FORM 500

HELI**MAX**®

INSTRUCTION MANUAL

SPECIFICATIONS

Span:	13.6 in [345 mm]	**Weight RTF:**	3.91 lbs (1774 g) with 5000 mAh LiPo
Size:	19.7 in [500 mm] diagonal span	**Flight Time:**	Up to 15 minutes
Height:	9.25 in [235 mm]		

WARNING

Please fully read and understand this manual and the operation and all safety aspects required of you for the safe operation of this product. Before use, if you feel this product is not for you, please return it to your place of purchase.

Heli-Max products are to be used by ages 14 and over.

Manual Specifications and Description Changes

The instruction manual, warranties and other associated documentation are subject to change without notice. Hobbico assumes no responsibility for inadvertent errors to this manual.

BOX CONTENTS

1. FORM500
2. (4) 12 x 4.5" Self-Tightening Propellers
3. Duratrax Onyx Lipo 11.1V 5000 mAh
4. Duratrax Li-24 Charger
5. Tactic TTX810 Transmitter with TR825 Receiver
6. (4) AA Alkaline Batteries
7. USB Cable for PC Interface
8. Instructions
9. 3 mm Hex Wrench

FEATURES

● Utility Rails to Mount Accessories
● Headless Flight Mode
● Altitude Hold
● Low Voltage Return to Home
● GPS Position Hold

INTRODUCTION

Thank you for purchasing the Heli-Max™ FORM500 quadcopter. We are certain you will get many hours of enjoyment out of this model. If you should have any questions or concerns please feel free to contact us at: helihotline@hobbico.com.

For the latest technical updates or manual corrections for the FORM500 please visit the Heli-Max web site at www.helimax-rc.com. Open the "Quadcopters" link, and then select the FORM500 quadcopter. If there is any new technical information, changes or important updates to this model a "tech notice" box will appear on the page. Click the "tech notice" box to learn more.

⚠ When you see this symbol, please pay special attention and heed all warnings regarding the information within.

SAFETY PRECAUTIONS

⚠ **Failure to follow these safety precautions may result in injury to yourself and others.**

● Keep your face and body as well as all spectators away from the rotating plane of the blades whenever the battery is connected. Keep loose clothing,

shirt sleeves, ties, scarfs, long hair or loose objects such as pencils or screwdrivers that may fall out of shirt or jacket pockets away from the rotors. The spinning blades of a model quadcopter can cause serious injury. When choosing a flying site for your FORM500, stay clear of buildings, trees and power lines. **AVOID** flying in or near crowded areas. **DO NOT** fly close to people or pets. Maintain a safe distance from the quadcopter.

- Your FORM500 should not be considered a toy. Because of its performance capabilities, the FORM500, if not operated correctly, could cause injury to you or spectators and damage to property.

- **DO NOT** alter or modify the model. Doing so may result in an unsafe or unflyable model.

- When and if repairs are necessary you must correctly install all components so that the model operates properly on the ground and in the air. Please check the operation of the model before every flight to insure that all equipment is operating and that the model has remained structurally sound. Be sure to check connectors and the propellers before each flight. Replace them if they show any signs of wear or fatigue.

BATTERY WARNINGS & USAGE GUIDELINES

Please read and understand the following regarding the usage of LiPo batteries. Through the use of the included LiPo battery you have assumed all risk and responsibility regarding a LiPo battery and its use.

Battery Warnings

- **ALWAYS** unplug your battery from either the charger or quadcopter after use. **NEVER** store your quadcopter with the battery plugged into the quadcopter.

- **DO NOT** attempt to charge your battery if it becomes swollen or hot.

- It's best to store your batteries in a cool, dry location at 1/2 charge (11.4 V). Storing a fully discharged battery may cause irreversible damage to the battery.

- **NEVER** disassemble, puncture or modify the battery pack in any way.

- **NEVER** allow the battery temperature to exceed 150° F [65° C].

- If your battery begins to swell or "puff" during charge or discharge or becomes damaged in any way, stop using it.

Charge Warnings

- Only use the included charger with the included LiPo battery. Do not attempt to use the provided charger with NiCd, NiMH or batteries with other chemistries.

- **DO NOT** leave the charger unattended while in use and always charge your battery in a fire-resistant location.

- Disconnect the battery and remove input power from the charger immediately if either becomes too hot to touch!

- **DO NOT** allow water or other foreign objects to enter the charger. Keep the charger away from moisture and **DO NOT** submerge in water. **DO NOT** block the air intake holes of the charger; this could cause the charger to overheat.
- **Please keep all electronic components out of the reach of children!**

WARRANTY

Heli-Max™ guarantees this kit to be free from defects in both material and workmanship at the date of purchase. This warranty does not cover any component parts damaged by use or modification. In no case shall Heli-Max's liability exceed the original cost of the purchased kit. Further, Heli-Max reserves the right to change or modify this warranty without notice. In that Heli-Max has no control over the final assembly or material used for final assembly, no liability shall be assumed nor accepted for any damage resulting from the use by the user of the final user-assembled product. By the act of using the user assembled product, the user accepts all resulting liability. If the buyer is not prepared to accept the liability associated with the use of this product, the buyer is advised to return this kit immediately in new and unused condition to the place of purchase.

To make a warranty claim, send the defective part or item to Hobby Services at this address.

Hobby Services	217-398-0007
3002 N. Apollo Dr., Suite 1	productsupport@hobbyservices.com
Champaign, IL 61822	
USA	

Include a letter stating your name, return shipping address, as much contact information as possible (daytime telephone number, fax number, e-mail address), a detailed description of the problem and a photocopy of the purchase receipt. Upon receipt of the package the problem will be evaluated as quickly as possible.

FORM500 COMPONENTS
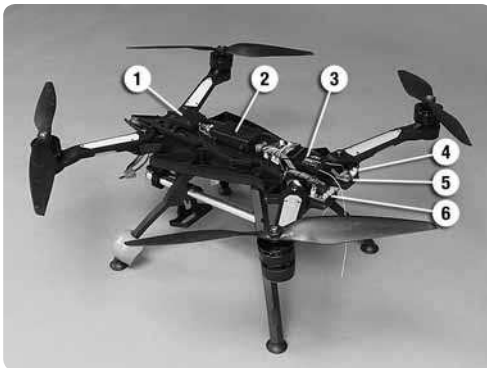
1. GPS Module
2. Flight Controller
3. Receiver
4. I/O Port
5. Firmware Button
6. LED Indicators

CHARGING THE BATTERY

Remove the battery tray with the battery from the FORM500.

Power up the Li-24 Charger. The status LED on the charger will be green and start flashing.

Plug the charger's charge adapter into the 4 mm sockets on front of the charger.

Set the battery type switch on the charger to LiPo.

Set the charge rate on the charger to 3A.

Connect the battery's balance lead to the center balance port on the charger and the battery's main power connector to the charge adapter.

The Charge Status LED will turn red and the 3 Cell Status LEDs will come on when the charge cycle has started. The Charge Status LED will turn Green when the battery is charged. If the Charge Status LED is flashing, unplug the battery from the charger and consult the charger manual for an explanation of the error code. Typical charge time for a fully depleted battery will be around 1 hour and 40 minutes.

SETUP

Remove the arm bolts and extend the arms. Tighten the arm bolts with the included 3 mm hex wrench.

CW Prop / Silver Nut   CCW Prop / Black Nut

CCW Prop/ Black Nut   CW Prop/ Silver Nut

Please follow this diagram when installing the propellers. Tighten the propellers by holding the motor and spinning the prop in the direction indicated on each propeller.

Pre-Flight Check List

Before you fly, we suggest that you go through the following pre-flight checklist.

Verify that the batteries are fully charged. A small voltage monitor that connects to LiPo balance plug is a good tool for this purpose.

Make sure that the props are tight and not damaged.

Put all transmitter switches in the proper positions.

Turn on the transmitter and make sure the controls move freely in all directions.

Connect the battery to the FORM500 and place it on a level surface. Wait for the controller to get a GPS lock on at least 5 satellites.

Calibrate the compass if the Red LED is not steady or if the quad is not at the same location as the last flight.

Calibrate the sensors.

Power up and check any accessories that will be operated during the flight.

When the Green LED is flashing, arm the motors and take off.

Hover and make sure the quad is responding to stick inputs from both sticks. If the quad is making any unusual sounds or vibrations, land and investigate before continuing the flight.

FORM500 INDICATORS AND ALARMS

LED Indicators

Blue LED
- Steady light indicates that the controller is receiving signals from the transmitter.
- Flashing slowly indicates that Headless mode is active. The LEDs on the bottom of the rear arms will flash at the same time.

Red LED
- Steady LED indicates compass is OK.
- Flashing slowly or off at startup indicates the compass needs to be calibrated.
- Flashes briefly during compass calibration procedure

Green LED
- Steady light indicates 3 or 4 satellite signals are being received.
- Flashing light indicates that 5 or more satellite signals are being received.

Audible Alarms

Single Beep – Indicates the controller and receiver are linked to the transmitter.

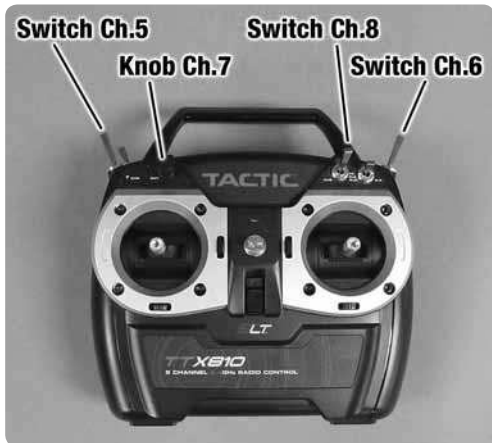**Slow Beeping** – Battery voltage is low

Rapid Beeping – RTH, or Headless mode is active.

TTX810

Batteries

The TTX810TS comes with 4 AA alkaline batteries. Rechargeable NiCd or NiMH batteries can also be used. There is a charge jack on the side of the transmitter that can be used with rechargeable batteries.

Control/Switch Identification

Switch Ch.5 - **Away** (pushed back) is Stabilize Mode (no GPS functions)
Centered is Position Hold Mode
Forward is Return to Home

Switch Ch.6 - **Away** (pushed back) is Altitude Hold Mode
Centered is Altitude Hold Mode
Forward is Headless Mode

Knob Ch.7 - Accessory Control

Switch Ch.8 – Accessory Control

Channel Reverse Switches

The Channel reverse switches are located inside the battery compartment on the back of the transmitter. Channels 1-4 should be on (reversed) and Channels 5 and 6 should be off (normal). Channels 7 and 8 are used for accessories.

Linking the transmitter and receiver

Remove the props and the canopy.

Turn on the transmitter.

Set the Ch. 5 and Ch. 6 switches to the center positions for Position Hold & Altitude Hold mode.

Center the controls for Channel 7 & 8.

Lower the throttle trim to the lowest setting.

Connect the battery to the FORM500.

While holding the throttle at 0%, press and hold the link button on the receiver until the Red LED on the receiver flashes twice. The FORM500 will beep once when the flight controller first receives a signal from the transmitter and the Blue LED indicator on the FORM500 will turn on. **Return the throttle trim to the center position when the receiver is linked.**

PC Interface

The PC Interface displays current data from the FORM500 flight controller and allows some features to be customized. The program needs to be installed on a Windows PC along with the driver for the USB cable. After the program is installed, right-click on it and select properties. Click on the compatibility tab. Click on the box next the "Run this program as an administrator".

ComPort

This window is used to select the communications port assigned to the USB cable. After the communications port has been selected (normally not Com1), click on the Connect Button. The FORM500 is connected to the PC Interface when the Connect Button changes to the Disconnect and there is live data in the Sensor Data window.

Flying Status

This window shows the current function(s) that have been selected with the Ch.5 and Ch.6 switches.

The GPS Mode Status window displays the current function selected by the CH. 5 switch. This switch controls the Altitude Hold mode (manual control), Position Hold and Return to Home functions. The Alt Smart Status window displays current function selected by the CH. 6 switch. The FORM500 is always in the Altitude Hold mode. The CH. 6 switch is used to turn the Headless Flight function on or off.

Parameter Adj. Window

Gyro Gain – The factory setting for the Gyro gain is 18. Lower settings will make the FORM500 react more smoothly to the controls but the quad will not be as stable. Higher gain settings will make the quad "hunt" while hovering instead of remaining still.

Aux Gain – The factory setting for the Aux Gain is 6.8. This setting does not normally need to be adjusted. Lower settings will make the FORM500 oscillate before settling in a hover. Higher settings will make the quad transition to a hover with aggressive movements. Raising this setting could make videos more jumpy.

Alt. Gain - The factory setting for Alt. gain is 15. This setting controls how much the FORM500 rises and falls while hovering. Lower settings will allow more movement and a smoother flight. Higher settings will reduce vertical motion, but can also make videos more jumpy.

Low Voltage – The factory setting is 10.8V. When the battery reaches the voltage in this window and the FORM500 is in the Position Hold mode, it will climb to 20 meters and return to home. If the FORM500 is flown a long distance while heavily loaded, this value should be increased so the battery does not die before the quad lands.

Land Speed – This parameter controls how fast the quad descends when in Position Hold or is in a Return to Home routine. The factory setting for this adjustment is MED. The HIGH setting could be used if the quad is heavily loaded. The LOW setting is best used when FORM500 is not carrying any accessories.

Attitude Window – This artificial horizon displays the FORM500's attitude for both the roll and the pitch axis. When on a level surface, the line separating the blue sky and the brown ground should be in the middle of the green horizon lines. The sensor calibration procedure should be performed any time the display is not centered when the FORM500 is level or if the display is drifting while the quad is stationary.

Heading Window – This is a graphic display of the data from the Heading Sensor in the Sensor Data window. Magnetic interference from computers, other electronic devices and metallic structures can affect the accuracy of this sensor. The best results from this sensor will be obtained when the FORM500 is in an open area.

Remote Controller Signal Window – These displays show the current positions of the left and right sticks and the two switches that control the flight functions. The pulse width for each channel is also displayed. The values should be between 1000 and 2000. If lower values are seen on the throttle channel, center the throttle trim.

Model Type – This window should always display FORM500.

Sensor Data Window – These displays show live data from the various sensors on the FORM500.

Roll – The number of degrees tilted left or right from level.

Pitch – The number of degree tilted forward or backward from level.

Yaw – The number of degrees rotated left or right of North.

GyroX – The amount of acceleration measured while rolling left or right.

GyroY – The amount of acceleration measured while pitching forward or backward.

GyroZ – Amount of acceleration measured when rotating (yaw) left or right.

Altitude – The height of the quad in centimeters above its launch point. The data from the barometric sensor will change as it warms up.

Alt. Velocity – The amount of acceleration measured while moving up or down.

Battery – Voltage of the flight battery.

Lat. – Latitude from the GPS sensor.

Long. – Longitude from the GPS sensor.

HAC – Horizontal accuracy of the GPS signal in meters. The more satellite signals acquired, the lower the value will be. The Green LED will come on when this value is below 6 meters and will start flashing when the value is below 3 meters.

Azimuth – The number of degrees from North that the FORM500 is pointing.

Heading – The number of degrees from North that the FORM500 is pointing.

Version – The current firmware version.

Limit Window

Dist. Limit – This window is used to set a distance the FORM500 can fly from the launch point in meters. The quad will tilt and or suddenly climb when it reaches this limit.

Altitude Limit – This window controls the maximum height of the FORM500 in meters. When the quad reaches the limit, it stops climbing.

Firmware Update

After downloading the latest update, connect the USB cable to the PC and open the Firmware updating tool. Press the "Open Firmware File" button to browse for the update file. Select the file and press the Open button to save the location of the update file in the window.

Select the COM port that has been assigned to the USB cable (usually it is not COM1) in the drop-down window and press the Connect Button.

Press and hold the Firmware Button next to the I/O port on the FORM500 and connect the USB cable. The alarm will beep and the three status LEDs at the back of the FORM500 will flash. The status of the update will be displayed in the horizontal gauge and in the black window. Release the button when the update process has started. The alarm will stop the continuous tone and beep once when the update is finished. The firmware update should not change any of the adjustable parameters in the Flight Controller.

Failsafe Test

This test should be performed any time the receiver or transmitter has been changed so they need to be re-linked using the procedure in the previous section. To check the failsafe:
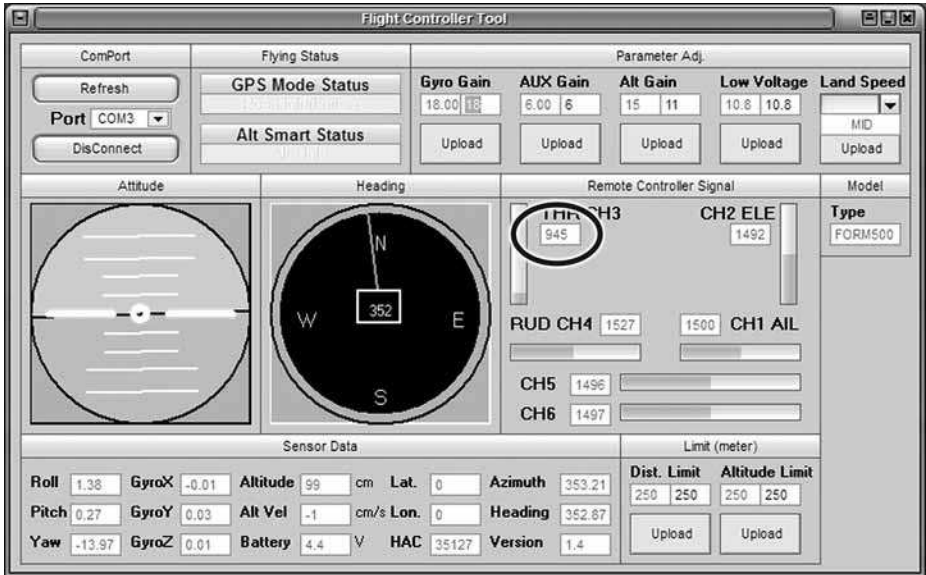
Remove the props and canopy.

Link the transmitter and the FORM500. Ch. 5 and Ch. 6 switches should be in the away position.

Connect the FORM500 to the PC Interface so the control inputs and the Flight Controller's response can be monitored.

Turn off the transmitter. The throttle pulse width value should drop below 950 and the CH 5 and 6 monitors should be centered.

If the monitors for channels 3, 5 and 6 do not change, turn the transmitter back on. Leave the FORM500 connected to the PC Interface and verify that the throttle value is below 950 when the throttle and throttle trim are both at their lowest setting.

Set the Ch. 5 and 6 switches to their center positions. Hold the throttle and

throttle trim at their lowest setting. Push the link button on the receiver down, long enough for the LED next to the link button to flash twice. Return the throttle trim to center and perform the failsafe test again.

Calibration Procedures

Sensor Calibration – The Sensor calibration should be performed when any of the following have occurred.

If the FORM500 starts drifting while hovering in calm conditions.

The flight controller has been replaced.

Place the FORM500 on a level surface. Turn on the transmitter and connect the battery or connect the FORM500 to the PC Interface program. When the Blue LED is on and steady, move the throttle to 100%, and then hold the rudder control to the left. The Blue LED and the LEDs on the rear arms should turn off for 5 seconds. When the LEDs are on again, release the rudder control and return the throttle to 0%.

Compass Calibration – The compass should be calibrated each time the quad is taken to a new area to fly or any time the Red LED is not steady after the quadcopter is linked to the transmitter. Perform this procedure outside in an open area away from buildings and other possible sources of magnetic interference.

Place the FORM500 on the ground so the LED Indicators are visible. Turn on the transmitter and connect the flight battery. When the Blue LED is steady, hold the elevator control as low as possible and the left stick in the upper right corner until the Blue LED turns off. You should see the Red LED flicker when the quad enters the Compass Calibration mode.

Put the transmitter down and rotate the FORM500 clockwise two complete revolutions

Hold the FORM500 so the nose is pointed at the ground and rotate it clockwise two complete revolutions.

Hold the FORM500 so it is level with the nose pointed away from you. Rotate the quadcopter so the nose moves up and then toward you. Continue to rotate the quad in the same direction for two revolutions.

Place the FORM500 back on the ground with the LED indicators visible. Pick up the transmitter and hold the elevator control down again and put the left stick in the upper left corner until the Blue LED flashes. Release the right stick and return the left stick to the 0% throttle position.

FLIGHT

Motor Arm/Disarm

The spinning propellers can cause damage or serious injuries. Do not arm the motors until the FORM500 is a safe distance from the pilot, spectators and all obstructions.

The flight motors need to be armed (started) before the quad can be flown. When the flight is completed, motors may need to be disarmed before the quad can be handled. To arm or disarm the motors on the FORM500, hold the sticks on the transmitter to the lower inside corners. Release the sticks slowly when the quadcopter has responded to the command.

Take Off and Landing

To take off, the throttle needs to be above the midstick (center) position before the props will have enough RPM. Advance the throttle slowly until you see the quad start to take off. Continue to advance the throttle until the FORM500 is at least 3 feet off the ground.

To land the FORM500, bring it to a hover at least three feet above the ground and slowly move the throttle down until the quad is an inch or two above the ground. To prevent the quad from bouncing up and down when it touches the ground, reduce the throttle quickly when the quad is barely above the ground. As you become more experienced, you will learn to gently land the quad.

Failsafe

The FORM500 is programmed to RTH if it loses the signal from the transmitter. The procedure for setting up and testing the failsafe function are described in the TTX810 section of the manual. If you see that you have lost control of the quad and it has started the RTH program, do not panic. As long as the quad was launched with the GPS Position Hold and Altitude Hold functions active, the quad will return to its launch point, land and turn off the motors. If these functions are not turned on, the quad will slowly descend and land.

If the problem that caused the loss of signal is corrected, the FORM500 will exit the failsafe procedure and hover so the flight can continue.

MAINTENANCE

Propellers

The propellers should be replaced any time they are damaged. Do not mix props from different manufacturers or sizes. Always check the balance of a new prop. If the prop is not balanced, the vibrations can reduce the stability of the quadcopter and will affect the quality of any videos that are being taken.

Motor Replacement

Remove all the propellers from the quadcopter.

Remove the LED cover below the motor.

The LED board below the motor can be pushed out the way to get access to the motor mounting screws.

Remove the arm cover on the top of the arm.

Remove the upper tray on the chassis.

Unplug the motor wires from the ESC.

Remove 4 screws that hold the arm connector (hinge) to the chassis.

Pull the wires back through the arm connector and the inside of the arm.

Loosen the 4 mounting screws for the motor and remove the motor.

Reverse these steps to install the new motor. Do not replace the upper chassis tray until the motor has been checked.

Put some thread locking compound on the motor screws.

When installing the arm connector, keep the wires centered so they do not become crushed between the connector assembly and the chassis.

When the motor and the arm are secure, power up the transmitter and the quadcopter.

Arm and disarm the motors. As the new motor slows down, check its direction of rotation.

If the motor is running backwards, unplug two of the motor wires from the ESC and swap them.

When the motor is spinning the correct direction, install the upper chassis tray.

ESC Replacement

**ESC IDENTIFICATION**		
No.	**Location**	**FC Port No.**
1	Front Left	9
2	Rear Left	8
3	Front Right	7
4	Rear Right	6

Unplug the ESC wire from the Flight Controller.

Remove the upper tray on the chassis.

Unplug the ESC from the motor and adapter on the bottom of the Chassis.

Twist the power lead of the new ESC at least 9 times before connecting it to the adapter. The speed controls should be mounted as far as possible from the center of the chassis.

Connect the new ESC to the motor and the Flight Controller.

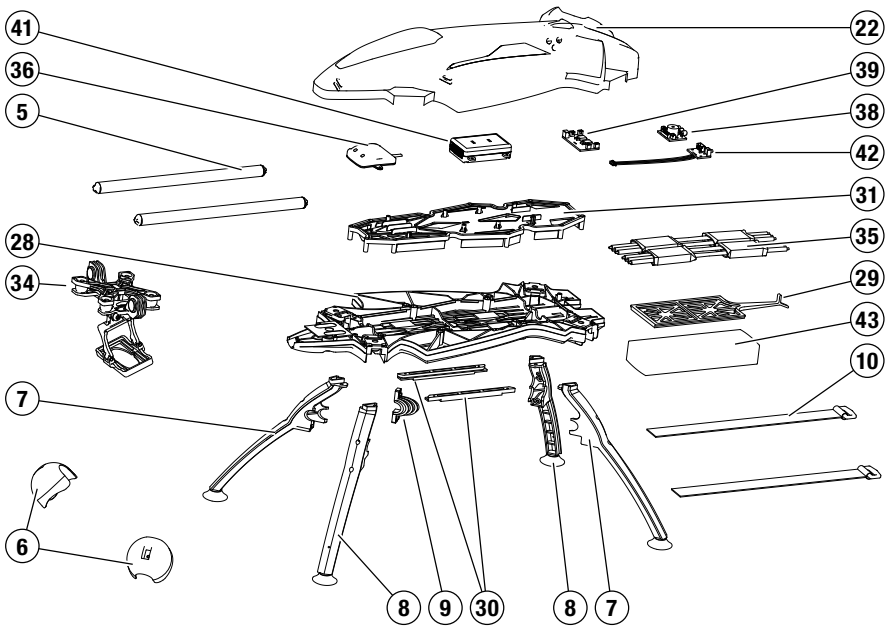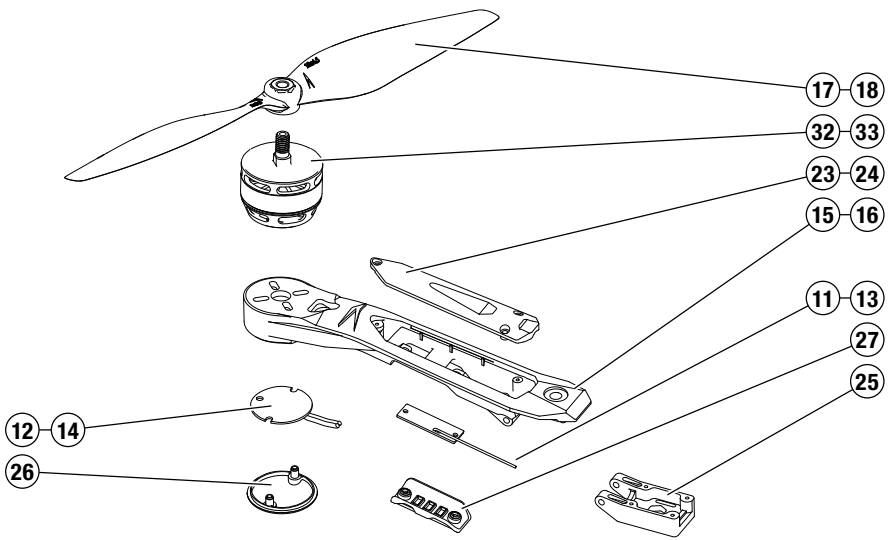Perform the motor rotation test in the Motor Replacement section.

NOTES:

FORM500 PARTS LIST

1*	HMXE2250	CAP HD Screw 3 x 22 mm (6)
2*	HMXE2251	BH S/T Screw 2 x 12 mm (6)
3*	HMXE2252	BH S/T Screw 2 x 6 mm (6)
4*	HMXE2253	BH S/T Screw 2 x 16 mm (6)
5	HMXE2254	Mounting Bar Set
6	HMXE2255	Visibility Ball Set
7	HMXE2256	Leg Set Right
8	HMXE2257	Leg Set Left
9	HMXE2258	Leg Holder Set
10	HMXE2259	Battery Straps (2)
11	HMXE2260	LED Set Front Arm Blue
12	HMXE2261	LED Set Front Motor Blue
13	HMXE2262	LED Set Rear Arm Red
14	HMXE2263	LED Set Rear Motor Red
15	HMXE2264	Motor Arm Set A
16	HMXE2265	Motor Arm Set B
17	HMXE2266	Propeller A CCW w/Nut
18	HMXE2267	Propeller B CW w/Nut
19*	HMXE2270	Arm LED Board Power Cable
20*	HMXE2271	Flight Controler Rear LED Cable
21*	HMXE2272	Flight Controller RX Cable
22	HMXE2273	Body Set w/Decal Yellow
23	HMXE2274	Arm Cover Set Yellow
24	HMXE2275	Arm Cover Set Gray
25	HMXE2276	Motor Arm Connector Set
26	HMXE2277	LED Motor Cover Set
27	HMXE2278	LED Arm Cover Set
28	HMXE2279	Chassis
29	HMXE2280	Battery Plate Set
30	HMXE2281	Battery Plate Holder
31	HMXE2282	Upper Chassis Tray
32	HMXG8045	BL3726 BL Motor 800 KV RH
33	HMXG8046	BL3726 BL Motor 800 KV LH
34	HMXE2283	Damper Set Camera Mount
35	HMXM2060	ESC 10 A Simonk
36	HMXM2061	GPS Set
37*	HMXM2062	ESC Power Cable
38	HMXM2063	Rear LED Board
39	HMXM2064	Arm LED Board
40*	HMXM2065	Sensor Board Set
41	HMXM2066	Flight Controlller Board Set
42	HMXM2067	Input/Output Board
43	DTXC1867	Duratrax Onyx LiPo 3S 11.1V 5000 mAh

Note: mounting screws are included with all part sets

* items not in drawings

HELI*MAX*®