

GIMBAL 800 3X INSTRUCTION MANUAL 使用說明書

H80B001XXT

ALIGN

 **800**
For T-REX 800E



For more detailed instruction, please check our website.
<http://www.align.com.tw/alignhtml/EN/video/G800.php>
更詳細的操作說明請上官網。

Thank you for buying ALIGN products. The GIMBAL G800 is the latest technology in Rotary RC models. Please read this manual carefully before assembling and flying the new GIMBAL G800. We recommend that you keep this manual for future reference regarding tuning and maintenance.

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



TABLE OF CONTENTS

目錄

ALIGN

INTRODUCTION

前言.....1

WARNING LABEL LEGEND

標誌代表涵義.....1

IMPORTANT NOTES

重要聲明.....2

SAFETY NOTES

安全注意事項.....2

EQUIPMENT REQUIRED FOR ASSEMBLY

自備設備.....5

RADIO TRANSMITTER AND ELECTRONIC EQUIPMENT REQUIRED FOR ASSEMBLY

自備遙控及電子設備.....5

ADDITIONAL TOOLS REQUIRED FOR ASSEMBLY

自備工具.....5

PACKAGE CONTENTS

包裝說明.....6

STANDARD EQUIPMENT

標準配備.....6

ASSEMBLY SECTION

組裝說明.....7

APS GYRO UPDATE INSTRUCTION

APS 陀螺儀更新使用說明.....12

SPECIFIC FEATURES OF THE APS V1.2 VERSION

APS V1.2版本特點.....12

SAFETY NOTES

安全注意事項.....13

DATA LINK CONNECTION

傳輸線接線方式.....14

INSTALLATION STEPS

安裝APS V1.2程式.....14

START UPDATE

開始更新.....15

APS V1.2 HEADING DIRECTION GAIN ADJUSTMENT

APS V1.2 頭向感度調整功能.....15

APS V1.2 Descend Deceleration System

APS V1.2 降落自動減速功能.....17

CONTROL FEEL ADJUSTMENT UNDER APS MODE

APS模式操控手感調整.....18

GS800 GIMBAL STABILIZER

FEATURES

GS800 雲台控制器產品特色.....19

GS800 PARTS IDENTIFICATION AND INSTALLATION

GS800 雲台控制器各部位名稱及安裝說明.....20

ELECTRIC EQUIPMENT ILLUSTRATION

雲台伺服器配置圖.....20

GS800 SETUP INDICATORS

GS800 雲台控制器各部位名稱.....21

GS800 AND APS CONNECTION METHOD

GS800與APS接線方式.....21

RECEIVERS CONNECTION METHOD

各接收器接線方式.....22

STANDARD RECEIVER CONNECTIVITY METHOD

傳統接收器接線法.....22

FUTABA S.BUS CONNECTIVITY METHOD

FUTABA S.BUS接線法.....22

JR/SPEKTRUM SATELLITE CONNECTIVITY METHOD JR/SPEKTRUM

衛星天線接線法.....23

SHUTTER LINE CONNECTIVITY METHOD

快門接線方式.....24

TABLE OF CONTENTS

目錄

ALIGN

OPERATION MODES DESCRIPTION

工作模式介紹.....25

TRANSMITTER SETUP

遙控器設定.....26

TRANSMITTER AIRCRAFT TYPE SETTING

遙控器模型種類設定.....26

TRANSMITTER SWITCH SETTING

遙控器開關設定.....26

FLIGHT MODE SETTING

飛行模式設定.....27

3-AXIS AUTO CORRECT

3軸自動修正.....27

2-AXIS AUTO CORRECT

2軸自動修正.....27

3-AXIS AUTO CENTER

3軸回中.....27

MANUAL MODE

手動模式.....28

RESCUE MODE

救機模式.....28

GS800 AND G800 GIMBAL SETUP

GS800及G800雲台設定.....28

MECHANICAL NEUTRAL ADJUSTMENT

機械中立點調整.....29

PRESET TO DEFAULT SETTING

回復原廠設定值.....30

GS800 SETUP FLOW DIAGRAM

GS800 設定流程表.....30

SERVO NEUTRAL POINT SETTING

伺服器中立點設定.....31

SERVO MAXIMUM TRAVEL LIMIT SETTING

伺服器最大行程設定.....32

NOTES FOR CAMERA INSTALLATION

相機安裝注意事項.....36

GIMBAL SHOCK DAMPENER

ADJUSTMENT METHOD

雲台避震器調整方式.....37

HELICOPTER CG ADJUSTMENT

METHOD

直昇機重心調整方式.....37

SPECIFICATIONS

產品規格.....38

Q & A

問與答.....39

INTRODUCTION

前言

ALIGN

Thank you for buying ALIGN products. Before entering RC world, there are something you need to know and pay attention with to make sure have a smooth learning process.

For make feel easy to use the G800 Gimbal, please read through this manual prior to install and configure the G800 Gimbal, and keep this manual handy for future reference.

G800 Gimbal is an electronic flight augmentation device, and can only function when used with Align's 3GX flybarless system and APS gyro. With APS gyro installed, the helicopter will have the ability to self stabilize, hold position as well as altitude, and even autonomous way point flights as well as return home. It is the perfect tool for flight training, as well as aerial photography applications.


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。

為了讓您容易方便使用G800雲台，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。

G800雲台是輔助直昇機空中攝影的裝置，它必須搭配亞拓3GX無平衡翼系統及ASP陀螺儀才能運作使用。可以讓您的直昇機發揮更多的功能，是您空中攝影作業的完美輔助飛行工具。

WARNING LABEL LEGEND

標誌代表涵義

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

IMPORTANT NOTES

重要聲明

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

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

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

做為本產品的使用者，您，是唯一對於您自己操作的環境及行為負全部的責任之人。

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

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

SAFETY NOTES

安全注意事項

ALIGN

- Fly only in safe areas, away from other people. Do not operate R/C aircraft within the vicinity of homes or crowds of people. R/C aircraft are prone to accidents, failures, and crashes due to a variety of reasons including, lack of maintenance, pilot error, and radio interference. Pilots are responsible for their actions and damage or injury occurring during the operation or as of a result of R/C aircraft models.
- Prior to every flight, carefully check rotorhead spindle shaft screws and tail blade grip screws, linkage balls and screws, ensure they are firmly secured.
- 遙控模型飛機、直昇機屬高危險性商品，飛行時務必遠離人群，人為組裝不當或機件損壞、電子控制設備不良，以及操控上的不熟悉、都有可能導致飛行失控損傷等不可預期的意外，請飛行者務必注意飛行安全，並需了解自負疏忽所造成任何意外之責任。
- 每趟飛行前須仔細檢查，主旋翼夾座橫軸螺絲、尾旋翼夾座螺絲，以及機身各部位球頭、螺絲，確實上膠鎖緊才能昇空飛行。



LOCATE AN APPROPRIATE LOCATION 遠離障礙物及人群

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

Do not fly your model in inclement weather, such as rain, wind, snow or darkness.

直昇機飛行時具有一定的速度，相對的也潛在著危險性，場地的選擇也相對的重要，請需遵守當地法規到合法遙控飛行場地飛行。必須注意周遭有沒有人、高樓、建築物、高壓電線、樹木等等，避免操控的不當造成自己與他人財產的損壞。初次練習時，務必選擇在空曠合法專屬飛行場地並適當搭配練習架練習飛行，這對飛行失誤所造成的損傷將會大幅的降低。

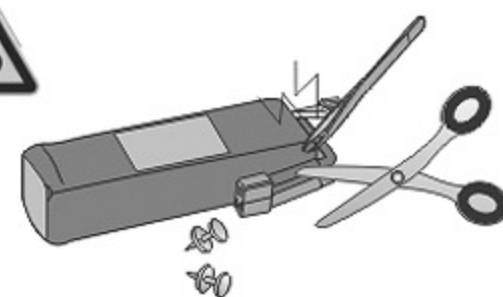
請勿在下雨、打雷等惡劣天候下操作，以確保本身及機體的安全。



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

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

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



PREVENT MOISTURE 遠離潮濕環境

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

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



PROPER OPERATION 勿不當使用本產品

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

請勿自行改造加工，任何的升級改裝或維修，請使用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，並勿用於安全、法令外其它非法用途。

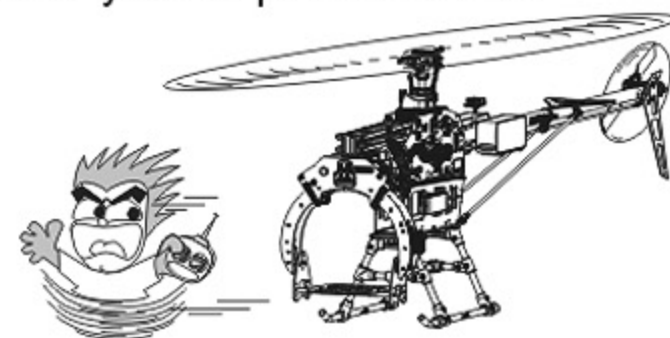




OBTAIN THE ASSISTANCE OF AN EXPERIENCED PILOT 避免獨自操控

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

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



SAFE OPERATION 安全操作

Operate this unit within your ability. Do not fly under tired condition and improper operation may cause 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.

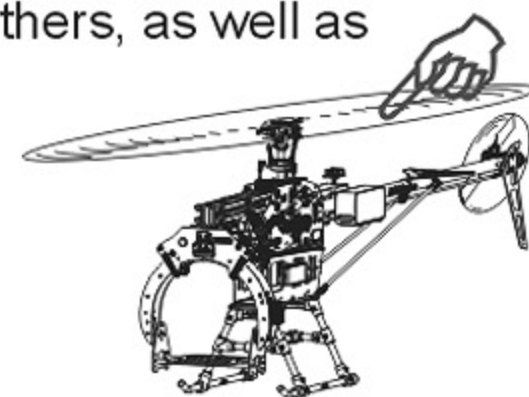
請於自己能力內及需要一定技術範圍內操作這台直昇機，過於疲勞、精神不佳或不當操作，意外發生風險將可能會提高。不可在視線範圍外飛行，降落後也請馬上關掉直昇機和遙控器電源。



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

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

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



KEEP AWAY FROM HEAT 遠離熱源

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

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



EQUIPMENT REQUIRED FOR ASSEMBLY

自備設備

ALIGN

1 RADIO TRANSMITTER AND ELECTRONIC EQUIPMENT REQUIRED FOR ASSEMBLY

自備遙控及電子設備



Flybarless System Helicopters T-REX 800
無平衡翼系統直昇機 T-REX 800



Transmitter (8-channel or more, helicopter system)

- Must have 3 step stunt mode and 2 step gyro gain control function.

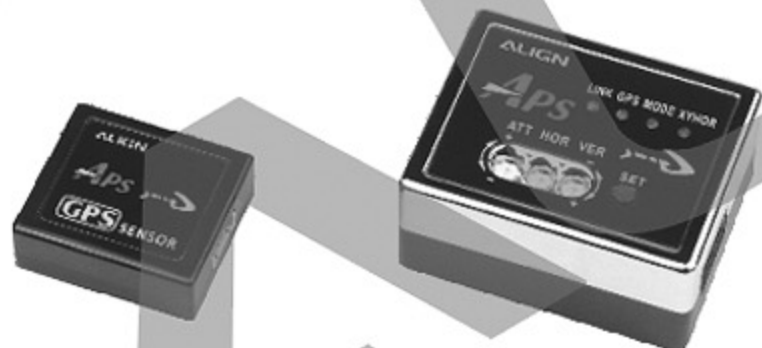
發射機(八動以上直昇機模式遙控器)

- 須要具備3段油門特技開關與2段感度開關



3GX Flybarless System
V2.1 or higher

3GX無平衡翼系統V2.1或V2.1以上版本



APS Gyro V1.2 or higher
APS Gyro 系統V1.2或V1.2以上版本



Receiver
(7-channel or more)
接收器(七動以上)

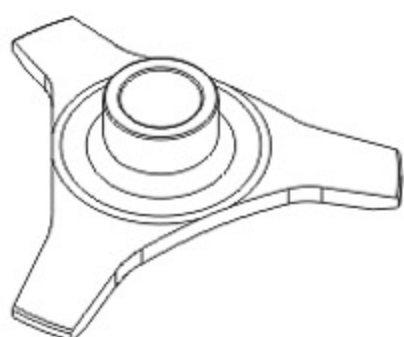
or
或



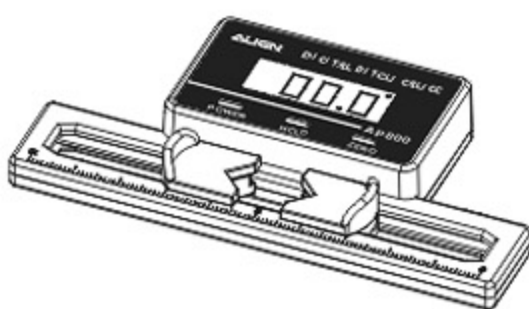
Satellites Receiver
衛星天線

2 ADDITIONAL TOOLS REQUIRED FOR ASSEMBLY

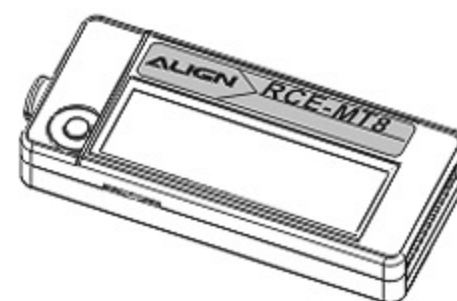
自備工具



Swashplate Leveler
十字盤調整器



AP-800 Digital Pitch Gauge
AP-800 數位螺距規



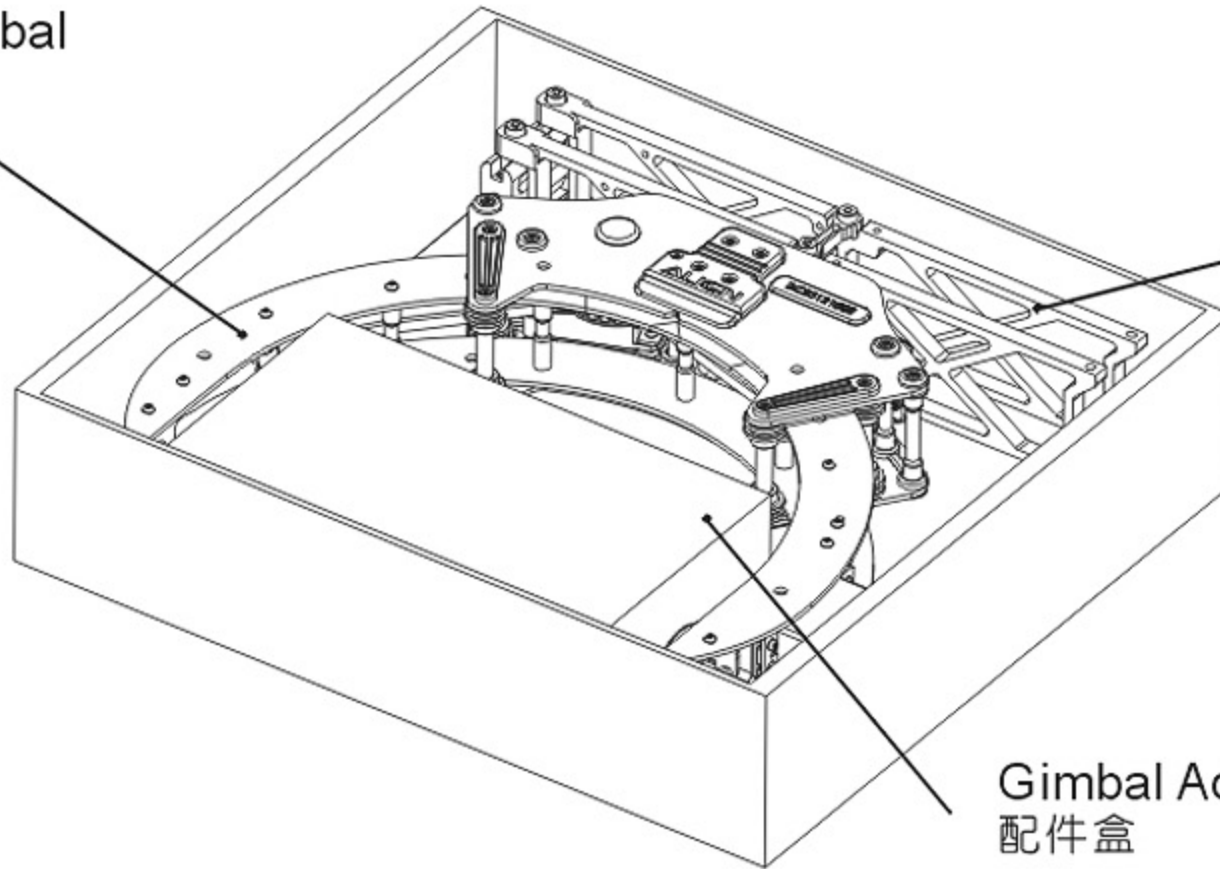
Multi-function Tester
Voltmeter/Servo Diagnosis
多功能檢測計
電池電壓/伺服器檢測

PACKAGE CONTENTS

包裝說明

ALIGN

G800 Gimbal
G800雲台



Gimbal Support Assembly
雲台支架組

Gimbal Accessory Pack
配件盒

STANDARD EQUIPMENT

標準配備



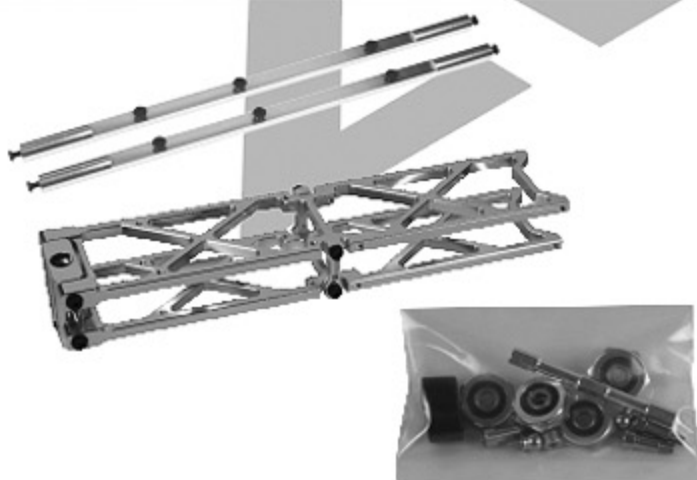
G800 Gimbal
G800雲台



Gimbal Controller
雲台控制器



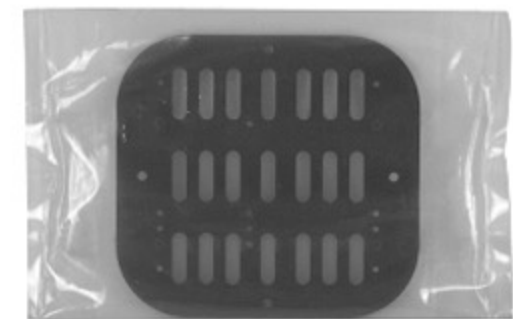
DS815 HV Robot Servo x3
DS815 高壓機器人伺服器x3



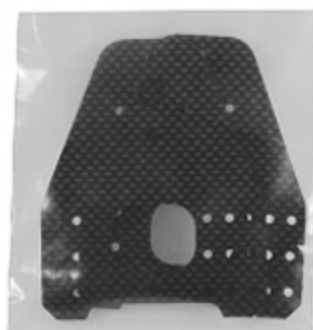
Gimbal Support Assembly
雲台支架組



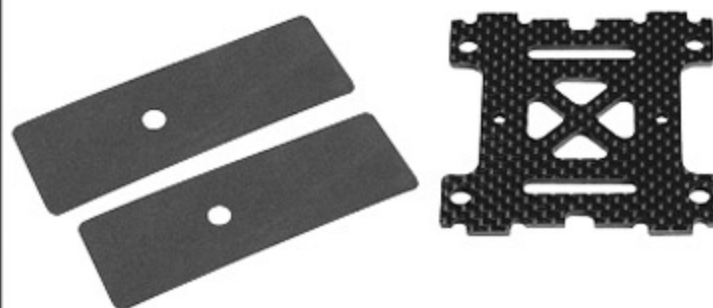
Gimbal Shock
Absorbers Assembly
雲台避震器組



Gimbal Bottom Plate
雲台底板



Gimbal Camera Tray Side
Plates x2
雲台底座側板x2



Camera Pad 700E ESC mount
相機墊 x2 700E ESC固定板



Connection Cord
連接線

ASSEMBLY SECTION

組裝說明

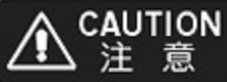
ALIGN



CAUTION
注意

While installing ROLL servo, first mount the servo loosely on gimbal yaw mount back plate, then assemble front and back plate together, rotate the gimbal arch plate so servo lines up with transmission axle, and then finally tighten the servo.

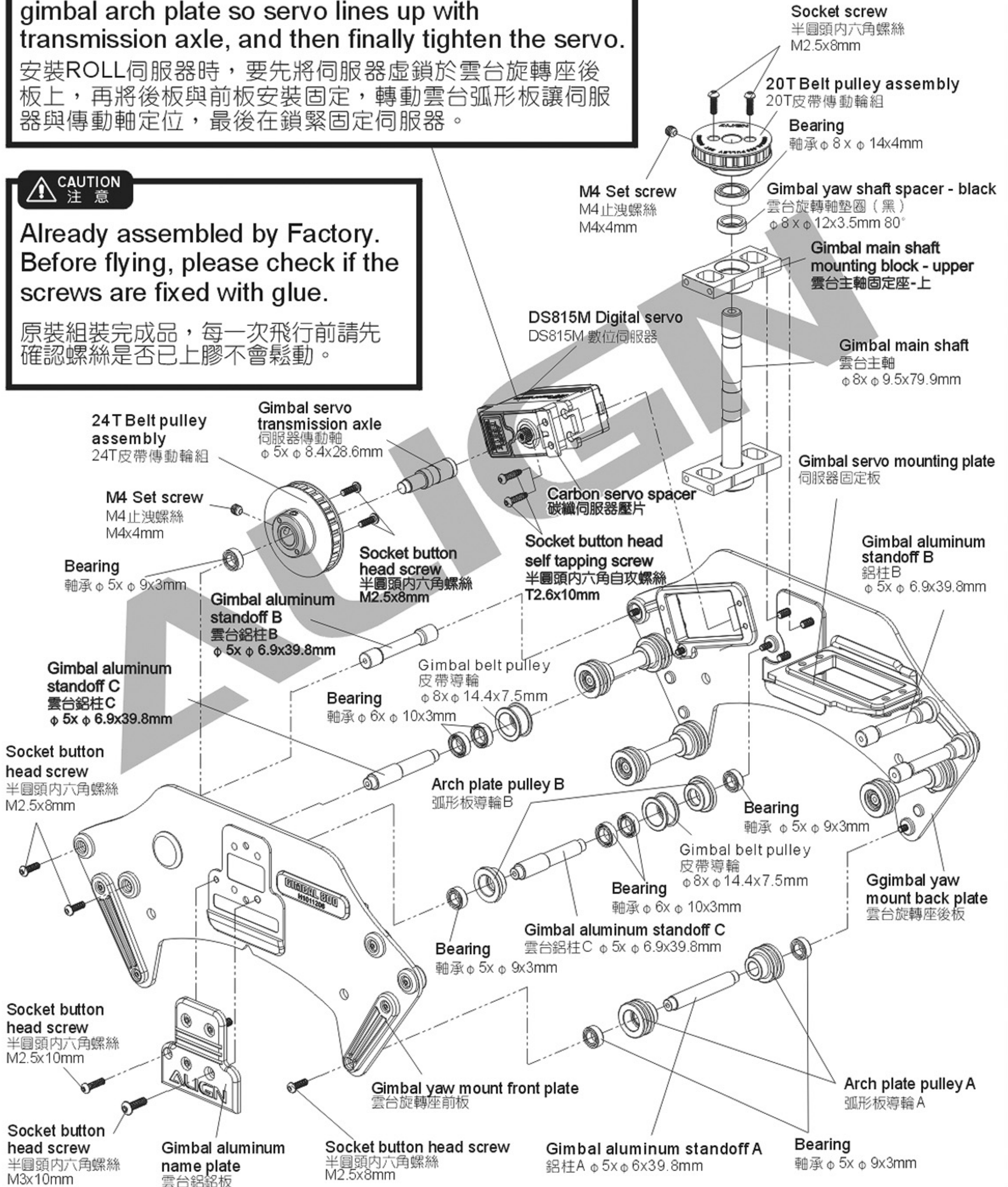
安裝ROLL伺服器時，要先將伺服器虛鎖於雲台旋轉座後板上，再將後板與前板安裝固定，轉動雲台弧形板讓伺服器與傳動軸定位，最後在鎖緊固定伺服器。



CAUTION
注意

Already assembled by Factory. Before flying, please check if the screws are fixed with glue.

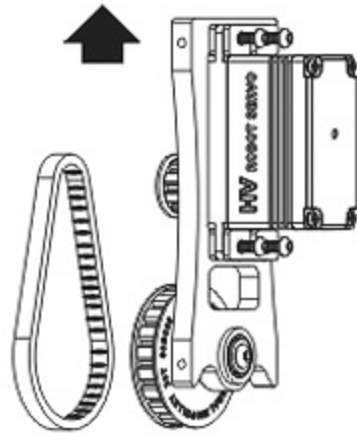
原裝組裝完成品，每一次飛行前請先確認螺絲是否已上膠不會鬆動。



CAUTION
注意

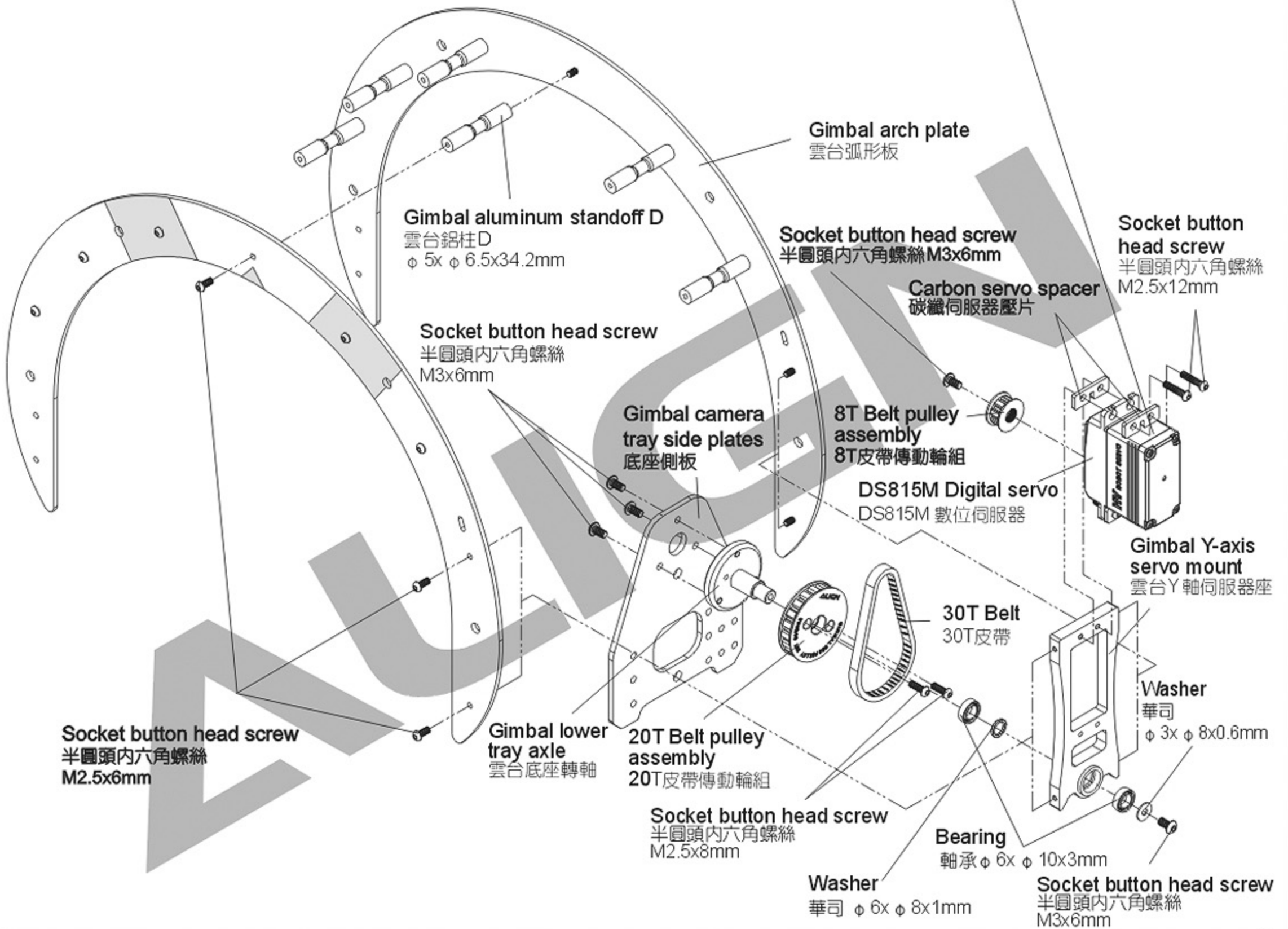
Route the 30T belt to pulley assembly and tighten, then fix with M2.5x12mm cap head hex screw. Do not over tighten.

將30T皮帶繞至皮帶傳動輪組並拉緊後，請使用適當力道鎖附半圓頭內六角螺絲M2.5x12mm。



DS815 Digital Servo :

- Soft start/緩啟動功能
- 1520 μ s standard band /1520 μ s寬頻系統
- Stall torque/輸出扭力 : 15kg.cm(4.8V)
18kg.cm(6V)
20kg.cm(7.4V)
- Motion speed/動作速度 : 0.15sec/60° (4.8V)
0.13sec/60° (6V)
0.11sec/60° (7.4V)
- Dimension/尺寸 : 40.1x 20.1 x 20.7mm
- Weight/重量 : 66g



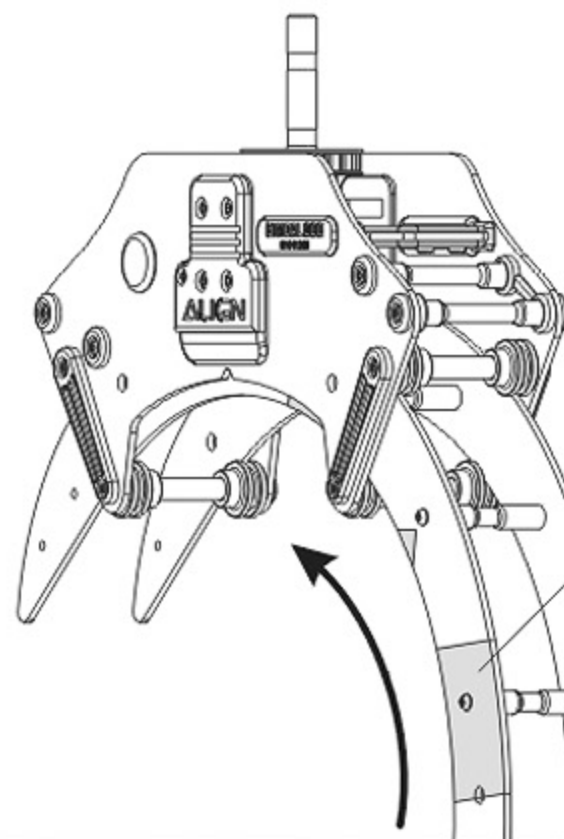
CAUTION
注意

Arch plate with yellow emblem need to face forward.

有黃色印刷弧形板要朝前。

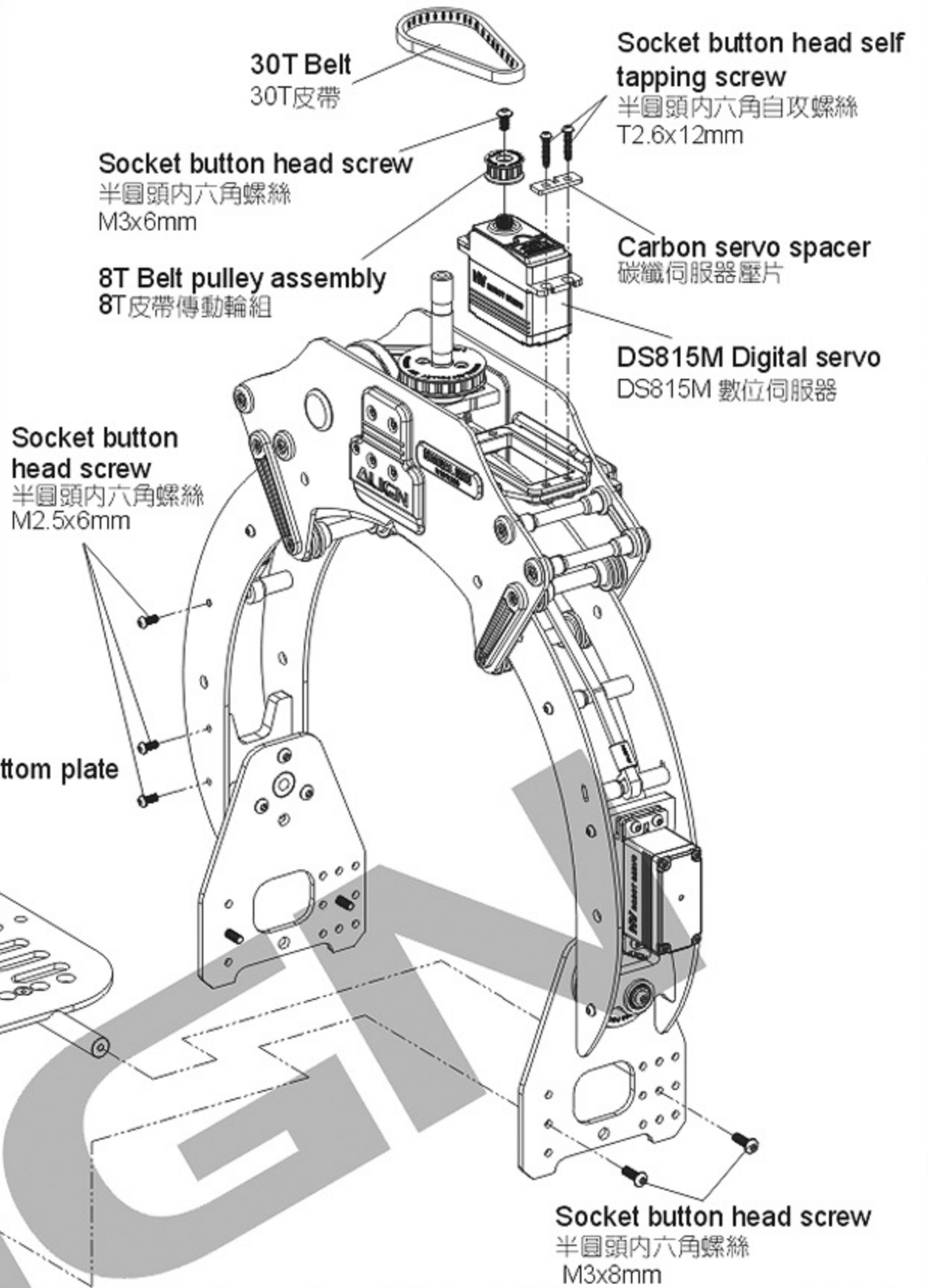
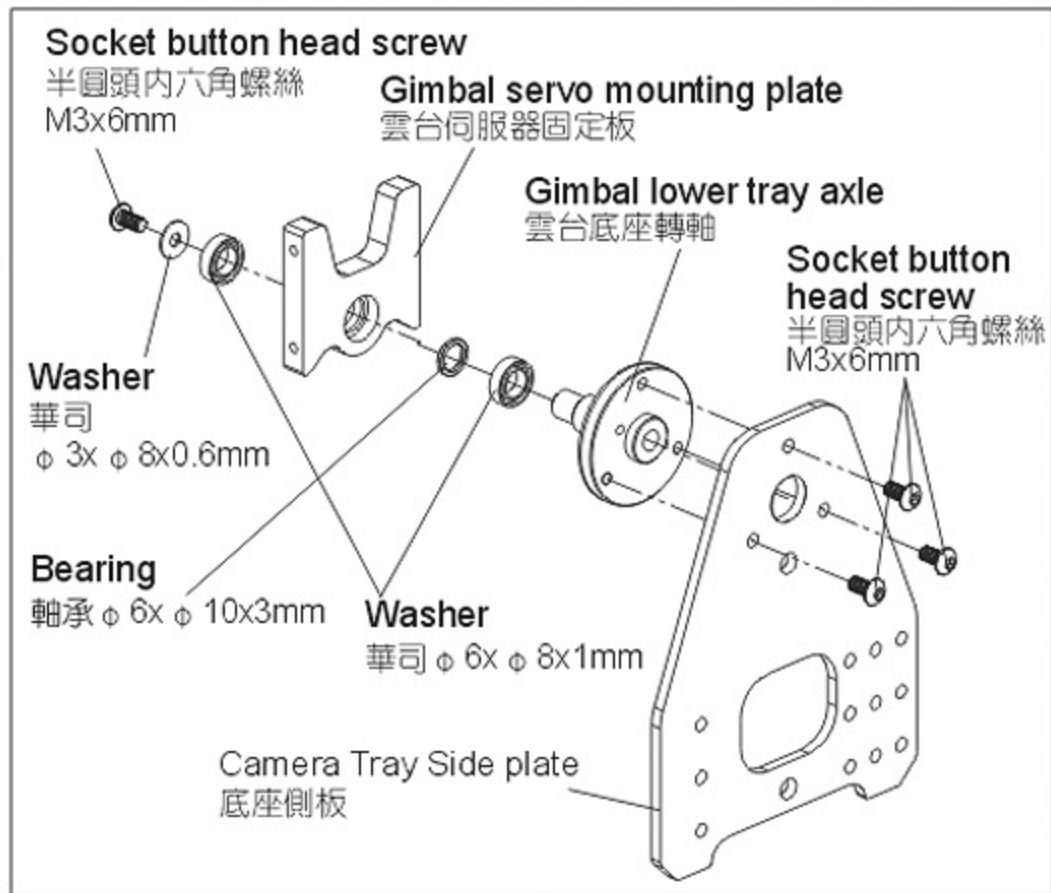
Insert the assembled gimbal arch plates into yaw mount plate pulley.

將組裝好的雲台弧形板穿入旋轉座弧形板導輪。



Arch plate with yellow emblem need to face forward.

有黃色印刷弧形板要朝前。



CAUTION
注意

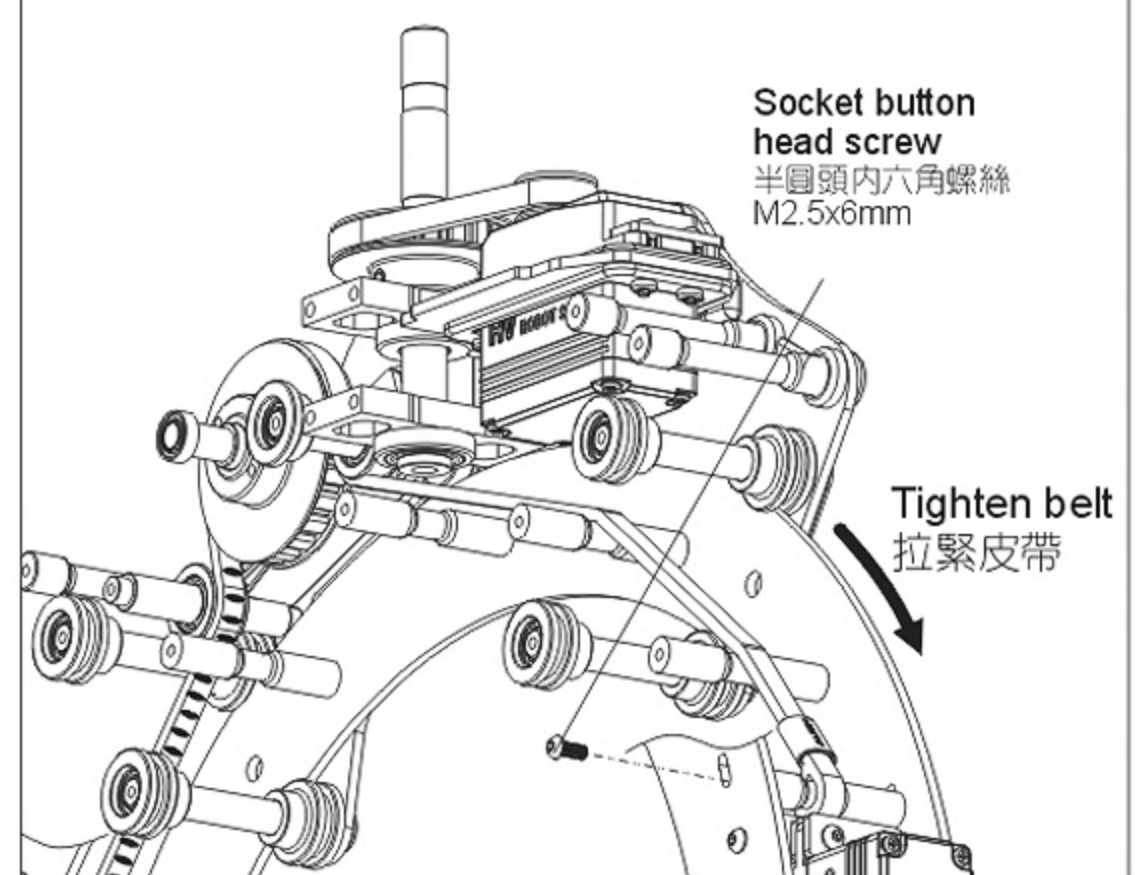
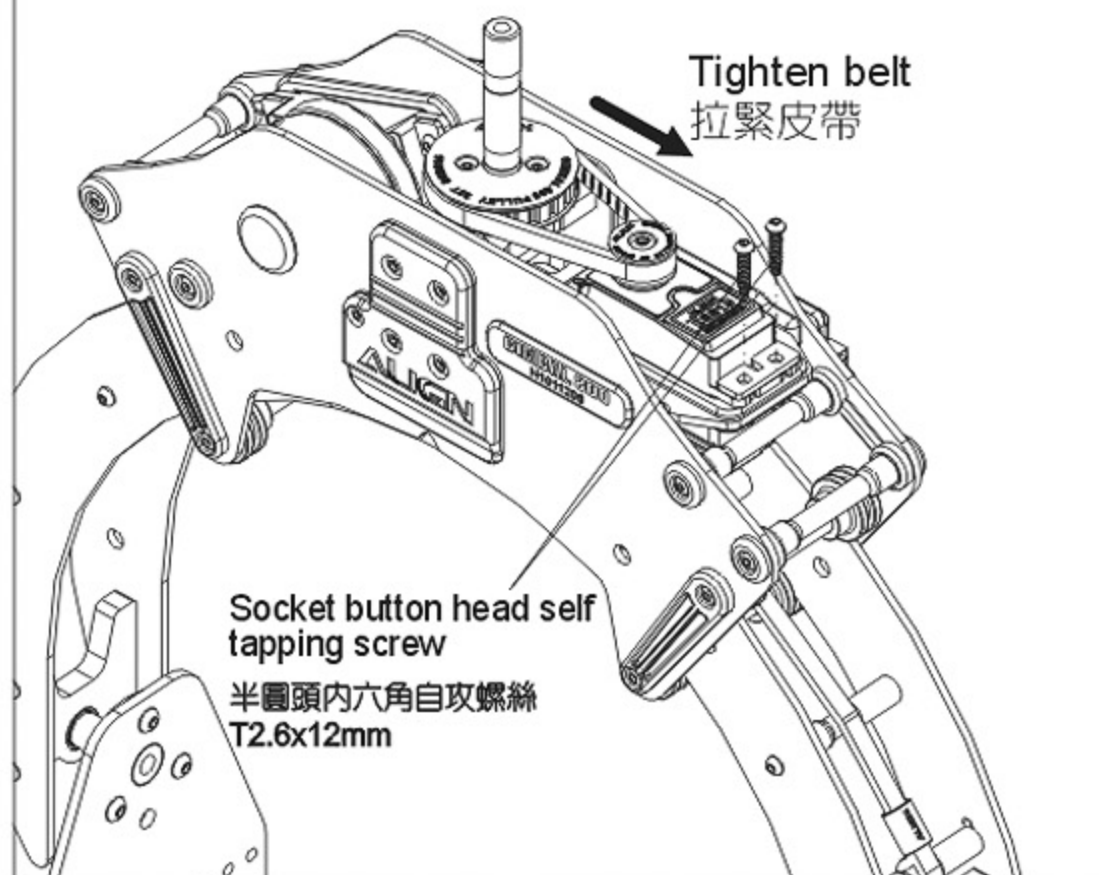
Route the 30T belt to pulley assembly and tighten, then fix with T2.6x12mm cap head hex screw. Do not over tighten.

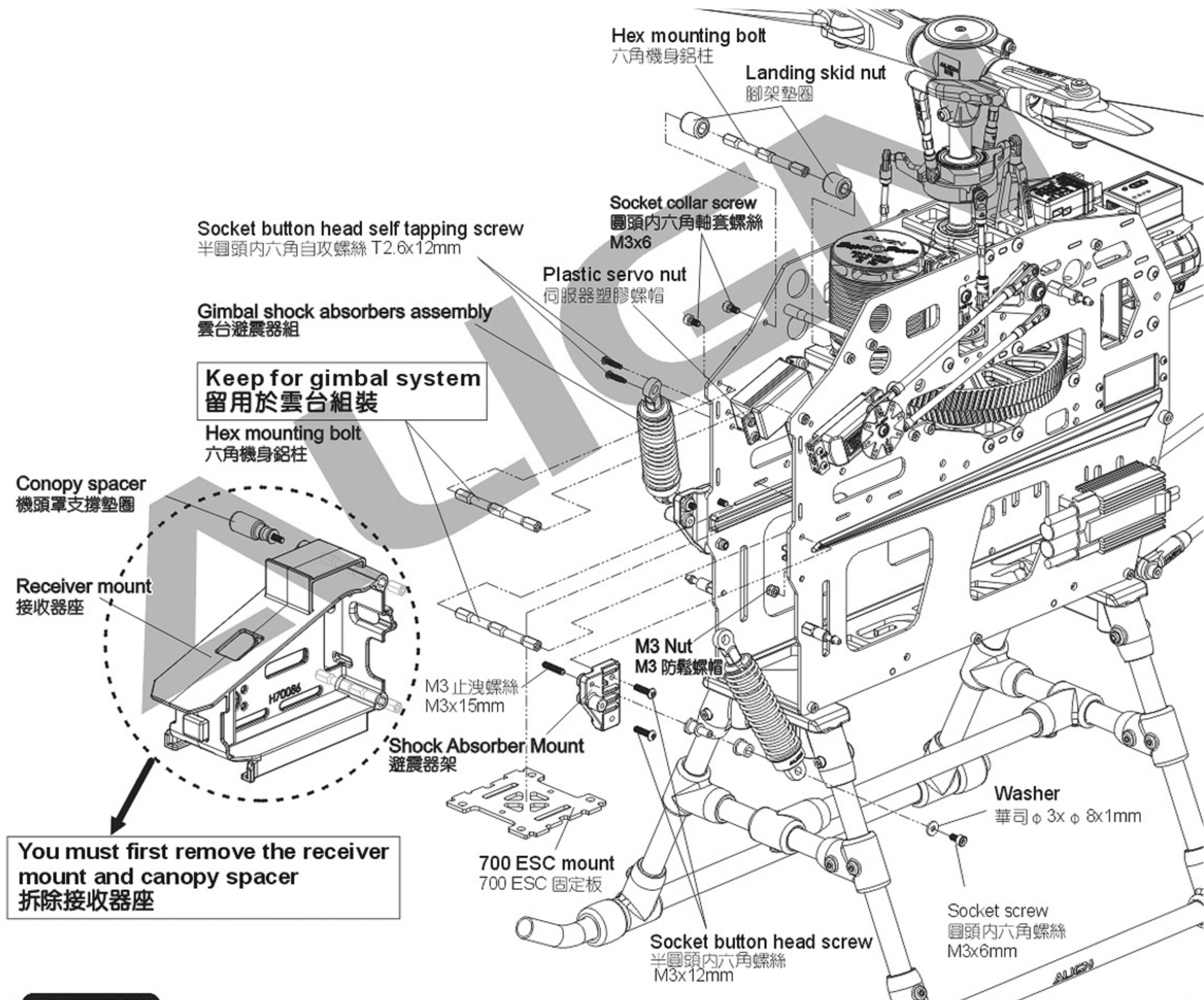
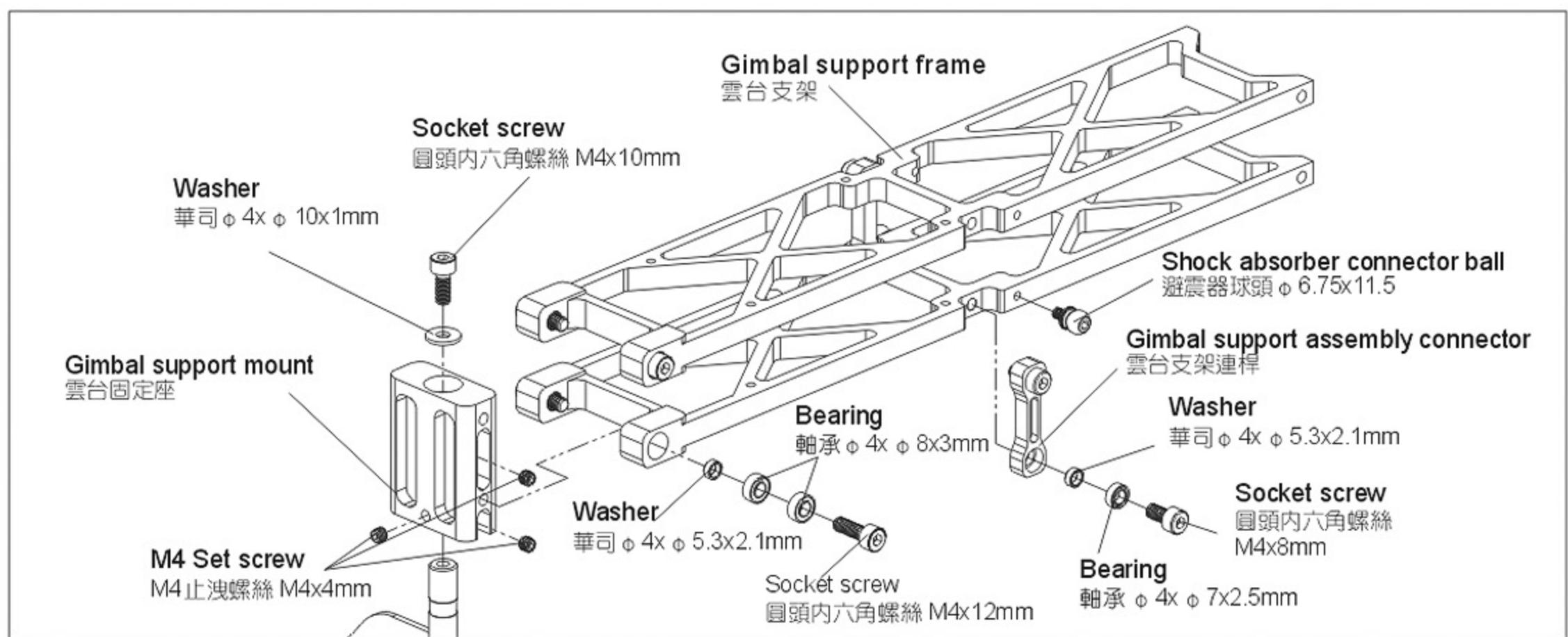
將30T皮帶繞至皮帶傳動輪組並拉緊，請使用適當力道鎖附半圓頭內六角螺絲 T2.6x12mm。

CAUTION
注意

Route the 87T belt to pulley assembly and tighten, then fix with M2.5x6mm cap head hex screw. Do not over tighten.

將87T皮帶繞至皮帶傳動輪組並拉緊，請使用適當力道鎖附半圓頭內六角螺絲 M2.5x6mm。





You must first remove the receiver mount and canopy spacer
拆除接收器座



You must first remove the receiver mount and canopy spacer, and remove the hex mounting bolts for installation back to the frame, then install the assembled gimbal support assembly to the frame.

需先拆除接收器座與機頭罩支撐墊圈，並取出六角鋁柱裝回機身側板，再將組裝完成的雲台支架裝於機身。

CAUTION
注意

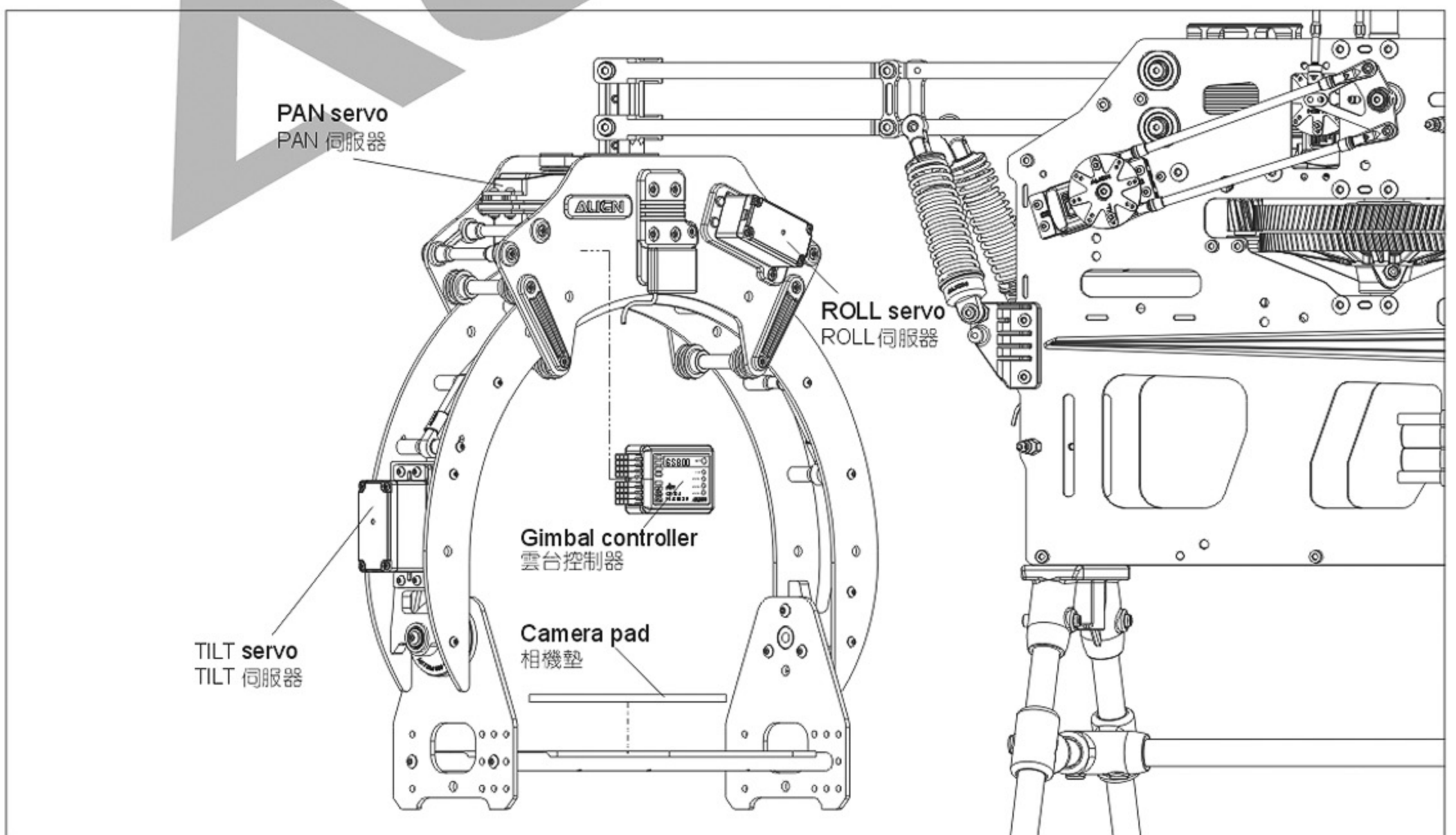
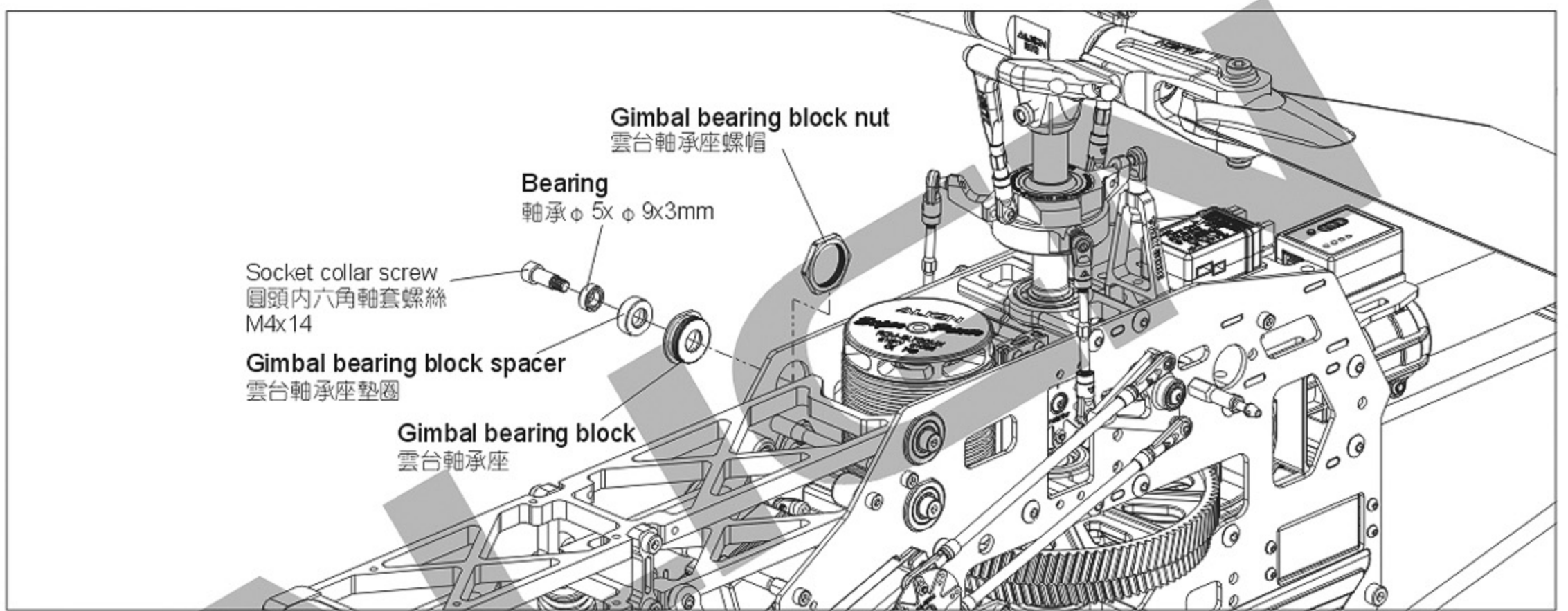
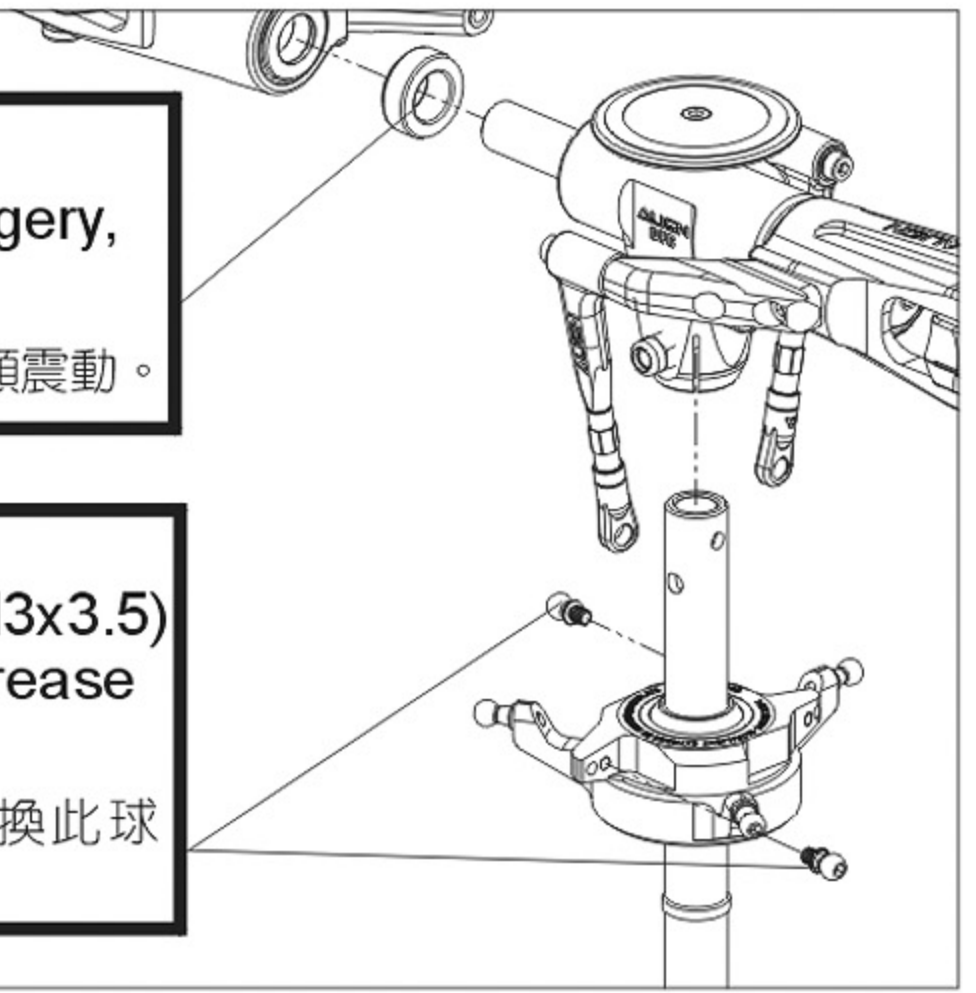
If have high frequency vibration in video imagery,
use damper rubber 80° - red .

請更換為材質較軟的紅色80°橫軸墊圈，可有效避免高頻震動。

CAUTION
注意

Please exchange to 700 DFC linkage ball (M3x3.5)
φ 5x9.3mm. Replace with these balls to increase
APS's correction angle.

請更換為700DFC球頭(M3x3.5) φ 5x9.3mm，更換此球
頭能讓APS有更多的修正角度。



APS GYRO UPDATE INSTRUCTION

APS 陀螺儀更新使用說明

ALIGN

When using G800 gimbal, APS Gyro must be firmware V1.2 or higher. Please use the following step to update APS Gyro. And adjust APS Gyro to make helicopter in a good flying conduction to get best filming result with G800 gimbal.

Upgrade 3GX to V3.0 or higher is highly recommended. V3.0 can increase the performance and stability of APS.

使用G800雲台，APS陀螺儀必須是V1.2或V1.2以上版本，請依照下列方式更新APS陀螺儀，並藉由APS的飛行手感將直昇機調整到穩定飛行狀態，如此才能在使用G800雲台時可以獲得最佳的拍攝效果。

建議將3GX升級至V3.0或V3.0以上版本，能有效提升APS飛行穩定性。

1 SPECIFIC FEATURES OF THE APS V1.2 VERSION

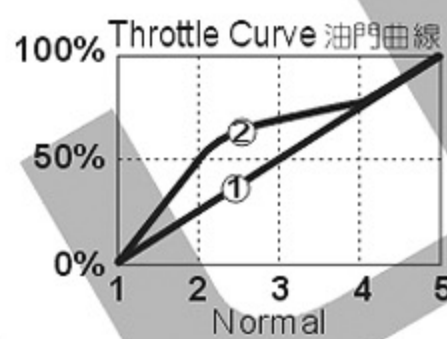
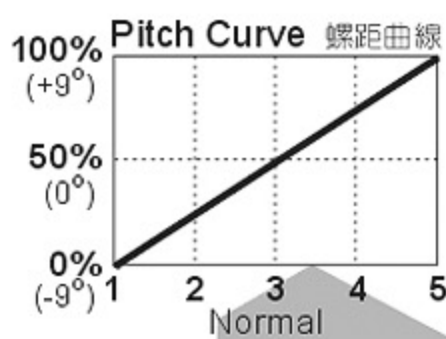
APS V1.2版本特點

- **Supports GS800 gimbal control system**
支援GS800雲台控制系統
- **Improve the control feel in APS mode, making the helicopter control feel more smooth and natural.**
提升APS模式的操控手感，讓直昇機的控制更得心應手。
- **Maximum altitude restriction increased from 500M to 700M.**
APS模式飛行高度限制由500公尺提高為700公尺。
- **Adding helicopter heading direction gain adjustment, to alleviate tail hunting under APS mode as result of transmitter discrepancy .**
增加直昇機頭向感度調整，解決APS模式下因為遙控器差異所造成的尾舵追蹤現象。
- **New descend deceleration feature to prevent hard landings as result of improper operation.**
新增降落自動減速功能，避免因操作不慎導致重降落。
- **Adding APS mode control feel adjustment, allowing different control feel to be achieved through ATT and HOR gain dials.**
優化APS模式姿態定位手感調整，透過姿態與水平位置感度旋鈕的調整，可以變化出不同的姿態定位手感反應。

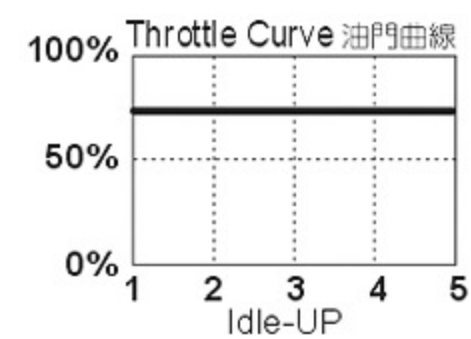
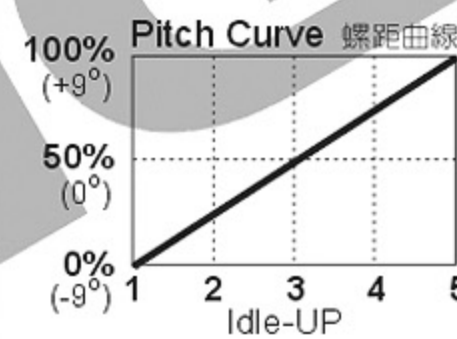
- Pilots are responsible for their actions and damage or injury occurring during the operation or as of a result of R/C aircraft models.
- Prior to every flight, carefully check rotorhead spindle shaft screws and tail blade grip screws, linkage balls and screws, ensure they are firmly secured.
- 請飛行者務必注意飛行安全，並需了解自負疏忽所造成任何意外之責任。
- 每趟飛行前須仔細檢查，主旋翼夾座橫軸螺絲、尾旋翼夾座螺絲，以及機身各部位球頭、螺絲，確實上膠鎖緊才能昇空飛行。

- To ensure proper operation of APS correction routine, we recommend collective pitch should not be set less than +/- 9 degrees; if in 3GX/APS/GPS flight modes, pitch curve must be 0-50-100 diagonal straight line.
- After entering APS flight mode, throttle stick position controls the helicopter height and vertical movement speed; helicopter pitch is controlled by APS's response.
- 為確保APS修正的正常運作，建議集體螺距設定不得小於正負9度，進入APS與GPS飛行模式時的螺距曲線必須0/50/100斜直線的設定。
- 當進入APS飛行模式後，油門搖桿的位置是控制直昇機的高度與垂直移動的速度，直昇機的螺距角度是由APS控制反應。

SEMI-AUTONOMOUS TAKEOFF/LANDING 半自動起飛/降落



APS FLIGHT MODE/ GPS FLIGHT MODE APS飛行模式/GPS飛行模式



- Vibration test must be re-performed should helicopter experienced a crash, parts replacement or RPM/collective pitch changes.
- If vibration test wasn't passed and APS function is switched on, possible loss of control and crash may occur.
- We recommend performing vibration test periodically every 10 flights to ensure safety.
- After passed vibration test and enter APS/GPS flight mode, do not change the rotor RPM, pitch and 3GX setting. Changing the setting can make the vibration conditions change, severe cases lead to a flight out of control of the crashes.
- Should helicopter experience any unusual behavior during APS flight mode, you must switch back to 3GX mode immediately and fly manually to ensure safety.
- 只要直昇機有變更主旋翼轉速、集體螺距設定、摔落或更換任何零件時，必須重新執行震動測試。
- 如未執行通過震動測試，冒然開啓APS功能，會造成直昇機失控墜毀的危險。
- 建議每10趟飛行定期執行震動測試檢查，以確保安全。
- 通過震動測試後，進入APS/GPS飛行模式，嚴禁隨意變更主旋翼轉速、螺距及3GX設定而使震動條件改變，嚴重者將導致飛行失控摔機。
- 在APS飛行模式下執行任何飛行功能時，若直昇機發生異常狀況，務必立刻恢復3GX飛行模式，改為手動操作，以確保安全。

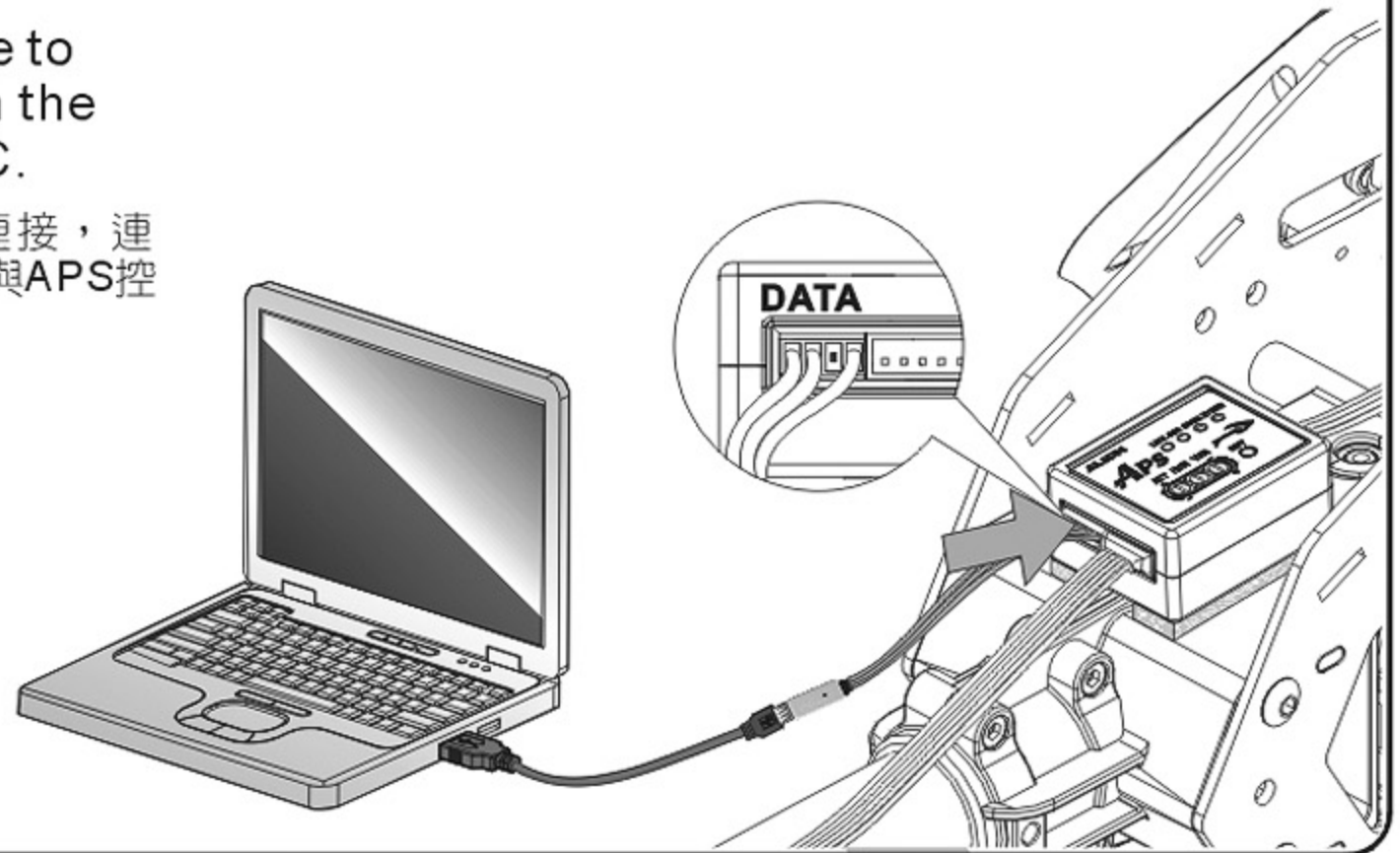
3

DATA LINK CONNECTION

傳輸線接線方式

Before APS V1.2 update, make sure to connect 3G data link cable between the DATA port on APS controller and PC.

進行APS V1.2更新前，必須將電腦與APS連接，連接方式如下：將3G傳輸線連接至電腦設備與APS控制器上的DATA埠。



4

INSTALLATION STEPS

安裝APS V1.2程式

STEP 步驟

1. Download 『 APS V1.2 Update 20121211 』 update file. APS.rar will appear on desktop after download is finished.

下載『APS V1.2 Update 20121211』更新檔案。下載完成後，會在桌面上產生一個「APS」壓縮檔。



2. Move the mouse to “APS.rar” and unzip the file to the desktop and you will find an “APS V1.2 Update 20121211” folder.

游標指至壓縮檔按右鍵解壓縮至桌面，會在桌面上產生一個「APS V1.2 Update 20121211」資料夾。



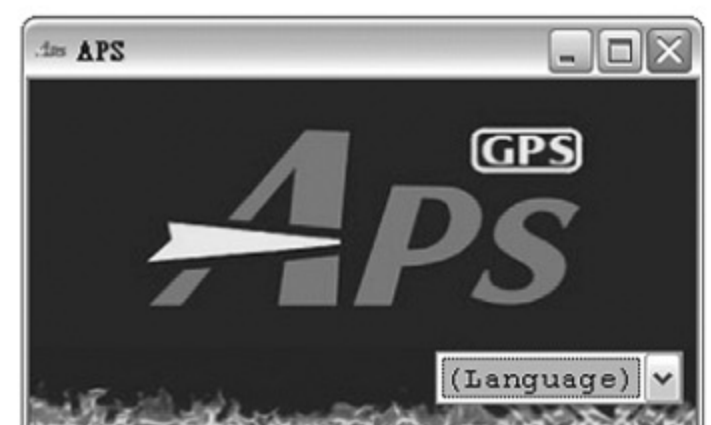
3. Open the unzipped folder and double click “APS.exe” to start update.

開啓解壓縮後資料夾，點選資料夾裡的『APS.exe』檔案，執行更新程式。



4. APS V1.2 update screen will be pop out.

接著會出現「APS V1.2 更新界面」視窗。



5

START UPDATE

開始更新



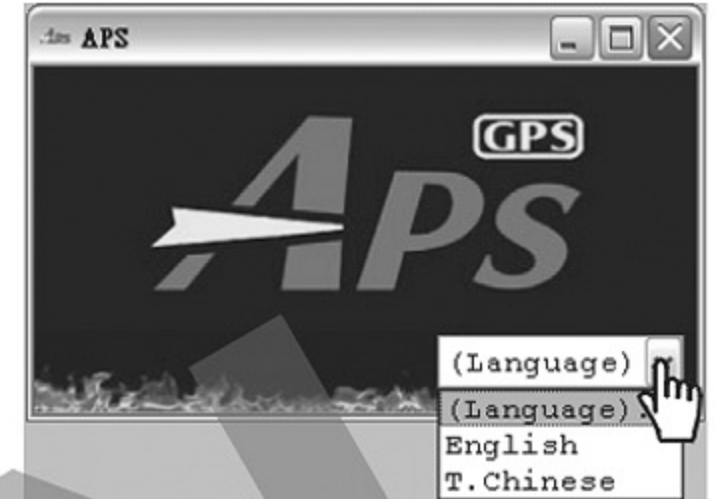
注意

APS controller need to power on or not be able to enter the update process.

需開啓APS控制器電源，否則無法進入更新程序。

STEP 步驟

1. Turn on APS controller power first
開啟APS控制器電源。
2. Select the language you want.
選擇使用語言。
3. APS update window pops up.
執行後會彈出APS更新視窗。

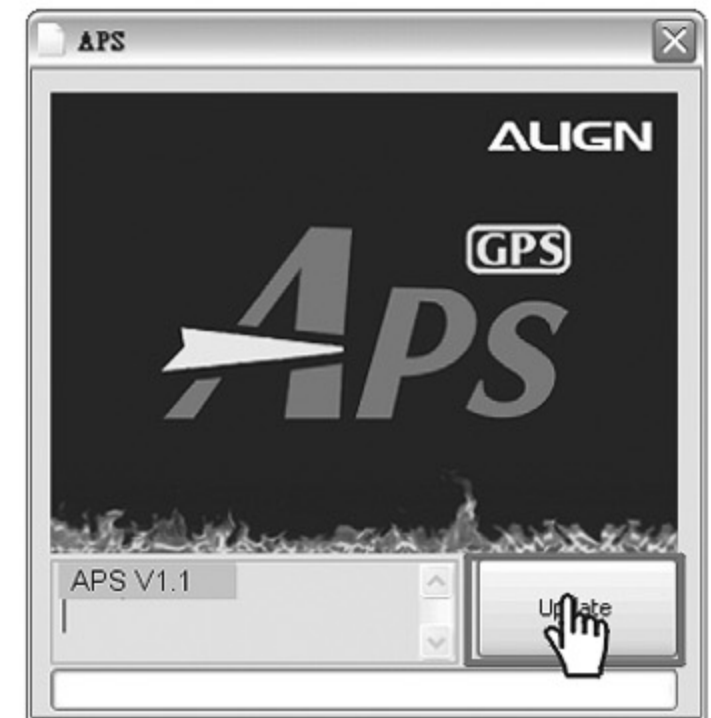


禁止

Do not power off or remove 3G data link cable during update, doing so may cause APS to fail and not power back up properly, if failure please contact the local distributors.

更新進行中勿移除電源與3G傳輸線，否則會造成APS更新失敗且無法正常開機，如無法使用請連絡當地代理商。

4. Click on "Update" to start update process.
將滑鼠移至Update，並按下開始更新。
5. APS will restart after update completes.
更新完成後，APS會自動重新開機。
6. Close window, and remove 3G data link cable to complete update.
關閉視窗，完成更新並移開3G傳輸線。



6

APS V1.2 HEADING DIRECTION GAIN ADJUSTMENT

APS V1.2 頭向感度調整功能

Should the helicopter exhibits tail hunting while flying under APS mode, this adjustment can be used to adjust the APS heading gain.

在APS飛行模式下，若出現尾舵追蹤現象，可以透過此功能來調降APS頭向感度。



Heading Direction
Gain Adjustment
頭向感度調整

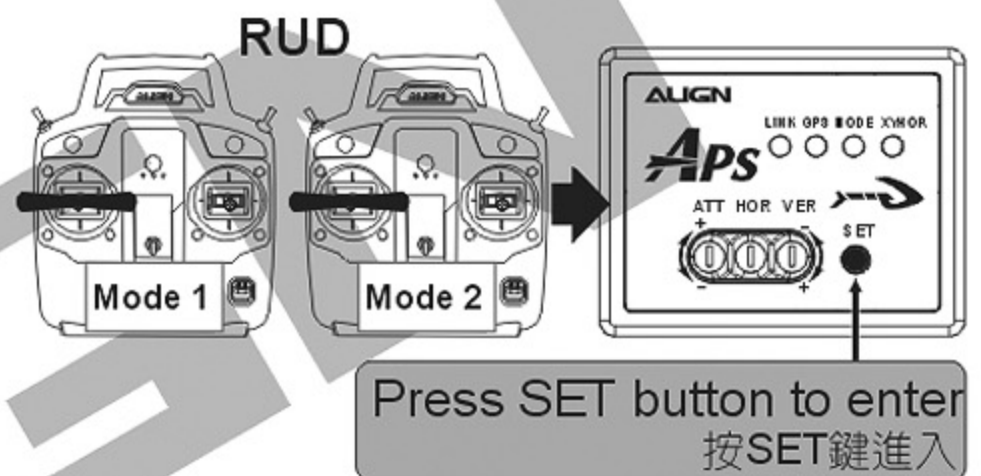
CAUTION
注意

1. If helicopter do not exhibit any tail hunting effect under APS mode, updating to V1.2 will not have any effect on its tail holding ability.
 2. Should there already exist tail hunting issue under 3GX mode, APS heading gain will not eliminate such hunting. Please adjust the rudder gyro gain in radio transmitter under 3GX flight mode, and eliminate possible mechanical binding which may affect tail responsiveness.
 3. Insufficient APS heading gain may cause rudder drift while in APS flight mode, Please increase gain.
1. 更新前APS飛行模式無尾舵追蹤現象的直昇機，更新V1.2版本後之並不會改變原來的鎖定效果。
 2. 若在3GX飛行模式下尾舵已經呈現追蹤現象，APS頭向感度並不會消除尾舵追蹤。請先透過遙控器調整3GX飛行模式下的鎖定感度，並先行排除機械干涉所造成的不正常尾舵反應。
 3. APS頭向感度不足時會導致在APS飛行模式時產生尾舵飄移的現象，請調高感度。

STEP 步驟

1. After APS finished powering up, push the rudder stick on your transmitter all the way left or right, and press the SET button on APS to enter APS heading gain adjustment mode.

在APS完成開機的狀態下，將遙控器尾舵搖桿撥至左邊或右邊不放，再按一下APS設定鍵進入APS頭向感度設定模式。



2. After entering APS heading gain adjustment mode, APS indicator LEDs will display the current gain value, factory value is set to 2 LEDs steady lit.

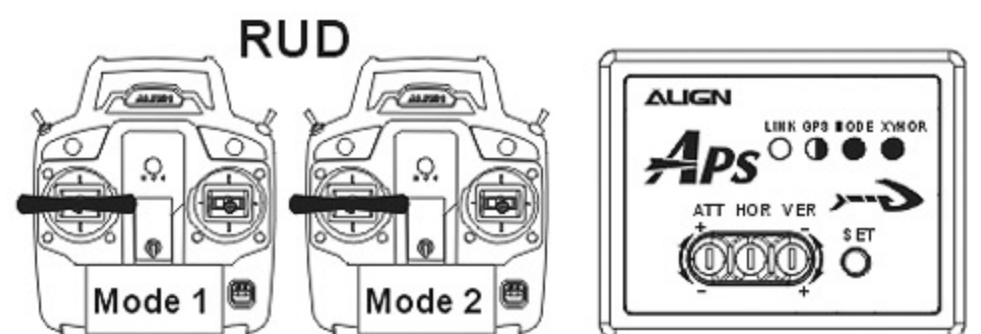
進入設定後APS顯示燈號會顯示當前的頭向感度設定，初始設定值為2個LED燈全亮。



3. Move the rudder stick to change the gain value. More LED's means higher gain, less LED's mean less gain, with total of 8 gain values. Reduce gain value should there be any tail hunting effect.

撥動尾舵搖桿來更改頭向感度設置，感度設置提供8個區段調整範圍。

燈號愈多感度愈高，反之燈號愈少感度愈小，若有尾舵追蹤現象，請調低感度。



4. After completing gain adjustment, press the SET button on APS once to exit.

設定完成後，按一下APS設定鍵記錄設定並退出APS頭向感度設定模式。



Press SET button to record 按SET鍵記錄

7

APS V1.2 Descend Deceleration System

APS V1.2 降落自動減速功能

To improve the safety of APS system, automatic landing safety deceleration system has been added to APS V1.2. While in APS flight mode, when pilot performs landing routine, to avoid crash as result of excessive descend speed, APS system will automatically reduce the descend speed to 2M/sec when the aircraft's altitude is between 10M and 5M, and lower to 0.8M/s when below 5M.

為提升APS使用的安全性，在APS V1.2版本特別新增降落自動減速功能。在APS飛行模式下，當操控者下達下降指令時，為避免直昇機下降速度過快而剎車不及，在距離地面高度10公尺到5公尺之間APS會自動把速度減速到每秒2公尺的下降速度，距離地面5公尺以下會減速到每秒0.8公尺的下降速度。



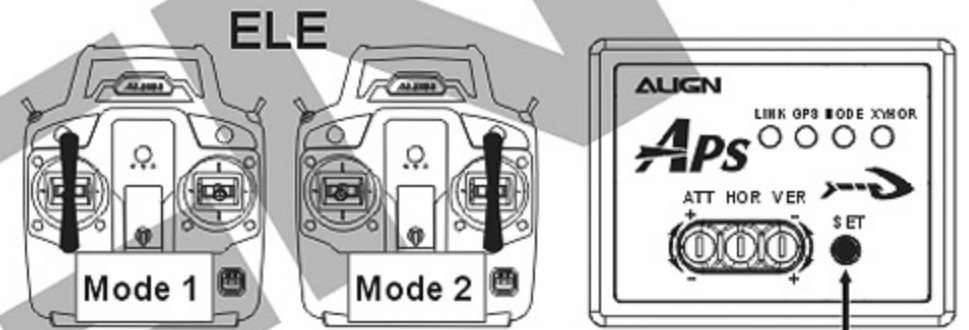
1. APS uses the elevation where the system was powered up as 0 altitude, not sea level elevation.
2. If APS is to be armed at higher elevation, and then flown into lower elevation environment, we recommend disabling this feature to achieve faster descent rate.

1. 飛行高度是以APS開機的地理位置為初始高度(0公尺)，而不是海拔高度。
2. 若在較高的地理位置將APS開機，欲飛行至相對較低高度的環境時，建議關閉此功能以獲得更快的下降速度。

STEP 步驟

1. After APS system powers up, move the elevator stick up or down and hold in position, press SET button on APS to enter setup mode for automatic landing safety deceleration system.

在APS完成開機的狀態下，將遙控器升降搖桿撥往上或往下不放，再按一下APS設定鍵進入降落自動減速功能設定模式。



Press SET button to enter
按SET鍵進入

2. After entering setup mode, the LINK and GPS LED's will both lit either green or red; green indicates automatic landing safety deceleration system is active, red means it's disabled.

Factory value is active.

進入設定後APS的LINK與GPS兩個燈號會同時恆亮綠燈或者紅燈，亮綠燈表示降落自動減速功能開啓，紅燈表示降落自動減速功能關閉，**預設值為開啓**。

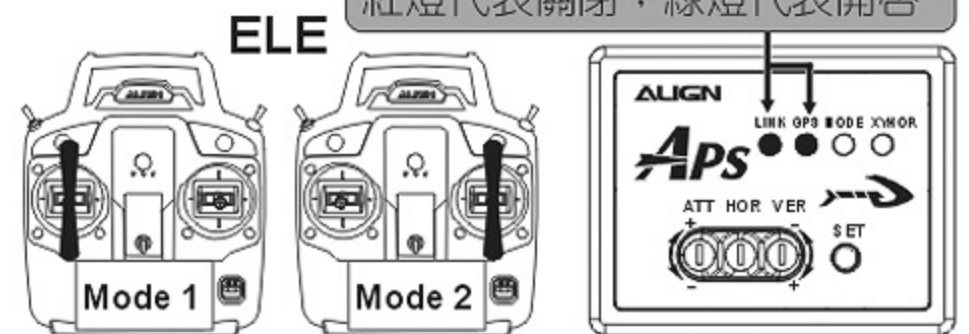
Red LED : Deactivate
Green LED : Activate
紅燈代表關閉；綠燈代表開啓



3. Move elevator stick to change the LED's color to correspond to active/disable of the automatic landing safety deceleration system.

撥動升降搖桿來更改燈號顯示，關閉或開啓降落自動減速功能。

Red LED : Deactivate
Green LED : Activate
紅燈代表關閉；綠燈代表開啓



4. Press the SET button on APS to register the change and exit automatic landing safety deceleration system mode.

設定完成後，按一下APS設定鍵記錄設定並退出降落自動減速功能設定模式。

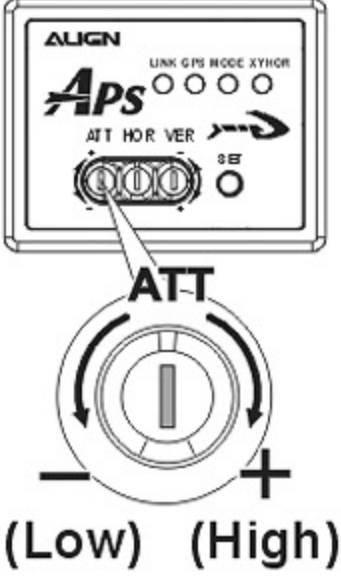


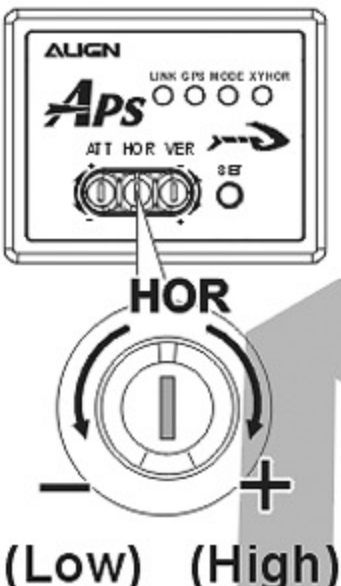
Press SET button to record
按SET鍵記憶

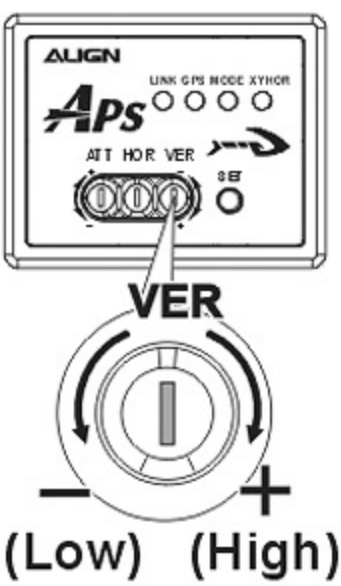
8

CONTROL FEEL ADJUSTMENT UNDER APS MODE

APS模式操控手感調整

Attitude Gain 姿態感度		Low Gain 低感度	High Gain 高感度
	Heli Response 機體反應	Smoother attitude correction by APS 機體回復成水平姿態的動作較為滑順緩慢	Harder attitude correction by APS 機體回復成水平姿態的動作較為紮實迅速
	Control Feel 操控手感	Attitude control and control direction change is slower, fuzzy, and softer. 操控機體姿態與變換移動方向時的反應較為延遲及模糊柔和	Attitude control and control direction change is more direct and more precise. 操控機體姿態與變換移動方向時的反應較為直接及細膩精確
	Application 應用範圍	1. Higher gain should be used under strong gust condition to enable immediate attitude compensating reaction. 2. For aerial photography, adjust ATT gain to achieve the desired control feel. 1. 強風環境下須調高感度，使姿態修正及時反應。 2. 進行空中攝影時，可依據操控手感調整姿態感度。	

Level Gain 水平位置感度		Low Gain 低感度	High Gain 高感度
	Heli Response 機體反應	Slower and more fuzzy positioning of the helicopter by APS. 機體定位緩慢，保持位置時略為飄移，定位時機體修正反應較為緩和	Faster and more precise positioning of the helicopter by APS, possible horizontal twitching during positioning. 機體定位迅速，保持位置較為精準，定位時機體會有抖動現象
	Control Feel 操控手感	Less positioning intervention during control. 操控時定位介入較弱	More positioning intervention during control. 操控時定位介入較多
	Application 應用範圍	1. Higher gain should be used under strong gust condition to allow for more precise positioning. 2. For aerial photography, adjust the HOR gain can be lowered to maintain smooth control feel. 1. 強風環境下須調高感度，使定位更精確。 2. 進行空中攝影時，可調低感度，保持較滑順的操控手感。	

Vertical Gain 垂直位置感度		Low Gain 低感度	High Gain 高感度
	Heli Response 機體反應	Slower height compensation, longer time before compensation. 修正高度緩慢，高度變化時介入修正時間較為緩慢。	Faster height compensation, possible vertical twitching during compensation. 修正高度迅速，修正時機體會有垂直跳動現象。
	Control Feel 操控手感	Softer stop during altitude changes 改變高度時緩停。	Harder stop during altitude changes 改變高度時急停。
	Application 應用範圍	Higher gain should be used under strong gust condition 強風環境下需要較高的高度修正感度。	

GS 800 GIMBAL STABILIZER FEATURES

GS 800 雲台控制器產品特色

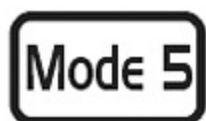
ALIGN

GS800 is a gimbal control system with superior processing capabilities. When used with Align T-Rex 800 and G800 gimbal system, and the required Align APS gyro system, you would have put together one of the most sophisticated aerial photography helicopter available for commercial or hobby use. GS800 features high degree of control precision, response agility, and stability, allowing precise focus to the shooting object, while the multiple operation modes will satisfy a variety of aerial photography needs. GS800 lets you capture the most optimal image with ease, and is the ideal choice for any type of aerial photography operations.

GS800是具備優異演算能力的雲台控制系統，必須搭配亞拓APS GYRO才能運作使用，並結合亞拓T-Rex 800與G800雲台，打造出前所未有的完美航拍直昇機組合，可廣泛用於各種商業或業餘空中攝影。其擁有高控制精準度、反應靈敏度與穩定性，具備多種操作模式，可精準使鏡頭鎖定拍攝目標物並滿足多種空拍需求，讓您鬆獲得最佳的拍攝畫面，是空中攝影作業的最佳選擇。



High stability, high precision 3 axis gimbal control system.
高穩定 / 高精度的三軸雲台控制系統。



Equipped with 5 operating modes to meet various aerial photography needs.
具備五種操作模式，可滿足多種空拍攝影需求。



Allowing precise lock on shooting objects, allowing capture of fantastic aerial footages with ease.
可精準鎖定拍攝目標物，能輕鬆拍攝出精彩的空拍畫面。



Unique survival mode, minimizes photo equipment damage during accidents
出色的救援模式，當意外發生時將攝影器材的損傷降至最低。



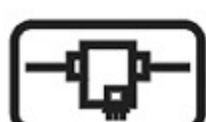
Used with Align APS Gyro.
搭配亞拓APS 陀螺儀使用。



Used with Align 3GX flybarless system.
搭配亞拓3GX無平衡翼系統使用。



Simple setup through few steps.
設定容易，只要經過幾個步驟就可以完成所有設定。



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



Supports Futaba S-Bus.
支援Futaba S.BUS功能。



Upgradeable programming interface allowing upgrading of new software through interface cable.
具備可升級程式化介面，可透過傳輸線更新軟體。



Compatible for T-REX 800.
相容直昇機 T-REX800。



Suitable for 4.8v-8.4v power, supports 2S lipo power source.
適用電壓 4.8V ~ 8.4V，支援2S鋰電池供電。



Small footprint, light weight, minimalists and reliable design.
體積小、重量輕，構造簡單可靠，提供操控者高性能的飛行樂趣。



RoHS certified.
符合RoHS限用規章。

CAUTION
注意

1. In order for GS800 to operate correctly, APS Gyro must have firmware V1.2 or higher.
2. Upgrade 3GX to V3.0 or higher is highly recommended. V3.0 can increase the performance and stability of APS.
3. GS800 will not power up unless connected with an APS Gyro system.
4. GS800 needs to be powered independently.
5. G800 can achieve optimal stability and control only if payload weight is balanced.
6. Requires 8 or more channels radio and receiver/satellites, transmitter must have 3 step stunt mode and 2 step gyro gain control function.

1. APS 陀螺儀必須為V1.2或V1.2以上版本，GS800才能正常運作。
2. 建議將3GX升級至V3.0或V3.0以上版本，能有效提升APS飛行穩定性。
3. GS800不能單獨使用，必須連接APS 陀螺儀才會開機。
4. GS800須獨立供電。
5. G800請均勻配重，才能達到最佳穩定與控制效果。
6. 須搭配8動以上遙控器與接收機/衛星天線，遙控器須要具備3段油門特技開關與2段感度開關。

FORBIDDEN
禁止



The two ports for connection of multi-color cable to GS800 are used for signals; Forbidden of input power or cause GS800 burned.

GS800上連接彩虹線的兩個頻道為訊號頻道，禁止接入電源否則會造成GS800燒毀。

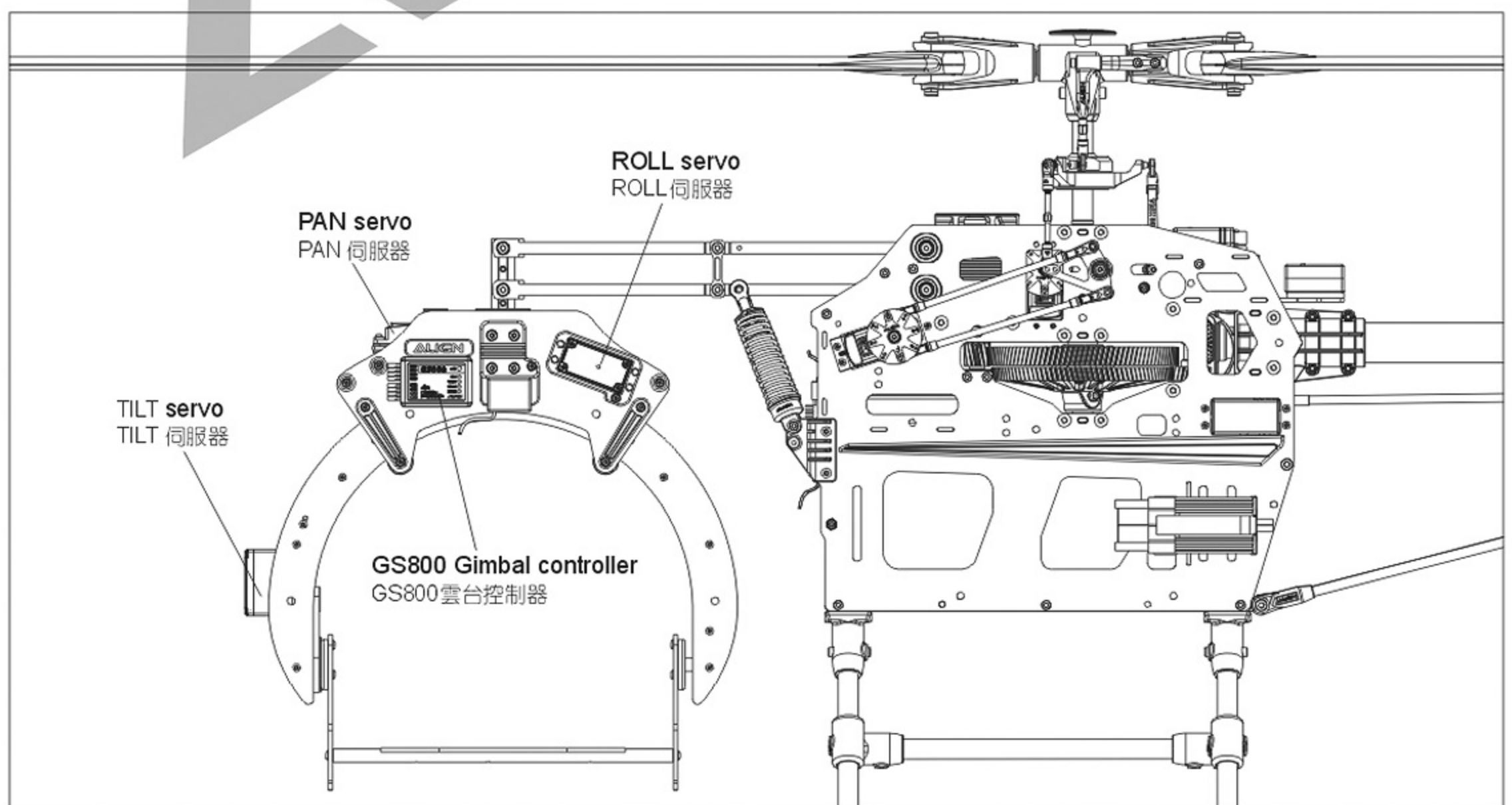
GS 800 PARTS IDENTIFICATION AND INSTALLATION

GS 800 雲台控制器各部位名稱及安裝說明

ALIGN

1 ELECTRIC EQUIPMENT ILLUSTRATION

雲台伺服器配置圖

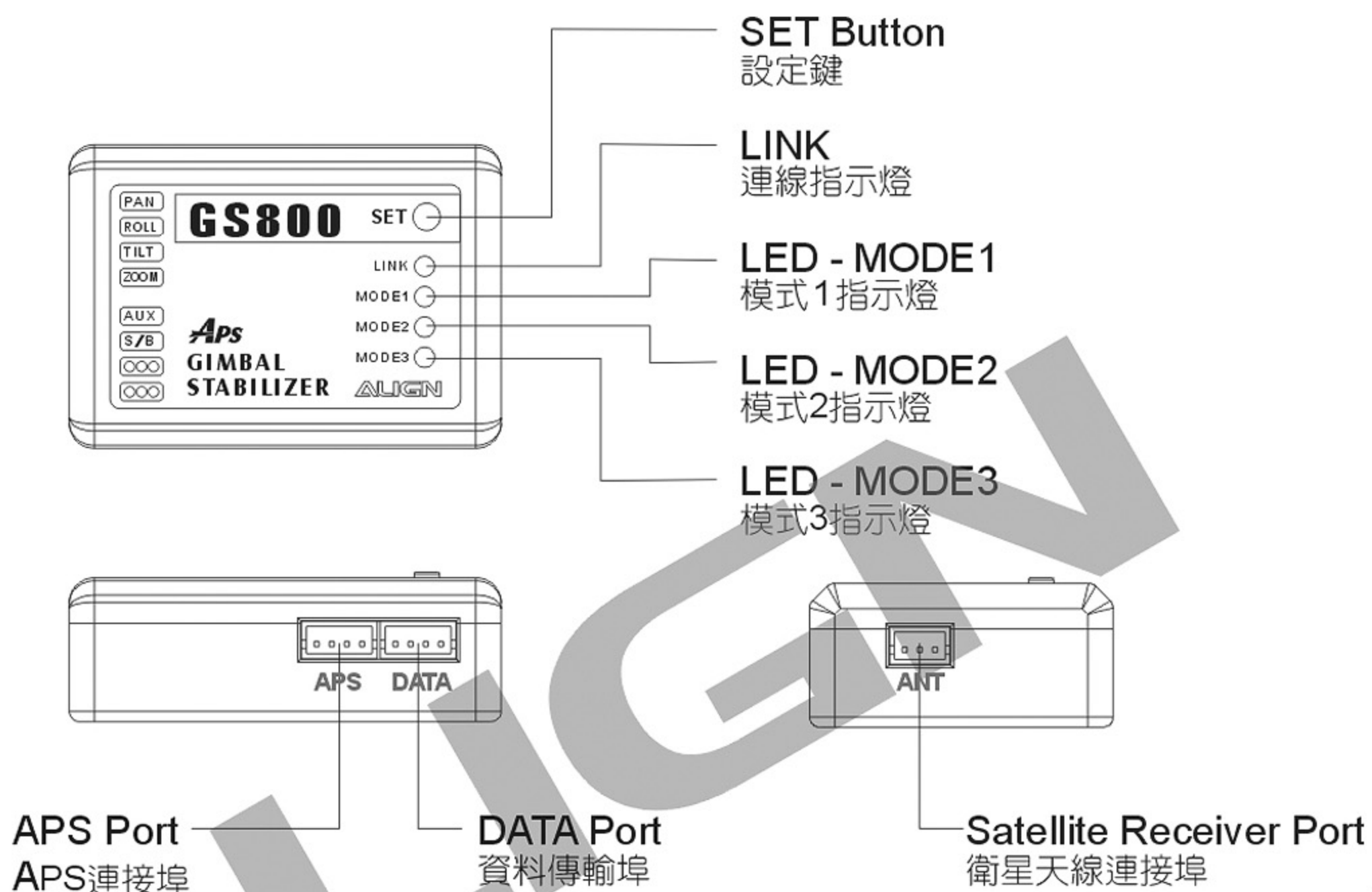


CAUTION
注意

In order for GS800 to operate correctly, APS Gyro must have firmware V1.2 or higher.
APS 陀螺儀必須為 V1.2 或 V1.2 以上版本，GS800 才能正常運作。

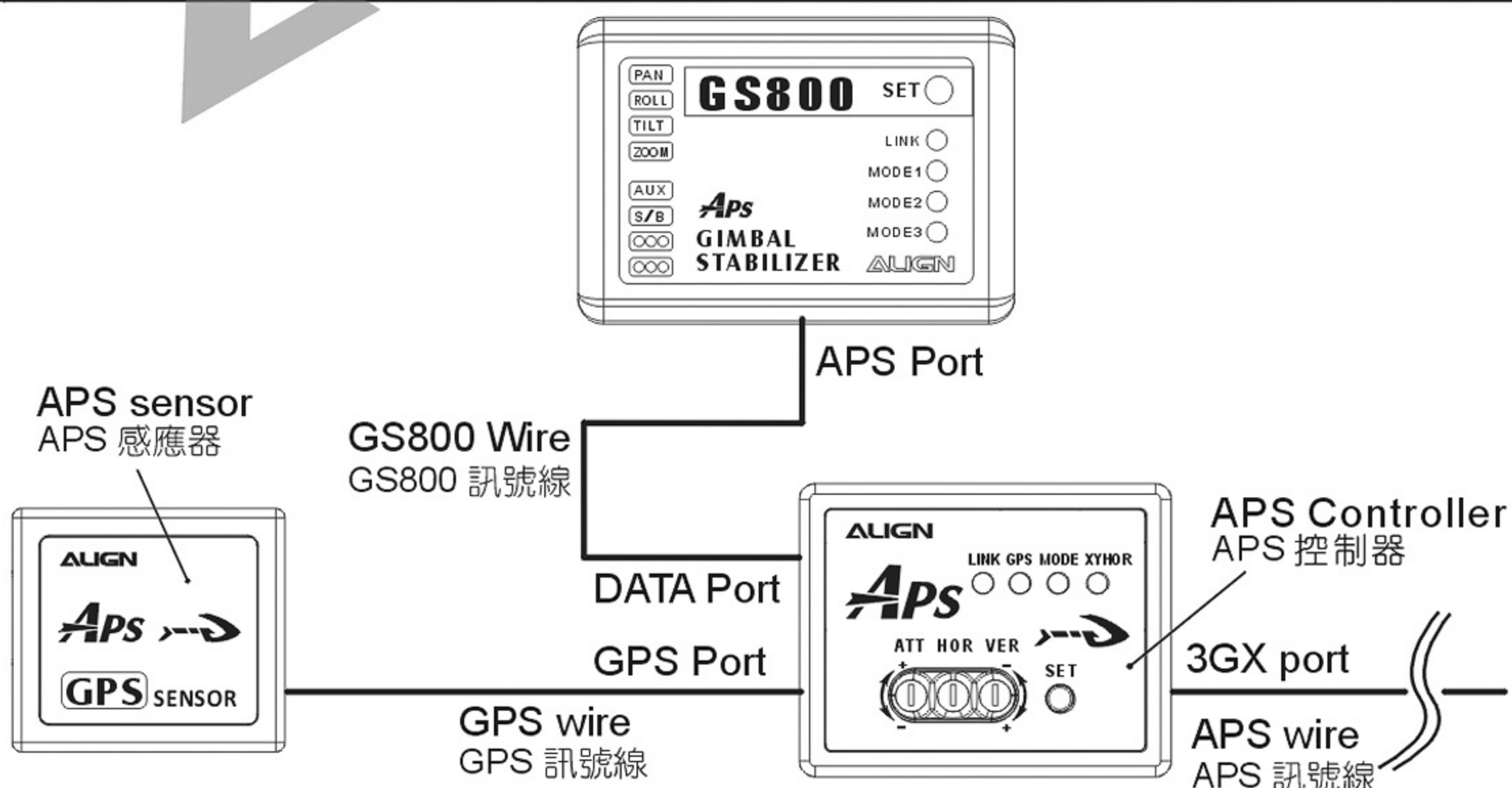
2 GS 800 SETUP INDICATORS

GS 800 雲台控制器各部位名稱



3 GS800 AND APS CONNECTION METHOD

GS800與APS接線方式



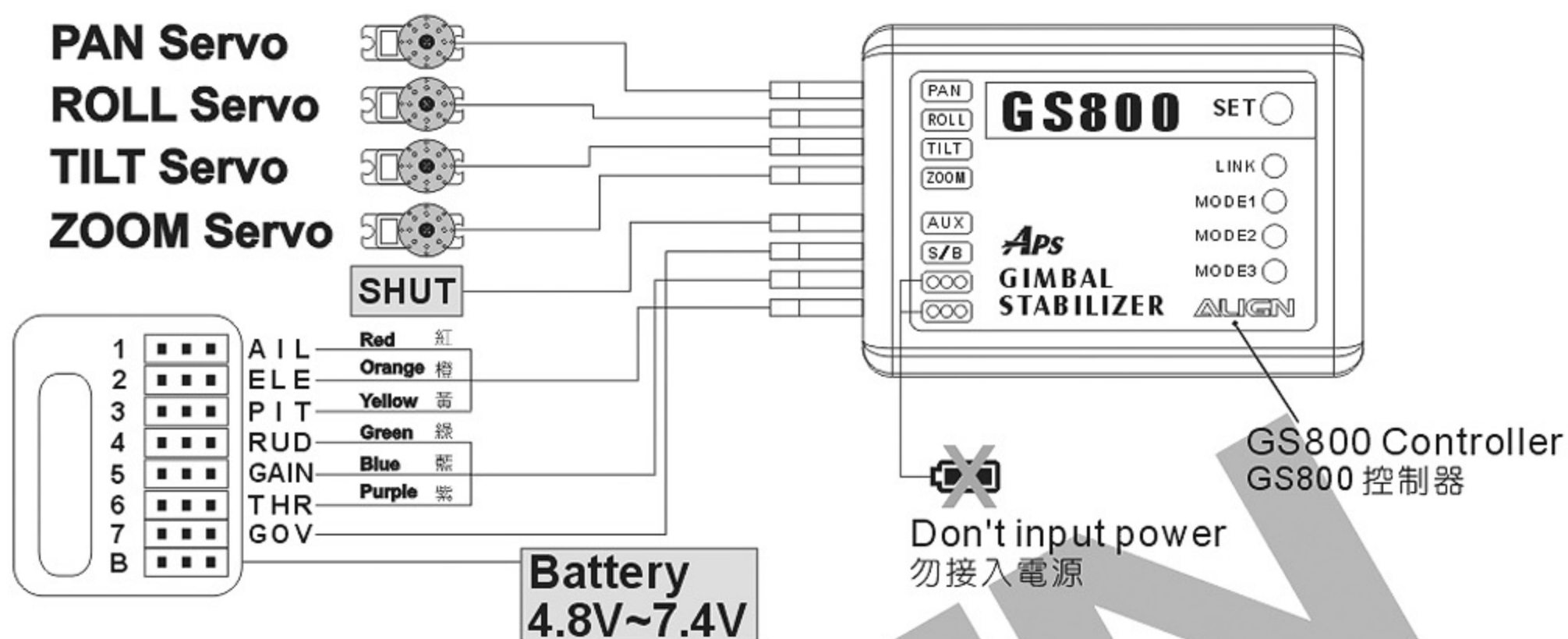
4

RECEIVERS CONNECTION METHOD

各接收器接線方式

1 STANDARD RECEIVER CONNECTIVITY METHOD

傳統接收器接線法

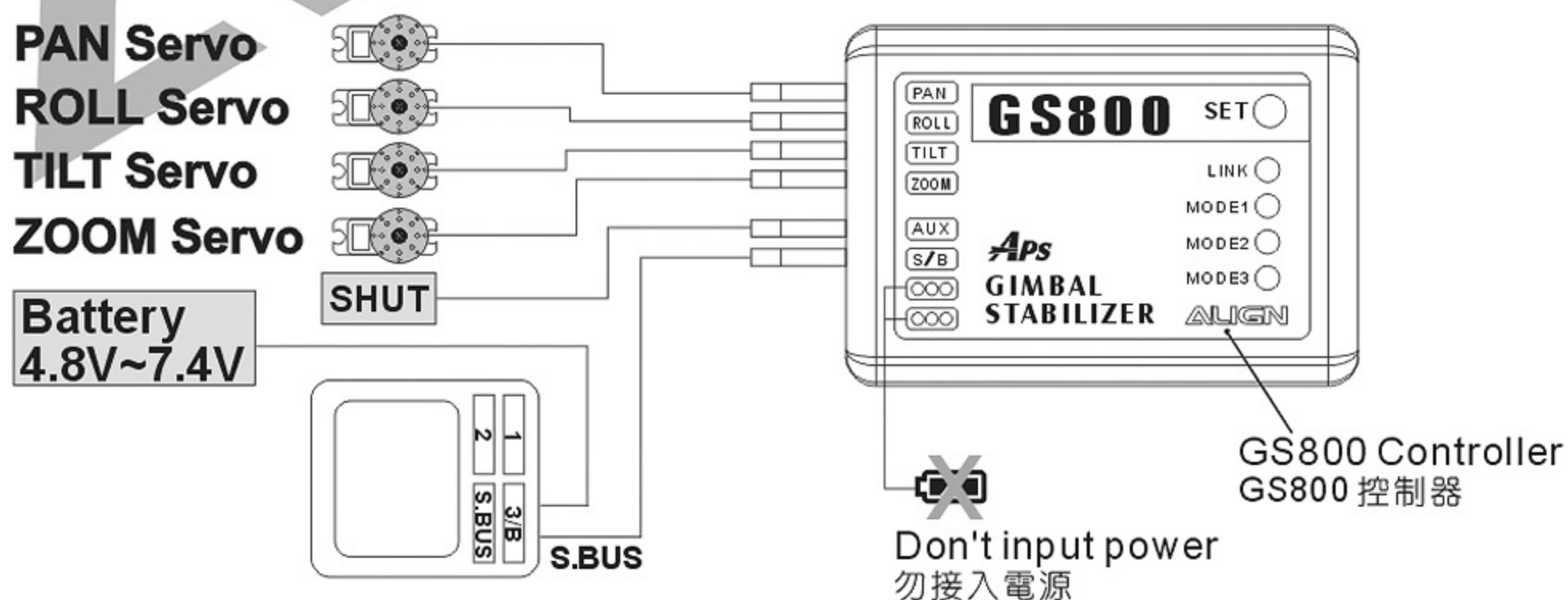


CAUTION 注意

- Using traditional receiver, GS800 draws power from the receiver.
- If 7.4V is used as power source, ensure the receiver can support 7.4V.
- 使用傳統接收時，GS800要由接收機供電。
- 使用7.4V供電時，要確認接收器是否支援7.4V。

2 FUTABA S.BUS CONNECTIVITY METHOD

FUTABA S.BUS 接線法

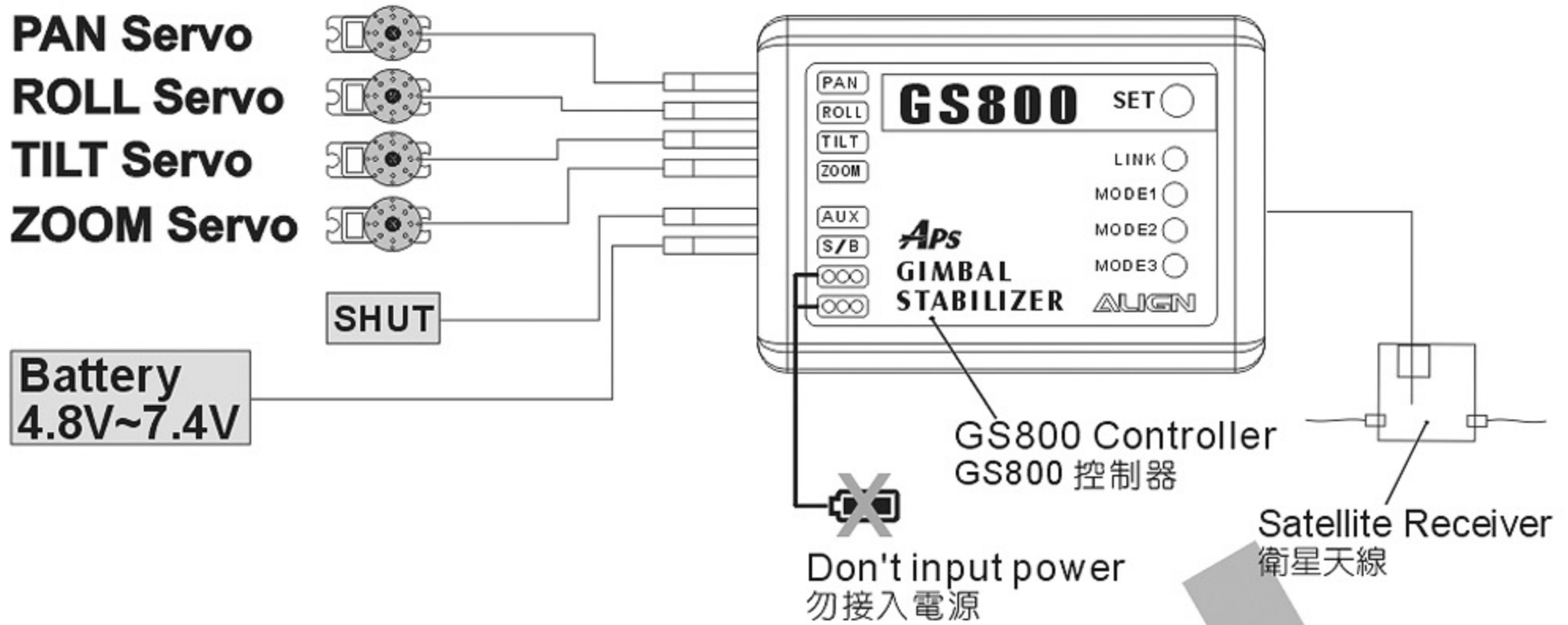


CAUTION 注意

- When Futaba S-BUS receivers are used, GS800 draws power from the receiver.
- If 7.4v is used as power source, ensure the receiver can support 7.4v.
- 使用S.BUS接收機時，GS800要由S.BUS接收機供電。
- 使用7.4V供電時，要確認接收器是否支援7.4V。

3 JR/SPEKTRUM SATELLITE CONNECTIVITY METHOD

JR/SPEKTRUM 衛星天線接線法



FORBIDDEN 禁止



The two ports for connection of multi-color cable to GS800 are used for signals ; **FORBIDDEN** of input power or cause GS800 burned.
 GS800 上連接彩虹線的兩個頻道為訊號頻道，禁止接入電源否則會造成 GS800 燒毀。

CAUTION 注意

- When satellite receivers are used, connect power to GS800's S/B ports.
- 使用衛星天線，可由 GS800 S/B 頻道供電。

STEP

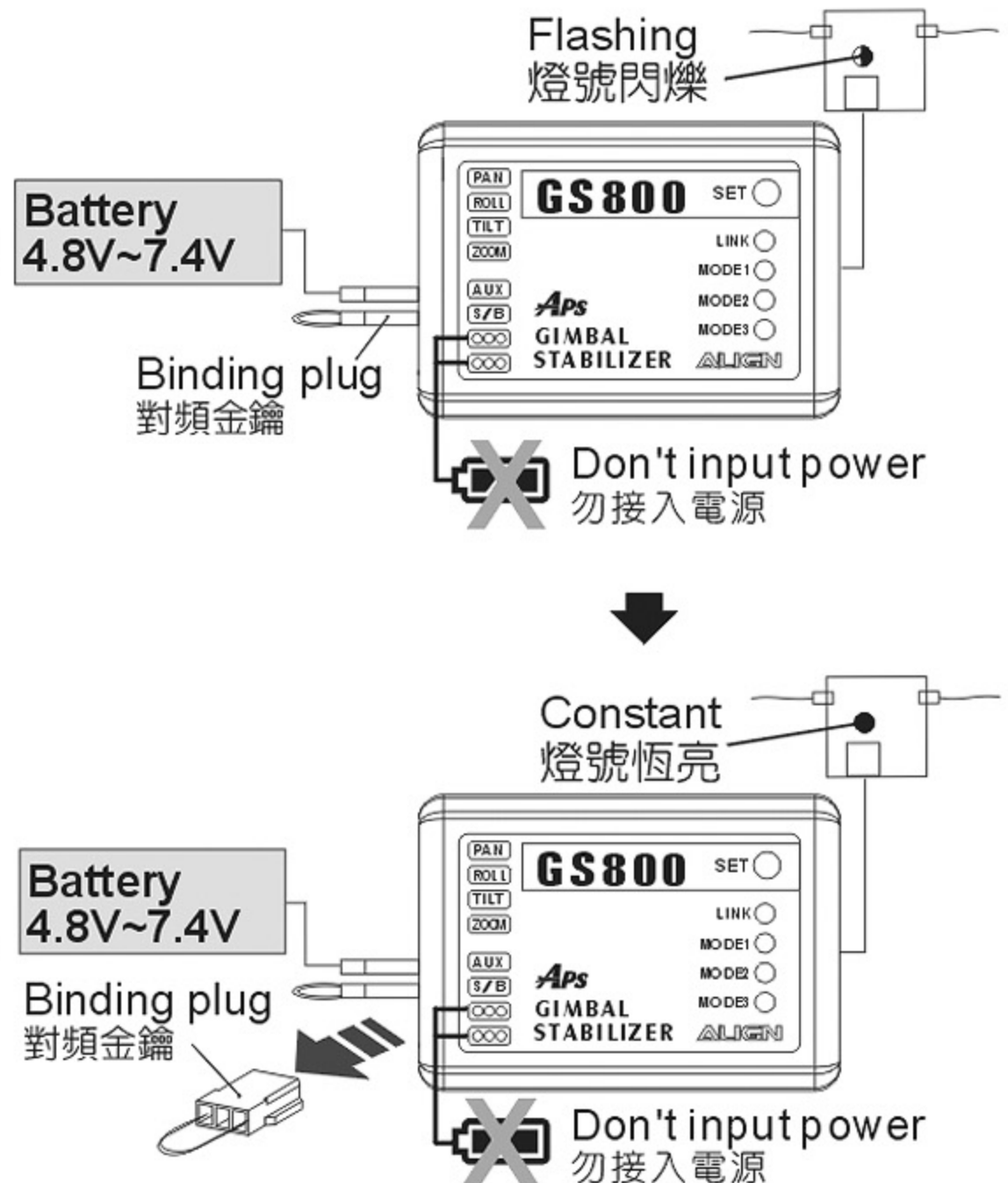
Use the following steps to bind when satellite receivers are used with GS800.

1. Connect satellites to GS800 gimbal controller.
2. Connect binding plug to S/B port.
3. Power on GS800, satellite indicator will flash.
4. Press and hold the bind button on TX and power on the TX.
5. Wait until satellite signal to go into steady light, binding is complete.
6. Remove binding plug

步驟

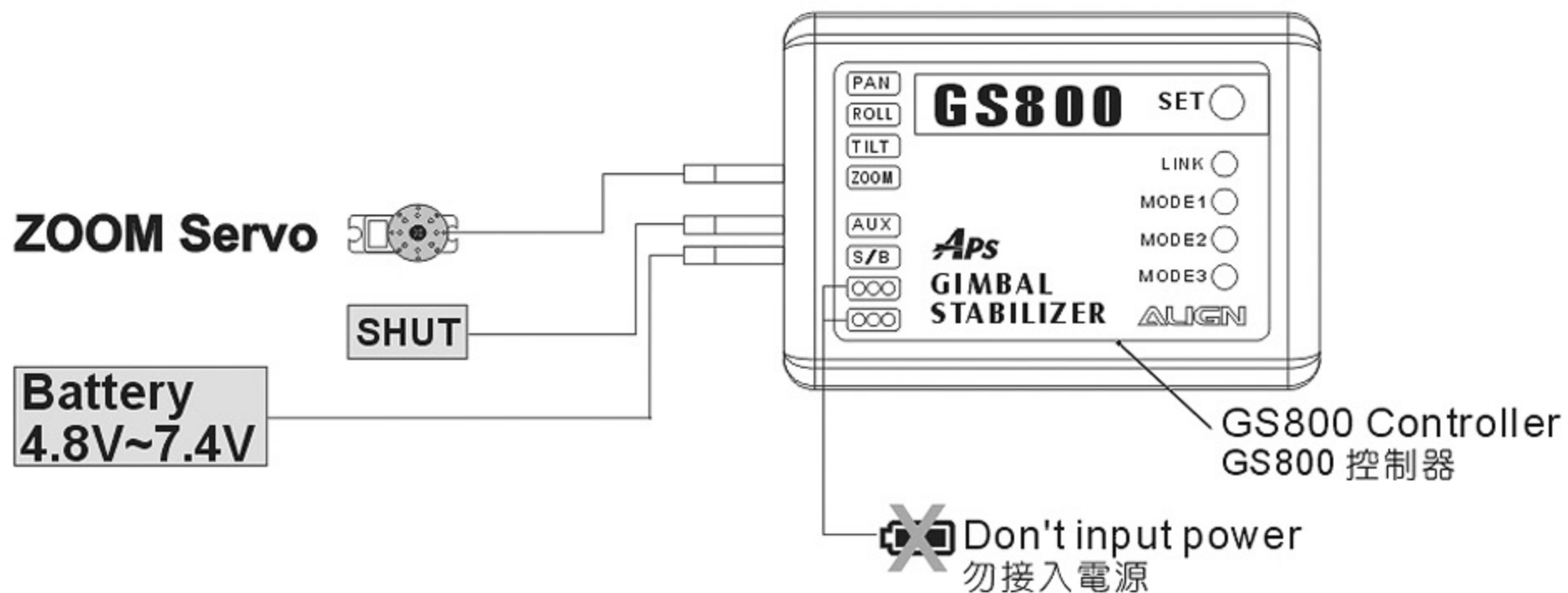
GS800 雲台控制器使用衛星天線時，您可以使用下列步驟進行衛星天線對頻。

1. 連接衛星天線與 GS800 雲台控制器。
2. 將對頻線連接到 S/B (Binding) 頻道。
3. 開啓 GS800 雲台控制器，此時衛星天線的訊號燈會開始閃爍。
4. 按住遙控器的 Binding 然後開啓遙控器。
5. 等到衛星天線的訊號燈恆亮即對頻完成。
6. 移除對頻線。



4 SHUTTER LINE CONNECTIVITY METHOD

快門線接線法

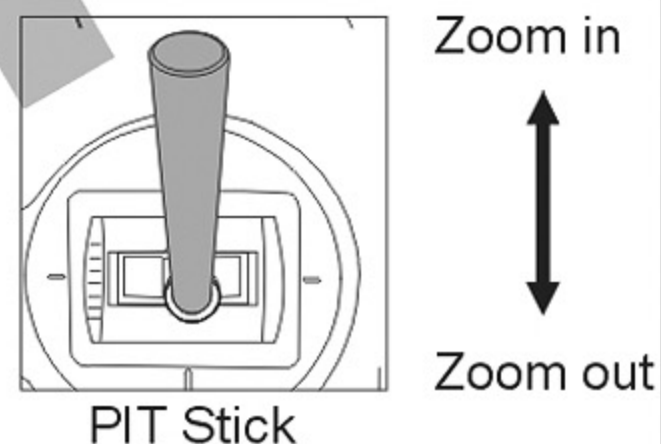


CAUTION
注意

1. Do not connect the AUX channel to the servo.
 2. Use shutter line to take pictures, you need to focus mode switch to manual focus(MF).
1. AUX通道請勿接入伺服器。
2. 使用快門線進行拍照時，需先將對焦模式切換至手動變焦(MF)。

ZOOM: GS800 can through the use of an external servo control loop to change the lens focal lengths. Channel corresponding to the radio control for the Chanel 6 PIT. Pitch stick directly to change focal lengths.

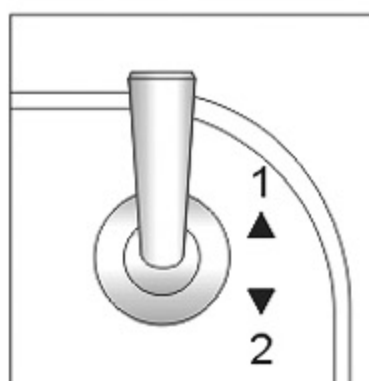
ZOOM: GS800可以透過使用外接伺服器控制環來改變鏡頭焦距，對應遙控器的通道為 Chanel 6 PIT，直接使用螺距搖桿來改變焦距。



GS800 can connect the camera shutter line through the AUX channel. Channel corresponding to the radio control for the chanel 7 AUX2/Gov. Use AUX2/Gov switch action

AUX:GS800可以透過AUX通道，連接相機快門線使用，對應遙控器的通道為 Chanel 7 AUX2/Gov，使用AUX2/Gov撥桿進行拍攝動作。

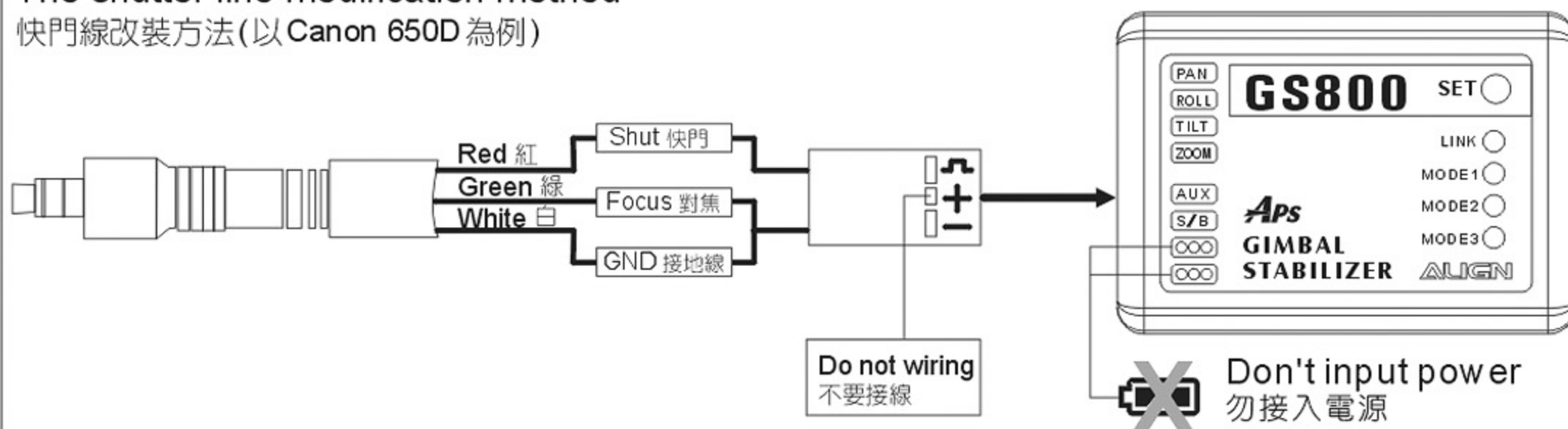
SHOOTING STEPS 拍照使用方式



Pictures will be taken from the position from 1 to 2, photographed a back to position 1, and repeat the action again to take the other picture.

位置 1 → 2 時會進行拍照，拍下一張時回到位置 1，並再次重複上述動作進行拍照。

The shutter line modification method
快門線改裝方法(以 Canon 650D 為例)








OPERATION MODES DESCRIPTION

工作模式介紹

ALIGN

Gimbal Operation Modes

雲台工作模式

	MODE 1 3-axis auto correct 3軸自動修正	MODE 2 2-axis auto correct 2軸自動修正	MODE 3 3-axis auto center 3軸回中	MODE 4 manual mode 手動模式	MODE 5 Rescue mode 救機模式
Description 簡介	Gimbal to ground attitude remain fixed 自動修正雲台對地面的相對姿態不變	Roll and tilt angles remain fixed 自動修正雲台的上下俯仰角度和左右滾轉角度不變	All gimbal servos remain fixed at neutral 保持雲台的伺服器都在中立點不變	Gimbal is manually controlled 雲台方向由人為控制	Keeping gimbal base pointing downwards to minimize photo equipment damage during crash 救機模式會保持雲台的底部朝下，減少意外撞擊時相機或攝影機的損傷
Gimbal Heading 雲台指向	Gimbal heading does not change with change in helicopter's heading 當機頭方向改變時，雲台指向不隨著機頭變化	Gimbal heading follows helicopter's heading 當機頭方向改變時，雲台指向隨著機頭變化	Gimbal and helicopter heading remain fixed 雲台指向和機頭方向固定不變	Gimbal heading follows helicopter's heading 當機頭方向改變時，雲台指向隨著機頭變化	—
RC Controllability 遙控器控制	3-axis 3軸可控	3-axis 3軸可控	None 不可控	3-axis 3軸可控	None 不可控
Stabilize 雲台增穩	Yes 有	Yes 有	No 無	No 無	Yes 有
RC Command 遙控器命令	Gimbal Rotation Speed 雲台轉動速度	Gimbal Rotation Speed 雲台轉動速度	—	Gimbal Rotation Speed 雲台轉動速度	—
LED Indicator 燈號指示					
Priority 優先順序	Low 低	Low 低	Low 低	Medium 中	High 高

LINK LED

連線指示燈



Green LED: APS is connected
Red LED: APS is not connected
Single Red flash: servo neutral point setting
Double Red flash: servo maximum travel limit setup

綠燈：APS已連線
紅燈：APS未連線
紅燈單閃：伺服器中立點設定
紅燈雙閃：伺服器最大行程設定

SERVO SLOW START FUNCTION

DS815 has servo slow start function. When GS800 is powered up, DS815 gimbal servo will slowly return to neutral position, to avoid the effect of jolting the gimbal when servo returns to neutral too quickly during power up (such as standard servos).

DS815緩啟動功能

DS815 伺服器具備緩啟動功能，在一開啓 GS800 電源時，雲台 DS 815 伺服器會緩慢回復到中立點位置，避免一般伺服器接電快速回中的現象造成雲台的抖動。

TRANSMITTER SETTING

遙控器設定

ALIGN

Align's GS800 gimbal controller consists of 5 control mode types. To allow user fast switching to each modes, GS800 is designed to allow control mode switching through transmitter's flight mode switch. Please follow the setting mode table below to configure your transmitter.

亞拓GS800雲台控制器具備五種操作模式，為了方便使用者快速切換到各種模式，GS800特別設計由遙控器的飛行模式開關，作為雲台工作模式的切換指令。請依照下列方式來設定遙控器。以下是遙控器各飛行模式所對應到GS800工作模式的對照表。

GS800 Control Modes 雲台工作模式	MODE 1 3-axis auto correct 3軸自動修正	MODE 2 2-axis auto correct 2軸自動修正	MODE 3 3-axis auto center 3軸回中	MODE 4 manual mode 手動模式	MODE 5 rescue mode 救機模式
RC Flight Mode 遙控器模式	Normal	IDLE 1	IDLE 2	Non-Heading Lock Mode 非鎖定模式	HOLD
GYRO Gain 感度	Heading Lock Mode 鎖定模式	Heading Lock Mode 鎖定模式	Heading Lock Mode 鎖定模式	Non-Heading Lock Mode 非鎖定模式	—

1 TRANSMITTER AIRCRAFT TYPE SETTING

遙控器模型種類設定

Please set the aircraft type to helicopter in your radio Transmitter. Swash type: H1 mode
遙控器請選擇直昇機模式。十字盤類型：H-1 模式。

USING FUTABA T8J AS AN EXAMPLE

以 FUTABA T8J 為例

REVERSE REV	THR 3	PARAMETER RESET ▶ Executu TYPE ▶ HELICOPTER SWASH ▶ H-1	(1/3) Pure (1/2/6)
NOR		RX ▶ S-FHSS ATL ▶ ON	



Futaba transmitter throttle must set to reverse.
Do not use swash mix function in the transmitter.
Futaba 遙控器請將油門通道設成反向。
嚴禁開啓遙控器內Swash MIX功能

2 TRANSMITTER SWITCH SETTING

遙控器開關設定

When using GS800, transmitter must have 3-step switch for 3 flight modes, and 2-step switch for gain. Please follow the instruction below to assign switch layout.

- IDLE-UP switch must be on a separate 3-step switch, and cannot be shared with the gain switch.
- Rudder gain uses independent switch.

使用GS800時，遙控器必須要有3段飛行模式的開關，與兩段感度切換功能。依照下列說明來配置遙控器開關。

- IDLE-UP 特技開關指定使用獨立3段開關，不能與感度開關共用。
- 尾舵感度使用獨立開關。

3 step stunt mode
3段油門特技

GYRO gain
陀螺儀感度開關



Throttle HOLD
油門熄火開關



The switch location on radio varies between different models.

各型號遙控器指撥開關的所在位置並不相同。

3

FLIGHT MODE SETTING

飛行模式設定

- GS800 operation modes are mapped to various flight modes on the transmitter. It basically goes into the GS800 operation modes based on the different throttle values under each flight modes. Please follow the table below to configure.
 - GS800 Mode 4 - manual mode setting is switched by rudder gain. Assign the rudder gain switch to a separate 2 step switch on the transmitter. The first gain setting is locking mode 0~100% range (JR/SPEKTRUM are 51~100%) for mode 1, 2, and 3. The second gain setting is non-locking mode 0~100% range (JR/SPEKTRUM are 0-49%). When switched to this gain mode, GS800 will switch into mode 4 - manual mode.
- GS800是將遙控器的各飛行模式指定為不同的工作模式，其工作原理就是由飛行模式的油門數值來判別進入GS800的工作模式。不同的工作模式對應不同的油門數值，在設定時請依照下面圖表指示來設定。
 - GS800的模式4-手動模式是由尾舵感度來切換，將尾舵感度的切換指定到遙控器獨立的兩段開關。第一段感度設定為0~100%範圍(JR/SPEKTRUM為51~100%)，作為模式1、2、3使用。第二段感度設定為非鎖定0~100%範圍(JR/SPEKTRUM為0~49%)，當感度開關切換到第二段感度，GS800就會切換到模式4-手動模式。

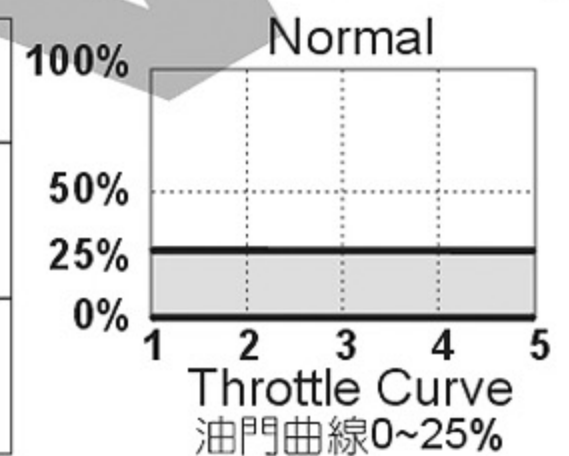
1 3-AXIS AUTO CORRECT 3軸自動修正

Gimbal to ground attitude remain fixed.
Gimbal heading does not change with change in helicopter's heading.

自動修正雲台對地面的相對姿態不變。
當機頭方向改變時，雲台指向不隨著機頭變化。

TX Flight Mode 遙控器油門模式	Normal 0~25%
Control Modes 工作模式	MODE 1
GYRO Gain 陀螺感度	Heading Lock Mode 鎖定模式

MODE 1



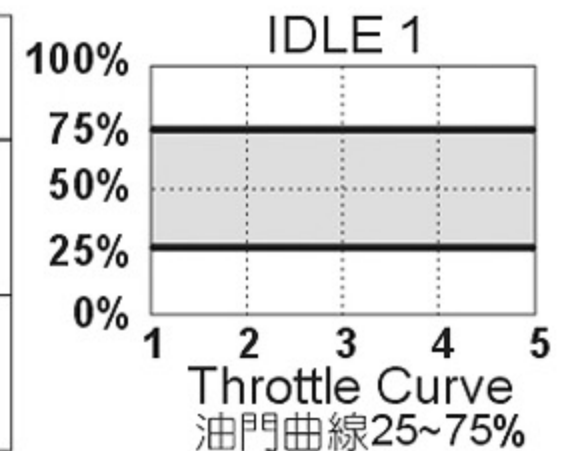
2 2-AXIS AUTO CORRECT 2軸自動修正

Roll and tilt angles remain fixed.
Gimbal heading follows helicopter's heading.

自動修正雲台的上下俯仰角度和左右滾轉角度不變。當機頭方向改變時，雲台指向隨著機頭變化。

TX Flight Mode 遙控器油門模式	IDLE 1 25~75%
Control Modes 工作模式	MODE 2
GYRO Gain 陀螺感度	Heading Lock Mode 鎖定模式

MODE 2



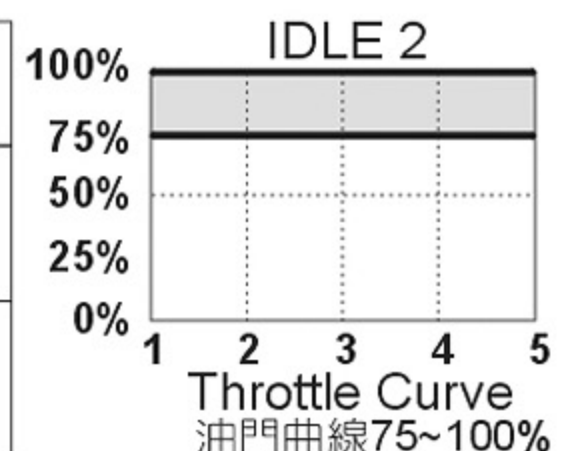
3 3-AXIS AUTO CENTER 3軸回中

Gimbal and helicopter heading remain fixed.
All gimbal servos remain fixed at neutral.

保持雲台的伺服機都在中立點不變。
雲台指向和機頭方向固定不變。

TX Flight Mode 遙控器油門模式	IDLE 2 75~100%
Control Modes 工作模式	MODE 3
GYRO Gain 陀螺感度	Heading Lock Mode 鎖定模式

MODE 3



4 MANUAL MODE

手動模式

MODE 4

Gimbal heading follows helicopter's heading. Gimbal is manually controlled.

雲台方向由人為控制。
當機頭方向改變時，雲台指向隨著機頭變化。



UP

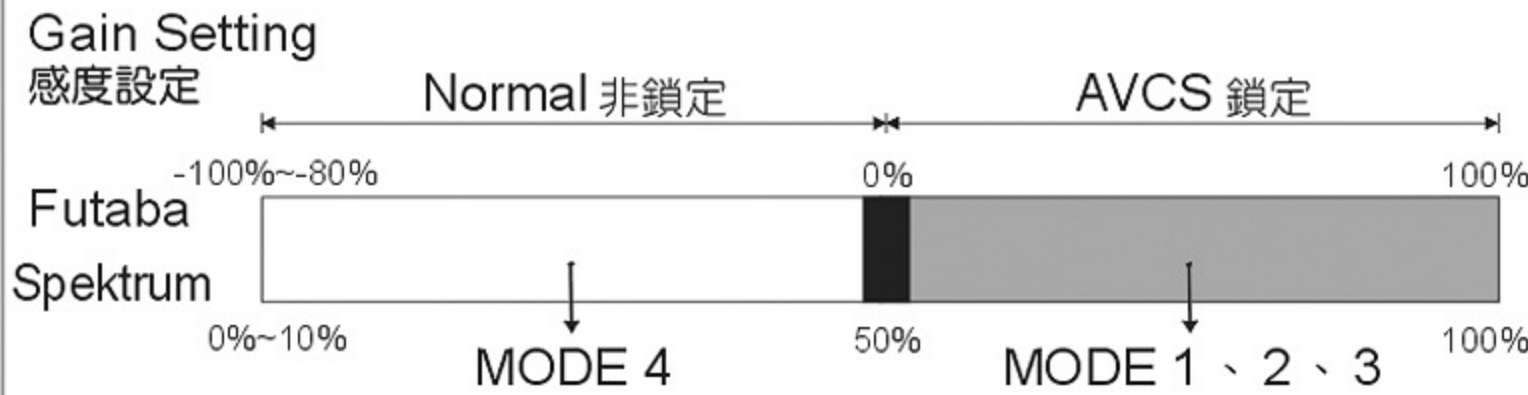


MODE 1、2、3
模式1、2、3

DWN



MODE 4 : Manual mode
模式4 : 手動模式



Using Futaba T8J as an example
以 Futaba T8J 為例

GYRO SENS
MIX ▶ ON
CH ▶ RUD (CHS)
TYP ▶ GY
SW ▶ SwG (UP)

UP ▶ AVC 66%
DWN ▶ NOR 40%

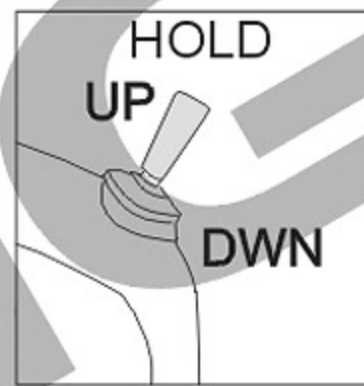
5 RESCUE MODE

救機模式

MODE 5

Keeping gimbal base pointing downwards to minimize photo equipment damage during crash.

救機模式會保持雲台的底部朝下，減少意外撞擊時相機或攝影機的損傷。



UP

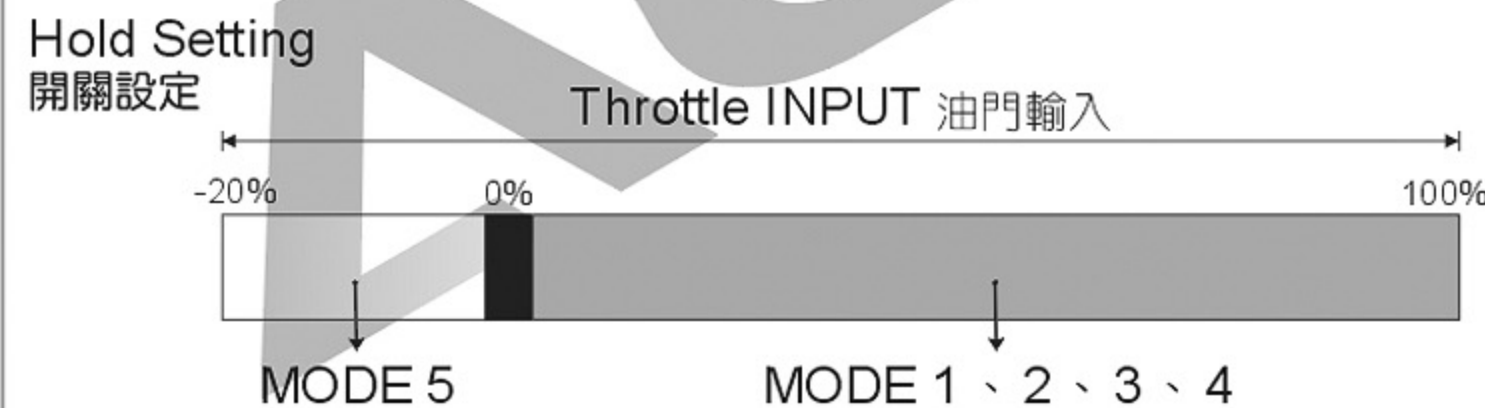


MODE 1、2、3、4
模式1、2、3、4

DWN



MODE 5 : Rescue mode
模式5 : 救機模式



Using Futaba T8J as an example
以 Futaba T8J 為例

THE HOLD
MIX ▶ OFF
RATE ▶ 20%

GS800 AND G800 GIMBAL SETUP

GS800及G800雲台設定

ALIGN

GS800 provides the following 2 setup modes. To achieve optimal gimbal performance, the following setup steps must be followed prior to deployment. Before setup begin, turn on power to gimbal's radio transmitter, APS gyro, and GS800.

GS800提供以下兩種設定，為獲得雲台最佳拍攝狀態，使用前必須依照下面方式進行調整設定。
設定前，請先開啓雲台遙控器，APS GYRO與GS800電源。

Servo neutral point setting 伺服器中立點設定	This defines the neutral point of the gimbal 此為雲台修正的基準點。
Servo maximum travel limit setup 伺服器最大行程設定	Adjusts maximum allowed range for the servo travel 調整伺服器最大的可動、可修正範圍。

1

MECHANICAL NEUTRAL ADJUSTMENT

機械中立點調整

Before operating GS800, ensure gimbal and all servos are in neutral position; which means PAN faces forward, ROLL and TILT remain level. Turn on helicopter, radio, and GS800, then switch GS800 to MODE3 to adjust mechanical neutral point.

進行GS800前，必須先確認雲台各伺服器是在機械中立點位置，即PAN方向要朝前，ROLL方向水平0度，TILT方向水平0度。先將直昇機遙控器與GS800電源開啓，將GS800切換到MODE3調整機械中立點。

Loosen set screw, adjust PAN direction so it points forward, and then re-tighten the set screw.

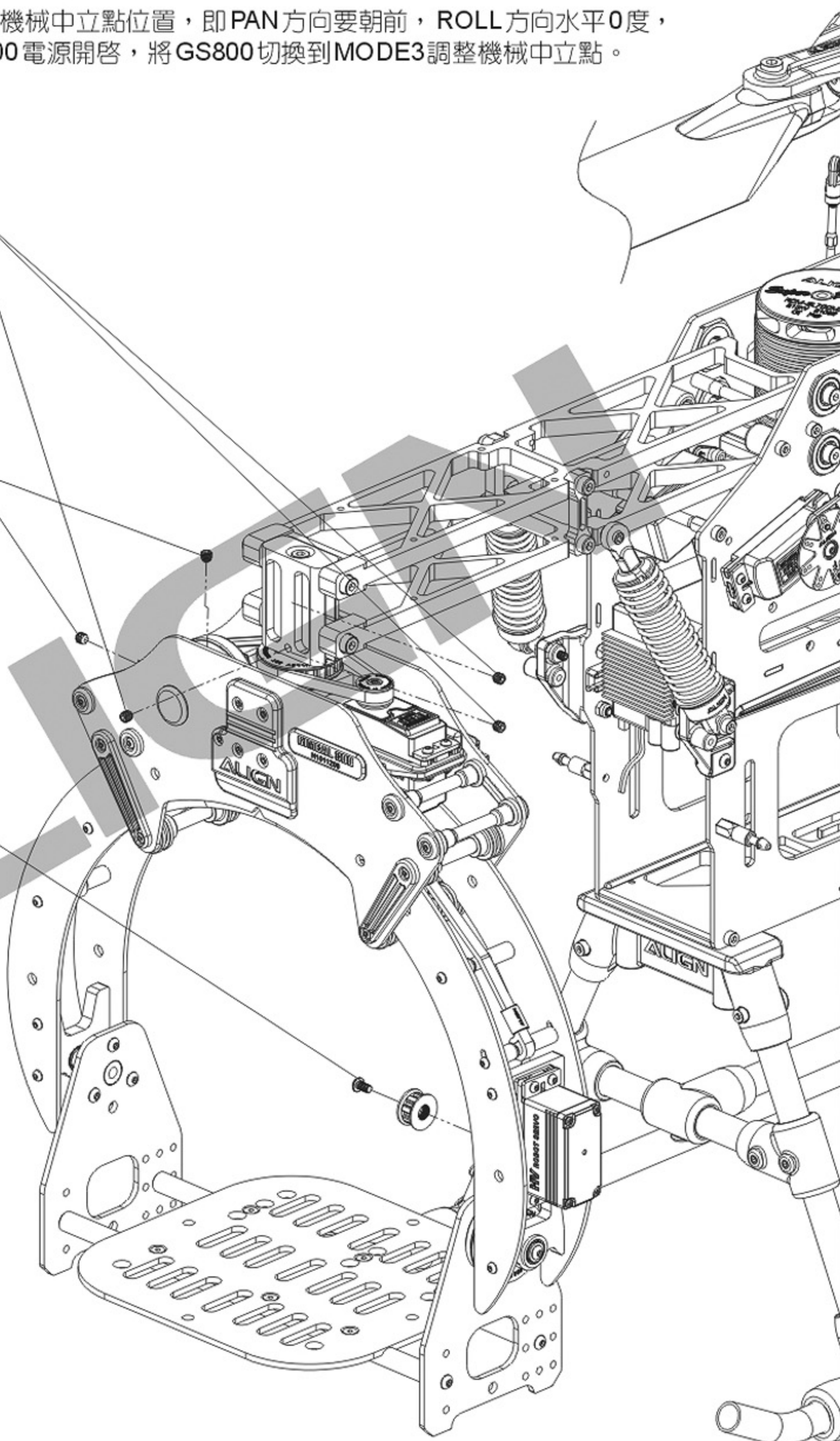
退出止洩螺絲，將PAN方向調整到朝前位置，在鎖上止洩螺絲固定。

Loosen set screw, adjust ROLL direction of gimbal until level at 0 degree, and then re-tighten the set screw.

退出止洩螺絲，將ROLL方向調整到水平位置，在鎖上止洩螺絲固定。

Loosen screw, adjust TILT direction of gimbal until level at 0 degree, and then re-tighten the set screw.

退出螺絲，將TILT方向調整到水平位置，在鎖上止洩螺絲固定。



CAUTION
注意

Then switch GS800 to MODE3 to adjust mechanical neutral point.

將GS800切換到MODE3調整機械中立點。



FORBIDDEN
禁止

Don't use sub-trim and trim on transmitter.

請勿調整遙控器內的Sub-trim及Trim。

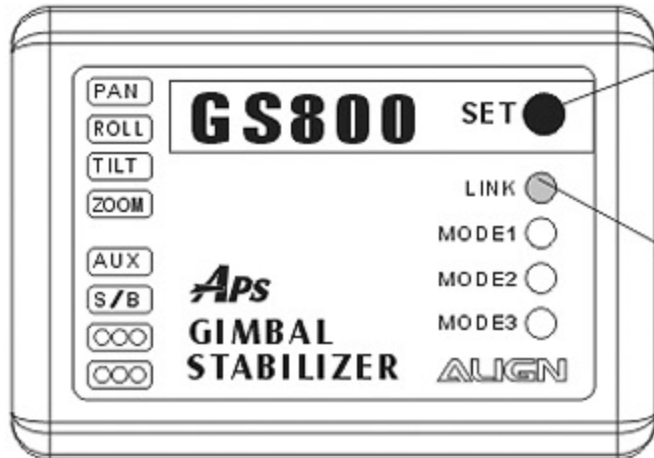
2

RESET TO DEFAULT SETTING

回復原廠設定值

Press and hold SET button for 4 sec. When LINK LED changed from flashing red into alternating red and green, the GS800 has reset back to default setting, release SET button to finish.

長按SET鍵4秒，當LINK燈由閃紅燈轉變為紅綠燈交錯閃燈，表示GS800已回復原廠預設值，然後放開SET鍵完成設定。



Press and hold SET button for 4 seconds.
長按SET鍵4秒

When LINK LED changed from flashing red into alternating red and green, the GS800 has reset back to default setting.
當LINK燈由閃紅燈轉變為紅綠燈交錯閃燈，表示GS800已回復原廠預設值

3

GS 800 SETUP FLOW DIAGRAM

GS 800 設定流程圖

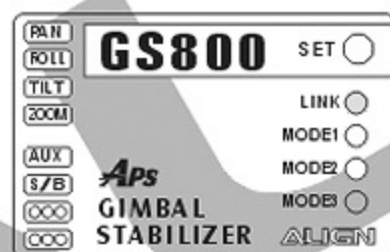
Press and hold SET for 2 seconds
按SET鍵2秒

CAUTION
注意

While performing maximum travel adjustments, TX elevator stick is used to select the adjustment steps; forward for next step, backward for previous step.

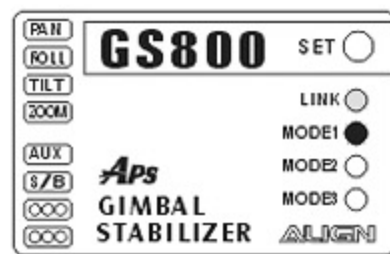
調整伺服器最大行程量時，遙控器升降舵往前為跳往下個動作行程設定，升降舵往後則為往回上個動作行程設定。

1. Neutral point setting. Single LINK Flashes
伺服器中立點設定
LINK單閃

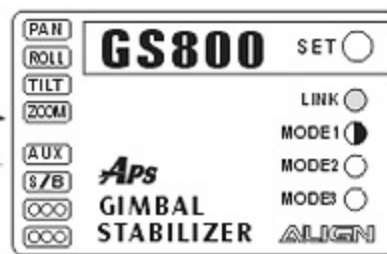


Press SET button
按SET鍵

2. Servo maximum travel limit setting. Double LINK Flashes.
伺服器最大行程設定
LINK雙閃



PAN Maximum left travel
PAN 向左最大行程



PAN Maximum right travel
PAN 向右最大行程

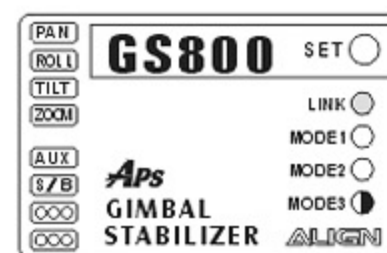


ROLL Maximum left travel
ROLL 向左最大行程

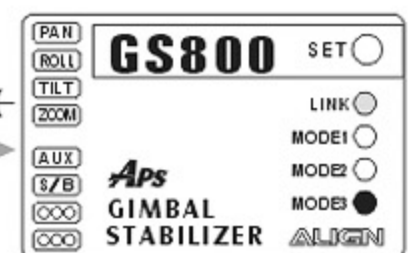


ROLL Maximum right travel
ROLL 向右最大行程

Press SET to finish setting
按SET鍵完成設定



TILT Maximum down travel
TILT 向上最大行程



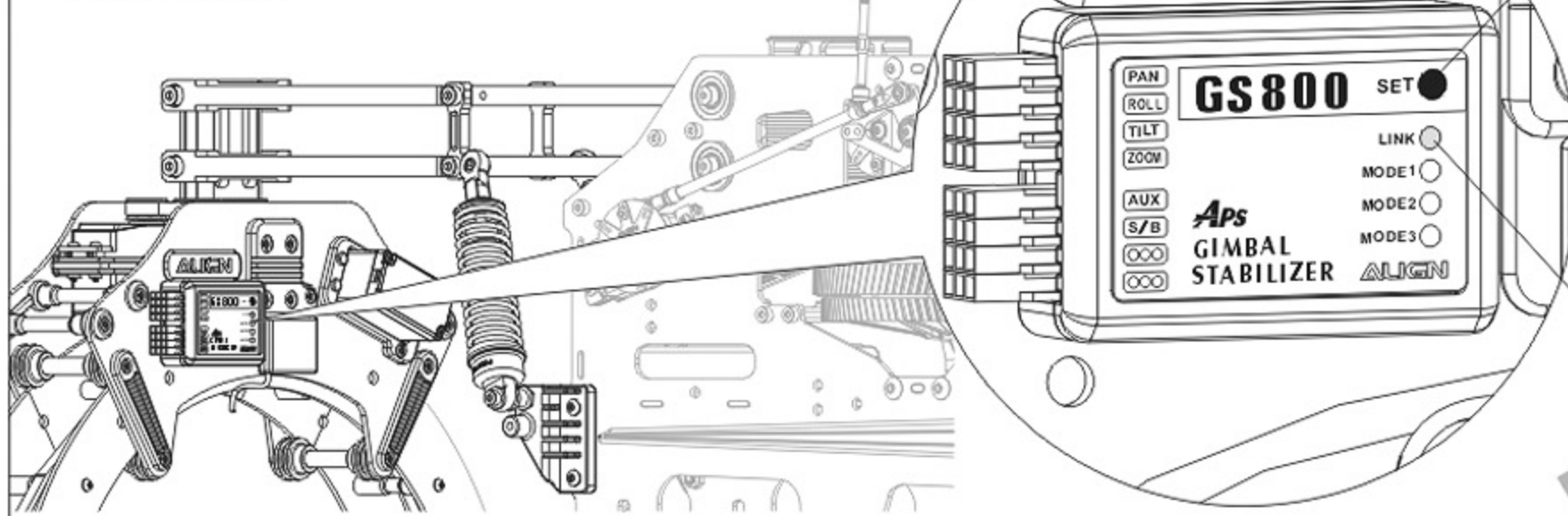
TILT Maximum up travel
TILT 向下最大行程

4 SERVO NEUTRAL POINT SETTING

伺服器中立點設定

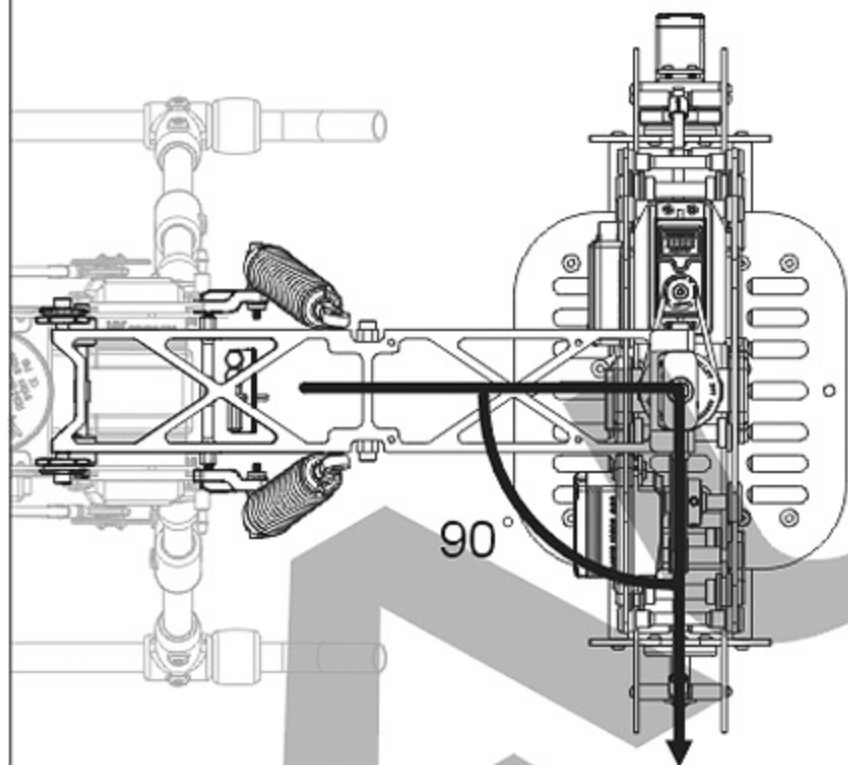
1. Press and hold SET button for 2 seconds to enter neutral setting. LINK LED will be flashing in red once per second.

1. 長按SET鍵2秒進入中立點設定，此時LINK燈會每秒閃爍1次紅燈。



2. Adjust the PAN servo neutral point by moving the TX rudder stick until gimbal is at same heading as the head of helicopter.

2. 用遙控器尾舵搖桿調整 G800 雲台 PAN 伺服器的中立點，即雲台指向機頭。

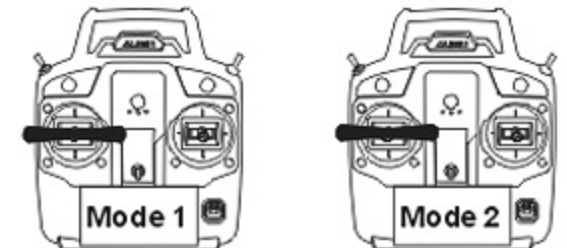


Adjust the PAN direction of gimbal slightly toward the head of helicopter
將雲台PAN方向微調指向機頭

LINK flashes once for neutral point setting
LINK閃爍一次中立點設定

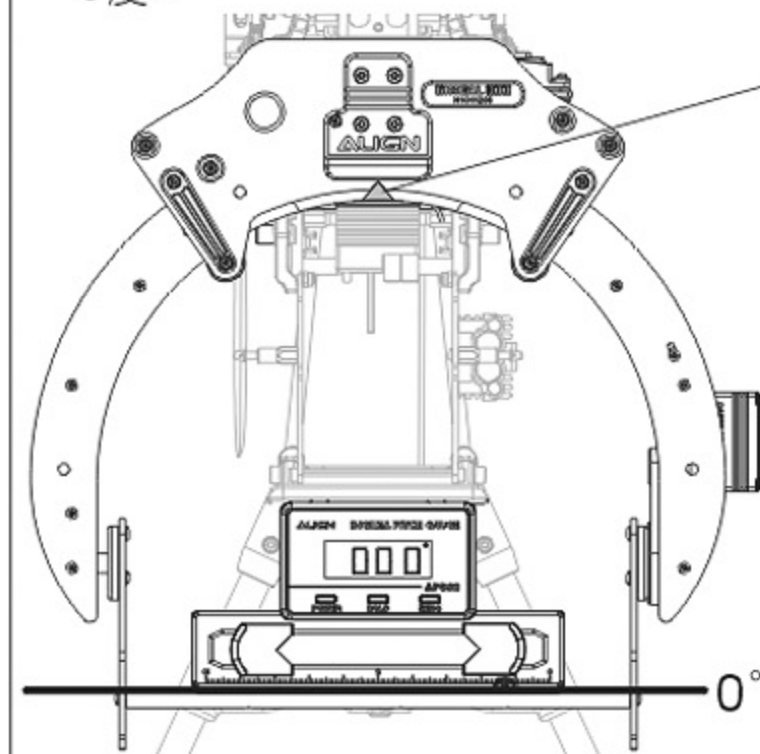


Move rudder stick to adjust PAN's neutral point
撥尾舵調整PAN中立點



3. Adjust the ROLL servo neutral point by moving the TX aileron stick until gimbal has 0 degree in roll direction.

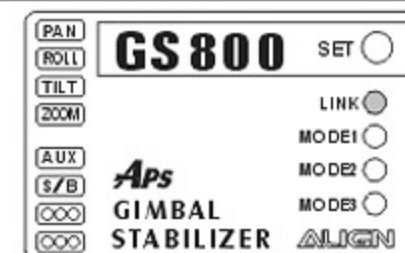
3. 用遙控器副翼搖桿調整 G800 雲台 ROLL 伺服器的中立點，即雲台滾轉方向 0 度。



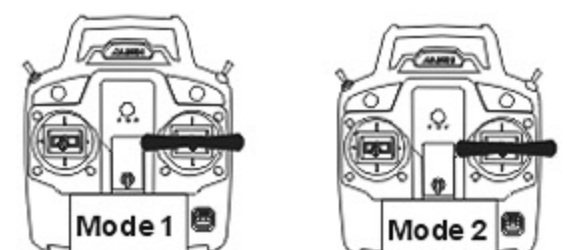
Yellow arrow points to the slot in front plate.
黃色指示箭頭對準前板凹槽。

Adjust the ROLL direction of gimbal until level at 0 degree.
將雲台ROLL方向微調至水平0度。

LINK flashes once for neutral point setting
LINK閃爍一次中立點設定

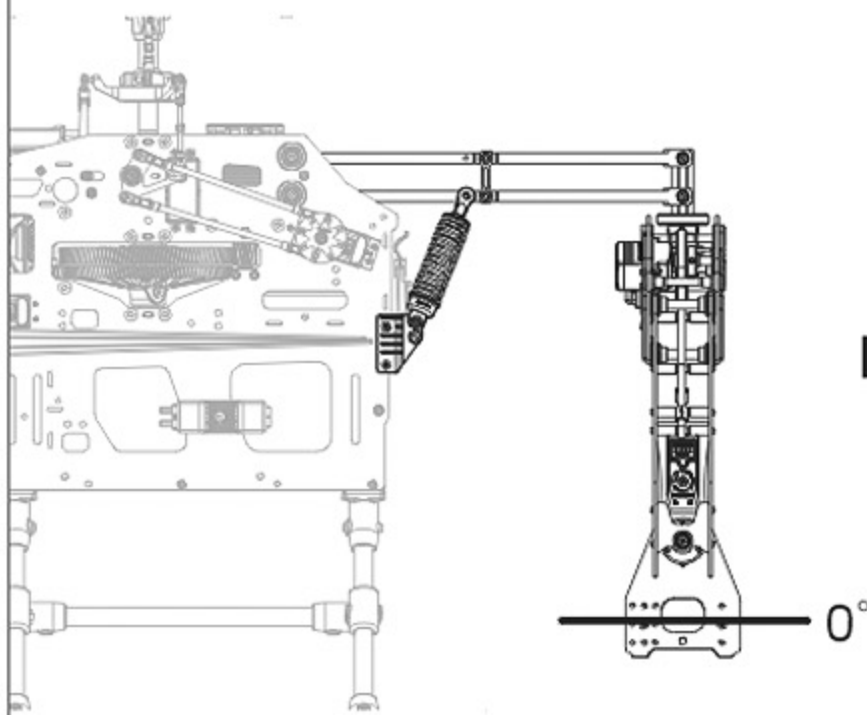


Move aileron stick to adjust ROLL's neutral point
撥副翼調整ROLL中立點

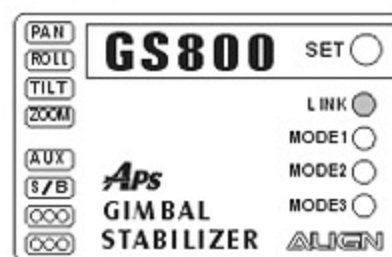


- Adjust the TILT servo neutral point by moving the TX elevator stick until gimbal has 0 degree in tilt direction.
- 用遙控器升降搖桿調整 G800 雲 TILT 台伺服器的中立點，即雲台俯仰方向 0 度。

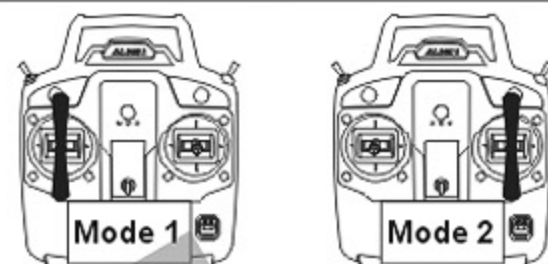
LINK flashes once for neutral point setting
LINK 閃爍一次中立點設定



Adjust the TILT direction of gimbal until level at 0 degree
將雲台 TILT 方向微調至水平 0 度



Move elevator stick to adjust Tilt's neutral point
撥升降舵調整 TILT 中立點



CAUTION
注意

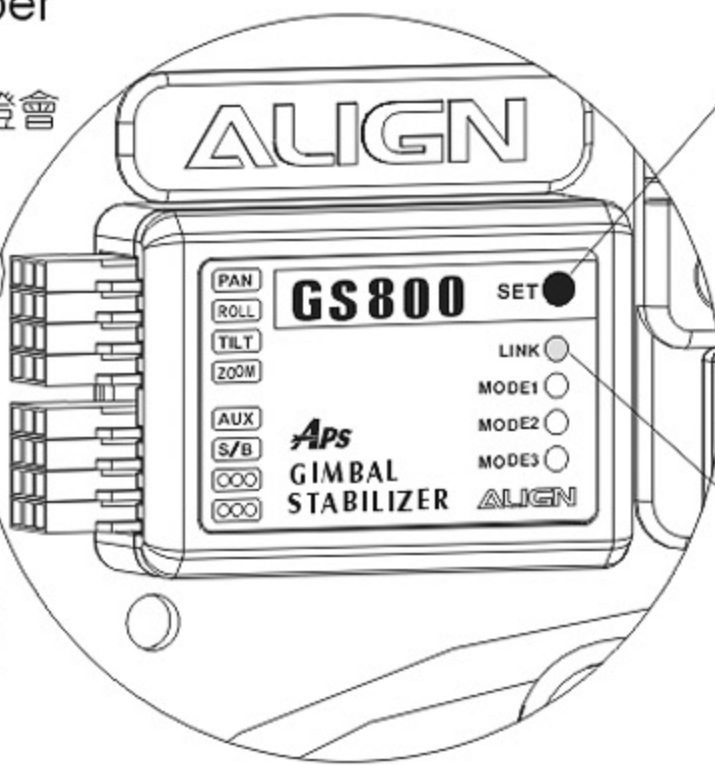
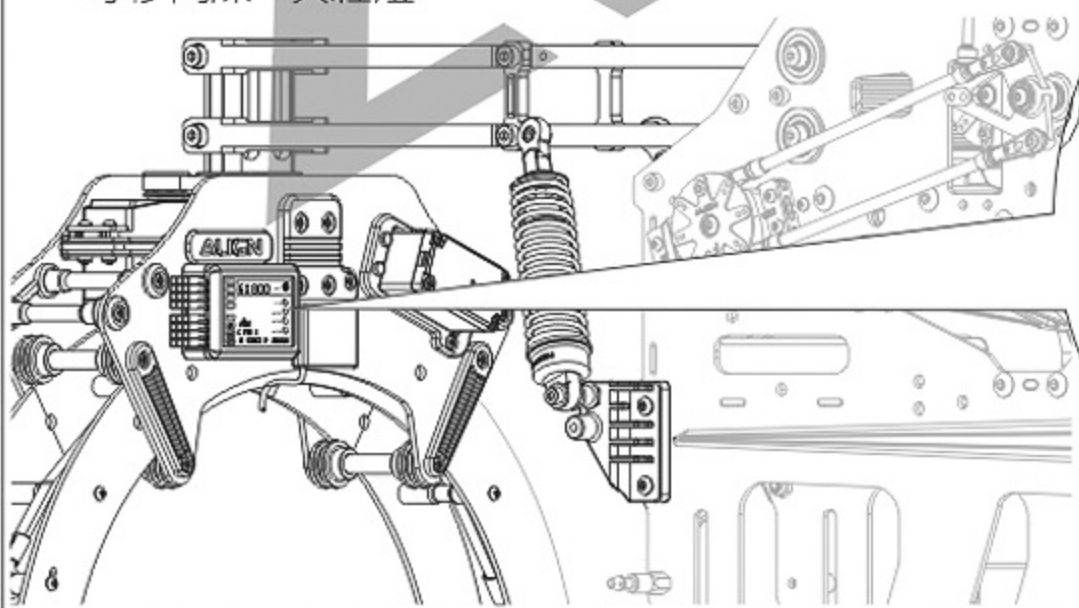
The sequence of neutral point setup is irrelevant; setting for the axis can be done in any order.

在此設定中，中立點無調整順序，可以隨時變換不同搖桿來調整雲台中立點。

5 SERVO MAXIMUM TRAVEL LIMIT SETTING

伺服器最大行程設定

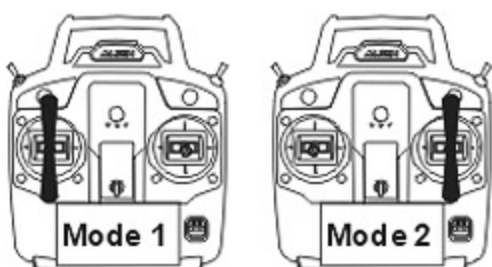
- Press SET again to enter servo maximum travel limit setting. LINK LED will flash red twice per second.
- 再按一下 SET 鍵可進入伺服器最大行程設定，LINK 燈會每秒閃爍 2 次紅燈。



Press SET again to enter servo maximum travel limit setting.
按 SET 鍵進入伺服器最大行程設定

LINK LED will be flashing in red twice per second.
LINK 燈會每秒閃爍 2 次紅燈。

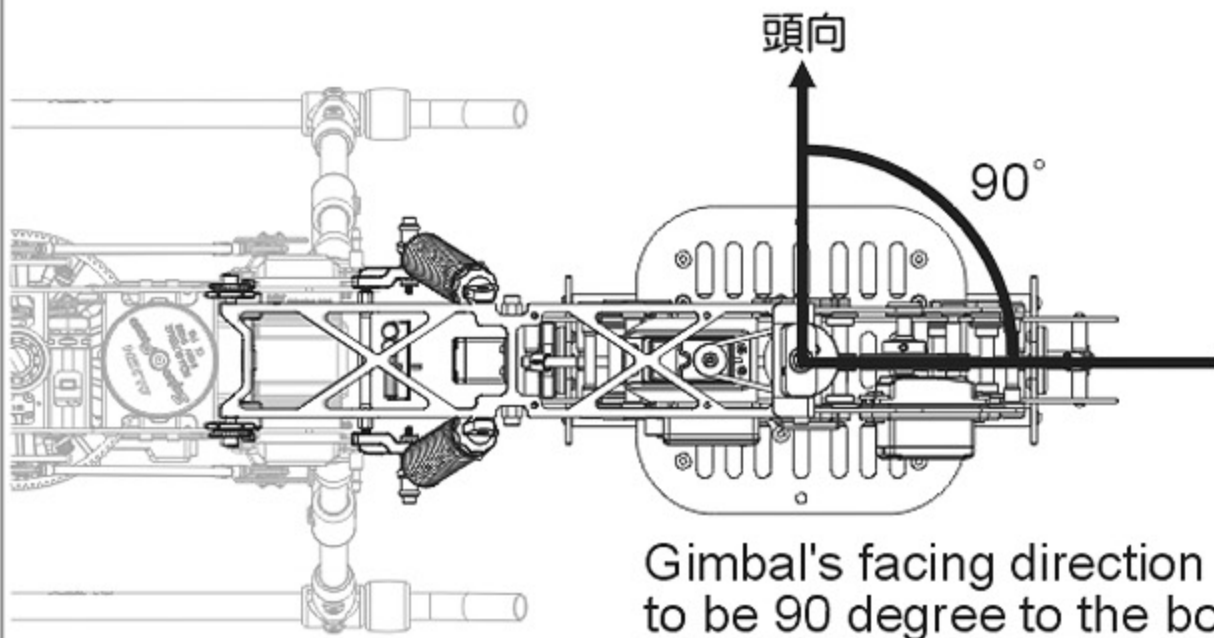
CAUTION
注意



While performing maximum travel adjustments, TX elevator stick is used to select the adjustment steps; forward for next step, backward for previous step. So the travel setting can be skipped forward or backwards to any servos.

調整 G800 雲台伺服器最大行程量時，遙控器升降舵往前為跳往下個動作行程設定，升降舵往後則為往回上個動作行程設定，所以可以利用升降舵來來回設定個伺服器的最大行程。

- The PAN servo will tilt to the left for left side travel setting, as indicated by MODE1 LED lighting steady green. Move the TX rudder stick left until gimbal's facing direction is 90 degree to the body.
- 此時G800雲台PAN伺服器會先偏左邊，進行PAN伺服器左邊行程設定，且MODE1燈會呈現綠燈恆亮，接著用遙控器尾舵搖桿微調伺服器到左邊頭向與機身呈90度。

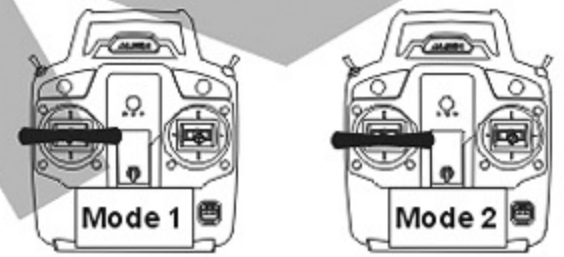


Gimbal's facing direction need to be 90 degree to the body.
頭向要與機身呈90度

LINK Flashes twice
LINK雙閃
MODE 1 : steady lit green
MODE 1 : 綠燈恆亮

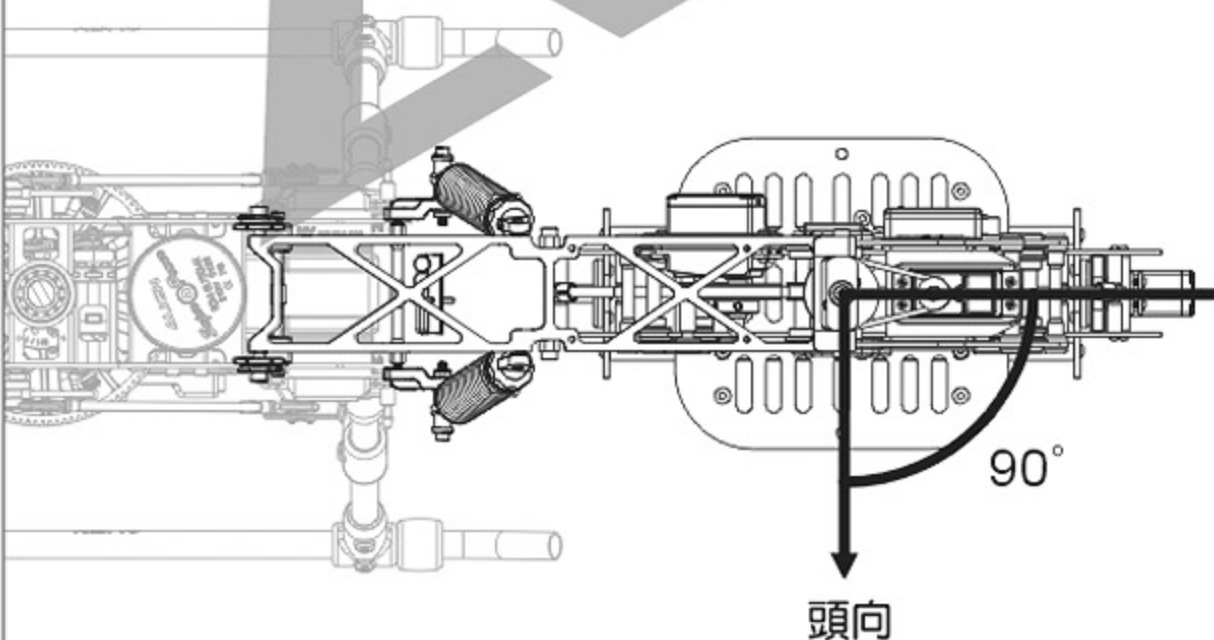


Move rudder stick to adjust
撥尾舵調整



CAUTION
注意
Gimbal stability may be affected if the travel range did not 90 degrees.
如果行程不是90度，會影響雲台穩定效果。

- After finishing with left side setting, push the elevator stick forward once to enter PAN servo right side travel setting. The PAN servo will tilt to the right, MODE1 flashing green. Move the TX rudder stick right until gimbal's facing direction is 90 degree to the body.
- 調整完成後，將遙控器升降搖桿往前打一次進入PAN伺服器右邊行程設定，此時雲台PAN伺服器會偏右邊，MODE1燈綠燈閃爍，用遙控器尾舵搖桿微調伺服器到右邊頭向與機身呈90度

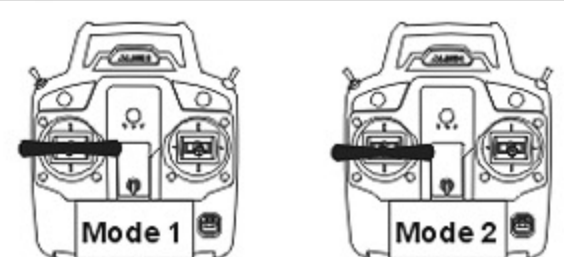


Gimbal's facing direction need to be 90 degree to the body.
頭向要與機身呈90度

LINK Flashes twice
LINK雙閃
MODE 1 : Flashing green
MODE 1 : 綠燈閃爍

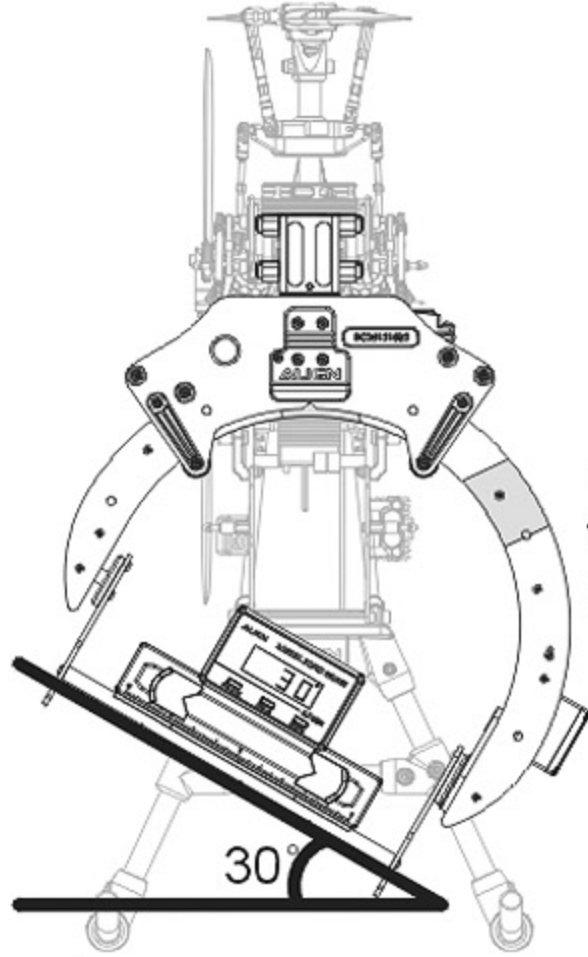


Move rudder stick to adjust
撥尾舵調整



CAUTION
注意
Gimbal stability may be affected if the travel range did not 90 degrees.
如果行程不是90度，會影響雲台穩定效果。

4. After finishing with right side setting, push the elevator stick forward once to enter ROLL servo left side travel setting. The ROLL servo will tilt to the left for left side travel setting, as indicated by MODE2 LED lighting steady green. Move the TX rudder stick left until gimbal bottom plate reaches to 30 degree.
4. 調整完成後，將遙控器升降搖桿往前打一次進入ROLL伺服器左邊行程設定，此時雲台ROLL伺服器會偏左邊，MODE2燈綠燈恆亮，用遙控器尾舵搖桿微調讓雲台底板呈30度。

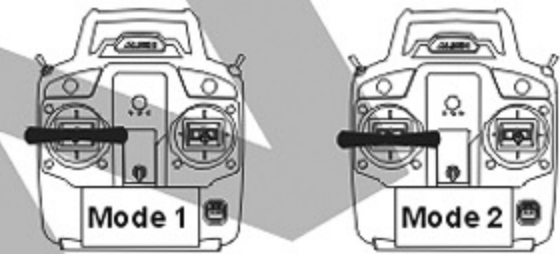


Adjust gimbal bottom plate to 30 degree
將底板調整至30度

LINK Flashes twice
LINK雙閃
MODE 2 : Flashing green
MODE 2 : 綠燈恆亮



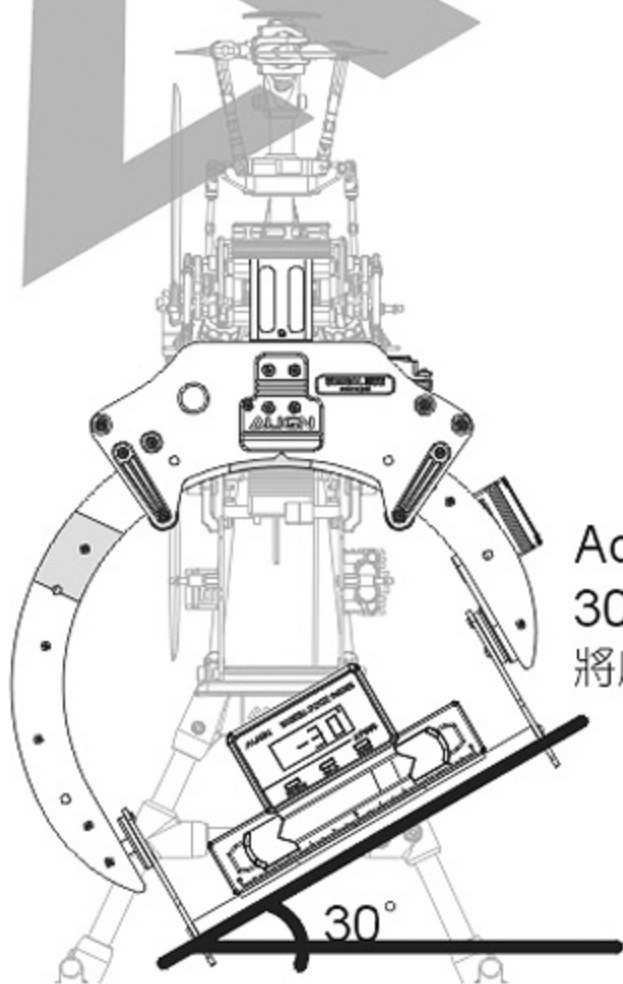
Move rudder stick to adjust
撥尾舵調整



CAUTION
注意

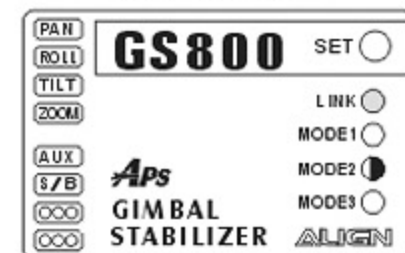
Gimbal stability may be affected if the travel range did not 30 degrees.
如果行程不是30度，會影響雲台穩定效果。

5. After finishing with left side setting, push the elevator stick forward once to enter ROLL servo right side travel setting. The ROLL servo will tilt to the right, MODE2 flashing green. Move the TX rudder stick right until gimbal bottom plate reaches to 30 degree.
5. 調整完成後，將遙控器升降搖桿往前打一次進入ROLL伺服器右邊行程設定，此時雲台ROLL伺服器會偏右邊，MODE2燈綠燈閃爍，用遙控器尾舵搖桿微調底板呈30度。

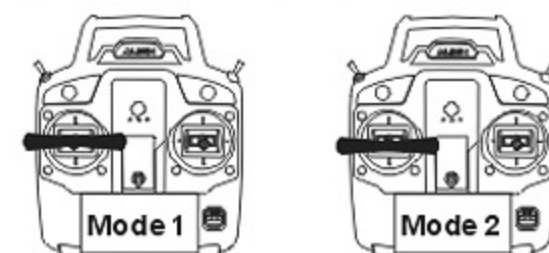


Adjust gimbal bottom plate to 30 degree
將底板調整至30度

LINK Flashes twice
LINK雙閃
MODE 1 : Flashing green
MODE 1 : 綠燈閃爍



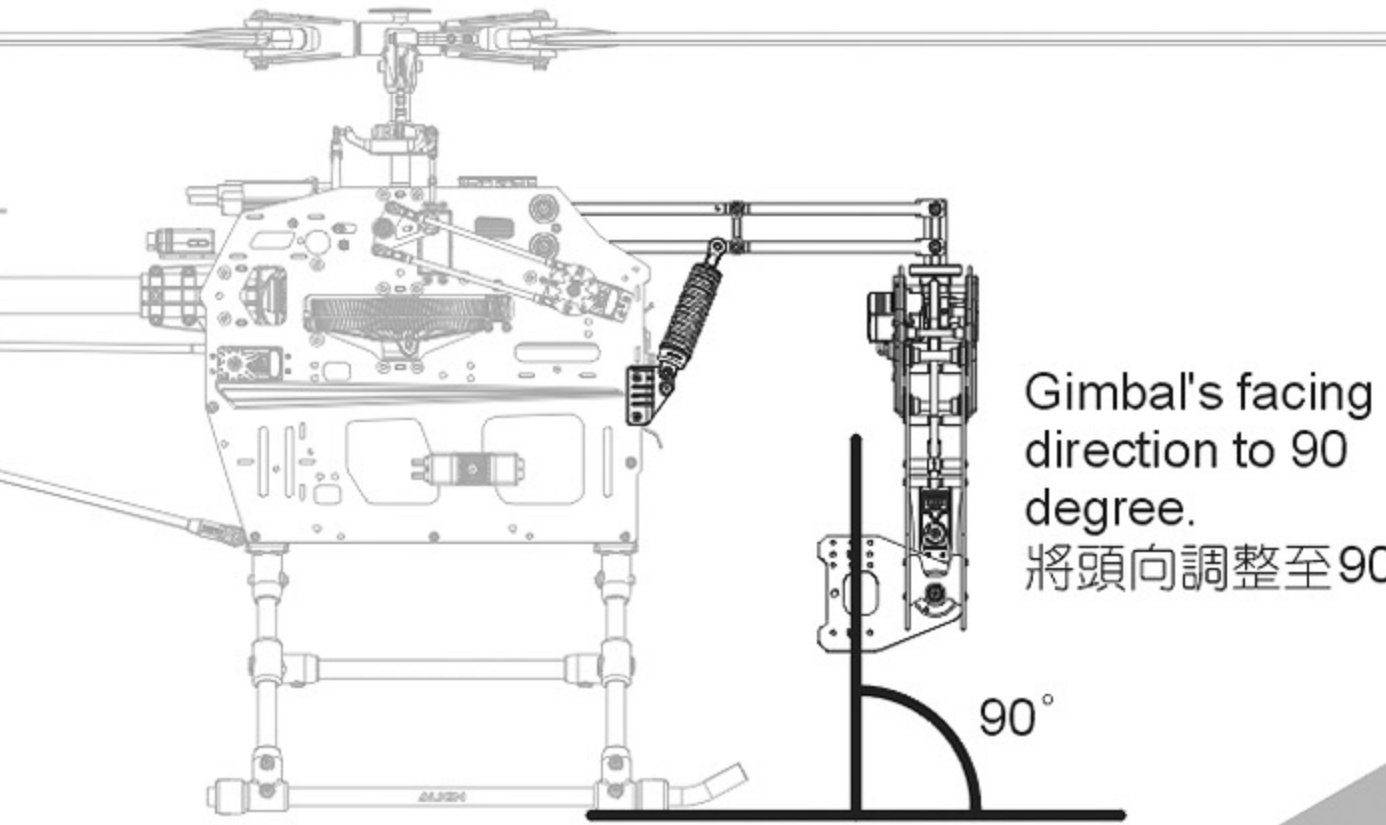
Move rudder stick to adjust
撥尾舵調整



CAUTION
注意

Gimbal stability may be affected if the travel range did not 30 degrees.
如果行程不是30度，會影響雲台穩定效果。

6. After finishing with right side setting, push the elevator stick forward once to enter TILT servo down travel setting. The gimbal will facing downward for down side travel setting, as indicated by MODE4 LED lighting steady green. Move the TX rudder stick right until gimbal's facing direction is 90 degree to the ground.
6. 調整完成後，將遙控器升降搖桿往前打一次進入TILT伺服器下行程設定，此時雲台頭向會偏向下，MODE4燈綠燈恆亮，用遙控器尾舵搖桿微調頭向與地面呈90度。

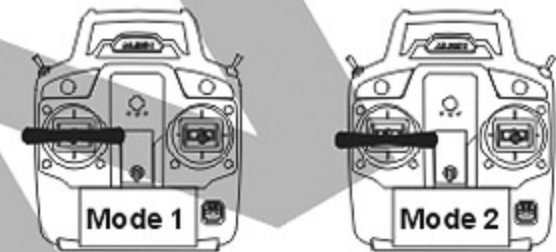


Gimbal's facing direction to 90 degree.
將頭向調整至90度

LINK Flashes twice
LINK雙閃
MODE 1 :
MODE 1 : 綠燈恆亮

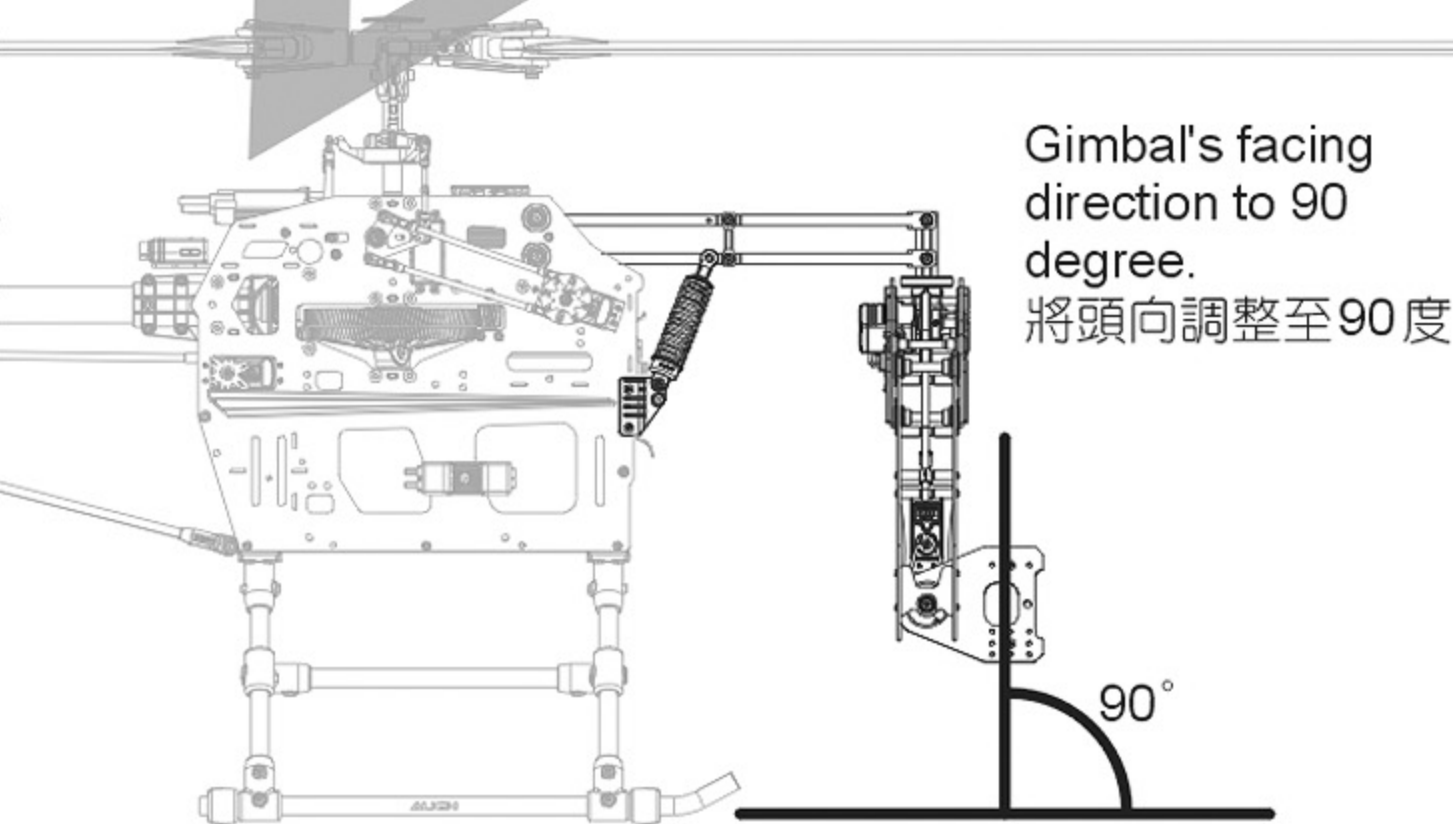


Move rudder stick to adjust
撥尾舵調整



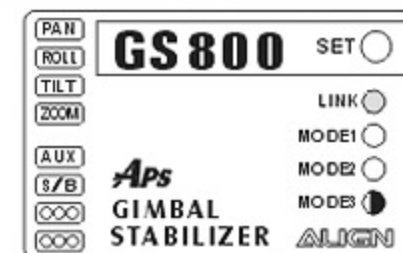
Gimbal stability may be affected if the travel range did not 90 degrees.
如果行程不是90度，會影響雲台穩定效果。

7. After finishing with down side setting, push the elevator stick forward once to enter TILT servo up travel setting. The gimbal will facing UP, MODE4 flashing green. Move the TX rudder stick left until gimbal's facing direction is 90 degree to the ground, press SET to finish setting.
7. 調整完成後，將遙控器升降搖桿往前打一次進入TILT伺服器上行程設定，此時雲台頭向會偏向上，MODE4燈綠燈閃爍，用遙控器尾舵搖桿微調頭向與地面呈90度，最後按SET完成設定。

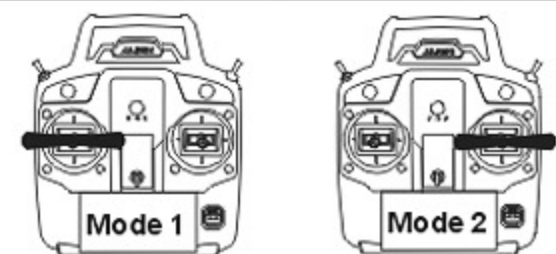


Gimbal's facing direction to 90 degree.
將頭向調整至90度

LINK Flashes twice
LINK雙閃
MODE 3 : Flashing green
MODE 3 : 綠燈閃爍



Move rudder stick to adjust
撥尾舵調整



Gimbal stability may be affected if the travel range did not 90 degrees.
如果行程不是90度，會影響雲台穩定效果。

NOTES FOR CAMERA INSTALLATION

相機安裝注意事項

ALIGN

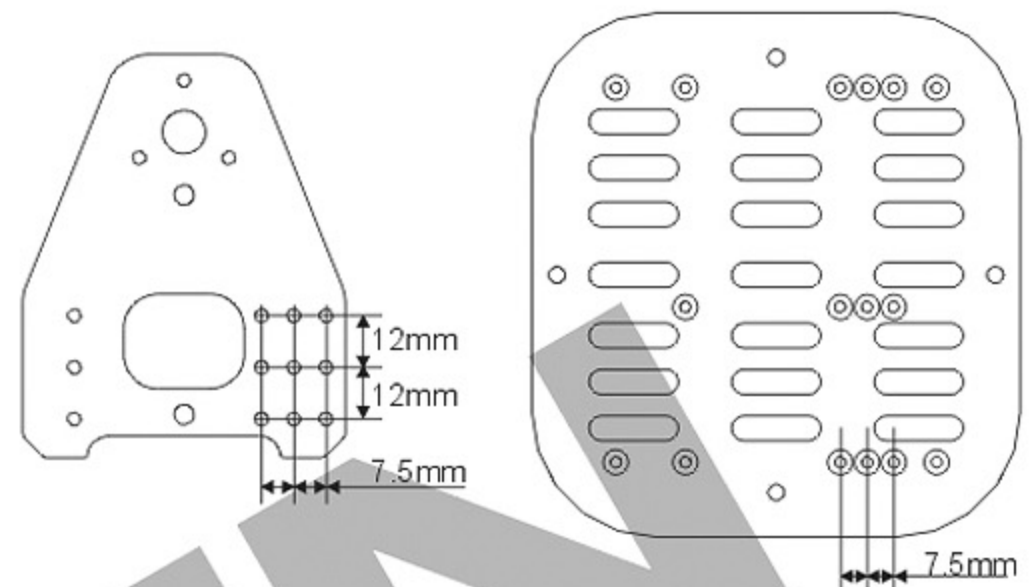
In order for the gimbal to achieve optimal shooting performance, please take the following precautions when installing the camera to the gimbal. Extra reserved mounting holes are available on the gimbal bottom plate and side plates for adjustment of actual camera positions. If the camera does not installed correctly, the abnormal vibration in video imagery may happen.

安裝相機到雲台時，必須依照下列方式來安裝固定，才會發揮雲台最佳的拍攝效果，雲台底板與底座側板有多種調整孔位，可依相機的規格大小來調整使用。如果相機安裝方式錯誤，就會造成拍攝畫面不正常的晃動。

CAUTION 注意

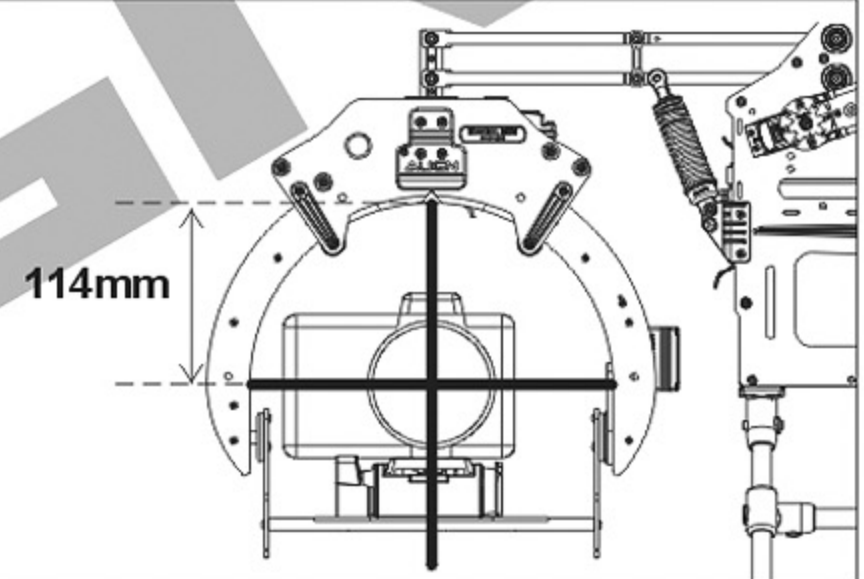
1. While taking photos, the camera need to be switch to manual focusing mode.
2. Focus distance need to be set to infinity.
3. While taking photos, both anti-vibration function for camera and lens need to be turn off.

1. 拍攝時，必須切換至手動變焦模式(MF)。
2. 拍攝焦距要調整至無限遠(∞)。
3. 拍攝時，必須關閉相機與鏡頭的防手震功能。



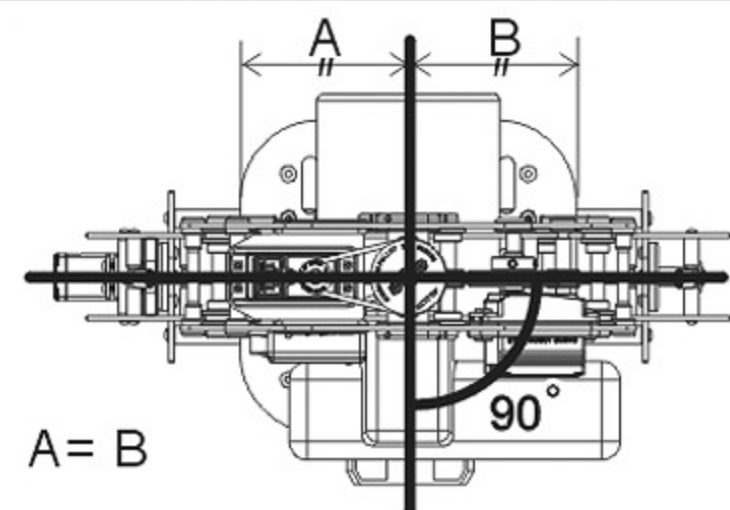
1. The center of camera lens needs to line up with the center of gimbal arch plate.

1. 相機鏡頭的中心位置要與雲台弧形板的中心位置同心。



2. Lens need to be placed at center, pointing at direction that is 90 degrees perpendicular with gimbal.

2. 鏡頭要置中，且鏡頭指向要與雲台呈90度。

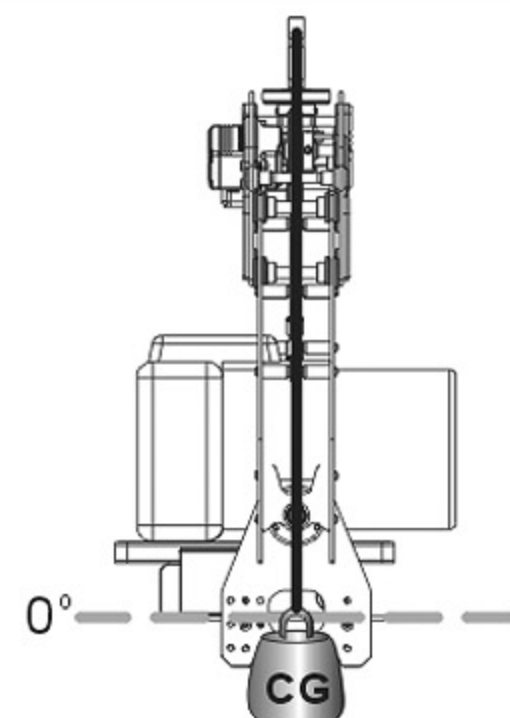


STEP

1. The lens bottom of camera image sensor must be lined up right below gimbal support mount.
2. With CG or bottom plate balanced using either battery or video down-link equipment.

步驟

1. 靠近相機鏡頭根部的感光元件，必須在雲台固定座正下方。
2. 利用電池或視訊回傳設備平均調整底板重心至雲台固定座正下方。



GIMBAL SHOCK DAMPENER ADJUSTMENT METHOD

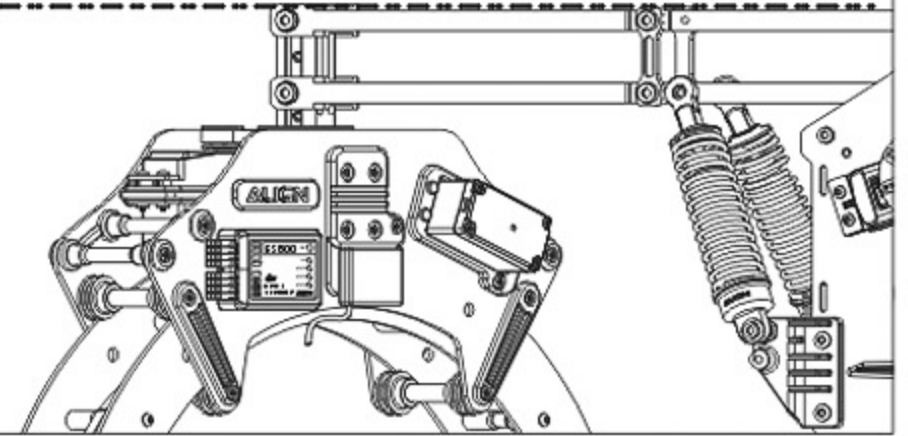
雲台避震器調整方式

ALIGN

After installed photography equipment on G800 gimbal, please use the suitable springs and adjustment o ring and adjust the gimbal support assembly to the level position.

攝影設備安裝於雲台上後，請使用適當的避震彈簧及彈簧調整環，將雲台支撐架調整至水平位置。

Horizontally Level
水平

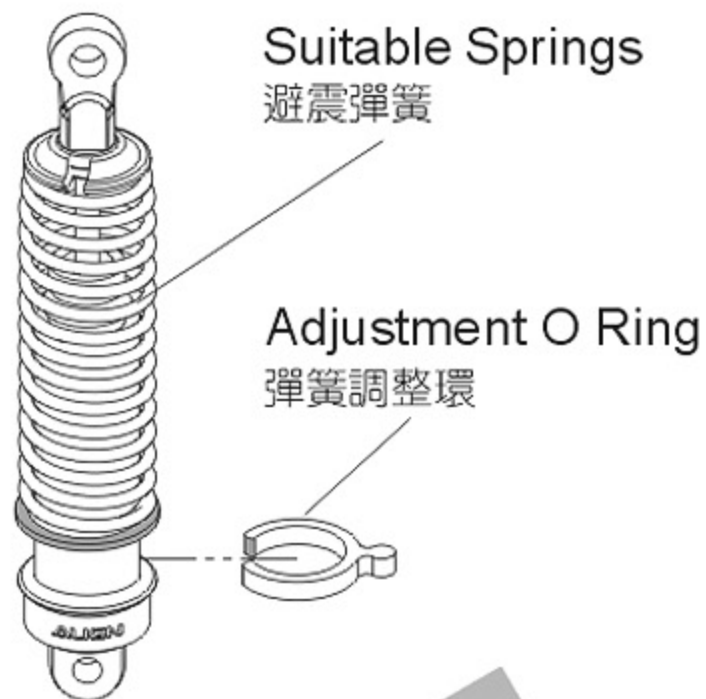


SPECIFICATIONS OF SPRINGS 避震彈簧規格

Suitable specifications 適用規格	Weight of photography equipment 攝影器材重量
ϕ 1.6	Below 2kg 2kg以下
ϕ 1.8	2kg~3kg 2kg ~3kg
ϕ 1.9 (Option equipment) (另購品)	Above 3kg 3kg以上

Weight of photography equipment (not including G800 gimbal)
攝影器材重量 (不包含G800雲台)

ADJUSTMENT O RING OF SPRINGS 彈簧調整環規格



HELICOPTER CG ADJUSTMENT METHOD

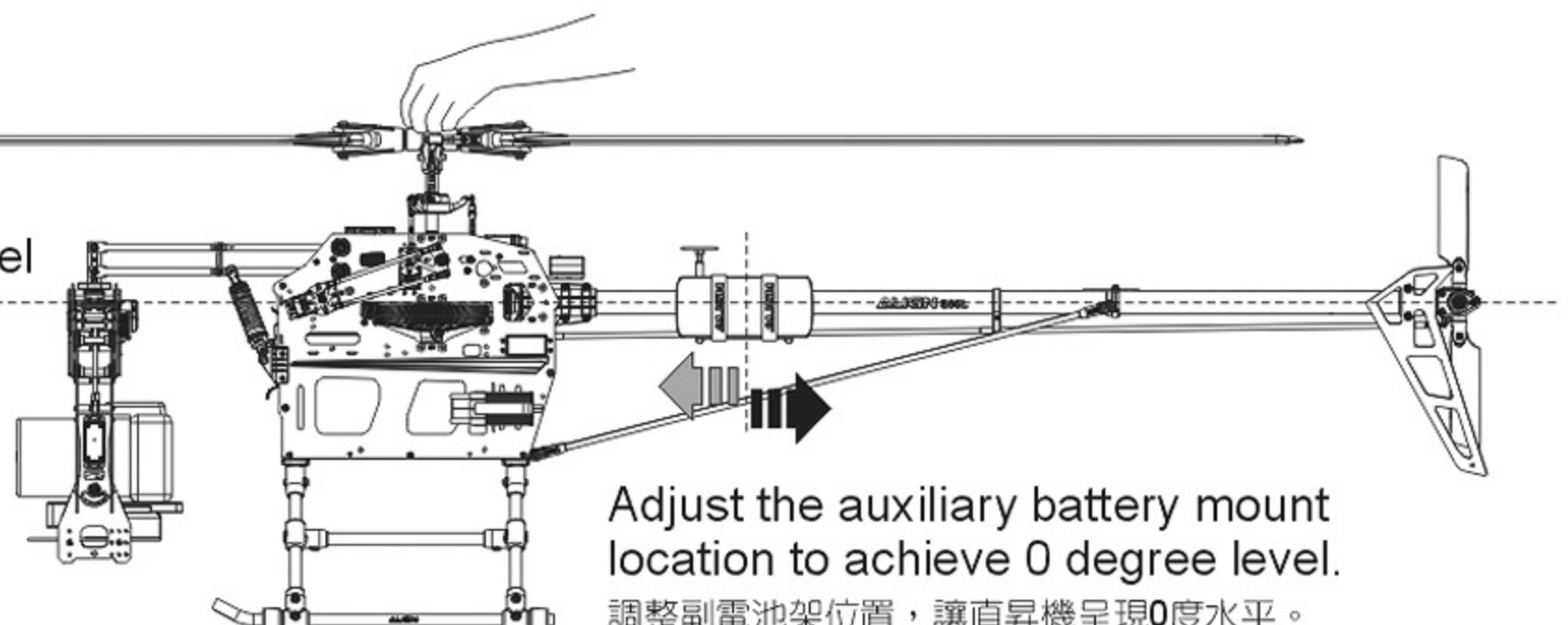
直昇機重心調整方式

ALIGN

When using space G800 gimbal system, nose or tail heavy CG will both affect shooting performance. Lift the helicopter as shown in diagram, the proper CG should fall on the body (near main shaft), resting at 0 degree horizontal position. If helicopter is not at 0 degree level, adjust the auxiliary battery mount location to achieve 0 degree level.

使用 G800 雲台時，直昇機重心偏前、偏後都會影響到拍攝的效果。將直昇機如圖示舉起，正確的重心應落在機身(主軸附近)位置，也就是直昇機會呈 0 度水平狀態。如果直昇機不是呈現 0 度水平，可以調整副電池架位置，讓直昇機呈現 0 度水平。

Horizontally Level
水平



SPECIFICATIONS

產品規格

ALIGN

Voltage Range 額定電壓	DC 4.8V~8.4V
Current Draw 消耗電流	40mA@ 6V (Excluding external RX) 55mA@ 6V (Include Futaba RX, for reference) 40mA@ 6V (不含外部接收機) 55mA@ 6V (含Futaba接收機，參考值)
Temperature Range 工作環境溫度	-40~125 °C (-40 ~ 257 ° F)
Maximum Control Range 最大可控制範圍	PAN 指向 ±90° ROLL 滾轉 ±30° TILT 俯仰 ±90°
Maximum Control Rotation Rate 最大可控制旋轉速度	PAN 指向 150° /s ROLL 滾轉60° /s TILT 俯仰150° /s
Other 其他	Support Satellites / SBUS Support 支援衛星天線 / 支援SBUS

Q&A 1

Gimbal does not respond after power up?

APS must be powered up in order for gimbal system to work. Please check that APS is powered up.

我的雲台開機後無法動作？

雲台必配合APS才可以做動，請檢查APS是否開機。

Q&A 2

There are wavy lines (jello effect) in my video imagery?

1. Please follow instruction manual for installation and setting up. Check and eliminate vibrations in helicopter, and ensure camcorder is installed with factory supplied anti-vibration foam.

2. Use damper rubber 80°-Red.

我的攝影畫面，有不規水波紋振動畫面？

1. 請依照說明書指示安裝與設定直昇機，排除直昇機異常震動問題，攝影機安裝原廠提供的避震海棉。

2. 請使用較軟的紅色80°橫軸墊圈。

Q&A 3

My video is not smooth, there are slight image shake in resulting video?

1. There are limits in gimbal's travel. Helicopter may be moving past the gimbal's travel limit or over compensated in APS mode. Adjust APS correction gain to have the compensation smoothly.

2. Please perform the initial setup again, and follow specifically the servo travel limit setting as described in the manual: adjust PAN servo travel limit to 90 degrees left/right, ROLL servo to 30 degrees left/right, TILT servo to 90 degrees up/down.

For more information about adjustment, please check APS V1.2 update instructions.

我的攝影畫面無法完全穩定，有小幅度的畫面晃動？

1. 雲台有修正角度的限制，ROLL ±30度、PAN ±90度、TILT ±90度，可能直昇機飛行動作過大超過修正角度範圍，或是APS模式直昇機動作修正過大，可調整APS修正感度，使動作修正柔和，調整方式請參考APS V1.2更新說明書。

2. 請重新設定，並且在設定伺服機行程量時依照說明書規定，將PAN伺服機的行程量設定為左右90度，ROLL伺服機為左右30度，TILT伺服機為上下90度。

Q&A 4

Gimbal control movement is too fast, how can I slow it down?

Using the dual rate function in your transmitter to reduce the travel.

雲台的操控的速度太快，要如何調慢？

可利用遙控器的D/R功能，將行程量調小即可。

Q&A 5

Can I replace the stock servos with aftermarket servos of other makes?

No, since these stock servos are designed specifically to work with the gimbal system.

我是不是能把雲台伺服器更換其他的廠牌的伺服機？

不能，因為原廠伺服器有經過特別設計，請使用原廠伺服器。

Q&A 6

If gimbal servos are replaced, do I need to perform initial setup again?

Yes. To achieve optimal results, any mechanical adjustments or servo replacements will both require initial setup to be done again.

若雲台伺服器有更換，是不是需要重新設定？

是的，調整機械結構或更換伺服器都必須重新設定，才能達到最佳效果。

Q&A 7

Why is my gimbal over/under compensating? How do I fix this?

Please perform the initial setup again, and follow specifically the servo travel limit setting as described in the manual: adjust PAN servo travel limit to 90 degrees left/right, ROLL servo to 30 degrees left/right, TILT servo to 90 degrees up/down.

為什麼雲台的修正量會過多或過少，該如何解決？

請重新設定，並且在設定伺服機行程量時依照說明書規定，將PAN伺服機的行程量設定為左右90度，ROLL伺服機為左右30度，TILT伺服機為上下90度。

Q&A 8

Camera is unable to follow the shooting subject during flight?

There are limitation to the left/right/up/down maximum angles gimbal can reach. Care should be taken not to exceed the gimbal's limits.

飛行當中攝影機有時無法追蹤到攝影目標？

雲台有左右上下的角度限制，攝影時需注意不要超過雲台的角度限制。

www.align.com
www.
www.align.com
www.alig
www.align
www.align.com.tw
www.align.com.t

ALIGN