MICROBEAST PLUS FLYBARLESS SYSTEM

INSTRUCTION MANUAL

使用說明書

HEGBP301T

For firmware version 4 .x .x
主程式 V 4 .x .x 版本專用

BEASTX FLYBARLESS SYSTEM

MICROBEAST **PLUS**

6-AXIS MEMS SENSOR SYSTEM FOR RC-MODELS

Thank you for buying ALIGN Products. Please read this manual carefully before assembling. We recommend that you keep this manual for future reference regarding tuning and maintenance.

承蒙閣下選用亞拓系列產品，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，以確保您能夠在使用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。

Compatible with helicopter of all sizes from T-REX 250 to T-REX 800 MICROBEAST PLUS Flybarless System. Here we use T-REX 700L DOMINATOR as an example .

MICROBEAST PLUS 無平衡翼系統電子設備相容小型直昇機至大型直昇機T-REX 250～T-REX800。
在此我們以T-REX 700L DOMINATOR作為操作範例。

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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直昇機與多軸飛行機（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會造成嚴重傷害甚至死亡，使用之前請務必詳讀本說明書，勿輕忽並注意自身安全。注意！任何遙控飛行機的使用，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過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。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，是唯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

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 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。
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。

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 of 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。

FORBIDDEN 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。

CAUTION 注意 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。

FORBIDDEN 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！

FORBIDDEN 禁 止 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，僅限熟練遙控飛行器之個人使用，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、並遵重他人智慧財產權、著作權，且勿用於安全、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。

WARNING 警 告 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)

WARNING 警 告 SAFE OPERATION
安全操作

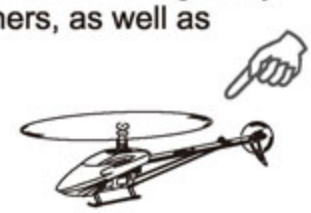
Operate this unit within your ability. Do not fly while feeling impaired, as improper operation may result in danger. Never take your eyes off the model or leave it unattended while it is turned on. Immediately turn off the model and transmitter when you have landed the model.

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遙控飛行機和遙控器電源。

CAUTION 注 意 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在身體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。



CAUTION 注 意

Please note that these instructions are only valid for the MICROBEAST PLUS firmware version 4 .x .x with Pro-Edition upgrade !

請注意！本說明書所描述的調整內容，只適合 MICROBEAST PLUS Version 4.x.x Pro版本！

The firmware version can be detected by connecting the unit to a computer by using the USB2SYS interface together with the StudioX software bundle . Also you can directly read on the MICROBEAST PLUS unit during the initialization phase what firmware version your MICROBEAST PLUS is running:

MICROBEAST PLUS first carries out a brief LED test by lighting up all Menu-LEDs simultaneously, and cycling the Status-LED color (Red->Blue->Purple) . Then for about 3 seconds, the Status-LED lights red while the Menu-LEDs A - G display the first digit of the firmware version, and the LEDs H - N the second digit of the firmware version .

您可以使用選購的 USB2SYS 的 StudioX 軟體在 PC 電腦上看到軟體版本。或是直接在MICROBEAST PLUS 初始化階段時了解主程式版本。

在初始化階段，您可以藉由 MICROBEAST PLUS 燈號來瞭解當前正在運行的主程式版本。在初始化時，您將會看到 Menu-LED燈來回閃爍 (紅燈->藍燈->紫燈)，約 3 秒鐘後，Status-LED燈就會亮起紅燈。而Menu-LED燈號 A-G 顯示第一位軟體版本，燈號 H-N 顯示第二位元數(請參考下列範例)。

Firmware version 4 .x .x:

In the left row menu LED C shows the mayor version "4" .

In the row from LEDs H to N nothing lights up . So minor version is "0" .

主程式 V 4 .x .x:

在左排選單中，LED燈號 C 顯示了主要的版本 "4" 。

LED燈號 H-N 都熄滅表示版本為 "0"。

By briefly pushing the button you can get more version informations displayed . In respect to the manual this information is not important . You will get more information about the version display in chapter 11 .

只要簡單地按下按鈕，就可以得到更多的版本資訊。更多版本顯示資訊的介紹，請參見第11 章。

MICROBEAST PLUS SAFETY NOTES
MICROBEAST PLUS安全注意事項

ALIGN

CAUTION 注 意

Radio controlled (R/C) helicopters are not toys! The rotor blades rotate at high speed and pose potential risk . They may cause severe injury due to improper usage . It is necessary to observe common safety rules for R/C models and the local law . You can gather information from your local R/C model club or from your national modelers association .

遙控直昇機不是玩具！螺旋槳高速旋轉帶來的潛在風險相當高，它們可能會導致嚴重的傷害，一切的使用要符合並遵守共同的安全規則，並且遵守當地的無線電遙控模型協會制度規定。您可以從當地的模型俱樂部或從您的國家航模運動協會取得相關資訊。

CAUTION 注 意

Pay attention to your own safety and the safety of other people and property in your vicinity when using our product . Always fly in areas away from other people . Never use R/C models in close proximity to housing areas or crowds of people . R/C models may malfunction or crash due to several reasons like piloting mistakes or radio interference, and cause severe accidents . Pilots are fully responsible for their actions, and for damage or injuries caused by the usage of their models .

注意自己與他人以及財物的安全，在您使用我們的產品時，請您遠離建築與人群。遙控直昇機可能在飛行中出現任何意外，可能是飛行員的操控失誤，或者是無線電干擾，並導致嚴重事故的發生。飛行員必須為自己的行為負完全責任，以及所造成的任何損害。

CAUTION 注 意

Please read the following instructions thoroughly before the first use of your MICROBEAST PLUS and setup the system carefully according to this manual . Allow sufficient time for the setup procedure and check each step carefully . Watch for a mechanically clean and proper build of your helicopter . A wrong system setup can lead to a serious accident and damage to the model .

設置 MICROBEAST 時請仔細閱讀以下說明，並且一定要留出足夠的時間來仔細設定，並小心檢查每一個步驟。除此之外，也要特別注意無平衡翼旋翼頭的組裝是否正確，稍有差錯或機械故障，可能導致嚴重的事故發生。

CAUTION 注 意

Radio controlled (R/C) models consist of several electrical components . It is therefore necessary to protect the model from moisture and other foreign subtances . If the model is exposed to moisture this may lead to a malfunction which may cause damage to the model or a crash . Never fly in the rain or extremely high humidity .

無線遙控模型，是藉由許多電子零件組裝而成，因此有必要保護這些脆弱的電子零件，例如防水、防塵等工作。如果遙控模型受潮可能導致故障，請絕對不要在雨天或濕度極高的氣候中飛行。

CAUTION 注 意

When operating the helicopter with a MICROBEAST PLUS ensure there is a sufficiently large and stable receiver power supply . Because of the direct coupling of the rotor blades to the servos, without the use of a flybar mixer, the servos are exposed to increased actuating forces . In addition, because of the intermediary electronic gyro system, the servos are driven more often than with traditional use . These factors can make the power consumption increase a lot compared to a flybar helicopter . When the supply voltage falls below 3,5 volts for a short amount a of time, the system will power off and reboot . In this case a crash of the helicopter is unavoidable .

操控您的直昇機時，請確保 MICROBEAST PLUS 有一個充足、穩定的接收器電源。由於十字盤伺服器直接連接十字盤、主旋翼，不像傳統貝爾希拉混控旋翼頭那樣的省力，所以請特別注意！無平衡翼直昇機使用的伺服器會顯得特別的耗電，請務必確定您的供電系統有足夠的供電能力。若電壓低於 3.5V，即使是很短暫的時間，系統將關閉並重新啓動。在這種情況下，墜機是很難避免的。

CAUTION 注 意

Do not expose the MICROBEAST PLUS system to extreme variations in temperature . Before powering up the system, wait some time so that the electronics can acclimatize and any accumulated condensation is able to evaporate .

請勿讓 MICROBEAST PLUS 在極端溫度變化的環境下飛行，例如從溫暖的室內短時間帶到寒冷的室外，環境轉換至少需有 20 分鐘以上的緩衝適應，讓電子零件上的水氣凝結揮發掉，才能夠通電開機。

CAUTION 注 意

The sensors of MICROBEAST PLUS consist of highly sensitive electomechanical components . These can be damaged due to moisture or mechanical or electrical impact . Do not continue using this product, if it hase been exposed to such influences, e .g . dure to a crash of the model or due to overvoltage caused by a defective receiver power supply . Otherwise a failure may happen any time .

MICROBEAST PLUS 包括高度敏感的電子元件，它可能在潮濕的環境中、機械或電子的衝擊中受到損害。如果您的模型已經遭受到撞擊，或者接收器的電源供應不穩定等等，請不要繼續使用 MICROBEAST PLUS，否則故障會不斷發生。

CAUTION 注 意

When operating electric helicopters make sure that the electric motor cannot start inadvertently during the setup procedure . Particularly pay attention if using a single-line receiver and if the ESC is connected directly to the MICROBEAST PLUS . We recommend disconnecting the electric motor from the ESC during the setup procedure . Prior the first usage please slide the motor/pinion away from the main gear, then check that the motor does not to start inadvertently when the receiver is switched on .

操作電動直昇機時，請確保電動馬達不會在安裝過程中無意間啓動。尤其要特別注意，如果您使用的是單線連接接收器，且 ESC 直接連接到 MICROBEAST PLUS。我們建議在安裝過程中 ESC 不要連接電動馬達。在第一次使用之前，請滑動馬達/齒輪以遠離主齒輪，然後檢查馬達不會在開啓接收器時被啓動。

CAUTION 注 意

When operating the RPM Governor feature of MICROBEAST PLUS Pro-Edition it is essential to ensure that the motor cannot start by accident when making adjustment or performing preparations to start the engine . Carefully read this manual and make sure you fully understand how the RPM Governor feature is operated before making any adjustments . Also make sure the motor does not start when the radio link is interrupted or when you switch on the transmitter initially. With electric driven models do not dock the motor to the main gear unless all necessary adjustment procedures have been finished. Always maintain sufficient safety distance to the motor and other rapidly rotating components of the helicopter.

操作 MICROBEAST PLUS Pro-Edition 的 RPM定速模式時，請確保馬達不會在調整或準備啓動引擎過程中無意間被啓動。調整前請仔細閱讀本說明書了解 RPM定速模式的操作特性。並請確保在開啓或關閉遙控器時，馬達不會被啓動。使用電動直昇機時請不要連接馬達跟主齒輪，除非確定所有必要的調整已經完成。直昇機內的馬達及其他快速轉動的零件必須保持足夠的安全間隙。

CAUTION 注 意

MICROBEAST PLUS with AttitudeControl can be used as a flying aid for beginners as the reaction of the helicopter to stick inputs can be limited and as an electronic control circuit can help to stabilize the helicopter. However, this does not provide that the helicopter can always be flown safely! By incorrect control inputs the helicopter still may crash or be placed in a position in which the pilot becomes disoriented even when using AttitudeControl. In addition, the helicopter can drift due to external influences and it is not guaranteed that the artificial horizon of the device can stabilize the helicopter at any time and recover from any orientation. Influences such as temperature fluctuations or vibrations may cause incorrect results and distort the position calculation of the system in consequence . There is no guarantee that the system will always work correctly . Only the pilot is responsible for the control of the helicopter and thus also for the use of the system . You must always be able to turn off the system immediately and be able to take over full control of the helicopter .

MICROBEAST PLUS 的姿態模式可以輔助初學者飛行，因為此模式可限制直昇機的搖桿輸入反應，且電子控制電路有助於穩定直昇機。但是，這並不保證直昇機可以安全飛行！不正確的指令輸入，即使是在姿態模式下，直昇機仍可能會摔機或者迷失方向。此外，直昇機可能受外部影響而漂移，我們無法保證可以隨時讓直昇機能從任何方向恢復並自平。其他如氣溫的變化或振動都可能影響系統而會導致不正確的結果，造成系統計算失真。我們無法保證此系統總是能正常工作。只有飛手能負責直昇機的控制，以及正確使用本系統。請確保您能隨時立即關閉此平衡系統，並取回直昇機控制權。

CAUTION 注 意

We suggest you to seek the support of an experienced helicopter pilot before you undertake the first flight of your model . Additionally, flight training with a R/C simulator can help make flying easier and more enjoyable . Ask your local dealer if you need technical support or if you observe problems during the usage of our system .

我們建議您尋求具有足夠經驗的遙控直昇機玩家，然後再進行第一次的 MICROBEAST PLUS 搭配飛行。此外，飛行訓練用的R / C模擬器可以幫助使飛行更簡單，更有樂趣。如果您有任何技術支援或系統使用的問題，請與當地代理連絡。

CAUTION 注 意

AttitudeControl can help to facilitate flying of model helicopters by briefly passing over control to the system if the pilot becomes disoriented . By using the built-in artificial horizon the helicopter can be brought to a nearly horizontal position so that the pilot gains time to reorient . Thus there can be no assurance that the model is saved from a crash in general . Depending on the current attitude and the speed of the model and depending on how fast the AttitudeControl is activated, the model may crash before or while the system tries to recover. In addition, the helicopter can drift due to external influences and it is not guaranteed that the artificial horizon of the device can stabilize the helicopter at any time and recover from any orientation . Influences such as temperature fluctuations or vibrations may cause incorrect results and distort the position calculation of the system in consequence . Strictly observe the general safety rules for dealing with RC models and do not totally rely on the system . The pilot is responsible for the control of the helicopter and thus also for the use of the system . You must always be able to turn off the system immediately and be able to take over full control of the helicopter .

如果飛手在飛行中迷失方向，姿態模式可以快速控制系統，幫助操控直昇機。藉由使用內建自平功能，使直昇機接近水平位置，讓飛手有時間重新調整正確的方向。但仍不保證可以拯救失控的直昇機，系統介入的速度及反應主要是根據直昇機當時的姿態和速度而定，即便如此，該直昇機仍可能會在系統嘗試恢復時或之前摔機。此外，直昇機可能受外部影響而漂移，且無法保證可以隨時讓直昇機能從任何方向恢復並自平。其他如氣溫的變化或振動都可能影響系統而會導致不正確的結果，且造成系統計算失真。我們無法保證此系統總是能正常工作。只有飛手能負責直昇機的操控，以及正確使用本系統。請確保您能隨時立即關閉此平衡系統，並取回直昇機控制權。

1 INTRODUCTION
簡介

Dear customer,

With MICROBEAST PLUS you have purchased an electronic control system that continuously detects and controls the attitude of your helicopter and the control commands from the pilot . As a result the system is constantly aware of how the drive system will be burdened . The Pro-Edition features a RPM Governor system that uses this advantage to control the motor rpm . Contrary to conventional motor control systems that only monitor the engine speed, MICROBEAST PLUS can thus react sooner to speed changes . A separate engine governor system is no longer required for nitro helicopters and electric models can be used with a simple (cheap) speed controller without additional features such as soft start or governor mode . The desired rotor speed is specified via the remote control transmitter and MICROBEAST PLUS controls the throttle servo or speed controller accordingly, so that the predetermined head speed is maintained from takeoff to landing . MICROBEAST PLUS offers an integrated soft start for spooling up the rotor before takeoff and a quick start to regain head speed in a controlled manner when practicing autorotation maneuvers . The system is suitable both for electric and nitro/gas helicopters . Using the proven "Easy Setup" concept no additional equipment is required for programming (apart from your remote control system) and the initial setup is done within minutes .

Furthermore the Pro-Edition has an integrated artificial horizon. This ensures that MICROBEAST PLUS can determine the absolute position in space of the helicopter on the roll and pitch axis, regardless of the position in which the helicopter is currently located. At the moment this so-called AttitudeControl can be used with five different modes:

- Bail out rescue mode (with/without collective pitch)
- 3D – Mode (with/without collective pitch)
- Flight trainer mode

AttitudeControl helps you to learn new maneuvers and reduces the probability of crashing significantly . If AttitudeControl is switched on in flight the helicopter will be oriented horizontally, depending on the selected mode always in normal or also in inverted flight position . So the helicopter can be brought in a save position by the press of a button, i . e . if the pilot becomes disoriented . Beginners can use AttitudeControl permanently (preferably in the"Flight trainer mode"), whereby the helicopter loses the peculiarity of having to be constantly controlled by the pilot . When AttitudeControl is switched on the pilot can simply release the sticks and the helicopter will be held almost horizontally without external control commands .

We thank you for your confidence and wish you fun and great flights with **MICROBEAST PLUS Pro-Edition.**

Your BEASTX-Team **WWW.BEASTX.COM**

親愛的客戶：

感謝您使用 MICROBEAST PLUS 無平衡翼控制系統，此 PRO 版本增加 RPM 定速模式功能。此功能的特色是系統在飛行時，會持續不斷地偵測直昇機的姿態及飛手指令來控制直昇機，使飛行保持穩定。這與傳統的馬達控制系統只監控馬達的轉速比不同，MICROBEAST PLUS 對直昇機的速度變化有更快速的反應。除此之外，本版本同時具備了整合式緩啓動功能，適用於電動和引擎/直昇機。「簡易安裝」一直以來是 MICROBEAST PLUS 的重要設計理念，無需額外的介面(除了您的遠端控制系統外)，在幾分鐘內就可完成初始設定。使用此功能後，引擎/電動直昇機只要搭配一個簡單(便宜)的速度控制器，且定速器無須緩啓動及定速功能，MICROBEAST PLUS 姿態/定速模式會有效的控制轉速/油門伺服，使直昇機能以預設的速度穩定地執行起降動作。

此外， Pro 版具有整合式自平功能。無論直昇機當前所在位置於何方，MICROBEAST PLUS 都能判斷直昇機上的滾轉和俯仰軸的絕對位置。此版本的姿態模式支援五種不同的模式：

- 失控保護模式(有/無 集體螺距)
- 3D 模式(有/無 集體螺距)
- 飛行訓練模式

姿態模式可以幫助您學習新的操作技能和降低嚴重摔機的機率。在飛行時開啓此模式，直昇機將以水平定位，但這仍取決於所選的模式是正飛或倒飛。當飛手迷失方向時，只要簡單地按下按鈕保存直昇機的位置即可。初學者也可以一直使用姿態模式，建議您最好是「飛行訓練模式」下這樣做，因為不需持續手動操控直昇機功能，當開啓姿態模式時，飛手可以放開搖桿，讓直昇機在沒有外部控制命令介入下，仍然能將直昇機保持水平。

感謝您對 MICROBEAST PLUS Pro-Edition 的信任，祝您飛行愉快！

Your BEASTX-Team WWW.BEASTX.COM

2 PREPARATIONS FOR GOVERNOR USAGE
定速器使用前準備

ALIGN

To use the Governor function of MICROBEAST PLUS it is necessary that MICROBEAST PLUS is able to measure the motor speed . Therefore see the separate purchase of a motor rpm sensor is required . Additionally you need the adapter cable BXA76401 to connect the sensor to your MICROBEAST PLUS unit . When using an electric helicopter it is possible that your speed controller has a rpm signal output . In this case no additional accessories are required . For more information please see chapter 6 .

When using a nitro helicopter remove the servo horn of to the throttle servo before powering up the system or do not connect the throttle servo linkage yet, in order to avoid blocking and in consequence damage of the servo due to incorrect setting .

Using an electric model ensure that the speed controller is programmed correctly and that the travels for the throttle channel have been adjusted in the transmitter if necessary . Note that the speed controller itself must not be operated in a (heli specific) governor mode, but must be operated in a simple motor control mode that allows to control the motor rpm as direct as possible . The throttle signal must not be filtered and should be processed as linear as possible . This ensures that the control loop of MICROBEAST PLUS can govern the motor rpm optimally . For this purpose some electric speed controllers offer a special "External control mode" or "Flybarless mode" on . If your motor controller does not have such a mode, we recommend to select a mode that typically offers such behavior, like a some mode for fixed wing aircraft . Note, however, that no brake function (which is required for electric gliders) must be active and that the throttle response should be set to maximum speed, if such a feature is provided .

若要使用 MICROBEAST PLUS 定速模式，首先必須讓 MICROBEAST PLUS 能夠測量到馬達的轉速。因此必須購買一個獨立的馬達轉速感應器。此外您需要使用一條連接線 BXA76401 來連接感應器與 MICROBEAST PLUS。若您使用的是電動直昇機，且使用的定速器有轉速信號輸出，在這種情況下，就不需要再另外加裝轉速感應器及連接線。欲了解更多信息，請參見第6章。

使用引擎直昇機時，在開啓電源系統前請移除油門伺服器的伺服臂，並移除伺服器連桿頭，以避免因不正確的設定起動引擎，造成油氣阻塞及伺服器損壞。

使用電動模式時請確保定速器的程式已經正確設定好，且遙控器的油門通道行程也要調整完成。應該注意的是定速器不得在定速模式（直昇機專用）下操作，必須在一個單純馬達控制模式下操作，直接控制馬達轉速。請注意，油門訊號應盡可能是線性的，且不能被過濾。這確保了 MICROBEAST PLUS 的控制迴路可以優化馬達轉速。為此，一些電動定速器會提供特殊的「外部控制模式」或「無副翼模式」。如果您的馬達控制器沒有這些模式，我們建議選擇適用於固定翼飛機的模式。然而，請注意，電動滑翔機特殊需求的「無煞車功能」必須開啓，如果無此功能的話，那麼必須將油門曲線設為最大速度。

⚠ CAUTION 注 意

Pay attention to your own safety and the safety of other people and property in your vicinity when using our product . When using helicopters with nitro/gas engines make sure that the motor will not start when making adjustments to the system . When using a gas engine always keep the ignition system deactivated!

注意自己與他人以及財物的安全，在您使用 MICROBEAST PLUS時，請您遠離建築與人群。當使用引擎直昇機時，請確保在調整系統時馬達不會被啓動。並請確定點火系統是關閉的！

⚠ CAUTION 注 意

For electric helicopters remove the motor pinion from the main gear during initial setup . Warning! Risk of injury! Never touch the motor when it's running . Always keep a save distance to all rotating parts of the helicopter .

電動直昇機在初始設定時，請移除主齒輪上的馬達驅動齒輪。 警告！這有受傷的危險！切勿觸摸運行中的馬達。並請與任何會旋轉的直昇機零件保持安全距離。

3 OPERATING PRINCIPLES OF ATTITUDECONTROL
姿態模式操作原理

ALIGN

When the term"AttitudeControl" is used in the further course, in general reference is made to the function of the artificial horizon, irrespective of a particular operating mode such as "Bail out rescue mode", "3D – Mode" or "Flight trainer mode" .

AttitudeControl itself can be enabled or disabled via Parameter menu point L by selecting one of the operating modes as mentioned above . Only if AttitudeControl is enabled, i .e . one of the five operating modes is selected, then AttitudeControl can be activated in operation via the remote control transmitter . Enable/Disable and activate/deactivate are therefore to separate conceptually!

For the use of AttitudeControl it is strongly recommended to use a single-line receiver, since for activating AttitudeControl in flight an additional control channel is needed . Almost every manufacturer of remote control systems offers such a receiver for his system and MICROBEAST PLUS supports almost all types of single-line protocols . The additional control channel allows to activate AttitudeControl before, during and after the flight via the remote control transmitter, so that the helicopter is stabilized depending on the selected operating mode if required . As long as AttitudeControl is deactived the helicopter can be flown as usual, so MICROBEAST PLUS only works as flybarless stabilization system . Preferably use a switch or push button on the transmitter that actuates the proper channel for activation/deactivation and that is safe and easy to reach .

Alternatively, the already existing channel for the tail gyro gain can be used to additionally switch AttitudeControl on and off, e .g . if a standard receiver is used (here only 5 channels can be plugged into MICROBEAST PLUS) or a transmitter with only six channels is used . This alternative, however, is far less convenient as it may require some complex programming of the transmitter, especially if several flight modes are programmed with different tail gyro sensitivity settings on the transmitter .

For more information on the individual receiver types, wiring and receiver settings, see the MICROBEAST PLUS instruction manual chapters 4 and 5 . The following chapter 4 amends these instructions specifically for the use of RPM Governor and AttitudeControl

在航線中使用「姿態模式」，一般是以自平功能為基準，而不管其他特定的操作模式，如「失控保護模式」、「3D 模式」或「飛行訓練模式」。

可以在參數選單第 L 點中選擇上述提到的操作模式來「啓動」或「停用」姿態模式。只有在啓動姿態模式時，例如：在任一選擇的操作模式並執行時，才能經由遙控器啓動姿態模式。因此「啓動 Enable / 停用 Disable」及「開啓 Activate / 關閉 Deactivate」在概念上是不同的！

使用姿態模式，強烈建議您使用單線連接接收器，因為在飛行中啓動姿態模式需要額外的控制通道。幾乎每個遙控器製造商都會提供這類型的接收器，且 MICROBEAST PLUS 支援大部分類型的單線連接接收器。額外的控制通道可允許在飛行前/中/後透過遙控器啓動姿態模式，並可依需要來選擇操作模式使直昇機穩定。只要簡單地「停用」姿態模式，直昇機就可以像平常一樣飛行，因此 MICROBEAST PLUS 也可以作為無平衡翼穩定系統。最好是利用遙控器的開關或按鈕來驅動適當的通道，這樣可以安全又方便地「啓動/停用」姿態模式。

如果使用的是六動遙控器，其中一個通道已經被傳統接收器使用，因此，只有 5 個通道可以插入 MICROBEAST PLUS，此時，您可以利用尾陀螺儀感度通道作為「啓動/停用」姿態模式。然而，這個替代方案並不方便，尤其是有很多的飛行模式必須對應不同的尾陀螺儀靈敏度，那麼遙控器的設定就會相對地複雜許多。

有關各接收器類型、接線方法和接收器設定的詳細資訊，請參閱 MICROBEAST PLUS 說明書第 4~5 章。接下來的第 4 章是專為 RPM 定速模式和姿態模式的使用修訂說明。

4 RECEIVER SETUP MENU
接收器設定選單

When selecting a specific type of single-line receiver the appropriate type of receiver channel allocation will be preset in MICROBEAST PLUS . Please refer to the tables below and check if your radio transmits the channels in the correct order . If this is not the case, you have to assign the channel order step by step through the menu points B - J (for this see section 5 .2 .2 of the MICROBEAST PLUS manual) . **To know the channel assignment of your transmitter you can check the user manual of the transmitter or look at the servo monitor of the transmitter (if it has this feature) . If in doubt ask the manufacturer of your transmitter .**

當選擇特定類型的單線連接接收器時，接收器通道分配的相應類型將出現在 MICROBEAST PLUS。請參考下表，檢查您遙控器通道的順序是否正確。如果順序是不正確的，您必須通過設定選單第 B- J 點一步一步來分配通道的正確順序(請參考 MICROBEAST PLUS 說明書第 5.2 .2)。想了解您遙控器通道分配的詳情，請查看遙控器說明書或遙控器的伺服器顯示器(如果它有這個功能的話)。如有相關疑問，請您進一步與遙控器製造商連絡。

CAUTION 注 意

After updating MICROBEAST PLUS to the Pro-Edition firmware you must perform the receiver setup once, independent of which receiver type you use . Otherwise you will not be able to activate/deactivate the new features. Note that for safety reason, the settings in Receiver setup menu will be saved only, if the menu is passed through until the end (reached after button press at menu point N)

MICROBEAST PLUS 升級到 Pro-Edition 後，您必須再執行一次接收器設定，這個動作與所使用的接收器類型無關。否則，您將無法執行「啓動/停用」新功能。請注意，基於安全的考量，在此選單中設定接收器時，必須將按鈕一步一步循序按到底，直到進入選單第 N 點，您所設定的接收器才會被儲存。

4.1 PRESET CHANNEL ASSIGNMENT
預設通道分配

When using the preset channel assignment the RPM Governor function for **nitro/gas helicopters** will use an auxiliary channel (channel 8) to set the rotor rpm and to activate/deactivate the RPM Governor . So you can control the throttle servo as usual by using the thrust stick and throttle curves of your transmitter and the RPM Governor will be switched by using an extra channel on your transmitter . In addition there is the possibility to control both functions (manual throttle control and switching the RPM Governor) only by the throttle channel, e .g . if the transmitter does not have a sufficient number of control channels . For this purpose it is necessary that no additional channel for the RPM Governor is assigned . This can be done by teaching a custom channel order (see next section) .

Using the RPM Governor in combination with an **electric helicopter**, then this is generally controlled by the throttle channel only . The specific allocation of an auxiliary control channel for the RPM Governor has no effect here .

For using AttitudeControl also some actuator is needed that can be used to activate/deactivate AttitudeControl during takeoff, landing and in flight . This switch controls a free channel on the transmitter, which is taught in the Receiver setup menu of MICROBEAST PLUS at menu point J or which corresponds to the standard assignment of the selected receiver type (see next page) .

當預設通道分配給有 RPM 定速模式的引擎直昇機時，會使用到一個輔助通道(通常是 CH8)來設定轉速及「開啓/關閉」RPM 定速模式。所以，您仍然能像往常一樣利用搖桿來控制伺服器油門，您也可以使用遙控器額外的通道來切換油門曲線及 RPM 定速模式。如果您的遙控器沒有足夠的通道，那麼，只利用油門通道，同時切換手動控制油門及定速兩種功能也是可以的。為了達成這個目的，請注意，在此情況下，是不允許將 RPM 定速模式分配到額外通道的。這可以通過自定義通道來完成(請參閱下一節)。

若將 RPM 定速模式搭配電動直昇機使用，其定速模式對於特定的輔助通道分配，是沒有作用的，一般只須使用油門通道來控制即可。

使用姿態模式時需要一些驅動器，以方便在起飛、飛行及著陸時來「開啓/關閉」姿態模式。此開關控制可以分配給遙控器上任一閒置通道，進一步的說明及接收器類型標準分配表，請參閱 MICROBEAST PLUS 接收器設定選單第 J 點(請見下一頁)。

	Spektrum Satellite 衛星天線	Futaba S-BUS	PPM composite signal* 複合信號
Transmitter channel 遙控器通道	**Function** 功能	**Function** 功能	**Function** 功能
Channel 1 通道 1	Throttle [CH5] 油門 [CH5]	Aileron 副翼	Collective Pitch 集體螺距
Channel 2 通道 2	Aileron 副翼	Elevator 升降舵	Aileron 副翼
Channel 3 通道 3	Elevator 升降舵	Throttle [CH5] 油門 [CH5]	Elevator 升降舵
Channel 4 通道 4	Rudder 尾舵	Rudder 尾舵	Rudder 尾舵
Channel 5 通道 5	Tail Gyro Gain 尾陀螺儀感度	Tail Gyro Gain 尾陀螺儀感度	AttitudeControl 姿態模式
Channel 6 通道 6	Collective Pitch 集體螺距	Collective Pitch 集體螺距	Throttle [CH5] 油門 [CH5]
Channel 7 通道 7	AttitudeControl 姿態模式	AttitudeControl 姿態模式	Tail Gyro Gain 尾陀螺儀感度
Channel 8 通道 8	RPM Governor* RPM定速模式*	RPM Governor* RPM定速模式*	RPM Governor* RPM定速模式*
Channel 9 通道 9	Auxiliary [CH6] 輔助通道 [CH6]	Auxiliary [CH6] 輔助通道 [CH6]	Auxiliary [CH6] 輔助通道 [CH6]

SRXL

	BEASTRX	Multiplex SRXL JR X.Bus Mode B JETI UDI	Graupner SUMD	Spektrum SRXL
Transmitter 遙控器	**Function** 功能	**Function** 功能	**Function** 功能	**Function** 功能
Channel 1 通道 1	Aileron 副翼	Aileron 副翼	Collective Pitch 集體螺距	Throttle [CH5] 油門 [CH5]
Channel 2 通道 2	Elevator 升降舵	Elevator 升降舵	Aileron 副翼	Aileron 副翼
Channel 3 通道 3	Throttle [CH5] 油門 [CH5]	Rudder 尾舵	Elevator 升降舵	Elevator 升降舵
Channel 4 通道 4	Rudder 尾舵	Collective Pitch 集體螺距	Rudder 尾舵	Rudder 尾舵
Channel 5 通道 5	Tail Gyro Gain 尾陀螺儀感度	Throttle [CH5] 油門 [CH5]	Auxiliary [CH6] 輔助通道	Tail Gyro Gain 尾陀螺儀感度
Channel 6 通道 6	Collective Pitch 集體螺距	Tail Gyro Gain 尾陀螺儀感度	Throttle [CH5] 油門 [CH5]	Collective Pitch 集體螺距
Channel 7 通道 7	AttitudeControl 姿態模式	AttitudeControl 姿態模式	Tail Gyro Gain 尾陀螺儀感度	AttitudeControl 姿態模式
Channel 8 通道 8	RPM Governor* RPM定速模式*	RPM Governor* RPM定速模式*	RPM Governor* RPM定速模式*	RPM Governor* RPM定速模式*
Channel 9 通道 9	Auxiliary [CH6] 輔助通道 [CH6]	Auxiliary [CH6] 輔助通道 [CH6]	Auxiliary [CH6] 輔助通道 [CH6]	Auxiliary [CH6] 輔助通道 [CH6]

When using SRXL the preset channel assignment is based on the receiver ‘s protocol version . MICROBEAST PLUS will detect automatically which brand of receiver is used and will choose the appropriate channel assignment accordingly .

* assignment only used for nitro helicopters

SRXL 預設通道是根據接收器的溝通協議版本來分配的。 MICROBEAST PLUS 會自動檢測不同品牌的接收器來選擇合適的通道分配。

*通道分配只適用於引擎直昇機

4.2 TEACH A REVISED CHANNEL ORDER
修改自訂通道的順序

If you need a customized channel order, please first prepare your transmitter as described in sections 3 .2 and 5 .2 .2 of the MICROBEAST PLUS instruction manual (if not already done) . In the following nine menu points B - J you can assign different functions by simply actuating the appropriate channel function on your transmitter . A blue flash of the Status-LED indicates that a channel has been detected . Press the button after learning each function to save the assignment and to go to the next function . The assignment of the auxiliary channel [CH6] can be skipped by pressing the button without teaching a channel for this function . Likewise, the assignment of the channel for nitro RPM Governor can be skipped in case it is not needed or if you don ‘t want to control the RPM Governor by a separate channel, e . g . if your transmitter does not provide enough free channels . By skipping the assignment the RPM Governor function will use a different operating mode that allows to control it via the throttle channel (set at menu point G) if you like . When used in an electric model the RPM Governor generally is controlled via the throttle channel (set at menu point G) . In this case the assignment at menu point I can be skipped anyway, as an assignment will have no effect .

Finally at menu point J you have to assign the channel that is used to activate/deactivate the AttitudeControl . Also this can be skipped if not needed or of you don ‘t want to use a separate channel . AttitudeControl can still be used then . In this case the channel for the tail gyro sensitivity (set at menu point F) is also used for AttitudeControl (if it is enabled in Parameter menu point L later) .

如果需要修改自訂通道的順序，首先請按照 MICROBEAST PLUS 說明書第 3.2 章 及 第 5.2 .2 章的敘述來準備遙控器。請依照以下九個選單 B-J 點，簡單地啓動遙控器相對應的通道來分配功能。Status-LED燈的藍燈閃爍，表示通道已被檢測到。在記住每個功能後，請將您的通道分配儲存起來，並按下按鈕進入下一個功能。若不使用輔助通道，按下按鈕直接跳過 [CH6] 的通道分配 。若 RPM 定速模式對您來說是不必要的，或您不想使用單獨的通道來控制 RPM 定速模式，又或您的遙控器沒有足夠的閒置通道時，同樣的，此通道分配也能跳過去。若您跳過此功能分配， RPM 定速模式會以不同的操作模式呈現，系統會默許油門通道來進行控制(設定選單第 G 點)。在電動模式下，RPM定速模式的通道分配是沒有任何效果的，一般都是透過油門通道來控制(選單第 G 點)。您可以跳過選單第 I 點的通道分配。

最後，在選單第 J 點，您必須為「開啓/關閉」姿態模式做通道分配。如果不需要或不希望使用單獨的通道，也可以跳過此設定。此時姿態模式還是可以使用的。因為尾陀螺儀靈敏度的通道（在選單第 F 點設定）也可用於姿態模式（如果在參數選單第 L 點下姿態模式能被啓動的話）。

Menu-LED 燈號	Function 選單
B	Collctive Pitch 集體螺距
C	Aileron 副翼
D	Elevator 升降舵
E	Rudder 尾舵
F	Gyro Gain 陀螺感度
G	Trottle [CH5] 油門
H	Auxiliary [CH6]* 輔助通道 [CH6]*
I	RPM Governor (only for nitro)* RPM定速模式*
J	AttitudeControl* 姿態模式*

＊Optional ＊自選

5 SETUP MENU
設定選單

Due to the new functionality some basic settings in the Setup menu have been changed in comparison to previous versions (MICROBEAST PLUS firmware versions 3 .2 .x and below) . The affected menu points are described below . Check and change these settings after updating your MICROBEAST PLUS to Version 4 .x .x in any case, even if the functions of AttitudeControl and/or RPM Governor are not (yet) used! Do not attempt to fly the helicopter, as long as these items were not checked and setup correctly . Otherwise the model is guaranteed to crash!!

因為加入了新的功能，所以在設定選單中的一些基本設定相較於先前版本（MICROBEAST PLUS版本3.2.x及以下）已被改變。下面針對受影響的選單進行說明。請注意，只要將 MICROBEAST PLUS 升級至 4.x.x 版本後，不論任何情況下，即使還沒有或不使用姿態模式/ RPM 定速模式，都請逐步檢查、更新並正確設定這些項目！上述項目尚未執行前，請勿飛行，否則，保證摔機！

⚠ CAUTION 注 意

If you are unsure that all the steps were followed correctly, perform a factory reset after the update process and setup the model from scratch . All of the settings (Setup menu points) not named here are setup as described in chapter 7 of the MICROBEAST PLUS instruction manual .

如果您不能確定 4.x.x 所有的步驟都已正確地執行，建議您，在升級後，先恢復出廠預設值，然後依照說明書從頭開始一步一步設定。相關詳細說明，請參考 MICROBEAST PLUS 說明書第7章。

Factory reset:

To reset MICROBEAST PLUS to factory settings, at **any Setup menu point** push down the button for at least 10 seconds until the LEDs A - N quickly blink one after the other to confirm the reset .

Please note that any previous configuration is now deleted . Do not attempt to fly the helicopter without doing the complete setup procedure again . Otherwise you will crash your helicopter! Please also note that all servo settings are lost . Therefore you should unplug the servos and remove the servo horns before resetting MICROBEAST PLUS .

The receiver type settings (see chapter 6 of the MICROBEAST PLUS instruction manual) are not affected by the reset! Conversely, if you change the receiver type in Receiver setup menu, the parameters of Setup menu and Parameter menu are not affected . However, you have to redo all the receiver-specific settings (channel assignment and fail-safe, see sections 5 .2 to 5 .3 of the MICROBEAST PLUS instruction manual) .

回復出廠預設值：

想要回復 MICROBEAST PLUS 出廠預設值，只要在設定選單下，**無論您停留在哪一個選單點**，請長按設定按鍵超過 10 秒，直到選單 A－N 和 J 點的指示燈快速閃爍一次，表示已經恢復出廠預設值。

請注意，一旦回復出廠預設值，之前的設定資料將會被刪除。嚴禁在完成所有設定前試飛直昇機，否則會造成直昇機摔機或損壞。另外，因為先前所設定的伺服器參數也同時會被刪除，所以您應該在重新設定 MICROBEAST PLUS 前移除伺服器連桿及伺服器擺臂，以策安全。

接收器類型設定（請參閱第6章）不會因為回復出廠設定值而被刪除！相反的，如果您在接收器類型中更改任何設定，設定選單或參數選單都不會被重置。不過，您需要重新做接收器個別設定（通道分配和失控保護，請參閱第 5.2 到 5.3 章節）。

MOUNTING ORIENTATION OF MICROBEAST PLUS
MICROBEAST PLUS 的安裝方向

Instead of the previous selection "horizontal" or "vertical" at Setup menu point A you now must selected the exact mounting position of the MICROBEAST PLUS unit . This results in eight possible settings for Setup menu point A:

MICROBEAST PLUS 3.2.x 的安裝方向只有「橫向」和「縱向」兩種選項，但是 MICROBEAST PLUS 4.x.x 要求更精確的安裝位置。因此，設定選單第 A 點會有八種不同方向供您選擇：

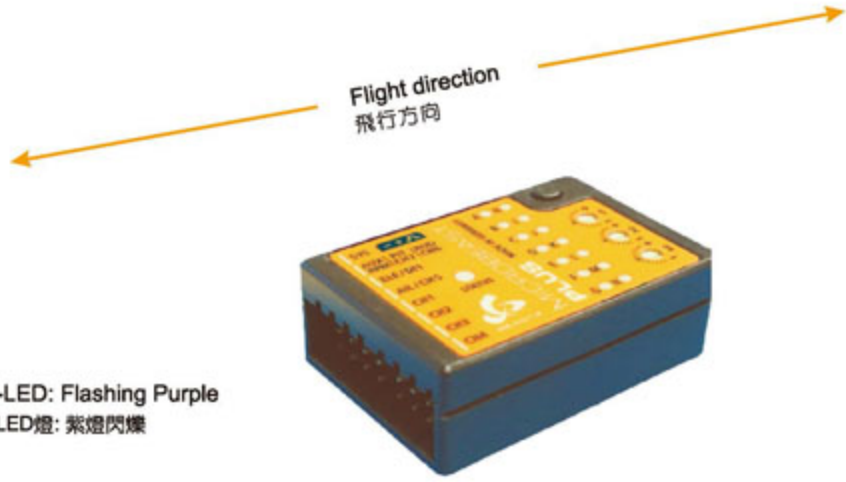
Status-LED Status-LED燈	Mounting Orientation 選單
Off 熄滅	Flat, sticker on top side, socket points in flight direction* 平放 / 貼紙朝上側 / 插口朝飛行方向*
Flashing Purple 紫燈閃爍	Vertical, button is on the top, socket points in flight direction 垂直/按鈕朝上側/插口朝飛行方向
Purple 紫燈	Flat inverted, sticker on bottom side, socket points in flight direction 平放倒置/貼紙朝底部/插口朝飛行方向
Flashing Red 紅燈閃爍	Vertical inverted, button is on the bottom, socket points in flight direction 垂直倒置/按鈕朝底部/插口朝飛行方向
Red 紅燈	Flat, sticker on top side, socket points to the tail boom 平放/貼紙朝上側 /插口朝尾管
Flashing Blue 藍燈閃爍	Vertical, button is on the top, socket points to the tail boom 垂直/按鈕朝上側/插口朝尾管
Blue 藍燈	Flat inverted, sticker on bottom side, socket points to the tail boom 平放倒置/貼紙朝底部/插口朝尾管
Red/Blue 紅燈/藍燈	Vertical inverted, button is on the bottom, socket points to the tail boom 垂直倒置/按鈕朝底部/插口朝尾管

＊Factory Setting ＊出廠預設值

Status-LED: off
Status-LED燈: 熄滅

Status-LED: Red
Status-LED燈: 紅燈

Fig / 圖示.1



Status-LED: Flashing Purple
Status-LED燈: 紫燈閃爍

Status-LED: Flashing Blue
Status-LED燈: 藍燈閃爍

Fig / 圖示.2

Status-LED: Purple
Status-LED燈: 紫燈

Status-LED: Blue
Status-LED燈: 藍燈

Fig / 圖示.3

Status-LED: Red/Blue
Status-LED燈: 紅燈/藍燈

Status-LED: Flashing Red
Status-LED燈: 紅燈閃爍

Fig / 圖示.4

You can switch between the options by moving the rudder stick to one or other direction (see section 6 .3 of the MICROBEAST PLUS instruction manual) . The Status-LED will change the color according to the selected orientation .

正如之前提到的方法（6.3），您可以移動遙控器上尾舵通道搖桿的方向來改變參數，Status-LED 燈也會隨著所選擇的方向而改變顏色。

Briefly push the button to save the configuration and to proceed to Setup menu point B .
按下按鈕保存當前設定，並進入設定選單第 B 點。

K COLLECTIVE PITCH RANGE AND ENDPOINTS
設定集體螺距行程量（總螺距）

In contrast to MICROBEAST PLUS firmware versions 3 .2 .x and below adjusting the collective pitch at Setup menu point K now is done by moving the aileron stick, similar as adjustment of cyclic pitch range is done at Setup menu point J!

Moving the rudder stick serves for a different task now: By moving the rudder stick you can reverse the internal collective pitch directions . The current pitch direction is indicated by the color of the Status- LED at Setup menu point K . When the thrust stick is set to positive collective pitch, the Status-LED must light up in blue color, when the stick is set to negative pitch the Status-LED must light in red . **The crucial factor is the actual pitch angle of the rotor blades, not the position of the thrust stick!** If the display of colors is inversed, i .e . the Status-LED lights blue when pitch is negative and lights red if pitch is positive, the directions can be interchanged by moving the rudder stick once into any direction . Check this setting several times and very conscientious . The setting is very important for proper function of AttitudeControl .

Besides setting the control direction, **after the first update to firmware 4 .x .x it is essential to set the collective pitch angles for both positive and negative direction (again)!** This will ensure that the internally stored values are adjusted to the new firmware . So push the thrust stick on your transmitter all the way forward to the maximum deflection . By moving the aileron stick left or right increase or reduce the collective pitch angle so that it corresponds to the desired maximum angle . Make sure the thrust stick stays all the way forward when adjusting the pitch! To confirm that the new value has been set, the Status-LED will flash in the appropriate color .

If you have set the maximum (or minimum) collective pitch angle, move the thrust stick all the way to the back and again adjust the collective pitch to the desired pitch angle by using the aileron stick, this time keeping the thrust stick all the way back .

與 MICROBEAST PLUS 3.2.x 版本相反，4.x.x 是由移動副翼搖桿來調整設定選單第 K 點的集體螺距，類似於設定選單第 J 點的循環螺距行程調整！

4.x.x 版本在移動尾舵搖桿有了不同的功能：移動尾舵搖桿可以反轉集體螺距的方向。當前俯仰方向，由設定選單第 K 點的 Status- LED燈的顏色來表示。當油門搖桿被設定為正集體螺距，Status- LED燈必須亮藍色，當油門搖桿被設定為負螺距 Status- LED燈必須亮紅色。關鍵因素不在於油門搖桿的位置，而在於螺旋槳的實際俯仰角度！如果顏色顯示相反，例如：Status- LED燈亮藍色的時候，螺距為負，亮紅色時螺距為正，一旦進入任何方向，是可以利用移動搖桿來進行互換方向的。所以請務必再三檢查您的設定是否正確。此設定正確與否，對姿態模式功能的好壞，是關鍵的環節！

除了設定控制方向，在第一次更新到 4.x.x 版本後，必須再次設定集體螺距角度的正反方向！這可確保內部儲存的最大行程量已被調整到新的主程式。因此，請將油門搖桿向前推到最大偏角。藉由向左或向右移動副翼搖桿來增加或減少集體螺距角度，以調整所需的最大行程量。請確保調整俯仰時，油門搖桿保持向前不要停頓！並請確認新的行程量已經設定完成，且 Status-LED燈也閃爍相對應的顏色。

如果您已經設定的最大（或最小）集體螺距，請再一次將副翼搖桿推至最大(或最小)來調整所需螺距角度。

CAUTION 注 意

Don't use any pitch curves in your transmitter **while doing these adjustments .** Later on for the flights, you can adjust your pitch curves as you like and are used to . Setup menu point K solely serves to teach MICROBEAST PLUS the maximum pitch range and the endpoints of the thrust stick .

MICROBEAST PLUS 在進行設定時，請不要更改遙控器上的螺距曲線設定（保持 0-50-100 直線）。設定完成後，試飛前，您可以按照自己的偏好，在遙控器上設定螺距曲線。設定選單第 K 點僅用於設定 MICROBEAST PLUS 可用的最大集體螺距行程量。

Push the button to save the configuration and to proceed to Setup menu point L .

按下按鈕保存當前設定，並進入設定選單第 L 點。

L CYCLIC SWASHPLATE LIMIT
設定十字盤最大傾斜範圍

Regarding Setup menu point L there are no changes compared to previous versions . Anyhow, after readjusting the maximum pitch angles at Setup menu point K, the swashplate cyclic limit at Setup menu point L should also be checked and readjusted in case there have been made changes to the pitch angles . How exactly the adjustment at Setup menu point L is performed, you can read in the MICROBEAST PLUS instruction manual at chapter 7 .

設定選單第 L 點與之前版本並沒有差異。無論如何，在設定選單第 K 點重新調整最大螺距角度後，請再次檢查和調整設定選單第 L 點的十字盤最大行程量，以確保在螺距角度有所變動時，可對應到十字盤最大傾斜範圍。要如何進行設定選單第 L 點的調整，請參考 MICROBEAST PLUS 使用說明書的第7章。

Push the button to save the configuration and to proceed to Setup menu point M .

按下按鈕保存設定並進入下一設定選單第 M 點。

M SWASHPLATE SENSOR DIRECTIONS
十字盤感應器方向

The approach to this Setup menu point was not changed compared to previous versions . **However, after updating to firmware version 4 .x .x it is very important to check the sensor directions again and set them correctly, even if the helicopter was previously flown . Because of the new architecture it can not be excluded that the sensor directions changed due to the update!**

此設定方法跟之前版本一樣。但是請注意，更新到 4.x.x 版本後，即使直昇機之前有飛行過，仍需再次檢查其感應器的方向和位置是否正確，這個步驟非常重要。因為先前感應器的方向和位置，是不會因為新韌體的更新而改變！

⚠ CAUTION 注 意

When tilting the helicopter forward the swashplate has to move backwards, when tilting the helicopter to the back, the swashplate has to compensate forward . Same thing applies to the roll axis, when you roll the helicopter to the left the swashplate has to steer right and vice versa . Basically the swashplate has to remain horizontal while banking the helicopter .

當直昇機向前方傾斜時，十字盤應當向後方傾斜。當直昇機向後方傾斜時，傾斜盤應當向前方傾斜。同樣，如果將直昇機橫向傾斜，十字盤應當向相反方向修正。當機體恢復初始水平位置時，十字盤也應該回到初始位置。

If this is not correct, you can reverse the sensor directions by moving the rudder stick in one direction . For confirmation you will see that the Status-LED changes color . Repeat this step until both sensors are working in the correct manner .

如果十字盤動作不正確，您可以將方向舵往一邊移動來修正系統感應器的方向。Status-LED燈將用不同顏色顯示當前選擇。重複此步驟，直到十字盤對應到升降、副翼的兩個感應器的方向正確為止。

There are four possible displays for control to choose from, one will be correct .

有四種可能的控制顯示可供選擇，其中一個會是正確的。

Sensor Directions 感應器修正方向

Status-LED Status-LED燈	Elevator 升降舵	Aileron 副翼舵
Off 熄滅	Reversed * 反向*	Reversed * 反向*
Purple 紫色	Reversed 反向	Normal 正常
Red 紅色	Normal 正常	Reversed 反向
Blue 藍色	Normal 正常	Normal 正常

＊Factory Setting ＊出廠預設值

When you press the button now, you will proceed to adjustment of the RPM Governor operation mode at Setup menu point N in case you operate MICROBEAST PLUS with a single-line receiver . Otherwise you will exit the Setup menu and MICROBEAST PLUS is ready for operation again . The RPM Governor function is not applicable when a Standard receiver is used!

假如 MICROBEAST PLUS 與單線連接接收器搭配使用，當您按下按鈕，您將直接進入到設定選單第 N 點的 RPM 定速模式-操作模式。否則，系統將退出設定選單且 MICROBEAST PLUS 會再度顯示已準備就緒。 RPM 定速模式不適用於傳統接收器！

N RPM GOVERNOR - OPERATION MODES
RPM 定速模式-操作模式

At menu point N you can choose between three different options:

- **Deactivated** - the RPM Governor is not used . All control commands on the throttle channel will be passed to **[CH5]** output directly .
- **Electric** - select this option if your helicopter is powered by an electric motor and an electric speed controller is plugged into **[CH5]** output of MICROBEAST PLUS . MICROBEAST PLUS reads the rpm signal from the speed controller or a phase sensor and controls the rotor speed accordingly . Note that the controller itself must not be operated in a (heli specific) governor mode . The speed controller must process the incomming throttle signals and control the motor as direct and unfiltered as possible (see chapter 2) .
- **Nitro** - with this option MICROBEAST PLUS can govern the rotor rpm of a helicopter with nitro or gas engine . For this MICROBEAST PLUS controls the throttle servo which is connected to **[CH5]** output and that controls the carburetor of the engine . The motor rpm will be read from a magnetic or optical sensor that captures the rpm from the crankshaft of the motor, the clutch bell or the main gear .

在選單第 N 點有三種選項可供選擇

- **關閉** — 不使用 RPM 定速模式。油門通道的所有控制命令將經過 [CH5] 直接輸出。
- **電動** — 如果您使用的是電動直昇機，請選擇此選項。定速器(ESC)插上 [CH5] 後輸出訊號給 MICROBEAST PLUS。MICROBEAST PLUS 會讀取來自定速器或相位感應器的 rpm 訊號來控制馬達的轉速。需要注意的是，定速器不得在（直昇機專用）定速模式下操作。因為定速器必須處理進入的油門訊號及控制馬達轉速，所以這些訊號的傳遞要盡量直接且未經過濾（參考第2章）。
- **引擎** —如果您使用的是引擎直昇機，請選擇此選項。在這個選項下，MICROBEST PLUS 能控制引擎轉速。因此可以控制油門伺服器，因為油門伺服器是連接 [CH5] 的訊號輸出，而且控制引擎化油器。磁或光感應器會讀取來自馬達、離合器或主齒輪曲軸的轉速訊號 。

The choice is done by moving the rudder stick in one direction until the LED indicates the desired color and state .

更改設定只需撥動尾舵搖桿，直到 Status-LED燈亮起您所需要的顏色。

Status-LED Status-LED燈	Operation Mode 操作模式
Off 熄滅	Deactivated* 關閉*
Red 紅色	Electric 電動
Blue 藍色	Nitro 引擎

＊Factory Setting ＊出廠預設值

If the RPM Governor is"deactivated" MICROBEAST PLUS will exit the Setup menu if you briefly press the button . Otherwise pressing the button will lead to Governor menu point A!

如果「停用」 RPM 定速模式，按下按鈕後 MICROBEAST PLUS 會離開設定選單。反之，按下按鈕後會進入定速選單第 A 點。

6 GOVERNOR MENU
定速模式選單

If the RPM Governor was activated at Setup menu point N (setting"electric" or"nitro") then you can access the Governor menu immediately afterwards . Here various helicopter-specific information must be provided which is necessary so that the RPM Governor can function correctly . Moreover, the transmitter will be prepared for the use with the RPM Governor function and at menu point A a function test for the rpm sensor is performed .

如果 RPM 定速模式在設定選單第 N 點中被開啓 (如上述的電動/引擎功能被點選)，那麼您可以在點選後立即進入此選單。為了讓 RPM 定速模式正確地發揮到最大，所以系統要求輸入各種直昇機的特定資訊。此外，遙控器將用於 RPM 定速模式和選單第 A 點執行轉速感應器的功能測試。

CAUTION 注 意

Pay attention to your own safety and the safety of other people and property in your vicinity when using our product . When using helicopters with nitro/gas engines make sure that the motor will not start when making adjustments to the system . When using a gas engine always keep the ignition system deactivated!

在您使用我們的產品時，請注意自己、他人以及財物的安全。當使用引擎直昇機時，請確保在調整系統時引擎不會被啓動，點火系統必須保持關閉！

CAUTION 注 意

For electric helicopters remove the motor pinion from the main gear during initial setup . Warning! Risk of injury! The following function test for the rpm sensor and adjusting the throttle range require the motor to be started . Never touch the motor when it's running . Always keep a save distance to all rotating parts of the helicopter .

電動直昇機在初始設定時，在測試轉速感應器和油門行程調整的功能時，會需要您啓動馬達，所以，為確保安全，請移除主齒輪的驅動齒輪。 警告！這有受傷的危險！。切勿觸摸運行中的馬達。並請與任何會旋轉的直昇機零件保持安全距離。

A FUNCTION TEST FOR RPM SENSOR
RPM感應器功能測試

Thus the RPM Governor of MICROBEAST PLUS can be used, the system must be able to detect the motor speed . This is done with the help of a rpm sensor that must be attached to the sensor input of MICROBEAST PLUS . For models with nitro/gas engines usually sensors are used that determine the speed signal magnetically or optically . These sensors are mounted next to the crankshaft or clutch bell and register the number of engine revolutions here .

For electric motors the motor speed can be determined electronically . For this purpose a phase sensor (e .g . BXA76013) is connected to one or two of the motor phases . Some electric speed controllers also offer a direct signal output for the rpm signal, so that no additional sensor is required .

To see how the sensor is mounted in detail please refer to the instruction manual from the sensor or from the helicopter . The wire with the rpm signal is connected to sensor input pin at the sideport of MICROBEAST PLUS by using the optional adapter cable BXA76401 . This sideboard also powers the sensor with the supply voltage, if necessary . Note that the height of the supply voltage corresponds to your receiver power supply voltage!

Here are some installation and connection examples . As described virtually all kinds of rpm sensors may be used . Unfortunately it is impossible to try and enumerate all types . If in doubt about whether a particular sensor can be used in conjunction with MICROBEAST PLUS ask your dealer to find out .

要讓 MICROBEAST PLUS 的 RPM 定速模式可以被使用，系統必須要能偵測到馬達的轉速。因此需要透過 RPM 感應器來協助，且 RPM 感應器的輸入必須附加至 MICROBEAST PLUS 的感應器裏面。一般引擎直昇機所使用的感應器，用來判斷磁或光的速度訊號。這些感應器安裝於曲軸或離合器旁，並紀錄引擎轉數。

電動馬達的轉速可以電子方式判定。用於此目的的相位感應器（例如 BXA76013）會連接到一個或兩個馬達相位。有些市售廠牌的電子定速器還提供一個直接輸出轉速的訊號，因此不需要額外的感應器。

感應器安裝方式請參閱您所使用之感應器或直昇機說明書。若使用選購的連接線 BXA76401 請將轉速的訊號線連接到 MICROBEAST PLUS 旁邊的感應器輸入插口。如果有必要，此插口也能提供電源給感應器。請注意，此處電壓的高低，會對應您所使用接收器電源的電壓高低而有所變動！

各種轉速感應器皆可使用於 MICROBEAST PLUS。 但因市售廠牌的感應器太多，僅舉例如下。若您想確定某些特定感應器是否可與 MICROBEAST PLUS 搭配使用，請向原購買處或經銷商諮詢。

1 ELECTRIC DRIVE SYSTEM WITH EXTERNAL PHASE SENSOR
電子式驅動系統搭配外接相位感應器

Connect the motor wires of the phase sensor with any two phases of the electric motor . It is recommended to solder those wires to the plugs of the speed controller . So for maintenance purposes it is easier to remove the motor from the model later . In some cases the use of only one phase wire is sufficient . Usually this is the case when the speed controller powers the system with a BEC thus there is no galvanic isolation between motor and receiver circuit . However, we recommend using both wires in any case! This ensures that the sensor provides an interference-free signal as possible

將相位感應器的馬達線與電動馬達的任意兩條相位線連接起來。建議將連接線焊接到定速器的插頭，這樣能夠讓馬達快速地從直昇機上取出，以方便維修。在某些情況下，只要使用一個相位就足夠了。一般來說，當 MICROBEAST PLUS 是透過定速器來啓動時，馬達和接收器電路之間是沒有電流絕緣的。無論如何，我們建議您，在任何情況下都使用兩條線！這確保感應器會盡可能提供無干擾的乾淨訊號。

The electronic speed controller is plugged into the **[CH5]** output .
定速器插入 **[CH5]** 輸出端口。

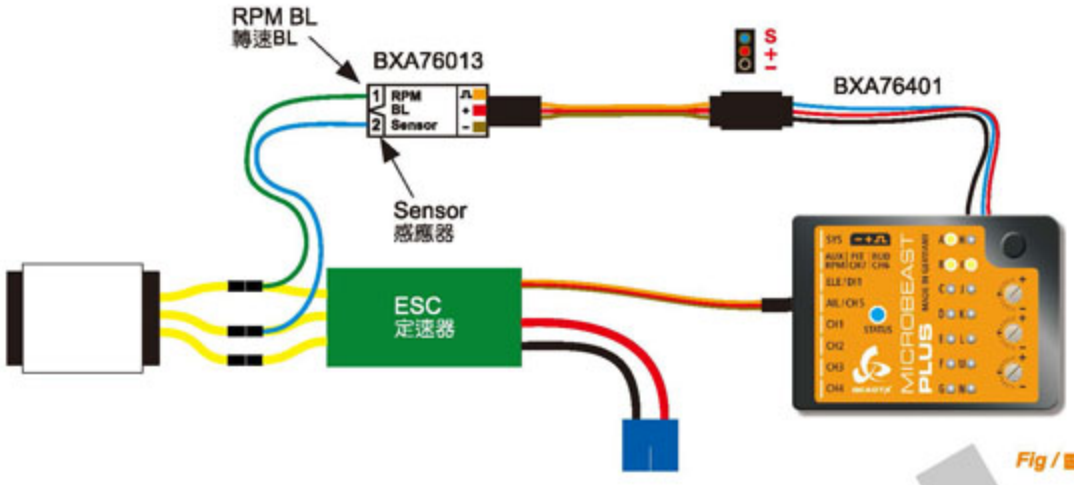


Fig / 圖示.5

2 ELECTRIC DRIVE SYSTEM WITH RPM SIGNAL OUTPUT FROM THE SPEED CONTROLLER
電動驅動系統與定速器輸出的轉速訊號

When a speed controller is used that provides a rpm signal output you can alternatively use the **[RPM] sensor input on the front connection board of MICROBEAST PLUS (lowest pin of the tripple signal input) . (RPM sensors can ‘t be connected here as this pin header does not provide any power supply!)**The speed controller ‘s signal input wire is plugged into the output [CH5] as usual .

若您的定速器可提供轉速訊號，此時，您可以選擇使用位於 MICROBEAST PLUS 連接板前方的 **[RPM] 感應器輸入端口（位置在三合一訊號輸入端口最底下的 pin）。請注意（RPM感應器不能連接到這裡，因為此處不提供電源！）定速器的訊號輸入線請和往常一樣插入[CH5] 輸出通道。**

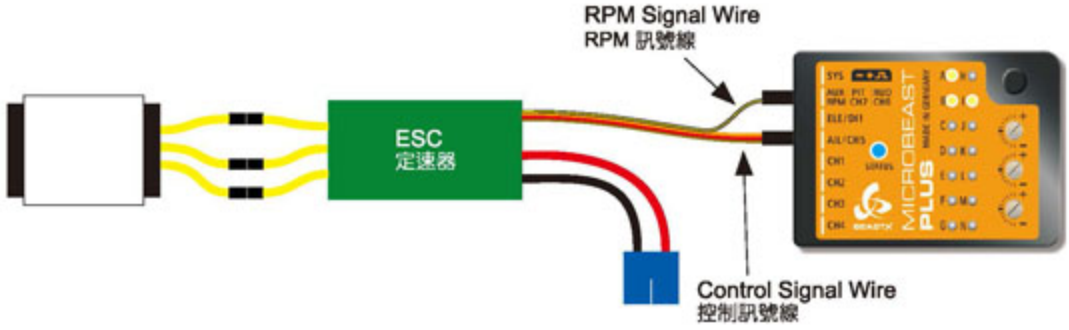


Fig / 圖示.6

3 COMBUSTION DRIVE SYSTEM(NITRO/GAS)
燃燒驅動系統(引擎)

Particularly when using sensors for combustion engines check for correct polarity of the sensor power supply on the adapter cable BXA76401. Here commonly sensors are used that are designed for governot systems from other manufactures and therefore have a special pin assignment. In this case the colors of the connecting cables may not follow the norm.(The wire colors of the ALIGN governor sesor HE50H22 are swapped for example. Here red denotes the negative and black the positive pole!)

當感應器是使用在引擎直昇機時，請特別注意感應器電源供應與連接線 BXA76401 的極性是否正確。這裡常用的感應器是專為其他廠牌的定速器系統所設計的，因此具有特殊的 pin 針分配。在這種情況下，連接線的顏色可能與標準連接方式不同。（以 ALIGN 定速感應器 HE50H22 的連接線顏色交換為例，這裡的紅色為負極而黑色為正極！）

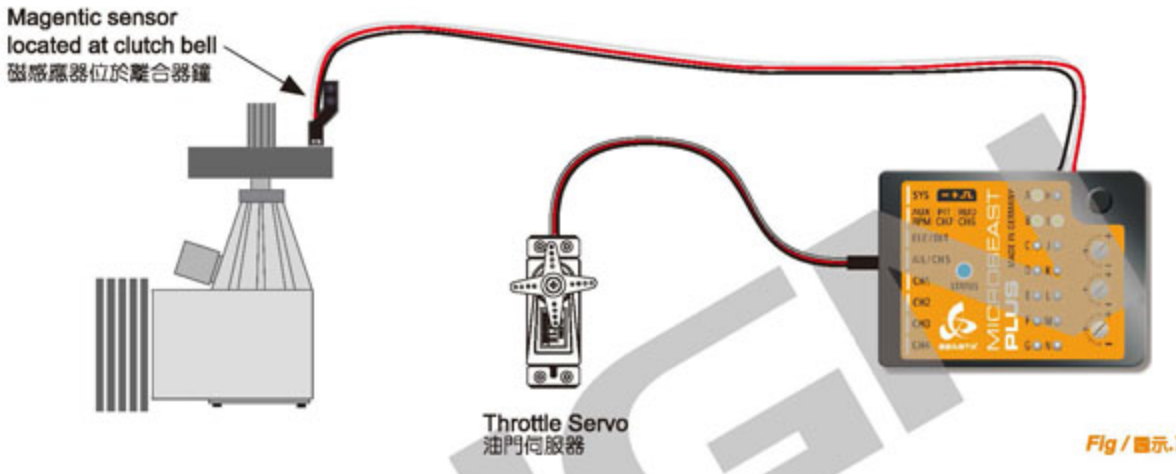


Fig / 圖示.7

At menu point A we check whether the rpm sensor is functioning properly and the rpm sensor wire is connected correctly and in general if there is a usable rpm signal . **Watch out! At this menu point the throttle channel is unlocked .** This means you have full control over the throttle output [CH5] with your remote control to control the speed controller or throttle servo .

When using an electric model it is necessary to give some gas so that the motor starts to rotate and the phase sensor or the speed controller outputs a rpm signal . Once the motor is running the Status-LED on the MICROBEAST PLUS should light up in red color .

With a nitro/gas powered helicopter you can simply rotate the clutch or engine crankshaft by hand until the signal generator (magnet or similar) passes the sensor . Whenever the signal generator is within the detection range of the sensor the Status-LED should light up in blue color .

If the Status-LED on the MICROBEAST PLUS does not light up as described please double check the wiring . Particularly pay attention whether the power wires of the sensor are of correct polarity (on some sensors the wire colors do not match the usual standard!) . If you have a magnetic sensor check if the magnets are installed with the correct polarity and if they are passing the front of the sensor close enough . Using a crankshaft sensor make sure that the sensor is mounted close enough to the frame accordingly .

請在選單第 A 點檢查轉速感應器的功能是否正常、轉速感應器的連接線是否正確，且在正常情況下，是否有一個可用的轉速訊號。請注意！油門通道在這個選單是解鎖的。這表示您可以使用遙控器來控制定速器或油門伺服器並完全控制 [CH5] 的油門輸出。

當您使用電動直昇機時，必須提供一些油門才能使馬達轉動，相位感應器或定速器才會輸出轉速訊號。一旦馬達開始運轉 MICROBEAST PLUS 的 Status-LED燈會亮起紅燈。

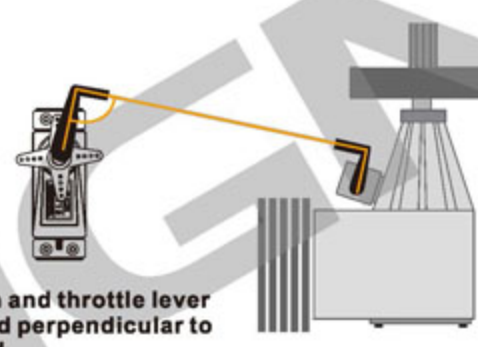
發動引擎直昇機時，您可以簡單地用手轉動離合器或引擎曲軸，直到磁性或相關訊號發出並被感應器偵測到為止。當這些訊號出現在感應器的偵測範圍內時，Status-LED燈應亮起藍燈。

如果已經按照上面的說明執行後， MICROBEAST PLUS 的 Status-LED燈並不會亮起，此時，請仔細檢查接線方法及極性是否正確。請注意，有些感應器連接線的顏色與標準可能不同。如果您使用的是磁感應器，請檢查磁鐵的極性是否安裝正確，以及訊號通過感應器時的距離是否恰當。若使用的是曲軸感應器，亦請確保感應器安裝位置是否正確。

In addition to the function control of the sensor, check the throw setting for the throttle servo in the remote control and adjust if necessary: Set the throttle to mid stick position and attach the servo horn, so that the throttle linkage is at a right angle to the servo horn . Then adjust the length of the linkage according to the instructions of the helicopter, so that it also is positioned perpendicular to the linkage lever at the carburetor . Adjust the lever at the carburetor so that it is opened halfways (note the markings on the carburetor!) . Now move the throttle stick towards full throttle and adjust the servo travel in the transmitter accordingly, so that the full throttle position is reached without binding . Lastly move both throttle stick and throttle trim on the transmitter to the"motor off" position and also adjust the servo travel in that direction until the carburetor is fully closed . If the servo travel must be greatly reduced in both directions, it is recommended that the linkage ball on the servo arm is mounted further in so that the servo can be moved over a wider range . For more information, refer to the instruction manual for your helicopter .

除了感應器的控制功能，請檢查遙控器油門伺服器行程量的設定，必要時請調整：請將油門推到中立點，裝上伺服臂，使油門連桿與伺服臂呈直角。然後根據直昇機的說明調整連桿的長度，同時它必須垂直於化油器的連桿控制臂。調整化油器控制臂時，請先將化油器開啓至一半的位置（注意化油器的標記！）。現在，將油門搖桿推到最大油門，然後調整遙控器的伺服器行程，使其在沒有對頻的情況下達到最大行程量。最後，移動遙控器的油門搖桿，微調油門到「馬達關閉」的位置，然後往同方向調整伺服器行程，直到化油器完全關閉。如果必須在兩個方向上大量減少伺服器行程時，建議您調整伺服臂球頭的位置，讓伺服器的移動範圍更大。欲了解更多訊息，請參閱直昇機的使用說明書。

Throttle at mid stick position
油門遙桿在中立點位置



Servo horn and throttle lever parallel and perpendicular to linkage rod
伺服臂及油門控制臂經由連桿互相平行並垂直

Fig / 圖示.8

Also with an electric model, the control range of throttle is crucial . Usually here the throttle endpoints of the transmitter are fixed by an initial programming of the speed controller . But also speed controller exist that require adjusting the servo throw of throttle channel in the transmitter, so that the throttle range is in accordance with the specification of the speed controller . At menu point A there is the possibility to check again whether this setting has been performed correctly . Carefully apply some gas . The motor should start to turn immediately if you move the stick just a little bit and full speed should be reached when the stick just reaches full throttle position . If the engine turns much earlier at the maximum possible speed or only starts to turn at a very high stick deflection decrease the travel of throttle channel in the transmitter or repeat the programming of the speed controller . Thus the RPM Governor of MICROBEAST PLUS can operate correctly, the motor speed should increase as linear as possible when the stick is moved and there should be no ranges in that the motor speed does not change .

使用電動直昇機時，油門的行程量是非常重要的關鍵。一般來說，遙控器上的油門行程量，是在定速器程式初始化的過程中就固定好的。在遙控器的油門通道中，定速器會被要求調整伺服器的總行程量，所以油門的行程量會依據定速器規格的不同而有所變化。在選單第 A 點，可再次檢查您的設定是否正確。並請小心增加微量的油門。如果您些微移動搖桿，馬達應該立即開始運轉。如果將搖桿推到最大行程的位置時，應該是全速，這樣 MICROBEAST PLUS 的 RPM 定速模式才能正確地發揮效能。請注意，油門的調整若有以下情形都是不正確的：馬達尚未到達最大可能速度前就高速轉動；或馬達只在非常高偏轉時，必須降低遙控器油門行程才開始轉動；或定速器一直重複初始化 。請注意，馬達轉速應盡可能是線性增加的，若油門沒有移動，馬達應該不轉動，油門行程量也應該不改變。

CAUTION 注 意

Watch Out! Electric motors rotate at high speeds . Keep a safe distance during the function test . We highly recommend to remove the motor from the main gear . However, please observe the manufacturer ‘s specifications of the motor . Some motors may not be operated without load . In this case only let the motor run for a short time or let the motor stay attached to the main gear and only remove the main and tail rotor blades (Warning! Increased risk of injury) .

If in doubt, do without the function test or throw adjust of the throttle stick .

請小心！高速旋轉的電動馬達。

在任何功能測試時請保持安全距離。我們強烈建議移除主齒輪上的驅動齒輪。但是，請仔細查看馬達原廠的規格。有些馬達的設計，在無負載時可能不會運轉。 在這種情況下，只能讓馬達短暫運轉，或測試時移除主旋翼及尾旋翼（警告！這有受傷的危險！）。

如果有疑問，請不要測試此項功能或調整油門行程量。

Briefly push the button to save the configuration and to proceed to menu point B .
按下按鈕保存當前設定，並進入設定選單第 B 點。

B MOTOR OFF/IDLE POSITION
馬達開啓/關閉位置

Menu point B is used to set the lowest throttle position . Watch Out! Output [CH5] can be directly controlled by the throttle stick .

Using an electric model bring the throttle stick to the position at which the motor just does not start . If the stick throw has been correctly adjusted as described at menu point A (or the speed controller has been programmed to the stick throws), the necessary gas position should be achieved at the lowest position of the throttle stick . Some speed controllers provide a special mode that allows for a quick start-up in case of aborting an autorotation landing . Here there is a larger area between the actual"motor off" position of the speed controller and the point at which the motor actually starts . Also in this case move the throttle stick to the point at which the motor is just before to start, so that MICROBEAST PLUS can determine the effective throttle range correctly .

With a nitro/gasser model you bring the throttle stick to idle position or a slightly increased idle position (not"motor off"!), so MICROBEAST PLUS can determine the effective throttle range in the next step . Using the RPM Governor without an auxiliary channel to control the RPM Governor as described in chapter 4, this position additionaly will be used as idle position when performaning an autorotation maneuver . So you should set the throttle as high as necessary so the motor will have a stable run and doesn't quit when performing the autorotation .

在選單第 B 點設定油門最低行程量。注意! 可由油門搖桿直接控制 [CH5] 的輸出。

使用電動直昇機時，請將油門搖桿推到馬達未開啓的位置。如果搖桿行程量有依照設定選單第 A 點正確地調整（或定速器有搖桿行程編程），此時油門應該在油門搖桿最低行程量的位置。有些定速器有特殊模式功能，在直昇機異常停止轉動並著陸時，可以快速啓動馬達。定速器實際的「馬達關閉」與實際「馬達開啓」的位置之間有些許差距。在這種情況下，請將油門搖桿推到馬達開啓之前的位置，使 MICROBEAST PLUS 能夠正確地判斷有效油門範圍。

使用引擎直昇機時，請將油門搖桿推到最低油門位置或稍微增加怠速位置（而不是“馬達關閉”），以便讓 MICROBEAST PLUS 在下個步驟確定油門的有效範圍。可以在沒有輔助通道下使用 RPM 定速模式，請參閱第 4 章說明。此外，在執行熄火(降落)特技動作時，這個位置將被另外用作怠速位置。所以設定油門最大行程是必須的，這樣馬達將穩定地運行且不會在熄火(降落)時熄火。

When setting the low throttle position make sure the Status-LED lights up in **blue** lights color (both **electrical as well as nitro**) . This means that a new valid throttle position has been detected . If the Status-LED lights up in **red** then the throttle stick is too close to the throttle stick center position, which is not considered optimal and therefore can not be used as throttle position . In this case check the setting of the transmitter and the programming of the speed controller or readjust throttle servo, carburetor position and throttle linkage rod .

無論是電動或是引擎直昇機，在設定油門最低行程量時，請確認 Status-LED燈是亮藍色的。這代表檢測到一個新的有效油門位置。如果 Status-LED燈為紅色，而且油門最低行程量(油門最低點)太靠近油門遙桿中心點，表示這裡並不是也不能設為油門的最低行程量。如發生這種情況，請檢查遙控器的設定、定速器的編程，或重新調整油門伺服器、化油器位置，和油門連桿是否正確。

When entering menu point B the Status-LED is **off** . As long as you do not move the throttle stick, the currently stored position will not be changed . So you can skip menu point B by a brief push of the button without changing the throttle position when performing subsequent adjustments in Setup menu or Governor menu . Conversely this means that you need to move the throttle stick at menu point B at least once to change the current throttle position!

當進入選單第 B 點時， Status-LED燈會呈現熄滅狀態。只要不移動油門搖桿，當前儲存的位置就不會改變。所以在執行設定選單或定速選單一連串的調整時，您可以在不改變油門位置下輕按按鈕跳過選單第 B 點。相反地，這表示在選單第 B 點中，您需要至少移動油門搖桿一次，來改變當前油門位置！

Briefly push the button to save the configuration and to proceed to menu point C .
按下按鈕保存當前設定，並進入設定選單第 C 點。

C FULL THROTTLE POSITION
油門最大行程量

At menu point C you have to set full throttle position of your ESC or throttle servo . Here the output [CH5] can be only controlled by the throttle stick when the RPM Governor type is set to"nitro" . In"electric" mode the throttle output will stay locked to your low throttle value . So you can set the full throttle position quite comfortable without the motor running high . Otherwise there are no differences between the modes"electric" and"nitro" .

Move the throttle stick to full throttle position . The Status-LED must light up in **blue** color . This means that a new valid throttle position has been detected . If the Status-LED lights up in **red** the distance between the lowest throttle position and the full throttle position is too small . Since this will have a negative effect on the control behavior of the system, this throttle position can not be used . In this case check the setting of the transmitter and the programming of the speed controller or readjust throttle servo, carburetor position and throttle linkage rod . If necessary, set the lowest throttle position at menu point B again .

在選單第 C 點，您必須為 定速器或油門伺服器設定油門最大行程量。當 RPM定 速模式設置為「引擎模式」時，這裡的 [CH5] 輸出僅能以油門搖桿控制。在「電動模式」下，油門輸出的值將被鎖定在您先前所設定的最低行程量。這樣，在適當的相對位置設定油門最大行程量時，就不需調高馬達轉速。除此之外，「電動模式」和「引擎模式」在此功能下是沒有差異的。

移動油門搖桿到油門最大行程時， Status-LED燈必須亮起藍色。這代表檢測到一個新的有效油門位置。如果 Status-LED燈亮起紅色，表示油門的最低/最大行程量的間距太小。這樣會讓系統誤判而產生負面效果，因此不能使用這個錯誤的油門位置。若亮起紅燈，請檢查遙控器的設定、定速器的編程，或重新調整油門伺服器、化油器和油門連桿的位置是否正確。如有必要，請重新設定選單第 B 點的油門最低行程。

Similar to menu point B the Status-LED is **off** when entering menu point C . As long as you do not move the throttle stick, the currently stored position will not be changed . So you can skip menu point C by a brief push of the button without changing the throttle position when performing subsequent adjustments in Setup menu or Governor menu . Conversely this means that you need to move the throttle stick at menu point C at least once to change the current full throttle position!

進入選單第 C 點與選單第 B 點的情況類似，Status-LED燈會呈現熄滅狀態。只要不移動油門搖桿，當前儲存的位置就不會改變。所以在執行設定選單/定速選單等一連串的調整時，您可以在不改變油門位置下輕按按鈕跳過選單第 C 點。相反地，這表示在選單第 C 點中，您需要至少移動油門搖桿一次，來改變當前油門位置！

Briefly push the button to save the configuration and to proceed to menu point D .

按下按鈕保存當前設定，並進入設定選單第 D 點。

D ADJUSTING THROTTLE CURVES IN THE TRANSMITTER
遙控器的油門曲線調整

Similar to menu point A, menu point D only serves to give you some status information . At menu point D the different activation points of the RPM Governor will be displayed based on color and state of the Status-LED . So you can prepare your transmitter for use with the RPM Governor function . The information conveyed by the Status-LED is basically the same in every Governor operation mode . However, the setup of the transmitter will be slightly different, depending on whether the mode"electric" or"nitro" is used .

與選單第 A 點類似，選單第 D 點僅能提供一些狀態資訊給您。在選單第 D 點 RPM 定速模式中，不同的啓動點是根據Status-LED燈所顯示的顏色而定。所以，您可以在遙控器上使用 RPM 定速模式。Status-LED燈號所顯示的訊息，基本上與每一個定速器的操作模式相同。但是，遙控器的設定會因為「電動模式」或「油門模式」而有所不同。

1 ELECTRIC
電動模式

In"electric" mode the speed controller is no longer controlled by the pilot via the transmitter . MICROBEAST PLUS takes over full control of the speed controller . With the transmitter you only specifiy the desired rotor rpm you want the helicopter to maintain . When setting an rpm higher than zero, MICROBEAST PLUS will speed up the rotor smoothly and ensure that the rotor rpm is kept constant throughout the flight . To practice autorotation landings, you can keep MICROBEAST PLUS in a special mode that causes the speed controller to be switched off during the maneuver but speed up the rotor rpm faster when aborting the autorotation (faster than with the initial soft start) .

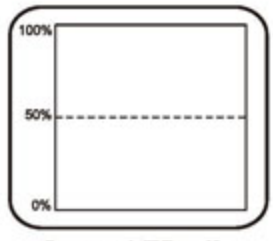
在電動模式下，定速器不再由遙控器控制。 MICROBEAST PLUS會完全介入定速器的控制。此時遙控器只負責將直昇機維持在一個您想要的轉速。當轉速設定大於零時， MICROBEAST PLUS 將平順地增加馬達轉速，並讓轉速在整個飛行過程中保持穩定。若想練習自旋降落，您可以將 MICROBEAST PLUS 維持在一個特殊模式，使定速器在做特技動作時被關閉，但馬達的轉速會在熄火(降落)模式時加快速度（比緩起動快）。

The rotor rpm is set via the throttle channel of the transmitter . You may use the transmitter's throttle curves for instance, so you can switch the motor on and off and pretend different speeds using the flight mode system of the transmitter . Instead of curves you only have to set horizontal lines so that the rotor rpm value does not depend on the throttle stick position but is fixed in each flight mode . The flight mode switch then acts as a switch that switches between different speed settings .

馬達轉速是經由遙控器的油門通道而設定的。以遙控器的油門曲線為例，您可以利用油門通道來開啓/關閉馬達，以及利用遙控器上的飛行模式系統，模擬不同的轉速。除了馬達轉速外，您只需要設定水平曲線，那樣馬達轉速就不會受油門搖桿位置的影響而有所變動，且在不同的飛行模式下，馬達轉速都會是固定的。所以切換不同的飛行模式，可用來當作一個切換不同速度的開關。

Normal flight mode
- Motor off
- Throttle is 0% over the entire range

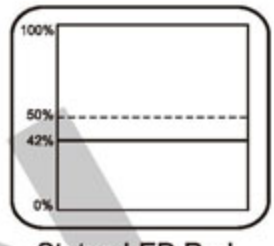
一般飛行模式
- 馬達關閉
- 全部範圍的油門=0%



Status-LED off
Status-LED 熄滅

Idle up 1
- RPM Governor enabled
- 1680 rpm = 42% throttle

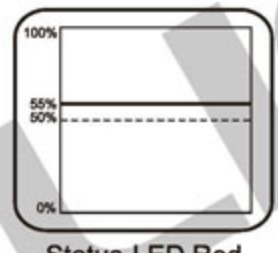
Idle up 1
- RPM定速模式啓用
- 1680 rpm = 42% 油門



Status-LED Red
Status-LED 紅燈

Idle up 2
- RPM Governor enabled
- 2200 rpm = 55% throttle

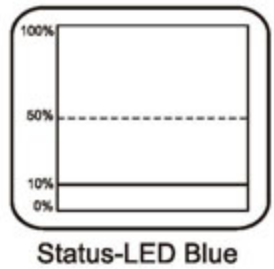
Idle up 2
- RPM定速模式啓用
- 2200 rpm = 55% 油門



Status-LED Red
Status-LED 紅燈

Autorotation
- RPM Governor on standby
- Motor off

熄火(降落)
- RPM定速模式待機
- 馬達關閉



Status-LED Blue
Status-LED 藍燈

In"electric" mode the adjustable throttle range is 3400 rpm/min . The lowest rotor speed that can be set is 600rpm/min, the maximum speed is 4000rpm/min . To enable autorotation bail out mode the throttle must be set to a value between 5% and 15% .

在電動模式下，可調整油門行程為 3400 rpm /分。最低的轉速可以設定為 600 rpm /分，最大轉速為 4000 rpm /分。啓動熄火(降落)失控保護模式，油門必須設定值在 5% 至15% 之間。

Throttle position 油門位置		Rotor RPM	Status-LED Status-LED燈
Futaba	Spektrum		
100	100%	4000	Purple 紫色
90	95%	3800	Red 紅色
80	90%	3600	
70	85%	3400	
60	80%	3200	
50	75%	3000	
40	70%	2800	
30	65%	2600	
20	60%	2400	
10	55%	2200	
0	50%	2000	
-10	45%	1800	
-20	40%	1600	
-30	35%	1400	
-40	30%	1200	
-50	25%	1000	
-60	20%	800	
-70	15%	600	
-80	10%	Motor off/ Autorotation 馬達關閉/熄火(降落)	Blue 藍色
-90	5%		
-100	0%	Motor off 馬達關閉	Off 熄滅

＊The list is not exhaustive. Intermediate values result accordingly.

＊無法列出全部數值，因此以中間值顯示。

2 NITRO
引擎模式

In"nitro" mode the throttle servo can be controlled entirely via the throttle channel of the remote control as long as the RPM Governor is switched off . Only when the RPM Governor is switched on, this will control the throttle servo to spool up the rotor to the desired speed (if this is not yet reached) and ensure that the rotor speed is maintained during the flight . The manual throttle control is especially necessary to start and warm up the engine as well as to stop the engine after flight . Also some model engines react very sensitive in the lower throttle sector and too abrupt engagement can cause the engine to quit, i .e . when the clutch is not fully engaged and/or the rotor is not yet turning . In this case a manual throttle control can be of advantage as the pilot can run the engine to speed by hand before control is passed over to the RPM Governor .

Depending on whether an auxiliary channel was assigned to control the RPM Governor in Receiver setup menu or not, the RPM Governor is either controlled separately via this channel or you can control both RPM Governor and throttle servo alone by using the throttle channel of the transmitter . In general the adjustable throttle range in"nitro" mode is 2400 rpm/min . The lowest head speed to govern is 600 rpm/ min, the maximum head speed is 3000 rpm/min .

If a separate control channel is used for the RPM Governor the throttle servo can be controlled as usual via throttle channel and throttle curves of the transmitter . By switching the separate control channel in different positions, the RPM Governor can be activated and the desired rotor rpm can be preset . Note that for safety reason the throttle channel has priority over the RPM Governor when the output is below 25% . So you can always control the lower throttle servo positions by hand, even if the RPM Governor is already switched on . Then when the throttle is raised above 25% the RPM Governor intervenes and spools up the rotor . Also when you want to bring the throttle servo to idle position for autorotation or to shut off the engine you can always do this, regardsless of how the RPM Governor is switched . Anyhow keep in mind that MICROBEAST PLUS will be set to autorotation bail out mode if the RPM Governor is switched on and the throttle channel is brought below 25% . When throttle then is increased again, the RPM Governor will speed up the rotor faster than on initial spool up! Therefore if you make a stopover and the rotor is completely stopped, the RPM Governor must be completely disabled once by using the separate control channel . So the RPM Governor is reset and will perform an initial startup again . Otherwise if autorotation mode would still be active, the helicopter may tip over due to the abrupt speed up (this does not apply if you set the bail out spool up rate at Parameter menu point K as high as the initial spool up rate - see chapter 8) .

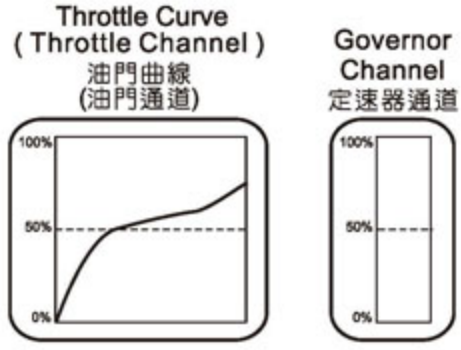
在引擎模式下，只要 RPM 定速模式關閉，便可利用遙控器的油門通道來控制整個油門伺服器。只有當 RPM 定速模式開啓時， MICROBEST PLUS 才能控制油門伺服器、轉動引擎，並將轉速提升至所設定的速度(或轉速尚未達到所設定的速度)，請確定引擎轉速在飛行過程中能保持穩定。手動油門控制需要特別注意引擎預熱、啓動，以及在飛行後引擎關閉等等問題。有些廠牌的引擎在油門較低點時，反應非常敏感，例如：當離合器未完全嚙合或引擎尚未轉動時，太突然的動作可能導致引擎熄火。在這種情況下，手動控制油門就比較有優勢了，因為飛手可以在控制指令傳遞到RPM定速模式前，以手動來控制引擎的轉速。

油門通道是否同時/分開控制油門伺服器及 RPM定速模式，取決於您在接收器設定選單中，是否將輔助通道分配給RPM定速模式使用。一般而言，在引擎模式中可調整的油門行程為 2400 rpm/min。最低頭速定速在 600 rpm/min，最高頭速為 3000 rpm/min。

如果將 RPM 定速模式分配在一個獨立的控制通道，油門通道和遙控器的油門曲線便可以控制油門伺服器。藉由在不同的位置上切換此獨立的控制通道，可開啓 RPM 定速模式，且可預設轉速。請注意，基於安全理由，當輸出低於 25% 時，油門通道優先於 RPM 定速模式。即使 RPM 定速模式已經開啓，您仍然可以隨時手動控制油門最低點。當油門提高至 25% 以上，MICROBEAST PLUS 會干預 RPM 定速模式並增加引擎轉速。此外，當您在執行熄火(降落)或關閉引擎時，可以隨時將油門伺服器調到油門最低點，因為這並不會開啓 RPM定速模式。總之請記住，如果開啓 RPM 定速模式且油門通道低於 25%，MICROBEAST PLUS 將被設定為熄火(降落)失控保護模式。當油門再次增加，RPM 定速模式會加速馬達，且其轉速會比平常要高！因此，如果您在飛行的過程中，有一個停頓點且馬達轉速完全停止，此時請注意，您必須「停用」 RPM 定速模式，並確實執行一次。之後，系統會重新設定並初始化 RPM 定速模式。否則，熄火(降落)模式仍然處於開啓狀態，直昇機可能會因為突然加快而翻倒（這並不適用於如果您在參數選單第 K 點設定保護加速率與初始加速率一樣高時- 請參閱第8章）。

Normal flight mode
- Throttle curve controls throttle
- RPM Governor off

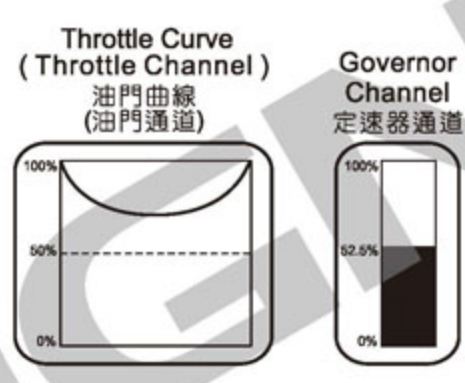
一般飛行模式
- 油門曲線控制油門
- RPM定速模式關閉



Status-LED off
Status-LED 熄滅

Idle up 1
- RPM Governor on
- 1800 rpm = 52 .5%

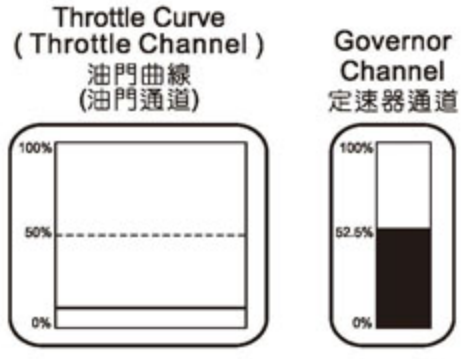
Idle up 1
- RPM定速模式開啓
- 1800 rpm = 52 .5%



Status-LED Red
Status-LED 紅燈

Autorotation
- RPM Governor on standby
- Increased idle position

熄火(降落)
- RPM 定速模式待機
- 增加 idle位置



Status-LED Blue
Status-LED 藍燈

Throttle position 油門位置		
Futaba	Spektrum	
100	100%	Manual control/ RPM control 手動控制/ RPM 定速模式
90	95%	
80	90%	
70	85%	
60	80%	
50	75%	
40	70%	
30	65%	
20	60%	
10	55%	
0	50%	
-10	45%	
-20	40%	
-30	35%	
-40	30%	
-50	25%	
-60	20%	Manual control/ Autorotation 手動控制 /熄火(降落) 模式
-70	15%	
-80	10%	
-90	5%	
-100	0%	

Rotor RPM*	Status-LED Status-LED燈
3000	100
2874	90
2747	80
2621	70
2495	60
2368	50
2242	40
2116	30
1989	20
1863	10
1737	0
1611	-10
1484	-20
1358	-30
1232	-40
1105	-50
979	-60
853	-70
726	-80
600	-90
aus	-100

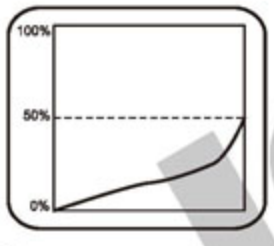
* The list is not exhaustive. Intermediate values result accordingly.
* 無法列出全部數值，因此以中間值顯示。

If no separate control channel is used for the RPM Governor, throttle servo and RPM Governor are solely controlled by the throttle channel . For this purpose the control range of the throttle channel is divided into two parts: Below the center position, the throttle servo is controlled manually by the throttle channel . The RPM Governor is switched off and the servo output range is doubled, so that the throttle servo can be moved over the entire range . Once the throttle channel is moved (switched) to the upper area, the RPM Governor will activate, spool up the rotor and try to hold the preset rpm . Similar as it was described above for electric models you make the throttle curve a horizontal line, so that regardless of the position of the throttle stick MICROBEAST PLUS will always see the same throttle value and so the preset rpm will stays the same . So at least two flight phases are necessary . One that the throttle curve goes only up to the middle and in which the motor can be controlled by hand, i .e . for starting the motor and one flight phase that activates the RPM Governor and the throttle curve is used to preset the desired rotor head speed .

如果 RPM 定速模式沒有被分配到獨立的控制通道，油門伺服器和 RPM 定速模式僅能由油門通道控制。因此為了配合這樣的結果，MICROBEAST PLUS 將油門通道的控制行程分成兩個部分：在中心位置下面，油門伺服器由油門通道手動控制。RPM定速模式被關閉而伺服器輸出行程加倍，從而使油門伺服器可以在整個行程內移動。一旦油門通道被移動（切換）到上方位置，RPM 定速模式將被開啓，此時系統會將馬達轉速增加，並嘗試將轉速維持在預設值。和之前介紹的電動模型類似，請將油門曲線設成水平曲線，這樣就不用管油門搖桿位置，MICROBEAST PLUS 會看到相同的油門值並維持預設轉速。所以必須至少有兩個飛行階段。其中油門曲線僅達到中間值且馬達可以用手動控制，例如：為了啓動馬達及一個飛行階段而開啓 RPM 定速模式和油門曲線被預設在所需的轉速。

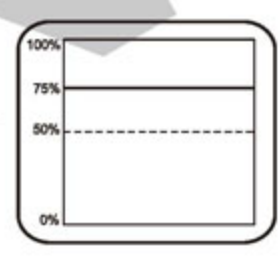
Normal flight mode
- RPM Governor off
- Throttle stick controls throttle servo

一般飛行模式
- RPM定速模式關閉
- 油門搖桿控制油門伺服器



Idle up 1
- RPM Governor on
- 1800 rpm = 75%

Idle up 1
- RPM 定速模式開啓
- 1800 rpm = 75%

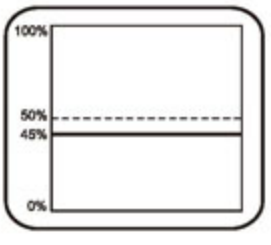


A third flight mode is used for autorotation: Here the throttle channel is constantly set to a value close below center position (between 40% and 50%) . When you switch to this flight mode once the governor was active, the throttle servo will be moved to the idle position set at menu point B . When switching back to governor mode, i .e . when you want to bail out from autorotation, the rotor will be spooled up at an increased rate (this does not apply if you set the bail out spool up rate at Parameter menu point K as high as the initial spool up rate - see chapter 8) . Alternatively if it is switch back to the flight phase with manual control, autorotation mode is canceled and the next time you switch on the RPM Governor, the rotor is spooled up slowly .

第三種飛行模式為熄火(降落) 模式：在這裡，油門曲線將被設定低於中間值（40% 至 50% 之間）。當您切換到此飛行模式時，一旦開啓 RPM定 速功能，油門伺服器將被設定到油門最低點(參考選單第 B 點)。若想脫離熄火(降落) 模式，而切換回定速模式模式時，系統將以一個加速率提高馬達轉速來回應（若您已在參數選單第 K 點，將保護加速率與初始加速率，設定成同樣高時並不適用- 請參閱第8章）。您也可以切換到手動控制模式來脫離熄火(降落) 模式，且下次再切換到 RPM 定速模式時，馬達轉速會緩慢增加。

Autorotation
- RPM Governor on standby
- Increased idle position

熄火(降落)模式
- RPM 定速模式待機
- 增加 idle位置



＊Only effective when RPM Governor was active before.

＊僅在 RPM 定速模式啓動前有效。

Throttle position 油門位置		Rotor RPM	Status-LED Status-LED燈
Futaba	Spektrum		
100	100%	3000	Purple 紫色
90	95%	2760	Red 紅色
80	90%	2520	
70	85%	2280	
60	80%	2040	
50	75%	1800	
40	70%	1560	
30	65%	1320	
20	60%	1080	
10	55%	840	
0	50%	600	
-10	45%	Motor off/ Autorotation 馬達關閉/熄火(降落)	Blue 藍色
-20	40%		
-30	35%	Manual controlf 手動模式	Off 熄滅
-40	30%		
-50	25%		
-60	20%		
-70	15%		
-80	10%		
-90	5%		
-100	0%		

＊The list is not exhaustive. Intermediate values result accordingly.

＊無法列出全部數值，因此以中間值顯示。

E DIVIDER FOR RPM INPUT SIGNAL
轉速訊號分配表

When using electric motors the rpm sensor signal usually consists of the (electric) field speed . In order to obtain the actual engine speed the field speed must be divided by half the number of motor poles . Using a 2-pole motor thus the measured speed corresponds to the motor speed . With a 10-pole motor on the other hand the field speed is five times higher than the actual speed .

Also for nitro/gas engines the measured speed of the sensor may be higher than the actual speed . For example when a magnetic sensor is installed and more than one magnets are used for measuring the rotational speed, the rpm output will be multiplied by the number of magnets . So when two sensor magnets are used the rpm signal from the sensor will be twice the engine revolutions .

At menu point E you must specifiy the factor by how much the incoming rpm signal must be divided to get the actual motor rpm . The currently selected division factor is represented by the color of the Status- LED . Use the rudder stick to switch between options .

使用電動馬達訊號感應器時，馬達的轉速訊號通常由電場速度(Electric Field Speed) 所構成。為了取得馬達實際轉速，所測得的電場速度必須以馬達極數除以 2 來計算。用一個 2 極馬達就可測得相對應的馬達轉速。若使用一個 10 極馬達，其電場速度會比實際高 5 倍。

引擎訊號感應器所測量的速度可能比實際速度更高。例如，安裝一個磁感應器，其所量測轉速的磁鐵數量高於一個時，其輸出的轉速必須除以所使用的磁鐵數量。因此，當感應器偵測的訊號是由兩個磁鐵所發出的，則轉速訊號將會是引擎轉數的兩倍。

在選單第 E 點，您必須參考「轉速訊號分配表」選擇您所使用馬達極數所相對應的燈號，來取得正確的馬達轉速。Status-LED燈的顏色表示當前選擇的馬達極數。以移動尾舵搖桿進行選項切換。

Status-LED Status-LED燈	Divider 轉速訊號分配表
Off 熄滅	No Division (2 motor poles or 1 magnet) 不須分配 (2 motor poles or 1 magnet)
Purple Flashing 紫色閃爍	2 (4 motor poles or 2 magnets)
Purple 紫色	3 (6 motor poles)
Red Flashing 紅色閃爍	4* (8 motor poles)
Red 紅色	5 (10 motor poles)
Blue Flashing 藍色閃爍	6 (12 motor poles)
Blue 藍色	7 (14 motor poles)

＊Factory Setting ＊出廠預設值

Briefly push the button to save the configuration and to proceed to menu point F .
按下按鈕保存當前設定，並進入設定選單第 F 點。

The motor poles of an electric motor can be easily determined by counting the number of magnets built into the motor housing . Each magnet corresponds to one magnetic pole . Note that on some motors pairs of magnets are used rather than one single large magnet . These pairs together form just one magnetic pole! If in doubt refer to the datasheet of the motor or ask the manufacturer or your local dealer .

To determine the number of magnets that are used for a magnetic rpm sensor in a nitro helicopter, you can use menu point A . Each time a magnet passes the sensor the Status-LED will light up in blue color there, i .e . when you turn the clutch bell by hand . So you simply count how often the Status-LED lights up during one rotation . Then this is the divider you have to set a menu point E .

電動馬達極數可以簡單地透過計算馬達內置的磁鐵數量來確定。每個磁鐵對應一個磁極。請注意，某些品牌的馬達，磁鐵數量必須要配對計算，而這些配對的磁鐵構成一個磁極！如有疑問，請參考該馬達數據表，或詢問製造商/當地經銷商。

當磁感應器使用在引擎直昇機上時，要如何判斷磁鐵數量? 參考選單第 A 點，請用手轉動離合器鐘(Clutch Bell)，每次磁鐵經過感應器時， Status-LED燈會亮起藍燈，所以，您只要計算轉動一圈， Status-LED燈會亮起多少次藍燈即可。然後在選單第 E 點轉速設定分配表中輸入對應的燈號。

FGH DIVIDER FOR MAIN GEAR RATIO
選單第 F / G / H 點之主齒輪比分配表

The RPM Governor of MICROBEAST PLUS in general calculates with the rotor head speed of the helicopter . So (as shown at menu point D) you can set the desired head speed very easily and MICROBEAST PLUS will try to maintain this headspeed as close as possible . Thus the detected rotation speed of the motor can be converted into rotor head speed, you must specify the main gear ratio of the helicopter . This is done at menu points F, G and H . Menu point F sets the number of gear ratio before the decimal point, menu points G and H specify the first two decimal places . Compare the following table and set the Status-LED to the corresponding color and condition at each menu point so the desired gear ratio will result as a combination of all three menu points . The ratio can be adjusted in increments of 0 .05 . Choose the ratio that is the closest for your helicopter and set the menu points one after the other .

一般來說，MICROBEAST PLUS的 RPM 定速模式可同時計算直昇機的頭速，而且 MICROBEAST PLUS 會將直昇機的頭速盡量保持在您的設定值內。只要馬達轉速在指定的主齒輪比下，就可以簡單地設定您所需的頭速，請參閱選單第 D 點。並在選單第 F、G、H 點下設定完成。先在選單第 F 點設定「齒輪比」小數點前的數字，接著在選單第 G 和 H 點設定小數點後兩位數。請參閱下表，並設定 Status-LED燈所對應的每個選單點的顏色和狀態，三個選單將組合出您所需的齒輪比。其比例的調整請以 0.05 的幅度來增加。請選擇最接近於您直昇機的比率，並按照選單點依序設定。

The gear ratio should be specified in the instruction manual for your helicopter . Especially with electric models it will vary depending on the motor pinion used . For helicopters with a single-stage gear drive the reduction can be calculated by dividing the number of pinion teeth from the main gear tooth count .

Example: Shape S8 - Main gear tooth count 130 teeth / 15 tooth pinion . Gear ratio ca . 8,67:1 .F - Status-LED purple flashing, G - Status-LED red flashing, H - Status-LED purple flashing.

直昇機說明書中應該有註明齒輪比。特別是電動直昇機的齒輪比會因其驅動齒輪的不同而有所變化。若使用單一主齒輪的直昇機，可從主齒輪齒數來推算出驅動齒輪的齒數。

例如:形狀 S8-主齒輪齒數 130 齒 / 驅動齒輪 15 齒。齒輪比為 ca . 8,67:1。選單第 F 點 -Status-LED燈紫色閃爍，選單第 G 點-Status-LED燈紅色閃爍，選單第 H 點-Status-LED燈紫色閃爍。

To proceed to the each menu point briefly push the button . After menu point H the initial setup is finished and the button press will lead back to operation mode .

只要簡單地按下按鈕，就可以前往各個選單選項。選單第 H點初始設定完成後，按下按鈕回到操作模式。

1 MAIN GEAR RATIO - X .YZ : 1
主齒輪比- X .YZ : 1

Menu point F
選單第 F 點

Status-LED Status-LED燈	X
Off 熄滅	user defined 使用者自訂義
Purple Flashing 紫色閃爍	8
Purple 紫色	9*
Red Flashing 紅色閃爍	10
Red 紅色	11
Blue Flashing 藍色閃爍	12
Blue 藍色	13
Red/Blue Flashing 紅色/藍色閃爍	14

Setting the option"user defined" at menu point F you can choose a custom gear ratio that can be edited by using the StudioX software and the optional USB2SYS interface . This allows to choose ratios smaller than 8 .00:1 or greater than 14 .95:1or that are not a multiplier of 0 .05 . In this case the menu points G and H will be skipped when the button is briefly pressed at menu point F .

在選單第 F 點設定「使用者自訂義」，可以自定義齒輪比，允許您使用 StudioX 軟體介面(另購品 USB2SYS)，直接在電腦上進行編輯。這允許選擇比率小於 8.00：1 或大於 14.95:1或是非 0.05倍數的比率。若使用 StudioX 軟體介面，可以在選單第 F 點按下按鈕略過選單第 G 和 H 點。

Menu point G
選單第 G 點

Menu point H
選單第 H 點

Status-LED Status-LED燈	YZ	Status-LED Status-LED燈
Off 熄滅	.00	Off 熄滅
Off 熄滅	.05	Purple Flashing 紫色閃爍
Off 熄滅	.10	Purple 紫色
Off 熄滅	.15	Red Flashing 紅色閃爍
Purple Flashing 紫色閃爍	.20	Off 熄滅
Purple Flashing 紫色閃爍	.25	Purple Flashing 紫色閃爍
Purple Flashing 紫色閃爍	.30	Purple 紫色
Purple Flashing 紫色閃爍	.35	Red Flashing 紅色閃爍
Purple 紫色	.40	Off 熄滅
Purple 紫色	.45	Purple Flashing 紫色閃爍
Purple 紫色	.50*	Purple 紫色
Purple 紫色	.55	Red Flashing 紅色閃爍
Red Flashing 紅色閃爍	.60	Off 熄滅
Red Flashing 紅色閃爍	.65	Purple Flashing 紫色閃爍
Red Flashing 紅色閃爍	.70	Purple 紫色
Red Flashing 紅色閃爍	.75	Red Flashing 紅色閃爍
Red 紅色	.80	Off 熄滅
Red 紅色	.85	Purple Flashing 紫色閃爍
Red 紅色	.90	Purple 紫色
Red 紅色	.95	Red Flashing 紅色閃爍

7 USAGE OF RPM GOVERNOR
RPM 定速模式之使用方式

ALIGN

In general the RPM Governor can only be switched on when MICROBEAST PLUS is ready for operation .During the initialization phase the signal from the throttle channel is passed directly to the throttle servo . Therefore (especially with electric models) make sure that during the initialization the throttle channel is set to"motor off" position at the transmitter (not"Autorotation"!) .

Note that if your receiver does not send a valid control signal to MICROBEAST PLUS within two seconds after power up, the throttle channel will be locked for security reasons . In this case **[CH5]** output will be set to motor failsafe position (set at Receiver menu point N) . Only when MICROBEAST PLUS gets a valid signal from the receiver and the throttle stick is moved to the failsafe position (or below) the throttle channel will be unlocked .

As described above at Governor menu point D set your throttle curves or the auxiliary channel in the various flight modes so the desired head speed will approached and observed . Keep in mind that the head speed should not be higher than 80% of the maximum head speed that is possible with this motor and this gear ratio . If the chosen head speed is too high, the RPM Governor will constantly give full throttle input and no effective govering will be possible because there is not enough room left to open the throttle for compensate of rotor head load .

With nitro helicopters always ensure that the RPM Governor is disabled when you start the model . Otherwise the RPM Governor would drive the throttle servo up to the full throttle position and stay there as it tries to reach the demanded head speed . So always check the throttle servo position before starting the engine very carefully!

Some transmitters offer a special setting that allows to automatically switch the auxiliary governor channel together with the flight mode switch . So the motor can be started in the first flight mode, you can spool up the rotor by applying throttle manually and hover the helicopter . With the second flight mode the throttle curve is switched to a"V"-shaped curve and simultaneously the RPM Governor is turned by the auxiliary channel . In this case pay special attention that the two throttle curves overlap as good as possible in the point at which the transfer between the two flight modes takes place . Otherwise the throttle servo would make a jump before the RPM Governor will take over control as you still may be in manual mode for a short amount of time . So in this type of operation it is not possible to activate the RPM governor from the get go and let the rotor spool up autonomously . If you want this, you must activate the RPM Governor before switching to your second flight mode!

一般只有在 MICROBEAST PLUS 準備就緒下，才可以開啓 RPM 定速模式。在初始化階段，油門通道的訊號會直接傳遞到油門伺服器。因此，（特別是電動直昇機）請確保在初始化過程中，遙控器的油門通道設定的是「馬達關閉」而非「熄火(降落) 模式」。

需要注意的是，如果您的接收器在開機後兩秒鐘內，沒有發出有效的控制訊號給 MICROBEAST PLUS，基於安全理由油門通道將被鎖定。在這種情況下，**[CH5]** 輸出將被設定至馬達失控保護位置（在接收器選單第 N 點設定）。只有當 MICROBEAST PLUS 收到接收器的有效訊號且油門搖桿移動到失控保護位置（或低於），油門通道才會解鎖。

如上所述，在定速模式選單第 D 點設定油門曲線，或在輔助通道設定不同的飛行模式，使其接近並可觀察到所需的頭速。請記住，最高頭速不應高於 80%，這和馬達及齒輪比相關。如果頭速太高時，RPM 定速模式將不斷輸入最大油門，這可能是無效果的定速，因為過高的頭速，沒有足夠的空間開啓油門來補償頭速負載。

使用引擎直昇機時，在啓動直昇機時，請確保 RPM 定速模式器保持在「停用」狀態。否則，當它試著達到設定的頭速時，RPM 定速模式會驅動油門伺服器到最大油門位置，並維持在那裡。因此，每次啓動馬達前，請再三仔細檢查油門伺服器的位置是否正確！

某些廠牌的遙控器有提供特殊設定，允許輔助定速通道和飛行模式共用，且能自動地互相切換。因此，可以在第一個飛行模式下啓動馬達，這樣您就能以手動模式加速油門並做停懸飛行。當第二個飛行模式的油門曲線被切換到「V」形曲線時，RPM 定速模式可經由輔助通道同時被開啓。在這種情況下，請特別注意這兩個油門曲線，應盡可能在兩個飛行模式轉換時重疊。否則，油門伺服器在 RPM 定速模式下，系統在取得控制前將會跳轉，在這短暫的瞬間，您可能仍然處於手動模式。因此，在此操作模式下，從啓動/馬達自動加速的同時，是不可能開啓 RPM 定速模式的。如果您要選擇這個設定，必須在切換到第二個飛行模式之前就要開啓 RPM定速模式！

8 PARAMETER MENU
參數選單

ALIGN

In order to make fine adjustments to the RPM Governor the Parameter menu of MICROBEAST PLUS has been extended by menu point I, J, K compared to the versions 3 .x .x . More over for AttitudeControl the parameter menu points L and M have been added .

有別於 3.x.x 版本，為了讓 MICROBEAST PLUS 的 RPM定速模式更好調整，4.x.x 的參數選單中增加了第 I、J、K 點。此外，也在參數選單第 L 和 M 點增加了姿態模式。

I RPM GOVERNOR - THROTTLE RESPONSE
RPM定速模式-油門反應

Use menu point I to change the response of the RPM Governor . This determines how fast and hard the system will open the throttle when the rotor rpm changes . Ideally the response is set as high as possible . If it is too low the main rotor may speed up immediately in unloaded conditions, e .g . when the helicopter is descening and the RPM Governor will only give soft throttle inputs when the head speed decreases . If the response is set too high on the other hand, the throttle may stutter audible and/ or the motor rpm will kick in very hard and overshoot after the rotor head was loaded and the rpm decreased . The height of throttle response highly depends on factors such as heli size (blade size), motor power and performance and/or the throttle reponse behavior of the speed controller (when flying an electric heli) . If you need to adjust the throttle response, we recommend to start with the lowest value and increase accordingly .

使用選單第 I 點來改變 RPM 定速模式的反應。這個反應將讓系統決定如何在轉速發生變化時又快又準的打開油門。理想情況是盡可能將反應設高一點。如果油門反應設定太低，在空載的情況下，馬達可能在一瞬間加速，例如，當直昇機在下降時，轉速和頭速降低，此時 RPM 定速模式只會有柔和油門輸入。如果將 RPM 定速模式設定太高，打油門時可能會卡卡的，或馬達轉速可能反衝/過衝。油門反應的高低取決於很多因素，如直昇機尺寸、螺旋槳的大小、馬達功率和性能、定速器油門反應特性(飛電動直昇機時）等等。如果需要調整油門反應，我們建議先從最低值開始，然後逐漸增加油門反應。

Typically with electric helis the setting"normal" or"slightly increased" gives good results . Helis with a lot of power might use higher values .

Nitro helicopters with small engines (like .37 nitros) or gassser prefer a low setting . 90 size helis typically perform better with higher values .

通常來說，電動直昇機的油門反應設定在「正常」" 或「稍微增加」就會有很好的效果了。 當直昇機有很大的動能時，那麼就可以設定較高的值。

搭配小引擎的直昇機（如0.37 引擎）請選擇較低的設定，90級的引擎直昇機，油門反應值設高一點，通常會有更好的飛行表現。

Status-LED Status-LED燈	Throttle Response 油門反應
Off 熄滅	User Defined 使用者自訂義
Purple 紫色	Normal 正常
Red Flashing 紅色閃爍	Slightly Increased* 稍微增加*
Red 紅色	Increased 增加
Blue Flashing 藍色閃爍	Fast 快速
Blue 藍色	Aggressive 極快速

＊Factory Setting ＊出廠預設值

Setting the option"user defined" to choose a custom value that can be edited by using the StudioX software and the optional USB2SYS interface .

「使用者自訂義」，允許您使用 StudioX 軟體介面(另購品 USB2SYS)，直接在電腦上進行編輯。

Briefly push the button to save the configuration and to proceed to menu point J .

按下按鈕保存設定並進入下一設定選單第 J 點。

J RPM GOVERNOR - INITIAL SPOOL UP RATE
RPM定速模式-緩啓動加速率

When activating the RPM Governor this will not apply full throttle immediately but will increase the rotor head speed slowly until the desired preset head speed is reached . At menu point J you can determine how quickly this soft start occurs when the RPM Governor is activated initially . The speed is given in number of revolutions by how much the rotor speed is increased per second . The higher the speed the faster your preset head speed will be reached . Please note that the given rates only are indicative . Depending on the response of the speed controller and the inertia of the rotor system it can actually take longer or shorter until the desired speed is reached . Associated with this the speed also determines how gently the rotor will start to turn . If the speed is too high, the rotor blades may fold in during startup because the system enters throttle too abruptly . With nitro helicopters this also may cause the engine to quit because the throttle is opened too fast and too far .

RPM 定速模式在開啓時，系統不會立即將最大油門打到最大，而是緩慢地增加頭速，直到轉速到達預設值。在選單第 J 點，當開啓 RPM定速模式時，您可以同時決定緩啓動的速度。其速率是由每秒增加多少轉速而定。速率越高就越快到達您所預設的頭速。請注意，所輸入的加速率僅是象徵性質，事實上，加速率是根據定速器的反應和旋翼系統的慣性而定的，因此您可以調整您所需的加速率。其它與此相關聯的速度也會影響旋翼系統緩啓動的加速率。如果加速率太高，系統就會突然介入油門，導致主旋翼可能在啓動時疊槳。同樣的狀況使用在引擎直昇機上，也可能導致引擎熄火，因為突然急速使油門打得太快又太大。

Status-LED Status-LED燈	Throttle Response 油門反應
Off 熄滅	User Defined 使用者自訂義
Purple 紫色	50 rpm/s
Red Flashing 紅色閃爍	100 rpm/s
Red 紅色	200 rpm/s*
Blue Flashing 藍色閃爍	300 rpm/s
Blue 藍色	400 rpm/s

＊Factory Setting ＊出廠預設值

Setting the option"user defined" to choose a custom value that can be edited by using the StudioX software and the optional USB2SYS interface .

「使用者自訂義」，允許您使用 StudioX 軟體介面(另購品 USB2SYS)，直接在電腦上進行編輯。

Briefly push the button to save the configuration and to proceed to menu point J .

按下按鈕保存設定並進入下一設定選單第 J 點。

K RPM GOVERNOR - QUICK CHANGE RATE
RPM定速模式-快速變化速率

If the RPM Governor is enabled and you increase the preset rotor head speed there will not be an abrupt change but the system will increase the rotor rpm with a given spool up rate that can be set at menu point K . This rate also determines how fast the rotor head speed will increase when reactivating the RPM Governor after an autorotation maneuver . In this case the normal soft start would take too much time until the rotor has reached full speed and on the other hand it would not be necessary as typically the rotor is still turning at some speed when performing an autorotation .

如果啓動 RPM定速模式並增加預設頭速，轉速並不會突然變化，因為系統會以設定的加速率來增加轉速，此加速率可以在選單第 K 點設定。當執行完一個熄火(降落)模式特技動作後，重新開啓 RPM定速模式時，此加速率也會影響頭速增加的速度。在這種情況下，要使頭速達到全速，正常緩啓動功能恐怕會佔用太多時間，另一方面，這其實並不必要，因為執行熄火(降落)動作時，轉速仍會以某種速度慣性地轉動。

Status-LED Status-LED燈	Quick Change Rate 快速變化率
Off 熄滅	User Defined 使用者自訂義
Purple 紫色	Same as Initial Spool Up Rate 與緩啓動加速率相同
Red Flashing 紅色閃爍	300 rpm/s
Red 紅色	500 rpm/s*
Blue Flashing 藍色閃爍	700 rpm/s
Blue 藍色	900 rpm/s

＊Factory Setting ＊出廠預設值

If you don't need the autorotation spool up you can set to"same as initial spool up rate" . The spool up rate will then be the same as set at menu point J . So effectively there is no difference if you spool up from an initial state when the RPM Governor gets activated for the first time or when you reactivate the RPM Governor from autorotation .

如果您不需要熄火(降落)模式的加速率，您可以設定「與緩啓動加速率相同」。熄火(降落)模式的加速率便會與您在選單第 J 點所設定的加速率相同。但是，如果您的 RPM定速模式是從初始狀態加速後，RPM定速模式是第一次被開啓，或當您執行完熄火(降落) 模式後重新開啓 RPM定速模式，這兩者間是沒有任何差異的。

⚠ WARNING 警告

A very high spool up rate can cause the throttle to be opened very fast and very far . This can cause the rotor blades folding in if the blade bolts are not tight enough or can damage the main gear especially in electric models . With nitro helicopters we recommend to use a rather low rate . Here an abrupt throttle change out of idle position can cause the engine to quit! Additionaly nitro motors react quite slow to throttle changes and it takes some time to speed up the rotor . When the change rate does not fit to the"mechanical" speed up it can happen that the motor is driven to full throttle during spool up .

加速率太高可能會導致油門突然開啓並急速升高。如果主旋翼螺栓未鎖緊，特別是電動直昇機，可能會導致主旋翼疊槳，或者可能損壞主齒輪。使用引擎直昇機，我們建議使用一個相當低的速度。油門突然變化並離開最低點時，可能會導致引擎熄火！此外油機引擎反應油門的變化相當緩慢，需要一定的時間來加速。當變化速率不符合「機械」加速率時，引擎可能在加速時被驅動至最大油門。

Select"user defined" to choose a custom value that can be edited by using the StudioX software and the optional USB2SYS interface .

「使用者自訂義」，允許您使用 StudioX 軟體介面(另購品 USB2SYS)，直接在電腦上進行編輯。

Briefly push the button to save the configuration and to proceed to menu point L .

按下按鈕保存設定並進入下一設定選單第 L 點。

L ATTITUDECONTROL - OPERATION MODE
姿態模式-操作模式

At Parameter menu point I you can choose between five different AttitudeControl operation modes . This is done as usual by selection with the rudder stick . If one of the AttitudeControl operation modes is selected, the AttitudeControl function is active and it can be activated/deactivated in operation by using the previously assigned transmitter channel for AttitudeControl . The"AttitudeControl disabled" option specifies the AttitudeControl is completely disabled and actuating the AttitudeControl channel has no effect (in terms of the AttitudeControl) . The assignment to the colors of the Status-LED is as follows:

在參數選單第 I 點有五個不同的姿態模式可供選擇。同樣是移動搖桿來完成設定。如果選擇其中一種姿態模式，並開啓姿態控制功能時，可以使用之前分配的遙控器通道來「開啓」、「關閉」姿態模式。若「停用」姿態模式，則系統會完全禁用姿態模式，此時「開啓」姿態控制通道是無效的（就姿態模式而論）。Status-LED燈顏色定義如下：

Status-LED Status-LED燈	Attitudecontrol Operation Mode 姿態模式-操作模式
Off 熄滅	Attitudecontrol Disabled* 停用姿態模式
Purple Flashing 紫色閃爍	Bail Out Rescue Mode 失控保護模式
Purple 紫色	Bail Out Rescue Mode With Collective Pitch 失控保護模式-集體螺距
Red Flashing 紅色閃爍	3D - Mode 3D-模式
Red 紅色	3D - Mode With Collective Pitch 3D模式-集體螺距
Blue 藍色	Flight Trainer Mode 飛行訓練模式

＊Factory Setting ＊出廠預設值

CAUTION 注 意

Firstly enable Attitude Control when all initial settings in Setup menu and Receiver menu have been performed . Otherwise the servos may drive to the mechanical full stop, start binding and may get damaged, e .g . when AttitudeControl gets activated when leaving the menu and the system starts to try moving the heli .

在「設定選單」和「接收器選單」中所有的初始設定完成前，請先「啓動」姿態模式。否則，伺服器系統可能驅動機械完全停止，然後開始對頻，這樣可能會造成不可預期的損害。例如：當離開選單時才開啓姿態模式，此時系統會開始嘗試移動直昇機。

CAUTION 注 意

If you repeat the adjustment in Receiver setup menu and setup the receiver channel assignment again, the Attitude Control operation mode at Parameter menu point L will be reset to"AttitudeControl disabled" for safety reason . So if you have previously used Attitude Control, you must enable Attitude Control again after a re-allocation of channels or switching the receiver type . In this regard check the settings of the transmitter and make sure that Attitude Control can be activated/ deactivated by the transmitter as before . Thereby other settings are not affected .

若您再次調整接收器設定選單，或重新分配接收器通道，基於安全理由，請在參數選單第 L 點，將姿態模式重設為「停用」。雖然您在先前已經使用姿態模式了，但是在通道重新分配或改變接收器類型後，仍然必須重新「啓動」姿態模式。若有上述改變，請特別再三檢查遙控器設定是否正確，並確定可由遙控器「開啓」、「關閉」姿態模式。其它的設定並不會有所影響。

1 BAIL OUT RESCUE MODE
失控保護模式

This operation mode can be used if the pilot becomes disoriented and would like to save the helicopter from crashing . In such case he just needs to let go the stick(s) for aileron and elevator and activate the AttitudeControl by flipping the assigned switch for AttitudeControl function . The helicopter then is rotated back into normal horizontal position by the shortest route over roll or pitch . The pilot must only operate the collective pitch function to control the height of the helicopter . Note that for safety reason there is a stick fading implemented . Even when AttitudeControl is switched on you can control aileron and elevator . The stick movements have priority over the AttitudeControl . The larger the deflection of the corresponding control stick, the less effect AttitudeControl has . On the other hand when both sticks are in center position AttitudeControl takes over full control of the aileron and elevator function .

在飛行中迷失方向，可使用失控保護模式來保護直昇機不致摔機。此時，只需要放開副翼和升降搖桿，並切換至姿態模式功能即可。系統會介入直昇機，以最短的路徑越過滾轉或俯仰動作來回正直昇機至水平位置。開啓失控保護模式時，飛行員只能操作集體螺距來控制直昇機的高度。請注意，基於安全理由，此功能設有遙桿淡出功能。即使當姿態控制功能在開啓的情況下，您仍然能控制副翼和升降功能。搖桿移動優先於姿態模式。當控制搖桿偏轉越大，對姿態模式的影響越小。在另一方面當兩個搖桿都在中心位置，姿態模式將完全控制副翼和升降功能。

2 BAIL OUT RESCUE MODE WITH COLLECTIVE PITCH CONTROL
失控保護模式-集體螺距控制

Bail out rescue mode with collective pitch control provides the same functionality as the"Bail out rescue mode" described above . In addition, here the AttitudeControl also controls the collective pitch function . During the rotation and after reaching the horizontal position, AttitudeControl inputs positive or negative collective pitch, making the helicopter turn (almost) without loss of height and maintain hover position (or slightly climping up) when horizontal position is reached . So the pilot can completely let go all sticks as soon as he activates AttitudeControl and the helicopter is automatically brought into a (relatively) save location by AttitudeControl . Here it is possible to add some collective pitch and let the heli climb up even faster by moving the thrust stick beyond the point that is applied by AttitudeControl . But moving the thrust stick lower is locked as you can never apply less collective pitch than AttitudeControl does . So the helicopter can not be moved towards the ground by giving wrong collective pitch inputs by accident .

失控保護模式-集體螺距控制與上述的「失控保護模式」提供相同的功能。不同的是，這裡的姿態模式也有控制螺距功能。在旋轉過程中並到達水平位置後，姿態模式會輸入「正」或「負」集體螺距，使直昇機達在這個高度維持不變(幾乎不變)並保持停懸(或稍微向上)。所以飛行員可以完全放開所有的搖桿，只要當他「開啓」姿態模式時，直昇機會自動由姿態模式帶入一個儲存的(相對)位置。這時可以將油門搖桿上推來增加一些集體螺距，並由姿態模式介入使直昇機快速向上。但此時因油門搖桿下推功能已被鎖定，因此螺距不可能小於姿態模式。所以直昇機不可能因為輸入了錯誤的集體螺距而墜機。

3 3D - MODE
3D-模式

In 3D - Mode MICROBEAST PLUS recognizes the current orientation of the heli (normal or inverted) and always rotates the helicopter to the nearest horizontal position when AttitudeControl is activated . This operation mode is well suited for practicing basic 3D - aerobatic maneuvers such as hovering or back flips . Since in 3D - Mode the stabilization can be fully overridden when actuating aileron or elevator function, it is possible to keep 3D - Mode activated for a longer period of time and to grope at an aerobatic maneuvers by only giving specific control inputs . Rolling and pitching back to horizontal position then does AttitudeControl for you . The pilot must only control collective pitch and rudder .

In addition, you can use this mode as rescue mode to stabilize the helicopter in an emergency situation . It should be noted, however, that the heli is always rotated to the nearest horizontal position . Therefore you must be very careful in controlling the collective pitch function as it may happen by accident that you give a collective input to the wrong direction . If you want to use 3D - Mode exclusively as rescue function, it is recommended to use 3D - Mode with collective pitch control .

在 3D 模式下，當姿態模式開啓時， MICROBEAST PLUS 會識別直昇機的電流方向(正常或反向)然後保持直昇機旋轉使其最接近正飛/到飛的水平位置。此操作模式非常適合一般停懸/後翻滾的 3D 特技動作。因為在 3D 模式下，執行副翼和升降功能時，系統會介入讓直昇機完全保持穩定。此功能也可輸入特定的控制訊號，讓 3D 模式開啓的時間延長，允許飛手有較多的時間去掌控 3D 特技動作。因為在此模式下，姿態模式會為您執行滾轉和俯仰動作並使其回到水平位置，飛行員只須控制集體螺距跟尾舵即可。

此外，此模式亦可當作失控保護模式使用，因為在緊急情況下，3D模式/失控保護模式都可以用來穩定直昇機。然而要注意的是，直昇機在保護模式下，系統會自動將其旋轉到最接近的水平位置。因此，您必須非常小心地控制集體螺距，如果集體螺距輸入錯誤，可能會造成不可預期的意外。如果您想將 3D 模式做為專門的失控保護功能，建議您選擇 3D 模式-集體螺距控制比較理想。

4 3D - MODE WITH COLLECTIVE PITCH CONTROL
3D模式-集體螺距控制模式

3D - Mode with collective pitch control provides the same functionality as the"3D - Mode" . In addition, here AttitudeControl takes over the collective pitch function . When reaching horizontal position AttitudeControl gives a positive or negative pitch input, so that the heli is held in the hover position or climbs up slightly . Here, the thrust stick is locked into each"wrong" direction . Therefore the pilot can only give additional collective pitch input (in normal position positive, in inverted position negative pitch) to increase the climb rate of the helicopter . But he cannot move the helicopter towards the ground by accidentally giving wrong pitch inputs .

3D 模式-集體螺距控制模式和先前介紹的集體控制螺距的功能中的 3D 模式相同，MICROBEAST PLUS 會識別直昇機的電流方向(正常或反向)和當姿態模式開啓時，直昇機會旋轉到最接近的水平位置。此操作模式非常適合一般 3D 特技動作，例如停懸或後翻。此功能也可輸入特定的控制訊號，讓 3D 模式開啓的時間延長，允許飛手有較多的時間去掌控 3D 特技動作。因為在此模式下，姿態模式會為您執行滾轉和俯仰動作並使其回到水平位置，飛行員只須控制集體螺距跟尾舵即可。

5 FLIGHT TRAINER MODE
飛行訓練模式

In Flight trainer mode you can only tilt the helicopter to a certain angle by giving aileron or elevator stick input . Moving the helicopter even further is impossible, as long as AttitudeControl is active . This prevents the helicopter from being tilted into a lateral position that may cause a big loss of height . As soon as the stick(s) for aileron and elevator is (are) released, the helicopter will be brought back to horizontal position by AttitudeControl . Additionally the helicopter is stablized all the time, independant of any stick input . This together makes the helicopter fly very similar to a multirotor helicopter . The pilot does not have to focus on the constant need of correcting the helicopter's attitude and he can not bring the helicopter in a difficult attitude by making violent control maneuvers .

Collective pitch and rudder are not affected by this operation mode .

在飛行訓練模式下，您只能打副翼和升降搖桿使直昇機傾斜到一定的角度。只要放開副翼和升降搖桿，姿態模式會將直昇機旋轉回到正飛/到飛的水平位置。此外，維持直昇機的穩定，與任何搖桿輸入無關。種種設計的考量讓直昇機飛起來非常類似多軸機。這樣飛行員就不需要一直注意修正直昇機的姿態，而無心去執行較暴力的 3D 動作。

集體螺距和尾舵不會受此操作模式影響。

M ATTITUDECONTROL - HOVERING PITCH
姿態模式-停懸螺距

If at Parameter menu point L a mode"with collective pitch control" is selected, briefly pressing the button at menu point L will lead to Parameter menu point M. Otherwise menu point M will be skipped!

At Parameter menu point M the collective pitch will automatically be set to hovering position, which will be used when AttitudeControl is activated and the helicopter flies horizontally . Ideally the pitch angle is exactly as large as it is necessary to maintain a stationary hovering flight without ascending or descending . Typically this is somewhere in the range between 5 and 6 degrees . Depending on your personal preference the angle can be set larger, so that the heli climbs up and gains altitude when AttitudeControl is activated .

By moving the aileron stick left or right the hovering pitch can be adjusted . The color of the Status-LED indicates the range which the pitch is in between at the moment . This range is specified as percentage of maximum positive/negative pitch which was set at Setup menu point K .

如果在參數選單第 L 點選擇「集體螺距控制模式」後，只要簡單地按下參數選單第 L 點的按鈕，即可進入參數選單第 M 點，否則選單第 M 點將會被略過。

當姿態模式開啓且直昇機水平飛行時，參數選單第 M 點的集體螺距會自動設定在停懸位置。理想的情況是，俯仰角要跟所需的角度完全一樣，使其在停懸飛行時保持靜止狀態而不會上升或下降飄移。通常，這個俯仰角介於 5 ~ 6 度之間。在此模式下，您可根據個人喜好設定更大角度，來加大直昇機爬升和高度的行程量。

可以向左或向右移動副翼搖桿來調整停懸螺距。Status-LED燈的顏色表示目前螺距的行程。在設定選單第 K 點設定最大正/負螺距特定的比例行程量。

Status-LED Status-LED燈	Hovering pitch Hovering pitch
Off 熄滅	> 20% of maximum collective pitch
Purple 紫色	> 30% of maximum collective pitch*
Red 紅色	> 50% of maximum collective pitch
Blue 藍色	> 70% of maximum collective pitch

＊Factory setting: 37.5%　＊出廠預設值：37.5%

CAUTION 注 意

If the maximum positive/negative pitch angle is changed at Setup menu point K then also the hovering pitch will change! So after re-adjusting the maximum angles also check and re-adjust the hovering pitch at Parameter menu point M .

如果在設定選單第 K 點改變最大正/負螺距角度，那麼停懸螺距也會改變！因此，在參數選單第 M 點中重新調整最大角度後，請重新調整停懸螺距。

CAUTION 注 意

When using the"3D - Mode with pitch control" make sure that the pitch range is symmetrical, i .e . the maximum positive and negative pitch angles are of same size . Otherwise the hovering pitch will differ in normal and inverted position as the hoving pitch is calculated from the maximum pitch! The setting at Parameter menu point M affects both directions . A separate adjustment of the hovering pitch angles is not provided .

當使用「3D模式-集體螺距控制模式」時，請確保螺距行程是對稱的，例如：最大正/負螺距角必須相同。否則，停懸螺距的正向/反向位置將會不同，因為停懸螺距是從最大螺距開始計算！在參數選單第 M 點的設定會影響到正反兩個方向。請注意，無法單獨調整停懸螺距角度。

9 USAGE OF ATTITUDECONTROL
姿態模式使用方法

ALIGN

Once AttitudeControl was enabled by choosing one of the five AttitudeControl types at Parameter menu point L, AttitudeControl can be activated and deactivated in flight by using the switch on the transmitter whose channel was assigned as actuator for AttitudeControl in Receiver setup menu . When MICROBEAST PLUS is ready for operation check whether activation of AttitudeControl works as expected:

Similar to the tail gyro gain display you can determine the status of AttitudeControl by watching the yellow Menu-LEDs . These light up each time after the initialization sequence as well as when the amount of AttitudeControl gain is changed respectively when AttitudeControl is activated/deactivated . To distinguish the tail gyro gain display from AttitudeControl the Status-LED lights up in red color when the status of AttitudeControl is displayed . When AttitudeControl is deactivated Menu-LED A starts to flash . If one of the Menu-LEDs B – N lights up, AttitudeControl is active . The individual Menu-LEDs signal the amount of AttitudeControl gain: The larger the deflection of the switch channel for the AttitudeControl is, the farther the Menu-LED will go in the direction of point N and the stronger the effect of AttitudeControl will be . In particular this determines how fast and violent the helicopter will be rotated back to horizontal position . For the first flight it is recommended to adjust the throw of the AttitudeControl channel just until Menu-LED G lights up when AttitudeControl is activated . If using a small helicopter like 450 size or below typically you can set the gain even higher (until Menu-LED I lights up) .

一旦在參數選單第 L 點選擇並開啓五個姿態模式中的任一種模式時，就可以在飛行時，透過所指派的遙控器通道來「開啓」、「關閉」姿態模式功能，此姿態模式是在「接收器設定選單」中設定的。當 MICROBEAST PLUS 準備就緒，請檢查姿態模式是否如預期的正確運作：

類似於尾陀螺儀感度顯示的方式，您可以透過黃色 Menu-LED燈來判斷姿態模式的狀態。在每次初始化後、姿態模式「開啓」、「關閉」，以及姿態控制感度改變時，黃色 Menu-LED燈都會亮起來。在姿態模式下，Status-LED燈亮紅色，則表示此為尾陀螺儀感度。若關閉姿態模式，Menu-LED燈 A 會開始閃爍。如果 Menu-LED燈 B – N其中一 個燈亮起，表示姿態模式是有效的。在此模式下，每一個 Menu-LED燈 (B – N)都表示不同的感度值：其開關通道的感度越大， Menu-LED燈離第 N 點的方向就越遠，且姿態模式的效果會越大。特別是此感度值會決定直昇機回正到水平位置時的速度及強度。首次飛行，建議您微量調整姿態模式通道的行程量，直到姿態模式開啓， Menu-LED燈號 G 亮起為止。如果使用的是 450 級別(含以下)的小型直昇機，基本上您可以將感度值設定高一點(直到 Menu-LED燈 I 亮起)。

Fig / 圖示.9

9.1 ATTITUDECONTROL WITH SEPARATE SWITCH CHANNEL
姿態模式-不同的開關通道

When a separate channel for AttitudeControl was assigned at Receiver setup menu point J (or when the default assignment has been loaded) throw and direction of the AttitudeControl channel determine whether AttitudeControl is active or not and how strong it reacts . A deflection into one direction will activate AttitudeControl . Typically Menu-Led N (maximum gain) will light up when activating AttitudeControl for the first time, as the throw of the channel will be 100% . Adjust the deflection of this channel, i .e . by reducing the servo throw in the transmitter, so that one of the Menu- LEDs lights up next to point G (or point I when using a small helicopter) as described above .

When the switch channel is moved into the other direction Menu-LED A will light up and flash . In this case AttitudeControl is deactivated . Here it doesn't matter how big the deflection of the channel is as only the sign of the deflection determines whether AttitudeControl is on or off .

當在接收器設定選單第 J 點分配姿態控制的個別通道（或載入原廠預設之通道分配），此通道之行程量和方向會判斷姿態模式是否開啓，及其反應的強度。當直昇機偏轉到一個方向時，系統會啓動姿態模式。通常首次開啓姿態模式時，行程通道將設在 100%，Menu-LED燈 N 會亮起(最大感度)。欲調整此通道偏角，請降低遙控器伺服器行程量，使 Menu-LED燈 G 點旁邊的燈亮起(如果使用的是 450 級別(含以下)的小型直昇機，請使 Menu-LED燈 I 亮起)。

當開關通道移動到另一個方向時，Menu-LED燈 A 將亮起並閃爍。在這種情況下，姿態模式是關閉的。開關通道的偏轉是大是小在此並無關係，因為系統只是利用偏轉訊號來判斷當前的姿態模式是否「開啓」或「關閉」而已。

If AttitudeControl works reversed, e .g . one of the Menu-LEDs B - N lights up when the switch for AttitudeControl is in"off"-position and the Menu-LED A does not disappear independant of the servo throw when the switch is in"on"-position, then simply reverse the channel for AttitudeControl in your transmitter by using the servo reverse function .

如果姿態模式反向時，例如： 當姿態模式的開關在「關閉」 位置時，Menu-LED燈 B－N 其中一個燈亮起，以及當開關在 「開啓」位置時，Menu-LED燈 A 伺服器行程並不會單獨消失，這時，只需調整伺服反向功能，將您遙控器中的姿態模式通道反轉即可。

9.2 ATTITUDECONTROL WITH COMBINED SWITCH CHANNEL
姿態模式-組合開關通道

If the tail gyro gain channel is also used for AttitudeControl (see chapter 4), then there is the following difference to the operation mode with separate channel as described above: In the switch position where AttitudeControl is off, the channel deflection determines the amount of tail gyro gain as usual . Increase or decrease the (servo) throw of this channel to adjust the tail gyro gain . The amount of tail gyro gain is indicated by the yellow Menu-LEDs each time after initialization procedure and always when the gain changes . Here the Status LED lights up in blue color . When you flip the switch and the channel is deflected to the other direction, MICROBEAST PLUS will keep the current tail gyro gain and activate AttitudeControl . When adjusting the height of deflection of the channel into this direction you can specify the AttitudeControl gain like described above . So here one channel is used for two functions . Depending on the direction you can either adjust tail gyro gain or AttitudeControl gain and by switching between directions AttitudeControl is activated or deactivated .

如果尾陀螺感度通道也同時用於姿態模式(參見第4章)，如上所述，則存在以下單獨通道的操作模式差異：當姿態模式的開關位置是關閉的，該通道偏角決定了不同的尾陀螺感度值。請增加或減少該通道的(伺服器)行程量來調整尾陀螺感度，此時 Status-LED燈會亮起藍色。雖然，在此模式下，每次初始化後，或感度改變時，不同的尾陀螺感度值皆由 Menu-LED燈亮黃色顯示。當您按下開關且通道偏轉到另一個方向時，MICROBEAST PLUS 會保持當前的尾陀螺感度並開啓姿態模式。同樣如上述，當調整通道偏轉高度到這個方向，您可以指定姿態模式的感度。因此，這一個通道有兩個功能。根據不同的方向，您可以切換姿態模式「開啓」、「關閉」來調整尾陀螺感度或姿態模式的感度。

CAUTION 注 意

When using AttitudeControl with combined switch channel make sure AttitudeControl is at least deactivated once before take off . Otherwise the tail gyro gain would be minimal as the system would not have been able to determine your tail gain adjustment after initialization .

當使用組合開關通道來操控姿態模式時，請確保姿態模式在起飛前至少要關閉一次以上。否則，尾陀螺感度會變最小，因為在初始化後，系統無法判斷您所調整的尾陀螺儀感度。

CAUTION 注 意

In this mode it is absolutely necessary to use a switch that changes the control directions directly and without intermediate steps . In particular, do not use a slider on the transmitter! Otherwise, when you activate AttitudeControl the tail gyro sensitivity would be decreased to 0% before the system turns on the AttitudeControl . So you would have 0% of tail gyro gain when AttitudeControl is active .

此模式下，絕對要使用一個直接控制方向且沒有中間步驟的開關。尤其是，不要使用遙控器滑套！否則，當您開啓姿態模式時，尾陀螺儀的靈敏度會下降到 0%。所以，當姿態模式開啓時，您的尾陀螺感度會是 0%。

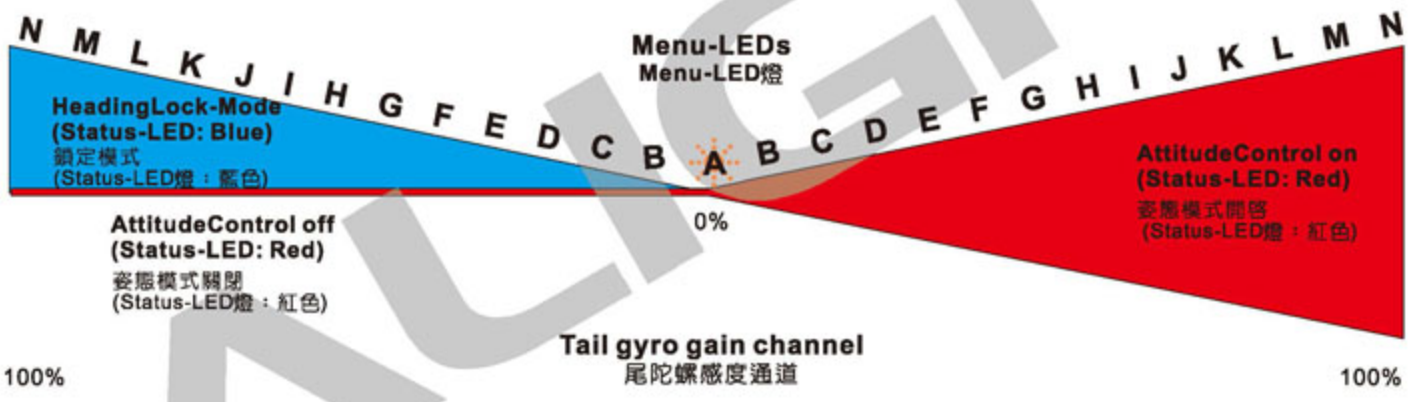


Fig / 圖示.10

When AttitudeControl is enabled in general the tail gyro can not be used in Normal-Rate mode . If operating AttitudeControl with separate switch channel (see section 9 .1) the channel for tail gyro gain activates HeadingLock - Mode in both directions . The sign of deflection is not relevant here, just the amount of deflection is important . When you also want to use the tail gyro in Normal- Rate mode (as described MICROBEAST PLUS instruction manual section 8 .4) you must disable AttitudeControl at Parameter menu point I (set Status-LED to"off") .

啓動姿態模式後，一般來說，是無法在非鎖定模式(Normal-Rate Mode)下使用尾陀螺儀的。如果使用單獨開關通道來操作姿態模式(參見第 9.1 節)，在正反兩個方向，尾陀螺都會開啓鎖定模式(HeadingLock Mode)。這裡與偏轉訊號並無關連，雖然偏轉值是很重要的。如果您想在非鎖定模式下執行尾陀螺儀功能（如 MICROBEAST PLUS說明書第8.4節），您必須在參數選單中，將姿態模式設定為「停用」(將 Status-LED燈設定為"off")。

10 FUNCTIONAL TEST OF ATTITUDECONTROL
姿態模式功能測試

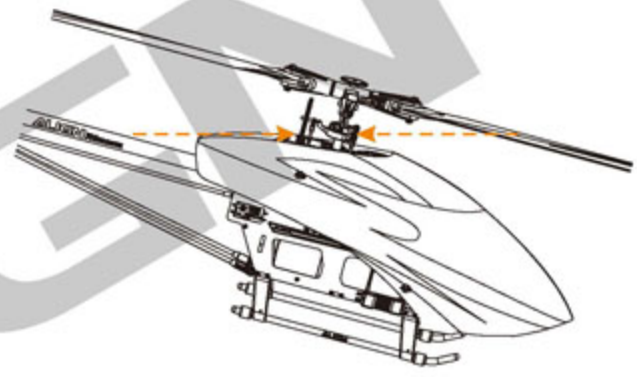
ALIGN

When activating AttitudeControl you should be able to see an immediate impact on the swashplate control: If the heli is tilted to one side, MICROBEAST PLUS permanently steers the swashplate opposed to the inclination . In the region around horizontal position the swashplate will always stay nearly horizontal to the ground . The system constantly tries to bring the helicopter back to the horizontal position as long as the helicopter is oblique .

當開啓姿態模式時，您應該可以看到十字盤控制的直接影響：如果直昇機向一側傾斜， MICROBEAST PLUS 將永遠控制十字盤並補償相反傾角使直昇機回到水平位置。

Tilt the helicopter forward
直昇機向前傾斜

The swashplate is tilted backwards and stays in this position…
十字盤向後傾斜並維持在此位置



... until the heli is brought back to horizontal.
直到直昇機向後移動達到水平

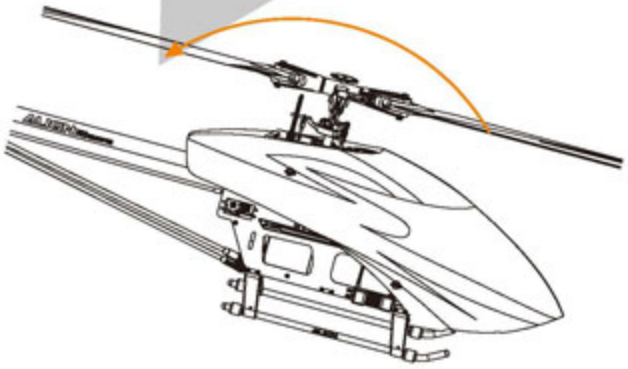


Fig / 圖示.11

When AttitudeControl is deactivated on the other hand, the swashplate will always be moved back to neutral position (perpendicular to main rotor shaft) as soon as the helicopter is standing still for a few seconds, independant of the current leveling . Here the system only corrects currently occurring rotational movements, but does not regulate the absolute deviation from horizontal position .

另一方面，當姿態模式關閉時，只要將直昇機靜置幾秒鐘後，十字盤會回復到中立點(垂直於主軸)，此與當前平衡無關。因為系統只校正當前發生的旋轉動作，但不會補償水平位置的絕對偏航。

Tilt the helicopter forward
直昇機向前傾斜

The swashplate briefly steers against the rotationbut then goes back to neutral when the helicopter is not moved anymore.
十字盤短暫地控制抵抗旋轉，
但當直昇機不動時，又回到中立點。

Fig / 圖示.12

When using an AttitudeControl mode with collective pitch control (see chapter 8) additonal to the cyclic movement also the collective pitch is moved in positive or negative direction when AttitudeControl is activated and the helicopter approaches the horizontal position . The pilot can add collective pitch in the same direction by using the thrust stick, but not in the opposite direction . Check to see if this works correctly and whether the control directions are correct . If the helicopter is kept in hovering position, some positive collective pitch must be applied by AttitudeControl and you can use the thrust stick to add more positive pitch, but not less . Analogous this must work when the heli is in inverted hovering position if using the"3D - Mode with collective pitch control" . Here AttitudeControl will apply some negative collective pitch and you can only add more negative pitch, but not positive .

當使用姿態模式-集體螺距控制（參見第8章），當姿態模式開啓，且直昇機接近水平位置時，額外的循環動作以及集體螺距會往正向或反向移動。飛行員可以移動油門搖桿往相同方向來增加集體螺距，但相反方向卻無效果。此時，請檢查此功能是否正常，以及控制方向是否正確。如果直昇機保持在停旋位置，姿態模式必須輸入一些正集體螺距，而且您可以使用油門搖桿增加更多正螺距，而不是減少正螺距。類似的情況，如果使用「 3D 模式-集體螺距控制」，直昇機處於倒置停懸位置時，此時，姿態模式會提供一些負螺距，您只能增加更多負螺距，而不是正螺距。

11 FLYING WITH ATTITUDECONTROL
姿態模式下飛行

11.1 FIRST TEST FLIGHT
首航測試

If not done already, for the first flight keep AttitudeControl deactivated and adjust all flight parameters like tail gyro gain, cyclic gain and so on as described in chapter 8 of the MICROBEAST PLUS instruction manual .

If the heli is setup well, you can familiarize yourself with the effect of AttitudeControl . For this we suggest to use the"Bail out rescue mode" (see chapter 8) . Fly the helicopter in a sufficient amount of height in a stable hover and activate the AttitudeControl by using the appropriate switch . The helicopter should continue to hover in approximately the same position . Now give some aileron or elevator stick input and release the stick when the helicopter reached some oblique position . AttitudeControl should bring the helicopter back to the horizontal position more or less rapidly . Deactivate AttitudeControl and again tilt the helicopter by giving some stick input . Now the helicopter will stay tilted if you release the stick . Only when AttitudeControl is activated by flipping the switch again, the helicopter will be rotated back to horizontal position as before .

若姿態模式下的飛行參數設定尚未完成，諸如尾陀螺感度、循環感度等，請參閱 MICROBEAST PLUS 使用說明書的第 8 章。請將姿態模式保持「關閉」狀態。

如果直昇機已經設定完成，您可以先熟悉姿態模式的效果。因此我們建議您使用「失控保護模式」(見第 8 章)。在姿態模式下，用開關通道控制直昇機到一個適當的高度，並穩定停旋。直昇機應該停旋在大致相同的位置。將直昇機飛到一定的傾斜位置時，現在，輸入一些副翼和升降感度，然後放開搖桿。此時，姿態模式應該將直昇機快速或緩慢的回正到水平位置。接著，把姿態模式關閉，再打一些副翼和升降舵使直昇機傾斜，現在，如果放開搖桿，直昇機將保持傾斜。只有當姿態模式再次經由開關通道開啓時，直昇機才會跟先前一樣回正到水平位置。

CAUTION 注 意

If using an AttitudeControl operation mode with collective pitch control (see chapter 8), moving the thrust stick does not have any effect in some area as AttitudeControl takes over collective pitch control as long as the thrust stick is in this area and AttitudeControl is activated . Therefore make sure the thrust stick is in a position that will roughly produce the same amount of collective pitch, before and while deactivating AttitudeControl . Otherwise when deactivating AttitudeControl the helicopter would make a leap down, if the thrust stick controls a smaller pitch angle than AttitudeControl .

當使用姿態模式-集體螺距控制(參見第 8 章)，只要油門搖桿在這區域且姿態模式是在「開啓」狀態時，將油門搖桿打到某些區域時，直昇機並無任何反應，那是因為姿態模式已接管集體螺距的控制。因此，姿態模式在關閉時或關閉之前，必須確保油門搖桿的位置，並有足夠大的相同集體螺距行程。否則，在關閉姿態模式時，因為油門搖桿比姿態模式掌控較小的俯仰角度，因此，直昇機可能會做出一個往下跳躍的動作。

CAUTION 注 意

For safety reason you should never take off or land with activated AttitudeControl . As AttitudeControl actively gives control commands to the control loop of MICROBEAST PLUS, the swashplate may tilt to one side if the helicopter is not placed perfectly level on the ground . This may cause the helicopter to tilt and crash when trying to take off or when the motor is switched off and the main rotor is running out .

為了安全起見，在姿態模式開啓時，您永遠不應該起飛或著陸。因為姿態模式會主動控制 MICROBEAST PLUS的控制迴路，如果直昇機沒有完全水平的放置在地面上，十字盤會向一側傾斜。這可能導致直昇機在試圖起飛時傾斜跟摔機，或當馬達關閉時，主旋翼嘎然而止。

11.2 FINE TUNING OF ATTITUDECONTROL
姿態模式微調

- The amount of deflection of the AttitudeControl switch channel controls the AttitudeControl gain . This determines the speed and roughness of the control input from AttitudeControl . If the effect of AttitudeControl is too low resp . the heli rotates back to horizontal position too slowly, increase the AttitudeControl gain by increasing the deflection of the AttitudeControl channel (i .e . by using the servo throw adjustment for this channel in the transmitter) .

  If on the other hand the heli overshoots after reaching neutral position and bobs briefly, maybe the AttitudeControl gain is set too high . Reduce the gain accordingly . In such case also make sure that cyclic gain (dial1) and cyclic feed forward (dial 2) are well adjusted . It is recommended to adapt the AttitudeControl gain to the preferred application . If you would like to use AttitudeControl as emergency rescue then set the gain as high as possible . On the other hand when using AttitudeControl mainly as a training aid, for example in 3D - mode, then make the effect of AttitudeControl rather weak, so that the system does take over control gently .

- If the helicopter is not aligned horizontally as desired with active AttitudeControl, i .e driftsto one side in hovering, the artificial horizon can be readjusted . This is done at Parameter menu point A which also serves as servo trim function (see chapter 9 of MICROBEAST PLUS instruction manual) . If you activate AttitudeControl at Parameter menu point A via the transmitter's AttitudeControl channel, you switch to trimming of the horizon instead of trimming the servos . By moving the aileron or elevator stick the roll and pitch tilt of the horizon can be increased/decreased .

  Briefly touching the appropriate stick will trim the horizon stepwise by 0 .5 degrees to the specific direction . Touching the stick repeatedly or holding it for longer time will trim the horizon by several steps . The Status-LED indicates the trim values: when it lights in blue color both angles are 0 degrees resp . they are in the factory setting . If the Status-LED lights red one or both angles are adjusted slightly . If the Status-LED is purple, then one axis is trimmed by more than 5 .0 degrees . When the status LED goes out, one of the two axes is further trimmed than 10 .0 degrees, which is the limit for each axis!

  By moving the rudder stick you can remove the trimm that has been set since entering this menu point . Place the helicopter in horizontal position and you should be able to see the effect of trimming . Note that the helicopter usually is slightly tilted to the side in hovering flight due to the drag of the tail rotor . Therefore as a starting point it is recommended to trim about 5 degrees to the right when using a helicopter with clockwise turning main rotor . Also note that AttitudeControl can not recognize the absolute position of the helicopter .

  Depending on wind and environmental conditions it may happen that the helicopter drifts slightly into a certain direction during hovering flight . Also long- lasting vibration or fluctuations in temperature can cause the helicopter not always comply exactly the same attitude . Therefore only trim in moderate steps and only when the helicopter reproducible drifts to the same direction!

- 開關通道的偏轉量掌控「姿態模式」的感度。這決定了姿態模式的速度和精度。若姿態模式的效果很慢則表示該直昇機旋回正到水平位置時的速度會很慢，請增加開關通道的偏轉量來提高姿態模式的感度（例如：利用遙控器上的伺服器行程量來調整此感度）。

  另一方面，達到中立點後，如果直昇機有過衝的情況，可能是姿態模式的感度設定太高。請降低感度。在這種情況下，請確保循環螺距感度(dial1)和十字盤直接輸出量(dial2)的調整是正確無誤的。建議您將姿態模式的感度設為優先應用(Preferred Application)。如果您想將姿態模式作為緊急救援用途時，請將感度盡量設高一點。另一方面，如果將姿態模式作為訓練輔助用途時，例如在 3D 模式下，將使姿態模式的感度降低，這樣系統就會平緩地接管並控制直昇機的飛行。

・如果姿態模式開啓時，直昇機並沒有如預期的對準水平方向，例如： 懸停時直昇機會往一側漂移，此時可用手動調整水平，此調整請在參數選單第 A 點完成。在此選單下，也能用來微調伺服器功能(參見 MICROBEAST PLUS 使用說明書第 9 章)。欲使用此功能，請在參數選單第 A 點透過遙控器開啓姿態模式，然後切換到水平微調來取代伺服器微調。只要移動副翼或升降搖桿，利用滾轉和俯仰傾斜角度，也可以調整水平位置。

短暫地移動相對應的副翼或升降搖桿，並以 0.5 度的行程量來微調水平。或握住搖桿稍微久一點，重複幾次修正的動作也可以微調水平。 Status-LED燈顯示微調行程量：當藍燈亮起表是兩邊的行程量為 0 度。此為出廠預設置。如果狀態指示燈紅燈亮起，表示其中一個行程需要微調。如果是紫燈亮起，那麼表示其中一個行程量超過 5 度。指示燈熄滅，表示其中一個行程量大於 10 度，這已經是副翼/升降行程量的極限了！

進入此選單後，您可以移動尾舵搖桿刪除原先設定的微調。請先將直昇機放置在水平位置，然後您應該可以看到微調的效果。需要注意的是，由於尾槳的阻力，直昇機停懸時通常會稍微往一側傾斜。因此，建議您以順時針方向旋轉的主旋翼作為起點，然後向右微調約 5 度。請注意，姿態模式無法識別直升飛機的絕對位置。

直昇機會根據不同風向和環境條件，在停懸時可能會略微往一個方向漂移。因為直昇機飛行時受振動、波動及溫度的影響，所以系統並非每次都會執行相同的姿態命令。因此只能在直昇機重複漂移到相同方向時，一步一步慢慢地微調水平！

Parameter menu point A is used to adjust two different things: Trimming the servo center positions and trimming the AttitudeControl horizon . Depending on whether the AttitudeControl is activated or not, either the artificial horizon or the servo center positions can be trimmed . The Status LED provides information on the currently active trim mode . If the Status-LED is lit permanently, the servo center positions are trimmed . If the Status-LED flashes, the AttitudeControl is turned on and the artificial horizon can be trimmed .

參數選單第 A 點可用來調整兩種不同的設定：微調「伺服器中立點」和在「姿態模式」下手動微調水平。要執行上述兩個功能，必須開啓姿態模式。 Status-LED燈顯示當前微調訊息。如果狀態指示燈恆亮，可調整伺服中立點。狀態指示燈閃爍，且姿態模式已經開啓，則可手動微調水平。

- When using AttitudeControl in"Flight trainer mode" note that the control behavior which is set at Parameter menu point B influences the maximum angle to that the helicopter can be tilted by control stick input when AttitudeControl is active . If Parameter menu point B is set to"normal" (Status-LED = purple) the maximum angle is very small (apprx . 20 degrees) . In"transmitter" mode (Status-LED = blue) the angle is the largest (apprx . 45 degrees) . The exact angle suitable for each setting can not be specified because this setting scales the control signals of the transmitter . The angle thus directly depends on the transmitters signal length and therefore varies depending on the transmitter type . On the other hand this means that you can fine tune the maximum angle by simply increasing or reducing the maximum deflection of your control stick(s) in the transmitter for example by using the Dual Rate function of the transmitter . So you could even switch between different angles in flight .

・當使用「飛行訓練模式」時，請注意此控制模式是在參數選單第 B 點中設定的，這個設定會影響到直昇機的最大俯仰角度，且當姿態模式開啓時，可以用搖桿輸入行程量來控制直昇機的傾斜度。如果參數選單第 B 點 被設為「正常」(Status-LED燈=紫色)，其最大角度是非常小的(約 20 度)。如果參數選單被設為「遙控器」時(Status-LED燈=藍色)，其角度是最大的(約 45 度)。系統無法指定適合於每個設定的角度，因為此設定是以遙控器的控制訊號來量測的。因此俯仰角度是直接取決於遙控器訊號的長度而定，且會因遙控器類型的不同而有所變化。另一方面，這意味著您可以簡單地以遙控器的搖桿來微調最大角度，例如使用遙控器的 Dual Rate 功能。所以，您甚至能在飛行時切換不同角度。

MENU OVERVIEW
選單總述

ALIGN

Setup Menu (Menu-LED is Steady ON)
設定選單 (Menu-LED 恆亮)

		Off 熄滅	Purple Flashing 紫色閃爍	Purple 紫色	Red Flashing 紅色閃爍	Red 紅色	Blue Flashing 藍色閃爍	Blue 藍色	Red / Blue 紅色/藍色
A	**Mounting Orientation** 陀螺固定方向	Horizontal Socket In Front 水平插座在前面	Vertical Socket in Front 垂直插座在前面	Hor. Inv. Socket in Front 水平.逆.插座在前面	Vert. Inv. Socket in Front 垂直.逆.插座在前面	horizontal socket at back 水平插座在後面	vertical socket at back 垂直插座在後面	hor. inv. socket at back 水平.逆.插座在後面	vert. inv. socket at back 垂直.逆.插座在後面
B	Swashplate - **Servo Frequency** 十字盤舵機工作機頻率	User Defined 使用者自定義	———	50 Hz*	65 Hz	120 Hz	165 Hz	200 Hz	———
C	Rudder - **Center Position Pulse Length** 尾舵機中立點脈衝頻率	User Defined 使用者自定義	———	960 μs	———	760 μs		1520 μs*	———
D	Rudder - **Servo Frequency** 尾舵機工作機頻率	User Defined 使用者自定義	———	50 Hz*	165 Hz	270 μs	333 Hz	560 Hz	———
E	Rudder - **Servo Endpoints** 尾舵機行程極限	Use Rudder Stick To Move Servo To Right Endpoint And Wait, Then Left Endpoint And Wait (or Vice Versa) 尾舵搖桿移到右極限並等待/再移到左極限並等待							
F	Rudder - **Sensor Direction** 尾感應器正逆方向	———	———	———	———	Normal* 正常*	———	Reversed 反向	———
G	Swashplate - **Servo Centering** 十字盤舵機中立點	Reference Position 原始位置	———	CH1 Center Pos. CH1中立點	———	CH2 Center Pos. CH2中立點	———	CH3 Center Pos. CH3 中立點	———
H	Swashplate - **Mixer** 十字盤混控	User Defined 使用者自定義	———	Mechanical 機械混控	90°	120° *	140°	140° (1=1)	———
I	Swashplate - **Servo Directions** 十字盤舵機方向	Nor | Inv | Inv 正/逆/逆	———	Nor | Nor | Inv* 正/正/逆*	———	Nor | Inv | Nor 正/逆/正	———	Nor | Nor | Nor 正/正/正	———
J	Swashplate - **Cyclic Pitch Geometry** 十字盤迴圈螺距設定	Use Aileron Stick To Adjust 6° Cyclic Pitch On The Roll Axis To One Direction (Blades Aligned With Fuselage). 用副翼搖桿調整到6°（主旋翼與機身綁定）							
K	**Collective Pitch Range And Endpoints** 機體螺距範圍	Set collective stick to max/min position and use aileron stick to adjust desired pitch. Set pitch direction by rudder stick input: Status-LED blue = positive pitch, red = negative pitch 將螺距搖桿推到最高點和最低點的同時用尾舵搖桿來做選擇							
L	Swashplate - **Cyclic Limit** 十字盤運動極限	Move Aileron, Elevator And Thrust Stick-Adjust Maximum Limit With Rudder Stick 移動副翼、升降和螺距搖桿，在最大極限位置用尾舵搖桿做選擇							
M	Swashplate - **Sensor Directions** 十字盤感應器正逆方向	Inv | Inv 逆/逆	———	Inv | Nor 逆/正	———	Nor | Inv 正/逆	———	Nor | Nor* 正/正*	———
N	**RPM Governor - Operation Mode** 自旋優化方向	Deactivated*	———	———	———	Electric 電動	———	Nitro 引擎	———

＊Factory Setting ＊出廠預設值

Paramete Menu(Menu-LED is Flashing Quickly)

參數功能表(Menu-LED 快速閃爍)

		Off 熄滅	PurpleFlashing 紫色閃爍	Purple 紫色	Red Flashing 紅色閃爍	Red 紅色	Blue Flashing 藍色閃爍	Blue 藍色
A	**Quick Trim** 快速微調	Aileron and elevator stick to trim cyclic, hold button 2s to trim rudder – reset all with rudder– stick 移動副翼和升降，用尾舵搖桿還原初始化設定						
B	**Control Style** 控制風格	User defined 使用者自定義	———	Normal 普通	Sport* 運動*	Pro 專業	Extreme 極限	**Transmitter** 遙控器
C	**Speed Flight Stability** 高速飛行穩定性	User Defined 使用者自定義	———	Very Low 極低	Low 低	Medium* 普通*	High 高	Very High 極高
D	**Rudder Rate Consistency** 尾舵速率一致性	User Defined 使用者自定義	———	Very Low 極低	Low 低	Medium* 普通*	High 高	Very High 極高
E	**Stick Deadzone** 搖桿死區	User Defined 使用者自定義	———	Very Small 極小	Small* 小*	Medium 普通	Large 大	Very Large 極大
F	**Torque Precompensation** 反扭力補償	User Defined 使用者自定義	———	Off* 關閉*	Low - Nor 低-正	High - Nor 高-正	Low - Rev 低-逆	High - Rev 高-逆
G	**Cyclic Response** 循環反應	User Defined 使用者自定義	———	Normal* 普通	Slightly Increased 增加一點	Increased 增加	High 高	Very High 極高
H	**Pitch Boost** 螺距-增強	User Defined 使用者自定義	———	Off* 關閉*	Low 低	Medium 普通*	High 高	Very High 極高
I	**Throttle Response** 油門反應	User Defined 使用者自定義	———	Normal* 普通	Slightly Increased 增加一點	Increased 增加	fast 快	aggressive 激進
J	**Slow Ramp Up Speed** 緩起動速率	User Defined 使用者自定義	———	50 rpm/s	100 rpm/s	200 rpm/s	300 rpm/s	400 rpm/s
K	**Fast Ramp Up Speed** 快速啓動速率	User Defined 使用者自定義	———	As Initial Rate 初始速率	300 rpm/s	500 rpm/s	700 rpm/s	900 rpm/s
L	**Attitudecontrol Mode** 姿態控制模式	Deactivated*	Bail out Rescue 救援*	Bail out Rescue With Pitch 救援-螺距	3D - Mode 3D模式	3D - Mode with Pitch 3D模式-螺距	———	Flight Trainer Mode 飛行訓練
M	**(Attitudecontrol Pitch)** (姿態控制螺距)	Adjust by aileron stick input. Reset by rudder stick input. 移動副翼搖桿執行調整、移動尾舵遙桿執行重設。						

＊Factory Setting ＊出廠預設值

GOVERNOR MENU(Menu LED Flashing Slowly)

定速器選單(Menu-LED燈緩慢閃爍)

		Off 熄滅	Purple Flashing 紫色閃爍	Purple 紫色	Red Flashing 紅色閃爍	Red 紅色	Blue Flashing 藍色閃爍	Blue 藍色	Red /Blue 紅色/藍色
A	**RPM Sensor - Function Test** RPM 感應器-功能測試	"Nitro" Mode: Status-led Blue When Magnet Passes Sensor "Electric" Mode: Status-led Red When Motor Is Running 移動副翼和升降，用尾舵搖桿還原初始化設定							
B	**Throttle - Motor Off/ Idle position** 油門-馬達關閉/Idle位置	"Nitro" Mode: Throttle Servo To (increased) Idle Position "Electric" Mode: Throttle In"motor Off" Position, Just Before Motor Starts "Nitro" 模式:磁鐵經過藍光感應器 Status-LED燈亮藍燈"Electric" 模式: 馬達啓動時Status-LED亮紅燈							
C	**Throttle - Full Throttle Position** 油門-全油門位置	Set throttle channel/throttle servo to full throttle position 油門通道/油門伺服器設定在全油門位置							
D	**Transmitter - Switch Point Display** 遙控器-開關點顯示	RPM Governor off 定速器關閉	———	RPM Governor Maximum 定速器最大值	———	RPM Governor on 定速器開啓	———	RPM Governor autorotation 定速器熄火(降落)	———
E	**RPM Sensor - Divider** RPM 感應器-分配器	1	2	3*	4	5	6	7	———
F	**Main Rotor - Gear Ratio** **(Sum of F + G + H if not"User Defined")** 主馬達-齒輪比 (F + G + H總和，如果不是則為 "使用者自訂義")	User Defined 使用者自定義	8	9*	10	11	12	13	14
G		+0.00	+0.20	+0.40*	+0.60	+0.80	———	———	———
H		+0.00	+0.05	+0.10*	+0.15	———	———	———	———

＊Factory Setting ＊出廠預設值

RECEIVER SETUP MENU(Menu-LED is flashing quickly)

接收器設定選單(Menu-LED 燈快閃)

		Off 熄滅	Purple 紫色	Red Flashing 紅色閃爍	Red 紅色	Blue Flashing 藍色閃爍
A	**Receiver Type** 接收器類型	Standard* 傳統型*	Spektrum satellite Spektrum 衛星天線	Futaba S-BUS	SRXL	PPM serial signal PPM系列 信號
B	**Collective Pitch** 集體螺距	Status-LED light up in blue color if valid incoming signal from receiver. Move the stick/channel on the transmitter you want to assign. The Status-LED will flash briefly in case the movement has been detected. Menu points H, I and J can be skipped in case you don't want to use the specific function or you want to use nitro RPM Governor and/or AttitudeControl without separate channel. To load the default channel assingment keep the button pressed at any menu point. You will directly jump to menu point N. 成功收到接收器信號時 Status-LED 燈會亮藍燈。 移動遙控器搖桿分配通道功能。當指令被偵測到時 Status-LED 燈會快閃。 如果你不想使用特定功能或是不想使用分開通道的 RPM定速器/或姿態控制時可以略過選單第 H、I、J 點。 如果要加載各頻道的原廠設定值時，在每個選單皆長按按鍵，就會直接跳到選單第 N 點。				
C	**Aileron** 副翼					
D	**Elevator** 升降舵					
E	**Rudder** 尾舵					
F	**Tail Gyro Gain** 感度					
G	**Throttle [CH5]** 油門 [CH5]					
H	**Auxiliary [CH6]** (Optional) 輔助通道（CH6）					
I	**RPM Governor** (Optional) 定速器					
J	**AttitudeControl** (Optional) 姿態控制					
N	**Failsafe Position** -Throttle [CH5] 失控保護位置 -油門 [CH5]	Move throttle to failsafe position and push button to save all menu items and exit menu. 移動油門到失控保護位置並按下按鈕儲存後離開選單。				

＊Factory Setting ＊出廠預設值

ADJUSTMENT OPTIONS OVERVIEW
調整選項總覽

ALIGN

Menu-LEDs: *Amount of Tail Gain A=0% to N=100%*
AttitudeControl gain A = "off" to N = 100%
(only after powering up or when adjusting the gain)

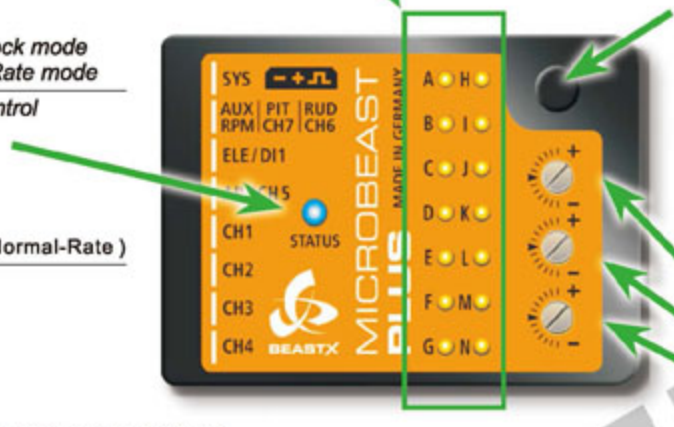
Menu-LED燈:尾舵感度總長 A=0% 至 N=100%
姿態控制感度 A="off" 至 N=100%
(只有開機後或是調整感度時)

Status-LED:
Tail gyro mode
Blue = Heading Lock mode
Purple = Normal-Rate mode

Red = Attitude Control

Status-LED燈:
尾陀螺工作模式
藍色=鎖定模式
紫色=非鎖定模式(Normal-Rate)

紅色=姿態控制



Button:
- to enter Setup menu push down several seconds until LED A is steady on
- to enter Parameter menu push shortly until LED A is flashing

按鍵
進入設定選單向下推幾秒鐘，直至 LED 燈 A 恆亮
進入參數選單短按一下，直至 LED 燈 A 閃爍

Dial 1: *Cyclic gain*
旋鈕1:循環螺距感度
Dial 2: *Cyclic feed forward*
旋鈕2:十字盤直接輸出量
Dial 3: *Tail gyro response*
旋鈕3:尾舵動態反應

* Only available if AttitudeControl is disabled
*只有在姿態控制禁用時可選擇

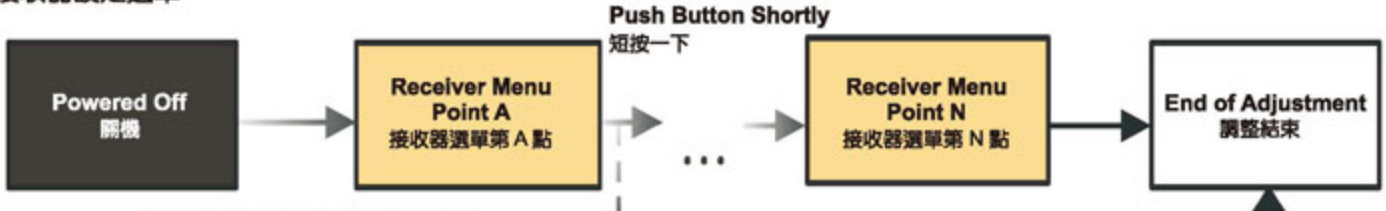
Parameter Menu
參數選單

Setup Menu
設定選單

If "Electric" or "Nitro" is Selected at Menu Point N
如果在選單第N點已選擇"電動"或 "引擎"

Governor Menu
定速器選單

Receiver Setup Menu
接收器設定選單



Hold button pushed and power on while still pushing the button
按住按鈕，開啓電源同時仍按下按鈕

When Selecting "standard" at Point A
如在選單第 A 點選擇"standard"

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

2016.Feb.17 G00677