

Ultimate - 90



0.91 cu.in. displacement 4-stroke
Radio required : 4 channels, 5 servos airplane radio

Specifications

Wing Span	49 in / 1240mm
Wing Area	818sq in / 52. 8 sq dm
Flying Weight	8. 1 lbs / 3700 g
Fuselage Length	52. 5 in / 1330 mm

* Specifications are subject to change without notice.*

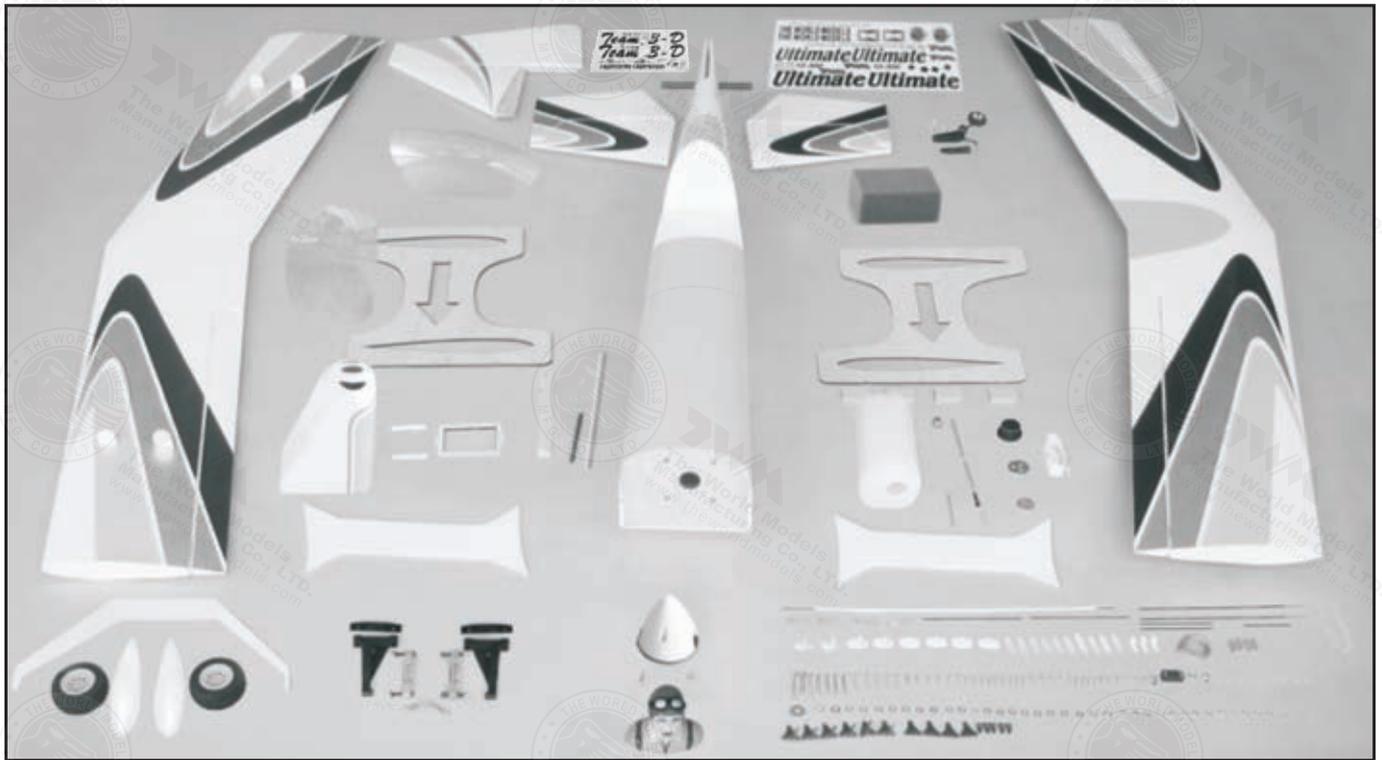
Warning !This model is not a toy.

It is designed for maximum performance. Please seek advice if one is not familiar with this kind of engine powered precision model. Operating this model without prior preparation may cause injuries. Remember, safety is the most important thing. Always keep this instruction manual at hand for quick reference.



TWM
The World Models
Manufacturing Co., LTD.
www.theworldmodels.com

FACTORY PRE-FABRICATED
 ALMOST-READY-TO-FLY (ARF) SERIES
 MADE IN CHINA



Parts List

1. MAIN WING (Lower) — 1 pc.
 2. SCREW PM2x20mm — 6 pcs
STRAPER — 2 pcs
CLEVIS — 2 pcs
FUEL TUBE $\varnothing 6 \times 5$ mm — 4 pcs
TRI-HORN M3x14mm (L) — 2 sets
PUSHROD $\varnothing 1.8 \times 70$ mm w/Threads (For Aileron) — 2 pcs
WOOD BLOCK 9x10x21mm (For Aileron) — 2 pcs
 3. MAIN WING (Upper) — 1 pc.
 4. STABILIZER & ELEVATOR — 1 set
FUSELAGE — 1 pc.
STABILIZER TUBE 9.6x250mm — 1 pc.
SCREW PWA3x12mm — 2 pcs
WIRE $\varnothing 3 \times 141$ mm — 1 pc.
 5. VERTICAL FIN & RUDDER — 1 set
 6. TAIL LANDING GEAR — 1 set
WHEEL $\varnothing 25$ mm — 1 pc.
COLLAR 2.6mm w/set screw — 1 set
SCREW PA3x12mm — 2 pcs
 7. SCREW PM2x20mm — 3 pcs
M2 NUT — 3 pcs
FUEL TUBE $\varnothing 6 \times 5$ mm — 2 pcs
CLEVIS — 2 pcs
WIRE $\varnothing 1 \times 534$ mm (For Rudder) — 2 pcs
TRI-HORN M3x22mm (L) (w/o Base For Rudder) — 2 sets
RIGGING COUPLER $\varnothing 1.8 \times 27$ mm w/Threads (For Rudder) — 2 pcs
COPPER TUBE d2.5xD3.2x8mm (For Rudder) — 2 sets
 8. SCREW PM2x20mm — 6 pcs
FUEL TUBE $\varnothing 6 \times 5$ mm — 2 pcs
CLEVIS — 2 pcs
TRI-HORN M3x22mm (L) — 2 sets
PUSHROD $\varnothing 1.8 \times 480$ mm w/Threads (For Elevator) — 2 pcs
 9. MAIN LANDING GEAR — 1 pair
WHEEL PANTS — 1 pair
SCREW PM5x50mm — 2 pcs
M5 NUT — 2 pcs
M3 NUT — 2 pcs
NYLON BOLT M3x18mm — 2 pcs
PLASTIC COLLAR d5.1xD9x3mm — 2 pcs
SCREW PM4x16mm — 4 pcs
WASHER d4xD9mm — 4 pcs
WASHER d5xD12mm — 2 pcs
WHEEL $\varnothing 76$ mm — 2 pcs
COLLAR $\varnothing 5.1$ mm w/set screw — 4 sets
 10. ENGINE MOUNT PL5111080 — 1 set
SCREW PM4x30mm — 4 pcs
WASHER d4xD12mm — 4 pcs
 11. FUEL TANK 450cc — 1 set
BALSA 8x8x129mm (For Fixing Fuel Tank) — 1 pc.
 12. LINKAGE CONNECTOR $\varnothing 2.1$ mm — 1 set
 13. THROTTLE PUSHWIRE $\varnothing 1.2 \times 480$ mm — 1 set
w/Plastic tube d2xD3x370mm — 1 pc.
ALUMINUM PLATE (For Engine Mount) — 1 pc.
 14. FUEL TUBE $\varnothing 6 \times 5$ mm — 1 pc.
STRAPER — 1 pc.
PUSHROD CONNECTOR — 1 set
PUSHROD $\varnothing 1.8 \times 70$ mm (For Elevator Servo) — 1 pc.
COPPER TUBE d2.5xD3.2x8mm (For Rudder) — 2 pcs
RIGGING Z BEND $\varnothing 1.8 \times 27$ mm (For Rudder) — 2 pcs
PLYWOOD 5x61x121mm (For Rudder Servo) — 1 pc.
BALSA 6x6x61mm (For Rudder & Elevator Servo Stand) — 4 pcs
PLYWOOD 5x61x126mm (For Elevator and Throttle Servo) — 1 pc.
SPONGE 60x70x120mm — 1 pc.
 15. CANOPY — 1 pc.
SCREW PM3x16mm — 2 pcs
WASHER d3xD7mm — 2 pcs
SCREW PWA2.3x8mm — 4 pcs
DOUBLE-SIDED TAPE — 1 pc.
SILICON GROMMET d1.5xD6.5mm — 4 pcs
PILOT PC001085A/B — 1 set
 16. COWLING — 1 set
TRANSPARENT DUMMY COWLING — 1 pc.
SPINNER $\varnothing 62$ mm (w/alu.back plate) — 1 set
SCREW PWA2.6x12mm — 4 pcs
SILICON GROMMET d1.5xD6.5mm — 4 pcs
 17. SCREW PM4x40mm — 1 pc.
SCREW PM4x30mm — 2 pcs
WASHER d4xD15mm — 3 pcs
 18. PLYWOOD 6x133x243mm (Side Cabane) — 2 pcs
PLYWOOD 6x20x36.6mm — 4 pcs
CENTER WING CABANE — 1 set
PLYWOOD 3x282x309mm (Wing Incidence Angle Template) — 2 pcs
SCREW PM3x16mm — 13 pcs
SCREW PM3x20mm — 1 pc.
WASHER d3xD7mm — 28 pcs
M3 NYLON INSERT LOCK NUT — 14 pcs
 19. SCREW PM2x10mm — 8 pcs
CLEVIS — 4 pcs
FUEL TUBE $\varnothing 6 \times 5$ mm — 4 pcs
HORN — 4 sets
PUSHROD M2xD4x212mm w/Threads (For Aileron) — 2 pcs
 20. DECALS — 1 set
- **COVERING:--**
- PURPLE COLOR SCHEME:**
TOUGHLON STL 100 WHITE
TOUGHLON STL 201 BLACK
TOUGHLON STL 561 PEARL PURPLE
TOUGHLON STL 370 SILVER
- YELLOW COLOR SCHEME:**
TOUGHLON STL 100 WHITE
TOUGHLON STL 201 BLACK
TOUGHLON STL 330 CADMIUM YELLOW
TOUGHLON STL 370 SILVER

Ultimate - 90

INDEX

BEFORE YOU BEGIN	P. 1
PARTS LIST	P. 2
ASSEMBLY	P. 3 - 11
SAFETY PRECAUTIONS	P. 11

BEFORE YOU BEGIN

- 1 Read through the manual before you begin, so you will have an overall idea of what to do.
- 2 Check all parts. If you find any defective or missing parts contact your local dealer. Please DRY FIT and check for defects for all parts that will require CA or Epoxy for final assembly. Any parts you find to be defective after the gluing process may be difficult to remove for warranty replacement. The manufacturer will replace any defective parts, but will not extend to the parts that are good before gluing to defective parts during assembly.
- 3 Symbols used throughout this instruction manual comprise of the following :-



Apply epoxy glue.



Apply instant glue
(C.A. glue, super glue.)



Assemble left and right
sides the same way.



Ensure smooth non-binding
movement while assembling.



Peel off shaded portion
covering film.



Cut off shaded portion.



Drill holes with the specified
diameter (here: 3mm).



Must be purchased separately!



Pay close attention here!

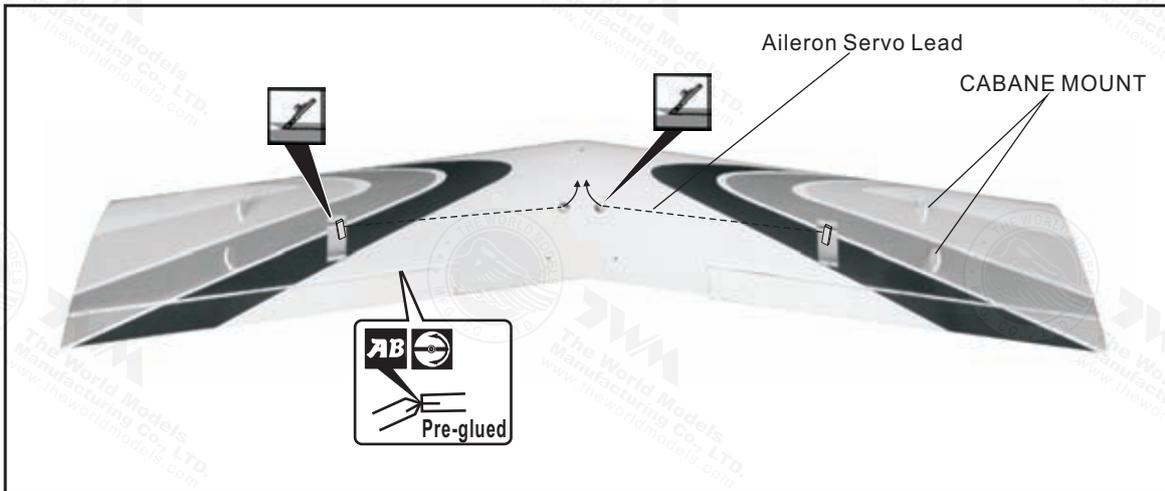


Do not overlook this symbol!



Pierce the shaded portion
covering film.

1 Main Wing (Lower)

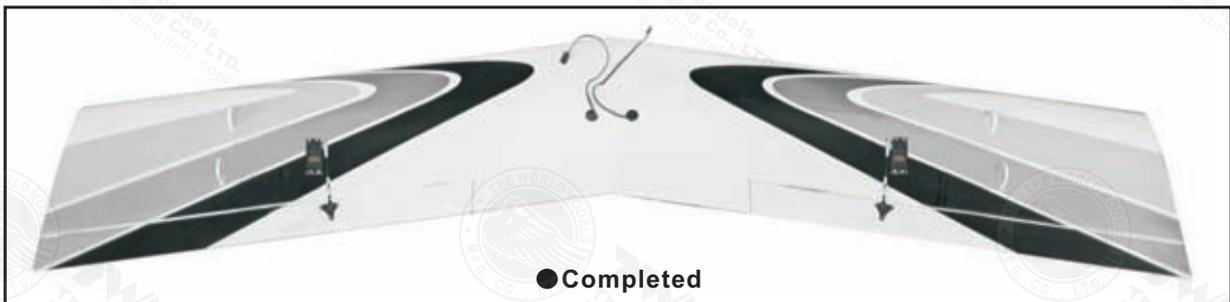
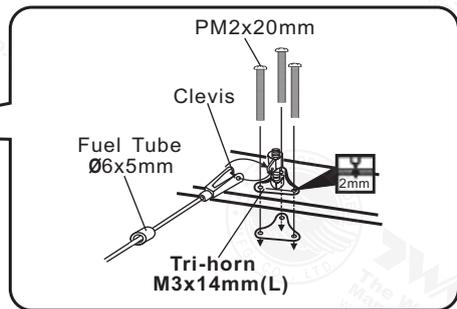
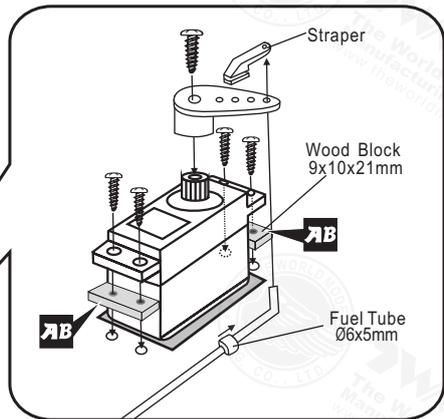
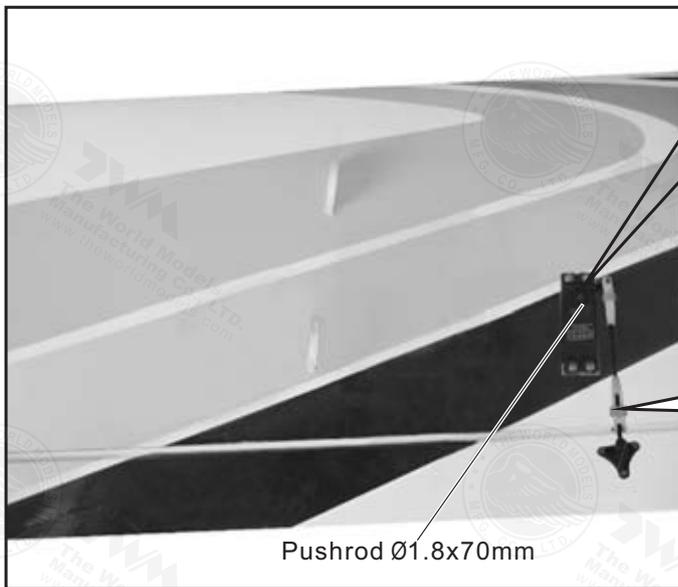


L/R

2 Aileron Servo (Lower)

PM2x20mm Screw
 6

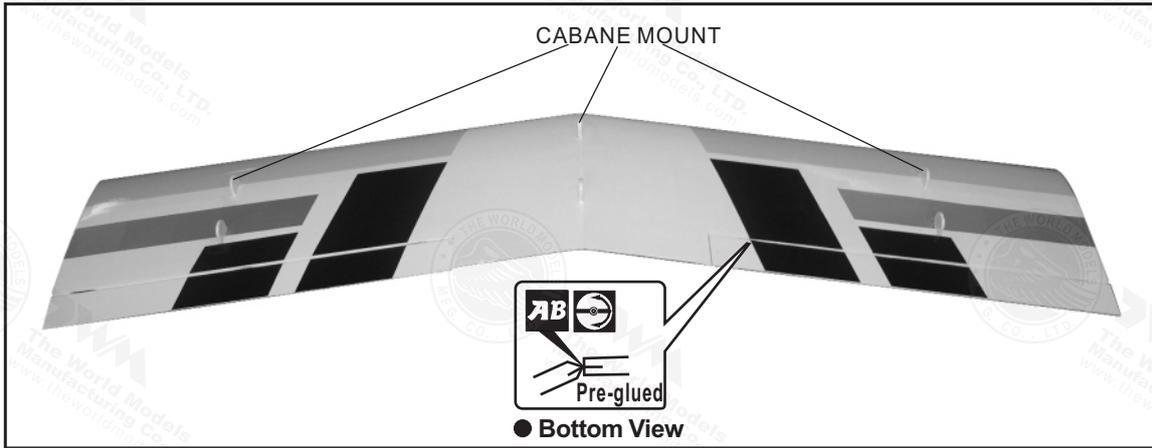
● Ø1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at under side of control surfaces.



● Completed

L/R

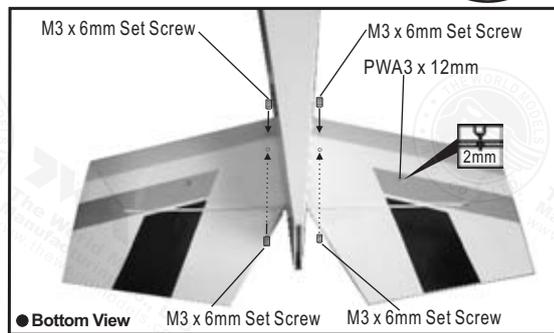
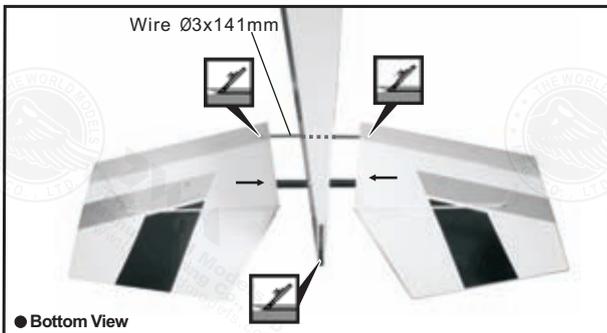
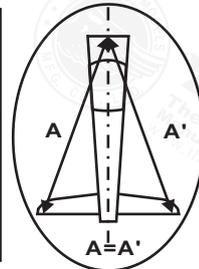
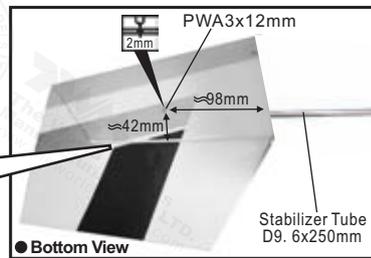
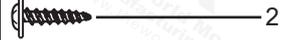
3 Main Wing (Upper)



L/R

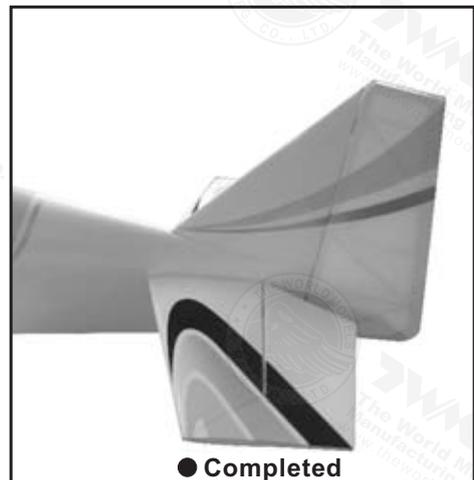
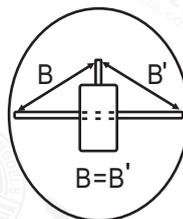
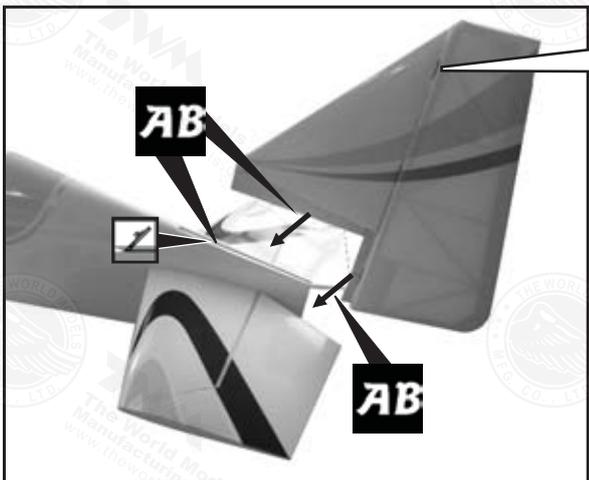
4 Stabilizer & Elevator

PWA3 x 12mm Screw



L/R

5 Vertical Fin & Rudder

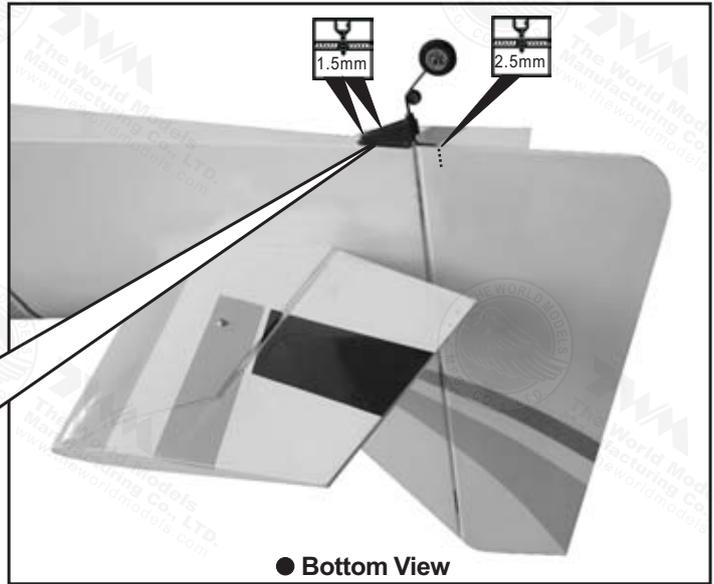
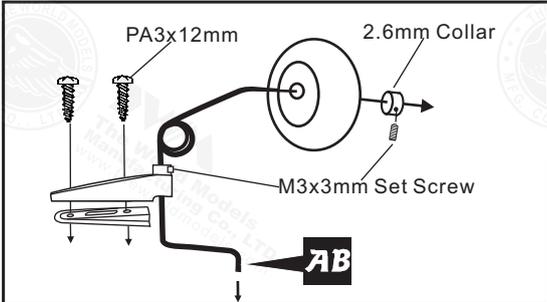
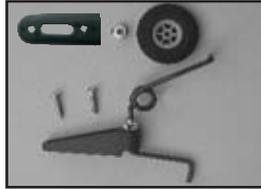


6 Tail Landing Gear

PA3x12mm Screw

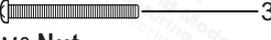


2.6mm Collar

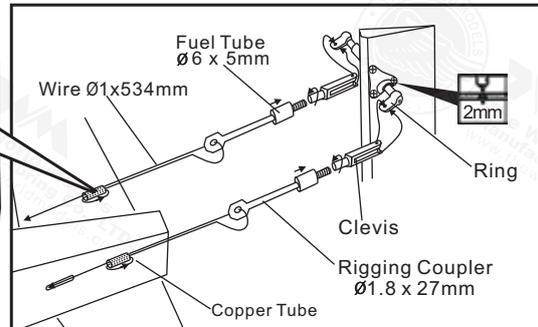
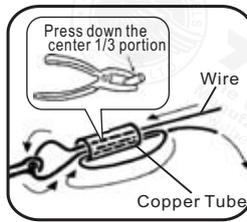
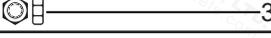


7 Rudder Pullwire

PM2x20mm Screw

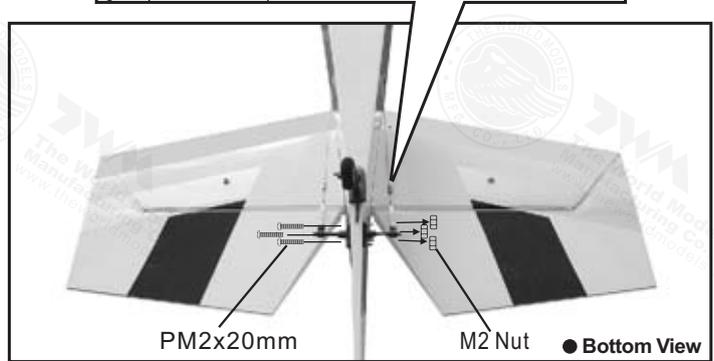
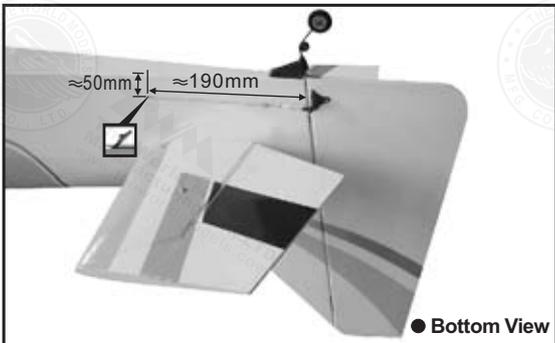


M2 Nut



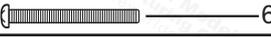
L/R

● Ø1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at side of control surfaces.

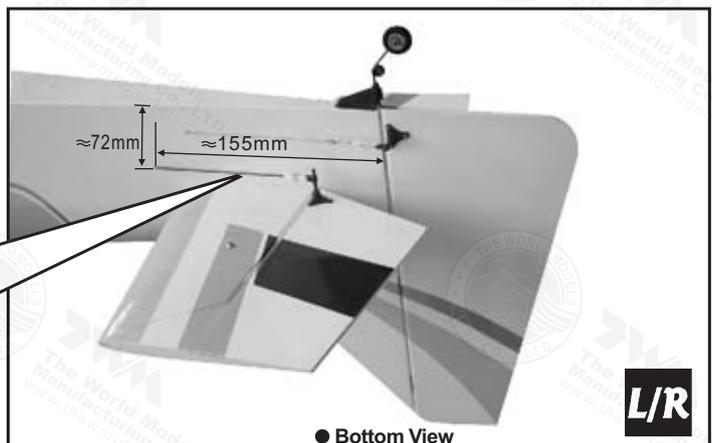
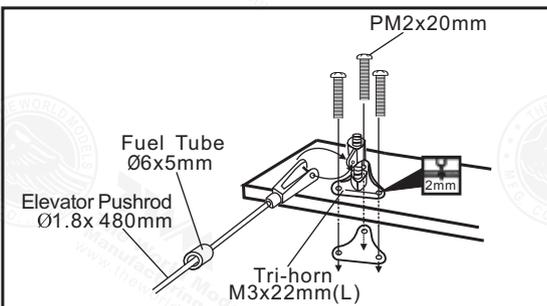


8 Elevator Pushrod

PM2x20mm Screw



● Ø1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at under side of control surfaces.

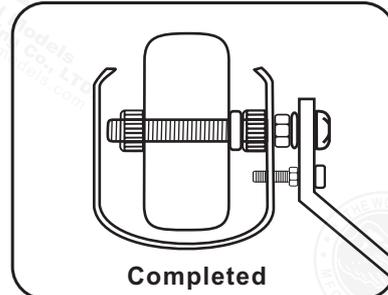
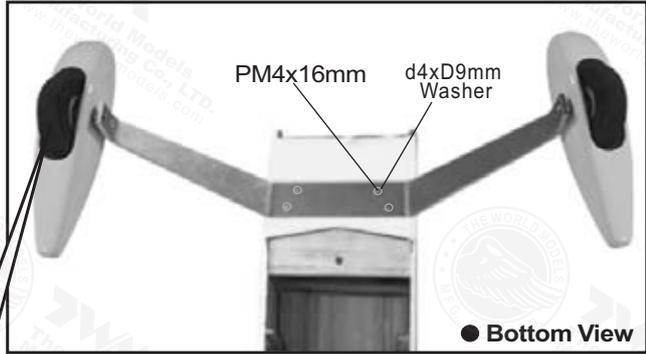
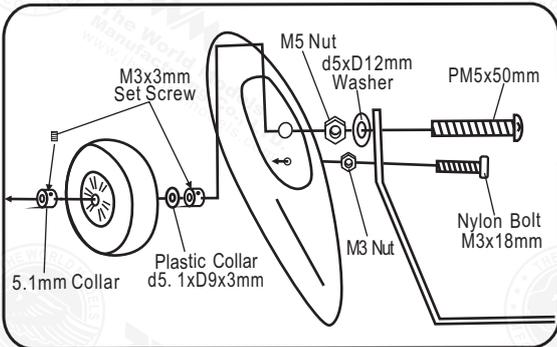


L/R

9 Main Landing Gear

PM5x50 mm **Screw** — 2
M5 Nut — 2
 PM4x16mm **Screw** — 4
 d4xD9mm **Washer** — 4

d5xD12mm **Washer** — 2
 5.1mm **Collar** — 4
 M3x18mm **NYLON BOLT** — 2
M3 Nut — 2



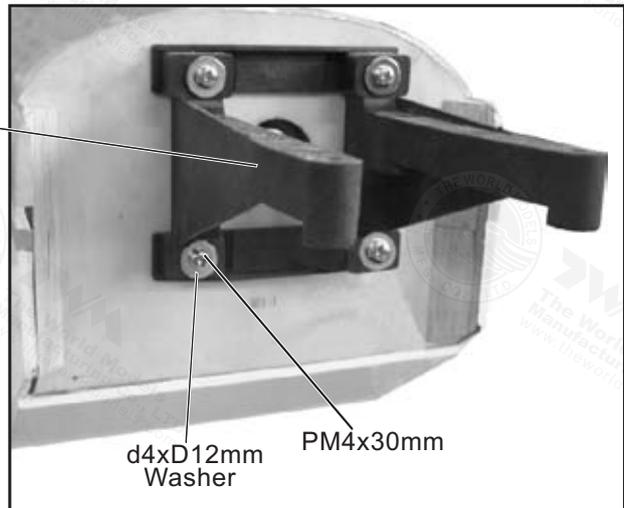
10 Engine Mount

PM4x30mm **Screw** — 4
 d4xD12mm **Washer** — 4

Engine Mount
 PL5111080

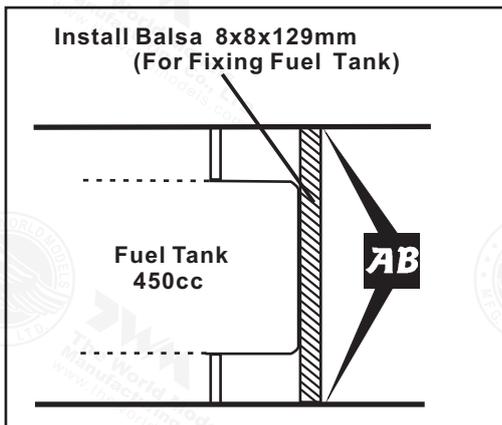
● Apply thread locker to screws.

! Blind nuts are off-centered to keep the spinner at the fuselage axis.

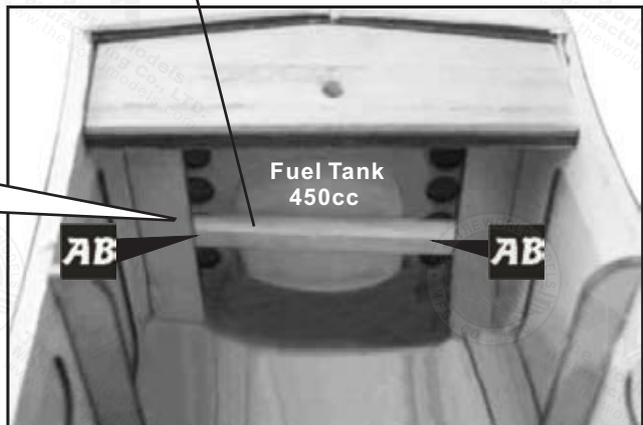


11 Fuel Tank

Install Balsa 8x8x129mm
 (For Fixing Fuel Tank)

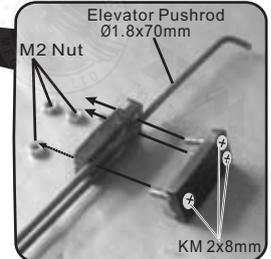
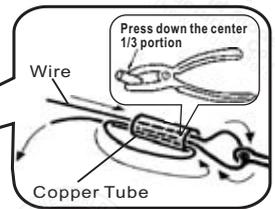
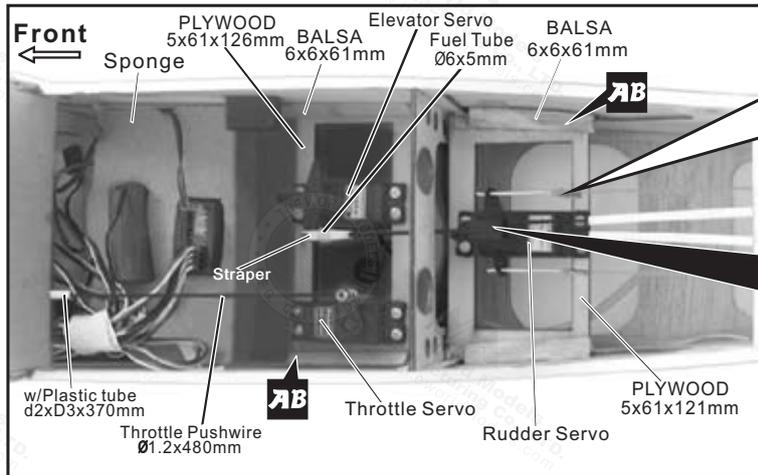
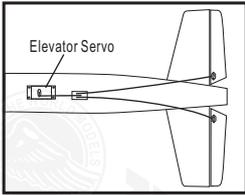


Install Balsa 8x8x129mm



14 Radio Equipment

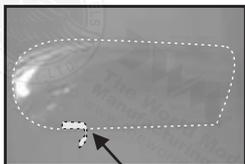
● Install and arrange the servo as shown in the diagram.



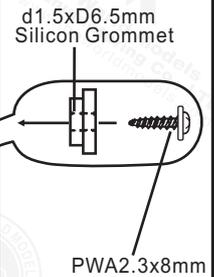
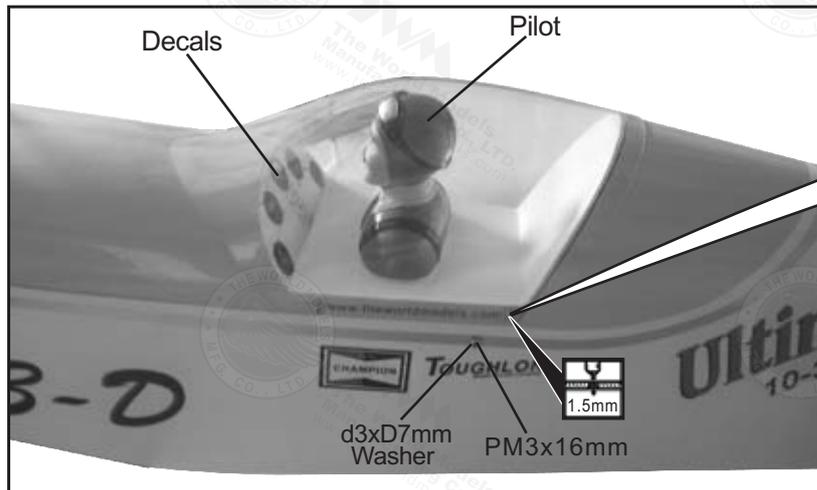
15 Canopy

● First insert the grommet to the canopy then apply screw.

- PWA2.3x8mm Screw — 4
- d1.5xD6.5mm Silicon Grommet — 4
- PM3x16mm Screw — 2
- d3xD7mm Washer — 2



Apply double-sided tape

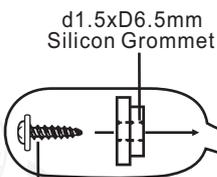
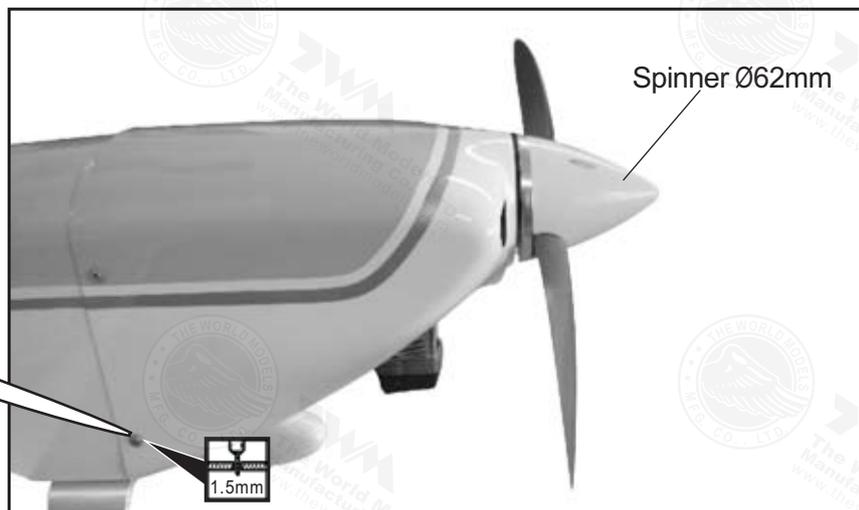


L/R

16 Cowling & Spinner

● First insert the grommet to the cowling then apply screw.

- PWA2.6x12mm Screw — 4
- d1.5xD6.5mm Silicon Grommet — 4

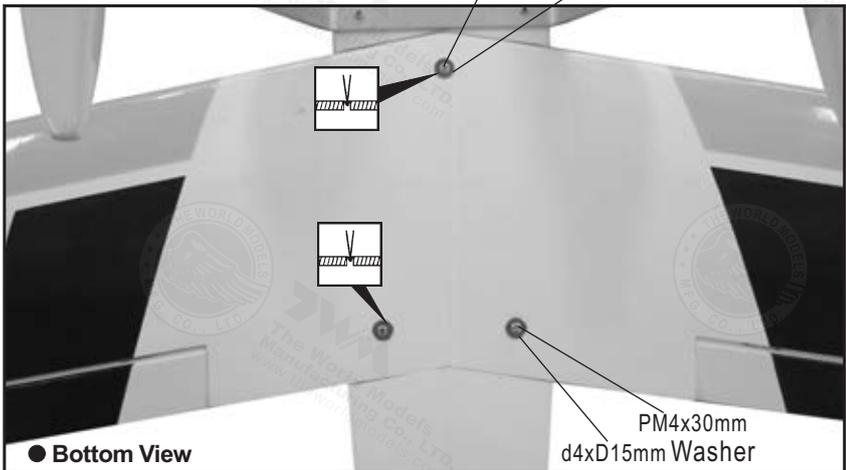


PWA2.6x12mm

L/R

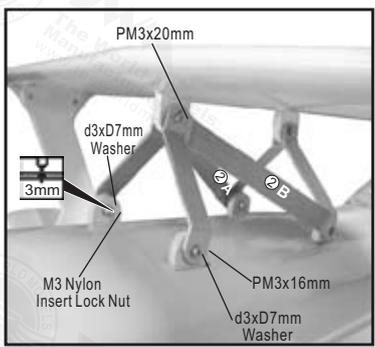
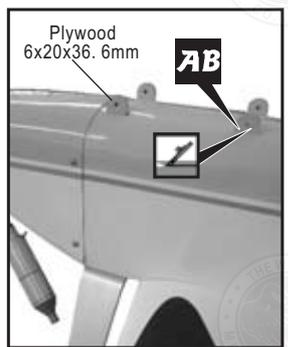
17 Main Wing (Lower)

- PM4x40mm Screw — 1
- PM4x30mm Screw — 2
- d4xD15mm Washer — 3

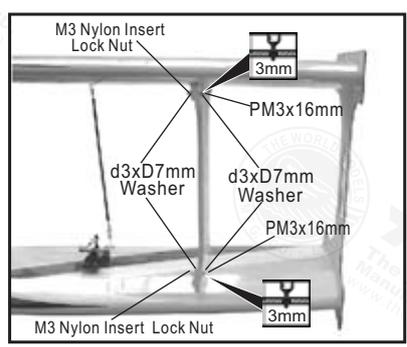


18 Main Wing

- PM3x16mm Screw — 13
- PM3x20mm Screw — 1
- d3xD7mm Washer — 28
- M3 Nylon Insert Lock Nut — 14



Pierce the two pre-drill holes at upper wing center cabane mount and fasten the center cabanes with PM3x16mm & PM3x20mm screw and nut. With the lower wing fastened to the fuselage, insert the wing incidence angle templates to both sides of upper and lower wing to hold the upper wing in position. Drill and fasten the center wing cabane with



With the wing incidence angle template still in place, position the side cabanes, mark and drill the side cabane mounts and fasten with PM3x16mm screw and nut.

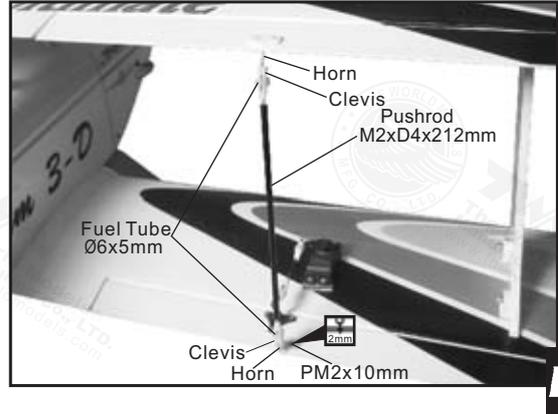
! Outer wing cabane should fit to the outside of outer wing cabane mounts.

L/R

19 Main Wing

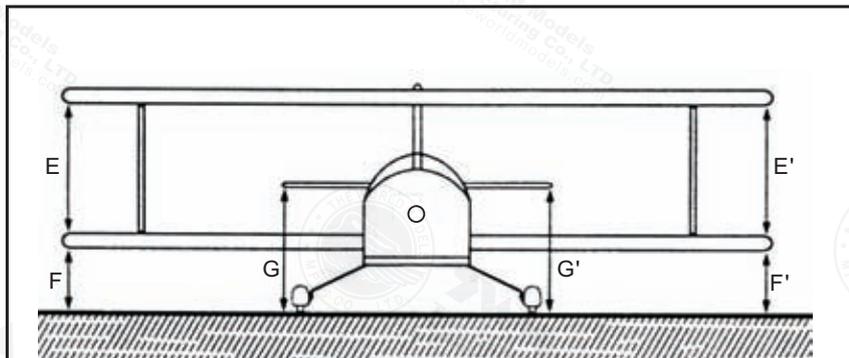
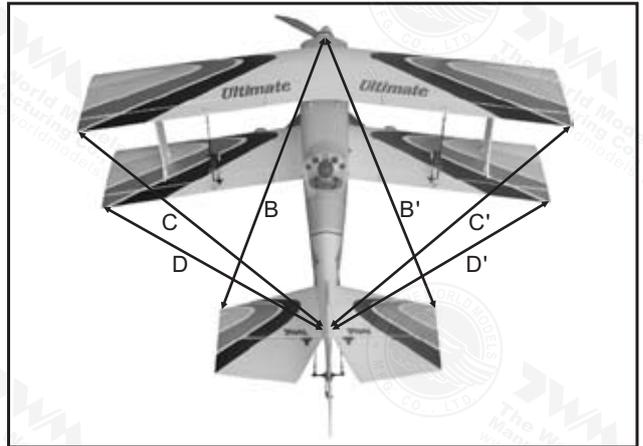
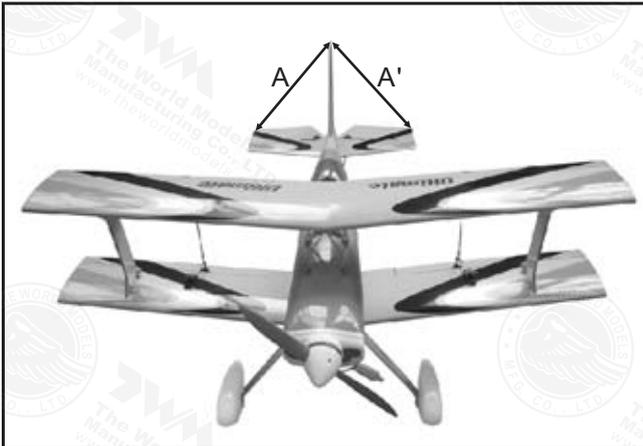
PM2x10mm Screw 8

● Ø1mm pilot holes for World Models horn are pre-drilled. Please look for pin-hole marks at under side of control surfaces.



20 Wing Setting

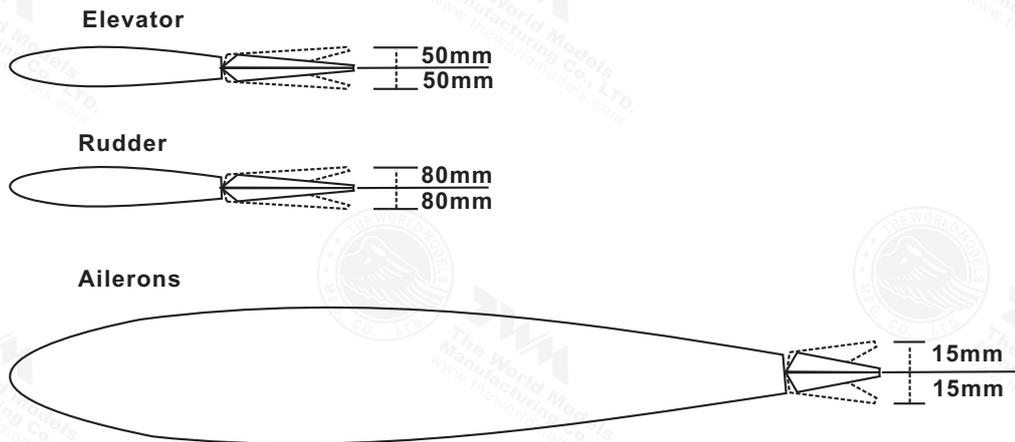
● Adjust the wing and fuselage configuration as in the diagrams.



A=A' B=B' C=C' D=D' E=E' F=F' G=G'

21 Control Throws

Adjust the control throws as shown in the diagram. These throws are good for general flying. You can adjust according to your personal preference.



22 C.G.

The ideal C.G. position is 120mm (4.72 in.) behind the leading edge measured at top wing center line. In order to obtain the C.G. specified, add weight to the fuselage or move the battery position. Check the C.G. before flying.



! Warning!

Important Safety Precautions

- # First time flyer should never fly by himself / herself. Assistance from experienced flyer is absolutely necessary.
- # Pre-flight adjustment must be done before flying, it is very dangerous to fly a badly pre-adjusted aircraft.
- # *Ultimate - 90* is specially designed to be powered by 4-stroke 0.91 engine using a more powerful engine does not mean better performance. In fact, over powered engine may cause severe damage and injuries.
- # Make sure the air field is spacious, never fly the plane too close to people and never get too close to a running propeller.
- # If you find wrinkles on the covering as a result of weather changes, you can use hot iron to remove the wrinkles. Please begin with lower temperature setting and gradually raise the temperature until the wrinkles are gone. Too hot an iron may damage the covering.
- # Check and re-tighten up all factory assembled screws, use thread locker if applicable.