訊號的位置即為Home點。

### FLIGHT MODE STATUS LED DESCRIPTION

#### 飛行模式狀態燈號圖示說明

Description of LED status 其他狀況燈號說明	 GPS Signal First Acquired : Continuously Flash 5 Seconds. 首次接收GPS訊號：綠燈連續快速閃爍5秒。		
	 Low voltage alarm : Red Fast Flash 低電壓警示：紅燈快速閃爍	 AP1 Multicopter GPS Sensor Malfunction : Red Flash AP1多軸GPS感應器故障： 紅燈閃爍	 Unsuccessful power on : Solid Red 開機未成功： 紅燈恆亮
Flight Mode 飛行模式	No GPS Signal 無GPS訊號	With GPS Signal 有GPS訊號	
Manual Mode 手動模式	 Red Flash 紅燈閃爍	—	
Attitude Mode 姿態模式	 Flash Red/Green 紅/綠燈交叉閃爍	 Flash/Green 綠燈閃爍	
GPS Mode GPS模式	 Red LED flashes 1 sec and Green LED flashes 2 sec alternatively. 紅燈閃爍1秒/綠燈閃爍2秒，兩燈號交叉閃爍	 Slow Flash/Green 綠燈慢速閃爍	
Return Home (Failsafe Protection、Low Voltage Protection) 自動返航(失控保護、低 電壓保護)	 Both red and green external status LED light up. 紅/綠燈同時恆亮	 Both red and green external status LED light up. 紅/綠燈同時恆亮	

While in GPS mode, green LED indicates normal flight condition. Should LED changes to red color, please land immediately.

在GPS模式下，燈號為綠色表示可正常飛行，若燈號顏色出現紅色時，建議將多軸機立刻停飛降落，避免造成危險與損壞。

Signal acquisition is quicker in wide open space. If the multicopter is in area with weak GPS reception, only attitude and manual control is available.

若在GPS訊號較弱的地方，沒有足夠穩定的資訊，就只有姿態和手動控制。

## 1 MANUAL MODE

### 手動模式

1. Full control by the pilot without any horizontal leveling or position holding capabilities. (Highly recommended not to turn on this function if you're not familiar with it.)
2. Does not support intelligent flight mode (Carefree Orientation or POI), automatic return home, failsafe, or low voltage protection.

1. 完全由操縱者控制，無自動水平與定位功能。(強烈建議，不熟悉操作者勿開啟此功能)。
2. 不支援智能飛行(航向鎖定、定點環繞)、自動返航、失控保護、低電壓保護功能。

#### Control Response adjustment:

Set the exponential (EXP) of Aileron/Elevator/Rudder according to your control feel in manual mode.

When control response is too high, increase EXP +10%~+30%

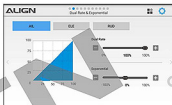
When control response is too low, decrease EXP 0%~30%.

#### 動作靈敏度調整:

A13遙控器手動模式可依個人飛行操控手感調整遙控器副翼、升降、尾舵的EXP。

當手動模式動作靈敏度太大，調高感度，範圍+10%~+30%。

當手動模式動作靈敏度太小，調低感度，範圍0%~30%。



Manual mode is suitable only for experienced pilots. Beginners should avoid flying in manual mode. Following functions will be disabled while in manual mode: automatic return home, intelligent flight mode, failsafe, low voltage return home.

手動模式適合有飛行經驗的玩家使用，並嚴禁初學者使用，否則會造成不可預期的結果。在手動模式下不支援自動返航、智能飛行、失控保護、低電壓保護等功能。

## 2 ATTITUDE MODE

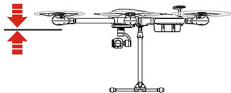
### 姿態模式

Maintains level and altitude. Elevator/Aileron/Rudder stick inputs are translated as angular command. Larger stick input translates to steeper angles of multicopter tilt, with maximum of 30 degrees.

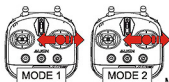
姿態模式會自動保持多軸飛行機姿態水平與定高功能，升降、副翼、尾舵搖桿指令為角度命令，搖桿動作越大飛行機動作角度越大，最大角度限制為30度。

#### a) Center throttle stick = altitude hold

油門搖桿置中=定高



- b) Elevator/aileron stick (left and right maximum of 30°)  
升降/副翼搖桿(左或右最大30度)



Maximum of 30°  
最大30°



Maximum of 30°  
最大30°

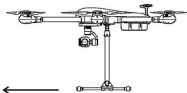
- c) Release stick (multicopter automatically levels)  
搖桿放開(機體自動回正)



### 3 GPS(VELOCITY) GPS(速度)

Maintains level, altitude, and position through GPS lock. Elevator/Aileron/Rudder stick inputs are treated as speed command. Larger stick input translates to faster flying speed, with maximum horizontal velocity of 15 meters/sec and vertical speed of 6 meters/sec.

會自動保持多輪飛行機姿想水平、定高與GPS定位，升降、副翼、尾舵搖桿指令為速度命令，搖桿動作越大飛行機飛行速度越快，最大飛行速度水平 15 公尺/秒，垂直 6 公尺/秒。



Straight flight speed: 15 m/sec  
直線飛行速度：15公尺/秒

#### CAUTION 注意

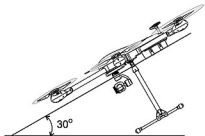
GPS Signal may be susceptible to interference including weather, environment and other possible factors, which could affect GPS locking performance. If multicopter receive inaccurate GPS lock or drift under GPS flight mode, make sure to switch to Attitude or Manual mode for manual control.

GPS訊號會因天氣、外界干擾、環境...等因素影響定位。在使用GPS模式飛行下，如果多輪機發生定位不準、飄移情況，請切換至姿態或手動模式，將多輪機手控飛回。

## 4 GPS(ANGULAR) GPS(角度)

Maintains level and altitude. Elevator/Aileron/Rudder stick inputs are translated as angular command. Larger stick input translates to steeper angels of multicopter tilt, with maximum of 30 degrees.

會自動保持多軸飛行機姿態水平與定高功能，升降、副翼、尾舵搖桿指令為角度命令，搖桿動作越大飛行機動作角度越大，最大角度限制為30度。



### CAUTION 注意

GPS Signal may be susceptible to interference including weather, environment and other possible factors, which could affect GPS locking performance. If multicopter receive inaccurate GPS lock or drift under GPS flight mode, make sure to switch to Attitude or Manual mode for manual control.

GPS訊號會因天氣、外界干擾、環境...等因素影響定位。在使用GPS模式飛行下，如果多軸機發生定位不準、偏移情況，請切換至姿態或手動模式，將多軸機手控飛回。

## 5 FLIGHT MODE FEATURE CHART 飛行模式功能對照表

Function 功能	Flight Modes 操作模式	MANUAL MODE 手動模式	ATTITUDE MODE 姿態模式	GPS(VELOCITY) GPS速度	GPS(ANGULAR) GPS角度
Retract 收腳架		✓	✓	✓	✓
Intelligent Flight-POI (Point of Interest) 智能飛行-定點環繞				✓	✓
Intelligent Flight-HCL (Home Course Lock) 智能飛行-返航點鎖定				✓	
Intelligent Flight-CFO (Carefree Orientation) 智能飛行-航向鎖定			✓	✓	
Return Home 自動返航			✓	✓	✓
Failsafe Protection 失控保護			✓	✓	✓
Low Voltage Protection 低電壓保護			✓	✓	✓

## 1 POI(POINT OF INTEREST)

定點環繞

GPS

POI can only be activated under GPS mode. POI is not supported under manual and attitude modes.

定點環繞只適用GPS模式，姿態和手動模式不支援定點環繞指令。

POI (Point of Interest) is a mode where multicopter flies in a circular pattern surrounding a designated object. To initiate POI flight, fly the multicopter over the object of interest in either GPS mode, switch on POI function to set the object location as center point.

1. From the top of POI center point, use back elevator to fly the multicopter backwards at least 10M away from the center point to set the diameter of circular pattern.
2. With the nose of multicopter still pointing at the POI center point, left aileron will initiate a clockwise 360° circular pattern flight around the POI center point; right aileron will initiate a counter-clockwise 360° circular pattern flight around the POI center point.
3. Stick movement angle is proportional to the speed of the aircraft. Larger the stick movement equates to faster multicopter flying speed, while smaller stick movement equates to slower flying speed.

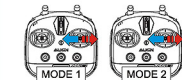
定點環繞是指多軸飛機向指定的一個景物做環繞或攝影的飛行模式。

當需要針對一個景物做360度定點環繞飛行時，請將多軸飛機飛行至指定物品上空，在GPS模式下，開啟定點環繞功能，即為設定環繞點。

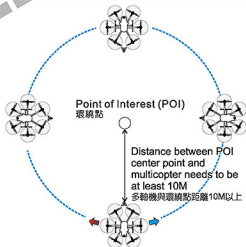
- 1.於環繞點上方，將升降舵向後打時多軸飛機往後飛行，然後退至距離環繞點的位置(至少10M以上)作為環繞半徑距離。
- 2.機頭朝著環繞點方向，當副翼持續向左打時，多軸飛機則會以環繞點做為中心，順時針360度飛行；當副翼持續向右打時，多軸飛機則會以環繞點做為中心，逆時針360度飛行。
- 3.操作角度與飛行速度成正比，操作角度動作越大則多軸飛機飛行速度越快；操作角度動作越小則多軸飛機飛行速度越慢。



- ① Back Elevator  
升降舵向後



- ② Right or Left Aileron  
副翼舵向左或向右



Aircraft can only move backwards, up, and down within 10M after position holding action. Full rudder lock cannot be turned around and it is controlled by AP1.

定位動作後在10M以內飛行機只能後退、上升、下降，全程尾舵鎖定不能轉頭向，由程式控制。

Home Course Lock is only active in GPS Velocity mode. Manual and attitude modes do not support home course lock.

返航點鎖定只適用GPS速度模式，手動、姿態模式不支援返航點鎖定。

Home course lock utilizes the home position as base point. Pushing elevator stick back will force the multicopter to fly toward the home position regardless of its current heading, and pushing elevator stick forward will force it to fly away from home position.

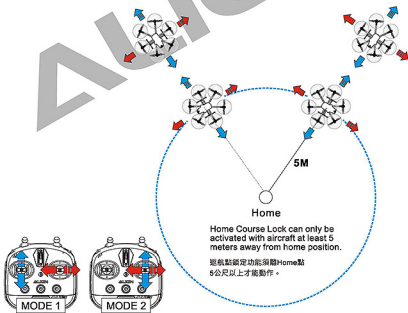
1. When this function is active and multicopter returns home, once it reaches the 5 meters point from home, AP1 will put the multicopter into hover, and lock out elevator/aileron/rudder control. At this time throttle can be used to land the multicopter, or Home Course Lock can be disengaged for manual landing.

2. Please confirm home position during power up.

返航點鎖定是以Home點位置為基準，不論飛行中的機頭朝向為何，控制的頭向是以Home點朝向多軸機位置的方向呈十字航道控制模式，當升降往後打時，多軸機不論頭向朝Home點飛回，升降往前打時，多軸機則往外飛離。

1.當開啓此功能將多軸機飛回Home，多軸機回航至離Home點5公尺時，AP1會將多軸機停止至該位置，並鎖定升降、副翼、尾舵動作，此時可控制油門將多軸機降落，或是解除返航點鎖定使用手動降落。

2.請務必確認開機時Home點位置。



Carefree Orientation Mode is suitable only under attitude and GPS Velocity mode. it is not supported under manual mode.

航向鎖定只適用姿態和GPS速度模式，手動模式不支援航向鎖定指令。

While in CFO (Carefree Orientation) mode, any control command direction will be based on the initial direction of multicopter during power up, regardless of which direction it's currently pointing. The aircraft will fly right with right aileron stick input, and fly left with left aileron stick input, regardless of the current heading. While in CFO Mode, multicopter will be in attitude/altitude mode, with stick control translated as angular command.

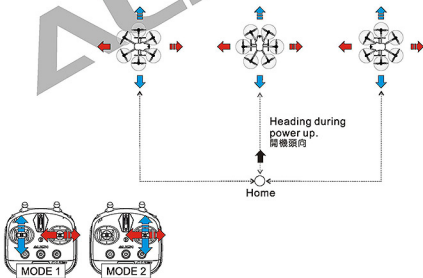
航向鎖定是以開機時的機體頭向做為基準，不論飛行中的頭向為何，開啓此模式時飛行機會以開機時的頭向為基準，當副翼向右打時，飛行機則向右飛；副翼向左打時，飛行機則向左飛，與遙控器動作相同。航向鎖定功能，多轉機為姿態水平與定高功能，搖桿指令為角度命令。



**CAUTION**  
注意

Please confirm home position and heading position during power up.

請務必確定開機時Home點位置及開機頭向



Automatic return home can only be activated under attitude and GPS mode; it is not supported under manual mode.

自動返航只適用姿態和GPS模式，手動模式不支援自動返航指令。

Automatic return home function is a flight aid in scenario where the pilot has lost sight of the aircraft, or is unable to tell its orientation due to excessive distance, the aircraft will automatically and securely fly back to the home position under GPS mode with good GPS satellite reception.

自動返航功能是輔助多軸飛行機在操控過程中，若發生迷航或距離太遠無法辨識正確飛行方向時，在GPS模式下且衛星訊號良好的狀態下，可藉由飛控系統執行自動返航指令，讓多軸飛行器在安全機制下自動駕駛安全返回Home點。



When either Auto Return Home or Failsafe or low voltage protection is been activated, the tail of aircraft will face home location when returning home.

自動返航、失控保護、低電壓保護啟動會機身尾即朝Home點返航。

Tail faces Home location to Return Home

機身尾部朝Home點返航



Home  
返航



#### AUTO RETURN HOME SWITCH

Auto Return Home: Short-press to activate/ Audio Reminder /Indicator LED solid white light.

Disengage Auto return Home: Short-press to disengage/ Audio Reminder /Turn-off Indicator LED.

自動返航開關

自動返航：短按啓動，語音提示，指示燈白燈恆亮。

解除返航：短按解除，語音提示，指示燈關閉。



Distance of Return Home 返航距離	Return Home Mode 返航模式	Speed of Return Home 返航速度
A 0-5M	●Auto Landing	●原地自動降落 3.3M/sec 3.3公尺/秒
B 5-30M	1. Direct straight home at current altitude 2. Direct straight home after climbing altitude 3. Return home at same path and same altitude	1. 原高度線返航 2. 升高高度線返航 3. 原高度路徑返航 3.3M/sec 3.3公尺/秒
C 30M and more 30M以上	4. Return home at same path after climbing altitude	4. 升高路徑返航 3.3M/sec 3.3公尺/秒



1. Home Position: When GPS signal is first received after power on, the mode LED will flash rapid green to indicate home position has been recorded.
2. Return Home Method: Regardless of current position, when Return Home is activated, multicopter will rise, rotate until the rear points toward home position, then proceed to fly toward home position. If retracts are in the up position, AP1 will lower the retractable landing gears down, then proceed to land at the home location.

1. Home點：開機後，第一次收到GPS訊號的位置。此時模式燈會快速閃爍綠燈表示已記錄Home點位置。  
 2. 返航方式：無論在什麼位置，飛行中如果開啓自動返航功能，多軸飛行機會先自動上升再轉動尾部朝向Home點，然後飛回Home上方，如果飛行機有收腳架，此時AP1會把腳架放下，然後降落在Home點位置。



1. During automatic Return Home function, multicopter will choose the shortest path between current location and home location, flying with multicopter's tail pointing at the pilot.
2. If the flight path deviates from the intended path to home during return home function, immediately disengage auto return home function, and manually fly the aircraft back home.
3. If automatic Return Home function needs to be disengaged while returning home, flip the Return Home switch on and off to regain manual control.

1. 執行自動返航功能時，多軸機會從飛行位置與Home點最短的距離做為飛行路徑，以機尾方向朝操作者返航。  
 2. 若在飛行機抵達Home點或返航途中，發生衛星定位回Home點航線偏移，請立即解除自動返航指令，以手動操控回Home點。  
 3. 解除自動返航指令：把自動返航開關切回關閉位置，即能解除自動返航指令改由手動操作。



Please make sure to read below importance carefully to prevent any serious damaged: Please make sure to read below importance carefully to prevent any serious damaged:

#### (1) Magnetometer Calibration

Please do perform magnetometer calibration before starting each flight to secure precise locking position to prevent any damage or accident happened to multicopter, such as drift, lost GPS positioning...etc.

#### (2) Receiving range of transmitter and receiver checking

During flight, please make sure to pay attention for receiving range of your own transmitter and receiver to keep airframe safety from long distant flying.

#### (3) GPS satellite reception

When power on before taking off, please make sure the GPS signal is acquired, the LED turns to flash/green. The GPS reception will be changed and interfered by temperature, obstacle...etc, so please be aware of GPS reception during flying.

飛行前請務必確定以下3項重點，如果有其中一項不確實就有可以導致多軸機飛行失誤。

#### (1) 磁針計校正

請務必於每次飛行前執行磁針計校正。確保每趟飛行過程定位的準確性，避免造成多軸機於飛行過程中失去定位、偏移或飛偏造成飛行失誤。

#### (2) 遙控器與接收器接收距離測試

飛行時須特別注意飛行距離範圍確保遙控器與接收器可接收範圍，以確保飛行安全。

#### (3) GPS衛星訊號

每趟飛行前請務必確認GPS已經完成定位才能起飛。但過程中衛星訊號仍會受遮蔽物干擾、氣候因素...等影響，因此飛行過程中須注意GPS衛星訊號是否正確。

Failsafe Protection is only active under attitude and GPS mode; it is not supported under manual mode.

失控保護只適用於姿態和GPS模式，手動模式不支援失控保護指令。

**Failsafe Protection :** When multicopter loses radio control signal, AP1 will initiate Return Home function when GPS signal is available. When there are no GPS signal, AP1 will maintain level.

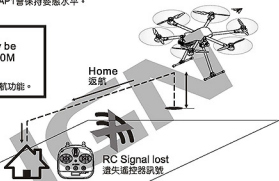
失控保護：當飛行機丟失遙控器訊號時，在有GPS訊號下，AP1會執行自動返航。在無GPS訊號下，AP1會保持姿態水平。



注意

Return Home Function can only be activated with aircraft at least 20M away from home position.

在HOME點半徑20M之內，不執行失控返航功能。



Disengage Auto return Home: Short-press to disengage/ Audio Reminder /Turn-off Indicator LED.

解除返航：短按解除，語音提示，指示燈關閉。



注意

1. Failsafe Protection is for use while in attitude and GPS mode only. Failsafe auto return home is not available in manual mode.
2. Should the RC transmitter signal is lost, AP1 will activate Failsafe Protection function to automatically fly the aircraft back home.
3. If failsafe auto return home function need to be disengaged while en route to home position, switch on Return Home mode and immediately switch it off, then control of multicopter can be regained.

1. 失控保護只適用於姿態模式與GPS模式下，手動模式無失控保護自動返航。
2. 當遙控器失去訊號無法控制時，AP1會開啓失控保護功能，使多軸機自動返航至Home點。
3. 若在抵達Home點或返航途中需解除失控保護指令，只要把自動返航開關切入開啓再切回關閉位置，即能回復手動操控多軸飛行機。

Low voltage protection is only active under attitude and GPS mode; it is not supported under manual mode.

低電壓保護只適用姿態和GPS模式，手動模式不支援低電壓保護指令。

AP1 provides two methods for low voltage protection. Please refer to the AP1 instruction manual for low voltage cutoff parameters.

#### 1. First Stage Protection: low voltage warning light

**Low voltage warning light:** Sets the trigger voltage for low voltage warning. Recommended value is 3.625V, at which point the aircraft will have approximately 200M range left (around 1 minute). When voltage drops below the set value, AP1 LED will be flashing red.

#### 2. Second Stage Protection: low voltage trigger for auto return home

**Low voltage Return Home:** Sets the trigger voltage for low voltage return home. We highly recommend the value of 3.60V to be used, at which point the aircraft will have approximately 100M range left (around 30 seconds). When voltage drops below the set value, AP1 will initiate auto return home feature.

AP1提供兩種低電壓保護，請參考AP1操作介面安裝與設定，進行低電壓保護數據設定。

##### 1. 第一階保護：低電壓警示閃燈

設定低電壓警示閃燈電壓，出廠設定為3.625V(建議值)，此電壓預估可安全飛行距離能力為(約1分鐘)200M，當飛行中電池電壓低於此設定電壓時，AP1即會閃爍紅燈提醒。

##### 2. 第二階保護：低電壓自動返航

設定低電壓自動返航電壓，出廠設定為3.60V(建議值)，此電壓預估可安全飛行距離能力為(約30秒)100M，當飛行中電池電壓低於此設定電壓時，AP1即會執行自動返航。

Main Power Battery  
low voltage  
動力電池電壓過低

Home  
返航



Low Voltage Return Home Function can only be activated with aircraft at least 20M away from home position.

在HOME點半徑20M之內，不執行低電壓返航功能。



Disengage Auto return Home: Short-press to disengage/ Audio Reminder /Turn-off Indicator LED.  
解除返航：短按解除，語音提示，指示燈關閉。



- We highly recommend activating low voltage protection function to ensure the safety of aircraft.
- When executing return home function, the aircraft will automatically lower its retractable landing gears after reaching the home position.
- To disengage auto return home command: Switch on Return Home mode and immediately switch it off, then control of multicopter can be regained.

1. 強烈建議開啓低電壓保護功能，提供飛行機安全保護。

2. 在執行自動返航動作時，當飛行機返回Home點上方會自動放下腳架，準備降落。

3. 解除自動返航指令：先把自動返航開關切回關閉位置，即能解除自動返航指令改由手動操作。

# SPECIFICATIONS

## 產品規格

**ALIGN**

### AP1 MULTICOPTER FLIGHT CONTROLLER Ap1多軸飛行控制器

Input Voltage 輸入電壓	DC4.5V~8.4V
Operating Current Consumption 消耗電流	<250mA@ 4.8V
Operating Frequency 工作頻率	400Hz
Operating Temperature 工作溫度	-20°C ~ 65°C (-4°F ~ 149°F)
Hovering Precision (Depending on Satellite Status) 停懸精度 (受衛星狀況影響)	Horizontal ±1m(3.28ft) · Vertical ±1m(3.28ft) 水平 ±1公尺, 垂直 ±1公尺
Maximum Flight Speed 最大飛行速度	Horizontal 15m/sec, Vertical 6m/sec 水平 15公尺/秒, 垂直 6公尺/秒
Maximum Altitude Restriction 飛行高度限制	700m(2297ft) above the takeoff point. 起飛飛點上方700公尺
Maximum Angular Speed 最大角速度	Aileron/Elevator 115°/sec, Rudder 145°/sec 副翼/升降 115度/秒, 尾舵 145度/秒
Maximum Tilting Angle 最大傾斜角度	30 degree 30度
Supports External Peripherals 支援外接產品	G2P Gimbal · VTD1 1080 HD Digital Video Transmitter. G2P雲台 · VTD1 1080高清數位攝像機
Supports Multicopter Configurations 支援機型	4 rotors+ type, 4 rotors X type, 6 rotors+ type, 6 rotors X type. 四軸+型、四軸X型、六軸+型、六軸X型
Dimension 尺寸	49x34.3x20mm

### PCU V2 POWER CONTROL UNIT SET PCU V2電源控制組 MULTICOPTER BRUSHLESS ESC 多軸無刷調速器

Input Voltage 輸入電壓	13.2V~25.2V(4S~6S Li-Po)	Input Voltage 輸入電壓	13.2V~25.2V(4S~6S Li-Po)
Operating Frequency 工作頻率	500KHz	Max Continuous Current 最大持續電流	40A
Dimension 尺寸	62x35x26mm	Dimension 尺寸	74.2x27x12.7mm
Operating Temperature 工作溫度	-5°C ~ 45°C (23°F ~ 113°F)	Operating Temperature 工作溫度	-5°C ~ 45°C (23°F ~ 113°F)

### RCM-BL4213 BRUSHLESS MOTOR 370 KV (RPM/V) RCM-BL4213無刷馬達 370KV(RPM/V)

Input Voltage 輸入電壓	DC 22.2V	Stator Arms 矽鋼片槽數	12
Max Continuous Current 最大持續電流	25A	Magnet Poles 磁極數	14
Max Continuous Power 最大持續功率	550W	Dimension/ Weight 尺寸/ 重量	φ 4x φ 52x33mm/ 185g

### VTD1 1080 HD DIGITAL VIDEO TRANSMITTER SET VTD1 1080 高畫數位攝像機組

Working Frequency 工作頻率	5~5.9Ghz	Power Consumption 功耗	Transmitter < 2.5W / Receiver < 2W 發射機<2.5 W / 接收機<2 W
Latency 延時	<40ms	Way of Transmission 傳輸方式	SDR Wireless Transmission Frame SDR無線電傳輸架構
Wide Transmission Distance 空曠傳輸距離	1.5~2km	Video Output 影像輸出	1080P / 720P HD Video Transmission 1080P/720P 高畫數位影像傳輸
Emission Power 發射功率	200mw ( 23dBm )	Antenna 天線	5dB Circular Antenna 5dB全向天線

## G2P GIMBAL G2P雲台

Operating Current Consumption 消耗電流	<500 mA	Input Voltage 輸入電壓	DC 12V(3S)
Maximum Control Range 最大可控制範圍	TILT-140°~29°, PAN±200°, ROLL±30° 俯仰-140~29度, 指向±200度, 滾轉±30度	Temperature Range 工作環境溫度	-20~80 degrees -20~80度
Maximum Control Rotation Rate 最大可控制旋轉速度	PAN60°/sec, ROLL60°/sec, TILT60°/sec 指向60度/秒, 滾轉60度/秒, 俯仰60度/秒	Dimension 尺寸	109.6x78.8x127.5mm

## 4K DV

Aperture 光圈	F2.8	Image Sensor 影像感測器	1/2.3" CMOS	Video Format 影片格式	H264 MOV
FOV 視角	90°	Effective Pixels 有效像素	12 million 1200萬	Video Resolution 錄影解析度	4K:3840x2160 30fps 2.7K:2716x1524 30fps
Support Memory Card—Micro SD card, SD/TF card: SDXC interface support read speeds up to UHS-I Class 10 Micro SD card (60MB/s read/write speed); support format: FAT32 & ex FAT 支援儲存卡類型—Micro SD卡、SD/TF卡、SDXC介面, 傳輸速度達到UHS-I C10等級的Micro SD卡(讀寫速度60MB/s), 支援格式FAT32、ex FAT					

## HOOK CONTROL 多軸掛勾組

Input Voltage 輸入電壓	5V~8.4V	Operating Temperature 操作溫度	-10°C~50°C
Open & Close Time 展開時間	8.4V/5 sec 8.4V/5秒	Dimension/ Weight 尺寸/重量	71x27x35mm/ Approx. 52g 71x27x35mm/ 約52g

## Q & A 問與答

**ALIGN**

### Unable to Power On?

**Q&A**

- (1) Press power button momentarily to check remaining battery level.
- (2) Check if battery plug is connected properly.
- (3) Check for proper connection between AP1 and PCU.

### 無法正常開機?

- (1) 短按電源指示燈的電源鍵檢查電池剩餘電量。
- (2) 檢查電池接觸是否沒有接好?
- (3) PCU電源控制組與AP1多軸飛控系統之間連線是否沒有接好?

### AP1 will not start up after power up?

**Q&A**

- (1) Check for any abnormalities in power source. Verify connection between AP1/PCU/Receiver are correctly connected.
- (2) Check for correct receiver type selection in configuration interface.
- (3) NOTE: AP1 must remain stationary, and will start properly only after system initialization is completed.

### AP1開機後, AP1無法啟動?

- (1) 檢查系統電源是否正常, AP1與PCU、接收器之間連線是否正確連接。
- (2) 檢查操作介面的接收器類型是否正確。
- (3) 注意AP1啟動時機體必須保持靜止, 當系統開機初始化完成後才會正常啟動。

## Q&A 3

**Long GPS acquisition time? Wide variance during position hold?**

- (1) Initial acquisition time will be longer for first time power ups.
- (2) Satellite signal will be weaker in urban area with highrise or other obstacles. Ideal location should be an open field free of magnetic interferences.
- (3) If 10 or less satellites were acquired, LED warning light will be displayed and GPS functions will not activate.
- (4) Please refer to the satellite acquisition table to determine satellite reception status.

**為何搜尋GPS時間長?定位偏移大?**

- (1)首次開機衛星接收時數一般會較長，屬正常現象。
- (2)在市區大樓有遮蔽物地點，衛星訊號較弱；建議遠離強磁場和導磁在空曠地使用，衛星訊號會較強。
- (3)衛星數低於10顆時，LED燈會顯示無衛星訊號，GPS功能不會開啟。
- (4)請參考磁力計校正/衛星訊號接收表，來判定您的衛星訊號接收狀況。

## Q&A 4

**Motor spins the wrong direction during motor spin test?**

Connection between motor and ESC did not follow proper color coding, or direction switch on ESC set incorrectly.

**為何馬達測試旋轉時，馬達轉向錯誤?**

馬達與電子變速器之間接線沒依照顏色連接，或電變設定馬達轉向開關設定錯誤。

## Q&A 5

**Motor did not follow M1/M2/M3/M4 sequence during motor test?**

Check the ESC signal wires are connected to correct ports on AP1.

**馬達測試旋轉時，馬達沒依照M1、M2、M3、M4順序轉動?**

檢查電子變速器訊號線與AP1之間接線，是否有按順序連接。

## Q&A 6

**AP1 powered up properly, but will not fly after performing the startup stick sequence?**

- (1) Check and ensure D/R (Dual Rate) function is not configured on transmitter.
- (2) Check if stick calibration was done. Go to the configuration program and run the stick calibration again.

**AP1有正常開機，但無法搖桿解鎖起飛?**

- (1) 檢查遙控器是否有設定D/R，使用AP1不可設定D/R功能。
- (2) 檢查遙控器是否有執行搖桿校正，重新至操作介面設定搖桿校正。

## Q&A 7

**Airframe tilts forward or backwards during takeoff?**

Check for proper balance on CG point. Adjust the battery or gimbal position to achieve proper CG balance.

**起飛時會有後傾或前傾現象?**

檢查機體重心是否正確，請調整電池、雲台位置，使重心落在機體中心點位置。

## Q&A 8

**Airframe fails to stay in one spot during pirouetting maneuver (spin of airframe with rudder applied)?**

- (1) Check for proper AP1 Multicopter GPS Sensor location configuration in configuration program.
- (2) Check for proper balance on CG point. Adjust the battery or gimbal position to achieve proper CG balance.

**打馬舵自旋動作，無法在固定點旋轉?**

- (1) 檢查操作介面的AP1多軸GPS感測器設定是否正確。
- (2) 檢查機體重心是否正確，請調整電池、雲台位置，使重心落在機體中心點位置。

## Q&A 9

**Airframe experiences slow response during flight, and drifts as if it's not holding position?**

Increase the gain value under attitude mode.

**飛行時動作反應較慢，會有飄移鎖不住的現象?**

建議將姿態模式感度增加。

## Q&A 10

**Excessive or insufficient stopping power during while flying?**

Adjust the stopping power parameter in program interface to increase or decrease accordingly.

**空中飛行停止制動力過強或過弱?**

調整介面GPS制車感度，制車力過過強，降低感度；制車力過過弱，增加感度。

**Q&A 11** Slight left/right shakes of video footage or aircraft heading during flight or hover ?  
Increase the rudder gain value under manual and attitude mode.  
飛行或停懸時，頭向或拍攝畫面微量左右晃動？  
將手動模式及姿態模式尾舵的感度增加。

**Q&A 12** Unable to hold position for vertical climb in GPS mode?  
Increase the elevator and aileron gain under attitude and GPS modes.  
GPS模式下無法定點垂直爬升？  
請高姿態/GPS的升降、副翼感度。

**Q&A 13** Motor and Navigation lights do not turn on?  
(1) Check if signal wire from motor arm assembly is plugged in backwards.  
(2) Open the motor mounting pod to see if ESC signal wire is detached.  
馬達及飛行指示燈無法啓動？  
(1) 檢查馬達訊號線是否反接。  
(2) 拆開馬達固定座，檢查ESC訊號線是否脫落。

**Q&A 14** Gimbal status LED does not light up, or gimbal does not have any movement.  
Check power is connected to gimbal, and also ensure power cable between PCU and gimbal is properly connected.  
雲台指示燈不亮或無動作反應。  
檢查雲台是否有供電，PCU與雲台之間電源線是否有正確連接。

**Q&A 15** Recorded video has wavy lines (jello effect)  
(1) Check for excessive vibration on airframe and eliminate the vibration source.  
(2) Use an appropriate damper.  
(3) Check if gimbal motors are oscillating, then lower the P gain and Power values.  
雲台拍攝畫面有水波影響。  
(1) 檢查機體是否有過大震動，且排除震動源。  
(2) 選擇正確雲台避震裝置使用。  
(3) 檢查雲台馬達是否有抖動情況，可降低該轉馬達P感度與Power。

**Q&A 16** Airframe offset, drift, and is out of control during flying?  
Please make sure to read below importance carefully to prevent any serious damaged: Please make sure to read below importance carefully to prevent any serious damaged:  
(1) Magnetometer Calibration  
Please do perform magnetometer calibration before starting each flight to secure precise locking position to prevent any damage or accident happened to multicopter, such as drift, lost GPS positioning ... etc.  
(2) Receiving range of transmitter and receiver checking  
During flight, please make sure to pay attention for receiving range of your own transmitter and receiver to keep airframe safety from long distant flying.  
(3) GPS satellite reception  
When power on before taking off, please make sure the GPS signal is acquired, the LED turns to flash/green. The GPS reception will be changed and interfered by temperature, obstacle ... etc, so please be aware of GPS reception during flying.

**多軸飛行時，定位偏移、飄移、飛偏或不受控制的情況發生？**

飛行前請務必確定以下3項重點，如果有一項不確實就有可以導致多軸飛行失誤。

- (1) 磁針校正**  
請務必於每次飛行前執行磁針校正。確保每趟飛行過程定位的準確性，避免造成多軸機於飛行過程中失去定位、飄移或飛偏造成飛行失誤。
- (2) 遙控器與接收器接收距離測試**  
飛行時須特別注意飛行距離範圍確保遙控器與接收器可接收範圍，以確保飛行安全。
- (3) GPS衛星訊號**  
每趟飛行前請務必確認GPS已經完成定位才能起飛。但過程中衛星訊號仍會受障礙物干擾、氣候因素...等影響，因此飛行過程中須注意GPS衛星訊號是否正常。

# ALIGN

## Specifications & Equipment/規格配備:

**Airframe Diameter/軸距:900mm**

**Main Blade Length/主旋翼長:179mm**

**Main Rotor Diameter/主旋翼直徑:391mm**

**Height/機身高:362mm**

**Flying Weight(without battery)/全配重(不含電池): Approx. 3400g**

