# 13 - ROTAX 912ULS ENGINE INSTALLATION

# ROTAX 912ULS
# ENGINE INSTALLATION

## FIREWALL ITEMS INSTALLATION

- Wipe all parts down with acetone to remove markings before assembly
- All parts must have their edges polished smooth before installation to avoid cracking in service.

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

## ENGINE MOUNT INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.
3. Check Engine thrust offset per **FIGURE 13A-3** when compared to the firewall. Insert washers between the Engine and Engine Attachment to set the RH thrust angle. Place Washers between the large steel washers and the Engine Attachment to set the up or down thrust angle.

## FUEL SYSTEM INSTALLATION - FIREWALL FORWARD

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

## COOLING SYSTEM INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

# LUBRICATION SYSTEM INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

## MUFFLER / HEATER WRAP ASSEMBLY & INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

## CABIN HEATER INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

# THROTTLE & CHOKE CABLE INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

## 912ULS ENGINE ELECTRICAL SYSTEM

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) and Parts pages for installation.
3. Refer to **FIGURE 13G-03** for details on installing the Hour Meter Relay.

## 912ULS – SENSENICH COMPOSITE PROPELLOR INSTALLATION

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

## OPTIONAL AIRBOX ASSEMBLY

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.

# OPTIONAL REMOTE BATTERY CHARGING POST

1. Become familiar with the ROTAX 912uls **Parts Drawings** and collect the parts shown in the drawing.
2. Refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation.
3. Refer to **FIGURE 13J-03** for placement of the Remote Battery Charging Post.

# 14 - SPINNER & COWLING INSTALLATION

# SPINNER & COWLING INSTALLATION

## SPINNER INSTALLATION

- The Engine, Prop Extension, and Spinner Backing Plate must be installed before installing the Cowling.
- Wipe all parts down with alcohol to remove markings before assembly

1. Become familiar with the Spinner Installation **Parts Drawings** and collect the parts shown in the drawings. Also refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation details.
2. The Spinner Dome and Backing Plate supplied have been trimmed at the factory and should not require any additional trimming.
3. Check that the Prop Extension fits in the pre-drilled holes of the Spinner Backing Plate. The fit should be tight. If some sanding is required, use sandpaper wrapped around a dowel or tube.
4. Cut out the Spinner Dome to match the Prop type. See **FIGURES 14-04** and **14-04A**. ***HINT:*** *Use a compass and draw a circle slightly larger than the spinner diameter. For a 2-blade prop make the marks exactly 180° apart. For a 3-Blade prop make the marks exactly 120° apart.* Center the Spinner Dome on the circle and mark the Dome.
5. Glue the Prop template to poster board and cut out. Align one edge of the template on a mark and tape to the Dome. Draw the opening on the Dome. Repeat for the remaining openings. The openings may be cut and sanded smooth using a Dremel. ***HINT:*** *Use reinforced cut-off wheels and 1/2" sanding drums.* ***CAUTION:*** *Always use proper safety equipment.* Cut the opening slightly small and sand to exact fit.
6. Fit the Spinner Backing Plate onto the Prop Extension. Press the Prop hub onto the Extension. Test fit the Dome. Sand the openings to an exact fit. Allow at least 1/8" clearance between the Spinner and Prop. ***NOTE:*** *Blades may need to be temporarily clamped in place on adjustable props.* Be sure the Dome is flush with the backside of the Backing Plate. ***HINT:*** *Use 3 or 4 thin boards under the Backing Plate for support.*
7. Remove Dome and mark hole locations on the Dome's perimeter for 5 screws, evenly spaced, on each side. Refer to **FIGURE 14-07**. ***NOTE:*** *3-blade installations will require 3 screws between openings.* Drill through the marked locations with a #40 bit.

8. Place Dome over Backing Plate/Prop Assembly with the Backing Plate sitting on a flat surface ***HINT:*** *Use 3 or 4 thin boards under the Backing Plate for support.* Place the Spinner Dome in position. Press the Dome tight to the surface to ensure that the Dome and Backing Plate are flush. Transfer drill #40 and Cleco.

9. Remove clecos one at a time. Transfer drill #30. Cleco as you go. Final Size drill #11 and cleco. The Dome and Backing Plate must remain tight against the surface as you drill.

10. Dimple the Dome near one opening and dimple the Backing Plate corresponding to that opening for alignment markings. See **FIGURE 14-10**. ***HINT:*** *Use a #11 bit and lightly press to make the dimples.* Assemble the Dome and Backing Plate each time with the dimples aligned.

11. Remove the dome and the prop from the backing plate and install the nut plates. ***HINT:*** *Use a short 3/16" bolt to hold the nut plate centered while drilling the ears #40.* ***NOTE:*** *Counter sink the #40 holes to allow the heads of the rivets to sit flush with the Backing Plate flange.* See **FIGURE 14-11**. "Set" the rivets by resting the head of the rivet against a vise and tapping the pulled end with a small hammer. Check for tightness. The nut plates must be snug.

12. The Spinner Dome is now ready for painting.

13. During final assembly install the spacer and the backing plate on the engine prop flange. Install the prop. Refer to **PROPELLER INSTALLATION** and bolt the spinner dome in place.

14. The spinner and prop should be balanced and no adjustment required. However, the ultimate test is in the running. If you experience a lot of vibration it could be caused by out of balance or misalignment. Use a good prop balancer. Check both the prop and spinner assembly, if the misalignment is not correctable then a new spinner may be required. Misalignment occurs through improper alignment of the parts. A slight amount of "wobble" is acceptable and may disappear at higher RPM's. Always pre-flight your spinner.

# COWLING INSTALLATION

- The Engine, Prop Extension, and Spinner Backing Plate must be installed before installing the Cowling.
- Wipe all parts down with alcohol to remove markings before assembly

1. Become familiar with the Cowling installation **Parts Drawings** and collect the parts shown in the drawings. Also refer to provided ROTAX 912uls INSTALLATION DVD (KPPW0285) for installation details.
2. Attach two 3/8" spacers to the flange of the Spinner Backing Plate. See **FIGURE 14A-02.** A couple of 3/8" thick wooden boards work well for this. Bolt the Extension and Spinner Backing Plate to the engine prop hub.
3. Set both upper and lower cowls on their aft edges on the floor. Match the cowling together to determine where to trim the lower cowl's forward edges to match to the upper cowl. ***HINT:*** *Cut open the air inlets next to the prop area to get a better idea of what needs to be trimmed.* A Dremel tool with a reinforced cut-off wheel and drum sander works well.
4. Apply two rows of 2" wide masking tape to the fuselage aft of the cowling joggle. You want approx 4 inches of tape aft of the cowling joggle all the way around the fuselage.
5. Mark a line 3" from the joggle all the way around the fuselage.
6. Tape the lower cowling in position against the backing plate with 3/8" spacers and mark forward 3" from the line on the fuselage. This will place a line on the cowling directly over the joggle. ***HINT:*** *Reinforced packaging tape work well to hold the lower cowling..*
7. Trim the lower edge of the lower cowling to this line and tape back in place on the fuselage. ***NOTE:*** *The sides of the cowl will be marked and trimmed after the top cowl is fit.*
8. Slip the upper cowl into place. The forward edge should touch the 3/8" spacers. Mark and trim the upper aft edge of the upper cowl to allow it to set into the joggle. ***NOTE:*** *The sides of the cowl will be marked and trimmed after the upper cowl is fit.* With the forward end of the cowl taped tightly together, check for proper alignment. The forward end of the upper cowl should be positioned to allow an undisturbed flow of air off the prop spinner and should be centered side to side. ***IMPORTANT:*** *Check to be sure the air openings appear level from side to side.* Re-adjust as needed and re-tape in place.
9. Locate the top center fastener hole per **FIGURE 14A-09**. Drill #40 and Cleco. Locate the bottom fastener holes, drill #40 and Cleco. Mark and trim the aft edges of the cowling as before.

10. Measure and drill the positions for the aft fasteners #40 and cleco. See **FIGURE 14A-09**.
11. Apply 2” wide masking tape to the lower cowling below the joggle. You want approx 2” of tape below the joggle all the way along the cowling side. Mark a line 1.5” below the joggle.
12. Tape the upper cowling in position and mark 1.5” from the line on the lower cowl. This will be placing a line on the upper cowling directly over the joggles.
13. The upper cowling may need to be trimmed again. Everything changes a little when it settles in the joggle.
14. Measure and drill the positions for the fasteners #40 at the cowl to cowl joggle and cleco. See **FIGURE 14A-09**.
15. Transfer drill all holes to #11 and cleco.
16. Final trim all of the openings.
17. Use the 1 to 1 template in **FIGURE 14A-17** to mark the position for the oil check door on the cowling. ***HINT:*** *Use the Reinforcement Ring and Maintenance Hatch to locate and cut more precisely.*
18. When you are satisfied with the position of the opening cut it out and position and cleco the door parts in place.
19. Assemble as shown in the assembly drawing.
20. Remove and paint.
21. Step drill the receptacle holes to 5/16” and mount receptacles. ***IMPORTANT:*** *The forward most holes must remain #11 for the #8 Screws.*
22. Step drill the fastener holes to 1/4” and install fasteners. See **Figure 14A-22**.
23. Install and admire.