

## **TITAN X-340 - ENGINE MOUNT INSTALLATION**

**For easy access to both sides of the firewall:** Before installing the engine the firewall, boot cowling should be fitted and removed, and rudder pedal return cable pulley installed.

**HINT:** For easy install of avionics only cleco the top of the boot cowl to gain access.

**For Tailwheel versions:** If building a tailwheel version and the tail group and tailwheel are not installed, ballast will be required to prevent nose over.

### **ASSEMBLY of FIREWALL MOUNTED ITEMS**

Install Engine Mount after all applicable accessories are located on firewall. Refer to **FIGURE 11-01/TITAN340** for mounting items on the firewall. Item specific dimensions are shown in other Figures following this one.

### **CABIN HEATER VALVE INSTALLATION**

1. Locate and cut or drill the holes required for the cabin heater valve. Install the cabin heater valve as per the parts manual drawing. See **FIGURE 11-02/TITAN340** for location of holes.
2. Locate and drill the hole location for heater cable exit grommet. Refer to **FIGURE 11-02/TITAN340**.
3. Connection to Heater Wrap on Exhaust system will be done during Exhaust Assembly.

### **GASCOLATOR INSTALLATION**

1. Refer to Fuel System – Fuselage. Locate and drill the holes in the firewall for installing the Gascolator Mount. Refer to **FIGURE 11-03/TITAN340**.
2. Install 1/8" Pipe Plug and 90 Degree Fitting in Gascolator. Orientate fitting per parts page drawing.
3. Install Gascolator to Gascolator Mount and bolt to firewall per parts page.
4. Orientate drain fitting outboard toward cowling. A hole may be located in cowling to allow checking fuel with a cylindrical type fuel tester.

## **TITAN X-340 – ENGINE ELECTRICAL ACCESSORY INSTALLATION**

1. Refer to the parts catalog and select the required components for assembly.
2. Install Ignition Boxes to AFT side of the firewall. Refer to **FIGURE 11-04/TITAN340**. Transfer drill #11 through firewall at pre-welded tabs as show. Cleco Ignition Boxes to tabs. Orientate and transfer drill through firewall. Install Oil Cooler Mount Angle to forward side of firewall when installing the Right Hand Ignition Box.
3. Locate holes for Throttle and Mixture Cable Exit Grommets. Be sure the locations will not interfere with the electrical connectors of the Ignition Boxes. Refer to **FIGURE 11-04/TITAN340**.
4. Locate hole for Alternate Air Cable Exit Grommet. Refer to **FIGURE 11-04/TITAN340**.
5. Cut Aluminum bushings as per the parts catalog and bolt boxes to firewall.
6. Locate and install Starter Solenoid per **FIGURE 11-04A/TITAN340**.
7. Refer to parts manual and cut bushings to length for the Ignition Modules, which mount on top of the engine. See **FIGURE 11-05/TITAN340** for Module Mount Bracket locations. Attach FWD and AFT Cooling Baffle Support Brackets at this time also. Re-torque the crankcase to 96 inch lbs. per TITAN X-340 Illustrated Parts Catalog.
8. Fabricate the Aft Ignition Bracket Brace from provided material per **FIGURE 11-06/Titan340**.
9. Cut Ignition Module Mount Plate into 2 parts. Bolt plates to Mount Brackets. Be sure to include the Aft Ignition Bracket Brace.
10. Bolt Ignition Modules to lower side of Mount Plates. Use bushings where indicated. The module assemblies will be installed to the engine when the baffles are installed.

**ENGINE MOUNT and ENGINE INSTALLATION**

Become familiar with the TITAN X-340 **PARTS MANUAL DRAWINGS** and collect the parts shown in the drawing.

1. Refer to the parts catalog and select the required components for assembly.
2. Assemble the engine mount to the firewall as per the parts manual. The mount may not line up exactly and will need to be pulled into place. A good method is to grease the bushings on the mount and fuselage cage, and insert all bolts and slowly and evenly work the mount tight against the firewall.
3. Install the engine using the hardware called out in the parts manual. Torque all bolts as per standard values for bolt size. See list below for reference.

5/16" with tensile nuts      100-140 in-lbs

7/16" with tensile nuts      450-500 in-lbs

**TITAN X-340 - BAFFLE INSTALLATION****SIDES, INLET FLOORS AND FORWARD BAFFLE ASSEMBLY**

1. Refer to the parts catalog and select the required components for assembly.
2. Attach Baffle Sides to engine. Leave the bolts slightly loose, until final assembly of baffles, to allow better alignment. Do **NOT** rivet the Baffle sides to each other.
3. Bolt Support Angles to forward sides of engine (both sides behind prop flange).
4. Cleco Right Inlet Floor to Reinforcement. Position on Right Support Angle and against Baffle Side. Tape in place. Transfer drill #30 into Support angle and cleco.
5. Position Left Inlet Floor under the Support Angle bolted to the FWD cylinder and on top of two remaining support angles behind the prop flange. Transfer drill #30 and cleco. Tape Inlet Floor to Baffle Side.
6. Position Barrel and Cylinder Plates under Inlet Floor Assemblies and transfer drill #30. Be sure Plates are tight against the Barrel and Cylinders. Rivet together. A #40 hole may be drilled in the lower flange of each Plate to allow securing tight against the cooling fins.
7. Rivet Cabin Heat Inlet to Right Inlet Floor.
8. Fabricate angles from Inlet Support Angle raw stock to join each Inlet Floor to Baffle Side. Locate #30 holes, transfer drill and cleco.

9. Position FWD Baffles on top of Inlet Floors. Locate against FWD Support Bracket at top FWD of engine. Move baffles as needed to allow aligning against face of engine and flush with inlet floors. Mark or use a hole finder to locate and drill #30 through FWD Baffles and FWD Support Bracket.
10. Fabricate angles from Inlet Support Angle raw stock to join each Inlet Floor to FWD Baffle. Locate #30 holes, transfer drill and cleco.

### **AFT BAFFLE ASSEMBLY**

11. Remove Oil Dip Stick Tube to make assembly easier. Plug hole to prevent foreign material falling into engine.
12. Rivet 3 inch Flange, Cylinder Plates, Outer Barrel Plate and Inner Barrel Plate Mount to aft side of AFT Right Baffle.
13. Bolt AFT Right Baffle to engine.
14. Transfer drill #30 through Aft Right Side Baffle into AFT Right Baffle, making sure the edges are flush.
15. Position Inner Barrel Plate against lower side of Plate Mount and against cylinder barrel. Transfer drill #30 and rivet.
16. Rivet Barrel Plates to aft side of AFT Inner Left Baffle. Temporarily bolt AFT Inner Left Baffle to engine.
17. Rivet Barrel and Cylinder Plates to aft side of AFT Outer Left Baffle and position assembly against flange of Inner Left Baffle and cooling fins. Tape in place.
18. Align AFT Support Angle with juncture of Left AFT Baffles and transfer drill #30 into each.
19. Transfer drill #30 through AFT Outer Left baffle and AFT Left Side. Remove Outer and Inner Baffles. Rivet AFT Support Angle in place. Re-bolt assembly to engine and rivet.
20. Transfer drill #11 through AFT Support Bracket and AFT Baffles. Bolt together with previously fabricated Aft Ignition Bracket Brace.
21. Tighten all bolts.
22. Any gaps may be sealed with High Temp Silicon Seal.
23. Re-install Oil Dip Stick Tube and secure with safety wire.

### **BAFFLE SEAL INSTALLATION**

24. Installing the Baffle Seal Material after fit-up of the cowling may make cowl fit-up easier.

25. The Baffle Seals will protrude away from Baffles and seal against the cowling. Cut Baffle Seal Capture Strips into lengths to fit the edges of all baffles. Strips may be cut shorter in curved areas as needed. Locate strips at edges of all baffles and drill #30 through centerline of strips. Most rivets may be spaced about 2.50" apart. Shorter areas will of course need to be spaced closer.
26. Locate Baffle Seal Material flush with bottom edge of Capture Strips. Cut to length as needed. Drill through and cleco to inside of baffles. Be sure baffle seals run around all edges of baffles (sides, AFT, FWD and inlet floors) where they can seal against the cowling. Trimming to height may be done after cowling is in place.
27. Any areas that will not allow a capture strip may be done by overlapping the Baffle Seals and using a Fabric Rivet. Mark and remove baffle seal material and capture strips to allow cowling to be more easily installed.

## **TITAN X-340 - BATTERY BOX ASSEMBLY & INSTALLATION**

1. Refer to the parts catalog and select the required components for assembly.
2. Cleco Support Angles to inner sides of Front Plate. Refer to the PARTS MANUAL DRAWING. Transfer drill #30 and rivet. Base of battery will set on Support Angles.
3. Cleco through the pre-drilled holes in one edge of Battery Box Front Plate and Battery Mount Plate.
4. Slip Battery into assembly. Align free edge of Plates; pull Front Plate against battery. Check to see if Battery can be slid in and out. If battery cannot be slid in and out, then loosen fit slightly to allow easier removal. Clamp and transfer drill #30 through all holes and cleco.
5. Rivet as shown in parts manual.
6. Transfer drill the remaining holes to #11. These three locations plus another builder located hole will be used to mount the box to the forward side of Station 3.
7. Slide the Battery Bar through the holes in the Battery Box assembly. Modify the Battery Bar per **FIGURE 11-07/TITAN340**. Remove Battery from Battery Box assembly

## **INSTALLATION**

8. Locate the plain clamps around the Station 3 tubes as shown in the parts manual. Bolt through the clamps using the pre-drilled holes.  

**NOTE:** Wrapping Anti-chafe tape around the tubes in the Plain Clamp locations is recommended.
9. Locate the right-hand 3/8" clamp, mark the hole location and drill the battery box to #11. Bolt in place.
10. Install Battery and Battery Bar. Install Small Cotter Pins to retain Battery Bar.
11. Drill 1/4" through the vertical welded steel bushing forward of Station 3 and through the Fuselage Bottom Skin.
12. Remove the powder coat from the top of the vertical bushing. Bolt the Tang to the top of the vertical bushing with the tang's end angled downward to clear the Aileron Cable. Be sure the 1/4" Pan Head Bolt is installed from below through the fuselage skin.
13. Bolt the Ground Cable to the Tang and to the negative (-) battery terminal.

14. For safety reasons the Battery to Solenoid Cable should only be attached to the positive (+) battery terminal just prior to engine start or other electrical testing.

### **TITAN X-340 - FUEL SYSTEM - FIREWALL FORWARD**

Refer to the parts pages and select the required components for assembly.

#### **FUEL LINE INSTALLATION**

1. Connect Fuel Line Assembly from OUTLET side of Gascolator to INLET side of Engine Fuel Pump as shown on Parts Page. Tighten all connections.
2. Connect Fuel Line supplied with engine from Engine Fuel Pump to Fuel Injection Servo with indicated fitting.
3. If installing a Fuel Flow Transducer (i.e. Electronics International FT60), re-route the fuel lines as shown in the parts manual using the Optional – Fuel Line Assembly – Transducer to Fuel Servo. This Optional Fuel Line Assembly is available from RANS Aircraft Parts.

#### **FUEL PUMP DRAIN INSTALLATION**

1. Install 90-degree Elbow into Mechanical Fuel Pump.
2. Cut Drain Line from provided Aluminum Tube. Be sure to place a 45° bevel at the lower end of tube. Orientate bevel to the aft when installing.
3. Locate Angle Bracket on lower flange of firewall. Drill #11 and rivet in place. Be sure to place far enough forward to allow drain tube to clear firewall when clamped in place. Also, locate away from exhaust, near center of firewall.
4. Bolt Plain Clamp with drain tube to Angle Bracket. Beveled end of drain tube should extend 1" or more below firewall. Route Black Fuel Line to drain tube. Cut to length, as needed, and attach to hose fitting and drain tube. Tighten or secure all connections.

## **TITAN X-340 - FUEL SYSTEM - FUSELAGE**

**IMPORTANT:** The header tank is designed to fit on the left side of the cockpit. Changing this location will affect the design of the system and is **NOT** recommended. The weight of the fuel and header tank is low and close to centerline and does not impact wings level rigging.

1. Locate Header Tank Mount per **FIGURE 11-08/TITAN340**. Transfer drill #30 through each tab. Glue Rubber Edging to top edge of Mount flanges. Rivet Header Tank Mount to top of tabs.

### **HEADER TANK ASSEMBLY**

1. Locate and drill fitting holes in Header Tank per **FIGURE 11-09/TITAN340**. Do **NOT** drill the sump drain holes until fitting of the tank to the fuselage. For drilling the holes a 1/2" Unit-Bit® and 3/4" Unit-Bit® work best. Locate center of each hole with a #30 drill bit, then drill full size. Deburr all holes. Thoroughly clean tank several times by rinsing with water. After confirming that all foreign material has been removed, let dry prior to installing fittings.

**NOTE:** If it is anticipated that the plane will be converted between Trike and Taildragger, then it is recommended to install sump drains in both locations.

<b>DOUBLE &amp; TRIPLE CHECK HOLE LOCATIONS BEFORE DRILLING.</b>
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2. To install the fuel fittings into the tank, obtain a piece of wire. Safety wire works well. Insert wire through one of the fitting holes in the tank and up through the filler neck. Refer to **FIGURE 11-10/TITAN340**. Install an O-Ring onto the tank withdrawal fitting and slide this assembly over the wire extending from the filler neck. Bend a loop in the end of the wire to keep the fitting and O-Ring from falling off. Pull the fitting through the hole. Slide a flat rubber washer, thick steel washer, and a retaining nut over the wire and onto the fitting. Apply Loctite to threads and thread the nut on before removing the wire.

**CAUTION:** Do **NOT** get Loctite on the rubber washer.

3. Use an Allen wrench inserted into the tank fitting to hold the fitting while tightening the retaining nut.

**IMPORTANT:** Do not allow the fitting or thick washer to rotate while tightening or leaks may occur.

**HINT:** Prevent the thick washer from turning by holding with needle-nose Vise-Grips.



4. Apply thread sealant to fittings and install into the tank fittings. Again, allow no rotation of the tank fitting. Refer to the parts manual for the correct parts.
5. Perform a leak test by capping off all fittings and pressurizing the tank to 1 PSI and let set for a period of time.

**CAUTION:** Damage may result from over-pressurization. While the tank is pressurized, check for any leaks by spraying a soap/water mixture onto the tank and around the fittings. To cap off the fittings use a 1" segment of fuel line with a bolt inserted, and fuel line clamps or similar. An alternate test is to fill the tank with water and let it sit for approximately 48 hours.

6. Modify Header Tank Mount Channel per **FIGURE 11-11/TITAN340**. Position Header Tank flush with front of Mount. Use large hose clamps to secure tank to mount.

**NOTE:** Modified Mount Channel will position under hose clamps, on top of tank, and be positioned so that Channel ends are flush with sides of header tank.

7. Drill a #40 hole in edge of Fuel Cap. Screw on the cap and tighten. Using the hole in the cap, safety wire the cap against rotation to the fuselage frame.

#### **(AFTER WINGS MOUNTED TO FUSELAGE)**

8. After wings are mounted to fuselage in final assembly, route fuel line from each wing, down behind Station 3 and to Header tank. Secure as desired using plastic ties. Add a clear plastic tape or split fuel hose as anti-chafe wherever the lines contact the fuselage frame or other parts.

#### **LOCATING HEADER TANK SUMP VALVE HOLE THROUGH BELLY SKIN**

1. Mark on the outside of the tank on each side next to the sump valve as per **FIGURE 11-12/TITAN340**. This allows location of the hole through belly skin with the tank installed.
2. Set the header tank in place. Transfer the marks on the tank to the belly skin. Remove the tank and project the marked lines at 90° to the sides of the tank until they intersect.
3. Drill a #40 in the skin at the intersection. Set the header tank securely in place. Drill #30 through the hole in the skin and the header tank. Use a step drill or several sizes of drill bits to work up to the required size hole for the sump drain fitting.

## **FUEL VALVE INSTALLATION**

1. Install two fittings to the fuel valve using thread sealant. Refer to **FIGURE 11-13/TITAN340** and the parts manual.
2. Remove the handle from the fuel valve and install the valve to the two tabs of the fuselage steel frame. Use the mount brackets as shown in **FIGURE 11-13/TITAN340**. Re-install the handle to the fuel valve.

**NOTE:** Valve should be "ON" when valve handle is AFT and "OFF" when valve handle is UP.

3. Fabricate and install a fuel hose assembly from the Gascolator Mount fitting in the firewall to the fuel valve. Secure as desired using plastic ties. Add a clear plastic tape or split fuel hose as anti-chafe wherever the lines contact the fuselage frame or other parts.

## **ELECTRIC FUEL PUMP**

1. Become familiar with the Electric Fuel Pump **PARTS MANUAL DRAWINGS** and collect the parts shown in the drawings.
2. Install fittings into Fuel Pump with Thread Sealant. Be aware that the Fuel pump will need to be assembled in "SHORT CONFIGURATION" per documentation at the following link. <https://www.flyefii.com/products/boost-pump/installation-tips/>
3. Fabricate Mounting Plate per **FIGURE 11-14/TITAN340**.
4. Cleco mount plate to tabs. Locate clamps on fuselage tubes and mark location of mounting holes. Remove plate and drill #11 for clamp mounting.
5. Rivet Nut Plates to bottom of mount plate and tabs under Left Seat.
6. Attach mount plate to fuselage and bolt fuel pump to mount plate.
7. Connect Fuel Line from Header Tank to Fuel Pump. Connect Fuel Line from Fuel Pump to Fuel Valve.
8. Connect electrical wires of fuel pump to a 12-volt switch on Instrument Panel. Do **NOT** forget to include a proper sized breaker.

### **OPTIONAL LOW FUEL WARNING KIT**

1. Become familiar with the Optional Low Fuel Warning Kit on the Header Tank **PARTS MANUAL DRAWINGS** and collect the parts shown in the drawings.
2. A 5/8" hole should have been located in the side of the Header Tank. If not, refer back to **FIGURE 11-09/TITAN340**. MAKE SURE THE LOW FUEL INDICATOR IS IN THE MIDDLE OF THE HEADER TANK. Replace Washer provided with Low Fuel Warning Switch with 5/8" Rubber Washer. Install Low Fuel Warning Switch into Header Tank. Be sure to orientate the switch to allow electrical continuity (closed circuit) when installed. Use a continuity tester (Ohmmeter) to be sure. Refer to **FIGURE 11-15/TITAN340**. As the header tank fills with fuel, the switch will open, turning off the LED Indicator Light.
3. Install 5/8" Rubber Washer, 5/8" Steel Washer and plastic nut on outside of tank and tighten. Double check to be sure the switch is orientated correctly.
4. Locate LED Indicator Light in instrument panel. Connect to Low Fuel Warning Switch per **FIGURE 11-15/TITAN340**. Do not forget to include a proper sized breaker or fuse.

### **TITAN X-340 – LUBRICATION SYSTEM ASSEMBLY**

1. Refer to the parts catalog and select the required components for assembly.
2. Oil Cooler Mount Angle should have been bolted to the firewall when the Ignition Modules were installed. If not refer back to **FIGURE 11-04/TITAN340**.
3. Install Nut Plates to lower side of Oil Cooler Mount Angle. Fabricate Spacer Bushings called out in parts manual. Bolt Oil Cooler Duct and Oil Cooler to Oil Cooler Mount Angle, on firewall. Include the spacer bushings.
4. Rivet FWD Oil Cooler Support under lower forward flange of Oil Cooler. Use washers to back up the mount holes in the oil cooler.
5. Locate cushion clamp on engine mount tube below oil cooler. Bolt left hand radiator mount bracket to FWD Oil Cooler Support. Insert bolt and spacer bushing. Through cushion clamp, through lower hole in the left hand Radiator Mount Bracket. Be sure Oil Cooler is 90° to firewall. If not adjust cushion clamp to raise or lower as needed.
6. Bolt remaining mount bracket to right side of FWD Oil Cooler Support. Swing to align with bolt in cushion clamp. Mark where aligned with bolt. Remove and locate a #11 hole on centerline. Trim excess material beyond hole. Re-bolt upper end to support and bolt lower end to cushion clamp.

7. Temporarily install 90° fittings in oil cooler and engine.
8. Install Upper and Lower Oil Hose Assemblies.
9. Re-install fittings and tighten to align with Oil Hose Assemblies.

**CAUTION:** Use a backup wrench on the oil cooler and engine fittings to prevent damage.

10. Install Oil Drain Valve into crankcase of engine and secure with safety wire.
11. Using hose clamps secure 3" hose to Oil Cooler Duct and 3" flange on aft of engine baffles.

### **ENGINE BREATHER VENT TUBE INSTALLATION**

12. Install 90-degree Elbow into Top Aft of engine.
13. Cut Vent Tube from provided Aluminum Tube. Be sure to place a 45° bevel at the lower end of tube. Orientate bevel to the aft when installing.
14. Locate Angle Bracket on lower flange of firewall. Drill #11 and rivet in place. Be sure to place far enough forward to allow vent tube to clear firewall when clamped in place. Also, locate away from exhaust, near center of firewall.
15. Bolt Plain Clamp with vent tube to Angle Bracket. Beveled end of drain tube should extend 1" or more below firewall. Route 5/8" Oil Line to vent tube. Cut to length, as needed, and attach to hose fitting and vent tube. Tighten or secure all connections.

### **TITAN X-340 – CROSS-OVER EXHAUST ASSEMBLY**

1. Refer to the parts catalog and select the required components for assembly.
2. Refer to manual supplied with Exhaust System for installation.

**TITAN X-340 - THROTTLE & MIXTURE CONTROL ASSEMBLY**

1. Refer to the parts catalog and select the required components for assembly.
2. Fabricate 2 Retainer Angles from raw stock per **FIGURE 11-16/TITAN340**.
3. Bolt Retainer Angles to Throttle / Mixture Control Mount. Only Bolt through the pre-drilled #11 holes at this time.
4. Bolt Teleflex Retainers to Retainer Angles. Make sure the slotted flange is forward.
5. Remove 3 of the Fuel Servo Mount Studs on bottom of the engine and replace with Longer Studs as indicated in the Parts manual. These studs must be longer to allow mounting of the Throttle / Mixture Control Mount.
6. Bolt gaskets, Fuel Servo Spacer, Fuel Servo and Control Mount to studs on bottom of engine. Tighten nuts to 204 in-lbs per Titan information.
7. Modify Eyeball Firewall Fittings by drilling center hole of ball to 19/64". Assemble each Eyeball Fitting, tighten the nut to prevent rotation of the eyeball, and clamp the assembly in a drill press.
8. Route Control Cables through Instrument Panel, then through Firewall with Eyeball Firewall Fittings. Insert Control Cables into respective Teleflex Retainers. Install Female Rod Ends and bolt to Control Arms on Servo. Tighten Eyeball Fittings to retain cables.
9. Allow Retainer Angles to align with Control Cables. Transfer drill #11 through Control Mount and Retainer Angles. Bolt Retainer Angles to Control Mount.
10. Safety wire through Teleflex Retainers to secure control cables.

### **TITAN X-340 - AIRBOX ASSEMBLY**

1. Refer to the parts catalog and select the required components for assembly.
2. Rivet Nut plates to inside of Airbox Bottom.
3. Cleco Airbox Top, Side and Bottom together at the aft end, using the pre-drilled #30 holes. Wrap side around to the front and transfer drill #30 through Top and Bottom Flanges. Adjust flange on Top and Bottom, as needed, to fit against the Airbox Side. Once satisfied with fit, rivet together. If desired smooth High Temp Silicone Seal on the outside of any gap.
4. Assemble Airbox Filter Cover with Alternate Air Valve parts. Note that the Airbox Filter Cover requires a specific orientation to work properly. Refer to **FIGURE 11-17/TITAN340** for proper orientation. The Airbox Bottom also has a 1/4" hole to allow the rivet retaining the 1/4" Plain Clamp to clear.
5. The Baffle Seal Material will protrude away from the front of the airbox inlet and seal against the cowling. Cut Baffle Seal Capture Strips into lengths to fit the inside edges of the airbox inlet. Locate strips centered on the pre-located #30 holes at front of the airbox top and bottom. Transfer drill #30. Cut strips for sides. They should align with top and bottom strips. Locate three #30 holes on centerline and transfer drill.
6. Fabricate 4 strips, 1-3/4" long from the capture strip material. Locate inside the bottom lip of the airbox and locate a #30 hole at one end to allow to be clecoed in place. These pieces will extend forward, and be bent down to help form the seal material to clear the lower lip of the cowling inlet.
7. Locate Baffle Seal Material flush with edge of Capture Strips. Cut to length as needed to complete the seal in one piece with an overlap at the top. Drill through and cleco to inside of Airbox inlet with capture strips. Be sure seal runs around all edges of inlet and will extend forward to seal against the cowling. Trimming to length may be done after cowling is in place.
8. Bolt airbox to Fuel Servo. Insert air filter and secure Airbox Filter Cover to bottom. Be sure the Cable Swivel Stop protrudes through Alternate Air valve. Install Adjustable Cable Ferrule into aft end of 1/4" Plain Clamp. Route Control Cable through Instrument Panel and grommet in firewall.
9. Mark control cable to length and trim. Be sure to pull the control wire out enough before trimming to allow engagement in swivel stop. With the control cable pushed "IN" the Alternate Air Valve should be "CLOSED". Tighten Swivel Stop Screw and safety wire the cable. Alternate Air Valve should open and close fully. Re-adjust as needed.

## **TITAN X-340 - 13" SPINNER ASSEMBLY**

- Spinner Assembly requires Propeller and Prop Extension

**NOTE:** The spinner will **NOT** measure 13" in diameter, but is designed to match up to a 13" diameter face on the cowling.

1. Refer to the parts catalog and select the required components for assembly.
2. The AFT edge of 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 **FIGURE 11-18/TITAN340**.

**HINT:** Use a compass and draw a circle slightly larger than the spinner diameter. Use a ruler and draw lines from center to outer edge of circle. Center the spinner dome and place a mark on the dome at each line.
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 opening using the same edge of the template. The openings may be cut and sanded smooth using a Dremel.

**HINT:** Use reinforced cut-off wheels and 1/2" or larger 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 3/16" 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, between each cut-out. Refer to **FIGURE 11-19/TITAN340**. Drill #40 through the marked locations.
8. Place Dome over Backing Plate/Prop Assembly with the Backing Plate sitting on a flat surface. 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 11-20/TITAN340**.  
**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. Refer to **FIGURE 11-21/TITAN340**.
12. "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.
13. The Spinner Dome is now ready for painting.
14. During final assembly, install the Prop Extension and Backing Plate on the engine prop flange. Install the prop. Refer to **PROPELLER INSTALLATION** and bolt the Spinner Dome in place.
15. 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.



## **TITAN X-340 - COWLING ASSEMBLY & INSTALLATION**

### **(FINAL INSTALL OF ENGINE)**

- The Engine, Starter Ring, Prop Extension, Spinner Backing Plate and Boot Cowl must be installed before installing the Cowling.
1. Refer to the parts pages and select the required components for assembly.
  2. Attach two 3/8" spacers to the flange of the Spinner Backing Plate. Reference **FIGURE 11-22/TITAN340**. A couple of 3/8" thick wood boards work well for this. Bolt the Extension to the engine drive flange. Bolt the Spinner Backing Plate to the prop extension. Use the back half of the prop hub or tubular spacers to press the backing plate tight against the prop extension.
  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. Trim prop opening flange of upper and lower Cowls to 1". Trim joggle areas of lower Cowl to 3/4". Refer to **FIGURE 11-23/TITAN340**. A Dremel tool with a reinforced cut-off wheel works well for cutting. A drum sander works well for smoothing.
  4. Remove AFT flat section of airbox inlet area of lower Cowl. Refer back to **FIGURE 11-23/TITAN340**.

**HINT:** Use a black sharpie to mark the cut-out perimeter.
  5. Apply two rows of 2" wide masking tape to the Boot Cowl aft of the cowling joggle. You want approx. 4 inches of tape aft of the cowling joggle all the way around the Boot Cowl.
  6. Mark a line 3" aft of the joggle all the way around the fuselage.
  7. Tape the lower cowling in position against the backing plate with 3/8" spacers. Be sure the lower cowl is level with the fuselage from side to side. Mark 3" forward from the line on the fuselage. This will place a line on the Cowling directly over the joggle.

**HINT:** Reinforced packaging tape works well to hold the lower Cowling while fitting up.
  8. Trim the lower edge of the lower cowling to the marked 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. Leave the aft edge of the scoop exit long for now.

9. Slip the upper Cowl into place. The forward edge should touch the 3/8" spacers. The forward end of the upper Cowl should be positioned to allow clearance with all components on top of the engine and the starter ring behind the prop. Set the top edge of the cowl 1/4' below the top of the spinner dome to allow for sag of the engine. The forward face of the cowl should be parallel to the spinner backing plate and centered side to side when completed. Trim area around Prop Flange Opening to allow Cowling to align with Spinner Dome.

**IMPORTANT:** Check to be sure the air openings appear level from side to side.

10. Re-adjust as needed and re-tape in place. The sides of the upper Cowl will lap over the lower Cowl until trimmed.
11. 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.

12. Tape forward ends of the Cowlings tightly together, check for proper alignment. Re-adjust as needed and re-tape in place.
13. Locate the top center fastener hole per **FIGURE 11-24/TITAN340**. Drill #40 and Cleco. Locate the bottom fastener holes, drill #40 and Cleco. Mark and trim the aft edges of the Cowling to fit in the Cowl joggle.
14. Measure and drill the positions for the aft fasteners #40 and cleco. Refer back to **FIGURE 11-24/TITAN340**.

**NOTE:** Removing the small square area where the lower Cowl overlaps onto the Boot Cowl Strip will allow the upper Cowl to lay flush with the Boot Cowl. Refer back to **FIGURE 11-23/TITAN340**.

15. 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.
16. 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.
17. The upper Cowling may need to be trimmed again. Everything changes a little when it settles in the joggle. Sand to final fit.
18. Measure and drill the positions for the fasteners #40 at the cowl to cowl joggle and cleco. See **FIGURE 11-24/TITAN340**.
19. Transfer drill all holes to #11 and cleco.
20. Final trim all of the openings.

21. Refer to **FIGURES 11-25/TITAN340 and 11-26/TITAN340**. Mark the opening position for the Oil Check Door on the upper side of the upper Cowl.

**HINT:** A Dremel tool with a reinforced cut-off wheel and small sanding drum works well.

22. Position Oil Frame Door with fastener holes towards aft edge of cowl. Cleco in place. Center Maintenance Hatch in opening. Align holes for 1/4-Turns and transfer drill #30 through hinge. Cleco as you drill.

**NOTE:** Form the Maintenance Hatch and Oil Frame Door to better contour to the upper Cowling as desired.

23. Rivet 1/4 Turn Receptacles to bottom of Oil Frame Door.
24. Cleco 1/4 Turn Receptacles through #11 holes to inside of Boot Cowl Strips. Align and transfer drill #40 through Receptacles. Remove Receptacles.
25. Position 4 forward Nut Plates to inside of lower Cowling, temporarily retain with Truss Head Screws and transfer drill #40. Remove Nut Plates
26. Step drill 1/4-Turn Receptacle holes to 5/16". Refer to **FIGURE 11-27/TITAN340**.

**NOTE:** Rivet holes in the cowling may be countersunk for a more flush fit.

**IMPORTANT:** The 4 forward most holes must remain #11 for the #8 Screws.

27. Step drill the fastener holes to 1/4". Refer back to **FIGURE 11-27/TITAN340**.

**IMPORTANT:** The 4 forward most holes must remain #11 for the #8 Screws.

28. Trim aft edge of lower Cowling air exit per **FIGURE 11-28/TITAN340**.
29. Paint Cowlings and Oil Access Door.

**(AFTER PAINTING OF COWLING AND OIL ACCESS DOOR)**

30. Rivet 1/4 Turn Receptacles and Nut Plates in place.
31. Install 1/4 Turn Fasteners in Cowlings. Refer back to **FIGURE 11-27/TITAN340**.
32. Install Cowling and admire.

## **TITAN X-340 - PROPELLER INSTALLATION**

### **(FINAL INSTALL OF ENGINE)**

- The Engine, Starter Ring, Prop Extension, and Spinner Backing Plate must be installed before installing the Propeller.
1. Refer to the parts pages and select the required components for assembly.
  2. Inspect the Prop for any nicks, crack or dings.
  3. Assemble and mount the propeller as per PARTS MANUAL DRAWING and Manufacturer's instructions using the bolts provided. Set pitch of prop, using measuring tools provided with the prop to the following for a starting point. Adjustment may be required after Static RPM is checked.
- Whirl Wind = 20° as a starting point
4. Use a star pattern and torque the bolt per Manufacturer's instructions. Re-torque bolts after 5 hours of flight and thereafter according to Manufacturer's instructions.
  5. Check prop for tracking by turning blade into a vertical position and placing an object at the tip. A plastic 5 gallon bucket or similar will work well. Rotate the prop to the next blade and check position. If the position is the same, the prop is in track. If not, loosen prop bolts and re-torque until proper tracking is achieved.

**HINT:** Start torque pattern on the blade that is out of track. See **FIGURE 11-29/TITAN340**.

**DANGER:** Track prop with ignition **OFF!!**
  6. Secure Spinner Dome to the Spinner Backing Plate. Refer to **SPINNER ASSEMBLY**.
  7. Before first test flight, lock brakes, chock wheels and tie the tail to prevent unintentional aircraft run-away when checking Static RPM. Static (full throttle) RPM should be between 2000 - 2400 RPM