

INSTRUCTION MANUAL



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 3002 N. Apollo Dr. Suite 1 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.

READ THROUGH THIS INSTRUCTION MANUAL FIRST. IT CONTAINS IMPORTANT INSTRUCTIONS AND WARNINGS CONCERNING THE ASSEMBLY AND USE OF THIS MODEL.



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INTRODUCTION

The Heli-Max MX400 ARF is a fully aerobatic-capable helicopter, offering the performance and flying manners of a 30-sized machine in a much smaller and more convenient package. The MX400 is no "toy" helicopter. With its double-damped head, belt-driven tail rotor, and aluminum frames, this is a "real" helicopter, ready to fly anywhere you can find a safe landing pad.

Take care to build straight and true. Misaligned parts will hurt the helicopter's ability to perform the extreme aerobatics it is designed for.

For the latest technical updates or manual corrections to the MX400 visit the Heli-Max web site at **www.bestrc.com/helimax**. Open the "Helicopters" link, and then select the MX400 ARF. If there is new technical information or changes to this model a "tech notice" box will appear in the upper left corner of the page.

CAUTION: Be aware that the MX400 is operated on the same frequency band as larger R/C models. If flying your heli within five miles of an R/C site, there is a real possibility that you could be operating your model on the same frequency (channel) as another R/C pilot. If this happens, a crash will result—with the person flying the more expensive model suffering the greater loss (and having greater potential for property damage or injury). The best thing to do is to join an R/C club and fly at the site where frequency control measures will be in effect. If you insist on flying elsewhere, **always be aware of your proximity to R/C flying sites.**

DECISIONS YOU MUST MAKE

In the hands of a capable pilot, the MX400 is an impressive 3D performer. But for this helicopter to perform to its full potential, it must be properly equipped with all the right gear (servos, batteries, receiver, speed control). There may be more than one type and brand of radio equipment that can be used. But based on extensive testing, following is the equipment we recommend so you can get the most performance out of your MX400 and assemble it as shown in this instruction manual.

Transmitter

At a minimum, this helicopter requires the use of a six-channel helicopter transmitter capable of mixing between the throttle and collective pitch channels. However, to unleash the full aerobatic potential of the MX400, you will need a computer radio capable of at least two sets of throttle and pitch curves. The Futaba® 6EXH radio is an excellent entry-level radio for use with this helicopter. For more programming capability, any of Futaba's higher channel-count computer helicopter radios will work very well. FUTK60** or FUTK61**

Servos

You will need four servos for the MX400. The servos should weight less than 10 grams apiece, and should have a minimum torque output of 14 oz-in. A good speed rating is also important for helicopters, and we recommend that you choose servos with a speed of 0.12sec/60deg or less. We recommend the Futaba S3103 (FUTM0037) and S3107 (FUTM0025) for use with this helicopter. Note: The Futaba S3108 servo will not mount to this helicopter without modification, and is therefore not recommended.

Receiver

You will need a 6-channel receiver for this helicopter. A small PCM receiver is strongly recommended for the noise rejection and failsafe capabilities that PCM offers. We recommend the Futaba R146iP receiver (FUTL0601) You will also need a single conversion crystal to use with this receiver. While most Futaba receivers are sold on high and low bands, the R146iP is not banded and can use either high or low band crystals.

Low band (channels 11 – 35) Crystal FUTL62** High band (channels 36 – 60) Crystal FUTL63**

Replace the "" in the order number for the crystals with the preferred channel number. For example, if you want to fly on channel 33, order crystal number FUTL6233.

Gyro Recommendation

We recommend the use of a heading-hold gyro with this helicopter. The Futaba GY240 gyro (FUTM0809) is an excellent choice.

Battery

The MX400 requires a 1200-2000 mAh 3-cell Lithium-Polymer (LiPo) battery capable of delivering 15A of current continuously. We recommend the ElectriFly™ 3S 1250 mAh pack (GPMP0823). This battery will deliver approximately 7 minutes of flight time with the recommended motor and speed control.

Motor

You will need a brushless motor capable of handling 15A of continuous current, and up to 22A in bursts. The motor should also have a kV rating of 2500-3000 RPM/V for use with the included pinion. We recommend the Heli-Max 6-pole brushless motor (HMXG1001).

Speed Control

A 25-Amp or better brushless electronic speed control (ESC) is required for this helicopter. We recommend the Heli-Max 25A Brushless ESC (HMXM3000).

Charger

A charger capable of charging 3-cell (11.1V) LiPo batteries such as the ElectriFly PolyCharge 1-3-cell LiPo charger (GPMM3010) must be used. If using another charger, it **must** be a LiPo charger or have a LiPo charge mode. Never charge LiPo batteries with chargers not intended for LiPo batteries or chargers on NiMH or NiCd settings. Overcharging or explosion may result. In addition to the PolyCharge, the ElectriFly Triton™ (GPMM3150) and Accu-Cycle Elite™ (HCAP0280) are also suitable chargers.

Battery Charging Leads

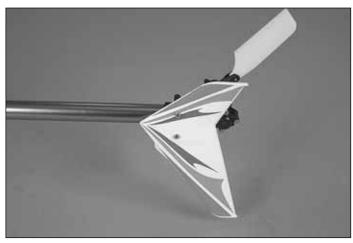
Many chargers (including the Triton and Accu-Cycle Elite listed above) do not include charging leads, but rather have banana jacks to plug the leads into. If this is the case with your charger, you will need to purchase a charge lead to match your battery. For the recommended 1250 mAh pack, the correct lead is GPMM3105.

IMPORTANT!

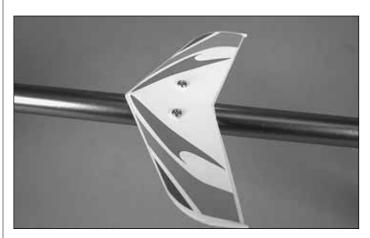
INSPECT YOUR HELICOPTER

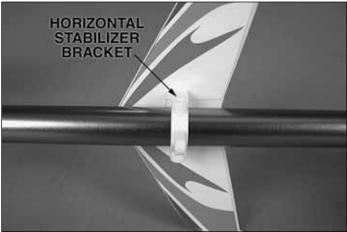
Check all screws on the helicopter for tightness. If any screws are loose, tighten them before flying. If any machine screw that threads into a metal part is loose, be sure to secure it with a drop of threadlocking compound. This check should include the tail blade grip screws, which will require removal of the tail rotor blades.



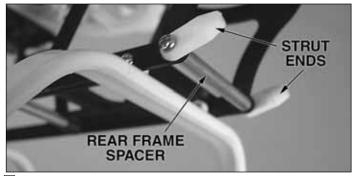


1. Remove the fin from the tail gearcase. Apply the decals to the fin and reinstall it.

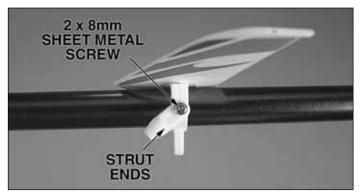




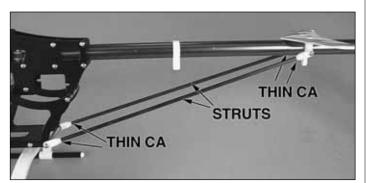
☐ 2. Apply the decals to the horizontal stabilizer. Install it and the horizontal stabilizer bracket onto the tail boom with two 2 x 8mm sheet metal screws. Do not fully tighten the screws at this time.



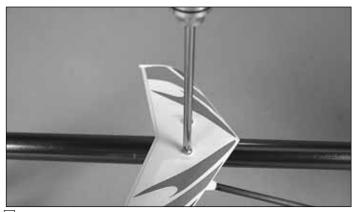
☐ 3. Secure two tail strut ends and the rear frame spacer to the frames with two 2x10mm machine screws as shown. Use a drop of threadlocker to secure each screw.



4. Secure two tail strut ends to the horizontal stabilizer bracket with 2x8mm sheet metal screws.

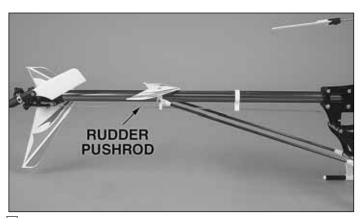


☐ 5. Insert the carbon fiber tail struts into the strut ends. Secure each end with a drop of thin CA.



☐ 6. Finalize the position of the horizontal stabilizer bracket, and tighten the horizontal stabilizer screws to hold the assembly firmly in place. Do not over tighten.

INSTALL THE PUSHRODS



☐ 1. With the Z-bend towards the front, slide the rudder pushrod back through both supports on the tail boom.



2. Screw a ball link onto the threaded end of the rudder pushrod.



3. Connect the ball link to the ball on the tail rotor pitch control horn. Check to see that the ball link runs freely on the ball, and loosen it if necessary using the following Heli-Max Tip.



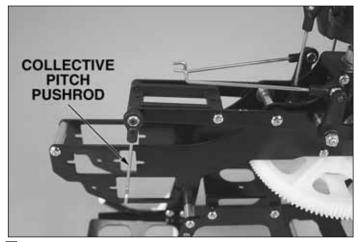
HELI-MAX TIP

How to adjust the fit of ball links.

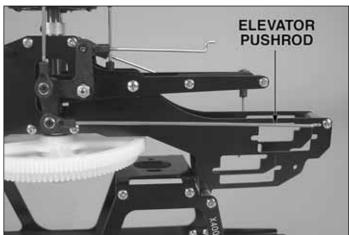
If a ball link does not twist freely on its ball, squeeze it firmly with a pair of needlenose pliers while it is installed on the ball.



4. Connect the aileron pushrods as shown. Check the ball links and adjust the fit if necessary.

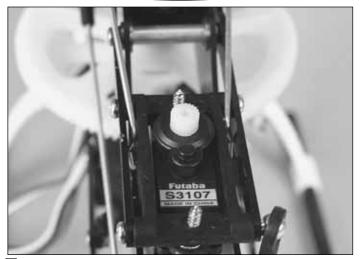


5. Connect the collective pitch pushrod as shown. Check the ball link and adjust the fit if necessary.



☐ 6. Connect the elevator pushrod. Check the ball link and adjust the fit if necessary.

INSTALL THE SERVOS



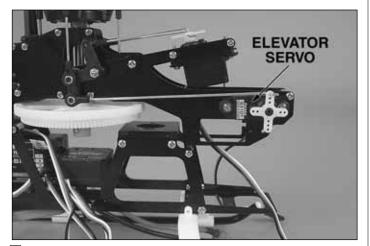
1. Install the aileron servo in its tray. If using the recommended Futaba servos, you will need to install the eyelets upside down in your servo, and install the servo under the tray, with the screws running up into the tray.



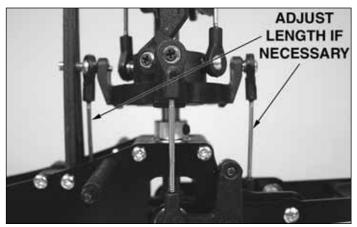


☐ 2. Center the aileron servo. Install the aileron pushrods through the servo arm and install the servo arm on the servo as shown. With the servo centered, the two aileron control horns should be even with one another. If they are not, adjust the pushrod until they are. Once you have the aileron control horns even, check to make sure that the

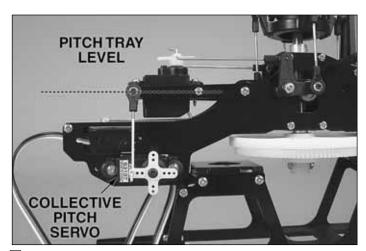
swash plate is level when viewed from the front. If it is not, adjust the linkages from the aileron control horns to the swash plate until the swash plate is level.



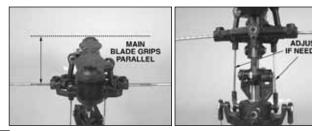
□ 3. Using two plastic servo screw nuts, install the elevator servo as shown. With the elevator servo centered, the elevator control horn should be vertical. If the control horn is not vertical, adjust the elevator pushrod until it is.



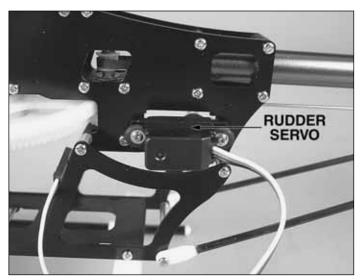
4. With the elevator control horn vertical, the swash plate should be level when viewed from the side. If it is not, adjust the length of the elevator swashplate linkages.

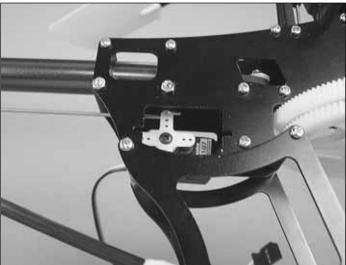


5. Install the collective pitch servo as shown. With the servo centered, the pitch pivot tray should be level. If it is not, adjust the length of the pushrod until it is.



☐ 6. With the servo centered and the pitch tray level, the main blade grips should be parallel to each other. If they are not, adjust the length of the linkages shown.

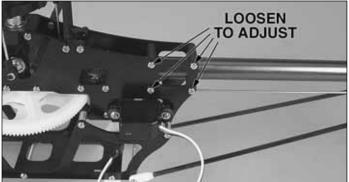




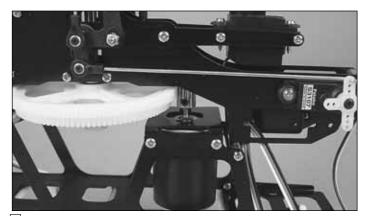
7. Install the rudder servo as shown. With the servo centered, the tail rotor should be at approximately zero pitch. If it is not, adjust the length of the rudder pushrod.

FINAL ASSEMBLY & SETUP





☐ 1. Check the tail drive belt tension by pressing on one side of the belt with a screwdriver. With gentle pressure, it should be possible to push the belt approximately as far as the picture shows. If you can easily push the belt against itself, it is too loose. If it does not deflect easily, then it is too tight. If you need to adjust the belt tension, simply loosen the screws shown and slide the tail boom in or out. When you have the tension correct, retighten the screws. Recheck the rudder pushrod adjustment.



2. Install the pinion onto the motor, and install the motor in the helicopter.

☐ 3. Be sure to set the gear mesh properly. This can be done by pushing the pinion and spur together with a strip of typing paper between them and tightening the motor screws. The paper can then be removed by turning the gears to eject it.



☐ 3. Install the gyro directly under the main shaft. Connect your rudder servo to the gyro's output port.

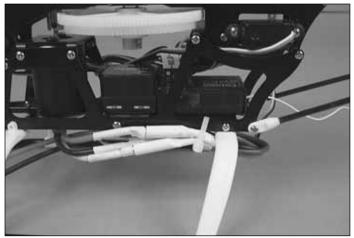


Alternately, the gyro can be installed on top of the rear end of the main frames. Use a piece of foam tape to isolate the gyro against vibration, and secure it with a tie wrap.

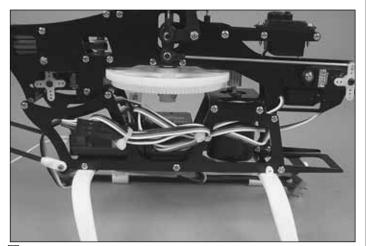


4. Install the receiver in the position shown. Connect your servos and gyro to the appropriate channels.



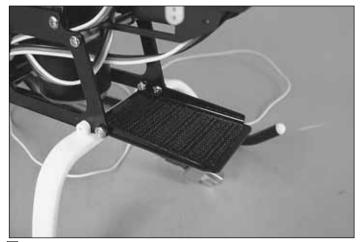


5. Install the speed control on the bottom of the helicopter with double-sided tape. Connect the ESC to the motor and receiver.

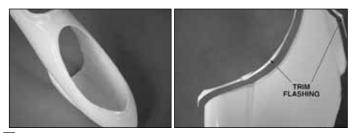


6. Secure all wiring to the frame with nylon wire ties.

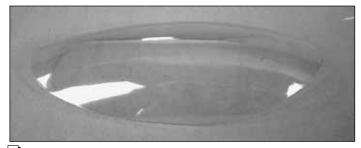
☐ 7. Make sure that the receiver antenna is routed so that it cannot possibly interfere with the main or tail rotor blades. There are many possible ways to route the antenna, and you may have to try different methods to get interference-free operation, but it is essential that the antenna be constrained against contact with the blades.



■ 8. Attach the hook side of hook and loop fastener to the battery tray.



9. Cut the window out of the canopy, and trim the flashing from around the rear opening.



10. Cut the clear shield out along the molded-in cut lines.



11. Secure the shield to the canopy with the two small screws packaged with the shield.



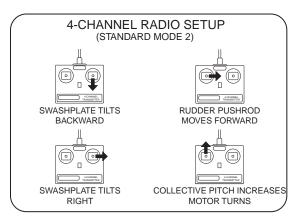
■ 12. Install the canopy onto the helicopter.



12. Secure the landing gear skids by positioning them correctly and adding a drop of thin CA at each joint.

CHECK THE CONTROL DIRECTIONS

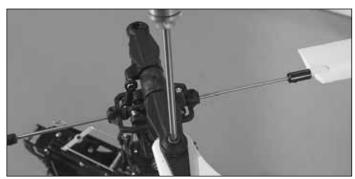
- 1. Attach the "loop" side of the hook-and-loop material to the battery. Mount the battery to the battery tray.
- 2. For safety, do not install the main blades while performing bench setup.
- 3. Lower the throttle stick all the way and turn on the transmitter. Connect your battery to the ESC. If the ESC has a BEC switch, turn it on.
- 4. Check all the servos to see if they are centered. Since you set the center points as you set up the linkages, they should already be very close. Use the trims or subtrims on the transmitter to center the controls.



☐ 5. Make certain that the swash plate and the motor respond in the correct direction as shown in the diagram. To operate the motor, you may have to "arm" your ESC. Follow the instructions that came with your ESC to do this. If any of the controls respond in the wrong direction, use the servo reversing in the transmitter to reverse the servos connected to those controls. Be certain the servos have remained centered. Adjust if necessary.

BLADE BALANCING & INSTALLATION

☐ 1. Balance your main blades using the Heli-Max Blade Balancer (HMXR4855). Do so according to the instructions that came with your balancer.



2. Attach the main rotor blades. The blades should be tight enough in the grips to hold their position when moved, but still move easily by hand.



WARNING: Disconnect the motor from the ESC to prevent accidental startup while performing pitch adjustment.

1. Cut out the pitch template from the last page of this manual and slip it over one of the main blades.



- ☑ 2. We recommend 8 degrees of maximum collective pitch in both directions as a starting point. Check to see that the bottom of the pitch template is level with the flybar at maximum positive pitch and the top of the template is level with the flybar at full negative collective pitch. Adjust your linkages or radio endpoints if necessary to achieve these values.
- ☐ 3. Once you are comfortable with the helicopter, feel free to increase or decrease this pitch value to suit your flying style.

SET CONTROL THROWS

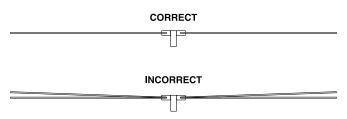


To set rates on the elevator and aileron, check to see that the control rates are set to maximum for high rates. This can be verified by checking that the ball link attached to the seesaw is close to touching the main rotor grips at full input. Check the elevator rate with the flybar perpendicular to the tailboom, and check the aileron rate with the flybar parallel to the tailboom. These maximum deflections work well for high rates, and we recommend 60% of these values for low rates.

Rudder control throw will be affected by your gyro settings, and will need to be tuned by to suit your flying style.

ADJUST BLADE TRACKING

1. Apply the two different colored stripe decals to the tips of your main rotor blades.



2. At zero pitch, bring the main rotor up to speed and observe whether the rotational planes of the blades are the same. If they are not, adjust one of the linkages to bring the blades into the same plane.

RANGE CHECK

Ground check the operational range of your radio before the first flight of the day. With the transmitter antenna collapsed and the receiver and transmitter on, you should be able to walk at least 50 feet away from the model and still have control. Have an assistant stand by your model and, while you work the controls, tell you what the servos are doing. Repeat this test with the motor running at various speeds. If the control surfaces do not respond correctly, do not fly! Find and correct the problem first. Look for loose servo connections or broken wires, corroded wires on old servo connectors, poor solder joints in your battery pack or a defective cell, or a damaged receiver crystal from a previous crash.



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

Keep your face and body as well as all spectators away from the plane of rotation of the rotors whenever the battery is connected.

Keep these items away from the rotors: 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 into the rotors.

The spinning blades of a model helicopter can cause serious injury. When choosing a flying site for your MX400, stay clear of buildings, trees and power lines. AVOID flying in or near crowded areas. DO NOT fly close to people, children or pets. Maintain a safe pilot-to-helicopter distance while flying.

Parts List

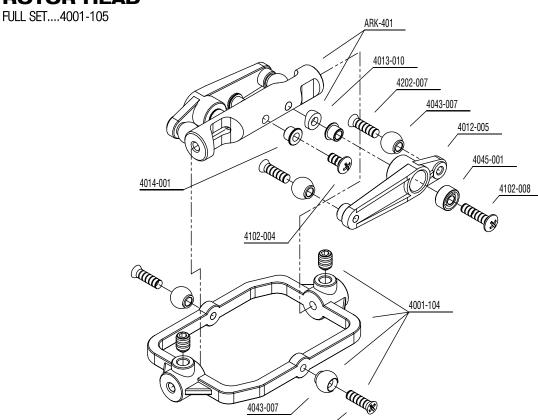
	rait	s List
SKU	Mfr. #	Description
	4001-101	
HMXE8310	4001-102	Main Blade Grip Set
		Rotor Head Set
		Stabilizer Control Set
HMXE8815	4001-105	Rotor Head Full Set
		Stabilizer Blades (2)
		Wash-Out Control Set
HIVIXE9005	4001-108	Swash Plate Set
HIMIXE03U3	4001-109	Main Rotor Blades (2) Auto-Rotation Gear Set
	4 001-110	Drive Pulley 11T
HMYEQ714	4 001-111	Counter Gear 21T
		Main Shaft Collar
		Stabilizer Control Rod
		Elevator Lever Swash Rod
HMXE7614	4001-116	Mixing Arm Rod
HMXE7616	4001-117	Aileron Rod
		Pitch Rod Short Links
	4001-119	
HMXE7622	4001-120	Pitch Rod
HMXE7901	4002-201	Upper Frame Set
		Main Shaft Mounting Blocks
		Tail Boom Mount
		Anti-Rotation Guide
		Lower Frame Set
		Motor Mount Set
HMXE/201	4002-207	Battery Mount
	4002-208	
	4002-209	
HMXE7930	4002-210	SKIU SEL
HMYE0523	4 003-301	Tail Dilve Beit Tail Pitch Plate Set
HMYEQ420	4 003-302	Tail Unit Case Set
HMXF9710	4003-304	Tail Offit Case Set
HMXF9711	4003-305	Guide Pulley
HMXE9620	4003-306	Tail Stabilizer Set
		Rudder Control Rod
HMXE9520	4003-308	Tail Housing Set
HMXE9521	4003-309	Tail Housing
HMXE9522	4003-310	Tail Blade Holder
		Tail Rotor Blades (2)
	4003-312	
		Tail Pitch Lever Set
		Tail Boom Brace Set
	4004-060	
		Instruction Manual
		Collar 3x5x4mm
HIVIXE882U	4012-005 4012-006	IVIIXING Arm
HMYEOGO	4 012-000	Wash-Out Control Arm
	4012-007	
		Spindle Bushing
HMXE8635	4013-001	Feathering Spindle
HMXF8612	4013-002	Anti-Rotation Pin
HMXE8401	4013-003	Main Shaft
	4013-006	
	4014-001	
	4016-001	
HMXE8608	4016-002	Center Hub Pin (2)
HMXE7630	4021-003	Collective Pitch Levers
		Counter Gear Case
	4021-008	
HMXE7903	4021-009	Cross Member 2x34mm (2)
HMXE7904	4021-010	Cross Member 2x26mm (4)
HMXE7905	4021-011	Cross Member 2x8mm (6)
		Elevator Mount
		Motor Pinion 14T
		Motor Pinion 13T Motor Pinion 12T
		Motor Pinion 121 Motor Pinion 11T
	4021-017	
		Elevator Torque Lever
	4022-002	
	4022-005	
		Main Gear 138T
HMXE8206	4022-009	Autorotation Gear 105T
HMXE7920	4022-013	Gyro Mount
		•

1 IN 43 / E-7 4 0 0	4000 047	
		Canopy Mount
		Autorotation Shaft
		M1.2 Rod Ends (20)
HMXE7357	4043-007	Ball (20)
		Bearing 2x5x2.5 mm
HMXE7306	4045-002	Bearing 3x8x3 mm
HMXE7307	4045-003	Bearing 3x8x4 mm
HMXE7343	4102-004	Pan Head Screw 2x4 mm
HMXE7344	4102-005	Pan Head Screw 2x5 mm
HMXE7346	4102-010	Pan Head Screw 2x10 mm
HMXE7347	4102-012	Pan Head Screw 2x12 mm
HMXE7348	4102-014	Pan Head Screw 2x14 mm
HMXE7350	4102-021	Pan Head Screw 2x21 mm
HMXE7350	4102-022	Pan Head Screw 2x22 mm
HMXE7351	4202-007	Flat Head Screw 2x7 mm
		Flat Head Screw 2x15 mm
HMXE7353	4402-005	Button Bolt 2x5mm
		Cap Screw 2x6mm
HMXE7377	4603-003	Set Screw 3x3 mm
		M2 Nylock Nut
	4702-045	
		M3 Nylock Nut
		Washer 2x4x0.3mm
		E-Clip 2.5 mm
HMXF7358	5400-115	O-Ring
HMXF7480	ARK-206	Crash Kit H
	ARK-207	
		Lower Frame Set Full
		Aluminum Seesaw Short
1 11VI∧⊏00U3	1 U P -//7/	Aiuiiliiliilii Seesaw Siioil

Option Parts

HMXM3000	ARK-122	Brushless ESC 25 AMP
HMXG1001	ARK-125	Brushless 6 Pole Motor
HMXG1002	ARK-126	Brushless 12 Pole Outrunner Motor
HMXM3002	ARK-129	Brushless ESC 25 AMP w/Heatsink
HMXE9006	ARK-201	Aluminum Swash Plate
HMXE9007	ARK-202	Aluminum CCPM Swash Plate
HMXE8620	ARK-203	Aluminum Top Dome
HMXE9421	ARK-204	Aluminum Tail Case Set
		CCPM Upgrade Kit
HMXE7950	ARK-209	Carbon Frame Full Set
		Carbon Frame CCPM Full Set
		Anodized Alum Frame Full Set
		Carbon Blade Set 325mm
		Carbon Stabilizer Blade Set
HMXE9502	ARK-214	Carbon Tail Rotor Blade Set
		Carbon Tail Boom 345mm
HMXE7625	ARK-216	Pro Linkage Set
HMXE7412	ARK-217	Pro Linkage Set Fiberglass Canopy
HMXE9625	ARK-218	Carbon Tail Fin Set
HMXE8817	ARK-219	Rotor Head Full Set Aluminum
HMXE8611	ARK-220	Center Hub Set Aluminum
		Slide Block Aluminum
		Seesaw Aluminum
HMXE8811	ARK-223	Stabilizer Control Arm Aluminum
HMXE8821	ARK-224	Mixing Arm Aluminum
		Washout Control Arm Aluminum
		Elevator Lever Aluminum
HMXE7654	ARK-227	Elevator Torque Arm Aluminum
HMXE9107	ARK-228	Horizontal Stabilizer Mount Alum
HMXE9703	ARK-229	Tailboom Brace Ends Aluminum
		Washout Control Set Aluminum
HMXE8311	ARK-231	Main Blade Grip Aluminum
HMXE9524	ARK-232	Tail Blade Grip Aluminum
HMXE7319	ARK-233	Main Shaft Mount Blocks Alum
		Counter Gear Case Aluminum
		Tail Boom Mount Aluminum
		Aluminum Tail Boom Servo Mount
		Tail Drive Belt Long
		Rudder Control Rod Long
HMXE7921	4021-021	Gyro Mount Aluminum

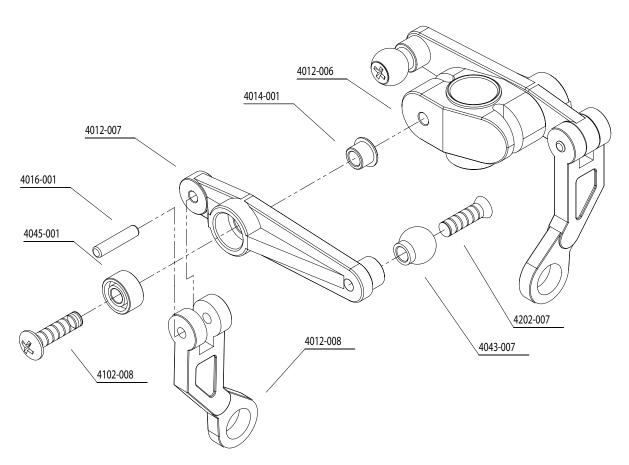
ROTOR HEAD



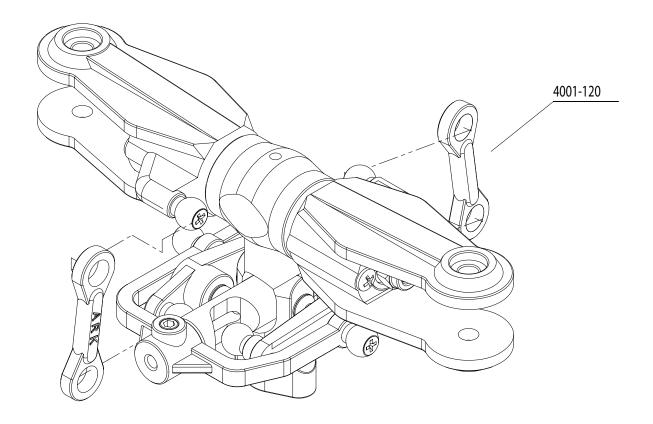
4043-007

4202-007

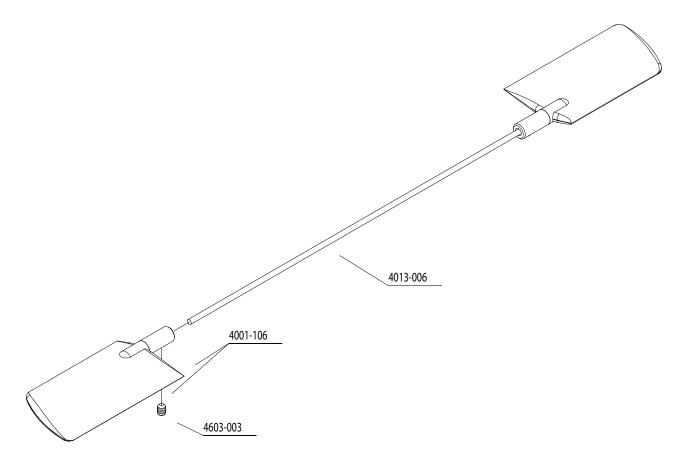
MIXING LEVERS



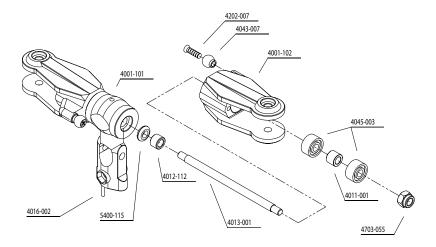
PITCH LINKS



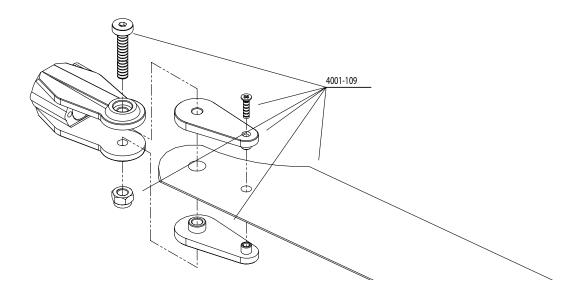
FLYBAR



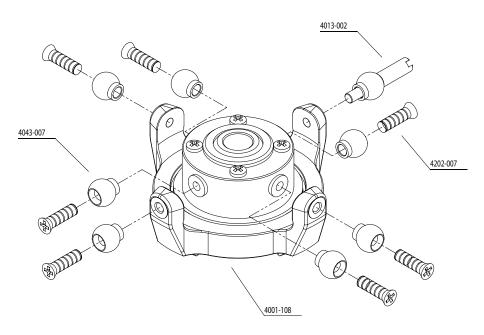
BLADE GRIPS



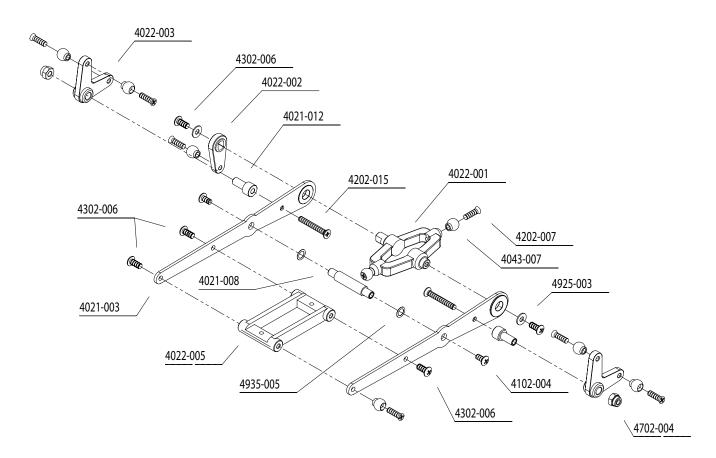
BLADE ATTACHMENT



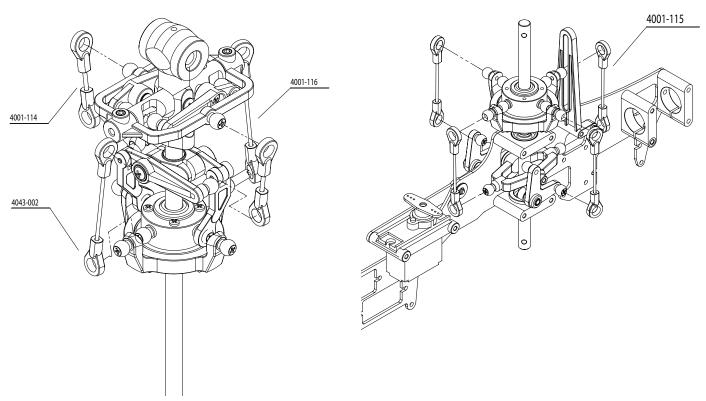
SWASH PLATE



PITCH LEVER

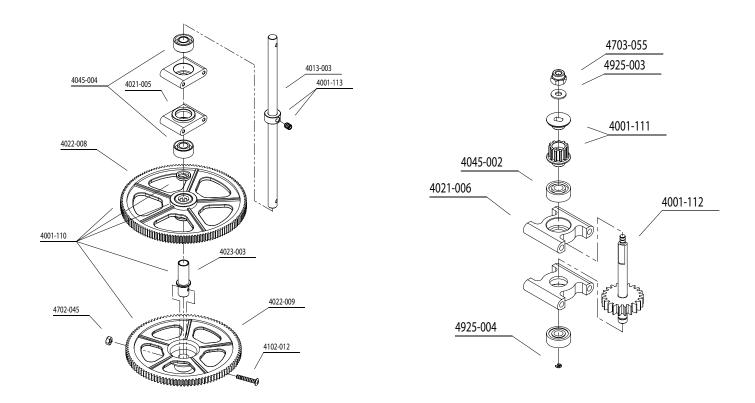


LINKAGES

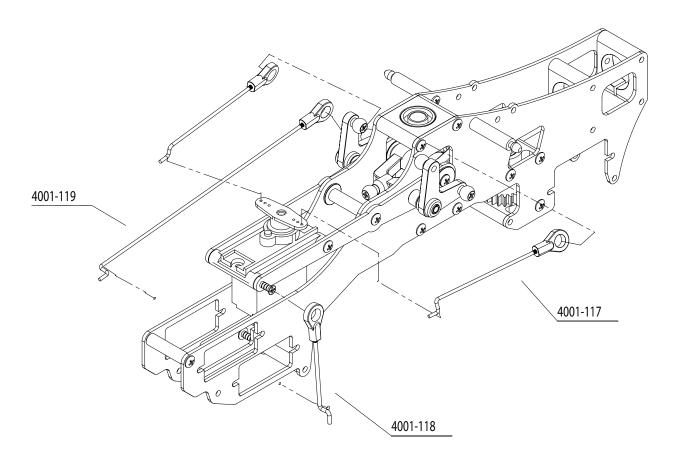


MAIN SHAFT

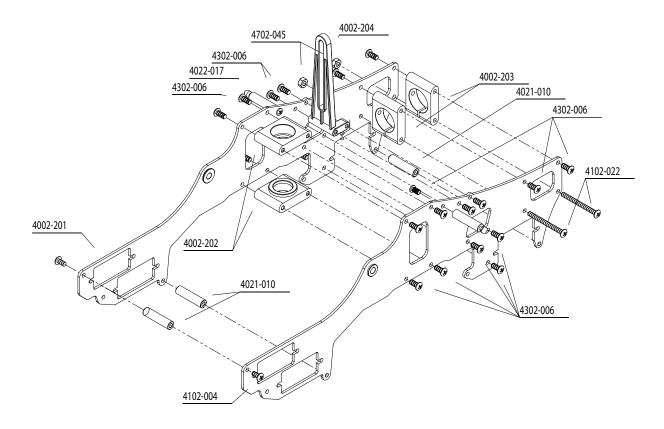
TAIL DRIVE



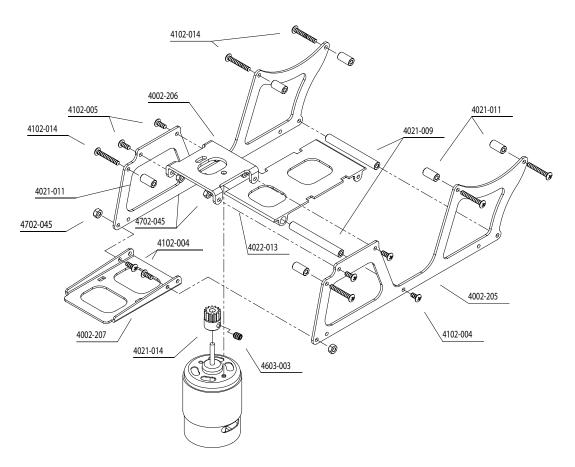
SERVO LINKAGES



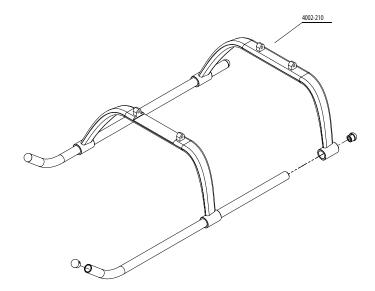
MAIN FRAME



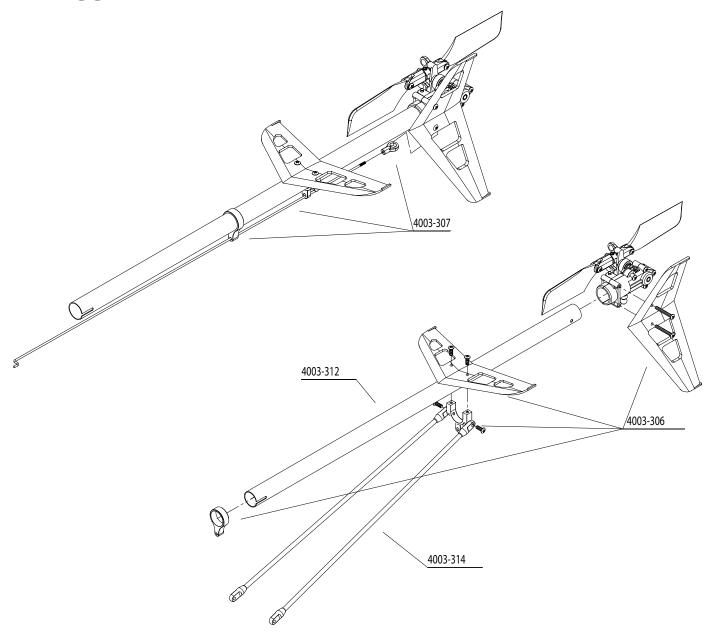
LOWER FRAME



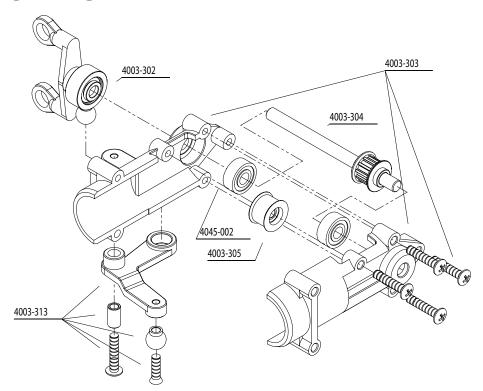
LANDING GEAR



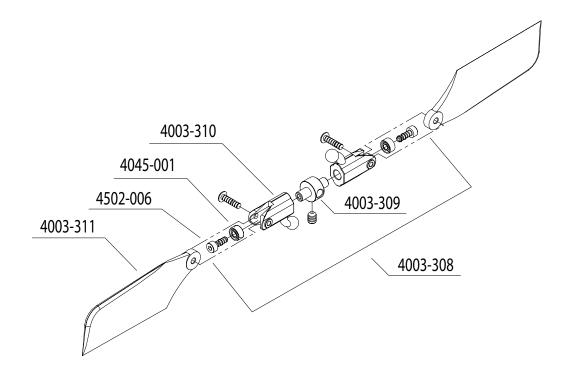
TAIL BOOM



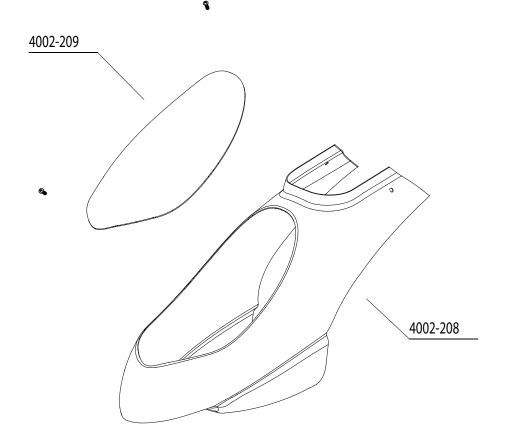
TAIL DRIVE GEARBOX



TAIL ROTOR



CANOPY



PITCH TEMPLATE

