



MD500

Assembly Manual



Specifications:

Fuselage Length (less rotor): 56" (1425mm)
Fueslage Width (less rotor): 23.5" (595mm)
Full Equipped Weight: 13-13.5 lbs (5900-6100g)

Hughes 500 MD Scale Fiberglass Fuselage (TTR3834)

Distributed in North America by Ace Hobby Distributors, Inc. • 2055 Main Street, Irvine, CA 92614

Telephone: 949.833.0088 • www.acehobby.com • E-mail: service@acehobby.com

Warranty

This kit is guaranteed to be free from defects in material and workmanship at the date of purchase. It does not cover any damage caused by use or modification. The warranty does not extend beyond the product itself and is limited only to the original cost of the kit. By the act of building this user-assembled kit, the user accepts all resulting in liability for damage caused by the final product. If the buyer is not prepared to accept this liability, it can be returned new and unused to the place of purchase for a refund.

Notice: Adult Supervision Required

This is not a toy. Assembly and flying of this product requires adult supervision.

Read through this book completely and become familiar with the assembly and flight of this MD-500. Inspect all parts for completeness and damage. If you encounter any problems, call us for help.

INTRODUCTION

Congratulations on the purchase of one of our finest scale heli fuselage to date. This famous Hughes MD 500 (Military Defender), used as an antitank, multi-mission helicopter. Flown extensively during the Vietnam War Era performing multiple missions under extreme conditions.

The venerable MD 500 has been replicated to exhibits this attack helicopters' sleek details. The light fuselage comes factory pre-painted with all necessary hardware. It is very easy to assemble and only takes you few hours of enjoyable installation to put this scale body on your helicopter.

This replica MD is just like a real thing, hovering this MD that will definitely make you stand out on the flying field.

PRE-ASSEMBLY NOTES

Before beginning the assembly read the instructions thoroughly to give an understanding of the sequence of steps and a general awareness of the recommended assembly procedures.

By following these instructions carefully and referring to the corresponding pictures, the assembly of your model will be both enjoyable and rewarding. The result will be a well built, easy to assemble scale model, which you will be proud to display.

This MD-500 is designed for intermediate to advanced pilots, and this manual assumes a basic knowledge of R/C model construction.

Before your assembly

1. Before you start to assemble this fuselage on your helicopter, we suggest you to first fine tune your helicopter in the air.
2. Double-check all screws, then secure and Loctite all the loose screws.
3. The instruction manual is written for Raptor, if user should choose to install it on other branded helicopters, then we would suggest to study thoroughly first the manual to see how it is installed on a Raptor.

Before you begin, check the entire contents of your kit against the parts list and photos to make sure that no parts are missing or damaged. This will also help you to become familiar with each component of your model. If you find that any of the parts are either missing or damaged, (Customers in North America) please contact Ace Hobby Distributors, Inc., Customer Service immediately for replacements.

Please read the entire manual before beginning construction.

Neither your dealer nor Ace Hobby Distributors, Inc., can accept kits for return if construction has begun.

Trial fit each part before gluing it in place. Make sure you are using the correct part and that it fits well before assembling. No amount of glue can make up for a poor-fitting part.

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RECOMMENDED TOOLS & MATERIALS

Adhesives:

- Instant setting Cyanoacrylate adhesive (thin CA)
- Slow setting Cyanoacrylate adhesive (thick CA)
- 10 Minute Epoxy (fast)
- 20-30 Minute Epoxy (slow)

Tools:

- Model knife, 1/2" MASK tape
- Small screwdrivers, medium screwdrivers
- Scissors
- Long nose pliers and diagonal cutting pliers
- Drill and drill bits (1/16", 5/64")
- 150 grid sand paper
- Fine felt tip pen and soft lead pencil
- Reamer

R/C System:

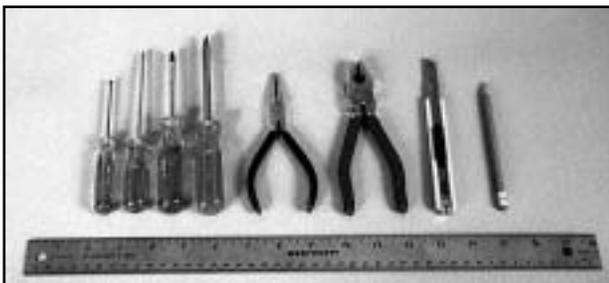
- 6 Channel Heli radio
- GYRO system

Helicopter:

- Raptor 60~90 Suggested

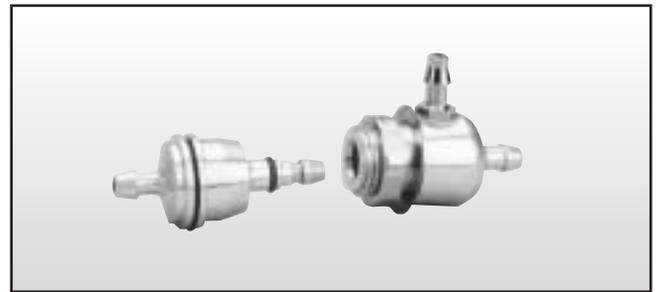


Adhesives - You will need two types of adhesives for the MD-500 - Epoxy and Instant (cyanoacrylate) adhesives. We recommend that you purchase both 5-minute and 30-minute epoxy to cut down on assembly time, but you can get by with only 30-minute epoxy if time is not important. You will also need a small bottle of both "Thick" and "Thin" instant CA adhesive.



Tools - Model assembly can be much easier if the proper tools are used. Therefore, we have included in our checklist to the left, a complete listing of all the tools we used to assemble our prototype models. As you will notice, many household tools can be utilized during construction.

ITEMS YOU MAY NEED



TTR1115 - Precision Fueler Valve



TTR2174 - Built in Glow Plug Extension Wire

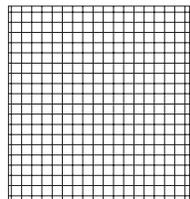
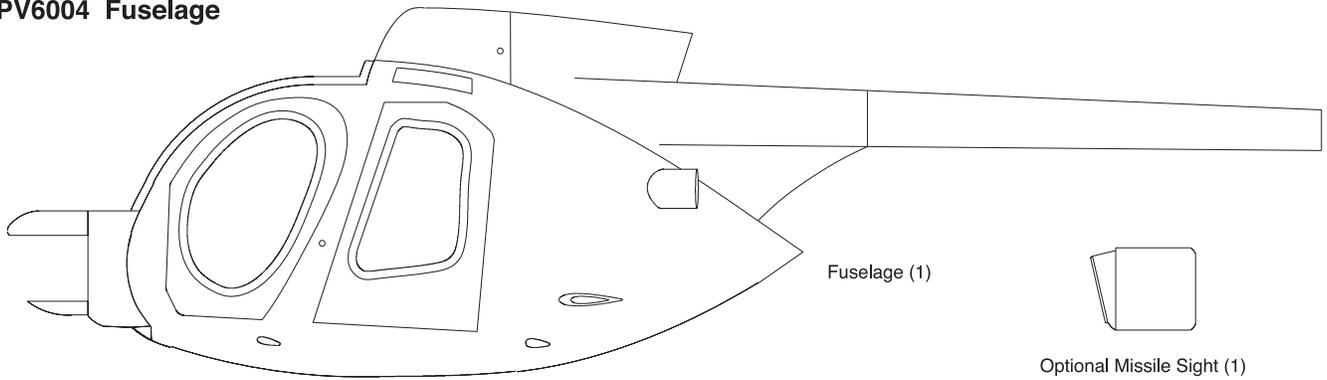


TTR4870 - Paptor 60



TTR4890 - Paptor 90

PV6004 Fuselage



Fiberglass Cloth (1)



Silicon Grommet (4)



2 x5mm Wood Screw (14)



Tail Boom Foam Retainer (1)



M4 Washer (4)



Strut Rubber (4)



Round Plywood (S,2)



Round Plywood (L,2)



4x10mm
Button Head Screw (4)



Plastic Tube (1)



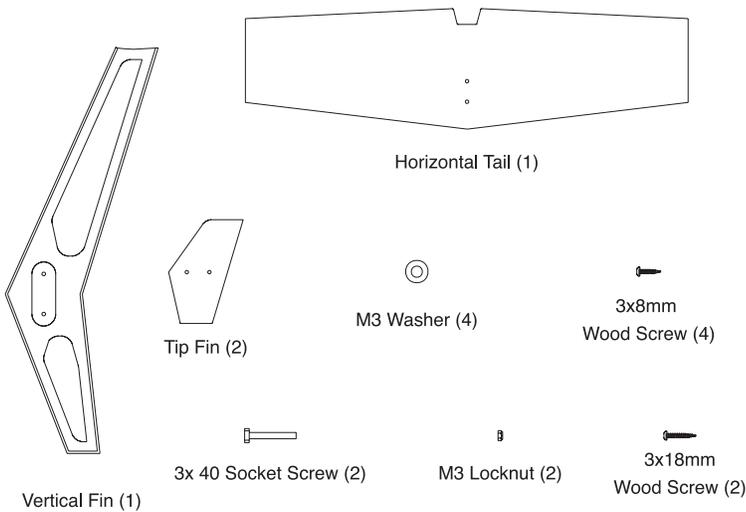
Laser Range Finder (1)



FLIR (Infrared) (1)

Optional Missile Sight (1)

PV6006 Tail Set



Vertical Fin (1)

Horizontal Tail (1)

Tip Fin (2)

M3 Washer (4)

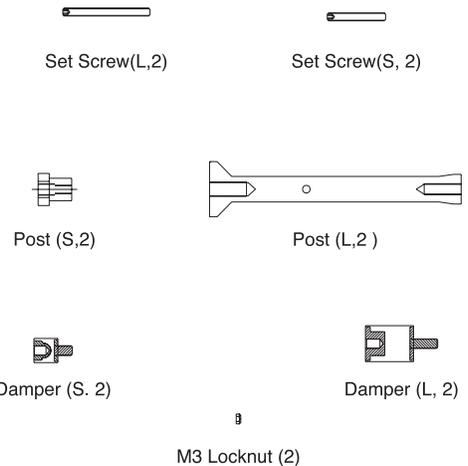
3x8mm
Wood Screw (4)

3x 40 Socket Screw (2)

M3 Locknut (2)

3x18mm
Wood Screw (2)

PV6010 Body Retainer



Set Screw(L,2)

Set Screw(S, 2)

Post (S,2)

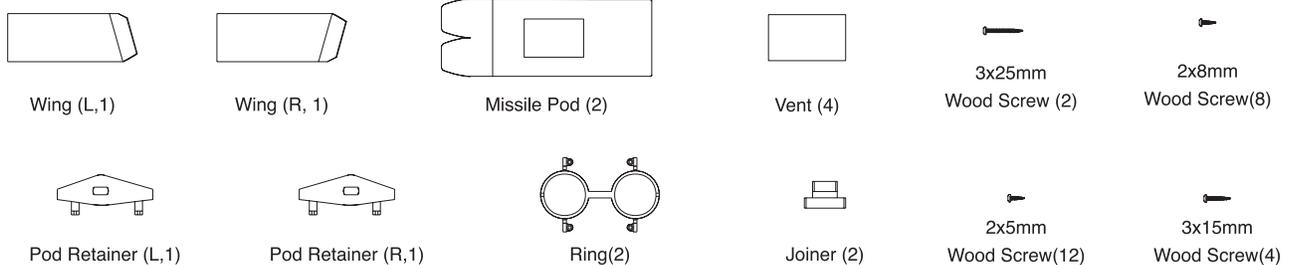
Post (L, 2)

Damper (S. 2)

Damper (L, 2)

M3 Locknut (2)

PV6007 Missile Set



Wing (L,1)

Wing (R, 1)

Missile Pod (2)

Vent (4)

3x25mm
Wood Screw (2)

2x8mm
Wood Screw(8)

Pod Retainer (L,1)

Pod Retainer (R,1)

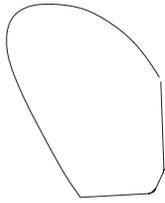
Ring(2)

Joiner (2)

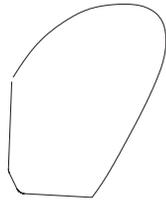
2x5mm
Wood Screw(12)

3x15mm
Wood Screw(4)

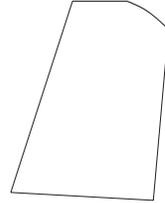
PV6005 Windshield



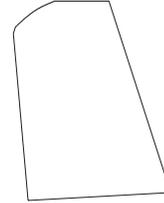
Right Front Window (1)



Left Front Window (1)



Left Rear Window (1)



Right Rear Window (1)



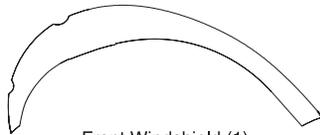
Missile Sight Lens (1)



Right Top Window (1)



Left Top Window (1)



Front Windshield (1)



2x5 mm Screw (16)



M2 Nut (16)



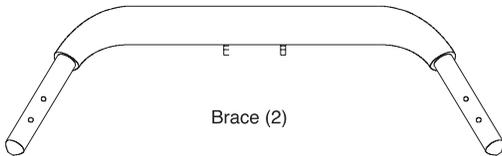
2x5 Wood Screw (44)

PV6011 Decal

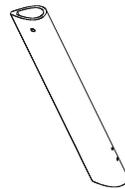


Decal (1)

PV6008 Landing Skid



Brace (2)



Al. Strut (4)



Skid Joiner (R, 2)



Skid Joiner (L, 2)



End Cap (4)



Skidpipe (2)



3x3mm Set Screw (4)



2.6x 14mm Socket Screw (8)



2.6x10mm Self Tapping Screw (4)

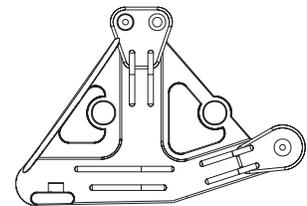


3x 30 Socket Screw (4)

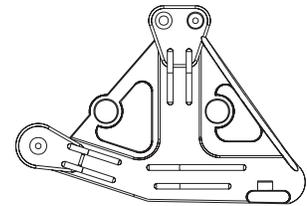


M3 Locknut (4)

PV6009 Rear Frame Set



Rear Frame (R, 1)



Rear Frame (L, 1)



Washer (4)

PARTS CHECK LIST



Kit Contents:

Fuselage

- Fuselage (1)
- Missile Sight (1)
- Round Plywood (S,2)
- Round Plywood (L,2)
- Laser Range Finder (1)
- FLIR (infrared) (1)
- Tail Boom Foam Retainer (1)
- M4 Washer (4)
- Silicon Grommet (4)
- Strut Rubber (4)
- 2 x5mm Wood Screw (10)
- Plastic Tube (1)
- Fiberglass Cloth (1)

Tail Set

- Vertical Fin (1)
- Horizontal Tail (1)
- Tip Fin (2)
- 3x 40 mm Socket Screw (2)
- 3x18mm Wood Screw (2)
- 3x8mm Wood Screw (4)
- M3 Washer (4)
- M3 Locknut (2)

Missile Set

- Wing (L,1)
- Wing (R, 1)
- Missile Pod (2)
- Pod Retainer (L,1)
- Pod Retainer (R,1)
- Ring(2)
- Joiner (2)
- Vent (4)
- 3x25mm Wood Screw (2)
- 3x15mm Wood Screw(4)
- 2x8mm Wood Screw(8)
- 2x5mm Wood Screw(12)

Body Retainer

- Post (L,2)
- Post (S,2)
- Set Screw(L,2)
- Set Screw(S, 2)
- Damper (L, 2)
- Damper (S. 2)
- M3 Locknut (2)

Windshield

- Front Windshield (1)
- Right Front Window (1)

- Left Front Window (1)
- Right Rear Window (1)
- Left Rear Window (1)
- Right Top Window (1)
- Left Top Window (1)
- Missile Sight Lens (1)
- 2x5 mm Machine Screw (16)
- M2 Nut (16)
- 2x5 mm Wood Screw (48)
- Mask Tape (1)

Landing Skid

- Brace (2)
- Al. Strut (4)
- Skid Joiner (R, 2)
- Skid Joiner (L, 2)
- End Cap (4)
- 3x 30 mm Socket Screw (4)
- 3x3mm Set Screw (4)
- 2.6x 14mm Self Tapping Screw (8)
- 2.6x10mm Self Tapping Screw (4)
- M3 Locknut (4)

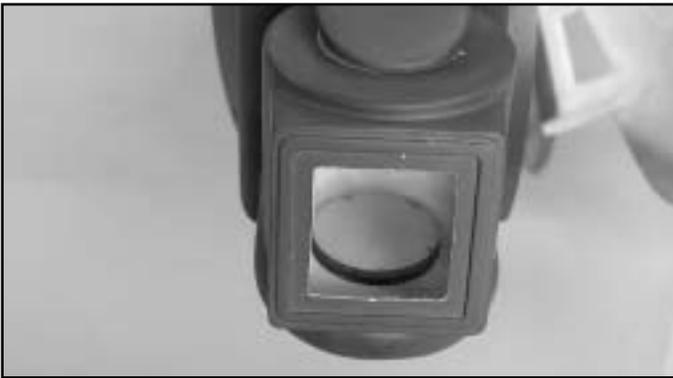
Rear Frame Set

- Rear Frame (L, 1)
- Rear Frame (R,1)
- Washer (4)

Assembly



1. Locate four Round Plywood pieces, glue the same sized pieces together as shown.



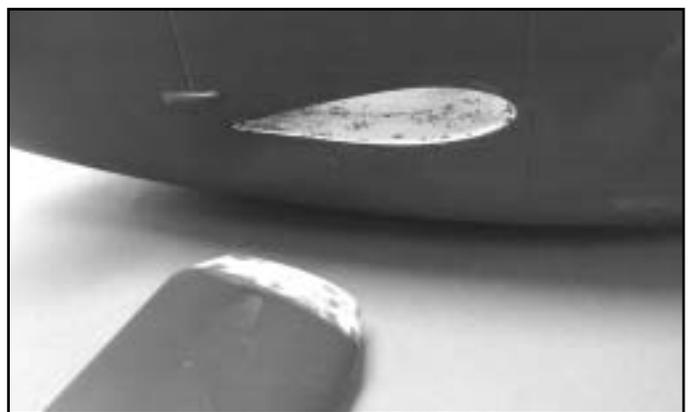
2. Position the OMS (Optical Missile Sight) in place then epoxy the two doubled round plywood inside the OMS. Glue one side first then the other. Make sure the OMS can be rotated. You may install a micro camera or servo making sure that it can really do a mission at your command. If not, then you can just epoxy the OMS in place firmly.



3. Locate the Sight Lens, position it in place, then drill 1/16" (1.5mm) holes at the four corners. Secure the lens in place with four 2x5mm Wood Screws.



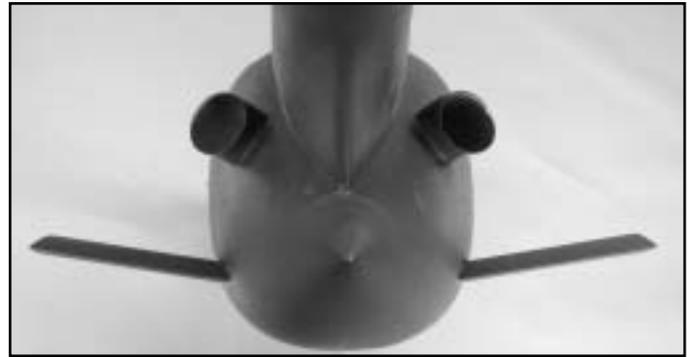
4. Note the orientation of the wing tip and trail making sure it can fit two Wings in the wing mount. Ascertain the two wings are at same dihedral angles and the trailing/leading edge of two wings are in line with each other. Adjust it until you obtain a satisfactory result, then use pencil to make marks on the wing at both sides as guidelines.



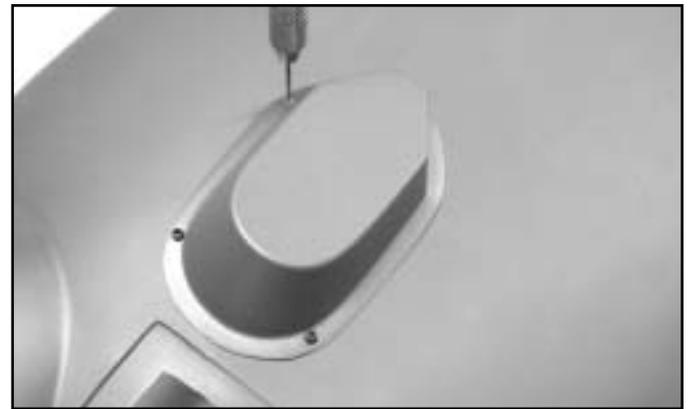
5. Remove the Wing to sand away the paint base on the guideline you drew, this is the glue area that you could sand with 150 grid sand paper to enhance the adhesion. Remove the paint in the wing mount, you may use hobby knife to scratch the surface in the well.



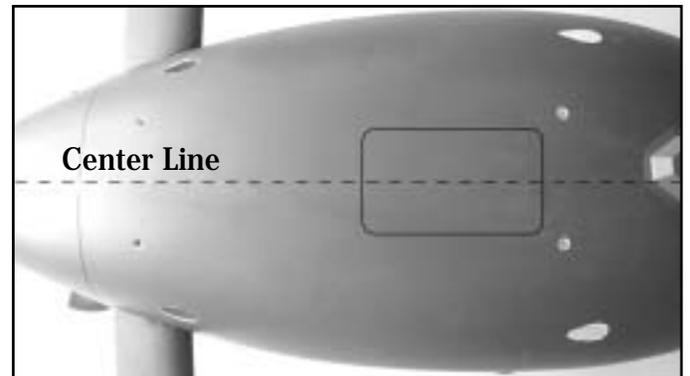
6. Fit the wing in place again, drill two 5/64"(2mm) holes through the wing mount to the wing from the inside of the fuselage. Remove the wing again, apply epoxy at glue area and secured it with two 3x15mm Wood Screws. Either wipe off the excess epoxy or use masking tape to tape the guideline to keep the wing clean after the masking tape removal.



7. Repeat the same procedure on the other wing, make sure the two wings are at same dihedral angles. If you see from the top the trailing/ leading edge should be in line with each other.



8. Locate the Laser Range Finder, position it right after the Windshield at the center bottom of fuselage. Drill 1/16"(1.5mm) holes and secure it with six 2x5mm Wood Screws.



9. Locate the molded marks for landing strut and engine cooling openings at the bottom of the fuselage. Note these marks are only for reference of Raptors, shall you install it on other branded helicopters then you will have to find out the correct opening position for landing strut before you drill or trim the fuselage.

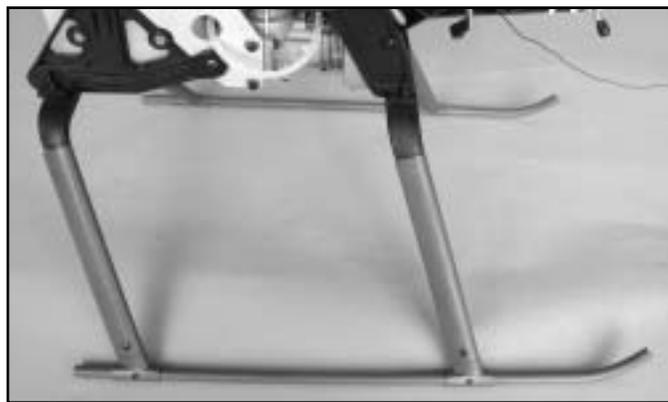
Note: For Raptor Owners, it is recommended to offset by 2mm to the center line when you trim the landing skid opening. This will get more space between the collective pitch frame and windshield where servo horn and ball link might contact.



10. Locate four Rubber Rings, trim away the flashing and center portion. Place the Rubber Rings at the four landing strut openings. It might be necessary to trim the opening larger to fit the rubber ring with the inserted Aluminum strut. For the rear strut opening, you may cut the ring for easier access.



11. Put the scale fuselage aside for a moment and get your heli prepared. For Raptor owners, please remove the Landing Skid, Muffler, Tail Fins, Boom Supports and Tail Rotor Assembly. Locate the new Rear Frames, which are specially designed for this MD fuselage. Use the new washers and secure the Rear Frame in place with the same screws you used previously. Also use the same screw and locknut to secure the Rear Frame at the tail boom mounting hole. Use the same Tank Rubber grommets and install the Fuel Tank.



12. Assemble the Landing Skid as shown. Temporarily install the Brace under the side frame. Adjust the Landing Skid as shown and make sure it sits on the table firmly. Secure the Joiner & Skid Pipe with the furnished 3x3mm Set Screws. Do not over-tighten the setscrews; just make sure the skid pipe will not rotate. Then secure the Joiner and the Aluminum Strut with 2.6x10mm Self-Tapping Screws.



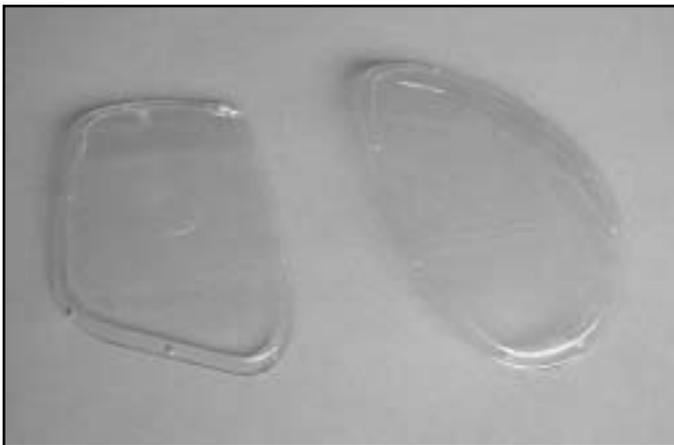
13. Remove the landing skid assembly from Heli. Remove the brace from the aluminum strut. Do not remove the strut and skid pipe as they are already adjusted and secured. Apply masking tape on the strut that is going to make contact with the fuselage, since the masking tape will protect the paint from scratching. Place the brace on the fuselage and install the strut and skid pipe onto the brace. You may apply Vaseline on rubber ring to increase the lubrication for easier installation.



14. Secure the Aluminum Strut and Brace with 2.6x14mm Socket Screws. Hint: Install the left Aluminum Strut Assembly and Brace first (Left side is the side of the fuselage with Optical Missile Sight). Pull the brace out and secure the socket screws then push it back and pull the right side out then install the right aluminum strut assembly.



16. Trial sit on the landing skid assembly. For Raptor owner, position the Front Windshield in place and check if the ball links on aileron servo horn contacts the front windshield when it is in maximum positive pitch. Lower the Raptor by enlarging the landing strut opening to the fuselage center liner if the servo horn contacts the windshield. It might be necessary to try several times before obtaining a desirable result.



15. Before fitting your helicopter into the fuselage, you may trim all Windows and trails to better fit them into the fuselage. It might be necessary to trim the FRP fuselage to match the windows as well. Once you obtain satisfactory result, proceed to drill 1/16"(1.5mm) openings through the fiberglass the fuselage and window and secure the window with 2x5mm Wood Screws. After finishing all the windows, remove all the windows and clean the inside fuselage entirely. (You can skip the rear side window for easy operation)



17. If you use Raptor 60 then it is required to trim off the fuselage tail for about 1"(2.5cm). However, it is not necessary for those using the 80/90 conversion kit, R90 STD Kit or R90 SE Kit since the tail gear case is longer than the fuselage tail. Install the tail rotor assembly in place and check if holes on the landing brace matches the side frame landing skid-mounting holes. If it cannot reach the holes then trim the tail until it is able to do so. Unthread the ball link, insert a Plastic Tube then thread the ball link back to pushrod at the original position.



18. Remove the tail rotor assembly once again and proceed to extract the Raptor from fuselage. Replace a M3 Locknut from the old body post. Remove the socket screws and replace the long setscrews, then secure the new retaining post in place. The upper post goes with long setscrew and the lower post goes with short setscrew. Remember to apply Loctite then secure the posts firmly. Place the Raptor into the fuselage again, the long post should be located between front and rear window where we will drill hole later. If not, try to move the Raptor backward by trimming the strut opening and trial fit it again.



19. Locate a sponge as the Tail Boom Retainer, install the sponge on the tail boom section where the plastic tube for the sponge insertion. Be careful not to apply any glue inside the plastic tube and make sure the pushrod can

move freely. Push the sponged tube into the fuselage tail and make sure there is no binding of the pushrod movement and the heli sit on the landing brace just right. Glue the sponge inside the fuselage tail with CA.

Note: do not glue sponge and tail boom in case you had to remove the heli from fuselage. Install the tail rotor assembly in place firmly and snap on the ball link.



20. Secure the helicopter onto the landing brace with four 3x30mm Socket Screws and M3 Locknuts. Secure the rear brace first then the front.



21. Secure the Vertical Fin in place with two 3x40 Socket Screws, two M3 Washers and two M3 Locknuts.



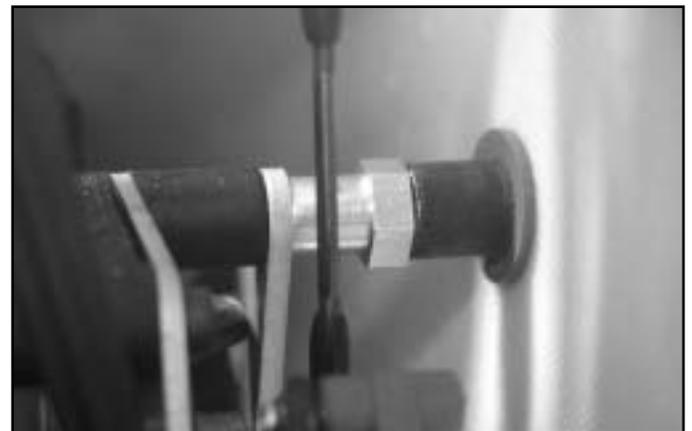
22. Trial fit the Horizontal Tail onto the vertical fin, note that flat surface should be facing up and the other side with the air foil facing down. It might be necessary to file/sand the contact area on the vertical fin so that they make perfect contact. Apply epoxy at the contact area and make sure it is perpendicular after securing it with two 3x18mm Wood Screws and two M3 Washers. Secure two vertical Tip Fins onto horizontal tail with four 3x8mm Wood Screws.



23. Install the big Damper in place as shown then drill 3/8" (9mm) hole. Never drill the hole on the molded mark as it is only for reference, please drill the hole and aim to the damper screw hole.



24. Remove the damper temporarily and insert the Silicon Grommet from the inside fuselage then re-install the damper again. Note the bigger diameter side should be facing the Damper. Secure the fuselage with 4x10mm Button Head Screw and M4 Washer. Do the same procedure at the other side.



25. Locate the small Damper and do the same way you did for the last two steps.



26. Secure the fuselage with 4x10mm Button Head Screw and M4 Washer as shown.



27. Locate the FLIR and place it at the center of the tail section either at the top or bottom. Drill four 1/16" (1.5mm) mounting holes and secure the FLIR with four 2x5mm Wood Screws.



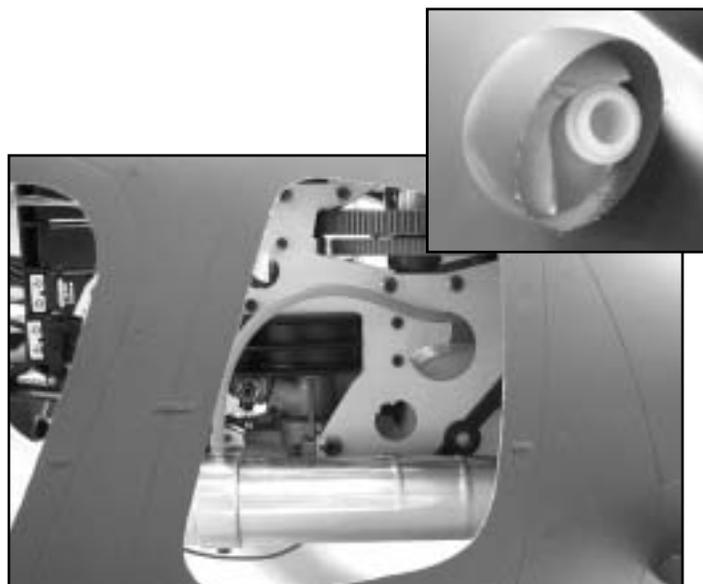
28. Locate the Pod Retainer and center it on the missile pod (the missile pod with square molded line should face down). Drill 1/16" (1.5mm) holes then secure it with 2x8mm Wood Screws. Note the orientation of the retainer.



29. Locate the Vents (fiberglass tube) and rings, position the two vents at the tail of missile pod then secure the ring on the tail with four 2x5mm Wood Screws. The vents should stay firmly in the place. Drill 1/16" (1.5mm) holes on the vent then secure the vent firmly with 2x5mm wood screw.



30. Locate the Joiner and insert it into the pod retainer, next trial fit the missile pod assembly onto the wing. Make sure two missile pod are angled just right, if not then trim it until it will. Remove the missile pod assembly then apply epoxy at the joint area in the wing then secure the wing with 3x25mm Wood Screw. Make sure again that the two missile pods are at same angle.



31. Install the muffer on the Raptor and try to install a diverter. It is recommended to drill an exit hole at the bottom of the fuselage and it will enable your beautiful MD to be less oily. If you do not care about the smoke oil then you may customer built a Y splitter and exhaust at the two exhaust vent to obtain a more scale-like look.



32. You will have to install the remote glow plug adaptor (TTR3803). With the opening for engine cooling located at the bottom of the engine, you can either use the glow starter from the opening or install a Built in Glow Plug Extension Wire (TTR2174) and secure the connector on the fuselage for easy glow ignition. Also suggested is the use of Precision Fueler Valve (TTR1115) which is very convenient for both re-fueling or de-fueling and could filter the fuel when fueling.



33. Install all the windows on. It is recommended to secure the front windshield first then the front side windows. You may skip the installation of the rear side windows, as it is easier for you in case of tuning engine or adjustment. Shall you decide to install the rear side window then you might need to cut a hole for your index finger's insertion allowing easier securing of the windows. Remember if rear windows are installed, a needle valve extension and a small hole for tuning the mixture metering screw (idle screw) are required. Even the RX battery on/off switch should be installed on fuselage.

Test Flight

1. When hovering you MD, try to keep rotor speed at approximately 1350~1400 RPM. The higher RPM will cause vibration at the small tip fins.
2. Check the helicopter and fuselage to see if there is any loose screw after each flight.
3. It is easy to get nose up in speed flight, please trim the elevator down when switch on the Idle. Suggest to off set at about 15%~20%.





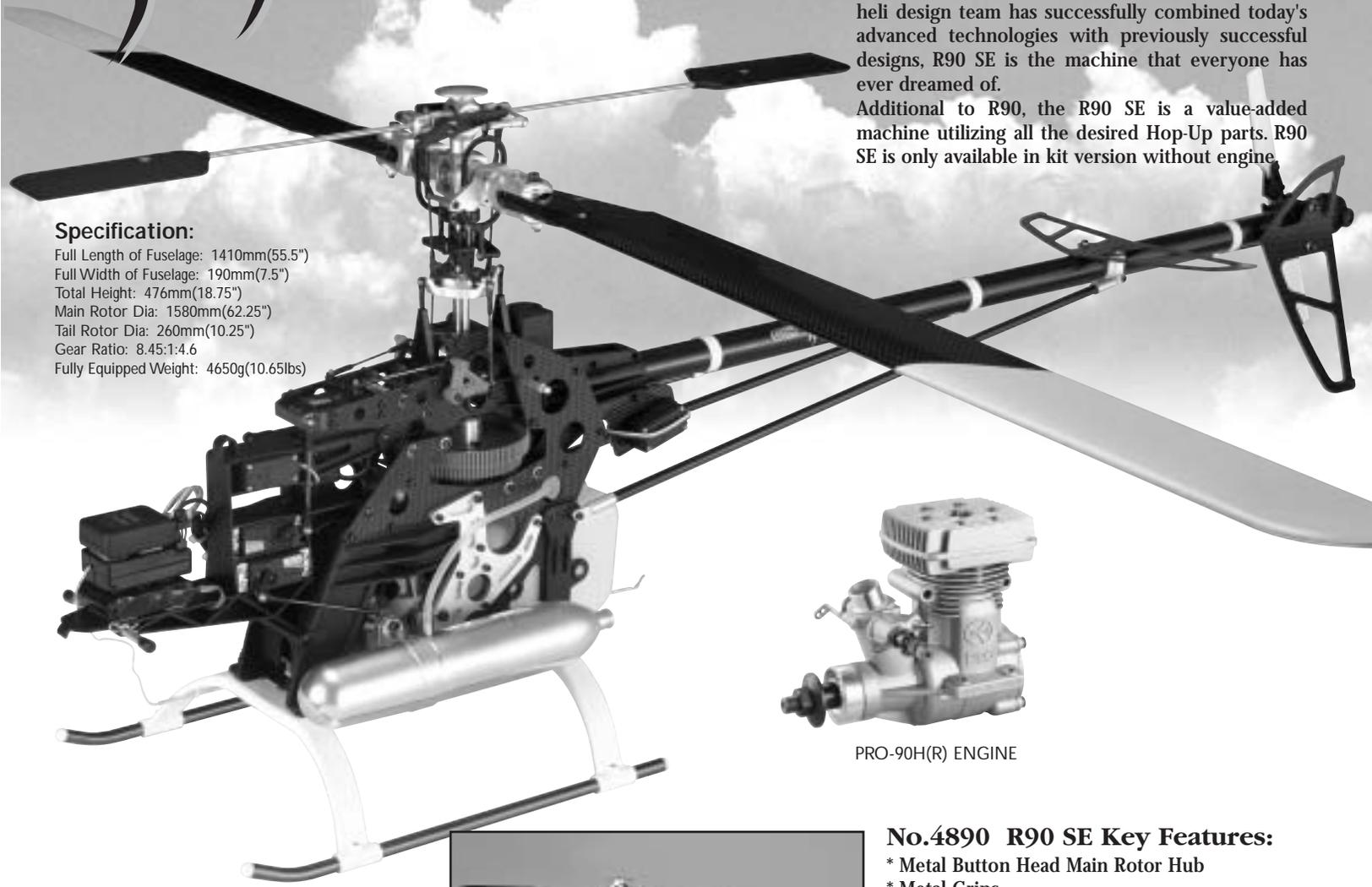
RAPTOR SE

90 CLASS RC HELI

Introducing the pinnacle heli of the Raptor family, the RAPTOR 90 SE. Designed and engineered by the world-renowned F3C champion Mr. Shigetada Taya. Thanks to all the feedbacks provided by Raptor owners and customers worldwide, Thunder Tiger heli design team has successfully combined today's advanced technologies with previously successful designs, R90 SE is the machine that everyone has ever dreamed of. Additional to R90, the R90 SE is a value-added machine utilizing all the desired Hop-Up parts. R90 SE is only available in kit version without engine.

Specification:

Full Length of Fuselage: 1410mm(55.5")
 Full Width of Fuselage: 190mm(7.5")
 Total Height: 476mm(18.75")
 Main Rotor Dia: 1580mm(62.25")
 Tail Rotor Dia: 260mm(10.25")
 Gear Ratio: 8.45:1:4.6
 Fully Equipped Weight: 4650g(10.65lbs)



PRO-90H(R) ENGINE



No.4890 R90 SE Key Features:

- * Metal Button Head Main Rotor Hub
- * Metal Grips
- * Metal Swashplate
- * Metal Washout Base
- * Metal Side Frame Stiffener
- * Metal Cooling Fan
- * Metal Fork
- * Metal Upper/Lower Bearing Block
- * Metal Elevator Control Lever
- * Metal Flybar Control Arm
- * Carbon Graphite Collective Control Arm Set
- * Carbon Side Frames
- * Carbon Tail Fins
- * Carbon Tail Boom
- * Carbon Tail Boom Support
- * Carbon Torque Tube
- * 550 cc Fuel Tank
- * Header Tank
- * New Decal