

Titan

RAPTOR

50 Size 3D Heli



MANUAL

ASSEMBLY & MAINTENANCE

INTRODUCTION

Congratulations on your purchase of the Thunder Tiger Raptor 50 Titan Version helicopter. This model was designed and engineered by the world-renowned Mr. Shgetada Taya. It combines elements of his previously successful designs with today's advanced technologies.

Raptor 50 , already the best 50 class 3-D helicopter is now even better. The Raptor 50 Titan is the culmination of all customers' feedback and tremendous research and development effort by the Thunder Tiger design team. The Raptor 50 Titan is more rugged and has improved flying performance than the previous Raptor 50 V2. The Raptor 50 Titan has the best power-to-weight ratio of any 50 class helicopters on the market. So get ready for incredibly fast accelerations and climb rate. With the new upgrades, 3-D pilots will enjoy executing crisp maneuvers like Climbing Tic-Tocs, Chaos, Death Spirals, or any radical maneuver that you can dream of. Key new features include new push-pull pitch lever, push-pull elevator lever, metal rear servo plate, hardened main shaft, stronger mainframes, bigger fuel tank, reinforced pitch control arm, and new main rotor with 6mm spindle featuring larger radial and thrust bearings. The Raptor 50 Titan includes a constant drive autorotation gear to allow aerobatics during autorotation. Beginners and advanced 3-D fliers will be impressed with the new Raptor 50 Titan.

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WARNING

This radio controlled helicopter is not a toy. It is a sophisticated piece of equipment and is designed for hobby use only. If not properly assembled and operated, it is capable of causing property damage and bodily harm to both the operator and spectators. Thunder Tiger and its duly authorized distributors assume no liability for damage that could occur from the assembly or operation of this product.

AMA INFORMATION

Operating a model helicopter requires a high degree of responsibility and skill. If you are a newcomer to the hobby, it is best to seek help and guidance from accomplished model helicopter pilots. This will greatly speed up the learning process and have you flying successfully in a reasonable amount of time. We also would strongly urge you to join the Academy of Model Aeronautics. The AMA is a non-profit organization that provides its members with a liability insurance plan as well as monthly magazine entitled Model Aviation. All AMA charter aircraft clubs require all pilots to hold a current AMA sporting license prior to operation of their models at club fields. For further information, contact the AMA at:

Academy of Model Aeronautics
5151 East Memorial Drive
Muncie, IN 47302
(317) 287-1256

FLIGHT SAFETY CHECKLIST

1. Make sure both the transmitter and receiver batteries are fully charged prior to operating the helicopter.
2. Make sure all flight controls operate properly prior to flying.
3. Range check the radio before the first flight. The servos must operate properly with the transmitter antenna collapsed at a range of at least 50 ft.(15 meters).
4. Check to make sure there is no radio interference on your radio frequency before operating the helicopter.
5. Use only the recommended engine fuel as specified by the engine manufacturer.
6. Make sure the transmitter and receiver are turned on before starting the engine.
7. The engine throttle must be in the idle position before starting the engine.
8. Model helicopter main and tail rotors operate at very high RPM. Make sure nothing can come in contact with the rotor blades during flight.
9. After starting the helicopter, maintain a safe distance during the flight.
10. Never operate the helicopter in rain or excessive wind conditions.
11. Always operate and fly your helicopter in a safe and responsible manner.
12. Never fly a model helicopter over other pilots, spectators, cars, or anything that could result in injury or property damage.

POST FLIGHT INSPECTION

1. Inspect the model thoroughly to insure no parts have come loose or become damaged during the flight and landing. Replace damaged parts and tighten loose screws before flying again.
2. Pump out any remaining fuel from the fuel tank.
3. Wipe off excess oil and fuel from helicopter body and other exposed parts.
4. Lubricate all moving parts to ensure smooth operation for the next time you fly.
5. Store model in a cool, dry place. Avoid storage in direct sunlight or near a source of heat.
6. Replace any loose ball links and damaged bearings.

Following these few, simple safety rules will allow you to enjoy the thrill of model helicopter flying for many years to come.

CAUTION: In the event the model has crashed, inspect the flybar, rotor shaft and the blade spindle to make sure they are not bent. If any item is damaged, it must be replaced with a new part to ensure safe operation. Do not glue any broken or damaged plastic parts. Do not repair broken rotor blades.

Always inspect the following items immediately:

Engine starting shaft.

All gears, Ball links, Link rods, bearings.

Main shaft, flybar and blade spindle.

Tail boom and support.

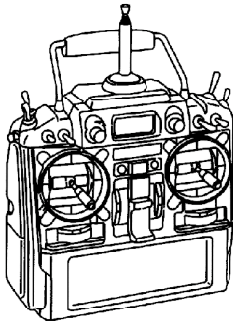
Vertical and horizontal fins.

Tail rotor shaft and control system.

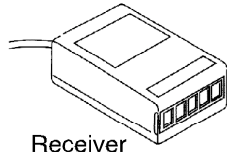
Main and tail rotor blades.

OTHER ITEMS REQUIRED

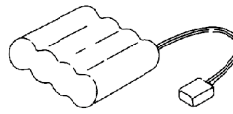
RADIO SET



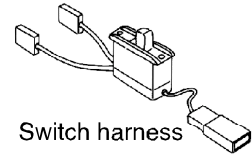
Transmitter
(helicopter type only
6 or more channels)



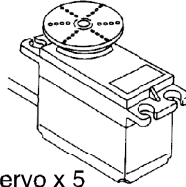
Receiver



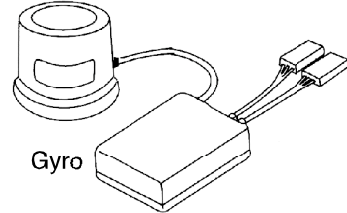
Battery
1000mAh



Switch harness

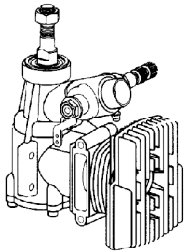


Servo x 5



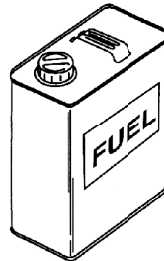
Gyro

ENGINE

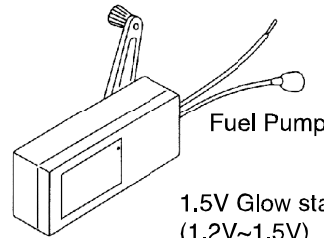


HELI ENGINE(50-size)

Glow Plug

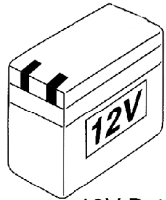
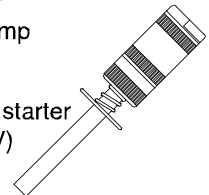


Glow Fuel(15%-30%)



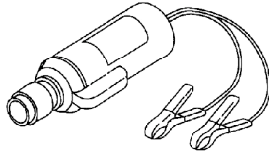
Fuel Pump

1.5V Glow starter
(1.2V~1.5V)

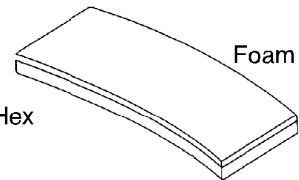


12V Battery

12V Electric starter

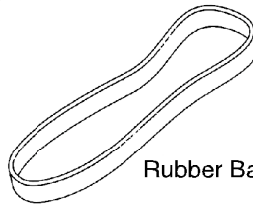
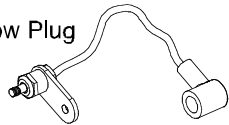


Extended 6mm Hex
Starting Tool

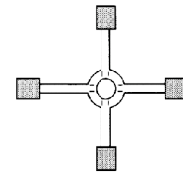


Foam

Remote Glow Plug
Extension



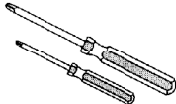
Rubber Band



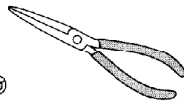
Glow Plug Wrench

TOOLS REQUIRED FOR ASSEMBLY

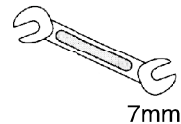
Screw Driver



Needle Nose Pliers

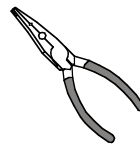


5.5mm Wrench

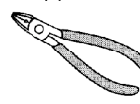


7mm

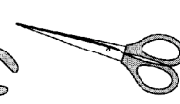
Ball Link Pliers



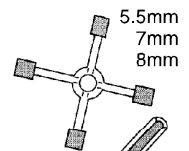
Nipper



Scissors



Metric
4-way Wrench



5.5mm
7mm
8mm

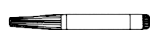
Hobby Knife



Instant Glue



Blue Locktite



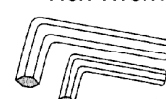
Grease



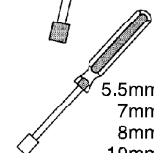
Epoxy



Hex Wrench

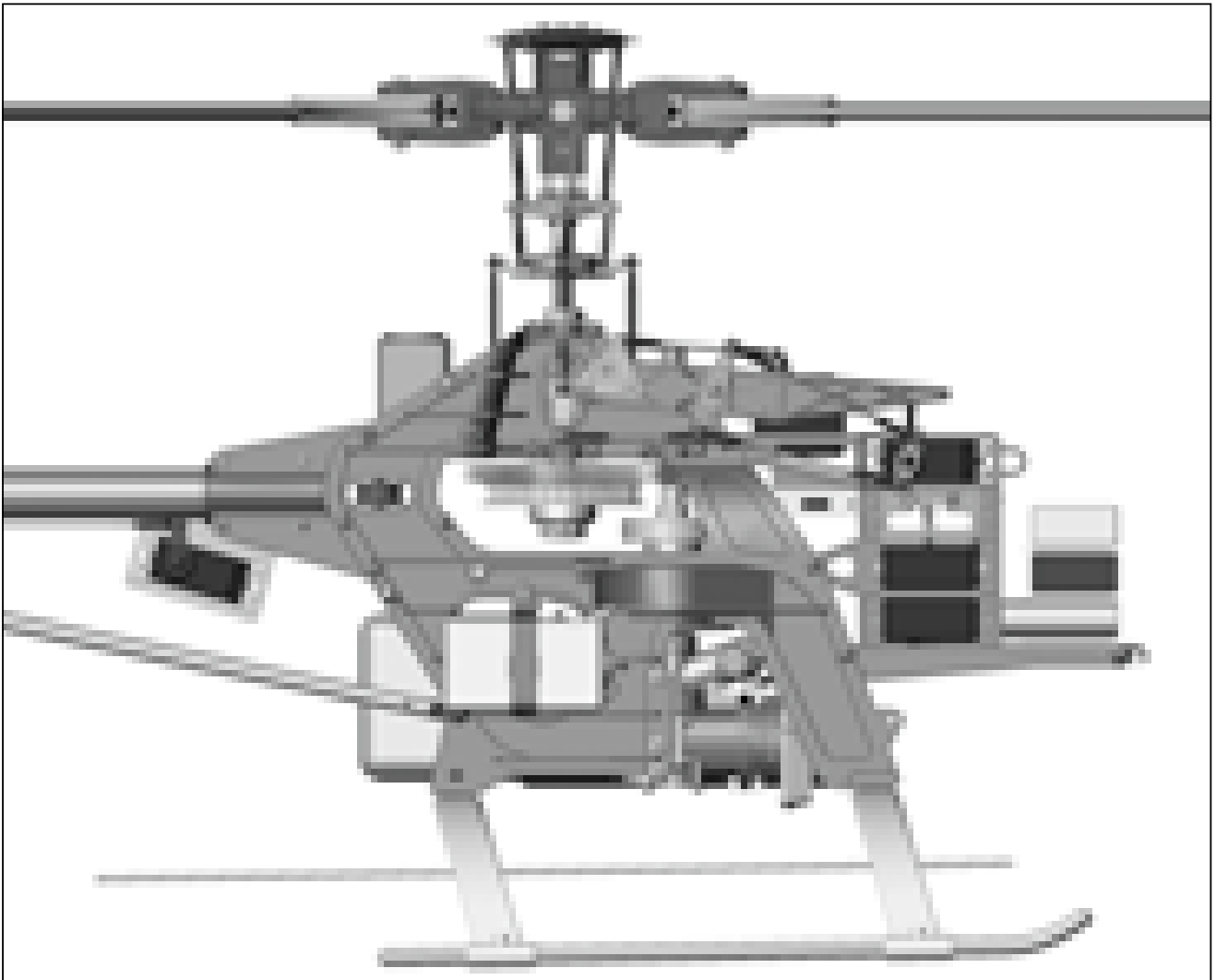


Socket Drivers



5.5mm
7mm
8mm
10mm

ASSEMBLING SECTION

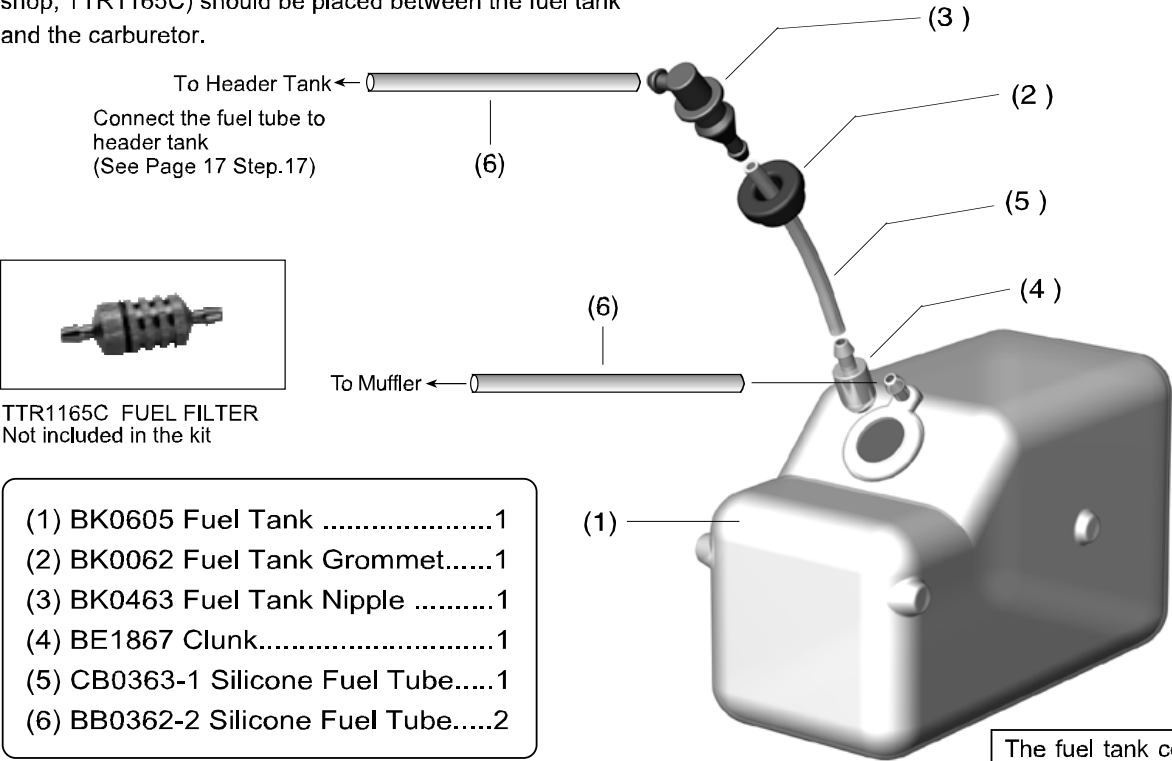


Most parts in the Raptor kit are packed according to the assembly steps. The part number and quantity contained in each step are always shown in the square box on each page. Do not open all the bags at once. Open only the bag that is needed for the current assembly step.

① Fuel Tank Assembly

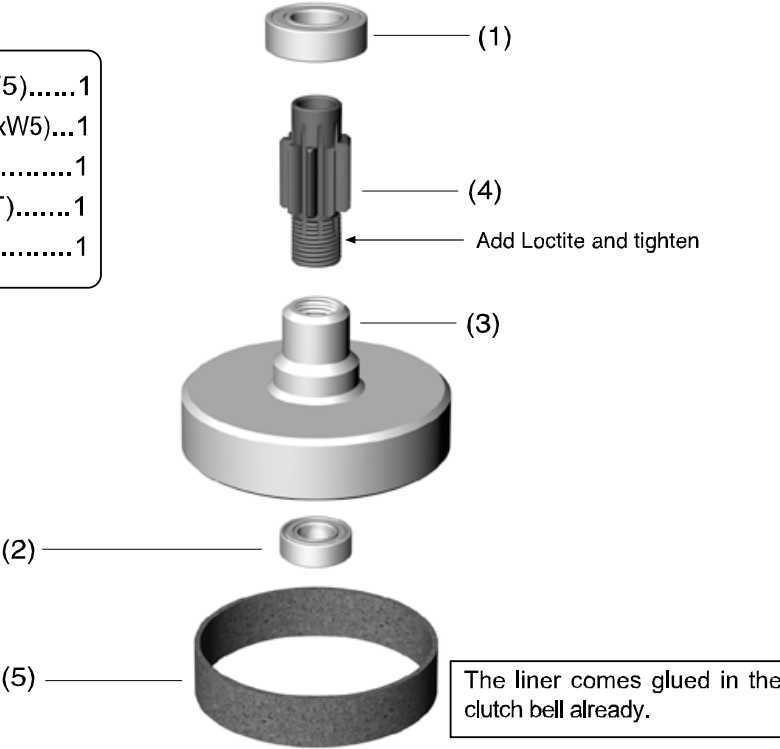
Note: After assembly, check to make sure the Fuel Tank clunk can move from top to bottom without touching the back of tank. Also, a fuel filter (available from any hobby shop, TTR1165C) should be placed between the fuel tank and the carburetor.

It might be necessary to inspect and replace the silicone tube inside the tank every month to ensure the fuel consumption is smooth.



② Clutch Bell Assembly

- (1) HMV1680 Bearing (d8xD16xW5).....1
- (2) HMV1360ZZY Bearing (d6xD13xW5)...1
- (3) BK0838 Clutch Bell.....1
- (4) BK0624 Drive Gear(Pinion 10T).....1
- (5) BK0590 Clutch Liner.....1

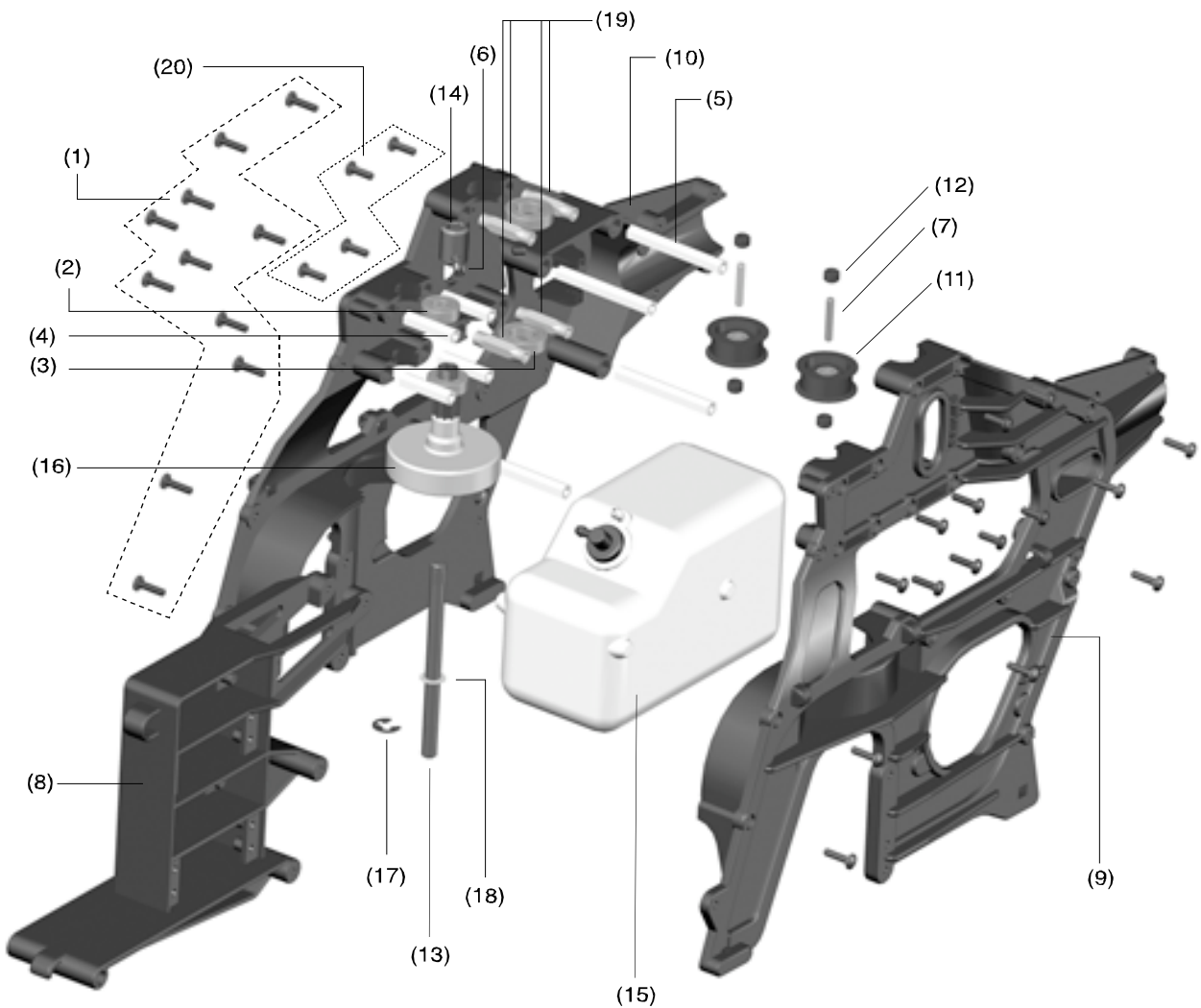


③ Main Frame Assembly-Part1

Please insert the frame spacers, bearings, pulley and parts in the frames according the drawing below. Install four metal aluminum frame spacers beside the main shaft bearings. Remember add Loctite when securing on these four spacers. Tighten the screws snugly, but do not over torque them which could strip the plastic.

Insert starter shaft through the center of the clutch bell assembly, through the top starter shaft bearing and into the starter coupling. Secure with the two set screws. Make sure this is tightly secured. The main frame can be reinforced by recommended Aluminum Frame Post (PV0104).

(1) HSE3-12B Self Tapping Screw (M3x12).....	22	(11) BV0035 Guide Pulley.....	2
(2) HMV696Z Bearing (d6xD15xW5).....	1	(12) BK0036 Pulley Collar.....	4
(3) HMV6800 Bearing (d10xD19xW5).....	2	(13) BK0592 Starter Shaft.....	1
(4) BK0059 Frame Spacer (S).....	4	(14) BK0594 Starter Coupling.....	1
(5) BK0058 Frame Spacer (L).....	4	(15) Fuel Tank Assembly	
(6) HME4-5B Set Screw (M4x5).....	2	(16) Clutch Assembly	
(7) BK0081 Pin.....	2	(17) HMS5 E-Clip.....	1
(8) BK0057 Servo Frame.....	1	(18) BK0584 Thrust Washer.....	1
(9) BK0599 Main Frame Left Side.....	1	(19) CK0136 Metal Frame Spacer(S).....	4
(10) BK0600 Main Frame Right Side.....	1	(20) HSA3-10 Socket Screw(M3x10).....	8

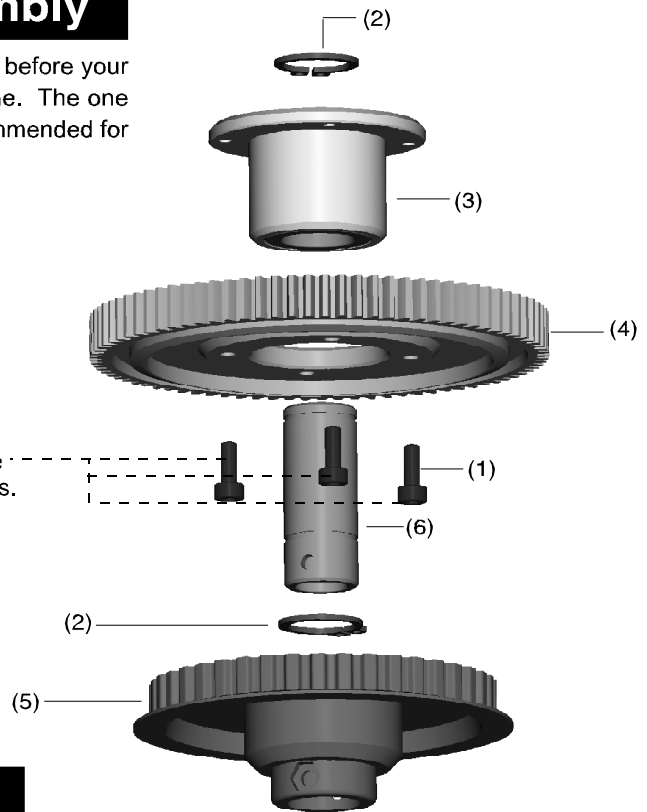


④ Main Drive Gear Assembly

It is necessary to add grease inside the one way clutch before your first flight. The clutch might lock up once grease is gone. The one way grease(PV0517) or Ball differential grease is recommended for this lubrication.

- | | |
|--|---|
| (1) HMC3-8B Socket Screw (M3x8)..... | 4 |
| (2) HMQ14 Snap Ring..... | 2 |
| (3) BV0033 One Way Clutch Housing..... | 1 |
| (4) BK0148 Main Spur Gear 85T..... | 1 |
| (5) BK0610 Autorotation Tail Drive Pulley..... | 1 |
| (6) BK0034 One Way Clutch Shaft..... | 1 |

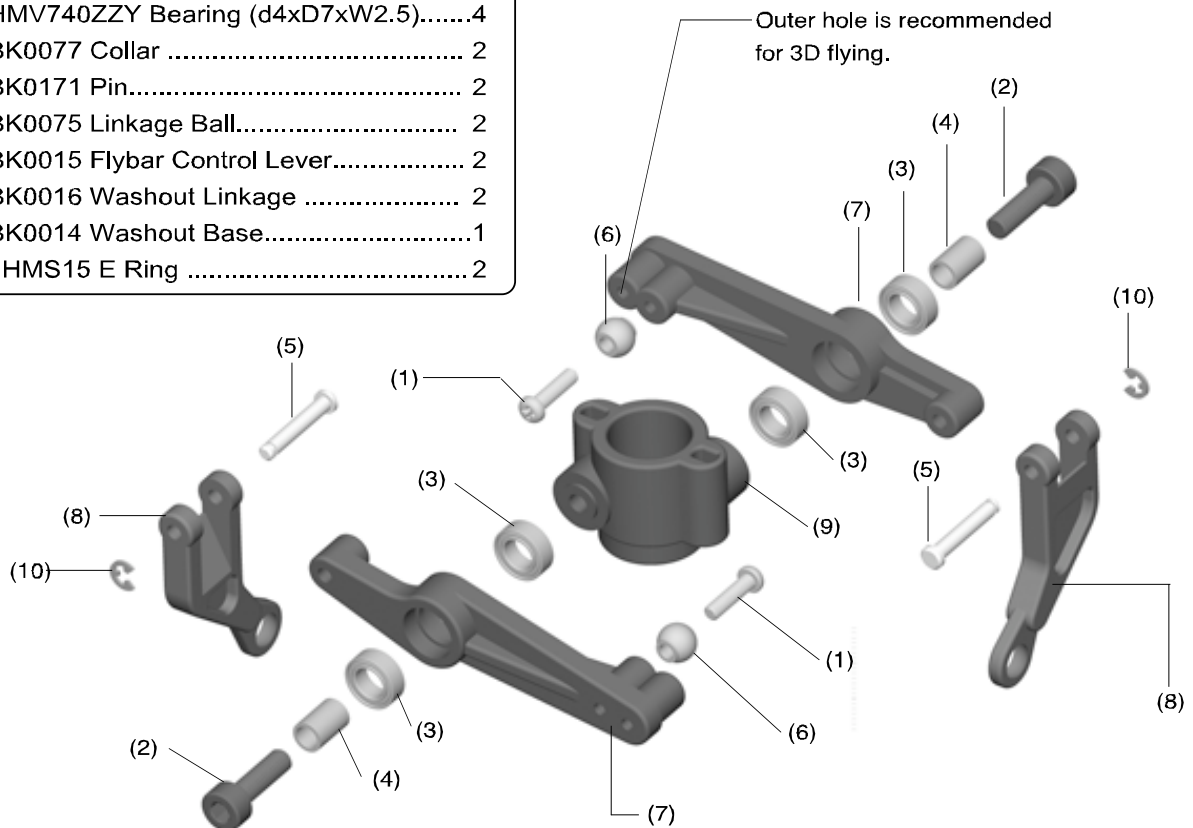
Add a drop of Blue Locktite on the thread of each of these four screws.



⑤ Washout Assembly

Make sure linkage balls are attached to the inside hole of each flybar control lever.

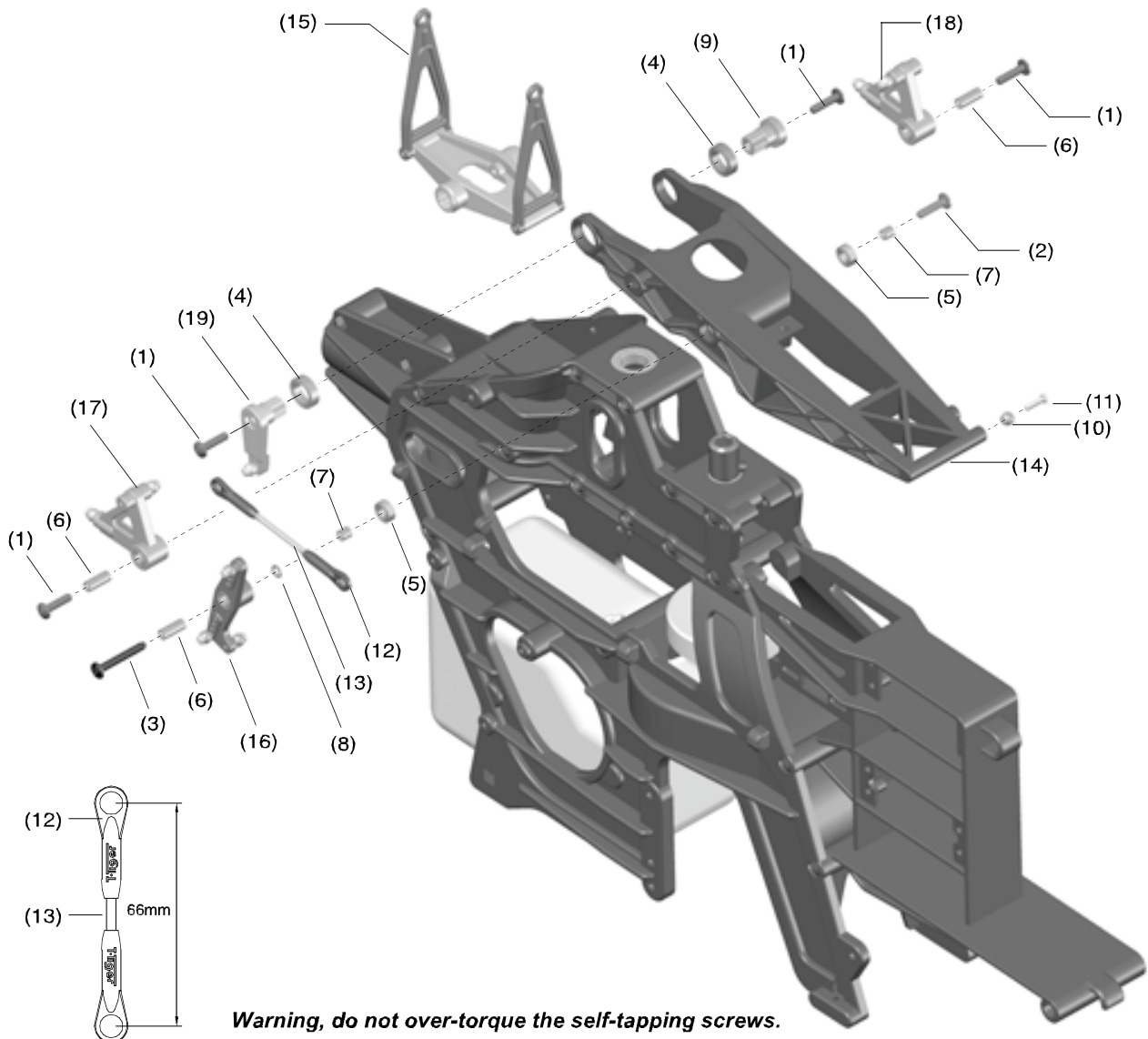
- | | |
|--|---|
| (1) HMJ2-10N Self Tapping Screw(M2x10).. | 2 |
| (2) HMC3-10B Socket Screw (M3x10)..... | 2 |
| (3) HMV740ZZY Bearing (d4xD7xW2.5)..... | 4 |
| (4) BK0077 Collar | 2 |
| (5) BK0171 Pin..... | 2 |
| (6) BK0075 Linkage Ball..... | 2 |
| (7) BK0015 Flybar Control Lever..... | 2 |
| (8) BK0016 Washout Linkage | 2 |
| (9) BK0014 Washout Base..... | 1 |
| (10) HMS15 E Ring | 2 |



⑥ Main Frame Assembly-Part2

Please complete subassemblies 6-1 through 6-4, then add them to the main frame. Insert the completed elevator control arm subassembly 6-1 in between upper bearing frame first. Then fit the plastic pitch control frame subassembly. Next insert elevator arm control shaft and elevator parallel lever subassembly. Then secure the plastic pitch control arm using self tapping screw (M3x12) and self tapping screw(M3x22). Adjust the two self tapping screw so the pitch control arm can rock freely but without excessively play. Add a drop of CA to the two screws at the pivoting point of the collective pitch control arm. Attach the linkage rod to the parallel elevator linkage balls. Finally add two plastic aileron levers and the elevator pushrod.

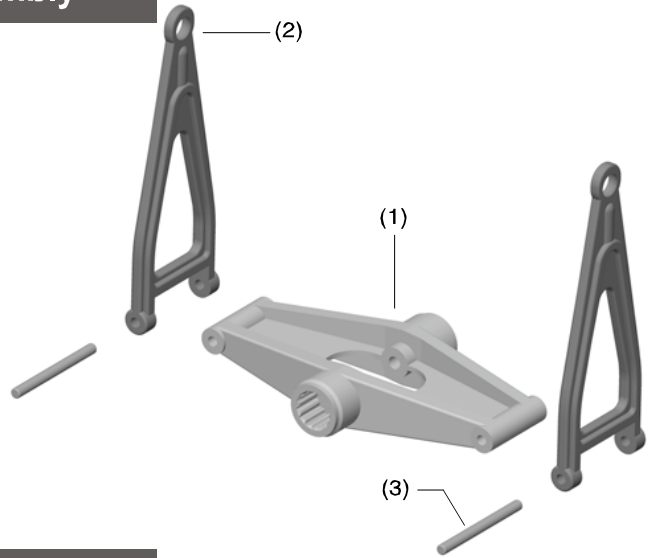
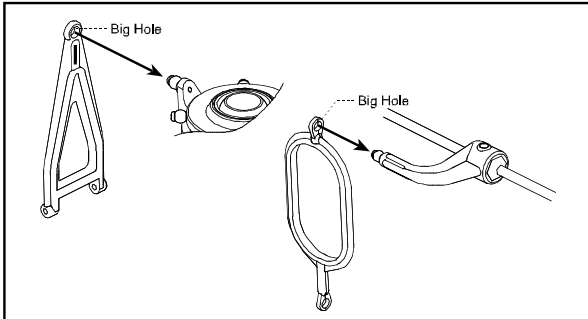
(1)HSE3-18B Self Tapping Screw (M3x18).....	4	(11)HMJ2-10N Self-Tapping Screw (M2x10).....	1
(2)HSE3-12B Self Tapping Screw (M3x12).....	1	(12)BK0086 Ball Link.....	2
(3)HMJ3-22B Self Tapping Screw (M3x22).....	1	(13)BK0840 SUS Linkage Rod.....	1
(4)HMV1280ZZY Bearing (d8xD12xW3.5).....	2	(14)BK0017 Collective Pitch Control Arm.....	1
(5)HMV840ZZY Bearing (d4xD8xW3).....	2	(15) 6-1 Elevator Control Arm Subassembly.....	1
(6)BK0076 Collar (d3xD4x10).....	3	(16) 6-2 Elevator Push Pull Lever Subassembly....	1
(7)BK0078 Collar (d3xD4x4).....	2	(17) 6-3 Aileron Lever Subassembly (R).....	1
(8)BK0088 Washer (d3xD5x0.5).....	1	(18) 6-3 Aileron Lever Subassembly (L).....	1
(9)BK0020 Elevator Arm Control Shaft.....	1	(19) 6-4 Elevator Parallel Lever Subassembly... 1	
(10)BK0075 Linkage Ball.....	1		



6-1 Elevator Control Arm Subassembly

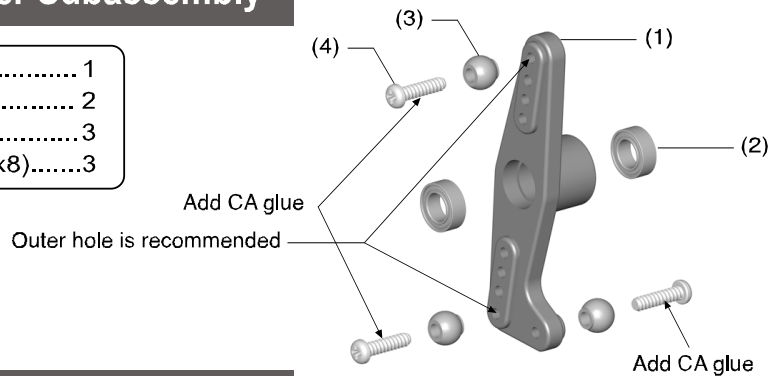
- (1)BK0018 Elevator Control Arm..... 1
- (2)BK0023 Elevator Control Arm Link..... 2
- (3)BK0084 Pin..... 2

INSTALLATION OF THE RODS



6-2 Elevator Push Pull Lever Subassembly

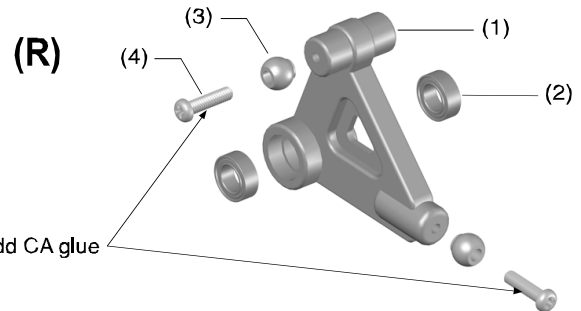
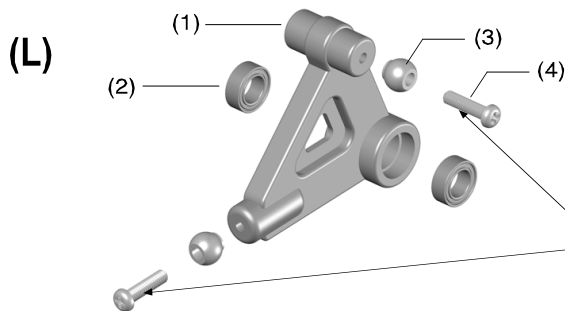
- (1)BK0836 Elevator Push Pull Lever..... 1
- (2)HMV740ZZY Bearing (d4xD7x2.5)..... 2
- (3)BK0075 Linkage Ball..... 3
- (4)HMJ2-8N Self-Tapping Screw (M2x8).....3



6-3 Aileron Lever Subassembly

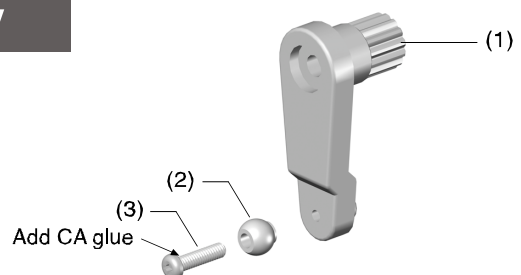
- (1)BK0022 Aileron Control Lever.....1
- (2)HMV740ZZY Bearing (d4xD7x2.5).....2
- (3)BK0075 Linkage Ball..... 2
- (4)HMJ2-10N Self-Tapping Screw (M2x10)...2

- (1)BK0022 Aileron Control Lever.....1
- (2)HMV740ZZY Bearing (d4xD7x2.5).....2
- (3)BK0075 Linkage Ball..... 2
- (4)HMJ2-10N Self-Tapping Screw (M2x10)...2



6-4 Elevator Parallel Lever Subassembly

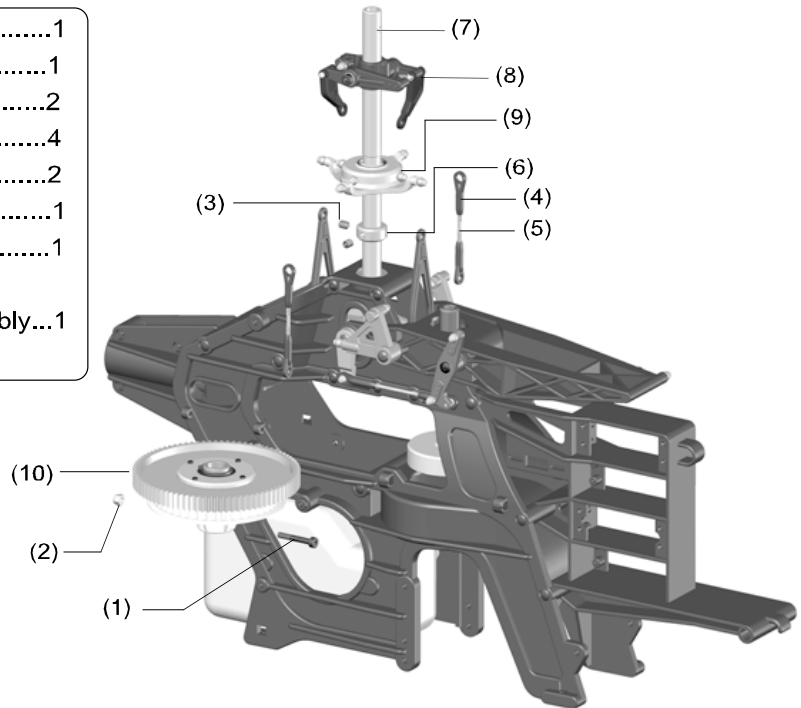
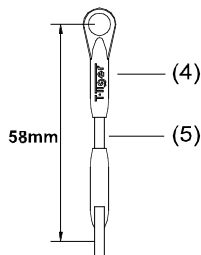
- (1)BK0019 Elevator Arm Parallel Lever.....1
- (2)BK0075 Linkage Ball..... 1
- (3)HMJ2-10N Self-Tapping Screw (M2x10)...1



⑦ Main Frame Assembly-Part3

Insert main shaft through the shaft bearings making sure that the end with the holes closest to the end is pointed down. Next, slide main gear assembly into position on the shaft and line up the holes in the main shaft with the holes in one way clutch shaft of the main gear assembly. Insert the socket head screw and secure with the lock nut. Secure the main gear assembly just tight, do not overtorque the socket screw as it might hurt the plastic autorotation gear. Next, slide on the mainshaft lock ring on top of the main shaft bearing and secure with the two set screws. Then slide on the swashplate assembly and attach the elevator and aileron control linkages to the outside swashplate linkage balls. Next, slide on washout assembly and attach washout linkage to the inner linkage balls of the swashplate.

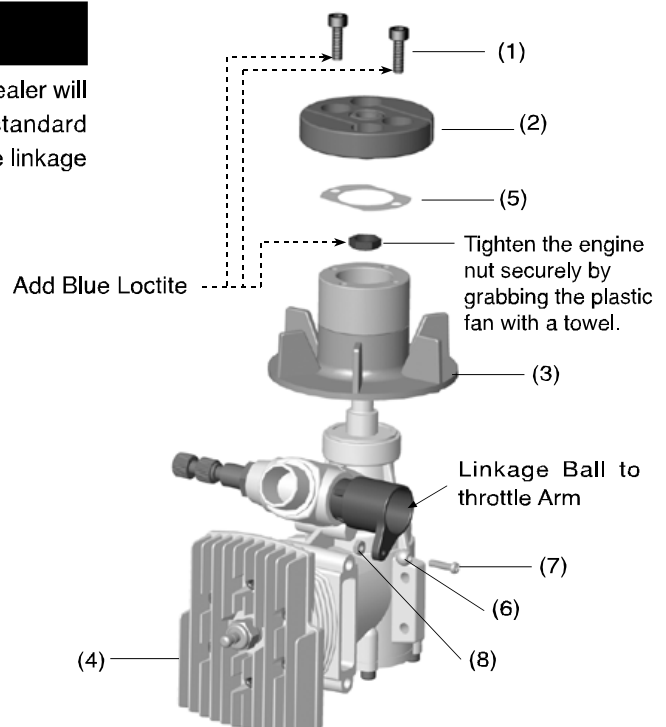
- (1) BK0616 Socket Screw(M3x20).....1
- (2) HMM3Z Lock Nut (M3).....1
- (3) HME4-5B Set Screw (M4x5).....2
- (4) BK0086 Ball Link4
- (5) BK0839 SUS Linkage Rod2
- (6) BK0030 Main Shaft Lock Ring.....1
- (7) BK0702 Harden Main Shaft.....1
- (8) Wash Out Assembly
- (9) BV0092 Metal Swash Plate Assembly...1
- (10) Main Gear Assembly



⑧ Engine Assembly

Note: A piston lock (TTR 1166P) purchased from your dealer will make this a much easier task. You must replace the standard throttle arm with the extended throttle arm and attach the linkage ball.

- (1) HMC3-10B Socket Screw(M3x10)..... 2
- (2) BV0589 Clutch Shoe..... 1
- (3) BV0143 Cooling Fan..... 1
- (4) No.9605 TT PRO-50H(R) Engine.....1
- (5) BK0170 Shim.....1
- (6) BK0075 Link Ball.....1
- (7) HMF2-8N Screw(M2x8)..... 1
- (8) HML2 Hex Nut (M2)..... 1



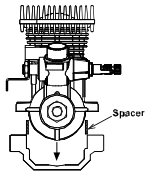
⑨ Main Frame Assembly-Part4

Add blue Loctite to all metal to metal screw surfaces.
After installing the engine, connect the silicone fuel tube to the carburator and muffler.

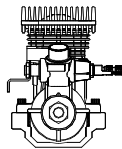
- (1) HMC3-14B Socket Screw(M3x14)..... 10
- (2) HMC3-35B Socket Screw(M3x35)..... 2
- (3) BK0087 Flat Washer.....6
- (4) BK0144 Engine Mount.....1
- (5) BV0172 Muffler.....1
- (6) Engine Assembly
- (7) BA1579 Muffler Gasket.....1
- (8) BK0179 Spacer.....2
- (9) HMT3B Spring Washer.....2

Engine Mount Notes:

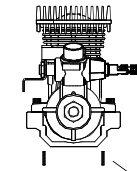
The engine mount furnished will accommodate the Thunder Tiger 50H, and the other hell engines. If you are installing a Thunder Tiger engine, you will find the mount is wider than the engine crankcase. Two spacers are furnished to accurately locate the engine while bolting it in place. Remove these spacers after installation.



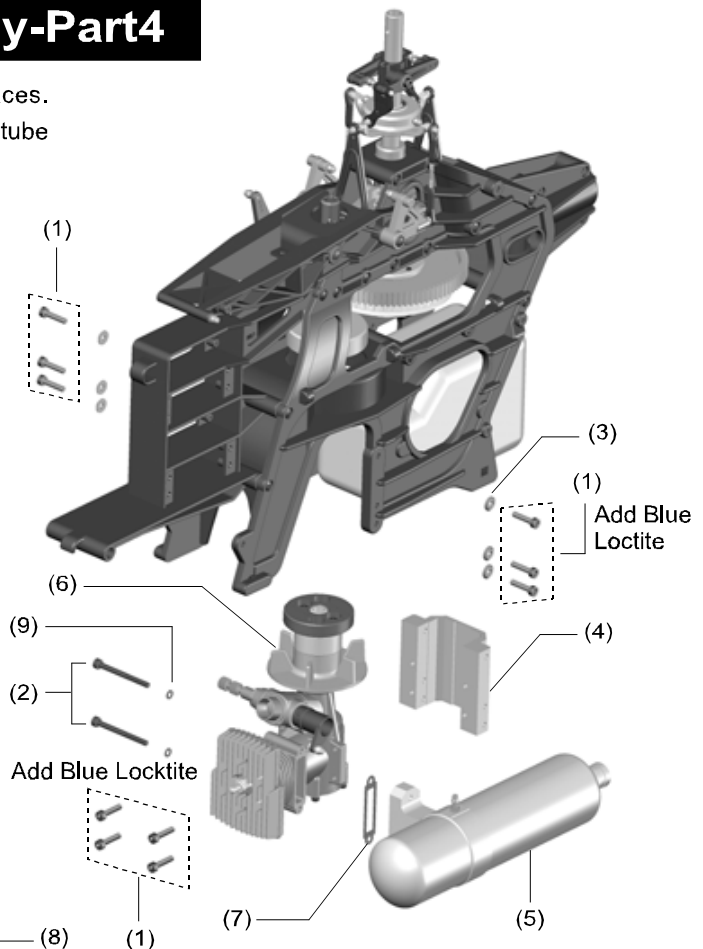
Step1
Install the engine and spacers into the engine mount.



Step2
Install the 4 mount screws and make sure the screws are tighten firmly.

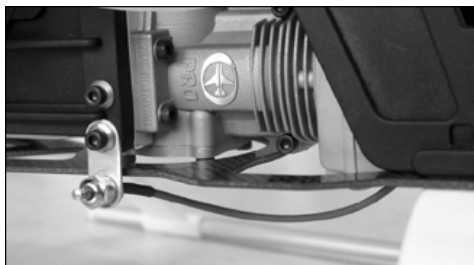


Step3
Remove the spacers.

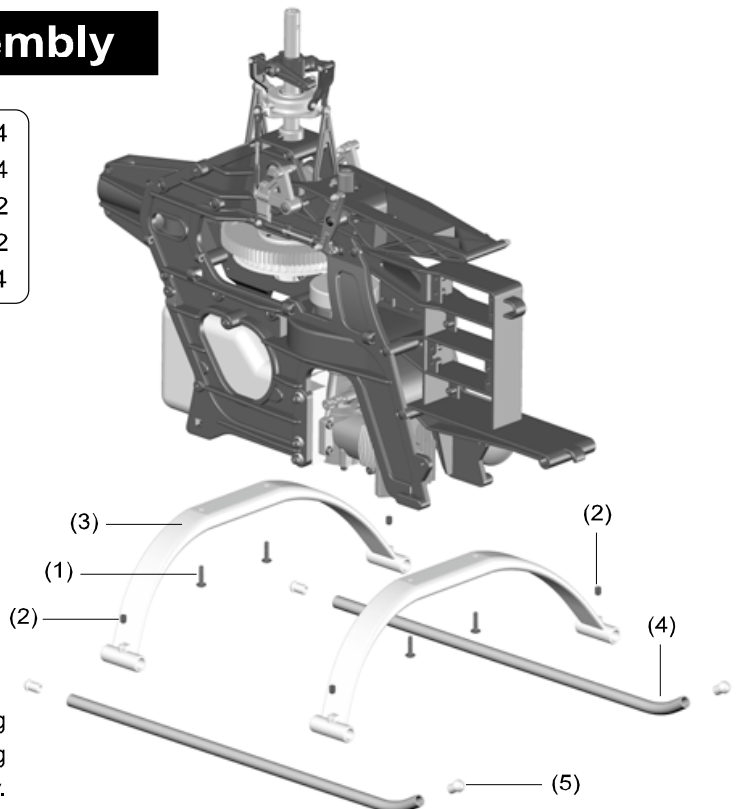


⑩ Landing Skid Assembly

- (1) HSE3-18B Self Tapping Screw(M3x18).4
- (2) HME4-5B Set Screw(M4x5).....4
- (3) BK0066 Skid Brace.....2
- (4) BK0064T Skid Pipe.....2
- (5) BK0065 Skid Pipe End Cap.....4



The optional Thunder Tiger Remote Glow Plug Adaptor(#3803) is recommended as shown, making starting easier without the removal of your canopy.



11 Main Rotor Head Assembly

Secure the linkage ball on the Main Rotor Pitch Housing first then insert the Flap Damper in the Main Rotor Hub. Add Silicon Oil or Vaseline to insert the Feathering Shaft through the Flap Dampers. There is also an optional red 80 degree durometer hard damper PV0382 for 3D flying.

Apply Loctite on the M4x8 socket screw then secure the Main Rotor Pitch Housing on the Feathering Shaft with bearings and washers tightly.

For extreme 3D flying, we would recommend our optional Metal Main Rotor Hub (PV0338) or Metal Button Main Rotor Hub (PV0484).

(1)BK0012 Pin.....	2	(9)BK0586 Flap Damper (70').....	2
(2)BK0435 Washer (d4xD11xW1.7).....	2	(10)BK0007 Flybar Control Rod.....	2
(3)HMV1360ZZY Bearing (d6xD13xW5).....	4	(11)BK0587 Main Rotor Hub Pin.....	1
(4)BK0584 Thrust Washer.....	2	(12)BK0595 Main Rotor Hub.....	1
(5)HMX0612 Thrust Bearing.....	2	(13)HMC4-8B Socket Screw (M4x8).....	2
(6)BK0596 Main Rotor Pitch Housing.....	2	(14)BK0075 Linkage Ball.....	2
(7)BK0583 Feathering Shaft.....	1	(15)HMJ2-10N Self Tapping Screw (M2x10)..	2
(8)BK0581 Flap Collar.....	2		

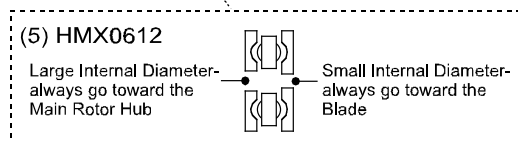
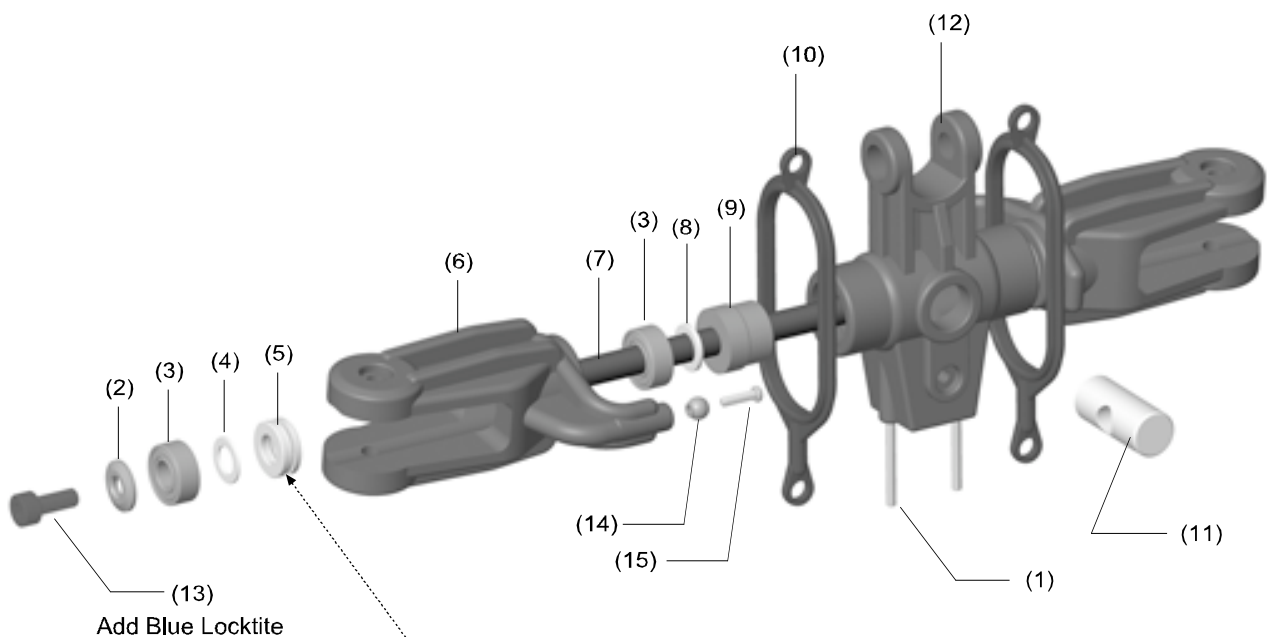


Diagram for Thrust Bearing Assembly

12 Flybar Assembly

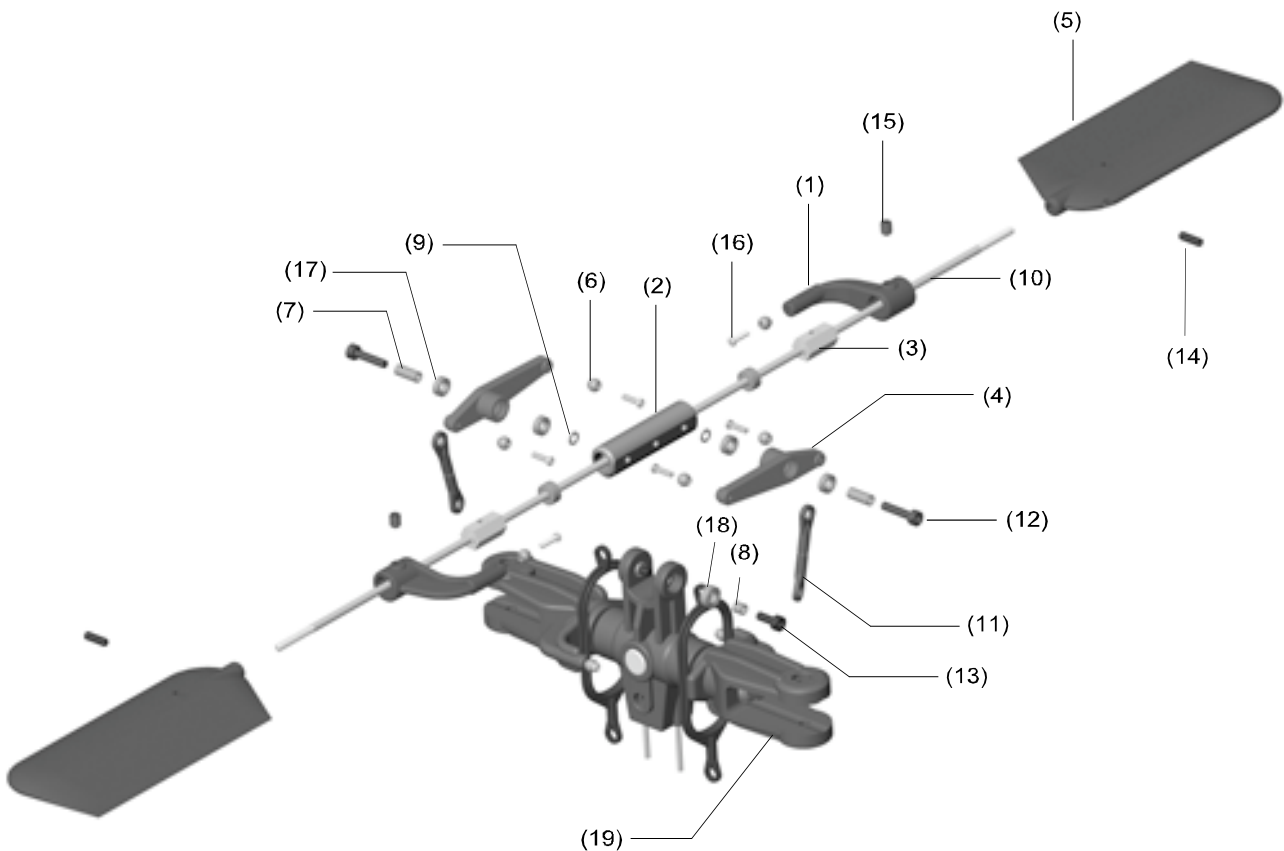
Begin by attaching six Linkage Balls to the Flybar Control Arm and Mixing Lever with Self Tapping Screw. Slide Flybar Arm Bushing and Flybar Control Arm onto the Flybar Rod. From the other end of the Flybar Rod, slide on the Flybar Seesaw Hub. Make sure the Flybar has equal protruding from each side of the Seesaw Hub, then install and tighten the HME4-5B set screws. Add the Paddles. Make sure the two Paddles and the two Flybar Control Arms are all parallel. Lock the Paddles with HME3-10B set screws.

Attaching four Linkage Balls to the Mixing Levers first. Then assemble and install the Mixing Levers, Bearings and washers using Collar with Socket Screw. Be careful don't let the Loctite seep into the bearings.

Attach the Bearings into the Main Rotor Hub. Insert and tighten the Set Screws. Attach the Flybar Control Rod to the Flybar Control Arm and use the Double Link to connect the mixing Lever (short side) to the Main Rotor Pitch Housing.

Note: The equipped with Paddle is good for stable and beginner flying. For those aggressive 3D pilots, we would recommend our optional light 3D Paddle (PV0481) or ultra light Paddle (PV0482) which weights only 25g and 20g.

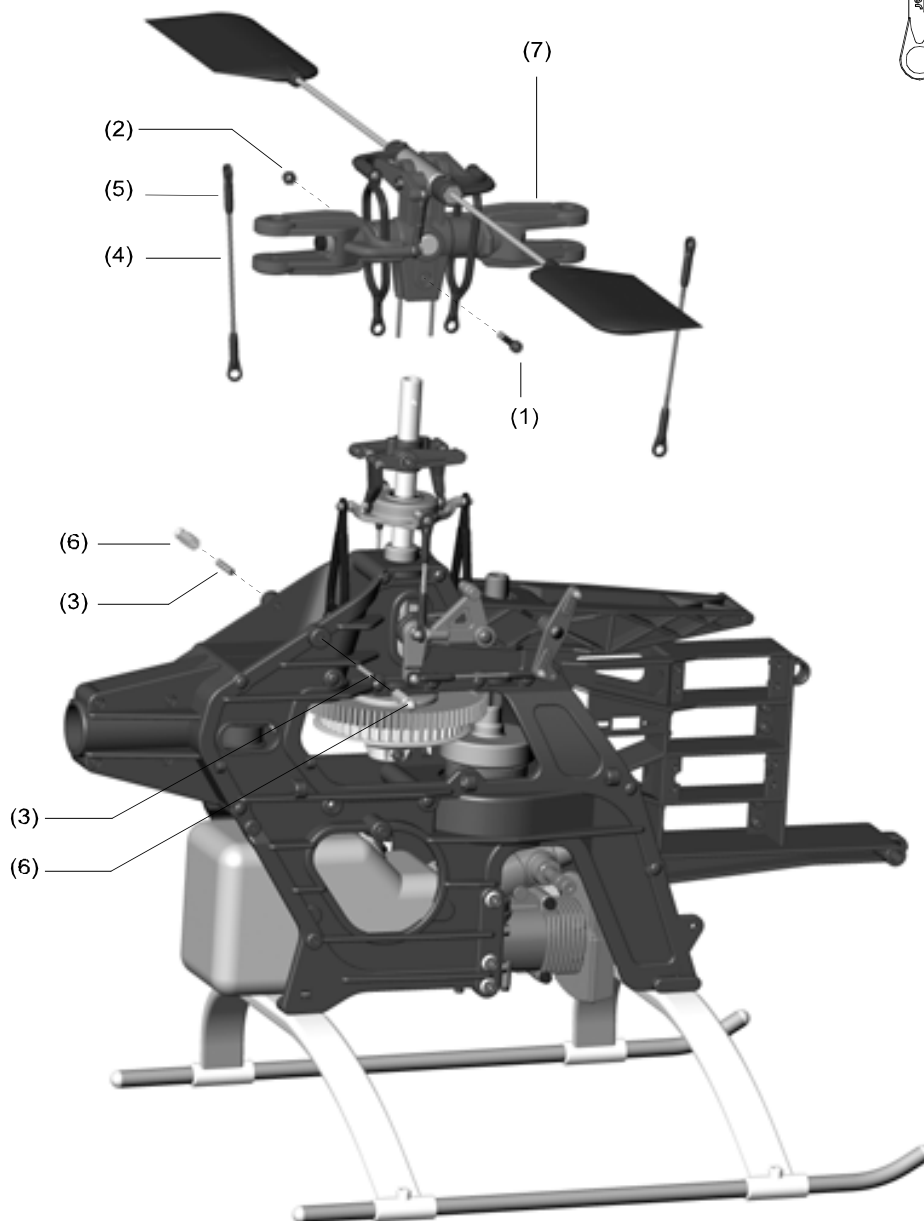
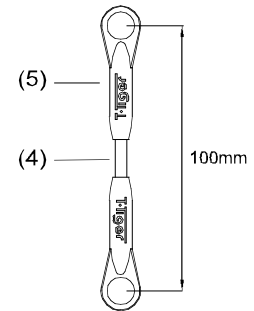
(1)BK0002 Flybar Control Arm.....	2	(11)BV0085 Double Link.....	2
(2)BK0004 Flybar Seesaw Hub.....	1	(12)HMC3-14B Socket Screw (M3x14).....	2
(3)BK0005 Flybar Arm Bushing.....	2	(13)HMC3-8B Socket Screw (M3x8).....	2
(4)BK0006 Mixing Lever.....	2	(14)HME3-10B Set Screw (M3x10).....	2
(5)BK0067 Flybar Paddle.....	2	(15)HME4-5B Set Screw (M4x5).....	2
(6)BK0075 Linkage Ball.....	6	(16)HMJ2-10N Self Tapping Screw (M2x10)..	6
(7)BK0076 Collar (d3xD4x10).....	2	(17)HVM740ZZY Bearing (d4xD7x2.5).....	4
(8)BK0078 Collar (d3xD4x4).....	2	(18)HVM840ZZY Bearing (d4xD8x3).....	2
(9)BK0088 Washer (d3xD5x0.5).....	2	(19)Main Rotor Head Assembly.....	1
(10)BK0631 SUS Flybar.....	1		



13 Main Frame Assembly-Part5

Slide the main rotor assembly over the main shaft and align the two pins to slide in the washout assembly. Make sure the holes in the main shaft line up with the holes in the main rotor head. Insert the socket screw and secure with locknut. Attach the ball linkage rods to the long end of the mixing lever and to the remaining inside linkage balls of the swashplate.

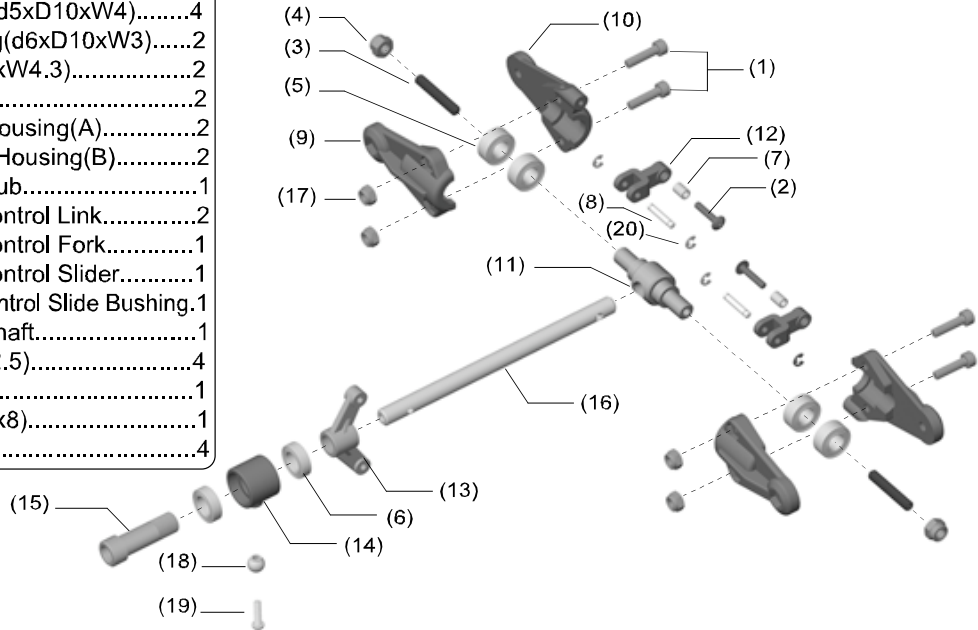
- | | |
|--|---|
| (1) BK0616 Socket Screw(M3x20)..... | 1 |
| (2) HMM3Z Lock Nut(M3)..... | 1 |
| (3) HME3-18.5B Set Screw(M3x18.5)..... | 2 |
| (4) BK0842 SUS Linkage Rod..... | 2 |
| (5) BK0086 Ball Link..... | 4 |
| (6) BK0626 Canopy Retaining Post..... | 2 |
| (7) Main Rotor Head Assembly | |



14 Tail Unit Assembly

Secure the tail rotor hub(#11) on tail rotor shaft first, note the Set Screw(#3) should be right setting on the dot of the shaft. Do not forget to apply Loctite on the Set Screws. Do not over tighten the locknut(#4) with the two bearings. Next work on the housing assembly, use care to install the Tail Pitch Control Link, do not over tighten the selftapping Screw(#2). Make sure it is just tight and the link rotates freely. Assemble the Tail Pitch Slider and Fork. Be careful when securing the Fork on the slider bushing, do not damage the bushing or it will not move smoothly on the tail rotor shaft.

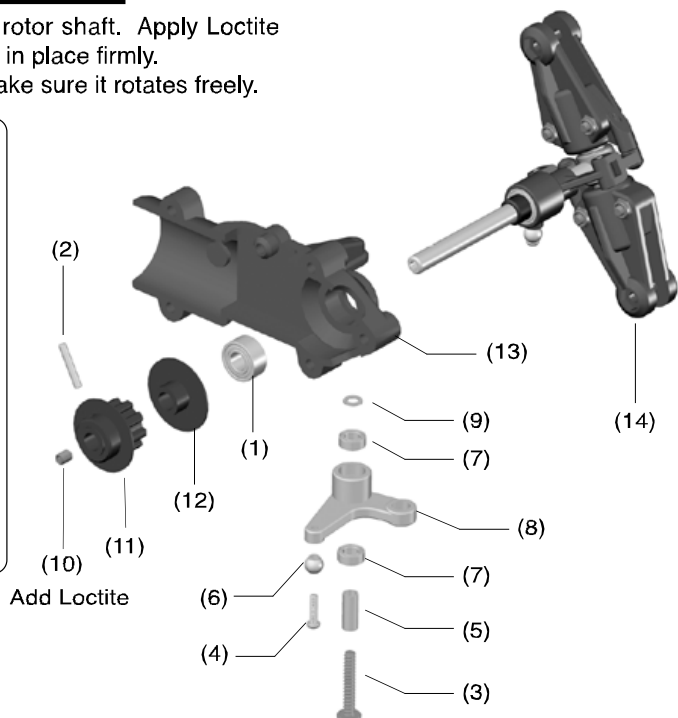
- (1)HMC2510B Socket Screw(M2.5x10).....4
- (2)HSE2-10B Selftapping Screw(M2x10)....2
- (3)HME3-18.5B Set Screw(M3x18.5).....2
- (4)HMM3Z Lock Nut(M3).....2
- (5)HMV1050ZZ Bearing(d5xD10xW4).....4
- (6)HMV1060ZZY Bearing(d6xD10xW3).....2
- (7)BK0082 Collar(d2xD3xW4.3).....2
- (8)BK0546 Pin(2mm).....2
- (9)BK0302-1 Tail Pitch Housing(A).....2
- (10)BK0303-1 Tail Pitch Housing(B).....2
- (11)BK0307 Tail Rotor Hub.....1
- (12)BK0026 Tail Pitch Control Link.....2
- (13)BK0025 Tail Pitch Control Fork.....1
- (14)BK0027 Tail Pitch Control Slider.....1
- (15)BK0028 Tail Pitch Control Slide Bushing.1
- (16)BK0053 Tail Rotor Shaft.....1
- (17)HMM25 Lock Nut(M2.5).....4
- (18)BK0075 Link Ball.....1
- (19)HMF2-8N Screw(M2x8).....1
- (20)HMS15 E Ring.....4



15 Tail Unit Assembly

Secure the Pulley by pressing the pin into the tail rotor shaft. Apply Loctite on set screw then secure the pin with the set screw in place firmly. Secure the Tail Pitch Control Lever just tight and make sure it rotates freely.

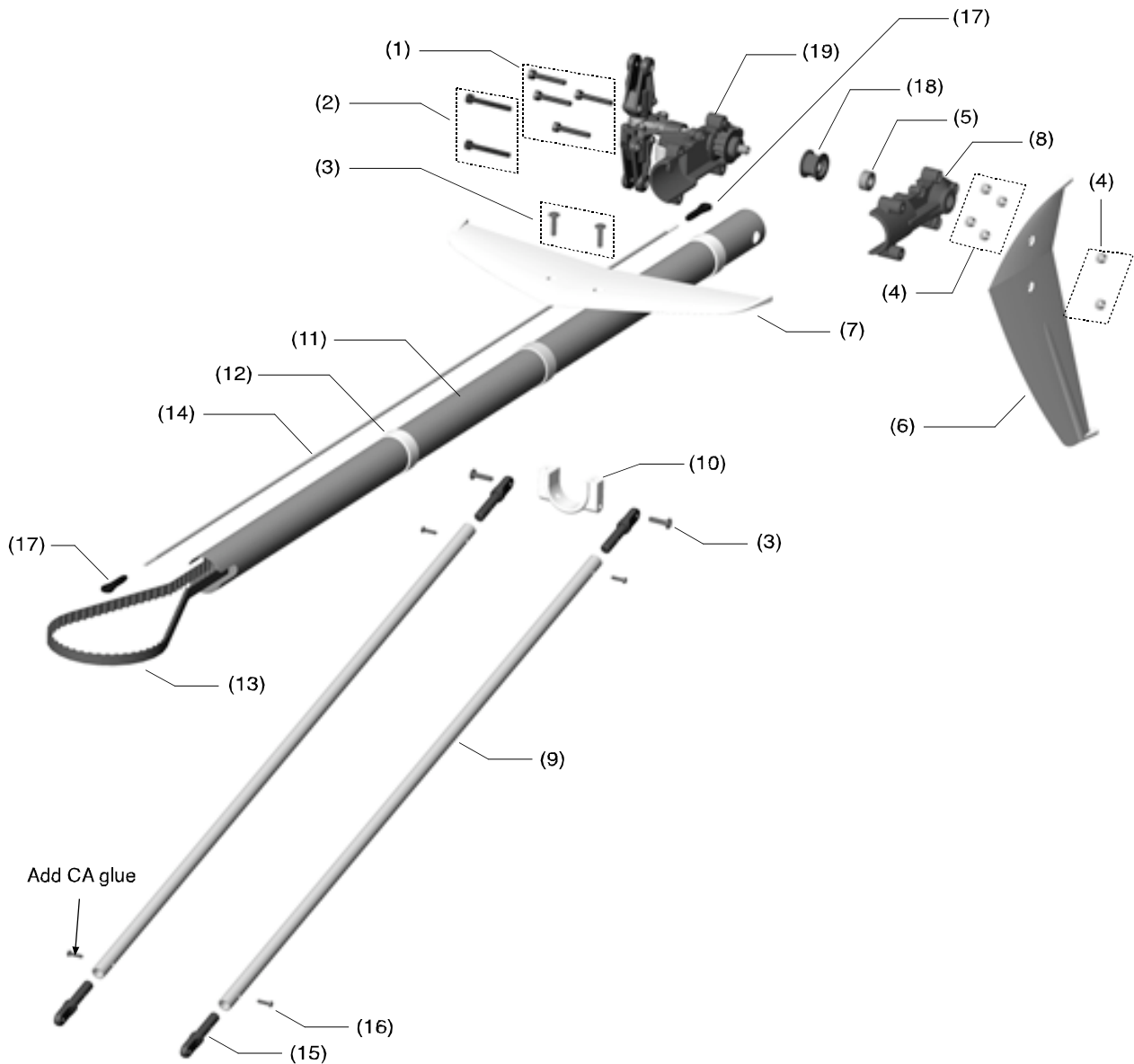
- (1) HMV1150X Bearing (d5xD11xW5)..... 1
- (2) HMY2-12 Pin(2x12)..... 1
- (3) HSE3-18B Self Tapping Screw(M3x18)..... 1
- (4) HMF2-8N Screw(M2x8)..... 1
- (5) BK0076 Collar(3x4x10)..... 1
- (6) BK0075 Link Ball..... 1
- (7) HMV740ZZY Bearing (d4xD7xW2.5).....2
- (8) BK0024 Tail Pitch Control Lever..... 1
- (9) BK0088 Flat Washer..... 1
- (10) HME3-4B Set Screw(M3x4)..... 1
- (11) BK0050 Tail Pulley..... 1
- (12) BK0051 Tail Pulley Flange..... 1
- (13) BK0047 Tail Unit Housing (R)..... 1
- (14) Tail Unit Assembly



16 Tail Boom Assembly

Assembly Tip: Slide the 3 rod guides onto the boom and space them out evenly as shown. Then slide the tail linkage rod into the rod guides. Next, insert the tail rotor drive belt into the boom so that it comes out of both ends. Place drive belt over tail drive pulley and complete balance of tail boom assembly. Remember to connect the tail linkage rod to the tail control lever. Apply thick CA or Epoxy when installing Tail support Rod End.

(1) HMC3-20B Socket Screw(M3x20).....	4	(11) BK0859 Tail Boom.....	1
(2) HMC3-25B Socket Screw(M3x25).....	2	(12) BK0091 Rod Guide.....	3
(3) HSE3-12B Self Tapping Screw(M3x12).....	4	(13) BK0858 Tail Rotor Drive Belt.....	1
(4) HMM3Z Lock Nut(M3).....	6	(14) BK0175 Tail Linkage Rod.....	1
(5) HMV1150X Bearing (d5xD11xW5).....	1	(15) BK0447 Tail Support Rod End.....	4
(6) BK0071 Vertical Fin.....	1	(16) HMJ2-8N Self Tapping Screw(M2x8).....	4
(7) BK0069 Stabilizer Fin.....	1	(17) BK0086 Ball Link.....	2
(8) BK0046 Tail Unit Housing.....	1	(18) BV0052 Tail Idle Pulley.....	1
(9) BK0524T Tail Support Rod.....	2	(19) Tail Unit	
(10) BK0070 Stabilizer Fin Bracket.....	1		



17 Main Frame Assembly-Part6

Insert the M3x20 and two M3x25 socket screws with metal Rear Servo Plate into the tail base of the Main Frame and secure with lock nuts. **Do not tighten at this point.**

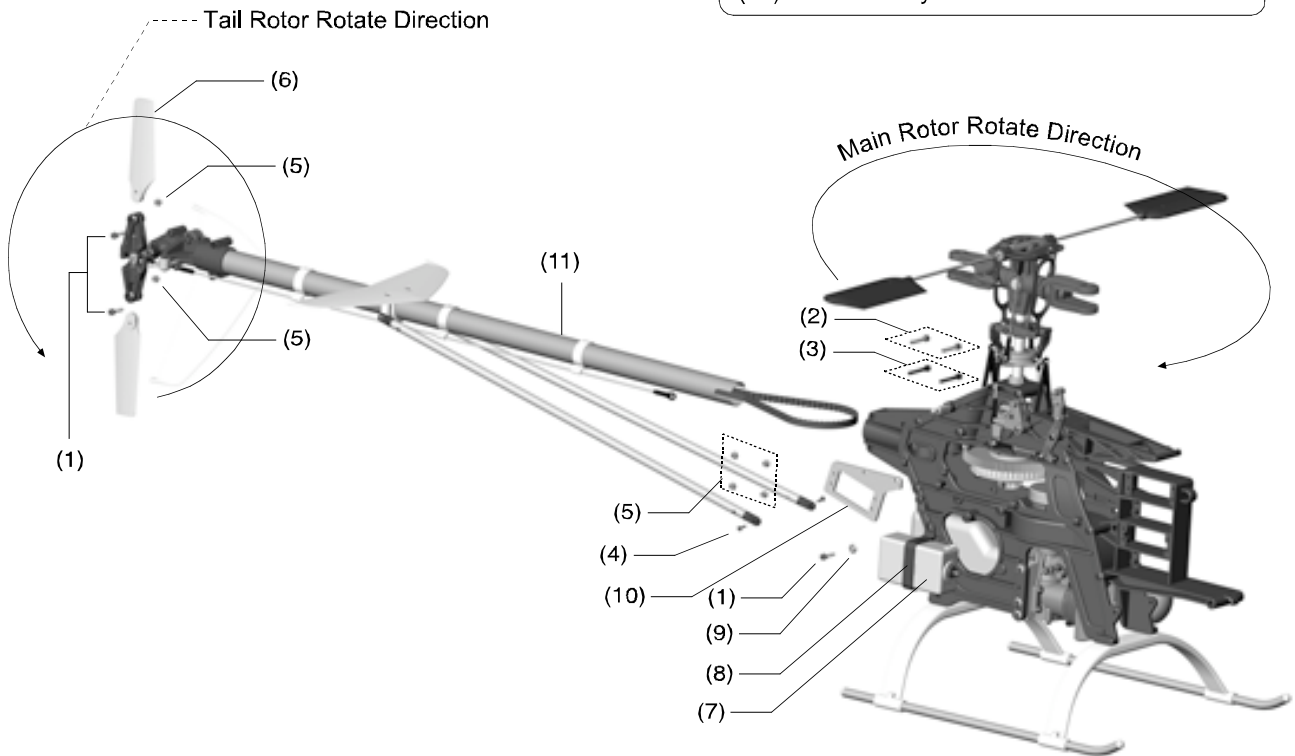
Hold the tail boom in one hand and hook your index finger on your free hand through the exposed loop of the tail rotor drive belt. Hold it so the belt is vertical and parallel to the tail drive pulley.

① Boom Drive belt

Important: Next, rotate the belt 90-degree counter clockwise.

⊖ 90-degree

(1)HMC3-14B Socket Screw (M3x14).....	3
(2)HMC3-20B Socket Screw (M3x20).....	2
(3)HMC3-25B Socket Screw (M3x25).....	2
(4)HSE3-12B Self-Tapping Screw (M3x12)....	2
(5)HMM3Z Lock Nut (M3).....	6
(6)BK0068 Tail Rotor Blade.....	2
(7)BV0502 Header Tank.....	1
(8)BK0506 Tank Mount.....	1
(9)BK0087 Washer.....	1
(10)BK0837 Metal Rear Servo Plate.....	1
(11)Tail Assembly.....	1



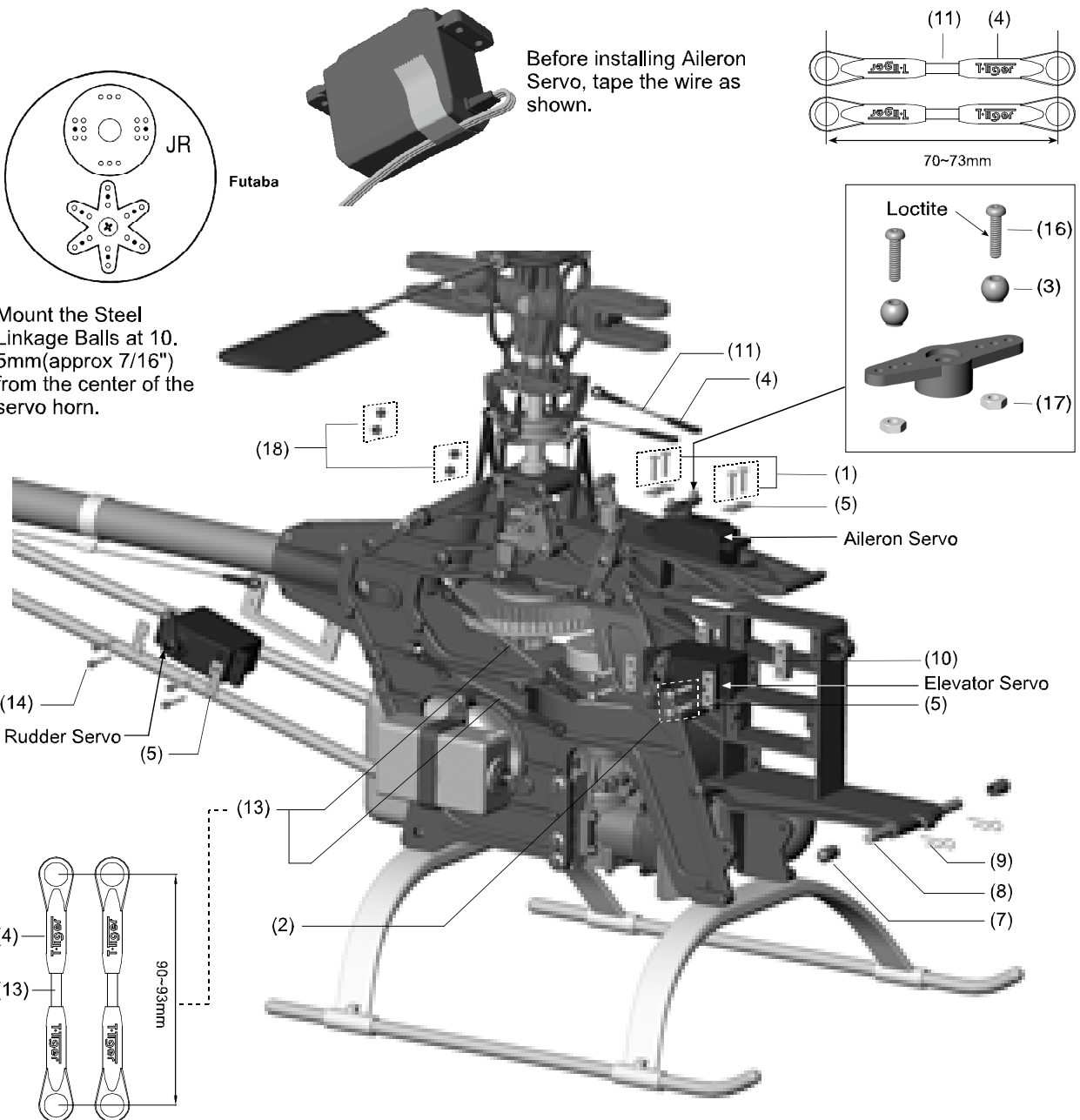
Pull the belt through the tail base, keeping the belt correctly aligned. Push the tail boom into the tail base all the way to the end. Place the drive belt over the tail drive spur gear. Then, gently pull back on the tail boom until the tension on the belt allows no more than 5mm(3/16") of free play in the belt. Tighten the locknuts and proceed with the rest of the assembly.

Install the header tank and secure the mount with socket screw, washer. Connect the fuel tube properly.

18 Servo Installation-Part1

Assembly Tip: Remove all the servo wheels prior to attaching the steel linkage balls. Make sure all linkages are the correct length.

(1)HSE2612N Self Tapping Screw(M2.6x12).....	4	(10)BK0833 Servo Block.....	2
(2)HSE2620N Self Tapping Screw(M2.6x20).....	4	(11)BK0840 SUS Linkage Rod (M2.3x46).....	2
(3)BK0075 Linkage Ball.....	5	(12)BK0843 SUS Push Rod A.....	1
(4)BK0086 Ball Link.....	9	(13)BK0845 SUS Linkage Rod (M2.3x64).....	2
(5)BK0104 Servo Mounting Plate.....	6	(14)HMC2516B Socket Screw (M2.5x16).....	4
(6)BK0105 Tail Control Rod Joint.....	1	(15)HME4-5B Set Screw (M4x5).....	2
(7)BK0474 Rubber CAP.....	2	(16)HMF2-8N Screw (M2x8).....	5
(8)BK0832 Body Support.....	1	(17)HML2 Nut (M2)	5
(9)HNLR6 R Pin.....	2	(18)HMM25 Lock Nut (M2.5).....	4



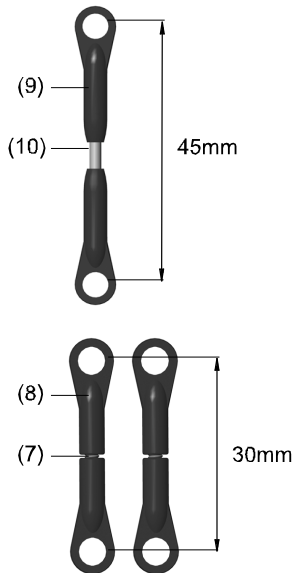
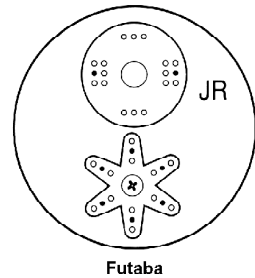
If you choose the rear servo plate to assembly, don't need to use #6, #12, #15.

19 Servo Installation-Part2

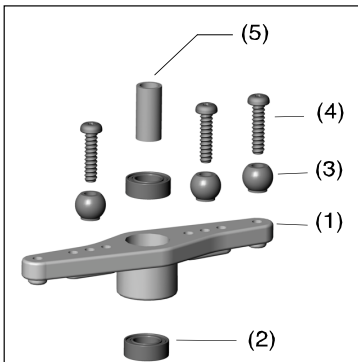
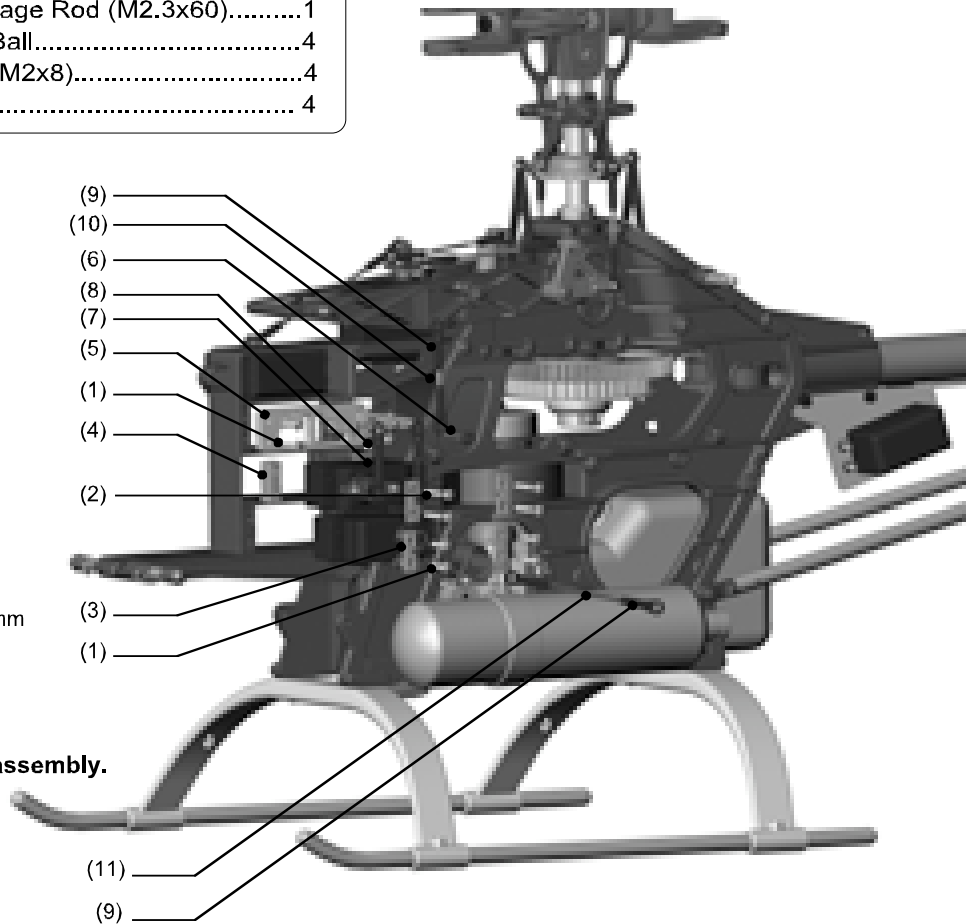
Assembly Tip: Remove all the servo wheels prior to attaching the steel linkage balls. Make sure all linkages are the correct length. See Engine-Throttle Control Linkage in page 22.

- (1)HSE2612N Self Tapping Screw(M2.6x12).....8
- (2)HSE2620N Self Tapping Screw(M2.6x20).....4
- (3)BK0104 Servo Mounting Plate.....4
- (4)BK0833 Servo Block.....2
- (5)BK0834 Pitch Lever Fixed Plate.....1
- (6)HMC3-18 Socket Screw (M3x18).....1
- (7)BK0113 Linkage Rod (M2.3x18).....2
- (8)BK0085 Ball Link.....4
- (9)BK0086 Ball Link.....4
- (10)BK0839 SUS Linkage Rod (M2.3x30).....1
- (11)BK0841 SUS Linkage Rod (M2.3x60).....1
- (12)BK0075 Linkage Ball.....4
- (13)HMF2-8N Screw (M2x8).....4
- (14)HML2 Nut (M2).....4

Mount the Steel Link Ball at 10.5mm(approx 7/16") from the center of the servo horn for the throttle arm.

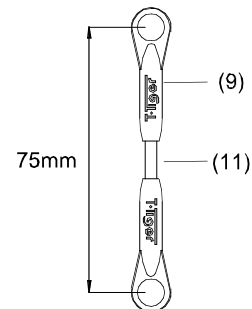


Pitch Linkage Rod Subassembly.



Pitch push-pull lever subassembly.

- (1)BK0835 Pitch Push-Pull lever.....1
- (2)HMCV740ZZY Bearing (d4xD7xW2.5)....2
- (3)BK0075 Linkage Ball.....3
- (4)HMF2-8N Self Tapping Screw(M2x8)....3
- (5)BK0846 Collar (d3xD4x8.5).....1

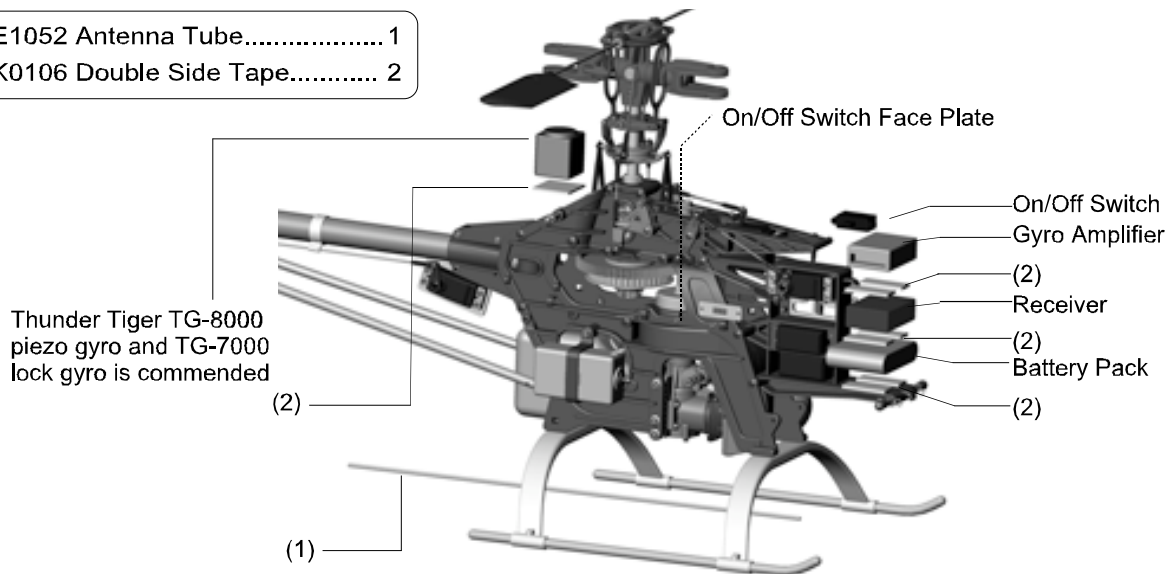


Throttle hinkage Rod subassembly.

20 Receiver/Gyro Installation

Thunder Tiger recognizes that there are many brands of radios and gyros to choose from. You are encouraged to seek the advice of experienced helicopter pilots when making this decision.

- (1) BE1052 Antenna Tube..... 1
- (2) BK0106 Double Side Tape..... 2

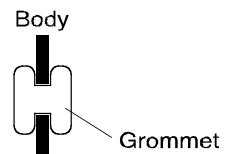
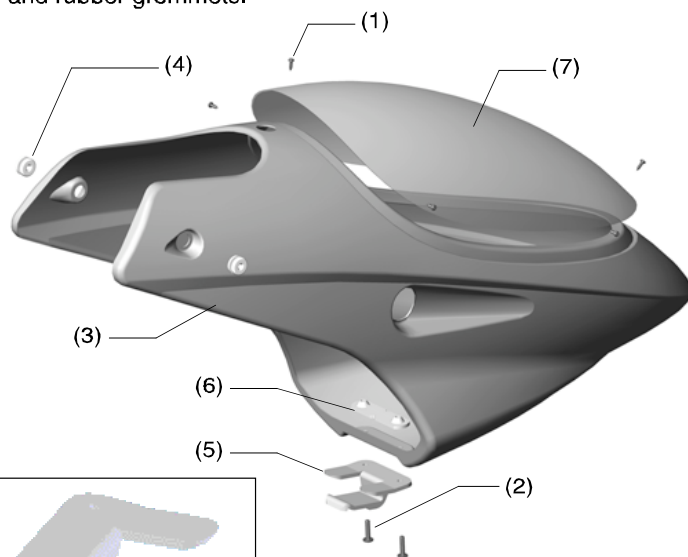


21 Body/Canopy Assembly

Cut off the bubble from the body leaving the lip all the way around. Neatness counts, so take your time. Next trim the flange from the canopy leaving a clean edge. You can lightly sand the edges to get it smooth and even. On the lip of the opening in the body, mark six points for drilling holes to secure canopy: 1-in front, 1-in rear and 2 on each side.

Using double stick tape secure canopy to body. Take a very sharp awl and make pilot holes through the canopy and body lip. Make sure all holes line up. Remove double stick tape and put in the self tapping screws. Install the body clip, decals, and rubber grommets.

- (1) HMJ2-6B Self Tapping Screw(M2x6).....7
- (2) HSE3-12B Self Tapping Screw(M3x12)..... 2
- (3) BK0611 Body..... 1
- (4) BK0102 Rubber Grommet 2
- (5) BK0098 Body Clip-A..... 1
- (6) BK0099 Body Clip-B..... 1
- (7) BK0612 Canopy.....1



Trim the hole and install the rubber grommets as shown.



If the Body will fall out during backward 3D flying, we suggest to install the self tapping screw (#1) on Body Clip-A (#5).

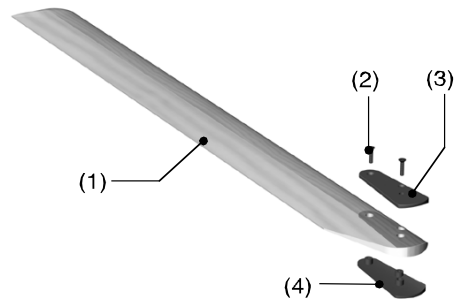
22 Main Rotor Assembly

The 600mm wood blades come with the kit, however, we suggest to use wood blade for Hovering only. Make sure you do the blade modification as page 32 instructed before you fly.

For F3C or 3D flying, we strongly recommend using Carbon or Fiberglass rotor blades for safety and higher performance.

Important-While Thunder Tiger takes great care to manufacture the most balanced blades available, no two rotor blades are exactly the same. It is highly recommended that you purchase a blade balancer from your hobby dealer. Follow the manufacturer's instructions for balancing the blades and install on helicopter.

- (1) BV0455 Main Rotor Blade(600mm).....2
- (2) HMD2612B Self Tapping Screw (M2.6x12)...4
- (3) BK0073 Upper Blade Grip... ..2
- (4) BK0074 Lower Blade Grip.....2
- (5) HMM4Z Lock Nut(M4).....2
- (6) HMC4-27B Socket Screw (M4x27).....2

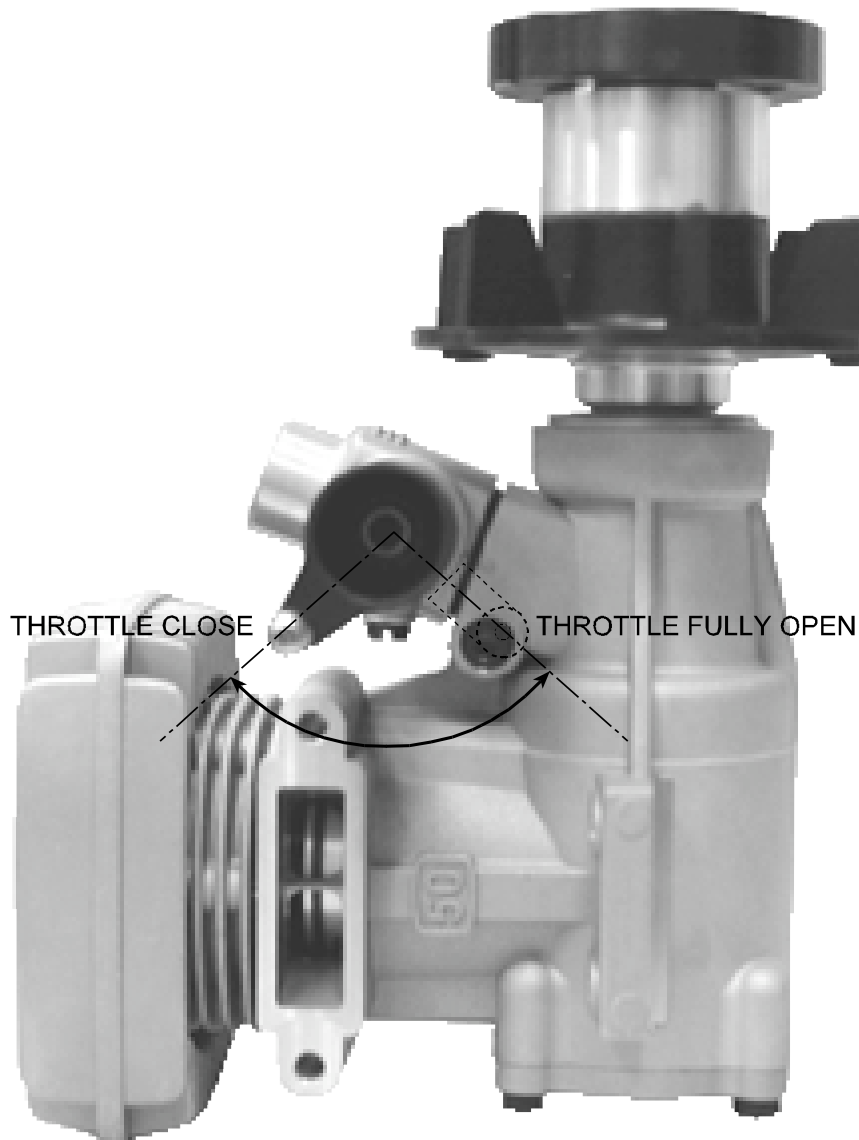


Make sure you do the blade modification as page 32 instruction before you fly.

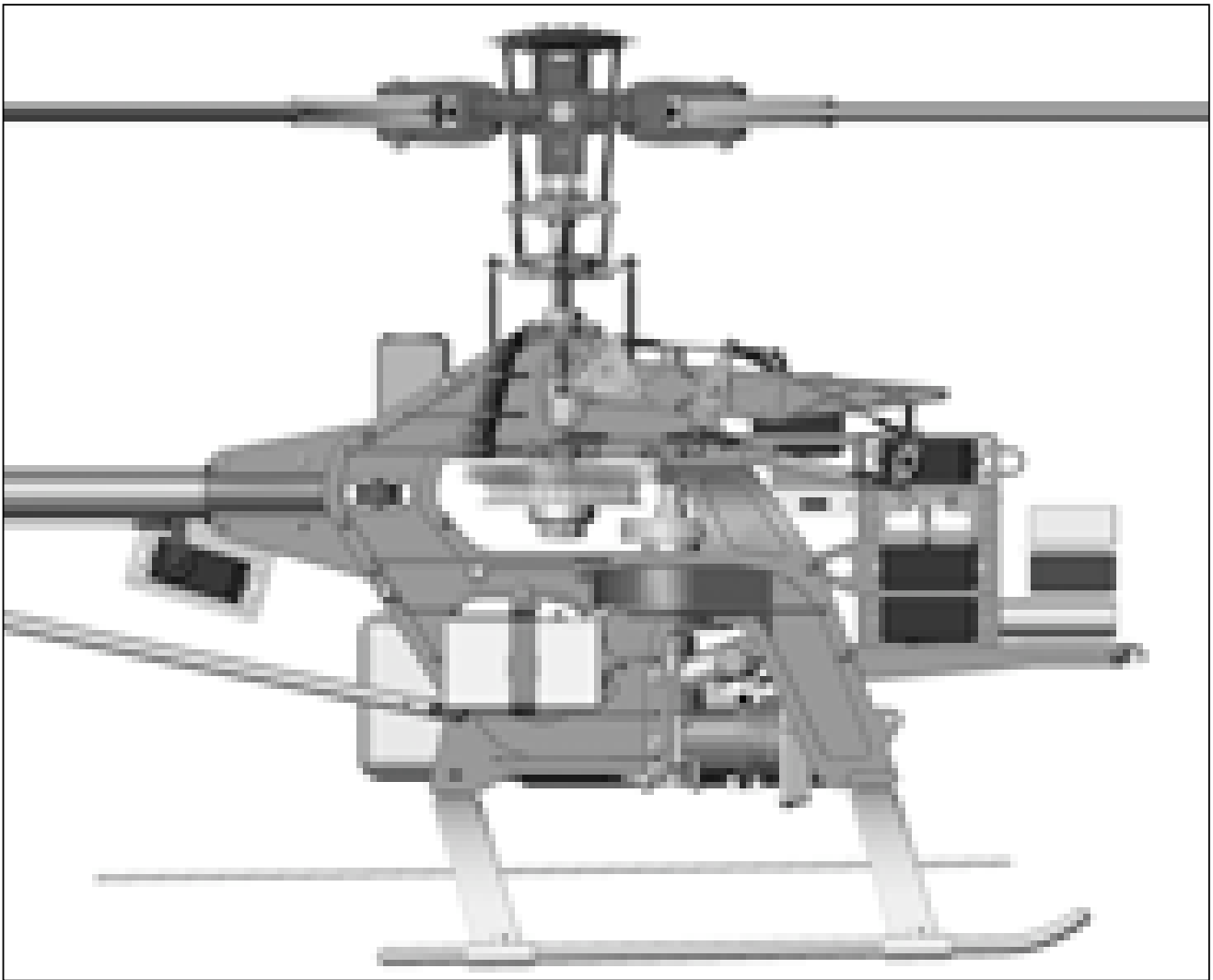


Engine Throttle Control Linkage

Mount the steel linkage ball to the outer hole on the plastic throttle arm. At full throttle stick, the carburetor hole should open completely. At low throttle and with the throttle trim all the way down, the carburetor hole should close completely. Adjust the ATV function in your transmitter to achieve the above requirement. Listen to the servo, it should not make any binding noise. Try keep the throttle ATV between 90% and 110%. If your radio does not have ATV, then adjust the location of the steel link ball on the throttle servo horn to get the correct throttle travel.

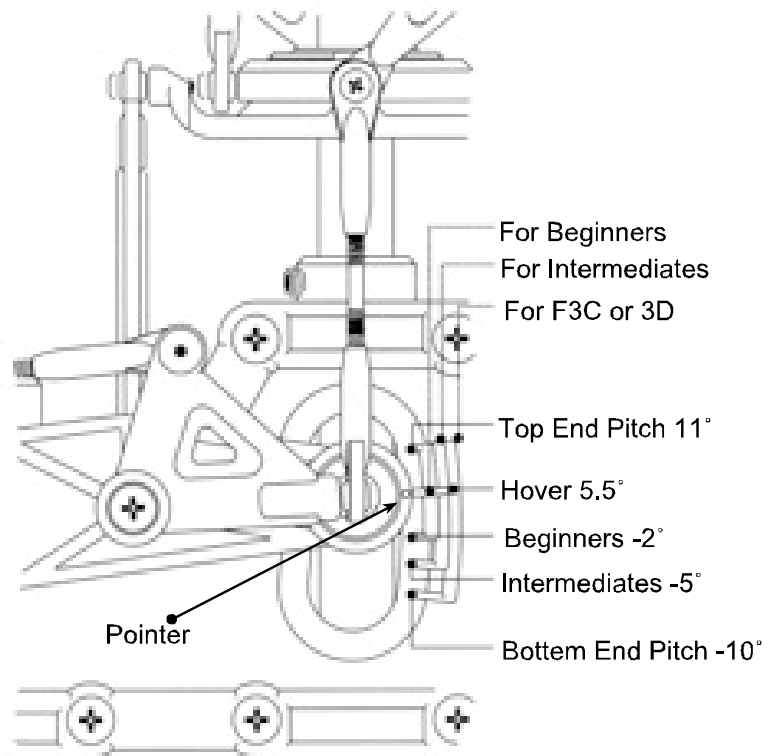


LINKAGE SET-UP SECTION



Setting up Main Rotor Blades Pitch Angle

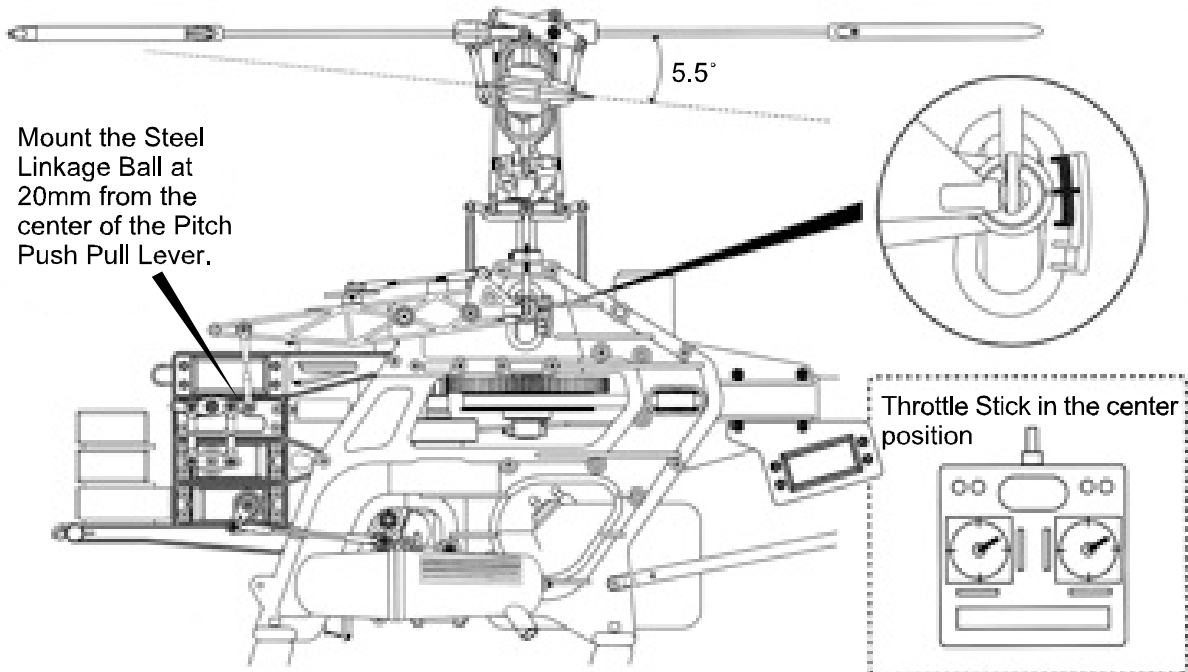
- On the left side frame, there are three pitch scales molded onto the plastic frame. The three different scales are designed for beginner, intermediate or expert F3C and 3D pilots.
- Use the "pointer" on the collective tray and the plastic molded scales to set up the initial collective control.
- The actual blade angle in degrees can be checked using a pitch gauge (sold separately).



The total pitch angle range should be at $-10^{\circ} \sim +11^{\circ}$.

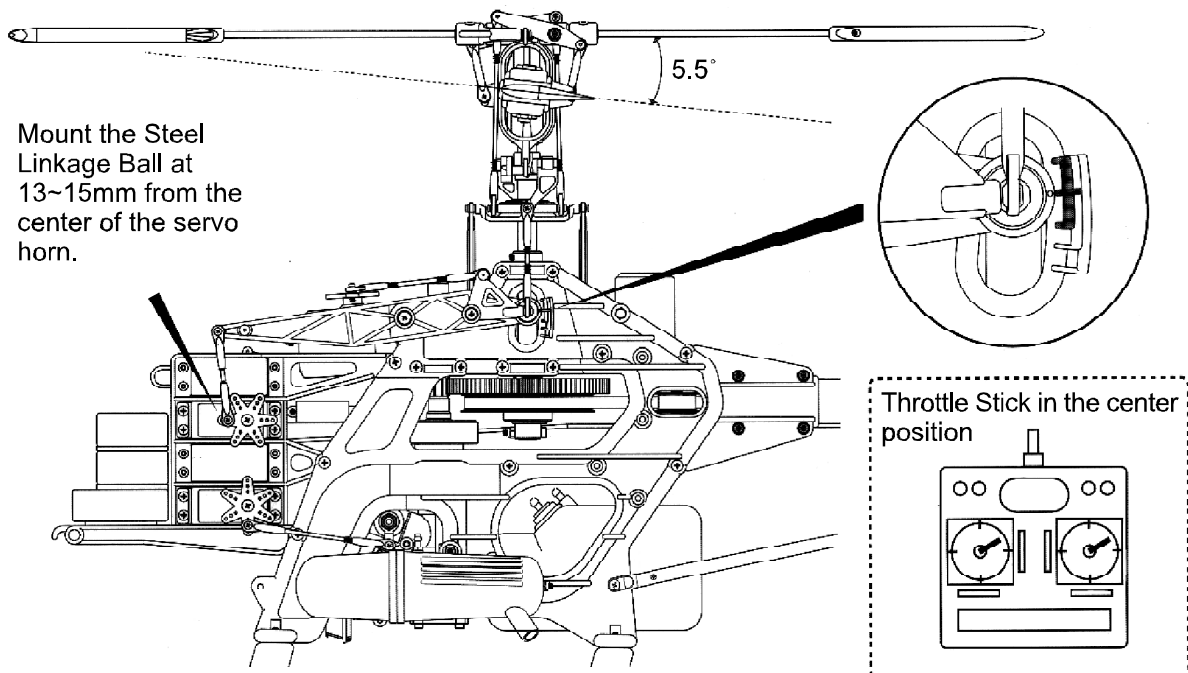
Setting up Main Rotor Blades Pitch Angle

(Hint for beginners)
Pitch Push Pull Lever Adjustment



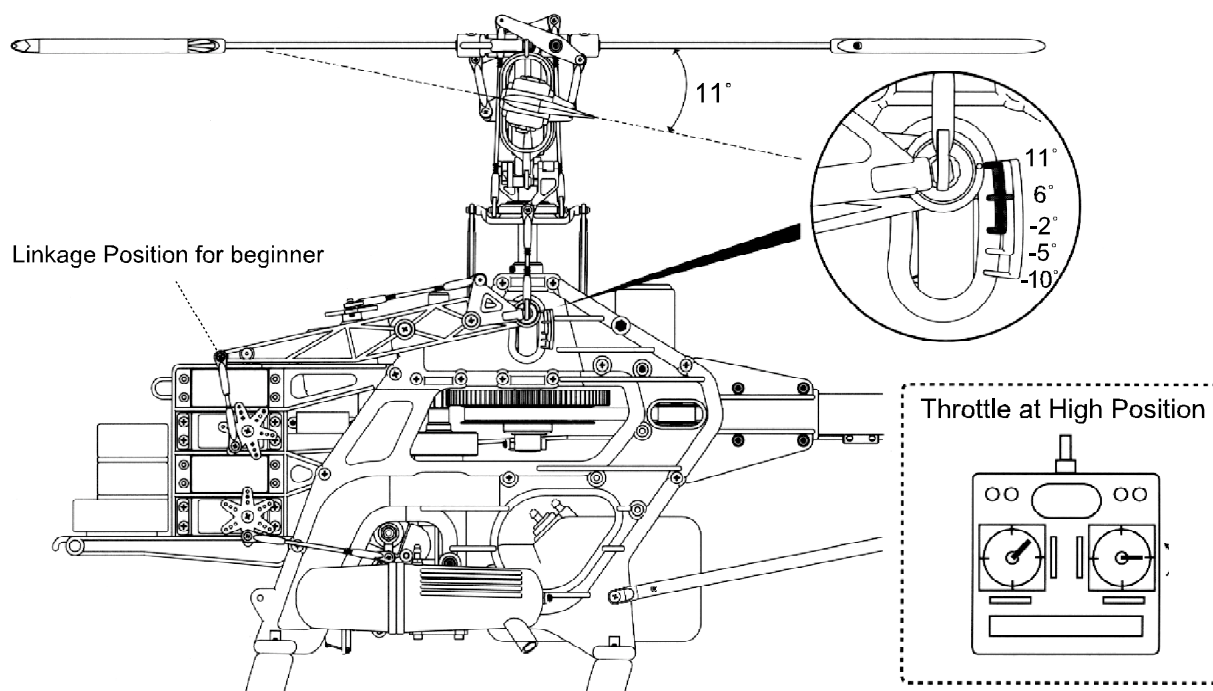
The hovering pitch angle should be at 5.5°. To get the -2° to 11° collective range, mount the steel linkage ball at 13~15mm away from the center of the collective servo horn.

(Hint for beginners)



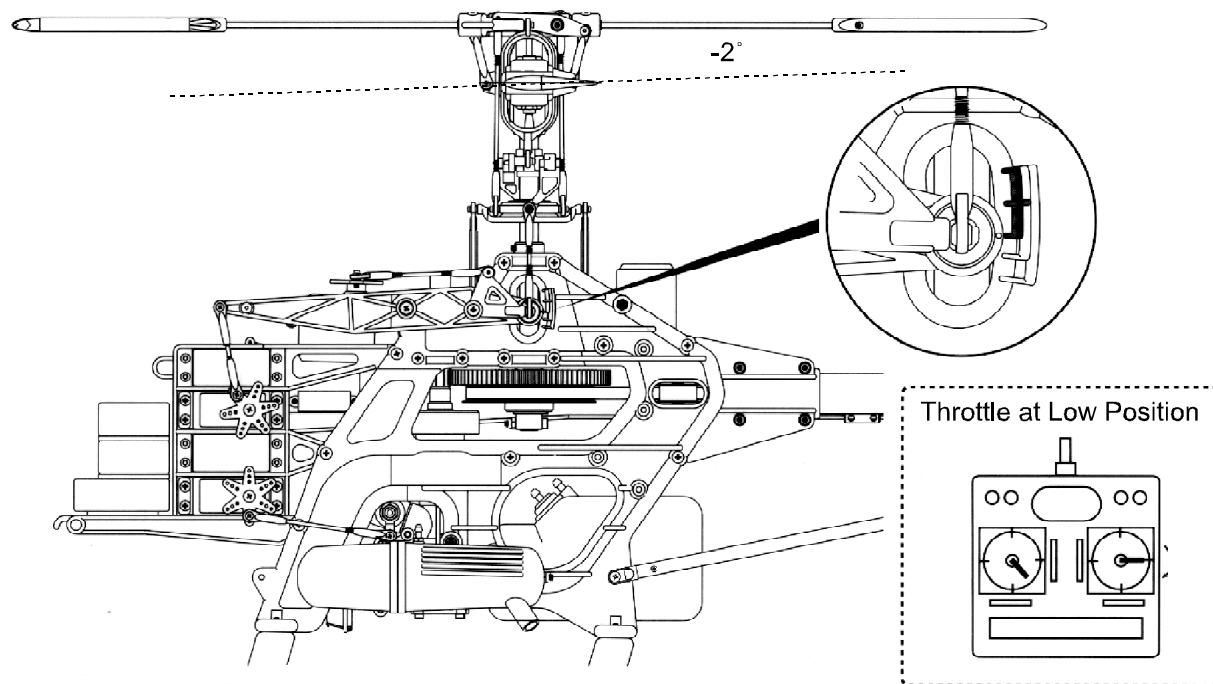
5.5° hovering pitch angle is used for beginners, intermediates and experts. The throttle/collective must be in the center position when adjusting the collective pushrod length to make the "point" line up with the 5.5° hover point on the molded scale(see above diagrams).

*High End Blade Pitch Setting



*Move the throttle/collective stick to the full throttle position(see upper right diagram). The molded "pointer" should now line up with the upper limit mark, which should provide about 11° of blade pitch.

*Low End Blade Pitch Setting



*Move the throttle/collective stick to the low stick position. Use the ATV function of your transmitter to make the "pointer" line up with the -2° mark for beginners(with the -5° mark for intermediates, and -10° mark for experts).

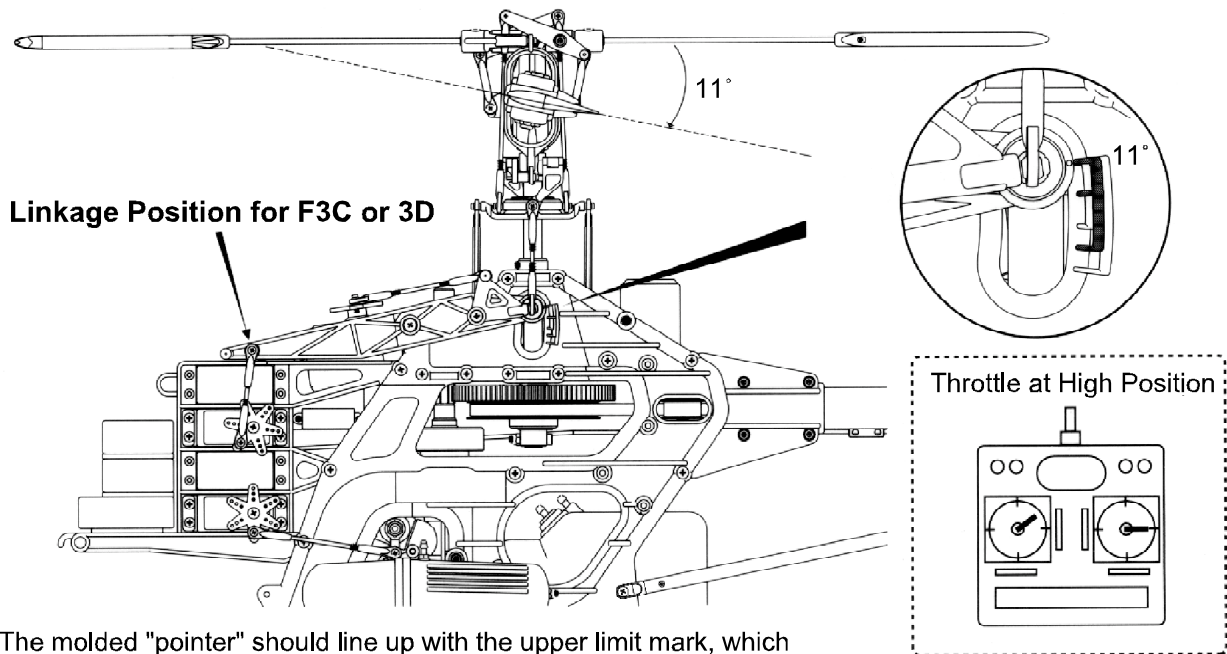
Collective Travel for F3C and 3D Flying

*To achieve $+11^\circ$ to -10° of collective travel range, the steel linkage ball must be moved to the inner location as shown in the figure.

*You can also flip the pitch servo to get the best configuration.

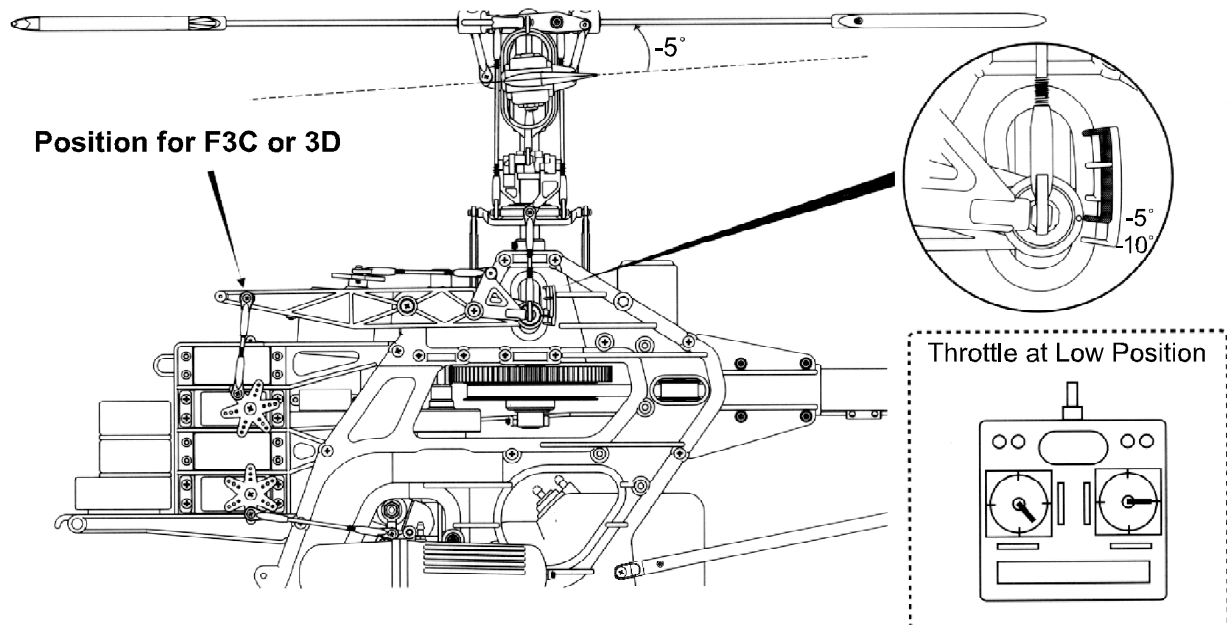
*Use ATV function of the transmitter to get the necessary servo travel.

*High End Blade Pitch Setting



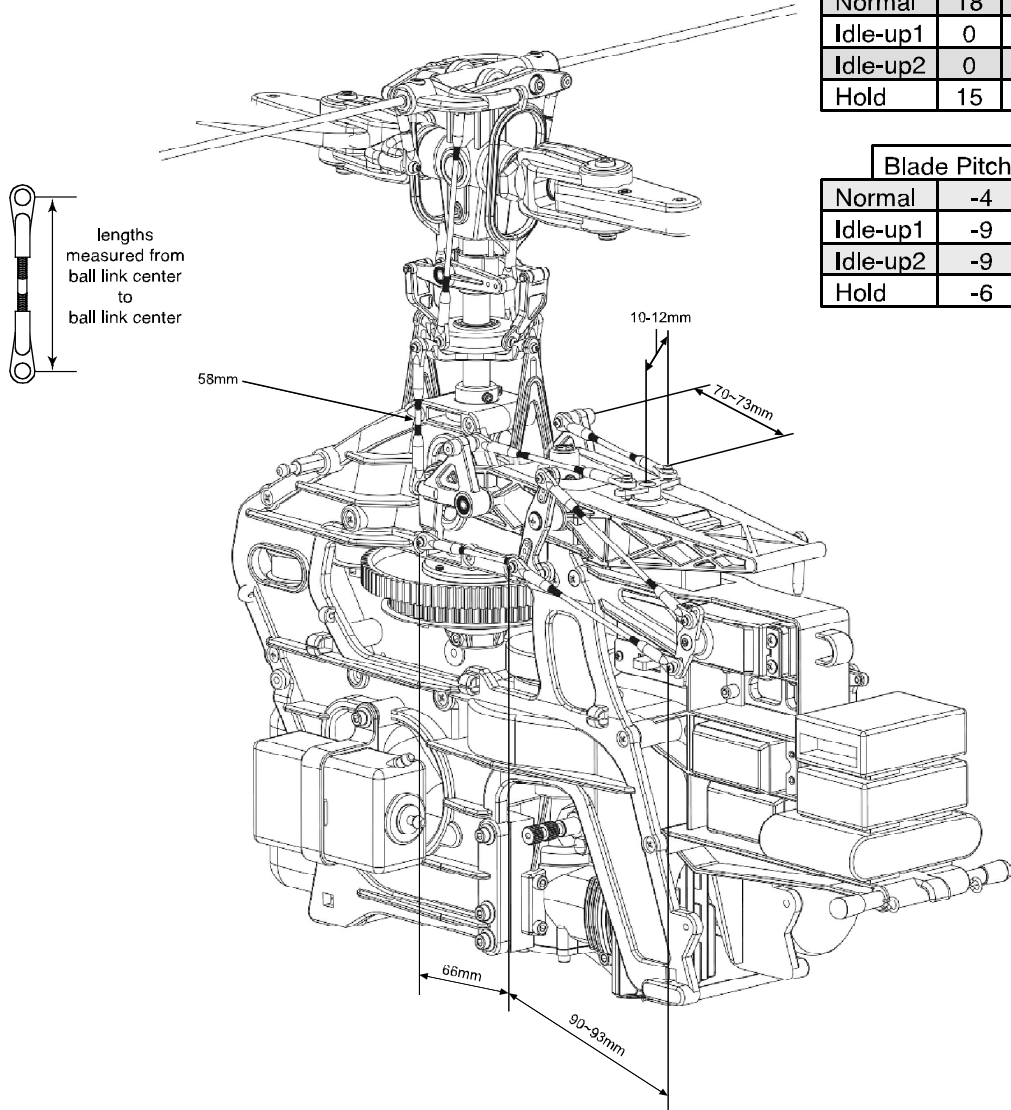
The molded "pointer" should line up with the upper limit mark, which should provide about 11° of blade pitch.

*Low End Blade Pitch Setting



For intermediates set the low end to -5° . For advanced F3C and 3D flying, set the low end to -10° .

CONFIGURING THE RAPTOR FOR 3D



5-Point Throttle Curves					
Normal	0	30	50	75	100
Idle-up1	100	85	60	85	100
Idle-up2	100	60	55	80	100

5-Point Pitch Curves					
Normal	18	38	55	75	94
Idle-up1	0	22	46	70	90
Idle-up2	0	22	46	70	90
Hold	15	38	55	75	100

Blade Pitch Angles (degrees)			
Normal	-4	5.5	9.5
Idle-up1	-9	0	9
Idle-up2	-9	0	9
Hold	-6	5.5	10.5

The above pushrod lengths will permit 3D with the Raptor.

Use these lengths as a starting point. Beginners can also use those pushrod lengths, but just connect the collective control to the outside point on the pitch control arm. Pushrod lengths are measured from ball link center to ball link center.

Suggested throttle and collective pitch set up: Idle-up1 is used for continuous 3-D flips and aerobatics. Idle-up2 is used for switchless inverted hover. Use a pitch gauge to check blade angles. It is easier to start setting up idle-up2 blade pitch angles first. Beginners should inhibit idle-up1, idle-up2. Beginners should only use the Normal mode values. The model should hover at around 1550 rpm in Normal mode, and flies at 1800 in idle-up1. Rotorspeed can be checked using TTR2000 MTF-301 helicopter tachometer. With 1700 or higher headspeed, the use of carbon blades is recommended.

Radio and Control Linkage Setup For Raptor 50

The performance of any RC helicopter and how well it fly depends strongly on well the model has been set up. We will go through the step-by-step on how to set up the transmitter and mechanics linkages to make your Raptor 50 fly at its best. Before you start, please make up the length of all the pushrods according to the recommended length given in our 3D setup drawing in the instruction manual. The pushrod lengths we have provided are valid for beginners to expert 3-D flying. Then, we recommend using the reset function on your transmitter to reset all settings to factory default values. Check the end point adjustment, or ATV value, on your transmitter to make sure the values are at 100%. Next we recommend program the numerical values we have provided in the table for the five points in the throttle curves and for the collective pitch curves. Now you can proceed to do the mechanical adjustments. We recommend leave the transmitter on during the following adjustments.

1.Throttle Adjustment.

The throttle arm on the carburetor should always be parallel to the throttle servo arm. When the throttle barrel is half open, the throttle arm should be straight down. Leave it at this position. Turn on the transmitter and leave the throttle in the Normal Throttle Mode. Set the throttle trim to the bottom and set the throttle stick to the middle. Adjust the throttle pushrod to the correct length. Check the throttle servo travel direction to confirm moving the throttle stick to the high position will move the throttle arm to the full open position. Use a medium length servo arm. Pick a hole on the servo arm so when the throttle stick is moved to the highest or the lowest position, it will fully open or fully close the throttle arm, without binding. Now is the time to use the End Point Adjustment or ATV feature on the transmitter to fine tune the throttle servo travel to achieve this. Avoid using too large or too small ATV values. The ATV values should stay between 90 to 100%.

2.Collective Pitch Setup

Collective control makes a helicopter ascend or descend by changing the main rotor blade angle. Beginners and advance fliers must attach the collective control pushrod to different locations on the collective control arm. The difference is that advance fliers desire more collective travel range, usually +10 to -10 degrees of blade change range. Beginners only need -2 to +10 degrees of blade change range. We assume you have programmed in our recommended values from the Table for the throttle and pitch curves.

Collective Setup for Beginners:

Only the Normal Throttle Model will be used. We recommend using a collective pitch range of -2 to +10 degrees. Move the throttle/collective control stick to the center. Attach the servo arm so the servo arm is in a horizontal position. The servo output shaft has spline. Try mounting the servo arm with different orientation until one of the arms becomes as close to horizontal. Attach the steel ball to the collective servo arm at about 15 mm from the center of the servo arm. Move the throttle stick to the middle position. Tilt the collective control arm/tray assembly so it is approximately in the middle of its allowable mechanics tilting range. Use the molded pitch scale on the left side of the plastic frame. The pointer on the collective arm should point to the mark for the hover position. See our drawings of the molded scale in the other section of this manual. Attach the pushrod. The pushrod length should be 51 mm as recommended in the drawing. Use a pitch gauge to check the blade angle, they should be about 5.5 degrees. This is what you need for hovering. This gives a hovering rotor rpm around 1500.

Radio and Control Linkage Setup For Raptor 50

Move the throttle stick to the high position to check if it causes binding. Move the throttle stick to the low position to check if it causes binding. The blade should be at 10 degrees at full collective control stick setting, and -2 degrees at idle stick position. Use the ATV or End Point Adjustment to eliminate binding, or to make the pitch come out at +10 and -2 at the extremes.

Collective Setup for 3-D:

We recommend using a collective pitch range of approximately +10 to +10 degrees in the Stunt mode, or idle-up mode. Use approximately -6 to +11 degrees in the Throttle Hold Mode. Please see the table of pitch angle values we have provided for 3-D flying. To set up the collective for 3-D or F3C flying, we recommend starting with Idle-up Mode, or Stunt Mode. Increase the ATV or End Point Adjustment of the collective channel to 130%. Attach the steel ball to the collective servo arm at about 15 mm from the center of the servo arm. The pushrod should be around 54 mm long. Move the throttle stick to the center position and mount the servo arm so the arm is in a horizontal position. Move the throttle stick to the high position to check if it causes binding. Move the throttle stick to the low position to check if it causes binding. The blade should be at 10 degrees at full collective control stick setting, and -10 degrees at idle stick position. Use the ATV or End Point Adjustment to eliminate binding, or to make the pitch come out at +10 and -10 at the extremes.

After you have done the above and obtained the +10, 0 and -10 degree collective travel range in idle-up, you will automatically get the proper collective settings for the Normal Throttle Mode and Throttle Hold Mode. This is because you have programmed in the numerical values we have provided in the table.

If the throttle was set up according to described earlier, and the numerical values for the five points from the table have been programmed into the transmitter, you will get the proper U-shaped throttle curve for 3-D flying. We have left the values for idle-up 1 and idle-up 2 the same. Individual fliers can refine the two Idle-up setting to suit the need for different 3-D and F3C maneuvers. With Idle-up on, the main rotor speed should be around 1700 to 1800 for good 3-D flying. We recommend using only carbon graphite main rotor blades for aggressive 3-D flying. Please try the Thunder tiger 600 mm carbon graphite rotor blades, they are designed for extreme 3-D flying with the Raptor 50. Wood main rotor blades are fine for learning how to fly or for practicing simple maneuvers.

3.Cyclic Control Setup

Cyclic controls consist of fore/aft cyclic and left/right cyclic. Fore/aft cyclic is often called elevator control. Left/right cyclic is often called aileron control. Elevator and aileron controls are terms used by airplane pilot. Set the cyclic control stick of your transmitter in the middle and set the trims to the center. Put the swashplate in a level position.

Fore/Aft Cyclic Setup: Attach the elevator servo arm to elevator control servo. The servo arm should point straight up. We recommend attaching the steel ball to the elevator servo arm at about 10 mm from the center of the servo. Adjust the pushrod length from the elevator servo to make the swashplate level.

Left/Right Cyclic Setup: Attach the aileron servo arm to aileron control servo. Mount the servo arm so the servo arm is close to perpendicular to the servo case. We recommend attaching the steel ball to the elevator servo arm at about 10 to 12 mm from the center of the servo. Adjust the pushrod length from the aileron servo to make the swashplate level. The two pushrods from the aileron servo to the aileron bellcrank should be very similar in length.

Radio and Control Linkage Setup For Raptor 50

4. Tail Rotor Control and Gyro Setup

The radio setup for using a heading hold gyro and a non-heading hold gyro will be different. But the mechanical setup will be the same.

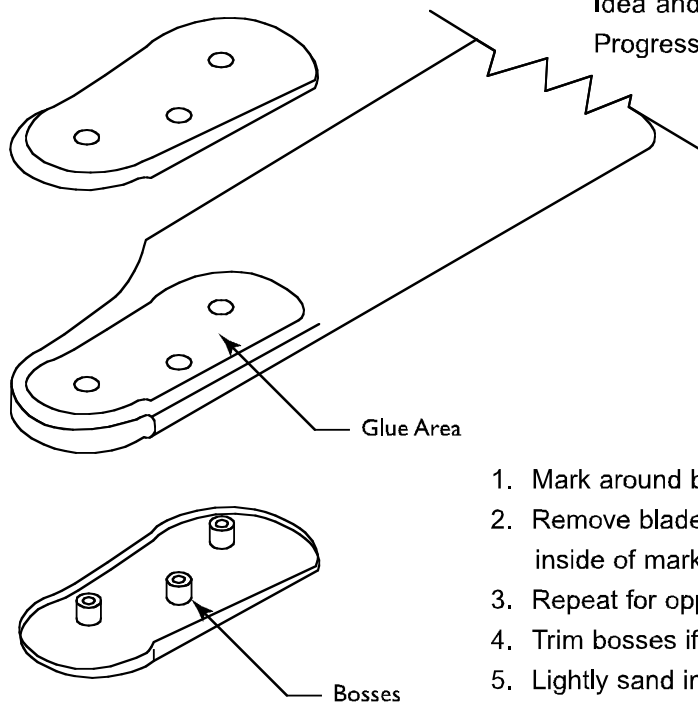
Heading Hold Gyro Setup: Set the tail rotor mixing or revolution mixing values to zero for every throttle mode in the transmitter. Leave the tail rotor control stick in the center and move the tail rotor trim on the transmitter to the center. Attach the servo arm so the arm is straight up. Mount the steel ball 10 to 12 mm from the center of the servo arm. Attach the tail rotor pushrod rod. The pushrod will require a small 15 degree bent to give a smooth run. See the 3-D setup drawing. Adjust the pushrod rod ball links so the tail rotor blade angle is approximately 15 degree. Check the tail rotor control direction so a right tail rotor command should increase the tail rotor blade pitch angle. A left command reduces the angle. Leave the tail rotor control channel ATV at 100%. Use the hand and rotate the gyro to the left should cause the servo to provide a right tail rotor command (increases the tail rotor blade pitch angle). Rotate the gyro to the right should cause the servo to provide a left tail rotor command (reduces the tail rotor blade pitch angle). If the gyro is providing the wrong feedback, then the gyro needs to be mounted upside down or some gyro has a reverse switch on the gyro box. Never use any tail rotor revolution mixing when using a heading hold gyro, that causes the gyro to drift. Never use any tail rotor trim when using a heading hold gyro, that causes the gyro to drift.

Non-Heading Hold Gyro Setup: Leave the throttle stick and tail rotor control stick in the center and move the tail rotor trim on the transmitter to the center. Attach the servo arm so the arm is straight up. Mount the steel ball 10 to 12 mm from the center of the servo arm. Attach the tail rotor pushrod rod. The pushrod will require a small 15 degree bent to give a smooth run. See the 3-D setup drawing. Adjust the pushrod rod ball links so the tail rotor blade angle is approximately 15 degree. Check the tail rotor control direction so a right tail rotor command should increase the tail rotor blade pitch angle. A left command reduces the angle. Leave the tail rotor control channel ATV at 100%. Use the hand and rotate the gyro to the left should cause the servo to provide a right tail rotor command (increases the tail rotor blade pitch angle). Rotate the gyro to the right should cause the servo to provide a left tail rotor command (reduces the tail rotor blade pitch angle). If the gyro is providing the wrong feedback, then the gyro needs to be mounted upside down or some gyro has a reverse switch on the gyro box. Go to the tail rotor revolution mix function in the transmitter. Put in a numerical value of +25 for the high end revolution mixing and -30 for the low end revolution mixing. Move the throttle stick to the high position and you should see the tail rotor servo moves and "increases" the tail rotor blade angle from 15 degrees to about 25 degrees. Move the throttle stick to the low position and you should see the tail rotor servo moves and "decreases" the tail rotor blade angle from 15 degrees to 0 degrees. This is to compensate for the change in torque on the helicopter fuselage when collective pitch is changed. A heading hold gyro does not need tail rotor revolution mixing because it automatically senses heading change and feed in command to lock on the helicopter "heading." A non-heading hold gyro can only stabilizes the "rate" that the helicopters nose is rotating.

For 3-D flying with a non-heading hold gyro, it will be necessary to put in a V-shaped tail rotor mixing curve. Try +15 for the high end revolution mixing and +15 for the low end revolution mixing.

Blade Modification

Idea and original art submitted by Randy Wishon,
Progressive Technologies, inc.



1. Mark around blade grips with a felt-tip marker.
2. Remove blade grips and cut covering lightly .125" inside of mark, being careful not to cut into the blade.
3. Repeat for opposite side.
4. Trim bosses if necessary to allow tight fit to the blades.
5. Lightly sand inside of grips for better adhesion.
Apply Epoxy to blades in area shown top and bottom.
6. Attach blade grips and tighten screws.
7. Wipe off the excess Epoxy.

Dear Raptor Customers:

The stock wood blades should be operated with a main rotorspeed of no more than 1700 RPM. For 3-D aerobatics or rotor speed more than 1700RPM, the Thunder Tiger 600mm Carbon Fiber Rotor Blade is recommend. (P/N TTR 3827) The above drawing illustrate how to remove the plastic blade grips and then carefully slice away some of the covering material, and add the "thin" type CA glue to further strengthen the wood. After installing the plastic blade grips, apply epoxy around the plastic grip and the wood to seal it off. This adds more strength and prevent oil from seeping through. For beginners, the best rotorspeed is around 1550 RPM. For advanced fliers, a good hovering RPM is around 1550, and a constant 1800RPM in idle-up for 3-D aerobatics. We recommend using the Thunder Tiger TR-2000 optical tachometer to help you check the rotorspeed and to help you set the engine mixture. This tachometer is especially helpful for the beginners and we highly recommend it.



TTR3827 600mm Carbon Fiber Rotor Blade

TTR3827 620mm Carbon Fiber Rotor Blade

After Flight Checklist

- (1) Check every screw and bolt to make sure none has loosened due to vibration.
- (2) Check every rotating and movable part to ensure they still move smoothly and normally.
- (3) Clean off the exhaust residue from the muffler, engine, and helicopter.
- (4) Check all movable parts, such as gears, ball links, belt, etc. for unusual wear.

Trouble Shooting

[1] The engine will not start.

* The engine starting shaft will not turn:

The engine may be flooded with too much fuel. Please remove the glow plug first, then turn the engine with the electric starter until the excess fuel spits out of the glow plug hole.

* The engine turns when the electric starter is applied, but the engine will not start:

- (1) Is the glow plug working? Remove the glow plug and does the platinum coil glow red when a 1.5 volt battery is applied to the plug? If not, then the glow plug battery may be weak and old.
- (2) Is the carburetor needle properly set? Please refer to the engine instruction manual for the proper needle setting.
- (3) Does the throttle control arm move properly and in the correct direction according your transmitter command?

* Engine will start, but quits immediately.

- (1) Use the transmitter to increase the carburetor opening slightly. The throttle stick should never exceed the 1/3 position when starting the engine.
- (2) Try a new or different type of glow plug. There are different types of glow plugs on the market for different types of fuel and operating conditions. Seek the advice of experienced fliers and also experiment with different types of glow plugs until you find the one that suits your operating condition the best.

* Engine runs, but the helicopter will not lift off.

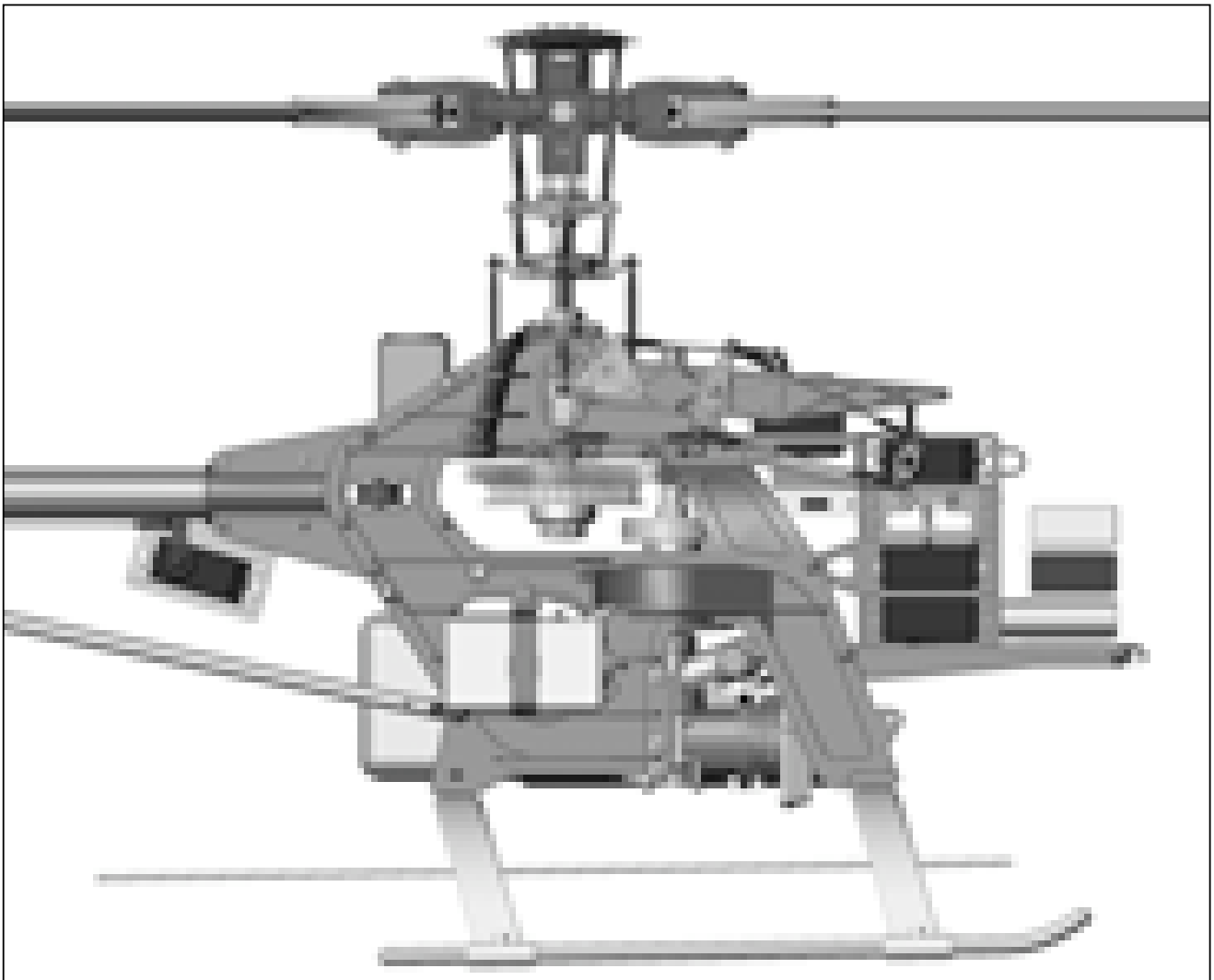
- (1) Check the main rotor blade pitch angle, they should be set at 5.5 to 6 degrees when the transmitter throttle/collective stick is at the center position.
- (2) Does the engine throttle arm move properly? The carburetor opening should be fully open when the transmitter throttle/collective stick is moved up. The carburetor opening should be nearly closed when the transmitter throttle/collective stick is moved down. And the opening should be completely closed when the transmitter throttle/collective stick is moved down and the throttle trim is also moved down.
- (3) Check your engine manual for proper starting point settings. Then try again to start your engine. If smoke is excessive when adding throttle your high speed needle may be too rich. Try a few clicks turning clockwise and try again. Once proper needle settings are achieved, model should lift off effortlessly.

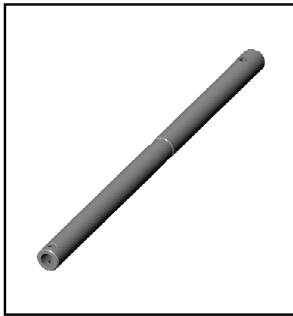
[2] Helicopter problems.

* The helicopter shakes.

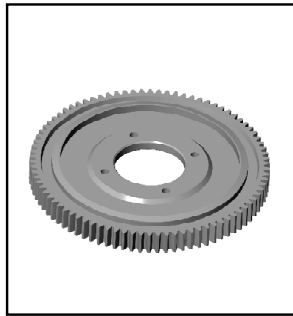
- (1) Is the blade spindle bent?
- (2) Is the flybar bent?
- (3) Is the main rotor shaft bent?
- (4) Are the two control paddles mounted at the same distance from the rotor shaft, and the paddles are parallel to each other, and in the proper direction?
- (5) Is the tail rotor shaft bent? The tail rotor blades mounted properly or damaged?
- (6) Are the main rotor blades damaged or mounted in the proper orientation? The blades may require additional balancing. The blade balance can be checked by removing both blades and then use one of the 4mm blade bolt and nut to hold the two blades together like a teeter totter. Then, hold the blade bolt with your thumb and index finger. The two blades should teeter and remain in a level position. If not, then add some tape to the lighter blade near the blade tip until the two blades teeter in a level position. Hobby shops also sell blade balancers that are designed solely for balancing model helicopter blades.

PARTS LIST SECTION

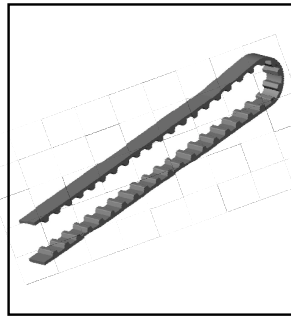




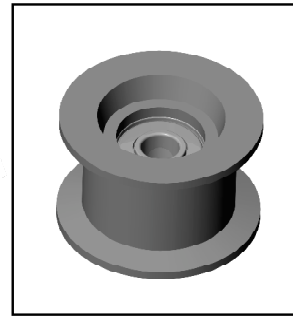
PV0451 Harden Main Shaft



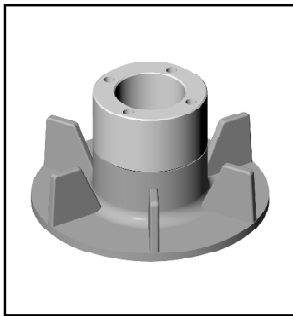
AK0148 85T Main Spur Gear



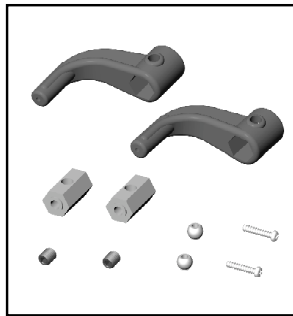
PV0520 686XL Tail Drive Belt



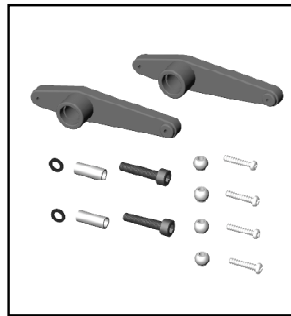
AV0052 Tail Idel Pulley Assy.



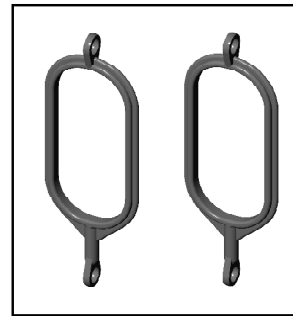
AV0143 Cooling Fan Assy.



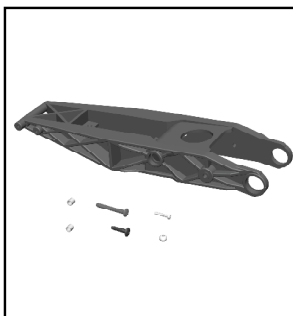
PV0002 Flybar Control Arm



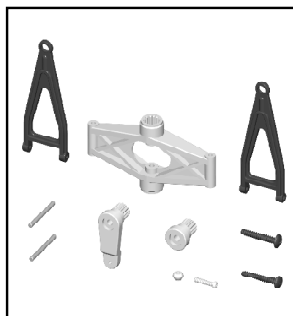
PV0004 Mixing Lever



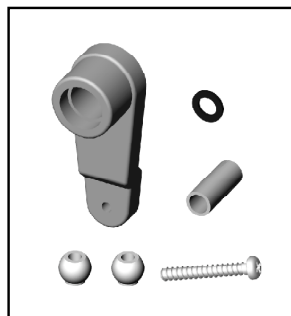
PV0005 Flybar Control Rod



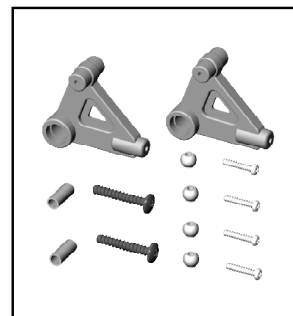
PV0012 Pitch Control Arm



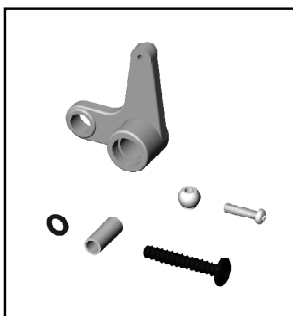
PV0013 Elevator Arm



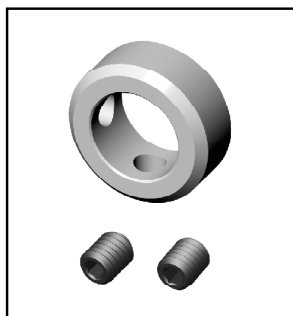
PV0014 Elevator Lever



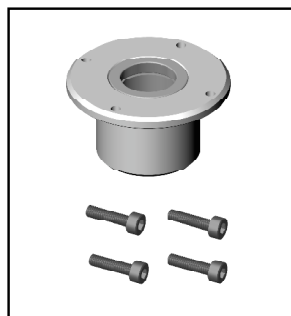
PV0015 Aileron Lever



PV0016 Tail Pitch Control Lever



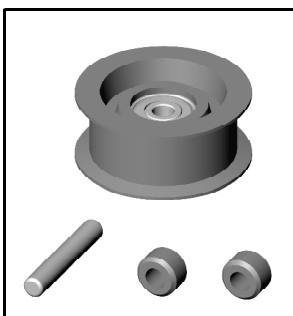
PV0018 Main Shaft Lock Ring



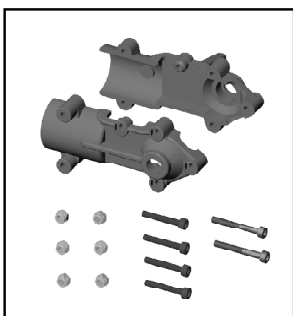
PV0019 One Way Clutch



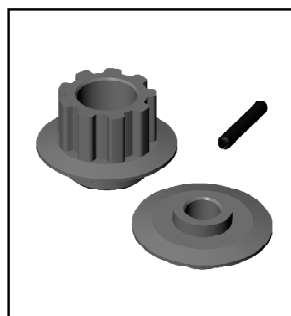
PV0020 One Way Clutch Shaft



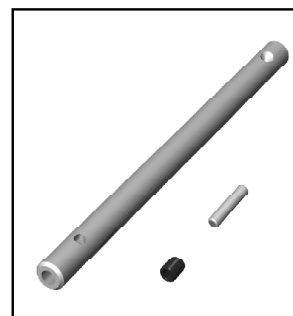
PV0021 Guide Pulley Assy



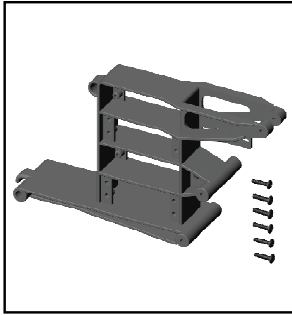
PV0027 Tail Case



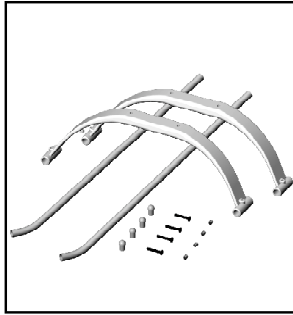
PV0029 Tail Pulley Set



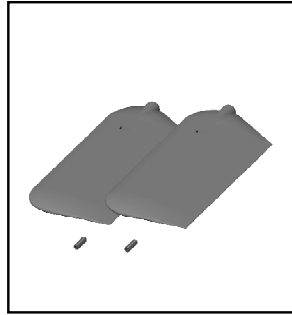
PV0030 Tail Rotor Shaft



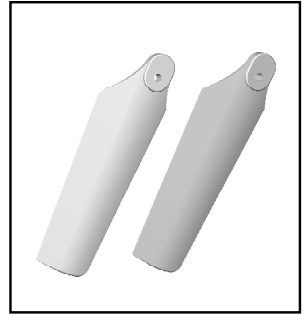
PV0033 Servo Frame



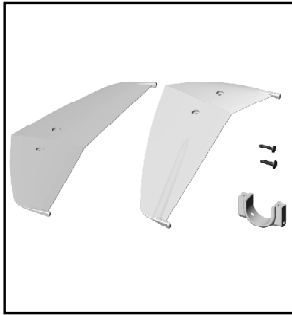
PV0035 Landing Skid Set(AL)
PV0035-T Landing Skid Set(Titan)



PV0036 Flybar Paddle



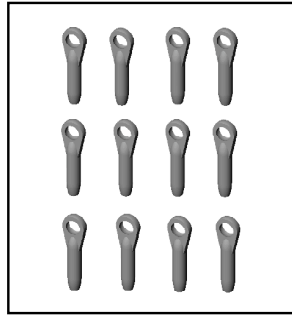
PV0037 Tail Rotor Blade



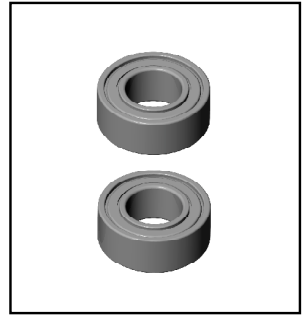
PV0038 Tail Fin



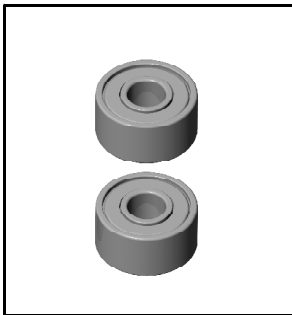
PV0040 Double Link



PV0041 Ball Link



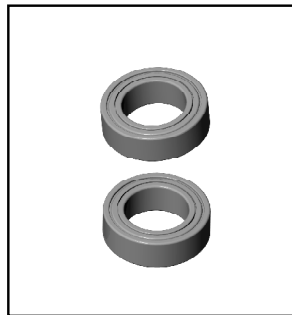
PV0048 Pitch Frame/Rotor
Hub Seesaw Brg.



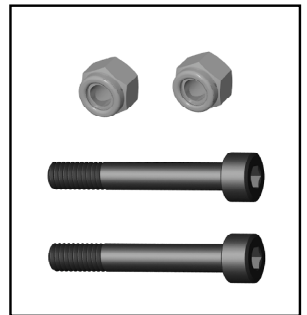
PV0049 Seesaw Brg.



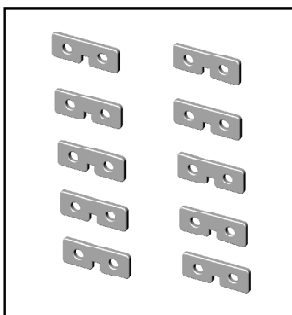
PV0051 Lever Brg.



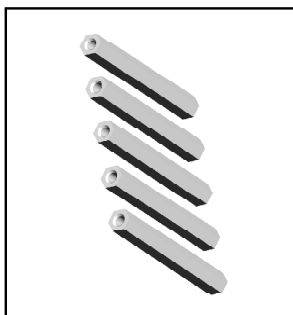
PV0052 Tail Slider Brg.



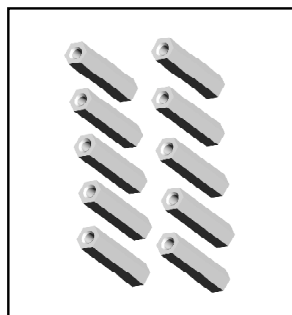
PV0053 Rotor Bolt



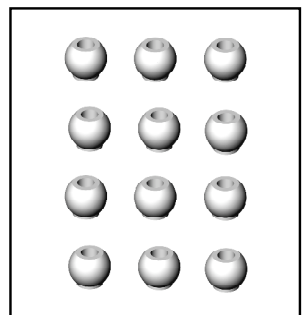
PV0054 Servo Mounting Plate



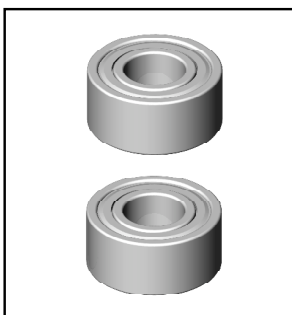
PV0056 Frame Spacer(L)



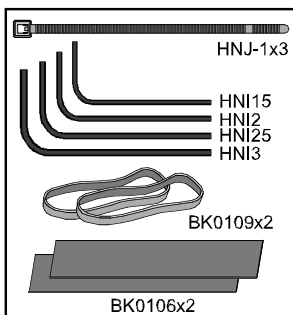
PV0057 Frame Spacer(S)



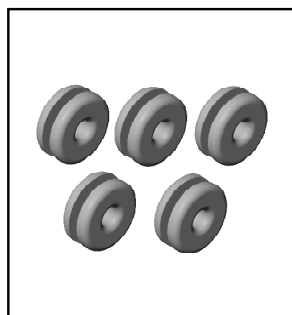
PV0058 Linkage Ball



PV0059 Tail Shaft Brg.



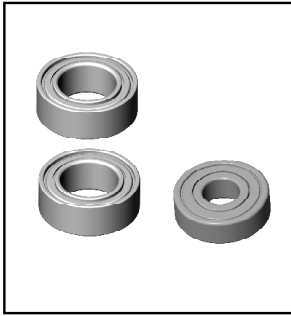
PV0060 Installation Set



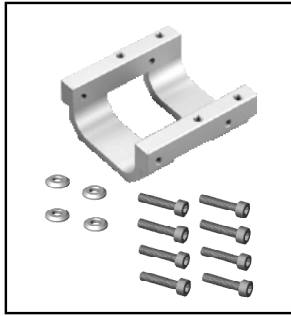
PV0062 Rubber Grommets (White)
PV0062-Y Rubber Grommets (Yellow)



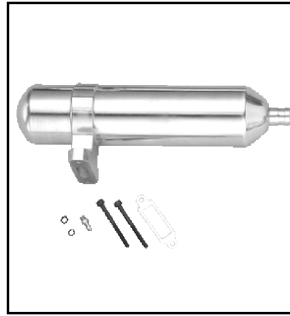
PV0092 Metal Swashplate



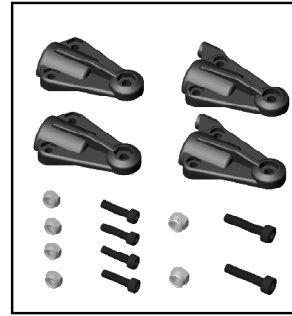
PV0093 Main Shaft Brg.



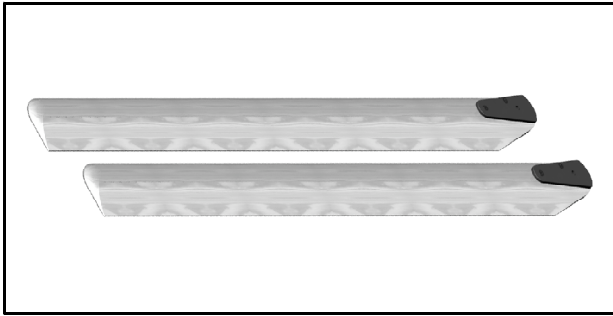
PV0107 Engine Mount (.50)



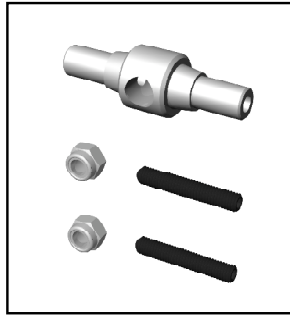
PV0109 High Performance Muffler (.46~.50)



PV0148 Tail Rotor Grip



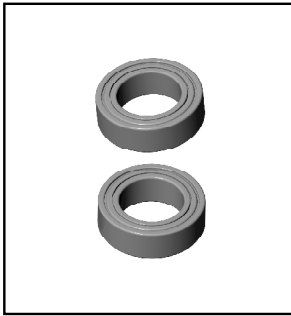
PV0118 600mm Wood Main Rotor Blades



PV0151 Tail Rotor Hub



PV0526 Tail Rotor Brg.



PV0203 Starter Shaft Brg.



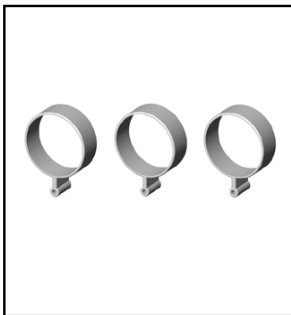
PV0267 Loctite #242



PV0268 Loctite #262



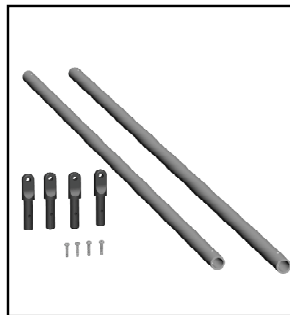
PV0270 Grease (For Bearing)



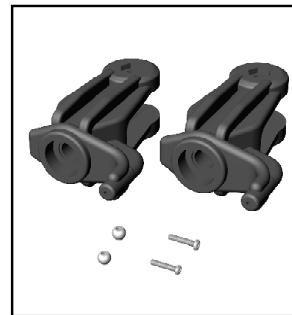
PV0279 Tail Rod Guide



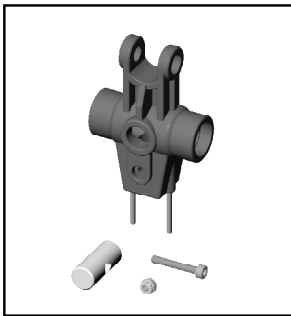
PV0311 Header Tank



PV0329 Tail Support(AL)
PV0329-T Tail Support(Titan)



PV0353 Main Rotor Grip



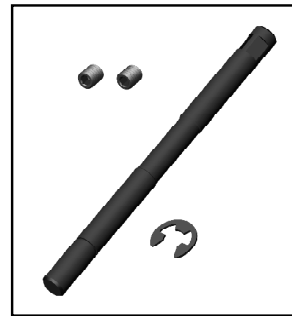
PV0354 Main Rotor Hub



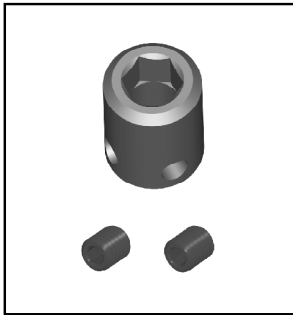
PV0355 Spindle



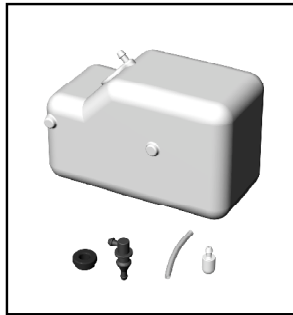
PV0359 Clutch



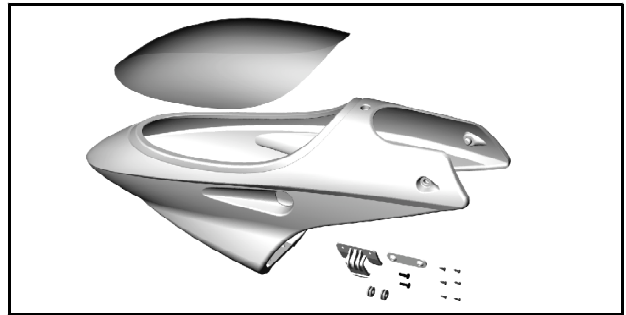
PV0360 Starter Shaft



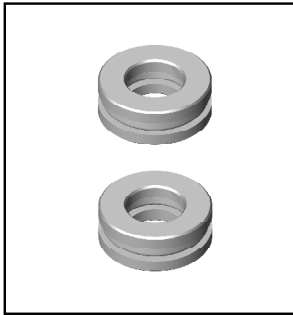
PV0361 Starter Coupling



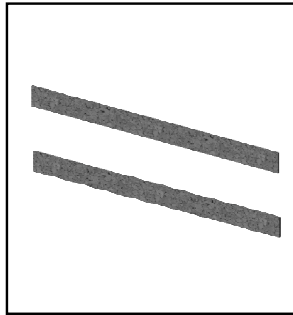
PV0363 Fuel Tank



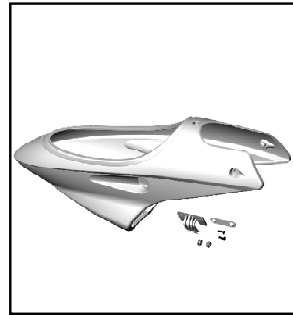
PV0364 Body(White)
PV0364-Y Body(Yellow)



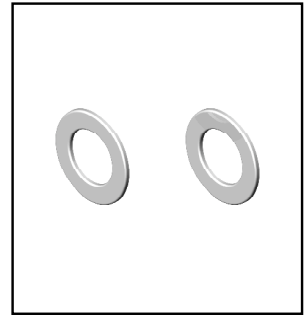
PV0365 Thrust Brg.



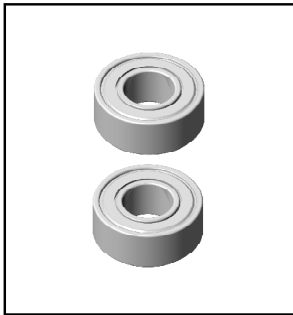
PV0368 Clutch Liner



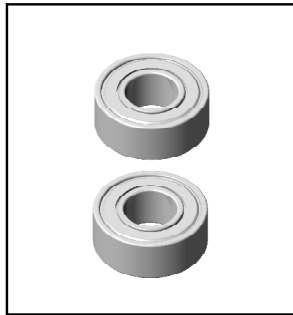
PV0370 Body Only(White)
PV0370-Y Body Only(Yellow)



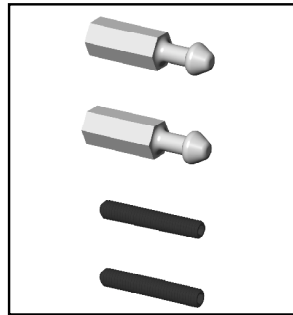
PV0372 Thrust Collar



PV0373 Clutch Bell Brg.



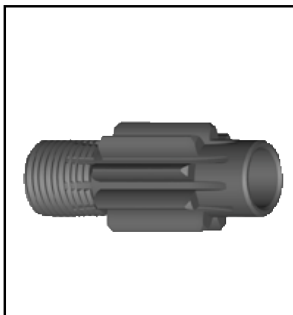
PV0374 Feathering Brg.



PV0375 Body Retaining Set



PV0379 Auto Rotation Pulley



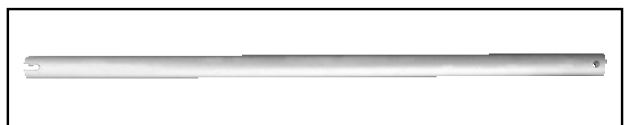
PV0380 Pinion Gear 10T



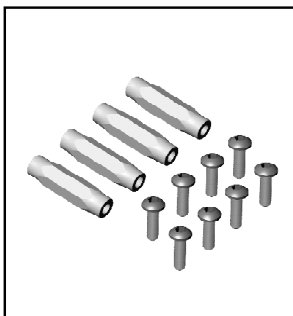
PV0381 70 Durometer Flap
Damper(Blue)



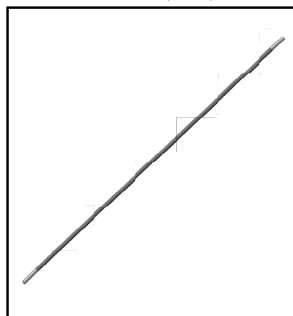
PV0519 Rear Servo Rod (R50T)



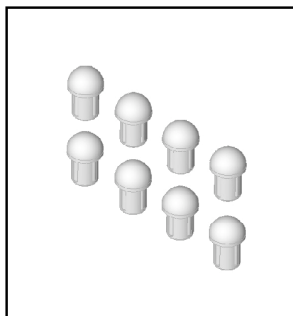
PV0521 Tail Boom (R50T)



PV0440 Metal Frame Spacer(s)



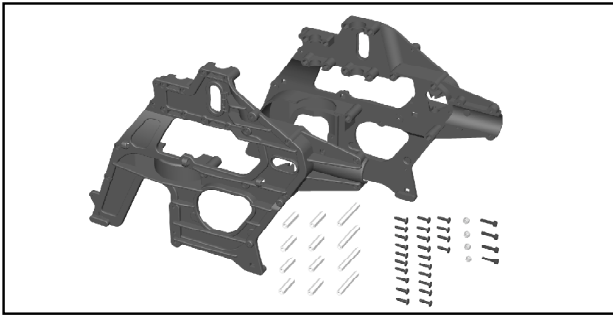
PV0450 SUS Flybar Rod



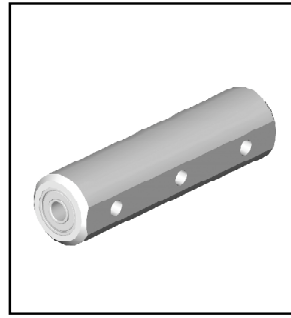
PV0454 Skid Pipe End Cap



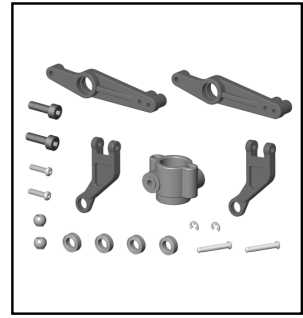
PV0517 Oneway Bearing Grease



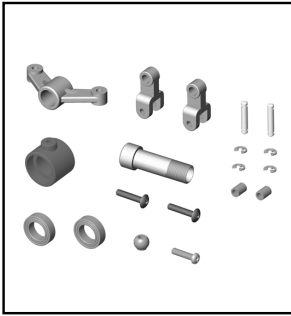
PV0480 Main Frame Set



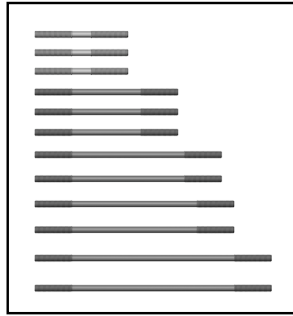
PV0486 Flybar Seesaw



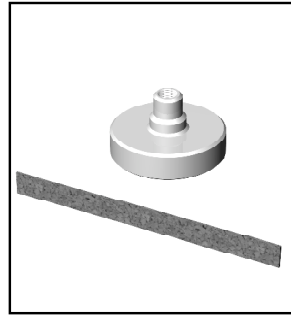
PV0503 Wash Out Set



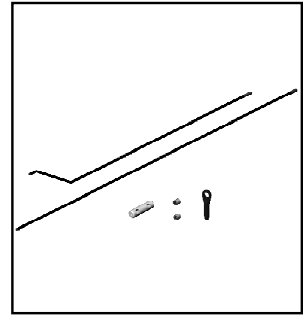
PV0504 Tail Pitch Slider



PV0505 SUS Linkage Rod



PV0506 Clutch Bell



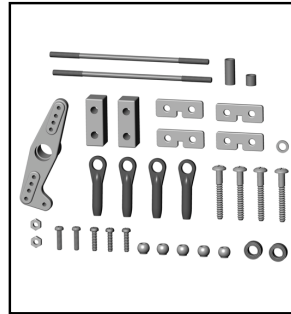
PV0507 SUS Tail Control Rod



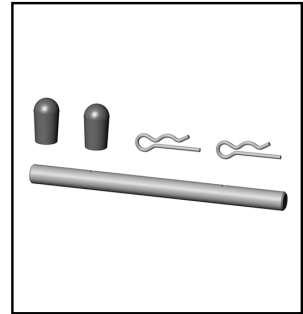
PV0508 Decal



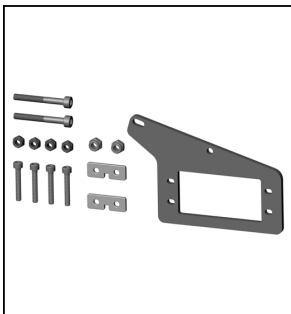
PV0509 Pitch Push Pull Lever Set



PV0510 Elevator Push Pull Lever Set





PV0515 Body Support



PV0511 Rear Servo Tray

	HMF2-6N M2X6 HMF2-8N M2X8
	HMJ2-10N M2X10 HMJ2-14N M2X14 HMJ2-6B M2X6 HMJ3-22B M3X22
	HSE2-10B M2X10 HSE2612N M2.6X12 HSE3-12B M3X12 HSE3-18B M3X18
	HSE3-5B M3X5

PV0088 Screw Bag (6pcs each)

	HMC3-10B M3X10 HMC3-12B M3X12 HMC3-14B M3X14 HMC3-20B M3X20 HMC3-25B M3X0.5L25 HMC3-32B M3X0.5XL32 HMC3-8B M3X8 BK0616 M3x20
	HME3-10B M3X10 HME3-18B M3X18 HME3-5B M4X5

PV0089 Screw Bag (6pcs each)

Parts No.	Description	Item No.	Description	quantity	Reference Assemble Step
AK0148	85T Main Spur Gear	BK0148	8ST Main Spur Gear	1	7
AV0143	Cooling Fan Assy.	BV0143	Cooling Fan Assy.	1	10
PV0002	Flybar Arm	BK0002	Flybar Control Arm	2	13
		BK0005	Flybar Arm Bushing	2	13
		BK0075	Linkage Ball	2	13
		HME4-5B	Set Screw, M4x5	2	13
		HMJ2-10N	Selftapping Screw, M2x10	2	13
PV0004	Mixing Lever	BK0006	Mixing Lever	2	13
		BK0075	Linkage Ball	4	13
		BK0076	Collar (d3xD4xL10)	2	13
		BK0088	Flat Washer	2	13
		HMC3-14B	Socket Screw, M3x14	2	13
		HMJ2-10N	Selftapping Screw, M2x10	4	13
PV0005	Flybar Control Rod	BK0007	Flybar Control Rod	2	12
PV0012	Pitch Control Arm	BK0017	Pitch Control Arm	1	8
		BK0075	Link Ball	1	8
		BK0078	Collar (d3xD4xL4)	2	8
		HMJ2-10N	Selftapping Screw, M2x10	1	8
		HMJ3-22B	Selftapping Screw, M3x22	1	8
		HSE3-12B	Selftapping Screw, M3x12	1	8
PV0013	Elevator Arm	BK0018	Elevator Control Arm	1	9
		BK0019	Elevator Arm Parallel Lever	1	9
		BK0020	Elevator Arm Shaft	1	8
		BK0023	Elevator Arm Linkage	2	9
		BK0075	Linkage Ball	1	9
		BK0084	Pin (D2xL23)	2	9
		HMJ2-10N	Selftapping Screw, M2x10	1	9
		HSE3-18B	Selftapping Screw, M3x18	2	8
PV0014	Elevator Lever	BK0021	Elevator Control Lever	1	8
		BK0075	Linkage Ball	2	8
		BK0076	Collar (d3xD4xL10)	1	8
		BK0088	Flat Washer	1	8
		HMJ2-14N	Selftapping Screw, M2x14	1	8
PV0015	Aileron Lever	BK0022	Aileron Control Lever	2	9
		BK0075	Linkage Ball	4	9
		BK0076	Collar (d3xD4xL10)	2	9
		HMJ2-10N	Selftapping Screw, M2x10	4	9
		HSE3-18B	Selftapping Screw, M3x18	2	8
PV0016	Tail Pitch Control Lever	BK0024	Tail Pitch Control Lever	1	15
		BK0075	Linkage Ball	1	15
		BK0076	Collar (d3xD4xL10)	1	15
		BK0088	Flat Washer	1	15
		HMJ2-8N	Selftapping Screw, M2x8	1	15
		HSE3-18B	Selftapping Screw, M3x18	1	15
PV0018	Main Shaft Lock Ring	BK0030	Main Shaft Lock Ring	1	10
		HME4-5B	Set Screw, M4x5	2	10
PV0019	One Way Clutch	BV0033	One Way Clutch Housing Set	1	7
		HMC3-12B	Socket Screw, M3x12	4	7
PV0020	One Way Clutch Shaft	BK0034	One Way Clutch Shaft	1	14
		BK0616	Socket Screw, M3x20	1	14
		HMM3Z	Lock Nut, M3	1	14
		HMQ14	Retaining Ring, ø14	2	14
PV0021	Gudie Pulley Assy	BV0035	Guide Pulley	1	6

Parts No.	Description	Item No.	Description	quantity	Reference Assemble Step
		BK0036	Pulley Collar	2	6
		BK0081	Pin, D13xL18	1	6
PV0027	Tail Case	BK0046	Tail Unit Housing (L)	1	16
		BK0047	Tail Unit Housing (R)	1	15
		HMC3-20B	Socket Screw, M3x20	4	16
		HMC3-25B	Socket Screw, M3x25	2	16
		HMM3Z	Lock Nut, M3	6	16
PV0029	Tail Pulley Set	BK0050	Tail Pulley Set	1	15
		BK0051	Tail Pulley Flange	1	15
		HMY2-12	Pin∅ 2x12	1	15
		HME3-4B	Set Screw, M3x4	1	15
PV0030	Tail Rotor Shaft	BK0053	Tail Rotor Shaft	1	15
		BK0414	Pin, D2xL12	1	15
		HME3-4B	Set Screw, M3x4	1	15
PV0033	Servo Frame	BK0057	Servo Frame	1	6
		HSE3-12B	Selftapping Screw, M3x12	6	6
PV0035	Landing Skid Set	BK0064	Skid	2	11
		BK0065	Skid Cap	4	11
		BK0066	Skid Brace	2	11
		HSE3-18B	Selftapping Screw, M3x18	4	11
		HME4-5B	Set Screw, M4x5	4	11
PV0035-Y	Landing Skid Set	BK0064T	Skid Pipe	2	11
		BK0065	Skid Cap	4	11
		BK0066	Skid Brace	2	11
		HSE3-18B	Selftapping Screw,M3x18	4	11
		HME4-5B	Set Screw,M4x5	4	11
PV0036	Flybar Paddle	BK0067	Flybar Paddle	2	13
		HME3-10B	Set Screw,M3x10	2	13
PV0037	Tail Rotor Blade	BK0068	Tail Rotor Blade	2	17
PV0038	Tail Fin	BK0069	Stabilizer Fin	1	16
		BK0070	Stabilizer Fin Bracket	1	16
		BK0071	Vertical Fin	1	16
		HSE3-12B	Selftapping Screw,M3x12	2	16
PV0040	Double Link	BV0085	Double Link	2	13,19
PV0041	Ball Link	BK0086	Ball Link	12	8,10,14,16,18,19
PV0048	Pitch Frame/ Rotor Hub Seesaw Brg.	HMV840ZZY	Bearing, d4xD8xW3	2	8
PV0049	Seesaw Brg.	HMV830ZZ	Bearing, d3xD8xW4	2	13
PV0051	Leaver Brg.	HMV740ZZY	Bearing, d4xD7xW2.5	4	7,9,13,15
PV0052	Tail Slider Brg.	HMV1060	Bearing, d6xD10xW3	2	15
PV0053	Rotor Bolt.	HMC4-27B	Cap Screw, M4x27	2	21
		HMM4Z	Lock Nut, M4	2	21
PV0054	Servo Mounting Plate	BK0104	Servo Mounting Plate	10	18, 19
PV0056	Frame Spacer (L)	BK0058	Frame Spacer (L)	5	6
PV0057	Frame Spacer (S)	BK0059	Frame Spacer (S)	10	6
PV0058	Link Ball	BK0075	Linkage Ball	12	—
PV0059	Tail Shaft Brg.	HMV1150X	Bearing, d5xD11xW5	2	15,16
PV0060	Installation Set	BE1052	Antenna Tube	1	20
		BK0106	Double Side Tape	2	20
		BK0109	Rubber Band 5x3 20xT1	2	20
		HNI15	Hex Wrench 1.5m/m	1	3
		HNI2	Hex Wrench 2m/m	1	3
		HNI25	Hex Wrench 2.5m/m	1	3

Parts No.	Description	Item No.	Description	quantity	Reference Assemble Step
		HNI3	Hex Wrench 3m/m	1	1
		HNJ-1	Tie Band 2.5x100	3	1
PV0062	Body Mount Rubber Grommet	BK0102	Body Mount Rubber	5	20
PV0062-Y	Body Mount Rubber Grommet	BK0102Y	Body Mount Rubber	5	20
PV0092	Metal Swash plate	BV0092	Metal swash plate	1	10
PV0093	Main Shaft Bearing	HMV1680	Bearing, d8xD16xW5	1	5
		HMV6800	Bearing, d10xD19xW5	2	6
PV0107	Engine Mount (.50)	BK0087	Washer	4	11
		BK0144	Engine Mount	1	11
		BK0179	Engine Mount Spacer	2	11
		HMC3-14	Socket Screw	8	11
PV0109	High Performance	BA1579	Muffler Gasket	1	11
	Muffler(.46~.50)	MV0172	Muffler	1	11
		HMC3-35B	Socket Screw	2	11
		HMT3B	Spring Wsher	2	11
PV0118	Wood Main Rotor Blades	BV0176	Wood Main Rotor Blade	1	21
PV0148	Tail Rotor Grip	BK0302-1	Tail Pitch Housing (A)	2	15
		BK0303-1	Tail Pitch Housing (B)	2	15
		HMC2510B	Socket Screw, M2.5x10	4	15
		HMM25B	Lock Nut, M2.5	4	15
		HMC3-14B	Socket Screw, M3x14	2	15
		HMM3Z	Lock Nut, M3	2	15
PV0151	Tail Rotor Hub	BK0307	Tail Rotor Hub	1	15
		HME3-18.5B	Set Screw, M3x18	2	15
		HMM3B	Lock Nut, M3	2	15
PV0200	Tail Rotor Brg.	HMV1050ZZ	Bearing, d5xD10xW4	4	15
PV0203	Starter Shaft Brg.	HMV696Z	Bearing, d6xD15x5	2	6
PV0267	Loctite #242			1	
PV0268	Loctite #262			1	
PV0270	Plastic Gear Grease			1	
PV0279	Tail Rod Guide	BK0091	Rod Guide	3	16
PV0311	Header Tank	BK0087	Washer	1	17
		BK0102	Rubber Grommer	1	17
		BK0506	Header Tank Support	1	17
		BK0502	Header Tank	1	17
		HMC3-14B	Socket Screw	1	17
PV0329	Tail Support(AL)	BK0447	Tail Support Rod End	4	16
		BK0524	Tail Support Rod	2	16
		HMJ2-8N	Selftapping Screw, M2x8	4	16
PV0329-T	Tail Support(Titanium)	BK0447	Tail Support Rod End	4	16
		BK0524T	Tail Support Rod	2	16
		HMJ2-8N	Selftapping Screw, M2x10	4	16
PV0353	Main Rotor Grip	BK0075	Linkage Ball	2	12
		BK0596	Main Pitch Housing	2	12
		HMJ2-10N	Selftapping Screw, M2x10	2	12
PV0354	Main Rotor Hub	BK0587	Main Rotor Pin	1	12
		BK0616	Socket Screa, M3x20	1	12
		BK0595	Main Rotor Hub	1	12
		HMM3E	Lock Nut, M3	1	12
PV0355	Spindle	BK0581	Flap Collar	2	12
		BK0583	Feathering Shaft	1	12
		BK0435	Washer, d4xD11x1.7	2	12
		HMC4-8B	Socket Screw, M4x8	2	12

Parts No.	Description	Item No.	Description	quantity	Reference Assemble Step
PV0359	Clutch	BK0170	Shim	1	10
		BV0589	Clutch Bell Set	1	10
		HMC3-10B	Socket Screw, M3x10	2	10
PV0360	Starter Shaft	BK0592	Starter Shaft	1	6
		HME4-5B	Set Screw, M4x5	2	6
		HMS5	E-Clip	1	6
PV0361	Starter Coupling	BK0594	Starter Coupling	1	6
		HME4-5B	Set Screw, M4x5	2	6
PV0363	Fuel Tank	BV0605	Fuel Tank Set	1	6
PV0364	Body	BK0098	Body Clip A	1	20
		BK0099	Body Clip B	1	20
		BK0102	Robber Groment	2	20
		BK0611	Body	1	20
		BK0612	Canopy	1	20
		HMJ2-6B	Selftapping Screw,M2x6	6	20
		HSE3-12B	Selftapping Screw, M3x12	2	20
PV0364-Y	Body (Yellow)	BK0098Y	Body Clip A (Yellow)	1	20
		BK0099Y	Body Clip B (Yellow)	1	20
		BK0102Y	Rubber Groment	2	20
		BK0611Y	Body (Yellow)	1	20
		BK0612	Canopy	1	20
		HSE3-12B	Selftapping Screw,M3x12	2	20
		HMJ2-6B	Selftapping Screw,M2x6	6	20
PV0365	Thrust Brg.	HMX0612	Thrust Bearing	2	12
PV0368	Clutch Liner	BK0590	Clutch Liner	2	5
PV0370	Body Only	BK0098	Body Clip A	1	20
		BK0099	Body Clip B	1	20
		BK0611	Body	1	20
		BK0102	Rubber Groment	2	20
		HSE3-12B	Self Tapping Screw, M3x12	2	20
PV0370-Y	Body Only (Yellow)	BK0098Y	Body Clip A (Yellow)	1	20
		BK0099Y	Body Clip B (Yellow)	1	20
		BK0102Y	Rubber Groment	2	20
		BK0611Y	Body (Yellow)	1	20
		HSE3-12B	Selftapping Screw,M3x12	2	20
PV0372	Thrust Collar	BK0584	Thrust Collar	2	12
PV0373	Clutch Bell Brg	HMV1260ZZY	Bearing, d6xD12xw4	2	5
PV0374	Feathering Brg.	HMV1360ZZY	Bearing, d6xD13xw5	2	12
PV0375	Body Retaining Set	BK0626	Body Mount Nut	2	14
		HME3-18.5B	M3x18.5 Set Screw	2	14
PV0379	Auto Rotation Pully	BK0610	Auto Rotation Pully	1	7
		HMC3-8B	Socket Screw	4	7
PV0380	Pinion Gear (10T)	BK0624	Drive Gear	1	5
PV0381	70 Durometer Flap Damper	BK0586	70 Flap Damper	2	12
PV0440	Metal Frame Spacer(S)	BK0136	Frame Spacer(S)	4	6
		HSA3-10B	Socket Screw, M3x10	8	6
PV0450	SUS Flybar Rod	BK0631	SUS Flybar	1	13
PV0451	Harden Main Shaft	BK0702	Harden Main Shaft	1	10
PV0480	Main Frame Set	BK0058	Frame Spacer(L)	4	6
		BK0059	Frame Spacer(S)	8	6
		BK0599	Main Frame Left Side	1	6
		BK0600	Main Frame Right Side	1	6
		HMC3-20B	Socket Screw,M3x20	4	16

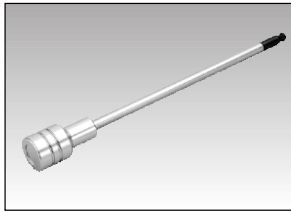
Parts No.	Description	Item No.	Description	quantity	Reference Assemble Step
		HSE3-12B	Self-Tapping Screw,M3x12	24	6
		HMM3Z	Lock Nut,M3	4	16
PV0486	Flybar Seesaw	BK0004	Seesaw	1	13
		HMV830ZZ	BRG,d3xD8xw4	2	13
PV0503	Washout Set	BK0014	Washout Base	1	7
		BK0015	Flybar Control Lever	1	7
		BK0016	Washout Linkage	2	7
		BK0075	Link Ball	2	7
		BK0077	Collar (d3xD4xL6)	2	7
		BK0171	Pin	2	7
		HMC3-10B	Socket Screw,M3x10	2	7
		HMJ2-10N	Selftapping Screw,M2x10	2	7
		HMS15	E Ring	2	7
PV0504	Tail Pitch Slider	BK0025	Tail Pitch Control Fork	1	15
		BK0026	Tail Pitch Control Linkage	2	15
		BK0027	Tail Pitch Control Slider	1	15
		BK0028	Tail Pitch Control Slide Bushing	1	15
		BK0075	Linkage Ball	1	15
		BK0082	Collar (d2xD3xL4)	2	15
		BK0546	Pin (2mm)	2	15
		HMF2-8N	Screw ,M2x8	1	15
		HSE2-10B	Selftapping Screw, M2x10	2	15
		HMS15	E Ring	4	15
		HMV1060ZZY	Bearing(d6xD10xW3)	2	15
PV0505	SUS Link Rod	BK0839	Linkage Rod (L=30)	3	10,19
		BK0840	Linkage Rod (L=46)	3	8,18
		BK0841	Linkage Rod (L=60)	2	19
		BK0842	Linkage Rod (L=76)	2	14
		BK0845	Linkage Rod (L=64)	2	18
PV0506	Clutch Bell	BV0838	Clutch Bell	1	5
PV0507	SUS Tail Control Rod	BK0086	Ball Link	2	18
		BK0105	Tail Control Rod Joint	1	18
		BK0843	SUS Tail Push Pull Rod A	1	18
		BK0861	SUS Tail Push Pull Rod B	1	18
		HME4-5B	Set Screw, M4x5	2	18
PV0508	Decal , R50 Titanium	JV0162	Decal	1	21
PV0509	Pitch Push Pull Lever Set	BK0075	Linkage Ball	5	19
		BK0085	Ball Link	4	19
		BK0086	Ball Link	2	19
		BK0104	Servo Mounting Plate	4	19
		BK0113	Linkage Rod (L=18)	2	19
		BK0833	Servo Block	2	19
		BK0834	Pitch Lever Fixed Plate	1	19
		BK0835	Pitch Push Pull Lever	1	19
		BK0839	SUS Linkage Rod	1	19
		BK0846	Collar (d3xD4x8.5)	1	19
		HMC3-18B	Socket Screw, M3x18	1	19
		HMF2-8N	Screw, M2x8	2	19
		HMJ2-8N	Selftapping Screw, M2x8	3	19
		HML2	Hex Nut, M2	2	19
		HMV740ZZY	Bearing, d4xD7xW2.5	2	19
		HSE2612N	Selftapping Screw, M2.6x12	4	19
		HSE2620N	Selftapping Screw, M2.6x20	4	19

Parts No.	Description	Item No.	Description	quantity	Reference Assemble Step
PV0510	Elevator Push Pull Lever Set	BK0075	Linkage Ball	5	18
		BK0076	Collar (d3xD4xL10)	1	8
		BK0078	Collar (d3xD4xL4)	1	8
		BK0086	Ball Link	4	8,18
		BK0088	Flat Washer	1	8
		BK0104	Servo Mounting Plate	2	18
		BK0833	Servo Block	2	18
		BK0836	Elevator Push Pull Lever	1	8
		BK0845	SUS Linkage Rod (L=64)	2	18
		HMF2-8N	Screw, M2x8	2	18
		HMJ2-8N	Selftapping Screw, M2x8	3	8
		HMJ3-22B	Selftapping Screw, M3x22	1	8
		HML2	Hex Nut, M2	2	18
		HMV740ZZY	Bearing, d4xD7xW2.5	2	8
HSE2620N	Selftapping Screw, M2.6x20	4	18		
PV0511	Metal Rear Servo Tray	BK0104	Servo Mounting Plate	2	18
		BK0837	Metal Rear Servo Plate	1	17
		HMC2516B	Socket Screw, M25x16	4	18
		HMC3-25B	Socket Screw, M3x25	2	17
		HMM25	Lock Nut, M2.5	2	18
		HMM3Z	Lock Nut, M3	1	17
PV0515	Body Support	BK0474	Rubber Cap	2	18
		BK0832	Body Support	1	18
		HNLR6	R Pin	2	18
PV0517	Oneway Bearing Grease	BV0857	Oneway Bearing Grease	1	7
PV0519	Rear Servo Rod	BK0086	Ball Link	2	16
		BK0091	Rod Guide	3	16
		BK0860	Rear Oush Rod, 600mm	1	16
PV0520	Tail Drive Belt ,686XL	BK0858	Belt ,686XL	1	16
PV0521	Aluminum Tail Boom	BK0859	Tail Boom	1	16

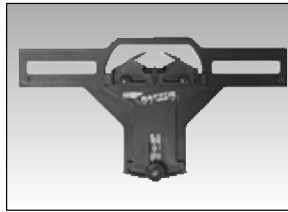
HELICOPTER ACCESSORIES



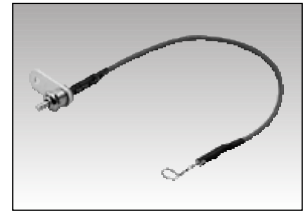
NO. 3800 BLADE SUPPORT



NO. 3801 6MM STARTER EXTENSION



NO. 3802 PRECISION PITCH GAUGE



NO. 3803 REMOTE GLOW ADAPTER

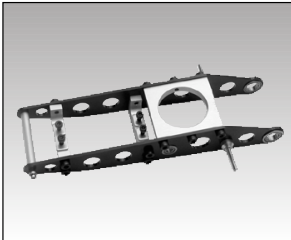


NO. 2000 TERA ON-BOARD DIGITAL TACHOMETER

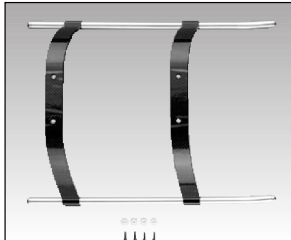


NO. 8000 TG-8000 GYRO

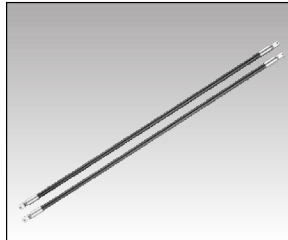
OPTIONAL PARTS



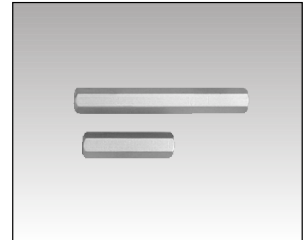
PV0068 ALUM COLL SERVO TRAY



PV0101 CARBON FIBER SKIDS



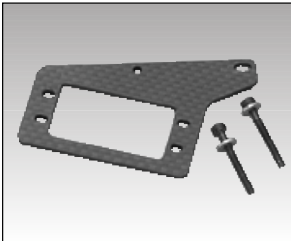
PV0103 CARBON TAIL BOOM BRACE



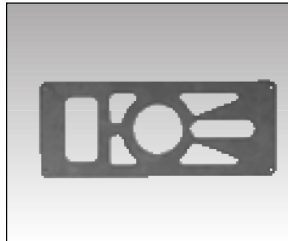
PV0104 ALUMINUM FRAME POST



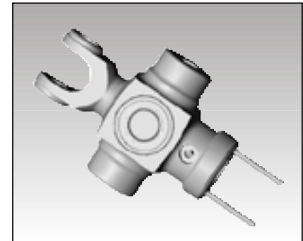
PV0106 COOLING FAN (.50)



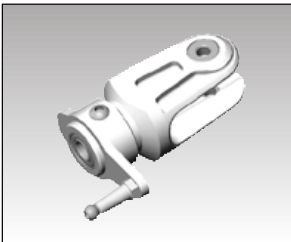
PV0321 REAR MOUNTED TAIL SERVO TRAY



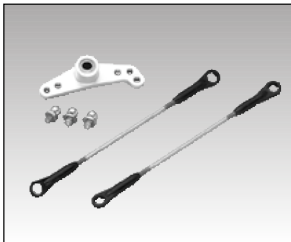
PV0326 CARBON BASE PLATE



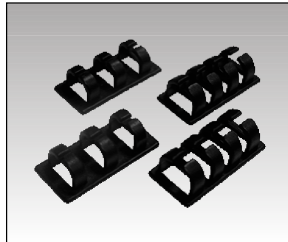
PV0338 METAL MAIN ROTOR HUB



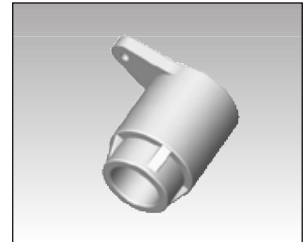
PV0339 METAL MAIN ROTOR GRIP



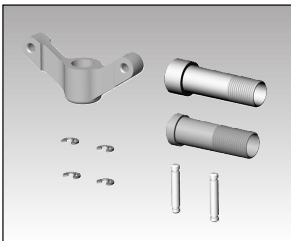
PV0349 PUSH/PULL ELEVATOR LEVER SET



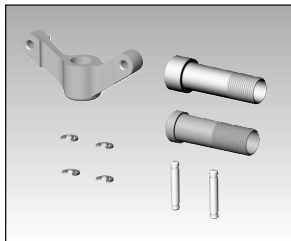
PV0384 WIRE CLAMP



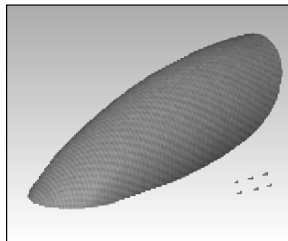
PV0387 HELI THROTTLE LEVER(S)



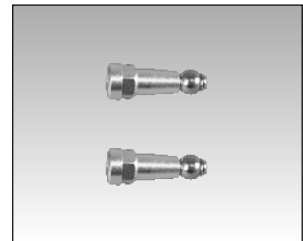
PV0439 M.TAIL Pitch Fork(A1)



PV0439-T M.TAIL Pitch Fork(B1)

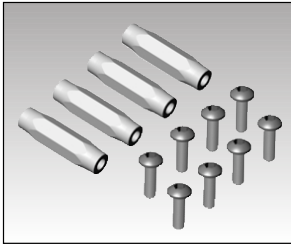


PV0394 SIM-CARBON CANOPY R30 V2

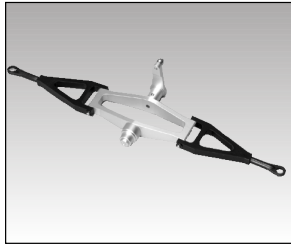


PV0399 MAIN ROTOR GRIP POST

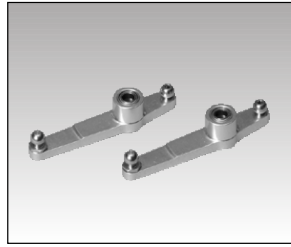
OPTIONAL PARTS



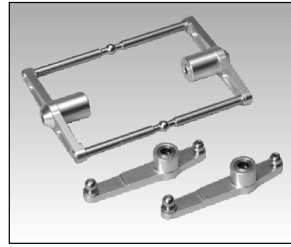
PV0440 METAL FRAME SPACER



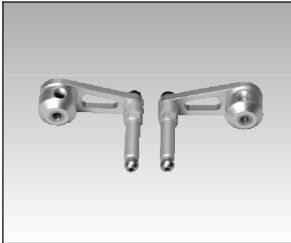
PV0441 METAL ELEVATOR LEVER SET



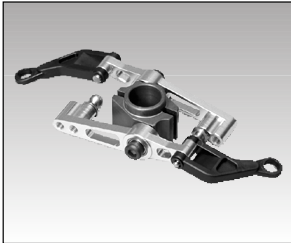
PV0442 METAL MIXING LEVER SET



PV0443 STABILIZER CONTROL SET



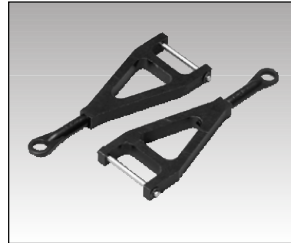
PV0444 FLYBAR CONTROL ARM SET



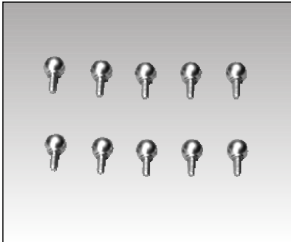
PV0445 METAL WASHOUT ASSEMBLY



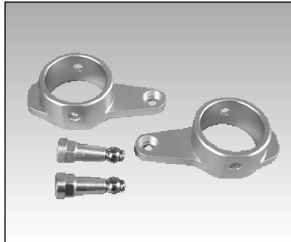
PV0446 METAL AILERON LEVER SET



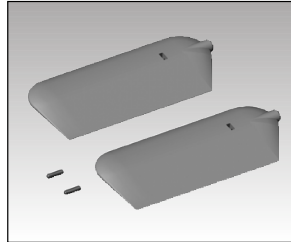
PV0447 ELEVATOR ARM LINK



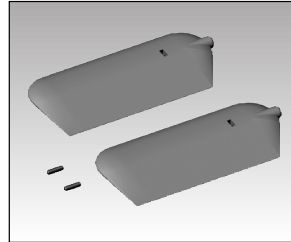
PV0448 SOCKET LINK BALL SCREW



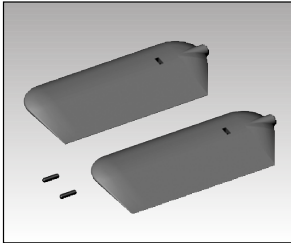
PV0449 ROTOR GRIP PLATE SET



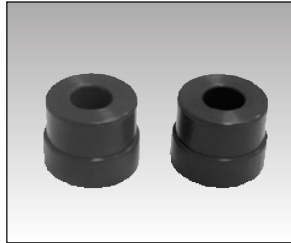
PV0482 Ultra Light Paddle (20g, GREEN)



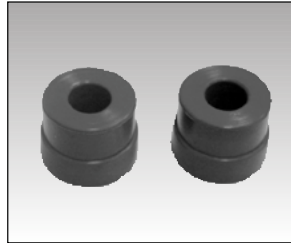
PV0482-R Ultra Light Paddle (20g, RED)



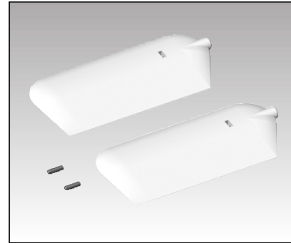
PV0482-L Ultra Light Paddle (20g, BLUE)



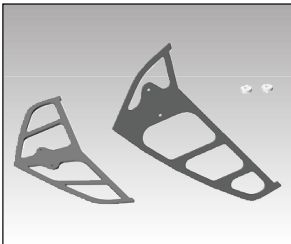
PV0381 FLAP DAPER (BLUE)



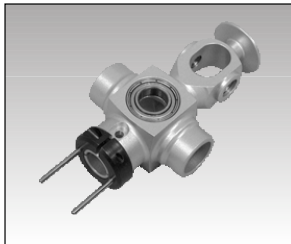
PV0382 FLAP DAPER (RED)



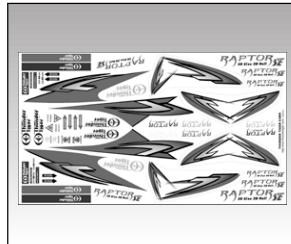
PV0481 LIGHT PADDLE (25g, WHITE)



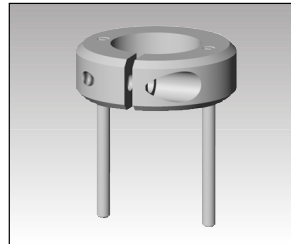
PV0483 CARBON TAIL FIIN SET



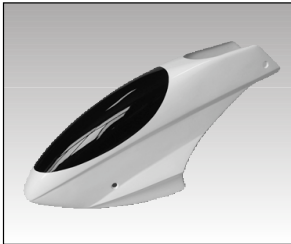
PV0484 M.BUTTON ROTOR HUB



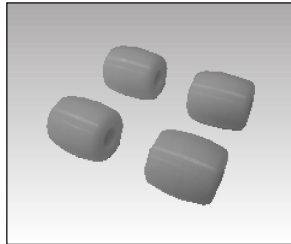
PV0485 DECAL



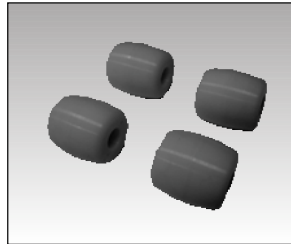
PV0492 ROTOR HUB SLIDER RING



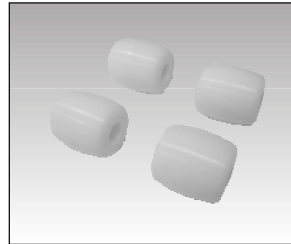
PV0502 3D FIRERGLASS BODY



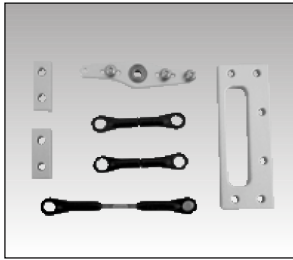
PV0512-Y SKID DAMPER (YELLOW)



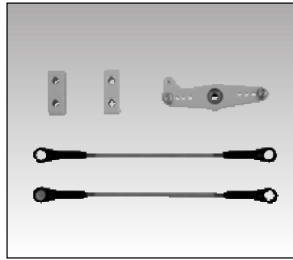
PV0512-L SKID DAMPER (BLUE)



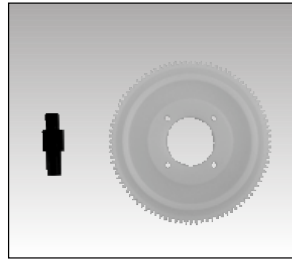
PV0512-W SKID DAMPER (WHITE)



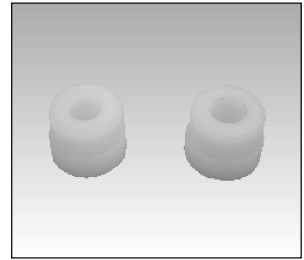
PV0513 METAL PITCH PUSH PULL LEVER



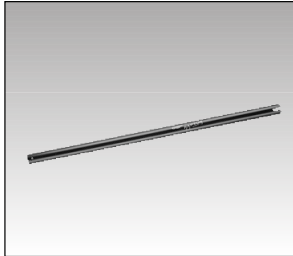
PV0514 METAL ELEVATOR PUSH PULL LEVER



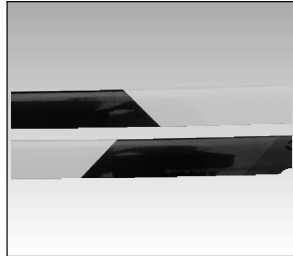
PV0518 OPTIONAL GEAR SET



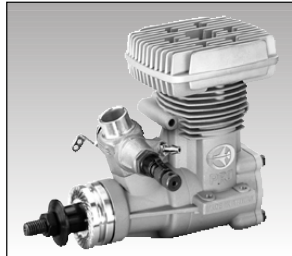
PV0522 POM FLAP DAMPER



PV0523 CARBON TALL BOOM (R50T)



3827 600mm CARBON FIBER ROTOR BLADES
3829 620mm CARBON FIBER ROTOR BLADES

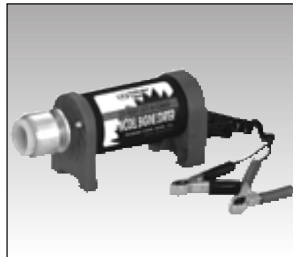


9605 PRO-50H ENGINE

HELICOPTER STARTING EQUIPMENT



2950AC 12V 7AH Sealed Lead Acid
2627 12V 10AH Sealed Lead Acid



2675 12V H.D 180 STARTER



2150 1.8AH GLOW STR-L,110V 2P
2151 1.8AH GLOW STR-L,230V 2P
2152 1.8AH GLOW STR-L,230V 3P



1658 12V FUEL PUMP



1263 Carry master W/ACC,110V
1264 Carry master W/ACC,220V



SPECIFICATION:

Full length of fuselage:1220mm(48.03")

Full width of fuselage:140mm(5.51")

Total height:400mm(15.75")

Main rotor dia:1345mm(52.95") 600mm Blades

Main rotor dia:1385mm(54.53") 620mm Blades

Tail rotor dia:237mm(9.33")

Gear ratio:1:8.5:4.56(STD)

Gear ratio:1:8.73:4.56(OP)

Full Equipped weight:3000g (6.6 lbs)

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