

TWISTER HAWK

READY TO FLY 4 CHANNEL R/C HELICOPTER

Assembly & Flight Training guide

**TEST-FLOWN &
FLIGHT-GUARANTEED**

so you know it flies!



SPECIFICATIONS

Main rotor diameter	340mm
Fuselage length	435mm
R/C transmitter	*FM 4 channel with 4 trims
Cyclic steering.....	hi-torque EnerG micro servos
On-board electronic control	Twister Hawk 4-in-1 unit
On-board power	7.4V Li-polymer (with cell balancer)
Flying weight.....	around 230g (8oz)
Flight time per charge	up to 10 minutes (approximate)
Main drive	twin motors + ballraced steel main shafts
Primary electronic stabilisation	on-board piezo yaw rate gyro

KIT CONTENTS

Twister Hawk helicopter.....	1
*Twister 4-channel FM transmitter.....	1
Twister "4 in 1" on-board electronics unit.....	1
EnErG micro servos.....	2
Twister transmitter and receiver crystals.....	1 set
Twister 7.4V lithium polymer battery pack.....	1
Twister Lithium polymer 12V DC/DC Charger.....	1
Twister 240V mains power supply.....	1
Twister Hawk instruction manual.....	1
Twister Hawk DVD	1
FREE main blades (upper & lower)	2 sets
Flight Simulator USB cable set (connects transmitter to a PC)	1
AA pence transmitter batteries	8

*36mHz FM in Australasia, 35mHz FM in UK & Europe



IMPORTANT!
Radio controlled model
NOT A TOY!

This high performance model must be assembled according to the instructions. May cause serious injury to persons or property if not used responsibly or if operated without due caution.

Unsuitable for children under 14 years old.



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VITAL SAFETY INFO

Please read all instructions carefully before using this model. If any information in this manual is unclear, please contact your supplier for help. Please note especially the potential dangers associated with the rotating parts in this model:

DANGER—Wear protective eyewear when using model helicopters!

DANGER—Do not wear loose clothing or ties!

DANGER—Keep well clear of rotating blades!

DANGER—Never fly near children or animals!

ABOUT THE FLYING AREA REQUIRED

The Twister Hawk is designed primarily for indoor use—or outdoors in flat calm conditions. A hard, flat surface clear of all obstacles with an area of around 400 square feet is the minimum recommended requirement.

However, you should fly only where it is safe to do so.

ABOUT TRAINING, CRASHES & SPARE PARTS

The Twister Hawk has been designed to be strong and very easy to repair, however, the helicopter is not invulnerable and most people will tip their helicopter over or break parts during their flying career. This is quite normal. All parts are available as spares from your supplier. Study the exploded view of the helicopter carefully to understand the relationship between parts and how to replace them if necessary. Crash damage is not covered by warranty.

GUARANTEE/WARRANTY

J. Perkins Distribution Ltd and Model Engines (Aust.) Pty. Ltd. guarantee this product to be free of manufacturing and assembly defects for a period of one year from time of purchase. This does not affect your statutory rights. This warranty is not valid for any damage or subsequent damage arising as a result of a crash, misuse, modification or for damage or consequential damage arising as a result of failure to observe the procedures outlined in this manual. Operation of this model is carried out entirely at the risk of the operator. Please note that, whilst every effort is made to ensure the accuracy of instructions and material included with this product, mistakes can occur and neither J. Perkins Distribution Ltd/Model Engines (Aust.) Pty. Ltd. nor it's distributors will be held liable for any loss or damage arising from the use of this model or for any loss or damage arising from omissions or inaccuracies in the associated instructions or materials included with this product.

We reserve the right to modify the design of this product, contents and manuals without prior notification.

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INTRODUCTION

Thank you for buying one of the most complete, most stable, high quality scale RC helicopters available today.

It almost hovers by itself!

The co-axial rotors and ingenious design of this helicopter make RC helicopter flight accessible and practical to virtually anyone interested in RC helicopters!

The Twister Hawk demonstrates remarkable hovering stability and will help guide pilots into successful flight in the shortest possible time.

Test-flown, Flight Guaranteed and Ready to Fly!

The Twister Hawk is ready to fly and is designed for use indoors and outdoors (in calm conditions) in an adequate and safe space. The helicopter is designed by expert engineers and assembled at the factory. It is strong and designed with numerous innovative safety and damage prevention features. The Twister Hawk uses the highest quality drive, power and control systems.

Above all, this is one of the most fun-packed models we have ever flown and we hope you will enjoy flying it as much as we have!

State-of-the-art electronics in one package

The '4-in-1' on-board electronics package includes 6 channel receiver, piezo gyro, electronic mixers and speed controllers PLUS a computer fail-safe, an LED system check, and a motor safe-start facility.

Damage prevention and safe-start systems included

The fail-safe cuts power to the main motor in the event of transmitter failure while the safe-start only allows starting when the throttle stick and throttle trim are low—so there is no danger of connecting the flight battery and thereby inadvertently powering up the main rotors.

Integral LBW (Low Battery Warning) beacon

helps prevent damage to your helicopter & Lipo battery by flashing when it's time to land & recharge!

Revolutionary MOPS (Motor Overload Protection System)

helps prevent damage to your motors & electronics by killing the motors automatically on blade-stalling tipovers—then automatically re-energising the system some seconds later!

Professional transmitter included

The transmitter has been designed for precision helicopter flying and features high quality adjustable height stick units, convertible between Mode II (throttle left) and Mode I (throttle right).

The transmitter incorporates full 4-function control via two dual axis control sticks, socket for the (included) Flight Simulator cable set, reversing switches, moulded ergonomic rear grips, carry handle, neckstrap hang point and a charging socket (for charging optional rechargeable transmitter batteries).

Flight Simulator USB cable set included

Practice helicopter flying using the included transmitter plus your Windows PC before flying for real!

Spares

All spare parts are available for the Twister Hawk and can be purchased through model and hobby outlets. Some FREE spares are included which will help you through your learning phase.

NEW TO R/C HELICOPTERS?

The model is not a toy and requires preparation before flight. If you are new to RC helicopters, please do not expect to be able to open the box and immediately 'fly around'. RC helicopters are fun to fly but require some time and training in order to be flown successfully.

If this is not what you were expecting, we advise you not to buy this model.

Flight Training Guide and DVD included!

In the DVD and manual we have included sections on Basic Helicopter Flight Theory as well as a Flight Training Guide—written and produced by experienced RC model helicopter pilots, so that anyone should be able to fly this model using just what is supplied in the box.

We sincerely hope this material will help you successfully explore real RC helicopter flying.

NB. The included DVD is not designed to replace this manual. Please use both the manual and DVD to get the most out of your Twister Hawk.

Although the Twister Hawk is easy to fly, please note that we do not guarantee that by following the information included with this product you will be bound to achieve successful helicopter flight. Neither do we guarantee you will not break anything!!



GENERAL SAFETY CONCERNING HELICOPTERS

Please be aware that rotating blades can inflict painful and possibly serious injuries to people, animals or objects should the rotors strike someone or something.

We recommend people use protective eyewear when operating this model. and that you read the manual carefully before operating your Twister Hawk.

Radio controlled models themselves can reach high speeds and cover significant distances rapidly if control is lost. This model is capable of speeds of around 20mph (30kph) or greater.
The model must therefore be used responsibly and with great care generally.

The model uses crystal-controlled 35MHz (36MHz in Australasia) FM RC equipment. To avoid interference, always check frequencies with other pilots in the area before switching on.

In the UK, we recommend you observe the model flying safety code of the British Model Flying Association which can be found at the the following address:

<http://www.bmfa.org>

In Australasia, please contact your hobby supplier.

WELCOME

A. KIT CONTENTS

- ▼ 1. Carefully remove the model and other items from the packaging and check all items are included.
- ▼ 2. Insert the 8AA alkaline batteries into the transmitter battery compartment being careful to observe battery polarity.

Although the Twister Hawk is strong, all model helicopters require careful handling and a delicate touch. In particular, take great care with the electrical connections to and from the '4-in-1' control unit and also the main rotor associated parts.

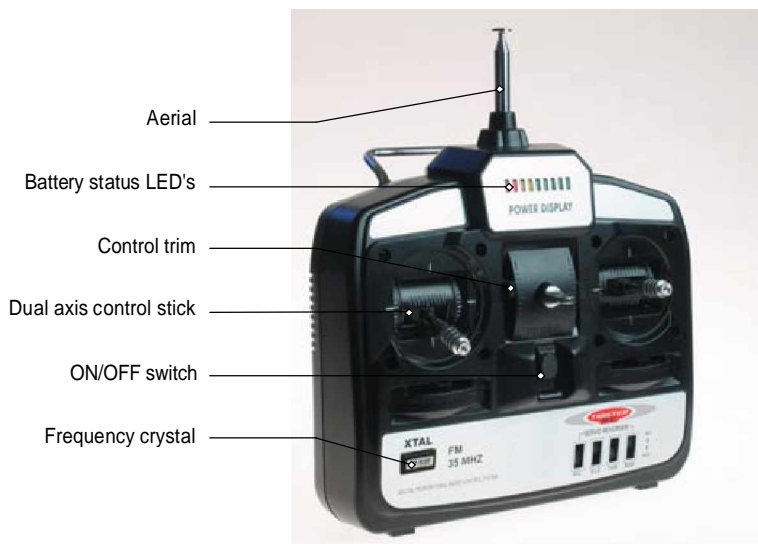
SAFETY NOTE!

RC flight is achieved through low power RF (radio frequency) transmissions. Do not shorten the receiver aerial or operate in the vicinity of any RF interference.



B. TRANSMITTER PART NAMES

The battery compartment is in the rear of the transmitter.



C. REVERSING SWITCHES

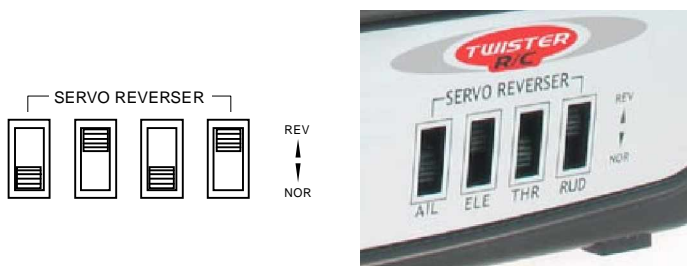
Reversing switches are used to reverse the direction of the four flying controls.

They are factory-set and should NOT be switched for flying your Twister Hawk.

They may be useful if you use other models or fly the many models available within R/C flight simulators.

The reversing switches are located on the front panel of the transmitter.

The correct position of the switches is shown below:



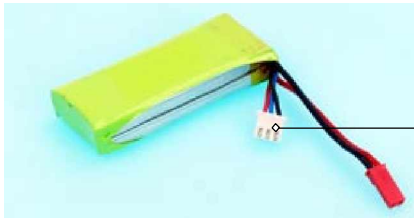
D. TRANSMITTER MODE CONVERSION

The transmitter can be converted from throttle left to throttle right and vice versa (i.e. between mode 1 and mode 2) by appointed engineers. Please contact your supplier for details.



FLIGHT PREPARATION

A. LITHIUM POLYMER FLIGHT BATTERY



Charging lead only

The Lithium polymer (Li-po) flight battery is a high power battery designed to give a flight time of up to 10 minutes per charge. It is supplied in a partially charged state. As well as a red JST polarised lead (for connection later to the 4-in-1 board), the battery is also fitted with a white 3-pin polarised connector. This is the charge lead.

When you have finished flying for the day, recharge the battery and always leave it in a partially or fully charged state. Never leave your battery in a discharged state as this may damage the battery and shorten it's life.

The battery must be recharged when the LBW beacon on the top of the helicopter starts to flash blue, or if you notice the helicopter is losing power. At this point, land and recharge the battery.

Do not be tempted to run the battery past this stage as you will be over-discharging and the battery may be damaged.

WARNING!

We recommend that you use only the supplied Twister charger with this battery.

WARNING!

Over-discharging will shorten the life of the battery or damage it. Stop flying immediately the LBW (Low Battery Warning) beacon starts flashing and recharge the battery.

WARNING!

Do not short circuit—battery may explode!

PLEASE READ THE SAFETY PROCEDURES FOR HANDLING LI-POLY BATTERIES ON PAGE 23 BEFORE PROCEEDING FURTHER.

B. CHARGING THE FLIGHT BATTERY



The charger is designed to automatically charge the Li-Po battery in about 1 hour from a discharged state. The 12V DC automatic charger is powered by the 240 Volt power supply illustrated above.

Alternatively, you can use a 12 volt sealed modelling battery to power the DC automatic charger.

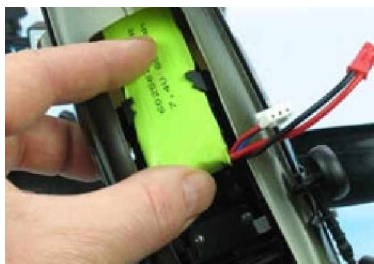


- ▼ 1. Connect the charger to your power source. The 'POWER' LED will flash red.



- ▼ 2. Plug the 3-pin connector on your Li-po battery into the socket in the right side of the charger.
The green LED will light and the red LED will glow solid red.
- ▼ 3. When the battery is fully charged the green LED goes out. Disconnect the battery from the charger.
- ▼ 4. Disconnect the power source from the charger. Your Li-po battery is ready for use.

C. FITTING THE FLIGHT BATTERY



- ▼ 1. Slide the charged battery pack into the rear part of the battery holder taking care to slide the battery beneath the two rear retainers only - but do not connect the power lead yet!



- ▼ 2. Push the battery forward to engage it securely beneath the front pair of retainers too.
Ensure the battery is slid all the way home and retained with velcro fastening (attached to the battery and battery holder).

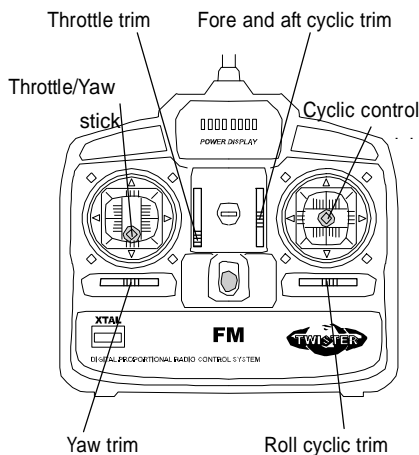


D. LINKAGE CHECKS

- ▼ 1. Check that all linkages and connectors are attached and that rotating parts are free to rotate smoothly.
- ▼ 2. Check that all linkages move freely with no binding or stiffness. Free off any linkages that show any sign of tightness or binding.

TRANSMITTER LAYOUT THROTTLE LEFT (MODE 2)

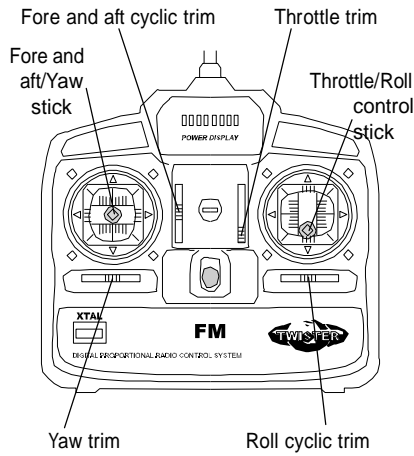
STICK AND TRIM CONTROL SUMMARY



- ▼ 1. Move the throttle (left stick) and throttle trim of your transmitter to the lowest (low throttle) position as shown above.
- ▼ 2. Centre the trim levers of the 3 other transmitter functions.
- ▼ 3. Extend the transmitter aerial fully.
- ▼ 4. Switch on the transmitter.

TRANSMITTER LAYOUT THROTTLE RIGHT (MODE 1)

STICK AND TRIM CONTROL SUMMARY

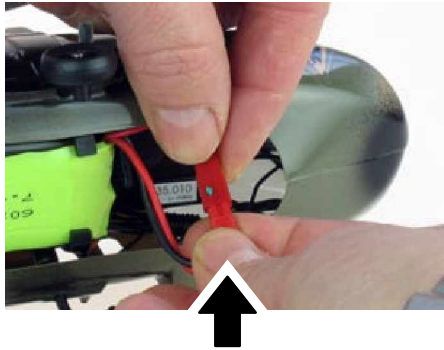


- ▼ 1. Move the throttle (right stick) and throttle trim of your transmitter to the lowest (low throttle) position as shown above.
- ▼ 2. Centre the trim levers of the 3 other transmitter functions.
- ▼ 3. Extend the transmitter aerial fully.
- ▼ 4. Switch on the transmitter.



POWER CHECKS AND CONNECTING UP

A. CONNECTING THE LI-PO BATTERY



- ▼ 1. Plug the battery connector into the matching battery lead emerging from the side of the canopy.

WARNING!

Keep hands, clothing, eyes, animals and children well clear when connecting power to this model or when flying it!



- ▼ 2. After the on-board 4-in-1 unit has completed satisfactory systems checks, the on-board LED will glow green continuously.

Do not move the helicopter during the checking and calibration process.

Do not operate the throttle yet.

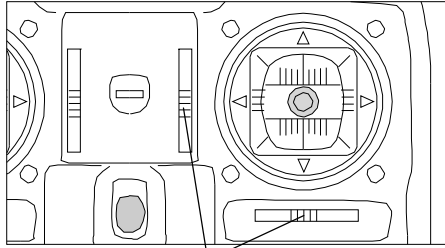
WARNING!

Always extend the transmitter aerial fully.

Check the receiver aerial emerging from the 4-in-1 board is extended and is not coiled up.

B. SWASHPLATE LEVEL CHECK (MODE 2 TRANSMITTER)

The next stage requires you check control servo operation. Proceed as follows:

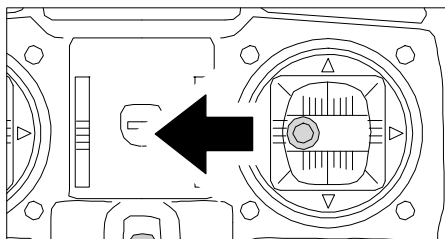


**Adjust cyclic trims to level swashplate
(Mode 2 transmitter shown)**

- ▼ The helicopter swashplate should be horizontal when viewed from the front and from the side of the helicopter. If it is not, adjust it's position by operating the cyclic trims. See pics above.

The ball joints snapped to the swashplate can be unsnapped and screwed/unsnapped if further adjustment is needed after the model has flown.

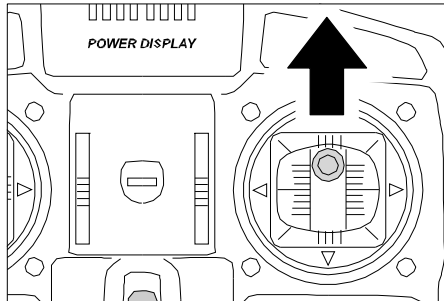
C. SWASHPLATE ROLL CHECK (MODE 2 TRANSMITTER)



- ▼ Roll cyclic - Move the transmitter roll (aileron) stick to the left.
The swashplate will tilt as indicated above.

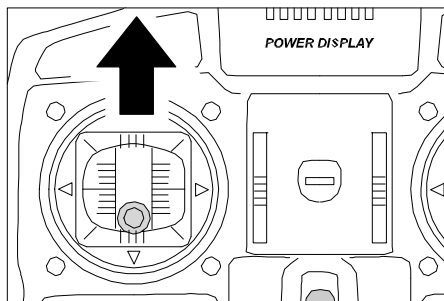


D. SWASHPLATE ELEVATOR CHECK (MODE 2 TRANSMITTER)



- ▼ Fore and aft cyclic - Move the fore and aft (elevator) stick forward. The swashplate will tilt as indicated above.

E. THROTTLE CHECK (MODE 2 TRANSMITTER)



- ▼ Throttle - Slowly push the throttle stick forward by a small amount and check that the main rotors start to rotate. Then immediately throttle back.

F. YAW CHECK

- ▼ Yaw - Tail control is achieved by altering the relative speed of the main rotors and can only be checked just before take-off as the helicopter becomes light on its skids.



G. RANGE & POWER CHECK

- ▼ It is important to check the transmitter will operate the model satisfactorily at maximum range.
- ▼ In order to do this place your model on the ground and walk away from the model whilst operating the swashplate controls.
Check that the servos in the helicopter operate without interference up to a distance of 50 metres with transmitter aerial fully extended.
- ▼ Check that the transmitter Battery Status LED's are showing at least one lit green LED.
Do not fly if no green LED's are lit.

Your Twister Hawk is ready for flight, but...

WARNING!

...If you are not an experienced R/C model helicopter pilot you must read the ENTIRE manual before flying.

WARNING!

Do not fly at 50 metres distance or greater. At distances of greater than 50 metres, it will become impossible to see your Twister Hawk.

We strongly recommend you fly no further away than 15 metres.

WARNING!

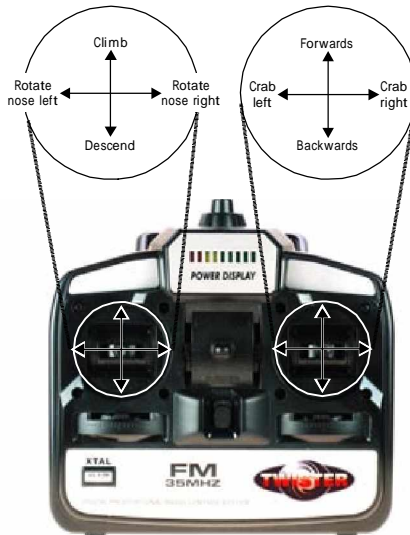
After finishing flying, always disconnect the battery from the helicopter FIRST. Then switch off the transmitter. Do not switch off the transmitter first and disconnect battery second.

WARNING!

You must take care and ensure the flying area is large enough and contains no obstacles (such as children, animals or furniture), which could be hit while you are flying your Twister Hawk.

FLIGHT CONTROLS MODE 2

A. FLIGHT CONTROLS LAYOUT

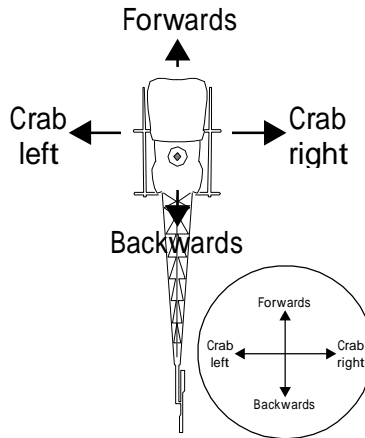


- ▼ Each dual axis stick unit of your transmitter controls 2 helicopter functions (complete with trimmers on each function) giving you control about all 4 axes of flight). See above.



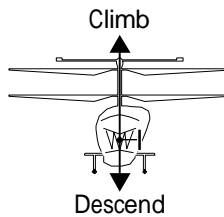
B. RIGHT STICK UNIT FUNCTIONS

- ▼ The right stick operates the 'cyclic' steering controls and moves the helicopter forwards/backwards and to the left/right in the horizontal plane. See below:

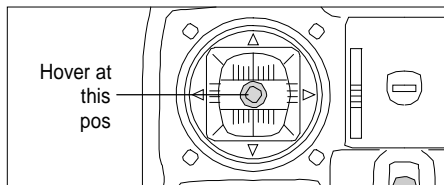


C. LEFT STICK UNIT FUNCTIONS

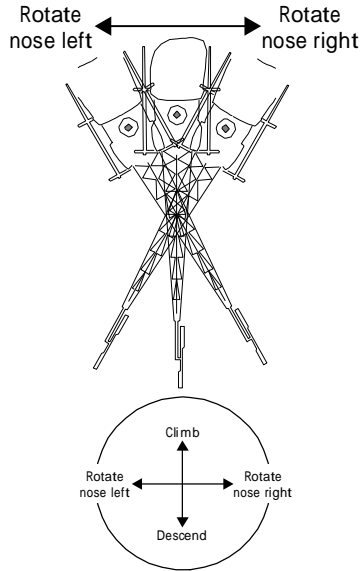
- ▼ The left stick operates throttle (main rotor speed) and yaw control. Throttle is increased to climb the helicopter and reduced to descend:



- ▼ The model hovers at approximately half power (at the middle stick position):

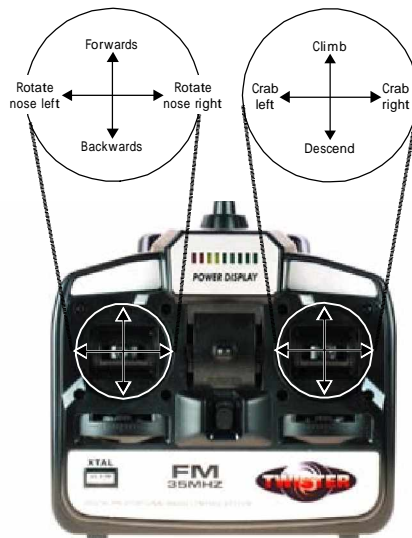


- ▼ Moving the stick to the left or right will rotate the nose to left or right. This is called 'yaw control'. See below:



FLIGHT CONTROLS MODE 1

A. FLIGHT CONTROLS LAYOUT

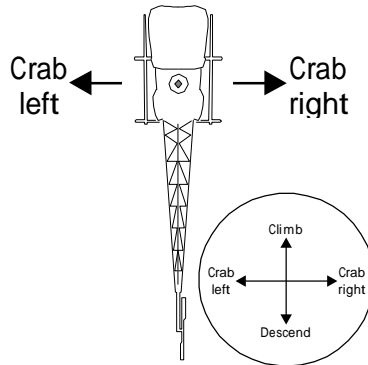


- ▼ Each dual axis stick unit of your transmitter controls 2 helicopter functions (complete with trimmers on each function) giving you control about all 4 axes of flight).

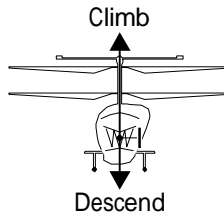


B. RIGHT STICK UNIT FUNCTIONS

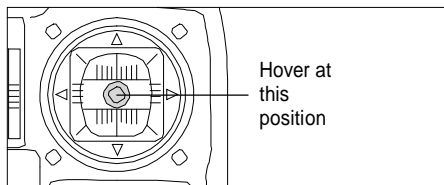
- ▼ The right stick operates the throttle (main rotor speed) and the 'cyclic' steering which moves the helicopter to the left/right in the horizontal plane. See below:



- ▼ The right stick also operates the throttle (main rotor speed).
Throttle is increased to climb the helicopter and reduced to descend:



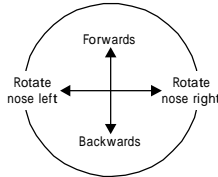
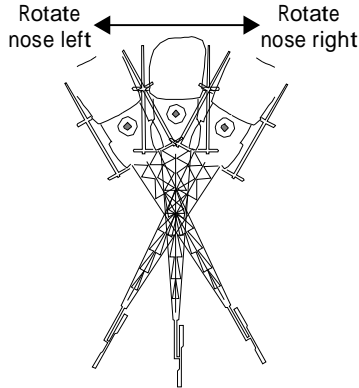
- ▼ The model hovers at approximately half power (at the middle stick position):



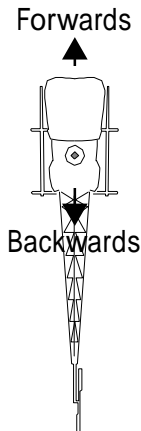


C. LEFT STICK UNIT FUNCTIONS

- ▼ The left stick operates both yaw control and the forwards/backwards 'cyclic' steering controls.
- ▼ Moving the stick to the left or right will rotate the nose to left or right. This is called 'yaw control'.
See below:



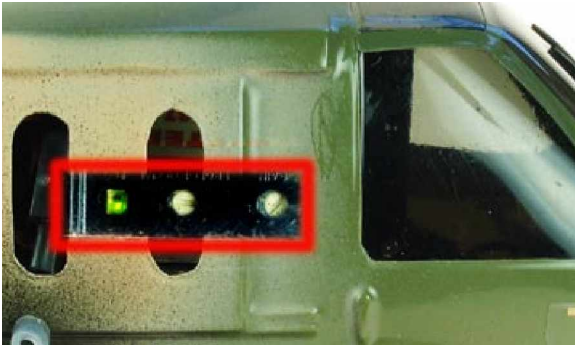
- ▼ Moving the stick forwards or backwards will cause the helicopter to move forwards or backwards.
See below:





FINE TUNING OF YAW CONTROL

4 IN 1 UNIT ADJUSTORS



The 2 trimmers on the front of the '4-in-1' unit are factory adjusted and usually require no adjustment. The status LED is next to the trimmers. The trimmers perform these functions:

- ▼ Gyro gain. The right trimmer (GAIN) adjusts the amount of gyro tail stabilisation from 0 to 100%. 90% is usually the best setting.
- ▼ Yaw trimmer. The left trimmer adjusts tail trim (centring of the tailboom).
NB if you adjust this trimmer you must restart the helicopter in order to observe an effect on yaw trim.

Adjustment of the yaw trimmer has no effect until the li-po battery is disconnected then reconnected and the system restarted in the usual manner.

WARNING!

If your model tips over or crashes you should close the throttle immediately, disconnect the battery and carefully inspect the model for damage. Make any repairs as necessary.

Crash damage is not covered by warranty.

DAMAGE PREVENTION FEATURES

Unique features built into your Twister Hawk are designed to prevent accidental damage to the power, drive and electronics systems.

LBW (LOW BATTERY WARNING) BEACON

The LED on the cabin of the helicopter will flash blue when the battery needs charging.

You must land immediately and recharge the battery. If you ignore the LBW beacon you risk damaging your battery!

WARNING!

Damage caused to the battery is not covered by warranty.

MOPS (MOTOR OVERLOAD PROTECTION SYSTEM)

In the event of a crash or tip-over where the blades become stalled, MOPS cuts power to the drive motors and electronics in order to prevent damage to these components.

If you crash the helicopter badly causing a blade stall, MOPS will kill the power automatically. You should return the transmitter throttle stick to the low power position. The system will automatically re-arm some seconds later.



HOW DOES A HELICOPTER FLY?

A hovering helicopter is controlled about 4 axes; yaw, pitch, roll and height. Your transmitter has 2 dual-axis precision stick units with two controls on each stick.

In a throttle left (mode 2) transmitter

- ▼ The left stick controls height (climb or descent) and tail rotor controls yaw (left or right).
- ▼ The right stick operates the cyclic steering controls which are used to pitch the helicopter nose up/nose down and to roll the helicopter left or right.

In a throttle right (mode 1) transmitter

- ▼ The right stick controls height (climb or descent) and cyclic aileron control to roll the helicopter left or right.
- ▼ The left stick operates the tail rotor controls yaw (left or right) and cyclic elevators controls which are used to pitch the helicopter nose up/nose down.

The revolutionary contra-rotating system used in the Twister Hawk transforms helicopter flight by making control so easy that the helicopter almost flies itself!

Transmitter stick movements

Helicopters require relatively small control inputs of relatively small duration. Do not move the sticks to extreme positions. A delicate touch is required on the sticks. The sticks should be allowed to return to neutral almost immediately after a control input is made. If you watch an experienced pilot hovering his helicopter, you will see that his transmitter sticks hardly move. This is the goal you will be working towards in this guide.

Height control

A helicopters rotating wings - the rotor blades, generate lift, in the same way that a propeller generates thrust. The lift generated by the main rotor blades increases as rotor speed rises causing the helicopter to climb. Conversely as the main rotor speed is reduced, the helicopter descends.

This method of helicopter height control is called 'fixed pitch'.

Height is managed using the throttle stick of your transmitter.

Push forward to climb, pull back to descend.

Yaw control

Yaw control is achieved by altering the speed of one main rotor relative to the other which causes a change in the torque generated by the main rotor and hence a rotation to left or right about the main rotor shaft.

When a helicopter is in the hover it can be yawed left or right.

Push the rudder stick left to yaw the nose of the helicopter to the left and push to the right to yaw the nose right.

Your Twister Hawk helicopter is fitted with a micro piezo gyro and electronic mixing system which automatically helps stabilise the tail making for much easier flight.

Steering control - fore and aft cyclic

When hovering, a brief forward push on the cyclic control stick will tilt the rotor disc forward causing the helicopter to move off in that direction. Pull the stick back gently to stop it. If you pull the stick back further, you start flying backwards.

Steering control - roll cyclic

When hovering, a brief right control stick movement will roll the rotor disc to the right and the helicopter will start moving to the right. By briefly moving the stick to the left any right drift or movement will be arrested or reduced.

Mastering the hover

Both experienced model and full-size helicopter pilots in the hover will gently 'nudge' the cyclic controls automatically in order to keep their helicopter in one spot and prevent it from moving away from that spot.

A large part of the initial learning phase in helicopter flight is about mastering the cyclic controls and learning to hover. Control commands will become 'instinctive' when you have 'mastered' the hover.



FLIGHT TRAINING GUIDE

THE FLYING AREA

The flying area should be indoors in a large room or a hall or office. In this room you should have all doors closed as any wind can affect the movement of the Twister Hawk.

Make sure the take-off floor has a smooth surface rather than carpet which can trip up the Twister Hawk during ground handling.

WARNING!

You should be aware that the main rotor blades spin at a high rpm and are capable of inflicting serious damage to objects, people and animals.

You must take care when you are flying and make sure there are no children or animals in the room or flying area.

In addition, make sure the flying area is large enough and contains no obstacles (such as furniture) which could be hit while you are learning to come to terms with the flight characteristics of your Twister Hawk.

POSITIONING YOUR TWISTER HAWK

First, double check that all the controls are working and operating correctly.

Place the model in the middle of the room.

Position yourself at least 2 metres behind the helicopter and slightly off to one side so that you are able to see the nose of the helicopter.

***Useful tip** Please note when flying that you must always watch the nose of the helicopter. For example, if the nose of the helicopter yaws to the left the tail swings right, therefore you must apply right tail rotor to correct this by pushing the yaw stick to the right.*

INCREASE THROTTLE GENTLY

Watch the nose and apply just enough throttle until the model becomes light on its skids.

***Useful tip** All helicopters exhibit a degree of instability when approaching take-off as friction from the ground is reduced as the helicopter gets nearer to 'unsticking' from the surface.*

Observe whether or not the helicopter is tending to move forwards or backwards.

If it tilts forward, you will need to apply rear elevator (rear cyclic) trim to correct. And vice versa if the Twister Hawk tends to tilt backwards towards you.

Observe the helicopter about the roll axis and adjust the trims in the same way—if it tends to roll or hop to the left, apply a little right roll trim and vice versa.

Adjust the trims until the Twister Hawk shows no detectable forward, backwards or sideways drift tendencies.

***Useful tip** When applying throttle, you must apply it gently and in small amounts.*

At this stage the Twister Hawk MUST STAY ON THE GROUND!

Too much throttle will cause the helicopter to leave the ground and you may have difficulty in bringing it under control quickly enough to avoid tipping it over.

WARNING!

Too much throttle applied too quickly will cause your helicopter to leap rapidly and uncontrollably into the air!

Never apply too much throttle too quickly.

WALKING THE HELICOPTER

The helicopter should now be trimmed and you should be in a position to start learning to 'take your Twister Hawk for a walk'.

These first flights should be made with the Twister Hawk in contact with the ground at all times.

Apply just enough power to make the helicopter light on the skids and add a few clicks of forward trim to tilt the rotor disc forwards.

Apply enough power so that the machine starts to move slowly forwards. Watch for any change of direction of the model and use the controls to correct.

At this point, you will be able to check yaw operation. Applying left yaw will tend to swing the nose to the left and right yaw will swing the nose right. Note that the on-board piezo gyro damps out any tail direction



changes and so stabilizes the helicopter.

The aim now is to travel steadily and progressively across the floor.

Walk forwards following the helicopter across the floor whilst using the controls to maintain slow and accurate progress.

The 'walking technique' is the method often used to safely develop the automatic ability to apply the right control input when needed. You should practice this until you are starting to automatically input the control commands required to keep the helicopter moving gently forwards along the ground.

When you feel confident, proceed to the next step...

TAKING THE FIRST 'HOP'

By now you should be making the correct control inputs automatically and be able to make smooth progress across the surface of your floor. If you cannot, please keep practicing!

The first 'hop' is a natural 'next step' from walking your Twister Hawk.

Whilst walking you apply a small amount of extra throttle to briefly raise the helicopter off the floor and into the air for a second. Then you should reduce throttle and settle back onto the floor.

With practice, you will find that you are able to make more and more of the correct control commands required to keep your Twister Hawk upright and that the hops become longer and higher.

Always make sure you watch the nose of your helicopter—not the tail. The gyro will keep the tail straight for you a lot of the time but you will have to use the yaw control to swing the nose of the helicopter straight as you make progress across the floor.

Keep practising and you will find that your flights will become longer.

Please be aware that a model helicopter in the hover—regardless of design—will never stay completely still! A helicopter will always require some level of input to stop drift or a tendency to turn or climb. This is not a sign of something faulty with the helicopter, but is in the nature of a hovering helicopter.

By now you should be able to manage hops at a height of between 10 and 30cm with duration of 5-10 seconds per hop. Flights will become longer and easier as your co-ordination and understanding of flight develop.

HOVERING AND MANOEUVRES

As your co-ordination and anticipation improves, you should be able to reduce forward speed when making 'hops', thereby bringing your helicopter into a hover.

Practice hovering until you feel confident with the basic handling of your helicopter.

Next, you should start experimenting at rotating (yawing) the helicopter slightly to the left or right using the tail rotor (yaw) controls—but only proceed to this stage when you have mastered the hover!

From the hover, yaw the model a few degrees left and then back to straight ahead—always remembering to watch the nose. Practice yawing to left and to right until you feel confident.

Next, practice crabbing your Twister Hawk to the right and left using cyclic controls:

From the hover, briefly 'nudge' a small amount of right roll. Your Twister Hawk will start a drift to the right.

Put in a small amount of opposite roll to halt the drift, then a small amount of left roll to start a drift to the left. You may need to keep the tail straight using tail rotor whilst doing this. Always be ready to correct the drift by using opposite roll. If you get into trouble at any stage, reduce the throttle, land, change your trousers and try again.

BEYOND THE HOVER

As you become more proficient with your helicopter you will want a larger space so you can really start to fly around instead of hovering about all day.

If you do fly outside, please remember that any wind will affect the performance of your Twister Hawk—sometimes markedly. Don't be too surprised if, while flying your model, it suddenly climbs or drops without you making any input. This can be caused by a small breeze, gust or a 'thermal' passing through.

A training undercarriage can be a huge help by providing your Twister Hawk with a wide track and a degree of cushioning to aid stability and therefore help prevent 'tip-overs'. See the parts listing at the end of this manual. Another useful training aid is a computer flight simulator which can greatly enhance and speed up the learning process. A simulator is also great for teaching yourself "nose in" flying. This is when the nose of the helicopter is pointing at you and where some of the controls effectively become reversed—which can catch out both experienced and novice pilots alike!

GOOD LUCK AND HAPPY FLYING!



USB PC FLIGHT SIMULATOR CABLE

Your Twister Hawk is supplied with a USB cable that connects via the socket on the rear of your transmitter to a Windows PC or notebook PC.



Using free R/C flight simulator software, downloadable from the Internet, you can run a realistic R/C helicopter simulation that will allow you to practice until you feel comfortable enough with the simulator to have a go with the real model.

The transmitter can be used with a Windows PC to run a number of R/C model flight simulators. The advantage to the pilot is twofold: by practising using your own transmitter on a simulator you will get familiar with your very own set of controls when you fly your Twister Hawk for real.

Secondly, a simulator is particularly good at introducing the basics of R/C flight for those unfamiliar with the four flying controls, the trims and their effects on a helicopter.

For advanced pilots wishing to practice 'nose-in' hovering where the controls are effectively reversed; a simulator is a great tool

We recommend the FMS free flight simulator available as a free download from:

http://n.ethz.ch/student/mmoeller/fms/index_e.html

There are hundreds of different models available for use with the FMS simulator. For example, you can download a Blackhawk helicopter for use with the FMS Simulator from this URL:

<http://logic-wizard.hp.infoseek.co.jp/fms/UH-60.zip>

TROUBLESHOOTING

MAIN ROTOR DOES NOT TURN

- ▼ Check throttle stick and trim lever are in the fully down position before advancing the throttle stick.
- ▼ Check all electrical connections and that the '4-in-1' receiver crystal is seated securely in the socket in the '4-in-1' unit.
- ▼ Check that both motor pinion gears are still engaged with the main drive gears.
- ▼ Check Li-po battery is charged.
- ▼ Check state of transmitter batteries.
- ▼ Check green light on 4-in-1 unit is glowing.

HELICOPTER SPINS UNCONTROLLABLY

- ▼ Check main gear retaining set screws
- ▼ Check Gyro gain trimmer (4-in-1 unit) to ensure gyro gain is set to approximately 90%.

HELICOPTER ACCELERATES AWAY WHEN STICKS ARE NEUTRAL

- ▼ Check that swashplate is level. Adjust trimmers and/or adjust swashplate cyclic links length if necessary.

VIBRATION

- ▼ Bent main shaft(s)—the tail boom and undercarriage will vibrate if the main shaft(s) is/are bent. Replace the main shaft(s) and gear unit if you suspect a bent main shaft.
- ▼ Flybar is bent—straighten or replace if badly bent.
- ▼ Main blades out of balance—check that blades are not bent or broken.



LITHIUM POLYMER BATTERY SAFETY

Before Charging Li-po's

- Before charging your battery check for any damage e.g. check if the battery has expanded or swollen in size or if the battery cells have been punctured. If any of the above is true: DO NOT CHARGE THE BATTERY!

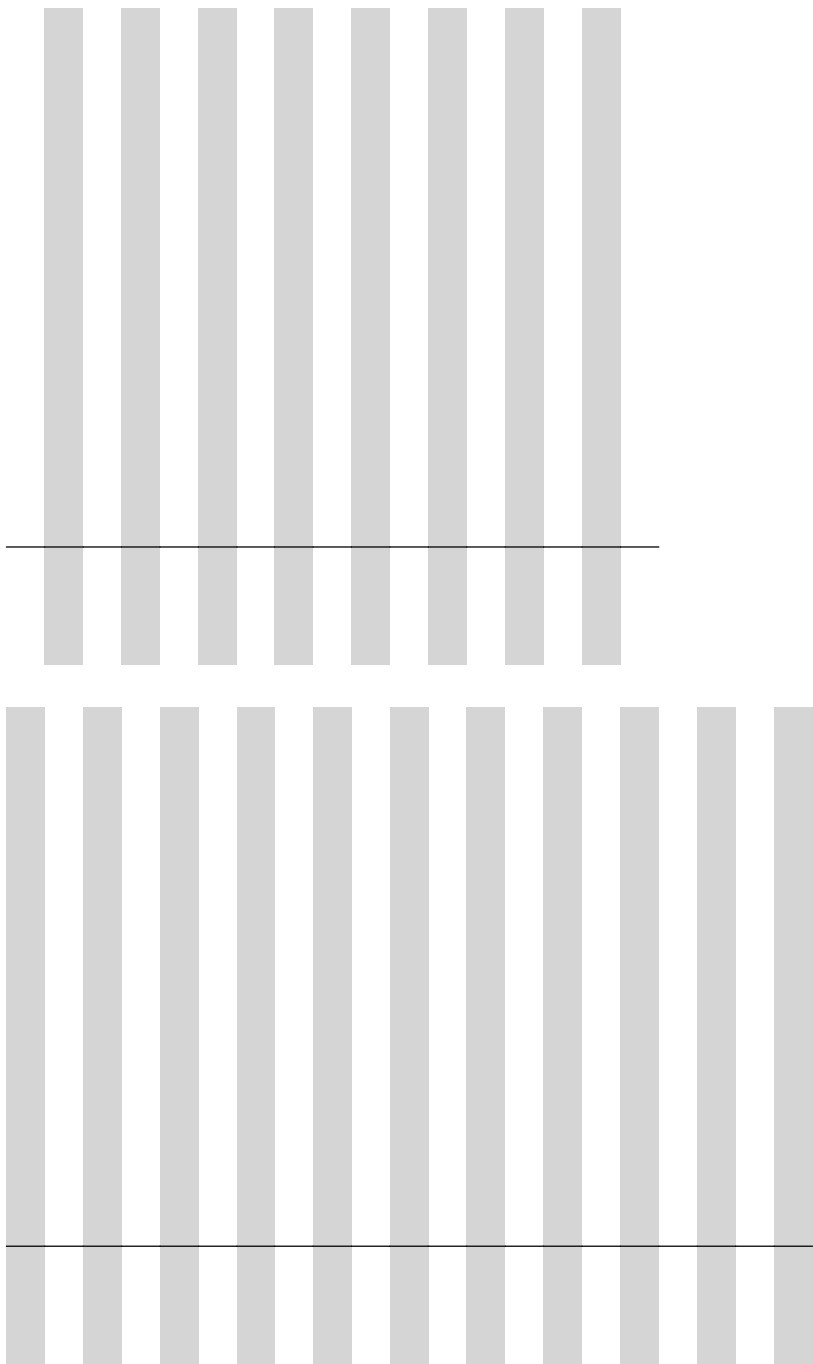
Charging Li-po's

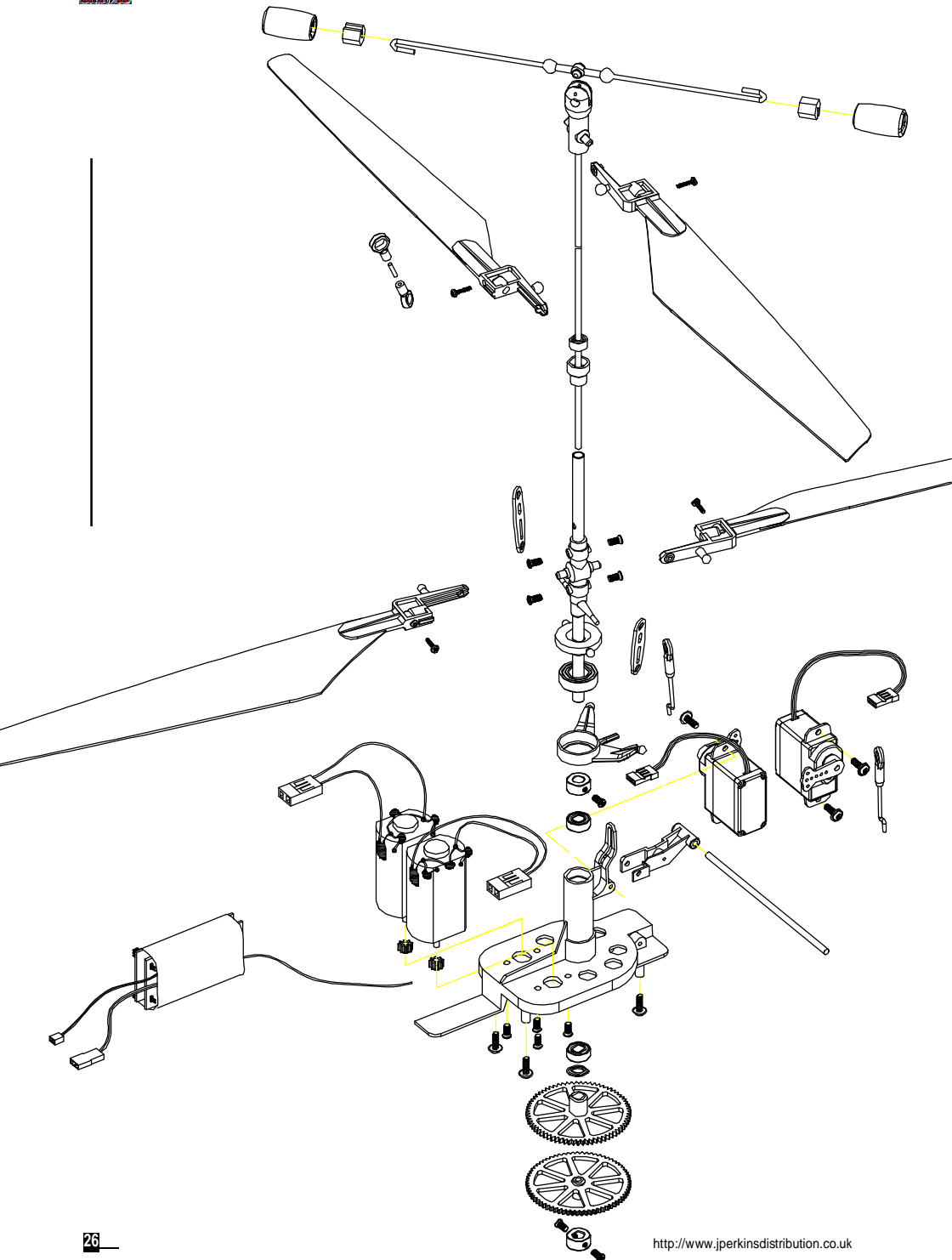
- Only use a charger designed to charge Lithium polymer batteries. Never use a nicad or other charger as this is very dangerous.
- Never attempt to charge at a rate faster than that recommended in the instructions. Check that the **battery** cell count matches the **charger** cell count switch (if fitted).
- Never charge unattended. Always stay with your battery whilst charging in case of overheating or fire.
- Charge on a safe surface or container (e.g. old unused microwave oven). Charge **only** on non-flammable surfaces, e.g. concrete floor preferably outdoors, or in a pyrex cooking dish with the battery placed on a bed of sand, or in a fireplace. Never charge inside a car!
- Switch off charger if battery gets too hot. If the battery becomes hot to the touch during charging, disconnect and switch off immediately.
- Extinguish fires with sand. If something goes wrong and your battery catches fire, always have sand from a fire bucket at hand to douse the flames. Do NOT use water!

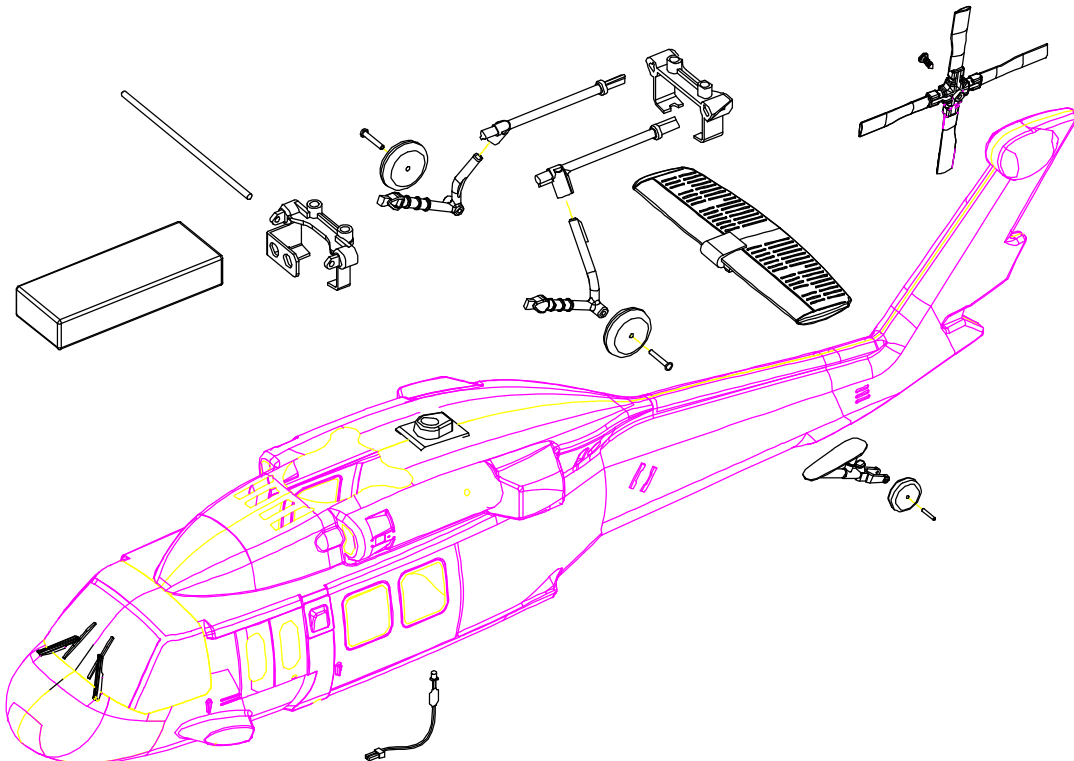
Using Li-po's

- Do not modify/change any part of the battery or lead. Do not remove its heat shrink protective covering. Removal or modification may damage the battery and will invalidate any warranty claim.
- Do not place this battery near fires or anything with high temperatures.
- Do not charge batteries while you are driving and do not store batteries in any type of motor vehicle.
- Do not let the battery get wet or become submerged in any type of liquid.
- Do not carry loose batteries in your pocket or bag as they could short-circuit against other items.
- If you should get electrolyte from the cells on your skin, wash thoroughly with soap and water. If in your eyes, rinse thoroughly with water. Seek medical assistance.









OPTION PARTS

Part No.	Description
6600500	CNC ALU.CENTRE HUB (OPTION)
6600502	CNC ALU. SWASHPLATE (OPTION)
6600504	CNC ALU. LOWER HUB (OPTION)
6600506	CNC ALU. BB/HOLDER (OPTION)
6600508	LED LIGHT SET(OPTION)
6600509	LED NAVIGATION LIGHT (OPTION)



6600500



6600502



6600504



6600506



6600508



6600509

TWISTER HAWK

READY TO FLY 4 CHANNEL R/C HELICOPTER

Assembly & Flight Training guide

**TEST-FLOWN &
FLIGHT-GUARANTEED**
so you know it flies!



Australasia agents: Model Engines,
Melbourne, Australia



www.modelengines.com.au

European agents: J Perkins Distribution,
Lenham, England



www.jperkinsdistribution.co.uk

Available from: www.modelflight.com.au