0.90-1.10 cu.in. displacement 4-cycle
Radio required: 4 channels, 5 servos airplane radio

<table>
<thead>
<tr>
<th>Specifications</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Wing Span</td>
<td>67.5in / 1720mm</td>
</tr>
<tr>
<td>Wing Area</td>
<td>997 sq in / 64.3 sq dm</td>
</tr>
<tr>
<td>Flying Weight</td>
<td>8.9 lbs / 4050g</td>
</tr>
<tr>
<td>Fuselage Length</td>
<td>68.5 in / 1740mm</td>
</tr>
</tbody>
</table>

* 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.
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:

- **AB**: Apply epoxy glue.
- **C.A.**: Apply instant glue (C.A.glue, super glue.)
- **L/R**: Assemble left and right sides the same way.
- **Ensure smooth non-binding movement while assembling.**
- **Cut off shaded portion.**
- **Peel off shaded portion covering film.**
- **Drill holes with the specified diameter (here: 3mm).**
- **Must be purchased separately!**
- **Pay close attention here!**
- **Pierce the shaded portion covering film.**

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:

- **AB**: Apply epoxy glue.
- **C.A.**: Apply instant glue (C.A.glue, super glue.)
- **L/R**: Assemble left and right sides the same way.
- **Ensure smooth non-binding movement while assembling.**
- **Cut off shaded portion.**
- **Peel off shaded portion covering film.**
- **Drill holes with the specified diameter (here: 3mm).**
- **Must be purchased separately!**
- **Pay close attention here!**
- **Pierce the shaded portion covering film.**
Parts List

1. FUSELAGE -- 1 pc.
2. MAIN WING -- 1 pair.
3. STABILIZER & ELEVATOR -- 1 set
4. VERTICAL FIN & RUDDER -- 1 set
5. CANOPY -- 1 pc.
6. COWLINGS -- 1 set
7. PILOT -- 1 pc.
8. SPINNER (w. alu. back plate) Ø70mm -- 1 set
9. ENGINE MOUNT PL511080 -- 1 set
10. FUEL TANK 380cc -- 1 set
11. SPONGE (For Radio Equipment) -- 1 pc.
12. CARBON FIBER MAIN LANDING GEAR -- 1 pair
13. TAIL LANDING GEAR -- 1 set
14. WHEEL PANTS -- 1 pair
15. MAIN WHEEL Ø55mm -- 2 pcs
16. TAIL WHEEL Ø30mm -- 1 pc.
17. PUSHROD, PUSHWIRE & PULLWIRE:--
   COPPER TUBE d2.5xD3.2x8mm (For Rudder) -- 4 pcs
   RIGGING Z BEND Ø1.8x27mm (For Rudder) -- 2 pcs
   RIGGING COUPLER Ø1.8x27mm w/Threads (For Rudder) -- 2 pcs
   Ø1.8x85mm w/Threads (For Aileron) -- 2 pcs
   Ø1.8x105mm w/Threads (For Elevator) -- 2 pcs
   Ø1.8x105mm (For Elevator) -- 1 pc.
   WIRE Ø1x1080mm (For Rudder) -- 2 pcs
18. THROTTLE PUSH WIRE Ø1.2x270mm w/Plastic tube d2x2D3x130mm -- 1 set
19. WOODEN PARTS:--
   BALSA 10x10x114mm (For Fixing Fuel Tank) -- 1 pc.
   PLYWOOD 5x61x114mm (For Throttle Servo) -- 1 pc.
   PLYWOOD 5x61x109.7mm (For Elevator Servo) -- 1 pc.
   PLYWOOD 5x61x112mm (For Rudder Servo) -- 1 pc.
   BALSA 6x6x81mm (For Fuselage Servo Stand) -- 6 pcs
20. PLASTIC PARTS:--
   CLEVIS -- 6 pcs
   RUBBER BAND -- 2 pcs
   STRAPER -- 3 pcs
   TRI-HORN M3x14(L) -- 4 sets
   TRI-HORN M3x14(L) (w/o-Base For Rudder) -- 2 pcs
   PUSHROD CONNECTOR -- 1 set
   DOUBLE-SIDED TAPE -- 1 pc.
   SILICON GROMMET d1.5xD6.5mm -- 14 pcs
   WING INCIDENCE ANGLE ADJUSTER -- 4 sets
21. METAL PARTS:--
   LINKAGE CONNECTOR 2.1mm -- 1 pc.
   COLLAR 4.1mm w/set screw -- 2 sets
   COLLAR 2.6mm w/set screw -- 1 set
   WING TUBE Ø22x720 mm -- 1 pc.
   STABILIZER TUBE D9.5x254mm -- 1 pc.
   ALUMINUM PLATE (For Engine Mount) -- 1 pc.
   WIRE Ø3x115mm -- 1 pc.
   M2 NUT -- 3 pcs
   M4 NUT -- 2 pcs
   SCREW PA3x10mm -- 2 pcs
   SCREW PA3x12mm -- 4 pcs
   SCREW PA3x25mm -- 1 pc.
   SCREW PM2x22mm -- 6 pcs
   SCREW PM2x25mm -- 9 pcs
   SCREW PM3x15mm -- 6 pcs
   SCREW PM3x16mm -- 2 pcs
   SCREW PM3x25mm -- 1 pc.
   SCREW PM4x25mm -- 4 pcs
   SCREW PM4x35mm -- 2 pcs
   SCREW PWA2.3x8mm -- 10 pcs
   SCREW PWA2.6X12mm -- 4 pcs
   WASHER d4xD12mm -- 8 pcs
   WASHER d3xD12mm -- 6 pcs
   WASHER d4xD9mm -- 2 pcs
   WASHER d4xD12mm -- 4 pcs
22. ANTI-VIBRATION MOUNT 4C-91 -- 1 set
   INCLUDE: SOCKET HEAD SCREW M4x35mm -- 4 pcs
   SCREW KM3x20mm -- 8 pcs
   WASHER d4xD12mm -- 8 pcs
   NYLON INSERT LOCK NUT M3 -- 8 pcs
   NYLON INSERT LOCK NUT M4 -- 4 pcs
23. FUEL TUBE Ø6x5mm -- 9 pcs
24. DECALS -- 1 set
25. COVERING:--
   TOUGHON STL100 WHITE
   TOUGHON STL 550 PEARL BLUE
   TOUGHON STL 561 PEARL PURPLE
   TOUGHON STL 360 VIOLET
   TOUGHON STL 361 PURPLE
   TOUGHON STL 511 PEARL FERRARI RED
   TOUGHON STL 251 SKY BLUE
1 Main Wing

- Apply instant type CA glue to both sides of each hinge.

2 Aileron Servo

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

3 Stabilizer / Elevator

- Apply instant type CA glue to both sides of each hinge.
4 Vertical Fin & Rudder

- Apply instant type CA glue to both sides of each hinge.

5 Tail Landing Gear

- PA3 x 12mm Screw: 4
- 2.6mm Collar: 1

6 Main Landing Gear

- PM3x15mm Screw: 6
- PM4x35mm Screw: 2
- PA3 x 10mm Screw: 2
- 4.1mm Collar: 2
- d3xD7mm Washer: 2
- d4xD9mm Washer: 2
- d3xD12mm Washer: 2
- M4 Nut: 2

Bottom View
7 Rudder Pullwire

- Ø 1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at side of control surfaces.

8 Elevator Pushrod

- Ø 1mm pilot holes for World Models tri-horn are pre-drilled. Please look for pin-hole marks at under side of control surfaces.

9 Engine Mount

- Apply thread locker to screws.
- Blind nuts are off-centered to keep the spinner at the fuselage axis.
10 Fuel Tank

Install Plywood 10 x 10 x 114mm (For fixing fuel tank)

Rubber Band

Fuel Tank 380cc

11 Engine

M4 x 35mm SOCKET HEAD SCREW

4

KM3x20mm Washer

8

M4 Nylon Insert Lock Nut

4

M3 Nylon Insert Lock Nut

8

d4 x D12mm Washer

8

ANTI-VIBRATION MOUNT INSTALLATION

KM3x20mm

Make sure the rounded edges are facing the shock absorbing SILICON PAD.

L/R

M3 Nut

Install Engine position

137mm

5.39in.

Throttle Pushwire 1.2x270mm

Plastic tube d2x0.3x100mm

Rubber Band

Fuel Tank 380cc

Install Plywood 10 x 10 x 114mm (For fixing fuel tank)
12 Servo Set

Please refer to attached sheet for linkage connector installation.

13 Radio Equipment

Install and arrange the servo as shown in the diagram.
Step 1. Insert the aluminum wing tube with the pre-drilled hole end into the right wing. Align the lines marked at the wing root and wing tube, then apply the PM3 X 25mm machine screw through the pre-drilled hole on top of the wing. (Please confirm the alignment of the hole by putting a 2.5mm diameter rod through the pre-drilled wing hole before applying the screw.) The hole on the wing tube is pre-threaded, do not overtighten the PM3 screw, the setup is for future removal of the wing.

Step 2. Install the right wing to the fuselage by inserting the wing tube (now attached to the right wing) through the fuselage, then install the left wing.

Step 3. Make sure the wings are resting against the fuselage tightly. Locate the pre-drilled 2.5mm hole at the top of the left wing, and drill along with 2.5mm drill bit until it passes through the wing tube. Apply the PA3 X 25mm self-tapping screw.

Note: It is recommended that the wing tube stays with the left wing. Removal of the wings could be achieved by removing the right wing machine screw, the right wing then the left wing with wing tube. If removal of wing tube from left wing is also required, it is recommended that instead of applying self-tapping screw in step 3, you pre-tap with M3 thread cutter and apply M3 machine screw.
15 Canopy & Pilot

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

16 Cowling

- First insert the grommet to the cowling then apply screw.
• Adjust the wing and fuselage configuration as in the diagrams.

A=A'  B=B'  C=C'

A

A'

B

B'

C

C'

P.10
**18 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.

<table>
<thead>
<tr>
<th>Elevator</th>
<th>35mm</th>
<th>35mm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rudder</td>
<td>70mm</td>
<td>70mm</td>
</tr>
<tr>
<td>Ailerons</td>
<td>35mm</td>
<td>35mm</td>
</tr>
</tbody>
</table>

**19 C.G.**

The ideal C.G. position is 160mm (6.3 in.) behind the leading edge measured at where the wing meets the fuselage. 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.

# *Groovy* SD is specially designed to be powered by 4c 0.90-1.10 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.