

## 10 - WINDSHIELD and CANOPY

WINDSHIELD INSTALLATION.....	10-1
HOLD DOWN STRIP FABRICATION .....	10-1
WINDSHIELD INSTALLATION.....	10-2
CANOPY INSTALLATION.....	10A-1
CANOPY HANDLE INSTALLATION.....	10B-1
OPTIONAL KEY LOCK INSTALLATION .....	10C-1

# WINDSHIELD and CANOPY

## WINDSHIELD INSTALLATION

- Wipe all parts down with alcohol to remove markings before assembly.
- All parts must have their edges polished smooth before installation to avoid cracking in service.
- The windshield is manufactured from Plexiglas and special care must be taken in handling, cutting and drilling this material.
- Observe all Safety and Health Warnings when handling Plexiglas.
- Sandbags will be required in part of the assembly to hold the Windshield in place.

**IMPORTANT:** This section does **NOT** go into the detail of trimming and drilling your Windshield / Canopy, as there are volumes written on this already.

More information may be found at [http://www.plexiglas.com/lit\\_technical/0/1](http://www.plexiglas.com/lit_technical/0/1).

Both the literature and the viewing software are free.

1. Become familiar with the Windshield Installation **Parts Drawings** and collect the parts shown in the drawings.
2. Place Windshield into place against Fuselage Top Skin and Roll Bar.
3. Trim the bottom edge of the Windshield to lay flush with the Fuselage Top Skin.
4. Clamp top edge of Windshield to the Roll Bar. Load the Windshield with sandbags, if necessary to make it lay flush.

## **HOLD DOWN STRIP FABRICATION**

**NOTE:** A pre-fabricated Hold Down Strip is available from RANS Parts Department as an option. Refer to parts pages for part number.

5. Cover the Top Skin and the Windshield with 3M™ Brand #471 Vinyl Tape, 5" in each direction from the intersection of the Top Skin and Windshield. Use several layers and overlap to prevent penetration of chemicals.
6. Make a paper template to fabricate the Windshield Hold Down Strip. The template should extend 2" on either side of the Windshield to Top Skin intersection.

7. Use the template to cut 3 layers of glass mat. **NOTE:** *The Windshield Hold Down Strip can be made from pieces that do not extend all the way around the Windshield. However, be sure that the joints overlap by **at least 2"** and a total of 3 layers are achieved.*
8. Use latex caulk to make a fillet between the Top Deck and Windshield. Allow to dry completely.
9. Use a small roller to apply PVA (Poly Vinyl Alcohol) 3" each side of the Top Deck / Windshield intersection. Let dry.
10. Apply resin, with a brush, between each layer of glass mat.  
**IMPORTANT:** *Epoxy resin is recommended by the windshield manufacturer.*
11. Allow to cure for a couple of days, remove, and trim to 1 1/2" each side of the intersection. Trim even with the aft edge of the Roll Bar.

### WINDSHIELD INSTALLATION

12. Position the Windshield on the Roll Bar and mark for trimming. Also mark the Roll Bar where the Windshield contacts.
13. Remove the Windshield and trim.
14. Return the Windshield to the Roll Bar and mark the locations for the Rivet-nuts on the Roll Bar. Evenly space per **FIGURE 10-14**.
15. Drill #30 and cleco. **IMPORTANT:** *Be sure to drill where the Windshield contacts the Roll Bar. Transfer drill 1/4".*
16. Remove Windshield and drill all holes in the Windshield 3/8".
17. Install Rivet-nuts in Roll Bar. See **FIGURE 10-17** for installation instructions. Apply 1/2" Black Foam Tape over top of Roll Bar. Punch out for the center of the Rivet-nuts.
18. Install Windshield to Roll Bar.
19. Tape Windshield Hold Down Strip in place.
20. Mark a line on the Hold Down Strip 1/2" forward of the Windshield edge.
21. Mark for rivets approximately every 2 1/2" along this line. **CAUTION:** *Avoid placing a rivet through any underlying structure. The rivets must only penetrate the Top Skin.*
22. Drill #40 and cleco in place. Drill to a final size of #30.
23. Remove Hold Down Strip. Sand and paint.
24. Place Silicone Sealer under the Strip and dip the rivets in Silicone Sealer when final assembling. Allow to dry. Remove excess Silicone.
25. Place a fillet of Silicone Seal at the forward and aft edges of the Hold Down Strip.

## CANOPY INSTALLATION

- Wipe all parts down with alcohol to remove markings before assembly.
  - All parts must have their edges polished smooth before installation to avoid cracking in service.
  - The windshield is manufactured from Plexiglas and special care must be taken in handling, cutting and drilling this material.
  - Observe all Safety and Health Warnings when handling Plexiglas.
1. Become familiar with the Canopy Installation **Parts Drawings** and collect the parts shown in the drawings.
  2. Drill and shape the Canopy Attach Angles as shown in **FIGURE 10A-02**.
  3. Cleco the forward hole of the Canopy Slide to the forward hole of the Canopy Attach Angle. **NOTE:** *Be sure the Canopy Slides are orientated properly. The outboard section of each Slide will move aft.* Cleco the alignment holes, transfer drill #11 the remaining holes and cleco.
  4. Position the Lower Canopy Trim Strip flush to the upper edge of the Canopy Frame rail and flush with the front of the Canopy Frame. Mark and drill per **FIGURE 10A-04**. **HINT:** *Canopy Attach Angles may be used to mark and drill the Canopy Slide holes in the Trim Strips.*
  5. Cleco the Canopy Slide to the Trim Strip and transfer drill #11.
  6. Set the Canopy Frame Assembly (Frame, Slides, Trim Strips, and Angles) on the fuselage. Make sure the Canopy Frame is even with the sides of the Roll Bar. Measure to insure the Angles are parallel with each other. Mark where the forward and aft end of the Attach Angles contact the fuselage for alignment. **NOTE:** *Be sure the Attach Angles are against the aft side of the Roll Bar and parallel to each other.* Remove the Canopy Frame Assembly.
  7. Remove the Attach Angles from the Canopy Frame. Position on the fuselage aligned with the marks. Clamp in position, transfer drill #11 to the Top Longeron. **NOTE:** *Be sure the Attach Angles are against the aft side of the Roll Bar and parallel to each other.*
  8. Slot the Angles to allow easier alignment of Canopy later on. Refer back to **FIGURE 10A-02**.
  9. Set the Canopy Latches flush to the aft edge of each Canopy Attach Angle. Transfer drill #11 from the outside and cleco. Mark for drilling the vertical hole through the fuselage. Remove Canopy Latch and drill #11.
  10. Drill and cleco Capture and Spacer Strips to upper Canopy Frame. Refer to **FIGURE 10A-10**.

11. Remove the upper Capture Strip. Cleco the Spacer and lower Capture Strip to the Canopy Frame.
12. Place a Canopy half over the Frame and mark for trimming. Also mark the line where the Canopy contacts the Frame on the Frame.
13. Remove the Canopy and trim.
14. Return the Canopy to the Frame and mark the locations for the Rivet-nuts on the forward and aft hoops. They should be evenly spaced. Refer to **FIGURE 10A-14**.
15. Drill #30 and cleco. **NOTE:** *Tape a 0.062" Lexan shim to the top of the aft hoop of the Canopy Frame. This will simulate the Canopy Skirt thickness.*
16. Repeat for other side.
17. Slip Outer Trim Strip between Canopy Frame and Canopy. Position Outer Trim Strip per **FIGURE 10A-17**. Transfer drill #30 and cleco. Mark and trim aft end per **FIGURE 10A-17**. Remove Outer Trim Strip and final size holes to 3/8". Outer Trim Strip will final install on outboard side of Canopy Assembly.
18. Remove Canopies and 0.062" shim. Fit the Canopy Skirt to the rear of the Canopy with the Canopy Frame Assembly clecoed in place on the Fuselage. Tape it down tight to the Canopy Frame and Fuselage. Transfer drill #30 to the Trim Strip and Canopy Frame.
19. Remove Canopy Assembly from Fuselage. Re-Cleco Canopies and Skirt to Frame. Transfer drill Canopies, Skirt, and Frame 1/4" for Rivet-nuts. Refer back to **FIGURE 10A-14**. Also include the ones in the Lower Canopy Trim Strip.
20. Remove Canopy. Drill Canopy holes to 3/8".
21. Drill the #30 holes in the lower Capture Strip and Spacer Strip to 1/4". Install Rivet-nuts.
22. Drill the upper Capture Strip to 3/8".
23. Drill the #30 holes in the Skirt to #28. Drill the 1/4" holes in the Skirt to 1/2". This will allow the skirt to sit flush against the Frame
24. Rivet the Trim Strip and Skirt to the Canopy Frame and install Rivet-nuts.
25. Paint the Canopy Frame Assembly as desired.
26. Apply foam tape to the Canopy Frame Assembly and re-assemble. **HINT:** *Apply multiple layers as needed to allow Canopy to match to the Windshield.*
27. Apply the "D-Cell" foam seal to the aft side of Roll Bar to seal when the Canopy closes.
28. Rivet and bolt assembly together.

## **CANOPY HANDLE INSTALLATION**

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

**NOTE:** *Proper fitting of the Canopy Handle will require the Canopy Assembly to be installed on the Fuselage. Fit up is best done with the Canopy halves removed.*

1. Become familiar with the Canopy Installation **Parts Drawings** and collect the parts shown in the drawings.
2. Bolt Stainless Steel Washer to threaded stub on Roll Bar.
3. Temporarily tape "D-cell" Foam to aft side of Roll Bar. Slide Canopy Assembly forward until tight and clamp into place.
4. Bolt Canopy Latch to top of welded tab of Canopy Latch Handle. Canopy latch must be able to rotate.
5. Slip Spacer Bushing over Latch Handle and slide Latch Handle Assembly through bushing in Canopy Frame.
6. Locate and drill a 1/4" hole in Canopy Frame tube for Rivet Nut installation. Refer to **FIGURE 10B-06**. Install Rivet Nut. **NOTE:** *When Latch Handle is in "UN-LOCKED" position the Canopy Latch should clear the threaded stub on Roll Bar.*
7. Drill the Door Handle (KPDR0026) per **FIGURE 10B-07**.
8. Push Latch Handle assembly fully into position through bushing in Canopy Frame..
9. Rotate Latch Handle assembly into "LOCKED" position. Press Door Handle onto the Latch Handle assembly protruding up through the bushing. Orientate the Door Handle inline with the Fuselage. Transfer drill #30 from both sides. **IMPORTANT:** *Be sure the Latch Handle assembly is pushed up tight.*
10. Drill one side to 3/16". Press Brass Flange Nut into 3/16" hole. Install Button Head Screw. **NOTE:** *Install Flange Nut and Button head Screw during Final Assembly.*
11. Cut Nylon Bushing to length from Raw Stock and bolt to Rivet Nut.

### **OPTIONAL KEY LOCK INSTALLATION**

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

**NOTE:** *Proper fitting of the Key Lock will require the Canopy Assembly to be installed on the Fuselage. Fit up is best done with the Canopy halves removed.*

1. Become familiar with the Key Lock Installation **Parts Drawings** and collect the parts shown in the drawings.
2. Locate the hole location for the Key Lock per **FIGURE 10C-02**. Mark the center of the Key Lock location and step drill slightly smaller than the barrel of the Key Lock. File the hole to size to allow insertion of the Key Lock. **IMPORTANT:** *Be sure to orientate the hole correctly.*
3. Install Key Lock.
4. Orientate arm of Key Lock downward. Close Canopy. Locate Canopy Key Latch (KPFU0662) on top of Forward Longeron just aft of the Key Lock arm. Position Canopy Key Latch to clear the Canopy side. Transfer drill #30, deburr, and rivet. **CAUTION:** *Do NOT rivet Canopy Key Latch in place with the Canopy closed.*