

# Twister CP V2.1

## THE MOST COMPLETE COLLECTIVE PITCH TRAINER/3D HELICOPTER IN THE WORLD

**FOR INDOOR FLIGHT, TRAINING FLIGHT, OUTDOOR FLIGHT AND AEROBATIC 3D FLIGHT  
NOW WITH (LBW) LOW BATTERY WARNING BEACON & 240V  
POWER SUPPLY (INCLUDED FREE!)**

### INCLUDED:

- Woven carbon main blades
- Two lipo batteries included
- Cell balance charger/batteries/ 240v power supply
- Bell/hiller mix rotor head
- Tx with trainer & 3d switches
- Tx batteries included too!
- Instructional DVD
- Flight training guide
- LBW (low battery warning beacon)



This model has been  
**TEST-FLOWN**  
SUCCESSFULLY and is therefore  
**FLIGHT-GUARANTEED**  
to ensure  
**MAXIMUM SUCCESS**

### SPECIFICATIONS

Main rotor diameter ..... 510 mm  
Fuselage length ..... 520 mm  
Radio control ..... CCPM system with 3 micro servos  
4-in-1 unit ..... speed cont., piezo gyro, receiver, etc.  
Flying weight.....300g

### CONTENTS

1 ....Assembled helicopter (incl. main & tail motors)  
1 ..... 35Mhz FM CCPM transmitter  
1 ..... "4 in1" on-board electronics unit  
3 ..... Micro servos  
1 ..... Set transmitter and receiver crystals  
2 ..... 11.1V 1000mAh lithium polymer battery pack  
1 ..... Lithium polymer DC/DC (12-15V) Charger  
1 ..... 240V power supply  
1 ..... Instructional DVD (showing mode 1 setup)  
1 ..... Twister CP V2.1 instruction manual  
1 ..... Lithium polymer charging/safety guide

### FEATURES

- Factory-assembled, RC installed COMPLETELY READY-TO-FLY collective pitch RC helicopter with carbon fibre main blades
- Around 15 minutes flight time per charge
- Two 11.1V Lithium polymer battery, 12V DC Li-Po fast charger with cell balancing technology & 240V power supply
- CCPM control system makes for precise hovering, instant height control and easier flight training
- Bell/Hiller cyclic and collective pitch system for amazing 3D aerobatics
- Idle up/3D switch for circuit flying/aerobatics
- One-piece '4 in 1' on-board computerised electronics unit saves weight, improves performance and simplifies use
- Transmitter with training switch, 3D switch, charging socket, adjustable height sticks and silky operation stick units
- Instructional DVD included
- Speed controller disallows high throttle starts
- Throttle Fail-safe cuts in when signal lost
- Gyro is disabled at closed throttle to prevent unexpected tail rotor starts during transport
- Ball bearing swashplate, rotor head, main shaft and tail shaft for ultimate precision
- 13 Ball bearings in total
- Carbon fibre boom, UC struts, flybar, etc.
- LBW (Low battery warning beacon) alerts you when LiPo pack is running low and needs recharging
- Ideal for beginner to advanced pilots



<http://www.jperkinsdistribution.co.uk>



**IMPORTANT!**  
Radio controlled model  
**NOT A TOY!**

This high performance model must be assembled and operated according to the instructions.

May cause serious injury to persons or property if not used responsibly. Unsuitable for children under 14 years.

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## CRASHES & SPARE PARTS

The Twister CP V2.1 has been designed to be strong and very easy to repair, however, the helicopter is not invulnerable and most people will tip their Twister CP V2.1 over or break parts during their flying career. This is quite normal. Crash damage is not covered by warranty.

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.

## DVD-IMPORTANT INFORMATION

Transmitter mode–Please note that the Instructional Flight DVD included with this helicopter shows use of a MODE 1 transmitter—a different transmitter setup to the mode II transmitter supplied. A mode I transmitter has throttle and roll on the right stick. In the UK, most pilots fly mode II, throttle and tail rotor on the left hand stick, cyclic on the right stick.

Aerial deployment—contrary to the video, please ensure your receiver aerial is COMPLETELY unwrapped from the skid as per this manual.

J. Perkins Distribution Ltd guarantees this product is free from manufacturing or 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 consequential 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 the material included with this product, mistakes can occur and neither J. Perkins Distribution 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.

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J Perkins Distribution Ltd, Northdown Business Park, Ashford Road, Lenham, Kent, ME17 2DL, UK.



## VITAL SAFETY INFORMATION

IF YOU HAVE NEVER FLOWN RC HELICOPTERS WE RECOMMEND YOU SEEK ADDITIONAL ADVICE FROM YOUR SUPPLIER OF RC HELICOPTERS.

READ ALL INSTRUCTIONS CAREFULLY PRIOR TO USING OR FLYING. CONTACT YOUR SUPPLIER IF ANY INFORMATION IS UNCLEAR. YOU ASSUME ALL RISK AND RESPONSIBILITY WHEN USING THIS MODEL.

KEEP WELL CLEAR OF ROTATING BLADES. NEVER WEAR LOOSE CLOTHING WHEN OPERATING HELICOPTERS. ALWAYS WEAR PROTECTIVE EYE WEAR WHEN OPERATING MODEL HELICOPTERS.

THE TWISTER CP V2.1 IS DESIGNED FOR INDOOR OR OUTDOOR USE, HOWEVER, FLY ONLY WHERE IT IS SAFE TO DO SO. A HARD FLAT SURFACE CLEAR OF ALL OBSTACLES AND A CLEAR INDOOR SPACE OF AROUND 400 SQUARE FEET IS THE MINIMUM RECOMMENDED REQUIREMENT.

DO NOT FLY NEAR CHILDREN OR ANIMALS.

Australasia agents: Model Engines,  
Melbourne, Australia



[www.modelengines.com.au](http://www.modelengines.com.au)

European agents: J Perkins Distribution,  
Lenham, England



[www.jperkinsdistribution.co.uk](http://www.jperkinsdistribution.co.uk)

## INTRODUCTION

Congratulations on your purchase of the most complete, high quality collective pitch micro helicopter available today.

The Twister CP V2.1 is ready to fly and includes charger, Lipos and 240V power supply. It is designed for use indoors and outdoors in an adequate and safe space.

This electric helicopter is designed by expert engineers and assembled at the factory. It is very strong, with numerous innovative safety features. The Twister CP V2.1 employs the highest quality CCPM (cyclic and collective pitch mixing) control systems and engineering.

### Collective pitch

Collective pitch provides much easier height control than fixed pitch and although more complex, makes flying easier and more stable. Even outdoor circuit flight and aerobatics (or 3D flight) is easily achievable using the Twister CP V2.1.

### Carbon fibre

Careful and appropriate use of carbon fibre has been made throughout to improve strength and save weight, whilst many precision miniature ball bearings support the important components.

### Electronics & safety

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. The fail-safe cuts power to the main motor in the event of transmitter failure, whilst the safe-start only allows starting when the throttle stick is low—so there is no danger of connecting the flight battery and inadvertently sending power instantly to the motors.

### CCPM

The CCPM transmitter has been designed especially for flying the CP helicopter and features high quality, adjustable stick units, convertible between Mode II (throttle left) and Mode I (throttle right). The transmitter incorporates a 'buddy box' trainer socket, a charging socket, a flight trainer switch and a 3D/Idle up flight switch. Both transmitter trims and stick units operate at a professional level of quality—a vitally important feature for successful helicopter control.

The Twister CP V2.1 performs magnificently outdoors and has a sparkling climb rate and great aerobatic/3D performance. Straight line stability in fast forward flight is excellent and is on a par with quality model helicopters many times its size! Spares are available through all good model shops.

## NEVER FLOWN? PLEASE READ...

Welcome to the fascinating world of RC model helicopters.

If you are new to RC model helicopters, please do not expect to be able to 'open the box and immediately 'fly around'. This model requires a commitment by the customer to spend time learning the procedures required for safe and successful operation.

To most people, this represents an interesting and usually exciting challenge. During the course of this manual we shall present you with an outline of the way model helicopters operate plus suggested training techniques written by experienced RC model helicopter pilots. We hope this will help you. However, this information is not designed as a definitive guide and is not a guarantee that you will achieve successful helicopter flight. Neither do we guarantee you will not break anything!

If this is not what you expected and demands more commitment than you wish to give, we advise you not to buy this product.

### Safety

On a 'safety first' note, you should be aware that the rotor head speed of a collective pitch model such as this, is markedly higher than the fixed pitch Twister helicopter. Hence, a good deal more damage will be caused should the helicopter strike a person or object!

Please observe the principles of safety prepared by the British Model Flying Association:

(<http://www.bmfa.org/>)

in their safety code which is available on-line.

### Advantages of collective pitch

A collective pitch model such as this is easier to fly than a fixed pitch model, chiefly because height control is instant and very precise. Also, a collective pitch helicopter is capable of advanced outdoor flight manoeuvres—unlike a fixed pitch helicopter. Please note, that unlike fixed wing aircraft where advanced models are more difficult to fly, collective pitch helicopters are easier to fly than fixed pitch helicopters!

Your supplier will be pleased to advise you on additional sources of information if you wish to know more about RC model helicopters.

## PREPARING FOR FLIGHT

### 1. UNPACKING YOUR TWISTER CP V2.1

- ▼ 1. Carefully remove the model and other items from the packaging.
- ▼ 2. Screw the transmitter aerial into its socket in the top of the transmitter.
- ▼ 3. Insert the 8 supplied AA batteries into the transmitter battery compartment being careful to observe battery polarity.
- ▼ 4. Unwrap the receiver aerial ENTIRELY from its stowed location around the right side undercarriage (and feed into the aerial tidy to prevent it from being caught in the blades). Do NOT tape it to any helicopter components as this may cause interference.

#### WARNING!

RC flight is achieved through low power RF transmissions and is susceptible to interference. The carbon and metal parts in a helicopter create potential interference hazards for your receiver, therefore it is important to route the receiver aerial directly away from the helicopter and away from interference hazards.

*Useful tip*..... Although the Twister CP V2.1 is very strong and includes many carbon fibre parts, all model helicopters require careful handling and a delicate touch when setting up for flight or during maintenance. In particular, take great care with the electrical connections to and from the '4-in-1' control unit.

### 2. CHARGING THE FLIGHT BATTERY

The Li-Po charger supplied is designed to automatically charge and balance the 11.1V Li-Po battery from the 240V mains power supply included in the kit or a 12V DC source such as a gel cell battery (JP No. 5510050 12V 7Ah - Not included).



Connect the charger to your power source and the Li-po battery to the charger using the white polarised multi-pin connector.

Follow the instructions on the front of the charger to charge the battery.

#### WARNING!

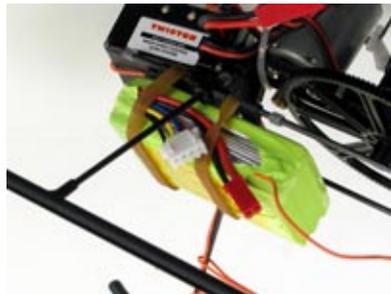
**Li-poly batteries can be dangerous!**

**Please take time to read the procedures outlined in the supplemental instructions for charging Lithium Polymer batteries.**

**The charger is designed to cut off when full capacity is reached.**

**Under no circumstance must a battery be left charging unattended!**

### 3. FITTING THE FLIGHT BATTERY



- ▼ 1. Place the charged battery pack onto the battery holder using Velcro supplied and secure in place with rubber bands. Do not connect to the RC equipment!

## PREFLIGHT CHECKS

### 1. 4 IN 1 UNIT CHECKS



Gyro gain      Mix gain      Status LED

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

- ▼ Gyro gain. The left trimmer (GAIN) adjusts the amount of gyro tail stabilisation from 0 to 100%. The gyro automatically stabilises the tail against torque changes and gusts. 90% is usually the best setting.
- ▼ Mix gain. The right trimmer (PROPORTIONAL) adjusts throttle/tail mixing from 0 to 100% and is very uncritical. 90% is usually the best setting.

### WARNING!

**This unit contains delicate electronics. If your model tips over or crashes when flying or if your Twister CP V2.1 motors are physically stalled and prevented from turning, you must immediately reduce throttle to avoid damage to the speed controllers and other components. Crash damage and motor stall damage is not covered by warranty.**

## 2. ROTOR BLADES CHECK



- ▼ Unfold the main rotors to the flying position as per the above pic ensuring they are exactly perpendicular to the flybar and paddles and that they are not damaged.

## 3. VISUAL CHECK

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

## 4. SWITCH ON TRANSMITTER

The transmitter is supplied in Mode II version where the left stick controls height (climb or descent) and tail rotor (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. Note that the included DVD shows the use of a Mode I (throttle right) transmitter. See pic following for Mode II layout with throttle stick on the left side .



Throttle and tail rotor control

Cyclic steering controls

- ▼ 1. Move the throttle stick and throttle trim of your transmitter to the lowest (low throttle) position.
- ▼ 2. Centre the trim controls for the 3 other transmitter functions.
- ▼ 3. Extend the transmitter aerial fully.
- ▼ 4. Switch on the transmitter.
- ▼ 5. Check that the receiver aerial is unwrapped ENTIRELY from its stowed location around the right side undercarriage (**tape the aerial along one of the undercarriage skids and then tape to rear fin**).
- ▼ 6. To power up the helicopter, you must connect the JST battery connector to the matching lead emerging from the '4-in-1' control unit.  
Do this now - ensuring you are well clear of main and tail rotors and that throttle stick and trim are in the low position.
- ▼ 7. Observe the '4-in-1' status LED. Initially, it will blink red, then blink green. After the on-board computer has completed satisfactory systems checks, it will glow green continuously.

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

### WARNING!

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

### WARNING!

**Do not operate this model with a collapsed or partially collapsed transmitter (or receiver) aerial. The model may suffer from interference and may endanger your personal safety! Always extend aerials fully. Never tape an aerial to any carbon fibre helicopter components.**

## 5. RANGE CHECK

- ▼ Check that all controls operate without interference at a minimum distance of 50 metres with transmitter and receiver aerials extended.

### **WARNING!**

At distances of greater than 50 metres, it will become impossible to see your Twister CP V2.1 clearly enough to be able to control it safely. Do not fly at 50 metres distance or greater. We strongly recommend you fly no further away than 15 metres.

## 6. CONTROL OPERATION CHECK



- ▼ 1. The helicopter swashplate should be perfectly horizontal when viewed from the side and horizontal with the flybar and paddles when viewed from the side of the helicopter. If it is not, adjust the transmitter trims until it is.
- ▼ 2. Roll cyclic - Move the roll (aileron) stick to the left. The swashplate should tilt to the left. If it tilts the opposite way, reverse the roll (AIL) reverse switch on the front of the transmitter.
- ▼ 3. Fore and aft cyclic - Move the fore and aft (elevator) stick forward. The swashplate should tilt forward. If it tilts the opposite way, reverse the fore and aft (ELE) reverse switch on the front of the transmitter.
- ▼ 4. Slowly move the throttle trim forward until the tail rotor unit rotates but the main rotor does not.
- ▼ 5. Move the tail rotor stick gently to the right. The nose of the helicopter should try to swing right (whilst the tail swings left).
- ▼ 6. Throttle - Slowly push the throttle stick forward and check that the main rotors start to rotate. Then immediately throttle back.

Your Twister CP V2.1 is ready for flight.

**N.B. After finishing flying you should always first disconnect the battery from the helicopter FIRST. Then switch off the transmitter.**

### **WARNING!**

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 flying your Twister CP V2.1.

## ADVANCED FLYING FEATURES

### Flybar weights

Your Twister CP V2.1 is equipped with adjustable flybar weights which are designed to increase stability as they are moved further out along the flybar. Moving the weights inboard will make the helicopter more responsive to cyclic commands. After adjustment, flybar balance must be checked by releasing all linkages to the flybar and observing which way the flybar seesaw unit falls. Adjust until balanced.

### 3D/idle up switch



The Twister CP V2.1 transmitter features an idle up switch. This is for use when flying outdoors and for performing aerobatic manoeuvres.

When the switch is pulled forward, a new 'throttle curve' and 'pitch curve' are applied.

With idle up on, collective pitch travel is increased at low stick, whilst at the same time, power is never allowed to fall below 60% over the lower half of throttle stick travel.

The nett effect is to provide high power at low throttle stick positions thus providing a constant rotor speed during aerobatic and descending flight patterns.

### **WARNING!**

**Do not operate this switch unless you are an experienced pilot!**

**If you are new to RC helicopters we recommend you read the following sections:**

***How does a helicopter fly?***

***Flight training tips***

**NEVER FLOWN R/C  
HELICOPTERS?  
WE RECOMMEND YOU  
SEEK ADVICE FROM  
YOUR LOCAL MODEL  
SHOP**

## HOW DOES A HELICOPTER FLY?

Both model and full-size helicopters are controlled in similar ways. A helicopter must be controlled about 4 axes simultaneously; yaw, pitch, roll and height. Your transmitter has 2 dual-axis precision stick units designed specifically for this task. The transmitter is supplied in Mode II version where 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. Note that the included DVD depicts the use of a Mode I (throttle right) transmitter.

### 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.

### Tail control

Motor-driven rotor blades generate an opposing force (torque) that acts on the body of the helicopter, twisting the fuselage in the opposite direction of rotation to the main rotor blades. This rotation needs to be balanced by thrust generated by the tail rotor.

When a helicopter is in the hover and the torque generated by the main rotor has been balanced by the tail rotor, a helicopter can be yawed left or right. If the tail rotor speed is increased, more tail thrust is generated and the nose of the helicopter yaws (swings) to the right. If the tail rotor speed is decreased the nose of the helicopter will swing to the left. This is called 'tail rotor control' and is achieved by operating the rudder stick of your transmitter.

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 CP V2.1 helicopter is fitted with a micro piezo gyro and electronic mixing system which

automatically compensates for torque changes and helps stabilise the tail making for much easier flight.

### **Steering control - cyclic control**

The main directional or steering controls in a helicopter are known as the 'cyclic' controls and work by directing the thrust generated by the main rotor blades in the direction required for flight. When helicopter main rotor blades are spinning in flight you will often be able to make out what looks like a disc - as the blades blur with speed and viewing angle. This is known as the 'rotor disc' and is operated by the cyclic controls on the right hand stick of your transmitter.

### **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 accelerate in that direction. By pulling the stick back, any forward speed gained will be reduced as the rotor disc tilts backwards and thereby reverses the thrust generated by the forward stick command.

### **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.

A helicopter in the hover behaves in an analogous way to a stick balanced vertically on ones finger - small movements of your hand will be required in order to prevent the stick from accelerating away from the vertical and falling to terra firma!

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

A large part of the initial learning phase in helicopter flight is about mastering the cyclic controls so that their correct use in the hover or whilst 'ground handling' becomes automatic and instinctive.

### **Cyclic controls in detail**

In order to fly and maintain a model helicopter a basic understanding of the control mechanisms involved is required.

The sequence of control works like this:

As the cyclic transmitter stick is moved forwards, a pulsed signal is picked up by the receiver in the '4 in 1' control unit which is passed to the proportional fore and aft cyclic servo mounted in the model.

The servo output arm operates the 'swashplate' tilting the swashplate forward. The swashplate is connected by linkages to the flybar and control paddles. The paddles are small 'wings' in their own right and are connected to the rotor head. It is the paddles that effectively drive the main rotor blade angle and hence move the rotor disc forwards/

backwards or left/right.

When the forward cyclic command is released the swashplate is returned to the horizontal position and the rotor disc follows suit.

## 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 CP V2.1.

Make sure the take-off floor has a smooth surface rather than carpet which can trip up the Twister CP V2.1 during ground handling.

Be prepared for the fact that the helicopter will slide around on the floor until flying rpm has been reached.

### WARNING!

**If you are a newcomer to R/C model helicopters, we advise you seek assistance from an experienced R/C model helicopter pilot. You should be aware that the main rotor blades and tail 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 CP V2.1.**

### STEP 1-POSITIONING

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. If the nose of the helicopter yaws to the left, you must apply right tail rotor to correct this by pushing the tail rotor stick to the right.*

### STEP 2-ROTOR SPIN-UP

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 due to the side thrust generated by the tail rotor and to turbulence generated by the main rotor blades. These disturbing influences mainly manifest themselves as a drift to the left before and during take-off and a tendency to yaw left or right just prior to take-off.*

Observe whether or not the helicopter is tending to tilt 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 CP V2.1 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 CP V2.1 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 CP V2.1 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.**

### STEP 3-GOING FOR A WALK

The helicopter should now be trimmed and you should be in a position to start learning to 'take your Twister CP V2.1 for a walk'. These first flights should be made with the Twister CP V2.1 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. If you cannot correct immediately, reduce the throttle and try again. The aim 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 required to safely develop the automatic ability to apply the right control input when needed. You must practice this until you believe you are starting to automatically input the control commands required to keep the helicopter moving gently forwards along the ground.

When you feel confident in your ability to operate the controls correctly, proceed to the next step...

### STEP 4-TAKING THE FIRST 'HOP'

If you are ready for the first 'hop' into the air you will have spent some time mastering the skills required to observe the attitude of your Twister CP V2.1. You should be making the necessary control inputs automatically and you should be able to make smooth progress across the surface of your floor.

If you cannot, please keep practicing Step 3!

The first 'hop' is a natural next step from walking your Twister CP V2.1. 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 almost immediately

to settle back onto the floor.

You will notice that as the helicopter breaks free from the floor its nature changes and it may attempt to accelerate in an unforeseen direction. Be prepared for this natural consequence of leaving the friction of the floor for the 'friction-free' realm of 'real flying'!

Most people feel they have just limited control when they leave the safety of the floor for the first time. However, with practice, you will find that you are able to make more and more of the correct control commands required to keep your Twister CP V2.1 upright and that the hops become longer and higher. It is important during these stages to keep moving forward by applying a small amount of forward trim to tilt the rotor disc forwards.

Always make sure you watch the nose of your helicopter—not the tail. The gyro will attempt to keep the tail straight for you but you will have to use the tail 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.

Also please note that, depending on the size of your room, some control instability may be felt as a result of the air circulated around the room by your helicopters down draft. If you find this off-putting, we suggest that you land and let the air settle.

Please be aware that a model helicopter in the hover—regardless of design—will never stay 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.

As you become more familiar with your helicopter, you will find that your developing hand/eye co-ordination skills will enable you to correct any drift, roll or yaw almost as soon as it starts, and this will make your flying smoother and less jerky.

By this stage in your training 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 dynamics develop.

## **STEP 5—HOVERING AND MANOEUVRES**

By now you will have realised that in order to maintain flight, brief control inputs or 'nudges' are required—plus enough practice to manage operation of all the primary flying controls successfully together.

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 CP V2.1 to the right and left using cyclic controls. Proceed as follows:

From the hover, briefly 'nudge' a small amount of right roll. Your Twister CP V2.1 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 will probably 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 you trousers and try again.

## **STEP 6—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 CP V2.1. Please keep this in mind if you do fly outdoors and 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 breeze or even a 'thermal' coming through.

A training undercarriage can be a huge help by providing your Twister CP V2.1 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.

In addition a simulator is great for teaching you "nose in". This is when the nose of the helicopter is pointing at you and where some of the controls become effectively reversed—which can catch out both experienced and novice pilots alike!

**GOOD LUCK AND HAPPY FLYING!**

## TROUBLESHOOTING

### VIBRATION

- ▼ Solution 1 – Out of balance main blades  
If vibration of tail boom or undercarriage is noticeable, the most likely problem will be out of balance main blades. To cure this, balance the blades as follows: Remove the complete rotor head from the main shaft. Support the head assembly by placing the flybar paddles on 2 glass tumblers or similar. Observe which blade falls lowest and add sellotape or similar to the undersurface tip area of the higher blade. Adjust until the blades are level and re-attach rotor head.
- ▼ Solution 2 – Bent main shaft  
The tail boom and undercarriage will vibrate if the main shaft is bent. Replace the main shaft and gear unit if you suspect a bent main shaft
- ▼ Solution 3 – Main blades too tight. If the blade retaining bolts have been done up too tight, the helicopter will vibrate and/or 'nod'. Loosen the blades and try again.
- ▼ Solution 4 – Blade tracking is out.  
Sometimes, the rotor blades will fly at different heights and this will cause vibration. When the helicopter rotor disc is viewed in flight, the red-tipped main blade may fly at a different height to the other main blade. The blades are running 'out of track'. Note which blade is lower. Land the helicopter and lengthen the pitch arm link pt. no 6601210 of the lower flying blade. The idea is to increase the blade's angle of attack which will make the blade to fly higher. Be careful you do not damage any parts. Test fly and check tracking again. Adjust again if required until the blades run 'in track' as closely as possible.
- ▼ Solution 5 – Flybar paddles out of balance.  
Check that the distances from the rotor hub centre out to the flybar paddles are the same for both paddles. Adjust the flybar position by loosening the flybar retaining collars associated with part no 6601190, re-centring the flybar, then tightening the retaining collar grub screws. N.B. A small allen key will be required.

### MAIN ROTOR DOES NOT TURN

- ▼ Solution 1 – Check throttle stick and trim lever are in the fully down position.
- ▼ Solution 2 – Check all electrical connectors and that the '4-in-1' receiver crystal is seated securely in the socket in the '4-in-1' unit.

### MAIN ROTOR TURNS BUT HELICOPTER DOES NOT TAKE OFF

- ▼ Solution 1 – This sometimes happens if your rotor blades are flying at too low or too shallow an angle. The helicopter will sometimes take off but appears to have too little power to climb. This is nearly always because one main blade is flying too low. If you can see which blade is flying low, follow the same procedure as outlined in Solution 4. Alternatively, increase the flying angle of both main blades as outlined in Solution 4.
- ▼ Solution 2 – Main motor needs to be loosened because the main gear/motor pinion gear mesh is too tight. The motor is retained by 2 screws. Slacken off both screws. Push the motor away from the main gear and retighten the screws in the new position.

### LBW SYSTEM

Now included on the Twister CP V2.1 is this clever device, this is designed to alert pilots when the Li-Poly battery pack is running low and needs recharging.

**When this light flashes, land immediately and recharge the Li-Poly battery pack as per the instructions on page 2.**

Failure to land immediately could result in the battery pack being over discharged.

## SPARE PARTS AND OPTION PARTS

### TWISTER CP V2 SPARE PARTS

6600710	MAIN FRAME SET
6600750	HEAD/MAIN SHAFT BEARINGS 3X6X2.5 (2)
6600770	TAIL HOUSING
6600780	VERTICAL FIN SET
6600800	TAIL GEAR & SHAFT
6600810	TAIL BEARING 2X6X3 (2)
6600820	TAIL ROTOR BLADE UNIT
6600850	ALLEN KEY/TIE WRAPS/SERVO TAPE
6600855	HEAD RETAINING PIN (5)
6600382	370 MAIN MOTOR WITH 9T PINION
6601130	TAIL MOTOR (8T PINION)
6601140	MOTOR WIRE (MAIN AND TAIL)
6601150	CENTRE HUB AND SPINDLE SHAFT
6601160	FLYBAR HUB/BEARINGS/CRADLE
6601170	CP MAIN BLADES WOOD (PAIR)
6601180	FLYBAR CONTROL UNIT
6601190	FLYBAR (2)
6601200	FLYBAR PADDLES (2)
6601210	FLYBAR-MIXER LINK SET (2)
6601215	(V2) SWASH-MIXER DOUBLE LINK (2)
6601220	(V1) SWASHPLATE
6601222	(V2) SWASHPLATE
6601230	SERVO LINK SET (3)
6601240	BATTERY MOUNTING SET
6601250	MAIN GEAR & MAIN SHAFT SET
6601260	UNDERCARRIAGE SET (CARBON STRUTS)
6601270	CABIN SET ASSEMBLED WITH DECAL
6601280	'O' RING/SILICONE TUBE SET
6601290	SCREW & NUT SET
6601300	TAIL BOOM (CARBON FIBRE)
6601310	(V1) BLADE HOLDER SET (2)
6600381	(V2) BLADE GRIP SET
6601320	SWASHPLATE TO FLYBAR LINKS (2)
6601330	MAIN SHAFT RETAINING COLLAR
6601340	FLYBAR PADDLE WEIGHTS (2)
6601350	MAIN FRAME/BOOM/TAIL HOUSING SET

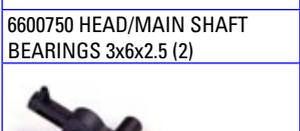
### TWISTER CP OPTION & CNC PARTS

6601120	370 MAIN MOTOR W/8T PINION (HIGH TORQUE)
6600380	(V2) COMPLETE BELL/HILLER ROTOR HEAD
6600384	CARBON TAIL ROTOR (OPTION)
6600386	CP CNC ALU.SWASHPLATE SET (OPTION)
6600390	CP CNC ALU.MAIN B/HOLDER SET (OPTION)
6600392	CP CNC MAIN ROTOR HUB SET (OPTION)
6600400	CP SYM.CARBON MAIN BLADE SET
6600405	CP CNC ROTORHEAD & S/PLATE SET (OPT)
6600410	CP SPINDLE SHAFT FOR OPTION ROTOR
6600840	TWISTER TRAINING UNDERCARRIAGE SET
6600860	TAIL MOTOR HEAT-SINK
6600870	MAIN MOTOR HEAT-SINK
6600379	MINI/MICRO HELI PITCH GAUGE

### TWISTER CP R/C PARTS AND ELECTRIC ACCESSORIES

6600295	11.1V 1000mAh (HD) (LI-POLY) PACK JST
6600355	CCPM 4-IN-1 ESC/GYRO/MIXER/RX UNIT
6600330	240v (TO 12v DC) POWER SUPPLY (3 PIN)
6600331	240v (TO 12v DC) POWER SUPPLY (2 PIN)
7711050	TRANSMITTER 35FM 5-CH TX (CCPM)
7712110	SUPER MICRO 7.5g SERVO (S7.5 EnErG)
6600362	EnErG 7.5g SERVO GEAR SET (NEW 15Z)

**SPARE PARTS**

		
6600710 MAIN FRAME SET	6600382 370 MAIN MOTOR WITH 9T PINION	6601210 FLYBAR-MIXER LINK SET (2)
		
6600750 HEAD/MAIN SHAFT BEARINGS 3x6x2.5 (2)	6601130 TAIL MOTOR (8T PINION)	6601215 (V2) SWASH-MIXER DOUBLE LINK (2)
		
6600770 TAIL HOUSING	6601140 MOTOR WIRING	6601220 (V1) SWASHPLATE
		
6600780 VERTICAL FIN SET	6601150 CENTRE HUB AND SPINDLE SHAFT	6601222 (V2) SWASHPLATE
		
6600800 TAIL GEAR & SHAFT	6601160 FLYBAR HUB/ BEARINGS/CRADLE	6601230 SERVO LINK SET (3)
		
6600810 TAIL BEARING 2x6x3 (2)	6601170 MAIN BLADES WOOD	6601240 BATTERY MOUNTING SET
		
6600820 TAIL ROTOR BLADE UNIT	6601180 FLYBAR CONTROL UNIT	6601250 MAIN GEAR AND MAIN SHAFT SET
		
6600850 ALLEN KEY/TIE WRAPS/ SERVO TAPE	6601190 FLYBAR (2)	6601260 UNDERCARRIAGE SET
		
6600855 HEAD RETAINING PIN	6601200 FLYBAR PADDLES (2)	

**SPARE PARTS CONTINUED...**



6601270 CABIN SET ASSEMBLED



6601280 O RING/SILICONE SET



6601290 SCREW & NUT SET



6601300 TAIL BOOM (CARBON FIBRE)



6601310 (V1) BLADE HOLDER SET



6600381 (V2) BLADE GRIP SET



6601320 SWASHPLATE TO FLYBAR LINKS



6601330 MAIN SHAFT RETAINING COLLAR



6601340 FLYBAR PADDLE WEIGHTS



6601350 MAIN FRAME/BOOM/ TAIL HOUSING SET

**OPTION PARTS**



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(8T PINION) (HIGH TORQUE)



6600380 (V2) COMPLETE BELL/  
HILLER ROTOR HEAD



6600384 CARBON TAIL ROTOR



6600386 CNC ALU.SWASHPLATE



6600390 CNC ALU.MAIN BLADE  
HOLDER



6600392 CNC MAIN ROTOR HUB



6600400 SYM.CARBON MAIN  
BLADE SET



6600405 CNC ROTORHEAD &  
SWASHPLATE



6600410 CP SPINDLE SHAFT FOR  
OPTION ROTOR



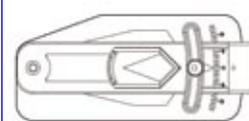
6600840 TRAINING  
UNDERCARRIAGE SET



6600860 TAIL MOTOR HEAT-SINK



6600870 MAIN MOTOR HEAT-  
SINK



6600379 MINI/MICRO HELI PITCH  
GAUGE

**R/C & ELECTRIC EQUIPMENT**



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6600355 CCPM 4-IN-1 ESC/GYRO/  
MIXER/RX UNIT



6600330 240v (TO 12v DC) POWER  
SUPPLY (3 PIN)



6600331 240v (TO 12v DC) POWER  
SUPPLY (2 PIN)



7711050 TRANSMITTER 35FM  
5-CH TX (CCPM)



7712110 SUPER MICRO 7.5g  
SERVO (S7.5 ENERG)



6600362 7.5g SERVO GEAR SET

