2. Torque the center torque tube bearing support bolts at the firewall and the cabin floor to 185-195 inch pounds and torque the bolts that attach the ends of the torque tube assembly to the fuselage sides to 300-350 inch pounds.
3. Be sure to install the lefthand brake cylinder attach bracket on the copilot's side before installing the forward rudder bar or sufficient clearance will not be available under the rudder bar to install the brake cylinder bracket rear retaining nut and washer.
4. Attach the left and right brake cylinder on the pilot's side to the floor. Then attach the parking brake chain to the parking brake link on the master cylinder using .032-inch stainless steel safety wire making a double loop through the link and through the chain. Lastly, install the two clevis pins which attach the left and right rudder pedals on the pilot's side to the master cylinders.
5. If the upholstery side panels and fiberglas insulation have been removed from the forward cabin area, the fiberglas insulation may be recemented to the fuselage side skin with Uniroyal 6306 adhesive or equivalent. This adhesive may also be used to recement the floor covering to the fuselage floor where it has been pulled loose forward of the rudder bars.
6. When reinstalling the manometer covers, be sure that the insulation on all electrical connections under the covers has not been disturbed while the covers were removed and hanging over the outside of the fuselage.
7. Be sure that the clear plastic seat-belt protectors are slid all the way down the seat belts before the seats are installed.
8. The seat installation may be simplified by installing the seat-return springs after the seat rails have been bolted to the brackets on the center section spar.
9. Torque the bolts that attach the nose gear strut to the torque tube assembly to 95-110 inch pounds.
10. Reseal the nose gear boot to the firewall and to the floor with Proseal No. 700.

## C. WHEELS, TIRE, AND BRAKES

The following steps lists the disassembly, inspection, repair, and reassembly procedures for first the main wheel, and secondly, the nose wheel.

To disassemble the main wheel:

1. Remove the two bolts which attach the brake lining to the brake assembly.
2. Remove the wheel from the axle by removing the cotter pin and the axle nut.
3. Deflate the tire by removing the valve core.
4. Break the tire bead loose.

**NOTE**

Care should be taken to prevent damage to the wheel halves when breaking the beads loose.

5. Separate the halves by removing the three bolts.

**CAUTION**

Do not attempt to separate the wheel halves with the tire under pressure. Serious injury could result, plus damage to the wheel halves.

6. Withdraw from both wheel halves the snap ring, grease seal rings, felt grease seal, and the cone bearings.

Inspection and repair of the main wheel:

1. Inspect the bearing cups for nicks and discolorations, and replace if necessary.

**NOTE**

To remove the bearing cups, heat the wheel halves for 15 minutes in boiling water. With an arbor press, press out the damaged bearing cups and press in the new ones while the wheel is still hot.

2. Clean the bearings, rings and seals with solvent and dry thoroughly using clean air blasts from an air hose.
3. Inspect the wheel halves for nicks, cracks, gouges, scoring, scratches and corrosion.

**NOTE**

Dress out small irregularities with hand sanding. Upon sanding an area, clean thoroughly, apply zinc chromate primer, and repaint with an aluminum lacquer. Replace cracked wheel halves.

4. Inspect the brake discs and linings for excessive wear or scoring and replace if neccessary. Small scratches may be sanded smooth.

5. Examine the bearings for damage or discoloration. Repack the bearings with bearing grease.

To reassemble the main wheel:

1. Position the tube inside the tire, aligning the red dot on the tire with the indexing mark on the tube.
2. Place the outboard wheel half in the tube and position the valve stem through the hole.
3. Position the inner wheel half and brake disc in the tube and secure the bolts.

NOTE

Care should be taken not to pinch the tube between the wheel halves.

4. Torque the bolts to the value marked on the wheel.

**CAUTION**

Uneven or improper torque values may result in wheel failure.

5. Install the bearings, grease seal rings, felt grease seal, and snap ring.
6. Inflat the tire to the prescribed pressure.
7. Position the wheel on to the axle and assemble the brake lining.
8. Install the axle nut and tighten until a slight drag is evident when rotating the wheel. Back off on the nut to the next castellation and install the cotter pin.
9. Install the dust cover, or wheel fairing.

NOTE

Whenever the wheel fairing is removed, the scraper assembly should be checked prior to installation. (Refer to Part E of this section).

To disassemble the nose wheel:

NOTE

If the nose wheel is equipped with a speed fairing, it will be necessary to remove the cotter pin and nut which attaches the nose wheel fork to the strut and withdraw the nose wheel and fairing together prior to the following steps.

1. Remove the nuts which mount the axle to the nose fork.
2. Withdraw the axle rod and subsequently the tire from the nose fork, and remove the axle assembly.
3. Deflate the tire by removing the valve core.
4. Break the tire beads loose.

NOTE

Care should be taken to prevent damage to the wheel halves when breaking the beads loose.

5. Separate the wheel halves by removing the three bolts.

**CAUTION**

Do not attempt to separate the halves with the tire under pressure. Serious injury could result plus damage to the wheel halves.

6. Remove the snap ring, felt grease seal, grease seal rings, and cone bearings.

Inspection and repair of the nose wheel:

1. Inspect the bearing cups for nicks and discoloration and replace if necessary.

NOTE

To remove the bearing cups, heat the wheel halves for 15 minutes in boiling water. With an arbor press, press out the damaged bearing cups and press in the new ones while the wheel is still hot.

2. Clean the bearings, rings, and seals with solvent and dry thoroughly using clean air blasts from an air hose.
3. Inspect the wheel halves for nicks, cracks, gouges, scoring, scratches or corrosion.

NOTE

Dress out small irregularities by hand sanding. Upon sanding an area, clean the area thoroughly, apply zinc chromate primer, and repaint with an aluminum lacquer. Replace cracked wheel halves.

4. Examine the bearings for damage or discoloration. Repack the bearings and bearing grease.

To reassemble the nose wheel:

1. Position the tubes inside the tire, aligning the red dot on the tire with the indexing mark on the tube.
2. Position the tire and tube on the wheel half and insert the valve stem through the hole.

3. Position the other wheel half and secure the bolts.

NOTE

Care should be taken not to pinch the tube between the wheel halves.

4. Torque the bolts to the value marked on the wheel.

**CAUTION**

Improper or uneven torque values may result in wheel failure.

5. Install the bearings, grease seal rings, felt grease seal, and snap ring.
6. Inflate the tire to the prescribed pressure.
7. Assemble the axle assembly through the wheel.
8. Position the nose wheel in the nose fork and insert the axle rod.
9. Install the nut and tighten until a very slight drag is evident when the wheel is rotated.

NOTE

All wheels and tires are balanced to within 5 in. lbs at the factory. It is recommended that replacement tires be balanced to this specification to prevent excessive vibrations in the gear assemblies.

D. TOE-IN AND CAMBER ADJUSTMENTS

Toe-in and camber adjustments are made at the factory to the following specifications and should be checked periodically to prevent excessive tire wear.

1. Toe in/out limit (each wheel) ± 30 minutes. Maximum difference (between wheels) is 30 minutes.
2. Camber to be within+ 2° at gross weight and -2° at empty weight.

Toe-in/out shims are available from the factory by the following part numbers =

| Part Number | Shim Angle | Amount of toe-in out change |
|---|---|---|
| 701068-1 | 0°-30 min. Ref. | 15 minutes |
| 701068-2 | 0°-45 min. Ref. | 23 minutes |
| 701068-3 | 1°-0 min. Ref. | 30 minutes |

Changing the toe-in/out on aircraft serials AA1-0001 through AA1-0064 can result in a camber change. A camber shim (Part No. 701072-1) is available and has an angle of 3°. The use of this shim requires replacement of the two lower bolts with AN6-21A bolts.

E. WHEEL FAIRINGS

The Yankee may be furnished at the customer's option, with fiberglass wheel fairings for both the main wheel and the nose wheel. All three fairings are equipped with an adjustable scraper which prevents stones and large deposits of mud or slush from entering the fairing cavity. Frequent checks of the fairing cavity should be made to determine that wheel rotation is not endangered by dirt accumulation.

When a fairing is removed or disturbed, the scraper adjustment should be checked for the proper clearance of 1/2-inch.

To remove the main wheel fairing:

1. Remove the plug button from the outboard side.
2. Remove the bolt which attaches the fairing to the axle.
3. Remove the four screws and two bolts from the inboard side of the fairing.
4. Remove the fairing by rotating up and forward.
5. Reassemble in the reverse order.

To remove the nose wheel fairing:

1. Remove the plug buttons from both sides.
2. Remove the tow bar bolts.
3. Remove the axle nuts and withdraw the axle.
4. Remove the cotter pin and nut which attaches the strut to the nose fork.
5. Withdraw the fairing, fork and wheel from the strut and individually remove the wheel and fork.
6. Reassemble in the reverse order.

# SECTION V

# CONTROL SYSTEM

## 5. CONTROL SYSTEMS

The following list of instructions describes the recommended procedures to properly rig the various control systems. Removal of the center console is necessary in order to rig any control system except the ailerons. Raising the baggage compartment rug and removing the access panels is necessary for rigging the ailerons. Normal servicing of the control systems should include the inspection of all turnbuckles, pulleys, fairleads, end fittings, and bearings. Also to be included is the addition of grease to the T-column and rudder torque tubes. Servicing of these bearings has no periodic requirement, but should be lubricated as necessary.

**NOTE**

Do not apply grease or oil to the aileron, rudder, elevator, or flap torque tube bearings. The flap actuator requires the application of general purpose grease to the screw jack every 100 hours.

**CAUTION**

Care should be taken to avoid grease contacting the outer surface of the nylon nut, since the nylon nut relies on friction to operate properly.

**NOTE**

All aircraft are rigged at the factory for slight left wing heaviness with one person. This results in right wing heaviness with two people. The aircraft can be rigged to suit individual requirements by adjusting the trim tabs on the ailerons. Do not exceed 45° as it will not contribute any more toward trim.

### A. AILERONS

1. Secure the control wheels in the nuetral position by installing the control wheel lock.
2. Adjust the turnbuckles, located beneath the baggage compartment, until the ailerons are positioned at 0° as indicated on an aileron rigging fixture. (See Figure 5-2).
3. Check the carry-through pulley cable tension at 25 ± 5 lbs.
4. Check the control column cable tensions at 25 ± 5 lbs.
5. Remove the control wheel lock and check the aileron travel to 25° ± 2° uptravel, and 20° ± 2° down travel.
6. Recheck the cable tensions.

### B. ELEVATORS

1. Secure the control wheels in the neutral position by installing the control wheel lock.
2. Adjust the elevator turnbuckles, located beneath the aft end of the console, until the elevator is located at 0° ± 2° as indicated by an elevator rigging fixture. (See Figure 5-3).
3. Check the elevator cable tension and adjust the turnbuckles to obtain a 35 + 0-5 lbs.
4. Recheck 0° position of the elevator surface.
5. Remove the control wheel lock and set the elevator stops, located on the aft bulkhead, to limit the elevator travel to 25° ± 2° up, and 15° ± 2° down.
6. Recheck surface travel and cable tensions.

### C. RUDDER

1. Position the rudder at 0° ± 2° as indicated by a rudder rigging fixture. Secure the rudder in this position (Figure 5-1 shows one recommended method).
2. Adjust the rudder turnbuckles, located beneath the aft end of the console, until the rudder pedal hinge pin is located 7.25-7.50 inches aft of the forward honeycomb (23-3/4" forward of the spar forward face). Refer to Figure 5-4.
3. Return the rudder surface to free movement and check the neutral position (0° ± 2°). For small adjustments, place or remove washers, as required, from beneath the centering spring eye bolt mounted to the forward bulkhead (firewall).
4. Adjust the rudder stops, located in the aft bulkhead, to limit the rudder travel to 25° ± 2° left and right.
5. Recheck the rudder travel and the rudder pedal location in the neutral position.

### D. FLAPS

1. Lower the flaps to 30° ± 2° as indicated by a flap rigging fixture. Any required adjustment should be made to the clevis on the flap linkage, located behind the seats (See Figure 5-5).
2. Raise the flaps to the 0° ± 2° position and adjust the limit switch so the button is depressed to within 1/16-inch of its full travel. Secure the switch.
3. Set the up stop on the actuator drive shaft approximately one-half turn beyond the point where the limit switch opens the electrical circuit.
4. Position the flap indicator .08 ± .06 inches from the forward end of the slot with flaps in the 0° position. Adjustments should be made by rotating the formed link which attaches the indicator rod to the actuator.
5. Recheck the flap travel.

E. TRIM

New bungee installation:

If a new bungee is being installed, the first step in rigging the trim system is to secure the elevator in its neutral position and place the trim tab 3° down with respect to the elevator. Match drill a #10 hole through the elevator bellcrank connecting link using the existing hole in the elevator bellcrank as the guide.

Bungee rigging:

1. Position the elevator at 0° ± 2° as indicated on an elevator rigging fixture. Install the control wheel lock.
2. Rotate the trim wheel to give a full nose up trim position.
3. Check the trim tab position at 11° ± 1° down with respect to the elevator surface. To measure the angle, a "bubble protractor" should be used (See Figure 5-6).
4. If the trim tab is not properly positioned, disengage the gears of the trim wheel and the flexible shaft by loosening or removing the trim wheel.
5. Rotate the trim shaft by hand until the trim tab indicates 11° ± 1°.
6. Replace the trim wheel and secure.
7. Remove the control lock and check the system for freedom of movement.
8. Check the trim indicator position during take-off and hand bend as required to bring within the green arc.

NOTE

Rigging fixtures may be procured through the Customer Service Department by the following part numbers:

A11533 Elevator and Rudder Fixture
A11534 Flap and Aileron Fixture

NOTE

For replacement of the shear-link rivets, see figure 5-6, Trim System.

F. FLAP MOTOR

The flap motor consists of a 12-volt series wound motor turning the worm gear. Its direction of rotation is controlled by a toggle switch which reverses the magnetic field in the motor.

To remove the flap motor:

1. Remove the bolt and nut which connect the actuator to the flap torque tube assembly.
2. Disconnect the four wires.

NOTE

It is recommended that the wires be labeled prior to disconnecting to prevent incorrect installation.

3. Remove the bolt which mounts the flap motor to bracket attached to the carry-through spar.
4. Reassemble in the reverse order and rig in accordance with Section 5D.

G. CONTROL SURFACES REMOVAL

To remove the ailerons:

1. Disconnect the turnbuckles from the aileron torque tube horn assembly, located beneath the baggage compartment.
2. Remove the horn assembly from the torque tube.
3. Remove the wing tip as described in Section 3-F.
4. Remove the fasteners from the outboard aileron torque tube support bearing.
5. Withdraw the aileron, torque tube, and support bearing by pulling the entire assembly outboard.
6. Reassemble in the reverse order.

To remove the elevators:

1. Remove the twelve mounting screws from the elevator tip.
2. Remove the tailcone as described in Section 3-E.
3. Remove the bolt which connects the elevator torque tube to the bellcrank assembly.
4. Pertaining to the right elevator only, remove the fastener connecting the trim tab servo-arm to the trim bungee bellcrank.
5. Remove the fasteners from the elevator torque tube support which is located at the tips.
6. Remove the control surface by sliding the torque tube out of the inner support bearing.
7. Reassemble in the reverse order.

To remove the rudder:

1. Remove the twelve mounting screws from the rudder tip. If the aircraft is equipped with a flashing beacon, disconnect the wires by cutting them directly by the butt connector. When reassembling, use quick connect fasteners and cover the terminals with heat shrink tubing or its equivalent.
2. Remove the bolt which connects the rudder torque tube to the bellcrank assembly.
3. Remove the fasteners from the rudder torque tube support which is located at the tip.
4. Remove the control surface by sliding the torque tube out of the inner support bearing.
5. Reassemble in the reverse order.

Flap removal:

1. Remove the aileron as described above.
2. Disconnect the flap drive linkage from the flap torque tube horn assembly located under the baggage compartment.
3. Remove the horn assembly from the torque tube.
4. Remove the fasteners from the inboard aileron torque tube bearing support.
5. Withdraw the flap and flap torque tube by pulling the entire assembly outboard.
6. Reassemble in the reverse order.

NOTE

The flap torque tube may be disassembled from the flap by removing the nut and sealant from the attachment at the inboard flap rib. When reassembling, be sure to reapply sealant* to the faying surfaces to prevent water from reaching the inner walls of the torque tube.

*Approved sealants:

EP711 and EP890 by Coast Pro-Seal
EC1239 and EC1675 by 3M Company
3201 by Chemical Seal Corp. of America
567 by Coast Pro-Seal

Trim tab removal:

1. Remove the elevator tip.
2. Remove the tailcone as described in Section 3-E.
3. Remove the two fasteners connecting the trim tab servo-arm to the elevator and the trim tab bungee bellcrank.
4. Remove the hinge pin and withdraw the trim tab.
5. Reassemble in the reverse order.

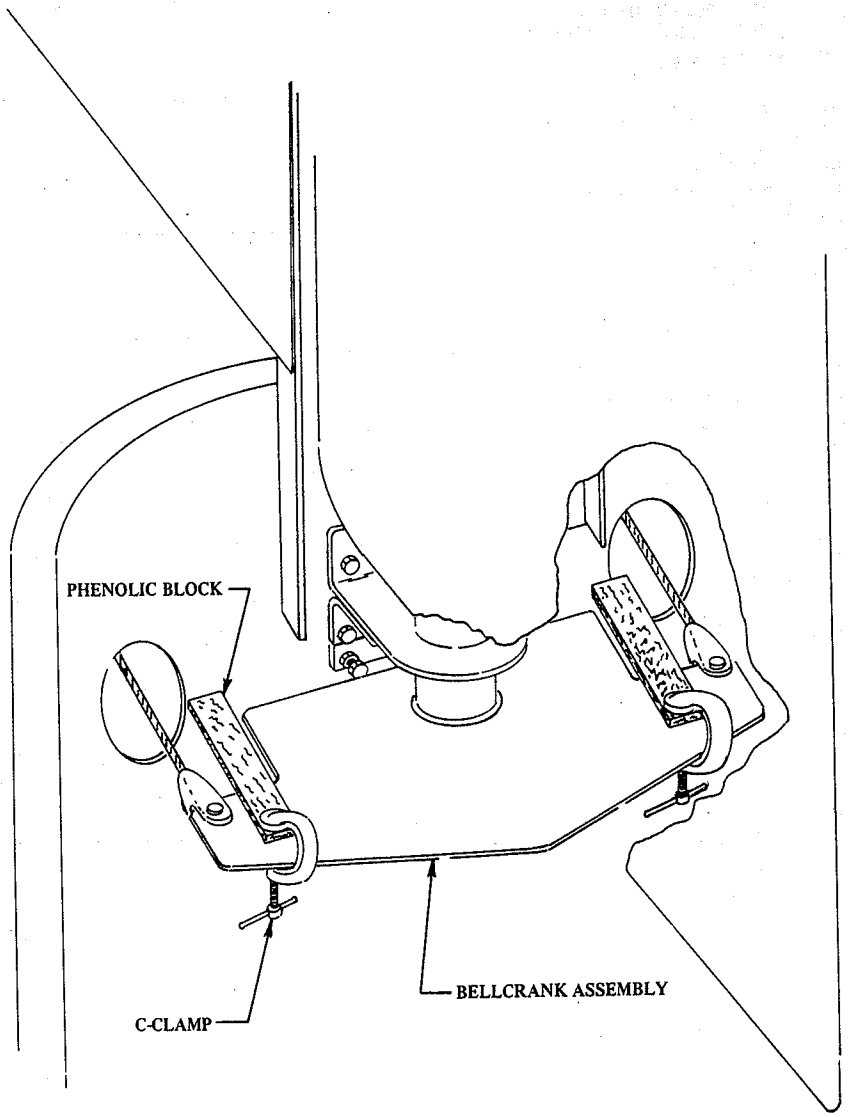
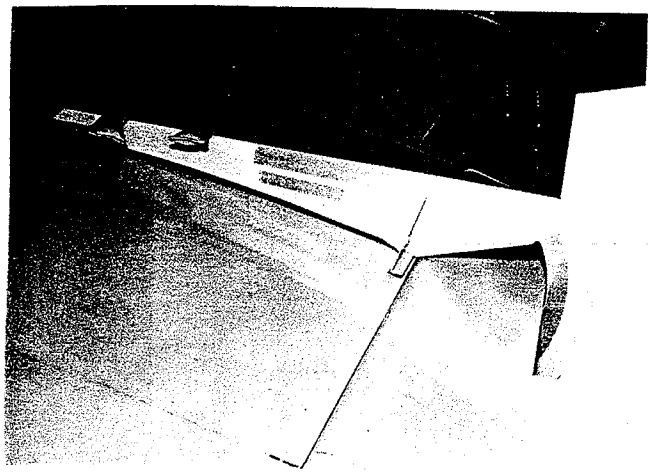



FIGURE 5-1 RUDDER RIGGING



AILERON RIGGING FIXTURE

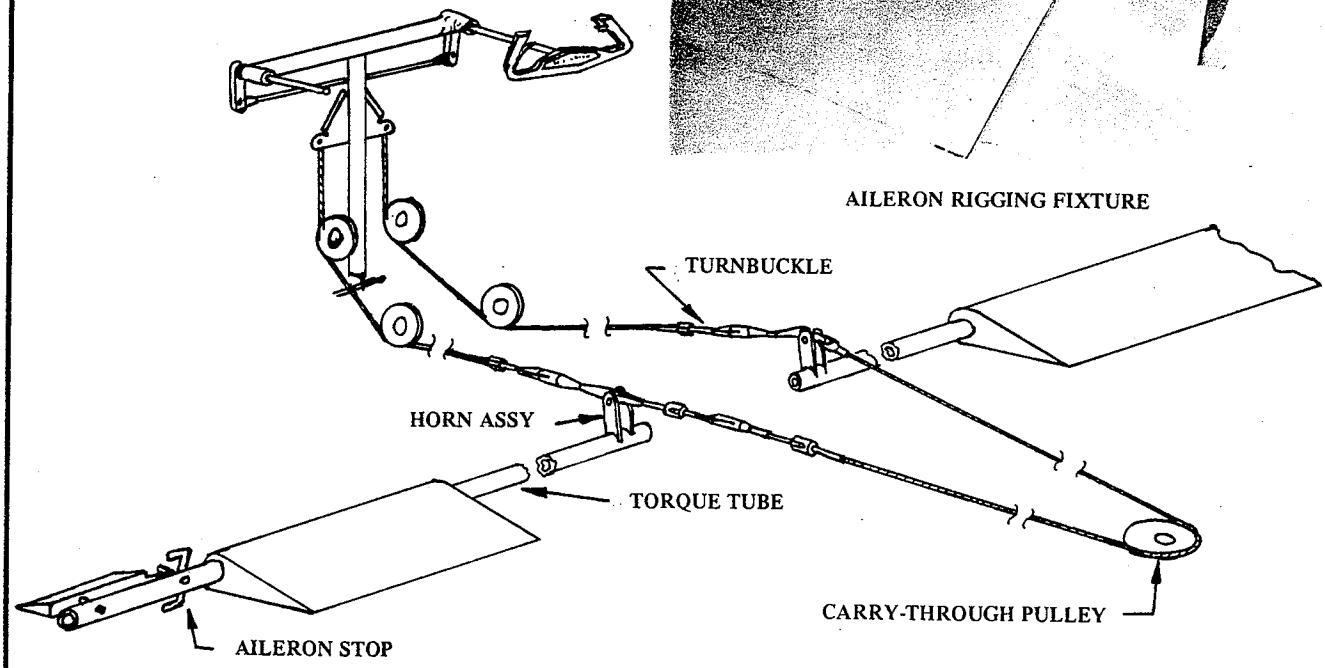
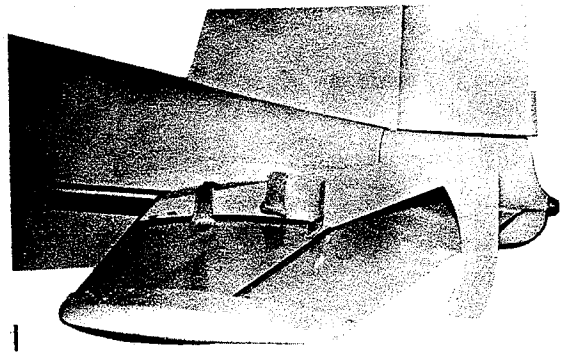



FIGURE 5-2 AILERON SYSTEM



ELEVATOR RIGGING FIXTURE

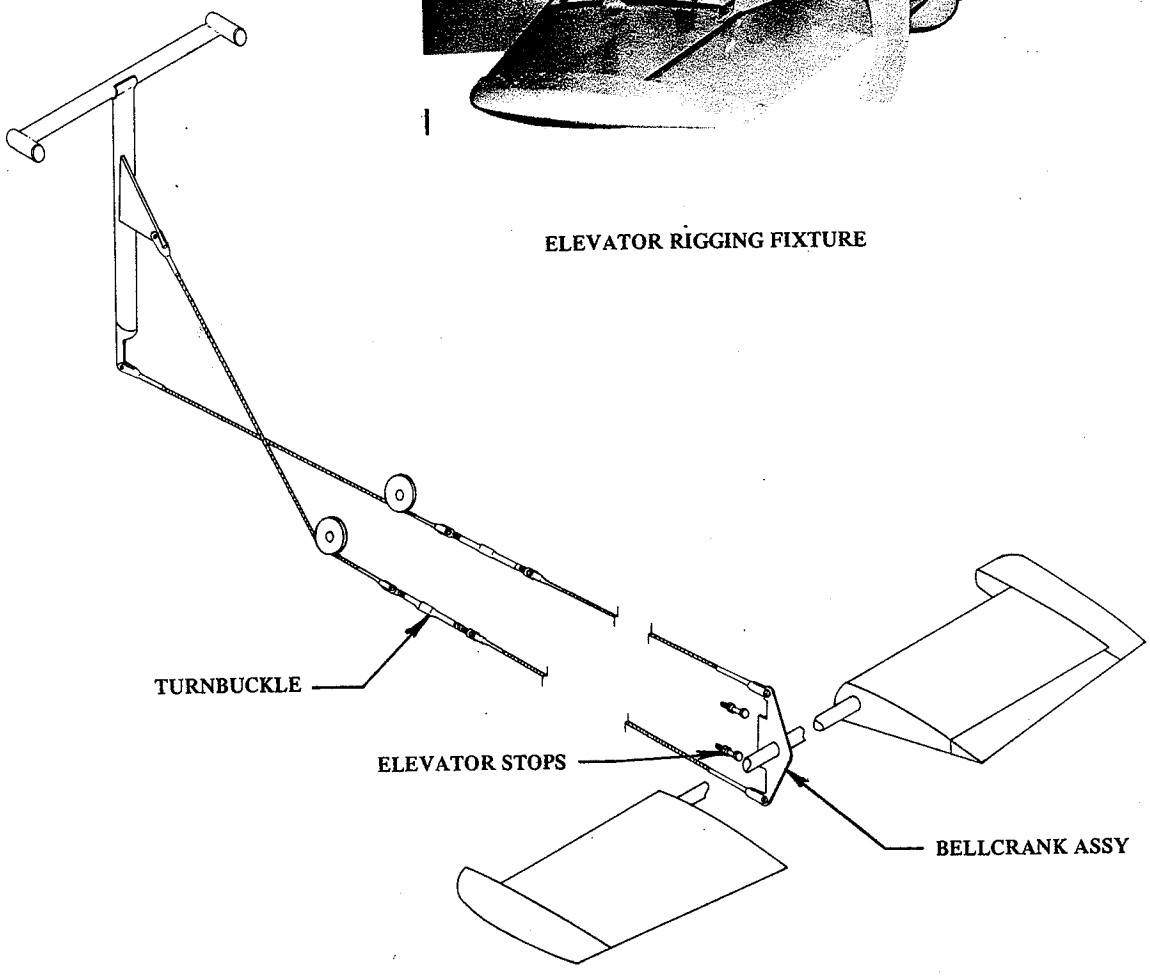
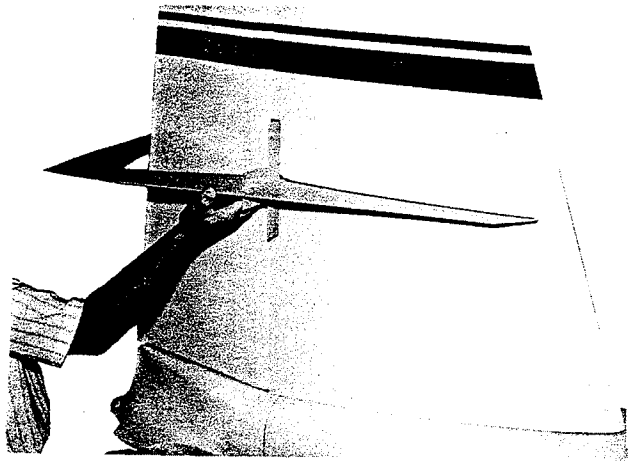



FIGURE 5-3 ELEVATOR SYSTEM



RUDDER RIGGING FIXTURE

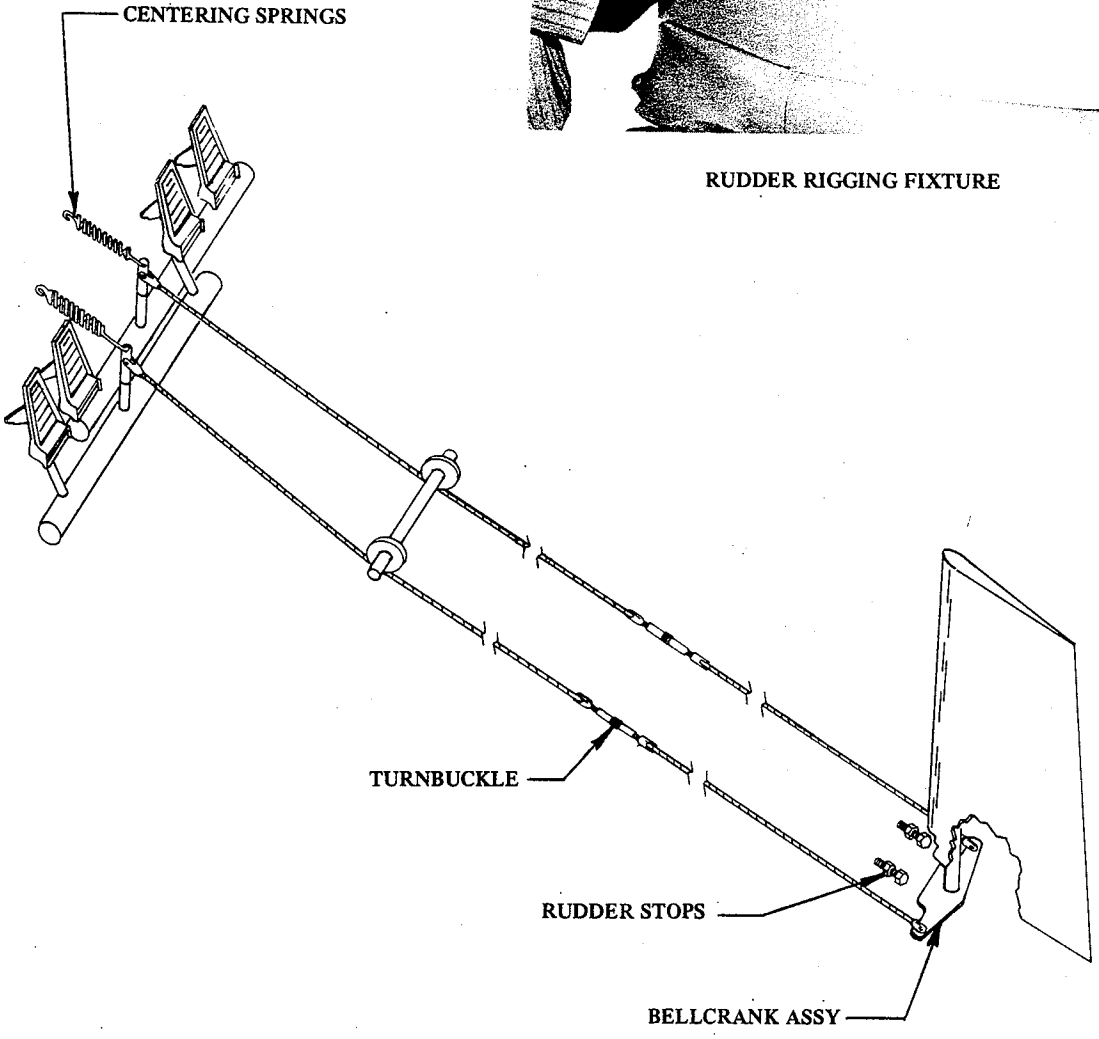
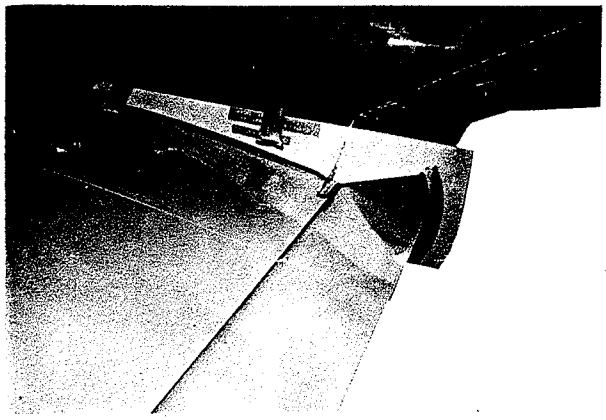



FIGURE 5-4 RUDDER SYSTEM



FLAP RIGGING FIXTURE

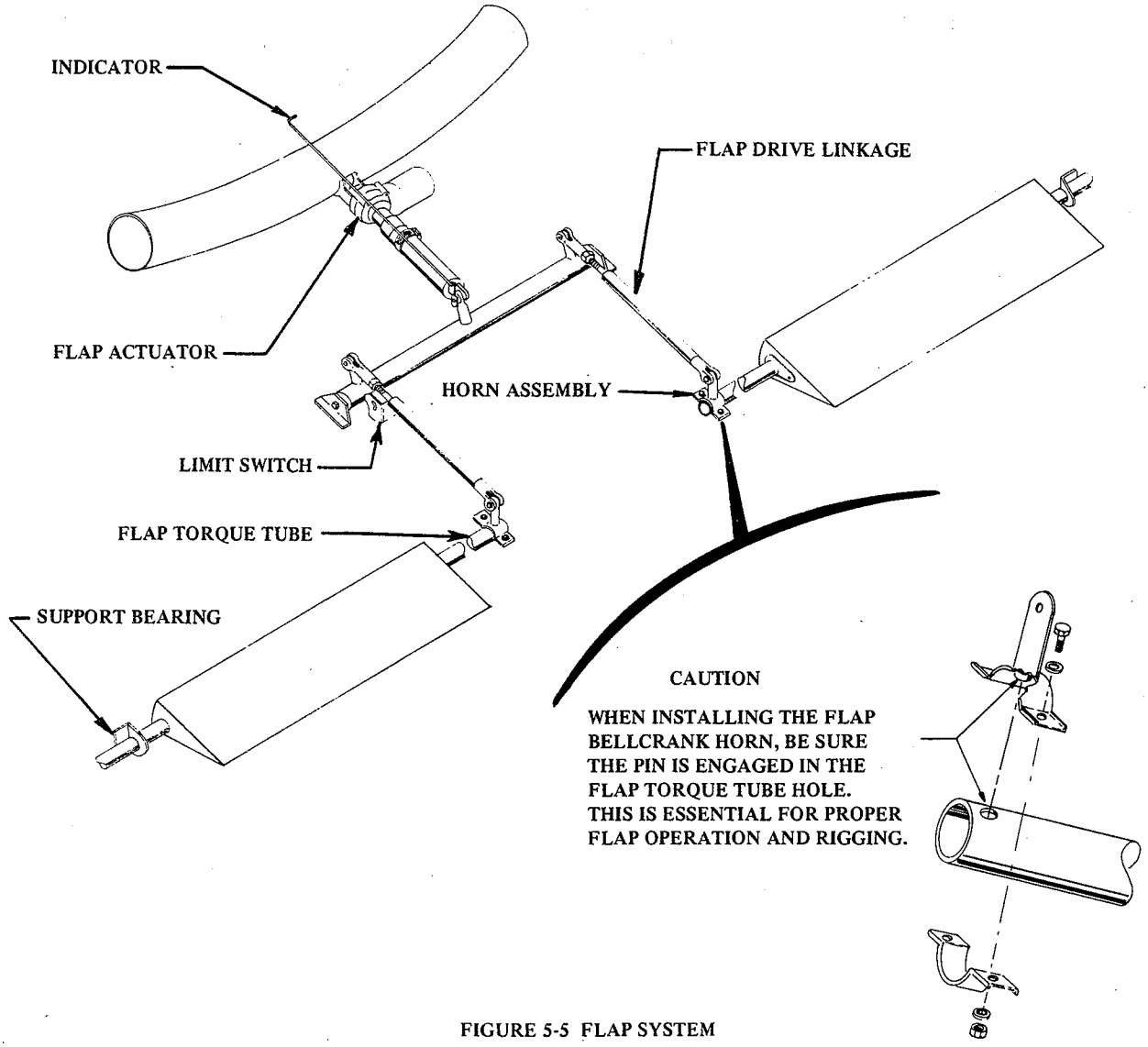
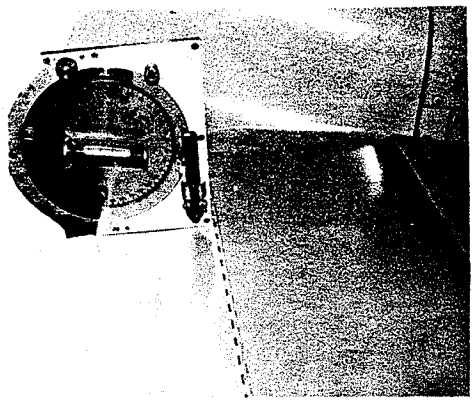



FIGURE 5-5 FLAP SYSTEM



TRIM TAB RIGGING

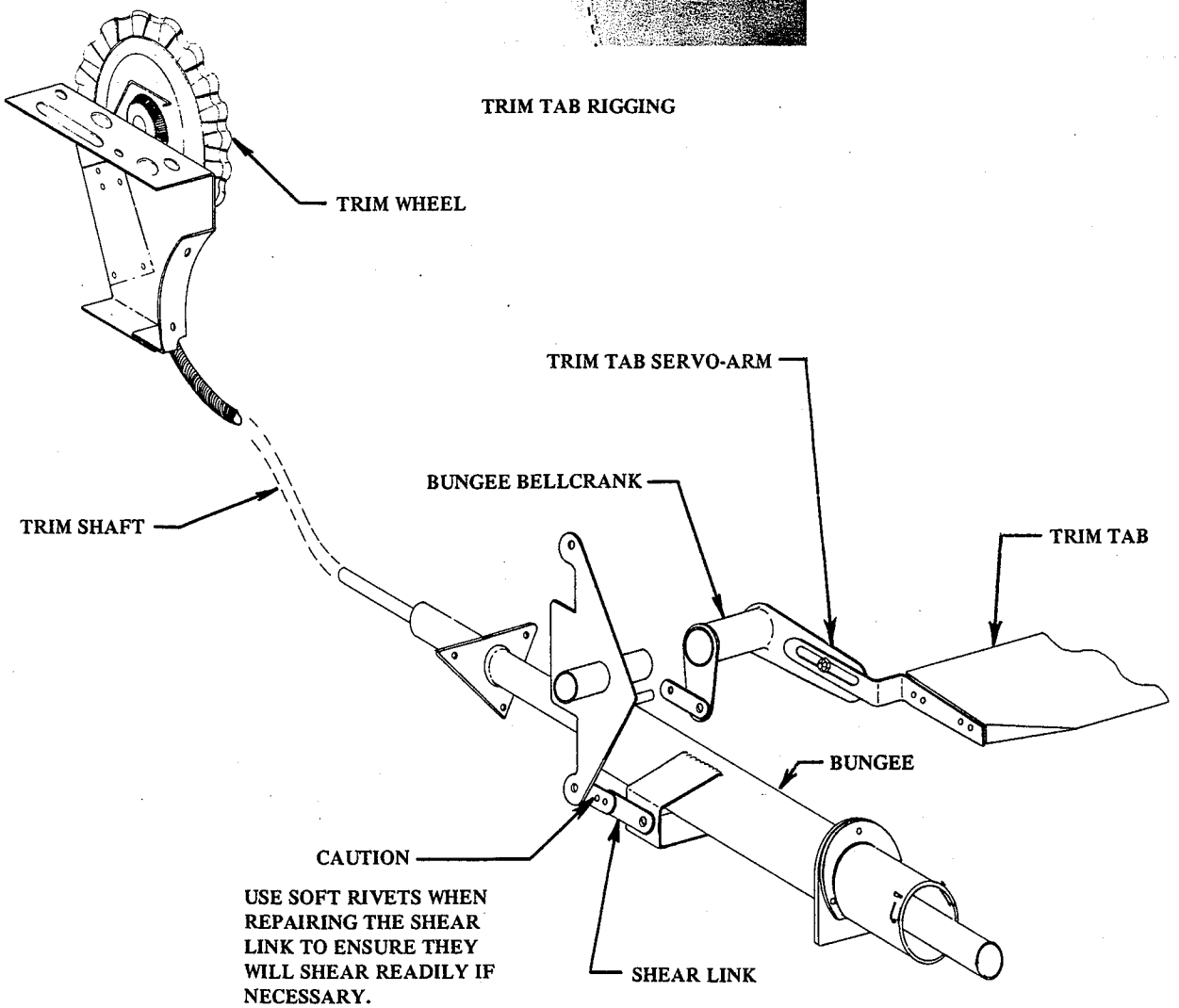



FIGURE 5-6 TRIM SYSTEM

# SECTION VI

# POWER PLANT

# 6. POWER PLANT

## . GENERAL.

The Yankee is powered by a 108 HP Lycoming, 4 cylinder, horizontally opposed, carbureted engine. The engine is mated with a McCauley fixed pitch propeller, model 1A105/SCM 7157.

**NOTE**

For repair and overhaul of the engine, refer to applicable manuals, bulletins, and other documents published by the engine manufacturer.

## B. SPECIFICATIONS

| | |
|---|---|
| Engine | 0-235-C2C |
| BHP | 108 @ 2600 RPM |
| Displacement (cubic inches) | 233.3 |
| Stroke (inches) | 3.875 |
| Bore (inches) | 4.375 |
| Firing Order | 1-3-2-4 |
| Compression Ratio | 6.75:1 |
| Left Magneto (plus impulse coupling) | #4051 Fires @ 25° BTC |
| Right Magneto | #4050 Fires @ 25° BTC |
| Oil Capacity | 6 Qts. |
| Dry Weight (includes magnetos, plugs, carburetor, starter, alternator and ignition harness) | 248.0 LBS |
| Fuel Pressure | Minimum 1/2 psi |
| | Normal 3-5 psi |
| | Maximum 8 psi |
| Oil Pressure | Minimum Idling 25 psi |
| | Normal 60-90 psi |
| | Start-Warmup 100 psi |
| Oil Temperature | Maximum 245° F |
| Cylinder Head Temperature | Maximum 500° F |

## C. ENGINE REMOVAL

Prior to the removal of the engine, be sure to place some type of support under the tail of the aircraft to prevent damage to the empennage. As an aid to reinstalling the engine, it is recommended that all of the cables and wires be labeled as to their functions.

To remove the engine:

1. Remove the propeller and the spinner.
2. Remove the cowling as described in Section 3-D.
3. Disconnect the throttle, mixture, and carburetor heat controls.
4. Disconnect the fuel and oil pressure lines.
5. Disconnect the main fuel line at the inlet to the engine driven fuel pump.
6. Disconnect the tachometer cable.
7. Disconnect the tailpipe support.
8. Disconnect the vacuum pump hose at the pump.
9. Disconnect the fuel primer line.
10. Disconnect all wires from the engine.
11. Disconnect the heater duct at the muffler.
12. Remove the four bolts which attach the engine mount to the engine.
13. Reinstall the engine in the reverse order (torque the engine mounting bolts to 40 inch lbs.)

## D. ENGINE CONTROLS

The engine controls consist of the throttle, mixture, and carburetor heat controls. Each control is adjusted at the factory to maintain the proper engine operation. However, field maintenance may require subsequent adjustment of these controls. The following will describe the adjustment procedures for the various engine controls.

1. Throttle Control

   a. The throttle control is attached to the carburetor throttle arm through the middle hole by a ball joint quick disconnect fitting.

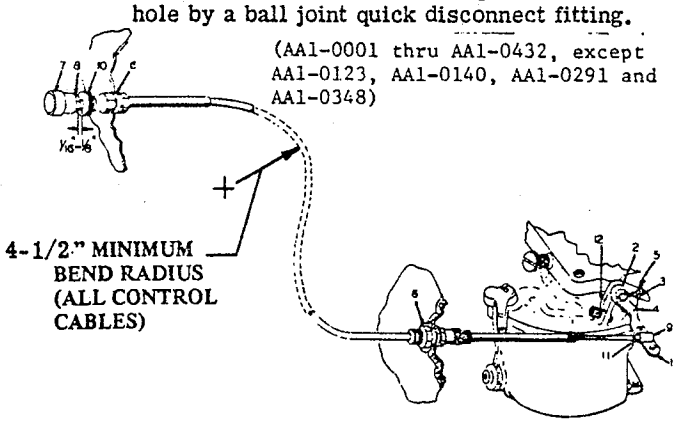



FIGURE 6-1 CARBURETOR THROTTLE ARM AND CABLE RIGGING

b. Check throttle arm position (1, figure 6-1). This must be 42° ± 5° forward of vertical when the throttle is wide open.

c. Check that throttle arm is positioned inboard tightly against stop (2).

d. Torque throttle arm clamp screw (3) to 26-28 in./lb.

e. See that clamping action has not closed gap (4) in throttle arm.

f. Safety wire throttle arm clamp screw to the throttle stop (5).

g. Check security of lock nuts (6) that attach the control cable housing to the instrument panel and to the firewall.

h. Loosen throttle knob (7), turn jam nut (8) all the way down (clockwise), and tighten the throttle knob against the jam nut. Do not clamp or mar the throttle plunger.

i. Disconnect the throttle control from the carburetor by releasing the ball joint connector (9). Push the throttle control in until the jam nut hits the friction lock (friction lock (10) 1/4 turn loose) and pull the throttle control 1/16 to 1/8 inch for control cushion.

j. Tighten the friction lock (10) being careful not to change the throttle position.

k. Adjust ball joint connector (9) to obtain full open throttle.

l. Reconnect ball joint to carburetor arm (1), tighten jam nut (11), then check threaded push rod for 3/16 inch minimum thread engagement via inspection hole in ball joint connector (9).

m. If further adjustment is required, make all adjustments either at the firewall or the carburetor. If slight repositioning of the throttle arm is required, the lockscrew (3) must be loosened, the arm repositioned, the screw (3) retorqued to 26-28 in./lbs. and resafetied to the throttle stop (12).

n. Release the friction lock (10) and check for full control movement noting that 1/16 to 1/8 inch maximum cushion exists.

NOTE

Check the static rpm of the engine. This should be =

Cruise prop. (2150-2300)
Climb prop. (2250-2400)

Allowances should be made for the effect of weather conditions and field altitude on the static rpm.

THROTTLE CONTROL RIGGING (AA1-0123, AA1-0140, AA1-0291 and AA1-0348. (AA1-0433 and up. AA1A-0001 and up.)

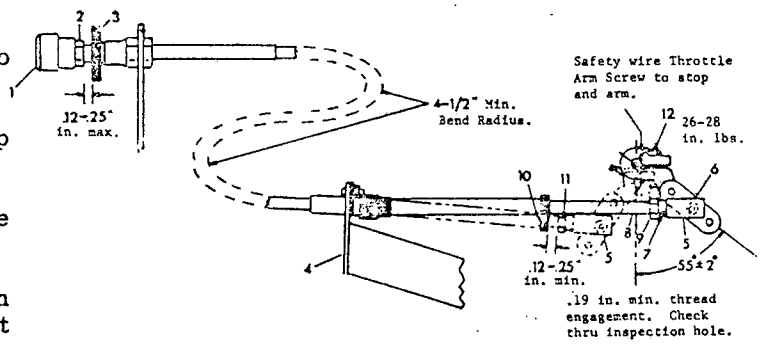



FIGURE 6-2 CARBURETOR THROTTLE ARM AND CABLE RIGGING

1. Screw throttle knob (1. fig. 6-2) and jam nut (2) all the way down and tighten jam nut (2) against throttle knob.

2. Place a .125 in. spacer between throttle knob jam nut (2) and friction lock (3) with friction lock partially loose.

3. Attach cable to throttle support bracket (4) at carburetor.

4. Check throttle arm position. This should be 55° ± 2° forward of vertical when the throttle is full open.

5. Adjust threaded ball joint (5) so carburetor throttle arm (6) is against the full open stop. Check through inspection hole (7) that ball joint (5) and push rod (8) have .19 inch minimum thread engagement and secure with jam nut (9).

6. If thread engagement in step 4 above is less than .19 inch, the throttle knob (1) may be threaded out to a minimum of .19 inch engagement and step 4 above repeated.

7. Space between plunger housing (10) and jam nut (11) at ball joint (5), with throttle closed, must be .12-.25 inch minimum.

8. Space between throttle knob jam nut (2) and friction lock (3), with throttle open and friction lock partially loose, must be .12-.25 inch maximum.

9. Torque throttle arm clamp screw (12) to 26-28 in. lbs.

10. Safety wire throttle arm and screw to throttle stop and arm as shown on figure 6-2.

11. Check all attachments, jam nuts, safety wire and bend radii (minimum 4-1/2 inches) for correct installation and security. Check throttle for smoothness of operation.

NOTE

Check the static rpm of the engine. This should be =

Cruise prop. (2150-2300)
Climb prop. (2250-2400)

Allowances should be made for the effect of weather conditions and field altitude on the static rpm.

2. Mixture control

a. Loosen the cable fitting located at the end of the control.
b. Reposition the control wire through the fitting until the operation of the mixture control is limited oy the carburetor mixture arm striking the rich and idle cut-off stops.
c. Retighten the cable fitting.

NOTE

With the mixture control in the rich position and mixture arm against its full rich stop, there should be a maximum 1/8" of travel remaining in the control.

3. Carburetor Heat Control

a. Loosen the cable fitting, located at the end of the control.

b. Reposition the control wire through the fitting until the operation of the carburetor heat control is limited by the air box arm reaching its most forward and rearward travel.

c. Retighten the cable fitting.

NOTE

When the carburetor heat control in the cold position (pushed in) and the air box arm at its most forward position of travel, there should be approximately 1/8" of travel remaining in the control.

E. INDUCTION SYSTEM

The induction system consists of an air inlet which permits outside air, through a filter, to enter the carburetor. The inlet, located in the nose cowl, is strategically designed for optimum performance.

Upon entering the induction inlet, the air passes through an oil-wetted filter to remove dust and abrasives which may prove harmful to the engine. Periodic and proper cleaning of the filter is necessary, and the following procedures should be adhered to:

1. Thoroughly wash the filter in petroleum solvent. Make certain that all dirt is removed from the filter, and the filter unit is in serviceable condition.
2. Dry the filter at room temperature making sure it is thoroughly dry before proceeding to the next step. If the filter is not dry, the solvent will prevent the oil from adhering to the small surfaces of the filter, and thereby decrease its efficiency.
3. Immerse the filter in the grade oil called for on the filter. If none appears, use engine preservative oil per MIL-L-21260.
4. After removal of the filter from the oil, allow it to drain thoroughly before installing in the aircraft.

NOTE

When operating the aircraft under extreme dusty conditions, frequent servicing of the filter will extend the useful life of the engine.

**CAUTION**

When installing the induction air duct assembly, be sure it is properly fitted over the scoop in the forward cowl. Failure to do this could result in an inadequate air supply.

Another feature of the induction system is the alternate hot air source. If the proper conditions exist, the carburetor may be subject to ice formation in the venturi. By pulling out the carburetor heat control, the normal air intake is shut off, and the alternate air source, which is comprised of a shroud around an exhaust riser, is employed. Air entrapped within the cowling is drawn in through the top of the shroud, circulated around the riser, and inducted into the carburetor.

NOTE

Limited operation of the carburetor heat is recommended since no filter is incorporated.

F. EXHAUST SYSTEM

The exhaust system consists of an integral muffler and exhaust pipe, four risers and four clamp assemblies. The muffler is surrounded by a heat exchanger which is piped into the cabin and serves as the cabin heater.

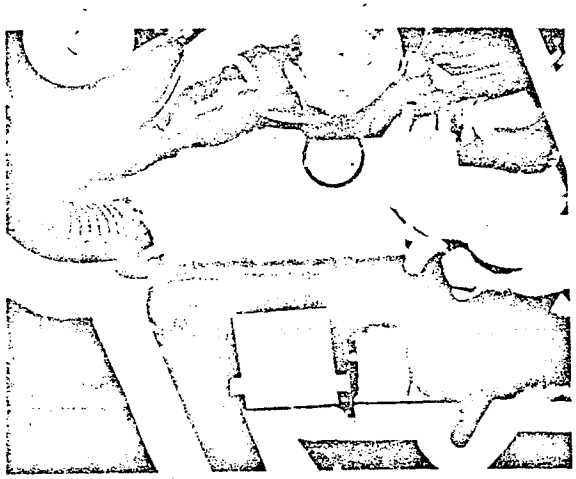


FIGURE 6-3 MUFFLER CLIPS

Removal of the muffler can be simplified by loosening the bolts through the bead clamps and lowering the unit from the engine. If the risers are removed, remove the old gaskets and inspect the engine flanges for smooth seating surfaces. Also check the header flanges for warpage. Use new gaskets and torque the engine exhaust flange nuts to 150 inch pounds.

Exhaust systems are subject to burning, cracking, and general deterioration from alternate thermal stresses and vibration. Consequently, it is extremely important that the system be inspected every 100 hours or at any time exhaust fumes are detected in the cabin. If the muffler is suspected of internal deterioration, it is necessary that it be completely removed and shaken to determine if the baffles are loose. Large flakes of scale and rust from the interior of the muffler is an indication of deterioration and the muffler should be replaced.

G. OIL SYSTEM.

The O-235 engine is equipped with a wet sump oil system with a capacity of six (6) quarts. The minimum capacity for safe operation is two (2) quarts, but it is highly recommended to never operate continuously below four (4) quarts. The following table recommends the grade of oil to be used with seasonal changes.

| Ambient Temperature | Single Viscosity SAE Grade | Multi-Viscosity SAE Grade |
|---|---|---|
| Above 60° F | 50 | 40 or 50 |
| 30°-90° F | 40 | 40 |
| 0°-70° F | 30 | 40 or 20W-30 |
| Below 10° F | 20 | 20W-30 |

The oil pressure relief valve performs the function of maintaining the oil pressure within the prescribed limits (refer to Section 6-B). This valve is not adjustable, but the pressure may be controlled by adding a maximum of three (3) washers, Lycoming Part Number STD-425, under the cap to increase the pressure, or adding a spacer, Lycoming Part Number 73629 or 73630, under the cap to decrease the pressure.

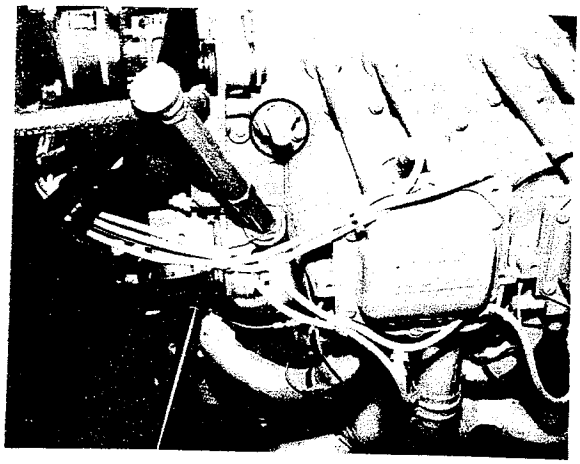


FIGURE 6-4 OIL PRESSURE RELIEF VALVE

To prevent excessive oil pressures from building up in the crankcase, the engine is equipped with a breather vent. The vent tube should be inspected periodically for obstructions.

The engine oil pressure can be evidenced by the oil pressure gage, located in the instrument panel. The line which attaches the engine to the pressure gage begins with an .040" orifice, to prevent a large amount of oil loss due to a line or gage failure.

Periodic maintenance of the oil system should include an oil change and removal and inspection of the oil suction and oil pressure screens.

NOTE

When inspecting the oil screens, carefully inspect for the presence of metal particles which is indicative of internal engine damage.

NOTE

During the initial 50 hours of a new or newly overhauled engine, use straight mineral oil (non-detergent oil). Use of detergent or additive oils should only be after consulting Lycoming Service Instruction No. 1014.

H. PRIMING SYSTEM

The engine is equipped with a three cylinder priming system (the fourth cylinder, #4, is left vacant for an addition of a manifold pressure gauge). Fuel is injected directly into the cylinder intake system by the action of a hand pump, located in the instrument panel. Fuel into this pump is obtained from a connection at the bottom of the right fuel measurement gauge.

I. IGNITION SYSTEM

The ignition system consists of the spark plugs, shielded harness, and slick magnetos. The magnetos are the sealed, lightweight type requiring no internal timing since the breaker points are non-adjustable.

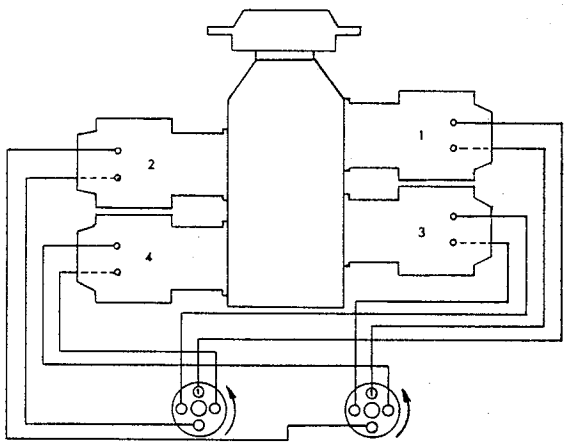



FIGURE 6-5 SCHEMATIC - IGNITION SYSTEM

If problems are known to exist somewhere in the ignition system, inspection of the harness and spark plugs should be accomplished first. For replacement of the ignition harness, or an individual lead, refer to Figure 6-5 for the correct wiring. To determine whether the harness is defective, examine the leads, and ceramics for corrosion and deposits. This condition is caused by dirty spark plugs, dirty connector

ends, or leaky spark plugs. If this condition exists, clean with a dry cloth moistened with methyl-ethyl ketone.

Spark plugs should be cleaned and regapped every 100 hours. The torque value for reinstalling the spark plugs is 360-420 inch pounds. Application of anti-seize compound to all but the first two threads on the plug is recommended.

NOTE

It is recommended that the lower and upper spark plugs be reversed every 100 hours to prolong the spark plug service life.

The timing of the magneto to the engine should be checked every 200 hours. Maximum allowable limits are plus or minus 2 degrees. If the magneto exceeds these limits, it will be necessary to time the magneto until it falls within the above tolerance. (Refer to magneto installation in this section for timing procedure).

To remove the magneto:

1. Disconnect the magneto ground wire.
2. Remove the distributor cap assembly.
3. Remove the mounting lugs and withdraw the magneto.

NOTE

Make a note of the approximate angle the magneto makes with the engine center line as an aid in its subsequent installation.

To install the magneto:

1. Rotate the propeller in the normal direction of rotation until #1 cylinder enters its compression cycle.

NOTE

To determine whether the #1 cylinder is in the compression cycle, remove the top plug from the #1 cylinder and place thumb over the port. As the piston approaches the end of the compression stroke, a positive pressure will try to force the thumb off the port.

2. Continue turning the propeller in the normal direction of rotation until the 25° advanced timing mark on the forward face of the starter ring becomes aligned with the small hole drilled in the head of the starter motor. At this point, the engine is ready to receive the magnetos.

FIGURE 6-6 ADVANCE TIMING ALIGNMENT

NOTE

An alternate method for Step 2, is to align the 25° advanced timing mark on the rear face of the starter ring at top dead center, in line with the engine case parting line.

3. Remove the plug from the bottom of the magneto. (See Figure 6-7).
4. Rotate the magneto shaft until a spark occurs from number one lead (hold screw driver close to #1 lead while turning the shaft). As soon as the spark occurs, slowly reverse the magneto shaft in the reverse direction until the timing hole in the rotor is centered in the plug opening.

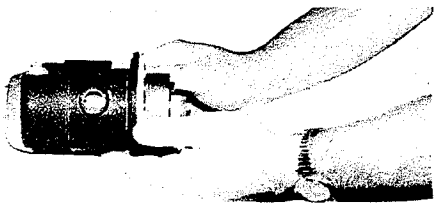


FIGURE 6-7 MAGNETO TIMING HOLE

NOTE

Failure to spark check the number one position leaves the possibility of the magneto being 180° out of phase. The timing hole appears in the plug opening twice for every complete firing cycle.

NOTE

In order to rotate the magneto incorporating an impulse coupling, depress the pawl on the impulse coupling with the finger.

5. Insert a pin (.093" diameter) into the timing hole in order to keep the rotor in the timed position.

6. Position the magneto into the crankcase at the approximate angle noted upon removal. Be sure gasket is installed behing the magneto mounting flange.
7. Install the attach clip over the magneto mounting flange and tighten the nuts finger-tight.

NOTE

Install the magneto with impulse coupling on the left side.

8. Install the second magneto in the same manner as described in Steps 3, 4, 5, 6, and 7 from above.

**CAUTION**

Be sure to NOT rotate the propeller with the pin still installed in the magneto timing hole.

9. Final timing should be accomplished with a timing light. Attach the positive leads to the magneto ground terminal, and the negative leads to any unpainted portion of the engine.
10. Remove the pins from the magnetos.
11. Rotate the magneto in its mounting flange until the light comes on. Slowly turn the magneto in the opposite direction until the light goes off. Bring the magneto back slowly until the light just comes on.
12. Repeat this process for the other magneto.
13. Upon timing both magnetos, check to ascertain that both magnetos will fire simultaneously.

NOTE

To check the simultaneous firing of both magnetos, back off on the propeller a few degrees (the timing light should go out). Bring the propeller back slowly in the direction of normal rotation until the 25° advanced timing mark aligns with the hole in the starter motor. At this point, both lights should go on simultaneously.

14. Tighten the magneto mounting nuts and torque to 150 inch pounds.

When the magneto shows an excessive rpm loss or has reached a total of 1500 hours, whichever comes first, the magneto should be returned to either the aircraft or magneto manufacturer for exchange. No attempt should be made to repair the magneto in the field since disassembly of the magneto will void its warranty.

NOTE

If the drive shaft nut has been removed from the magneto incorporating the impulse coupling, care should be exercised when reassembling, not to overtighten. The recommended torque is 120-360 inch pounds.

## J. COOLING SYSTEM

The cooling system consists of ram air being conducted over, and around, the cylinders by use of baffles. Since defective baffles can decrease the cooling, and decreased cooling results in increased engine wear and damaged parts, baffles should be carefully inspected and any cracks or deformities corrected.

## K. PROPELLER

The propeller should be included in every preflight inspection, and should receive special attention during 25, 50 and 100-hour inspections. Visually inspect the entire propeller for damage or defects, and any necessary repair should strictly adhere to AC43.13-1 aircraft inspection and repair manual or manual and bulletins published by the propeller manufacturer.

NOTE

Use a soft bristle brush to remove deposits from the blade. Do not use a metal, hard-bristled brush, or tool of any kind to remove blade deposits.

1. To remove the propeller:
   a. Remove the spinner.
   b. Cut the safety wire and remove the six propeller mounting bolts.
   c. Reassemble in reverse order, using a torque value of 280-320 inch pounds for the propeller mounting bolt.

## L. IDLE SPEED AND MIXTURE ADJUSTMENT

The following steps describe the corrective action for an engine which is running too lean or too rich, or which is not idling correctly. Correct idle adjustment should produce an idling speed of 600 to 650 rpm.

1. Perform a normal engine run-up until the oil and cylinder temperatures have stabilized.

2. Check the mag-drop prior to proceeding with idle adjustment.
3. Set the throttle stop screw so that the engine idles at 600 to 650 rpm.
4. With a smooth and steady motion, pull the cockpit mixture control towards the idle cut-off position and observe the tachometer for any change. Return the control to the full rich position prior to the engine cutting out. An increase of more than 50 rpm while "leaning out" indicates an excessively rich idle mixture. An immediate decrease in rpm indicates the idle mixture is too lean.

NOTE

Each time the idle adjustment is changed, the engine should be run up to 2000 rpm before proceeding with the next rpm check.

5. Upon completing Step 4, close the throttle and check the idling speed making any final adjustment necessary.

NOTE

In case the setting does not remain stable, check the mixture control linkage for slippage.

ENGINE TROUBLE SHOOTING

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Engine fails to start | Lack of fuel | Open fuel selector valve. Service fuel tanks. Push mixture control to full rich position. |
| | Flooded or overprimed | Open throttle and unload engine by cranking |
| | Underprimed | Prime with 2 to 3 strokes |
| | Incorrect throttle setting | Open throttle to 1/4 position |
| | Defective spark plugs | Clean and regap, or replace |
| | Dead or weak battery | Recharge or replace |
| | Water in carburetor | Drain carburetor and lines |
| | Internal failure | Check oil sump for metal particles. If found, complete overhaul is indicated. |
| Engine not idling properly | Incorrect carburetor idle adjustment | Adjust throttle stop to obtain correct idle. |
| | Idle mixture | Adjust mixture |
| | Open primer | Lock primer in closed position |
| | Leak in the induction system | Tighten all connections and replace defective parts. |
| | Low cylinder compression | Check condition of piston rings and valve seats and then check cylinder compression |
| | Faulty ignition system | Check ignition leads, plugs, and magnetos |
| | Dirty air filter | Clean filter |
| Low power and uneven running | Mixture too rich; indicated by flames and black smoke from exhaust pipe. | Check primer for leakage or readjust carburetor |
| | Mixture too lean; indicated by overheating and backfiring | Check fuel selector valve for proper position; check fuel lines for restrictions; readjust carburetor |
| | Leaks in induction system | Tighten all connections and replace defective parts |

ENGINE TROUBLE SHOOTING (cont)

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| Low power and uneven running (Continued) | Defective spark plugs | Clean, regap or replace spark plugs |
| | Defective ignition wire | Replace wire |
| | Magnetos not properly timed | Check for proper timing and synchronization |
| | Defective spark plug terminal connectors | Replace terminals on wire |
| | Improper grade of fuel | Empty tank and fill with proper grade of fuel |
| | Incorrect valve clearance | Adjust valve clearance |
| Failure of engine to develop full power | Throttle not properly adjusted | Adjust throttle lever |
| | Leak in the induction system | Tighten all connections and replace defective parts. |
| | Dirty air filter | Clean or replace filter |
| | Restriction in air scoop | Remove restriction |
| | Improper grade of fuel | Empty tank and fill with proper grade of fuel |
| | Faulty ignition system | Check ignition leads, plugs and magnetos |
| Rough running engine | Cracked engine mount | Repair or replace mount |
| | Lead deposit on spark plugs | Clean and regap or replace spark plugs |
| | Unbalanced propeller | Remove propeller and check for balance |
| | Defective mounting bushings | Install new mounting bushings |
| | Malfunctioning engine | Check entire engine |
| Low oil pressure | Insufficient oil | Check oil supply and fill as recommended |
| | Dirty oil strainer | Remove and clean oil strainer |
| | Air or dirt in relief valve | Remove and clean oil pressure relief valve |
| | Defective pressure gauge | Replace gauge |
| | Leak in pressure or suction lines | Check gasket between accessory housing and crankcase |
| | Stoppage in oil pump intake passage | Check line for obstruction and clean strainer |
| | High oil temperature | See "High oil temperature" in "Trouble" column |

ENGINE TROUBLE SHOOTING (cont)

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| High oil temperature | Insufficient oil supply | Check oil supply and fill as recommended |
| | Insufficient cooling air | Check cowl inlet and outlet for obstructions. Check baffles |
| | Low grade of oil | Replace with proper grade of oil |
| | Clogged oil lines or strainers | Remove and clean oil lines and strainer |
| | Defective gauge | Replace gauge |
| | Defective probe | Replace probe |
| | Excessive blow-by | Usually caused by worn or stuck rings. Complete overhaul required. |
| | Bearing failure | Examine sump for metal particles. If found, complete overhaul required. |
| Excessive oil consumption | Bearing failure | Examine sump for metal particles |
| | Worn or broken piston rings | Install new rings |
| | Incorrect installation of piston rings | Install new rings |
| | Low grade of oil | Replace with proper grade of oil |
| | External leakage | Check engine carefully for leaking gaskets and o-rings |
| Engine does not stop | Mixture control not correctly adjusted | Adjust mixture control |
| | Leaking "Idle cut-off" | Overhaul carburetor |
| | Faulty ignition system | Check ground wires and replace switch |
| Cold weather difficulties | Cold oil | Heat oil |
| | Weak battery | Recharge or replace |
| | High oil pressure | In extreme cold weather, readings up to approximately 100 psi do not necessarily indicate malfunctioning |
| | Overpriming | Open throttle, put mixture control in "Idle cut-off". Crank engine until it starts and immediately return mixture to "full rich" and close throttle as required. |

# SECTION VII

# FUEL SYSTEM

## 7. FUEL SYSTEM

### A. GENERAL

Fuel is stored in each wing inside of the tubular spar. From the pickup point on the inboard end, the fuel line slopes continuously up through the fuel selector valve, to the electric fuel pump mounted on the forward side of the firewall.

### B. FUEL TANK

The tubular wing spar, which also serves as the fuel tank, is sealed on each end by a machined casting. This casting has an o-ring and sealant around its entire periphery for sealing purposes. These are three baffles inside of the tank which serve to retard fuel slosh in uncoordinated maneuvers.

To disassemble the fuel tank components:

1. Remove the wing tip as described in Section 3-F.
2. Remove the sealant from around the outboard end plate and end plate mounting bolts.
3. Remove the end plate mounting bolts.
4. Slowly withdraw the end plate housing and tank baffle components by pulling straight out from the tank. Care should be taken not to scar the inside surface of the fuel tank.

NOTE

To remove the inboard end plate, the following additional steps are required.

5. Remove the wing as described in Section 3A.
6. Remove the sealant from around the inboard end plate and mounting bolt.

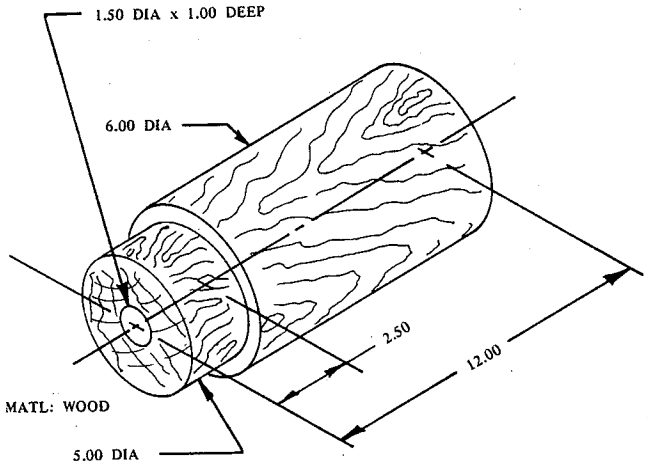



FIGURE 7-1 RAM-END PLATE REMOVAL

NOTE

Remove sealant by scraping with a knife or scraper. Care should be taken not to scar the walls of the fuel tank.

7. Remove the end plate mounting bolt. Later aircraft use 2 bolts in this installation.
8. With a wooden ram similar to that shown in Figure 7-1, and using light hammer taps, drive the end plate from the outboard end. Care should be taken not to scar the walls of the fuel tank or break an end plate.

To reassemble the fuel tank components:

1. Prior to installation, inspect the o-rings for distortion, cuts or gouges and replace if necessary. Be sure the proper o-ring seals are used as shown below:

Serial No. AA1-0001 through AA1-0004
"O"-ring seal #2-163
Serial No. AA1-0005 through AA1-0017
"O"-ring seal #MS29513-259
Serial No. AA1-0018 and up
"O"-ring seal #MS29513-361

2. To install the inboard end plate, locate the end plate as far into the spar by hand as possible. With a board and hammer, lightly tap around the edge, slowly working the end plate into position.
3. Install the inboard end plate mounting bolt or bolts, using new stat-o-seals.
4. Apply sealant* around the entire periphery of the end plate and over the complete head of the mounting bolt.

NOTE

Prior to the application of sealant, thoroughly clean the area to be sealed with MEK (Methyl Ethyl Ketone) or any equivalent commercial solvent.

5. To reinstall the outboard end plate and baffle assembly, slide the entire assembly into the spar taking care not to scar the inside surface.
6. Install the outboard end plate mounting bolts.
7. Apply sealant* around the entire periphery of the end plate and over the mounting bolts and nuts.

NOTE

Prior to the application of sealant, thoroughly clean the area to be sealed with MEK (Methyl Ethyl Ketone) or any equivalent commercial solvent.

*Approved sealants:

EP711 and EP890 by Coast Pro-Seal
EC1239 and EC1675 by 3M Company
3201 by Chemical Seal Corporation of America
567 by Coast Pro-Seal

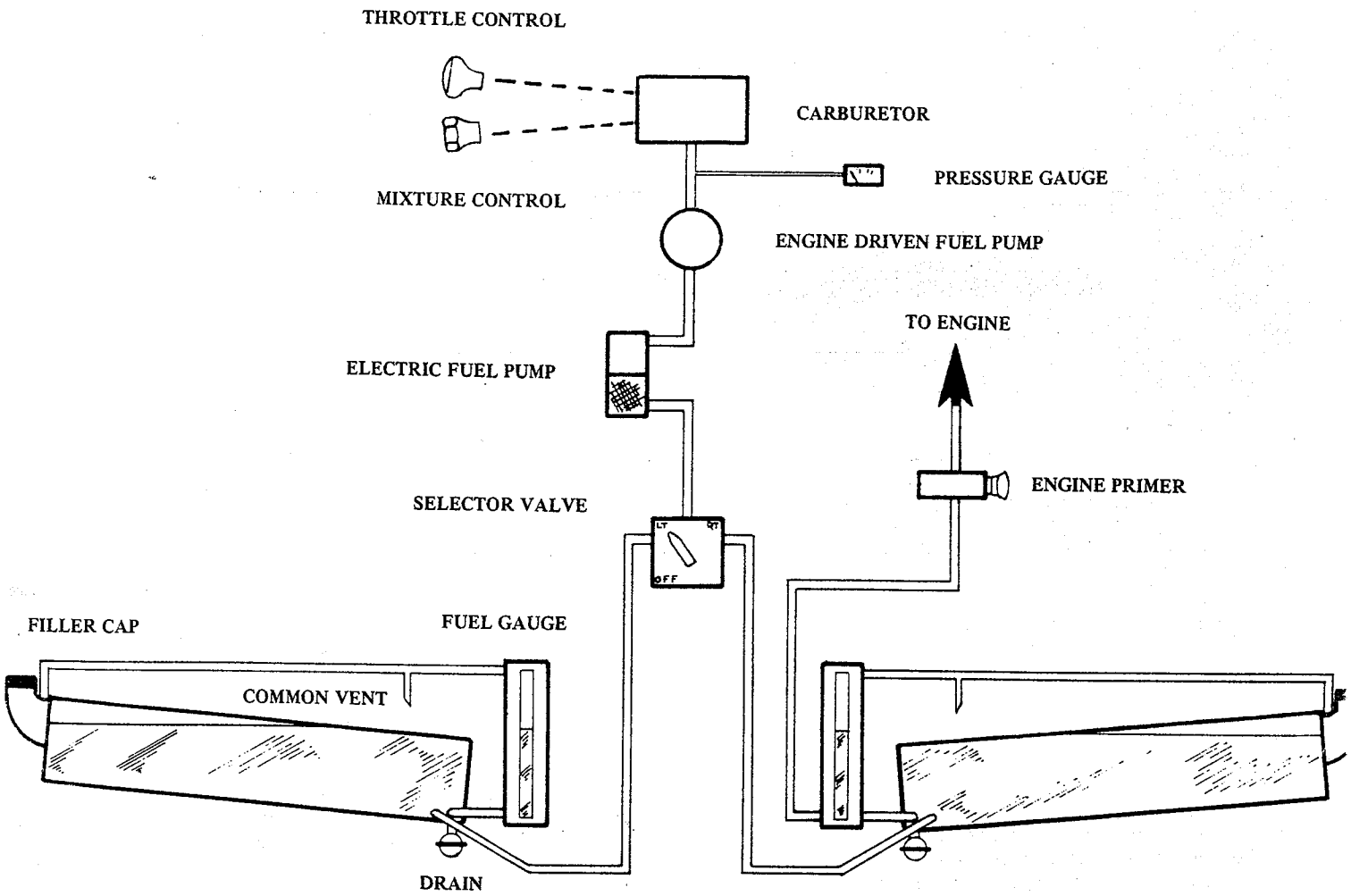



FIGURE 7-2 SCHEMATIC – FUEL SYSTEM

C. FUEL TANK DRAIN

The fuel tank drain is located towards the rear and on the bottom of the wing, just outboard of the wing root (Figure 7-3). It is spring loaded in the closed position to provide easy pre-flight draining. This quick-drain is connected with a line and a short length of hose to the lowest point in the fuel tank. A periodic inspection should be made of this line and hose connection for deterioration and leakage.

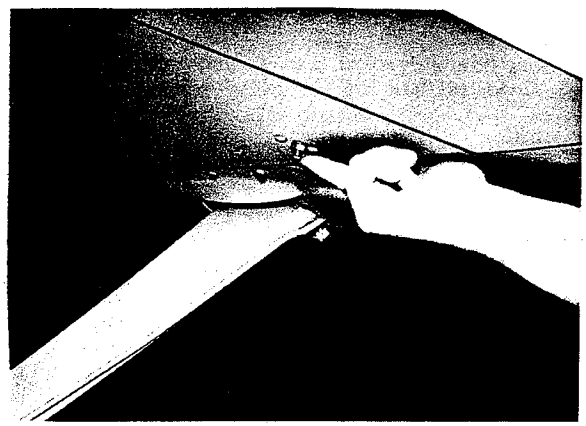


FIGURE 7-3 FUEL TANK QUICK DRAIN

NOTE

The center spar is drilled and equipped with a drain to allow any fuel to escape if the fuel tank end seals should start leaking.

If fuel leakage is noted at the center spar drain, it can be determined which tank is leaking by removing the wing root access covers and inspecting the wing spar and center spar joining surfaces. Normally a red dye will be evident on the side that is leaking. In the event the wing spar fits tightly enough in the center spar to prevent seapage at that point, inspect the landing gear to spar mounting bolts for similar indications.

D. FUEL CAP

The fuel caps are required to provide a fuel and air tight seal with the fuel filler neck. Absence of an air tight seal may produce erroneous readings in the fuel measurement system.

The fuel cap should be periodically inspected to assure that the gasket inside of the fuel cap has not deformed or deteriorated. Refer to the Parts Manual for replacement gaskets.

E. FUEL SELECTOR VALVE

The fuel selector valve, located in the forward portion of the console, provides for fuel tank selection and serves as the fuel supply shut-off valve.

To remove the fuel selector valve:

1. Remove the woodgrain cover and screw from the handle face and withdraw the handle from the selector valve shaft.
2. Remove the console.
3. Disconnect the fuel lines. Be sure to seal the line openings to prevent the entrance of foreign particles.
4. Remove the two mounting bolts which attach the fuel selector valve to the mounting brackets.
5. Reassemble in the reverse order.

F. FUEL PRESSURE GAUGE

The fuel pressure gauge, connected into the main fuel supply line at the carburetor inlet, is a direct indication of carburetor fuel pressure. The line which leads from the pick-up point to the gauge, begins with an .040-inch orifice to prevent damaging surges and excess spillage in the event of a line or gauge failure.

Normal fuel pressure readings should be approximately 3 psi with a maximum limit of 8 psi and a minimum limit of 1/2 psi.

G. ELECTRIC FUEL PUMP

The electric fuel pump is used as an emergency pump and, as an aid in starting a cold engine. It incorporates a 40 micron filter through which all fuel flow to the engine must pass. This filter must be serviced periodically (100 hours).

To service the fuel pump filter:

1. Remove the bottom cover from the fuel pump by cutting the safety wire and turning the cover with a 5/8-inch wrench (Figure 7-4).

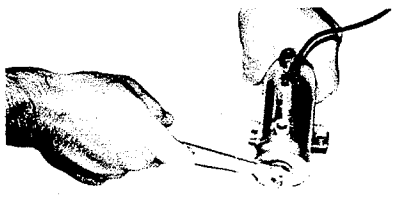


FIGURE 7-4 ELECTRIC FUEL PUMP DISASSEMBLY

2. Remove the cover gasket, magnet and filter.
3. Clean the filter by rinsing in gasoline or kerosene and blowing out cleansing agent with air pressure. If filter is distorted or

damaged, it should be replaced. Refer to the Parts Manual for replacement.
4. Clean the cover and gasket in the same manner as the filter.
5. Reassemble in the reverse order. Be sure to safety wire the cover to prevent its loosening during operation.

To remove the fuel pump:

1. Disconnect the lines from the pump inlet and outlet. Be sure to cover the openings in these lines to prevent the entrance of foreign particles.
2. Disconnect the fuel pump electrical lead.
3. Remove the two mounting bolts which attach the fuel pump to the firewall.
4. Reassemble in the reverse order. (Splice electrical lead with a butt connector or quick disconnect terminal.)

H. FUEL MEASUREMENT SYSTEM.

The fuel measurement gauges (manometers) are interconnected with the fuel tank on both a fuel supply line and a vent line. The fluid tending to seek its own level will directly indicate the height of fuel in the tank. Damaging surges or loss of fuel by siphoning is prevented by orifices located at both ends of the gauges.

Periodic servicing of the fuel measurement system is not required except for the occasional replacement of a deteriorated vent hose. (Figure 7-5).

To disassemble the fuel measurement gauges:

1. Remove all side panel covers.
2. Disconnect the vent line from the top of the gauge.
3. From inside the wing root, disconnect the measurement gauge fuel supply line.

NOTE

Be sure the tank has been drained prior to disconnecting the fuel supply line.

4. Remove the two screws in each of the two clamps which mount the measurement gauge to the side panel.
5. The measurement gauge may now be disassembled on a bench and each component individually inspected. Be sure to inspect the U-cup packings for distortion, cuts or gouges, and replace if necessary.
6. Reassemble in the reverse order.

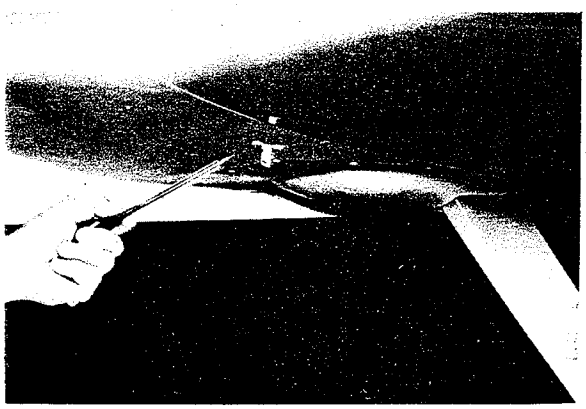


FIGURE 7-5 FUEL VENT

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| | FUEL SYSTEM TROUBLE SHOOTING | |
| No fuel pressure (electric fuel pump turned off) | Fuel selector valve in Off position | Switch to fullest tank |
| | Fuel tanks empty | Service with proper grade of fuel. |
| | Defective engine pump | Remove outlet line, crank engine several times, check for fuel flow from pump. Replace if faulty. |
| | Clogged filter in electric fuel pump | Check filter for blockage. |
| | Obstruction in fuel supply line | Starting at carburetor, remove, inspect and clean each line. |

FUEL SYSTEM TROUBLE SHOOTING (cont)

| TROUBLE | PROBABLE CAUSE | REMEDY |
|---|---|---|
| No fuel pressure (cont) | Dirty tank strainer | Remove and clean strainer. Flush tank clean prior to reassembly. |
| | Defective gauge | Replace gauge |
| | Obstruction in pressure gauge line | Remove all fittings and lines starting at carburetor inlet and inspect and clean as necessary. |
| No or low fuel pressure (electric fuel pump turned on) | Partial or no fuel flow from the preceding causes | Use the preceding remedies |
| | Blown fuse | Replace with fuse of appropriate rating. |
| | Faulty switch | Replace switch |
| | Defective pump | Remove outlet line from pump. No or little fuel flow indicates bad pump. Repair or replace pump. |
| Low pressure or surging pressure | Obstruction in fuel lines | Starting at carburetor, remove, inspect, and clean all fuel lines. |
| | Fuel valve improperly positioned | Check position |
| | Clogged filter in electric fuel pump | Clean filter |
| | Defective engine pump | Repair or replace |
| | Fuel line or connection leaking | Inspect all lines and tighten connections. Use thread sealant as required. |
| | Leaking o-ring in electric fuel pump | Disassemble, inspect and replace o-ring or pump. |
| No fuel quantity indication | Empty fuel tank | Service with proper grade |
| | Obstruction in fuel gauge supply line | Remove, inspect and clean line. |
| | Obstruction at the fuel gauge inlet (bottom) | Disassemble and clean gauge |
| | Obstruction in fuel gauge vent line | Remove, inspect and clean line |
| | Obstruction in fuel gauge outlet (top) | Disassemble and clean gauge |
| Fuel quantity indicating too high | Aircraft not level | Disregard - fuel will indicate correctly when aircraft is level. |
| Fuel gauge indicates too low | Aircraft not level | Disregard - fuel will indicate correctly when aircraft is level. |
| | Obstruction in fuel tank vent line | Remove, inspect, and clean vent line. |

# SECTION VIII

# UTILITY SYSTEMS