

FUEL INDICATING MAINTENANCE PRACTICES

1. FUEL - INDICATING - MAINTENANCE PRACTICES

A. Fuel Cell Transmitter

Warning: Read and understand the FUEL SYSTEM SAFETY PRECAUTIONS listed in Chapter 28-00-00, 201, before doing any work on the fuel system.

(1) Fuel Cell Transmitter - Removal

- (a) Remove electrical power from the airplane (Ref. 24-36-00, 301, ELECTRICAL POWER - DISCONNECT).
- (b) Remove the access cover over the applicable fuel cell transmitter (Ref. Figure 201 for upper fuel cell transmitter access cover location).
- (c) Disconnect the electrical leads from the fuel cell transmitter.
- (d) Remove the screws securing the fuel cell transmitter to the fuel cell.
- (e) Remove the fuel cell transmitter from the fuel cell. Use care to avoid bending the float wire.

(2) Fuel Cell Transmitter - Installation

Note: For airplane serials TC-1 thru TC-1607; and TE-1 thru TE-942 except TE-938, that have P/N 95-380012-1 and 95-380012-3 fuel level transmitters installed, refer to REPLACEMENT FUEL LEVEL TRANSMITTER - INSTALLATION (TC-1 thru TC-1607; and TE-1 thru TE-942 except TE-938) for replacement and installation instructions.

- (a) Before installing the fuel cell transmitter, inspect if liner material is grommet or felt. If grommet, replace as required. If felt is replaced, fold a 1/2 x 1/16 inch strip of felt around the edge of the opening in the liner and cement with sealer (20-40-00, Table 1, 2).
- (b) Be sure electrical power has been removed from the airplane (Ref. 24-36-00, 301, ELECTRICAL POWER - DISCONNECT).
- (c) Position the fuel cell transmitter in the fuel cell.
- (d) Make sure the float arm is mechanically free through its full range of travel. Non-metallic floats must turn freely on the float arm.
- (e) Install and torque the retaining screws to 25 in-lbs and safety wire (Ref. 20-07-00, 201, SAFETY WIRE/LOCKWIRE).
- (f) Connect the electrical leads to the fuel cell transmitter.
- (g) Install the access cover over the fuel cell transmitter
- (h) Restore electrical power to the airplane (Ref. 24-36-00, 301, ELECTRICAL POWER - CONNECT).

(3) Replacement Fuel Level Transmitter - Installation (TC-1 thru TC-1607; TE-1 thru TE-942 except TE-938)

The fuel level transmitters (P/N 95-380012-1 and 95-380012-3) that were originally installed in the inboard leading edge of the main fuel cell on airplane serials TC-1 thru TC-1607; and TE-1 thru TE-942 except TE-938 are not available for spares replacement. The replacement transmitters that are available are not of the same manufacturer and are not compatible with the original inboard and outboard fuel cell transmitters (P/N 95-380012-1 and 95-380012-3) in the same wing indicating system. Because they are not compatible, whenever an original fuel cell transmitter is replaced in a wing, the other fuel cell transmitter in the same wing must also be replaced with a fuel cell transmitter of the same manufacturer. After the initial replacement of both fuel cell transmitters and the accomplishment of the required rewiring, the fuel cell transmitters may be replaced individually as required for maintenance of the airplane.

The current fuel level sensor which should be used as a replacement for the inboard fuel cell transmitter is P/N 95-380012-13. This unit supersedes P/N 95-380012-5 and is a replacement for P/N 95-380012-1.

Note: A serviceable fuel cell transmitter (P/N 95-380012-5) which has been previously installed as a replacement and is stamped with the manufacturers P/N 7740-56, may be reused.

The current fuel level sensor which should be used as a replacement for the outboard fuel cell transmitter is P/N 95-380012-15. This transmitter supersedes P/N 95-380012-7 and is a replacement for P/N 95-380012-3.

Note: A serviceable fuel cell transmitter (P/N 95-380012-7) which has been previously installed as a replacement and is

stamped with the manufacturers P/N 7740-55, may be reused.

The fuel quantity electrical circuit for the inboard leading edge fuel cell must be re-connected whenever the original fuel level transmitters are replaced. The required electrical circuit connections are provided in Figure 202, and are also included in Kit 55-9018 (which is furnished with the purchase of the replacement transmitters). The electrical circuit changes consist of re-connecting the wires in a single wing fuel quantity indicating system using the existing fuel gage and existing wires.

For the physical removal and installation of the fuel cell transmitter, refer to [FUEL CELL TRANSMITTER - REMOVAL](#) and [FUEL CELL TRANSMITTER - INSTALLATION](#).

(4) Fuel Quantity Indicator - Adjustment (TC-1 thru TC-1607; TE-1 thru TE-942 except TE-938)

The fuel quantity system may be adjusted by removing the liquidometer access covers from the cells and bending the float wire up or down slightly to obtain the proper reading in both the full and empty tank conditions.

Note: Do not raise the outboard float in the auxiliary cell or the 40 gallon main cell when the inboard float is on the bottom of the cell and power is applied to the circuit. Never reverse the power leads to the 25 gallon main cell transmitter. These actions will cause excessive current flow in the circuit.

Airplane serials TC-113, TC-129, TC-133, TC-141, TC-148, TC-164, TC-166, TC-168 thru TC-1607; TE-1 thru TE-942 except TE-938, and any prior airplanes incorporating Service Letter No. 4, have two 50-ohm resistors to protect the system components.

Two fuses are installed to protect the system on airplane serials TC-1, TC-2, and TC-34 thru TC-167 except TC-113, TC-129, TC-133, TC-141, TC-148, TC-164, TC-166 and airplanes modified according to Service Letter No. 4.

Airplanes serials TC-3 thru TC-33 not modified according to Service Letter No. 4 have no circuit protection other than the 5 amp circuit breaker. On these airplanes, excessive current may burn out the fuel level transmitter.

B. Inboard Wing Leading Edge Fuel Cell Transmitter Outboard Cover Plate Insulator - Installation (TC-1609 thru TC-1635; TE-943 thru TE-957; TH-386 thru TH-413)

Warning: Read and understand the FUEL SYSTEM SAFETY PRECAUTIONS listed in Chapter 28-00-00, 201, before doing any work on the fuel system.

- (1) Remove electrical power from the airplane (Ref. [24-36-00, 301, ELECTRICAL POWER - DISCONNECT](#)).
- (2) Remove the outboard fuel transmitter cover from the inboard wing leading edge fuel cell (Ref. [Figure 201](#)).
- (3) Install the phenolic insulator on the inner surface of the cover with adhesive ([20-40-00, Table 1, 85](#)).
- (4) Install the outboard fuel transmitter cover.
- (5) Restore electrical power to the airplane (Ref. [24-36-00, 301, ELECTRICAL POWER - CONNECT](#)).

C. Fuel Quantity Gages - Adjustment (TC-1608 and After; TE-938, TE-943 and After; TH-1 and After)

Warning: Read and understand the FUEL SYSTEM SAFETY PRECAUTIONS listed in Chapter 28-00-00, 201, before doing any work on the fuel system.

(1) Adjustment For Full Reading

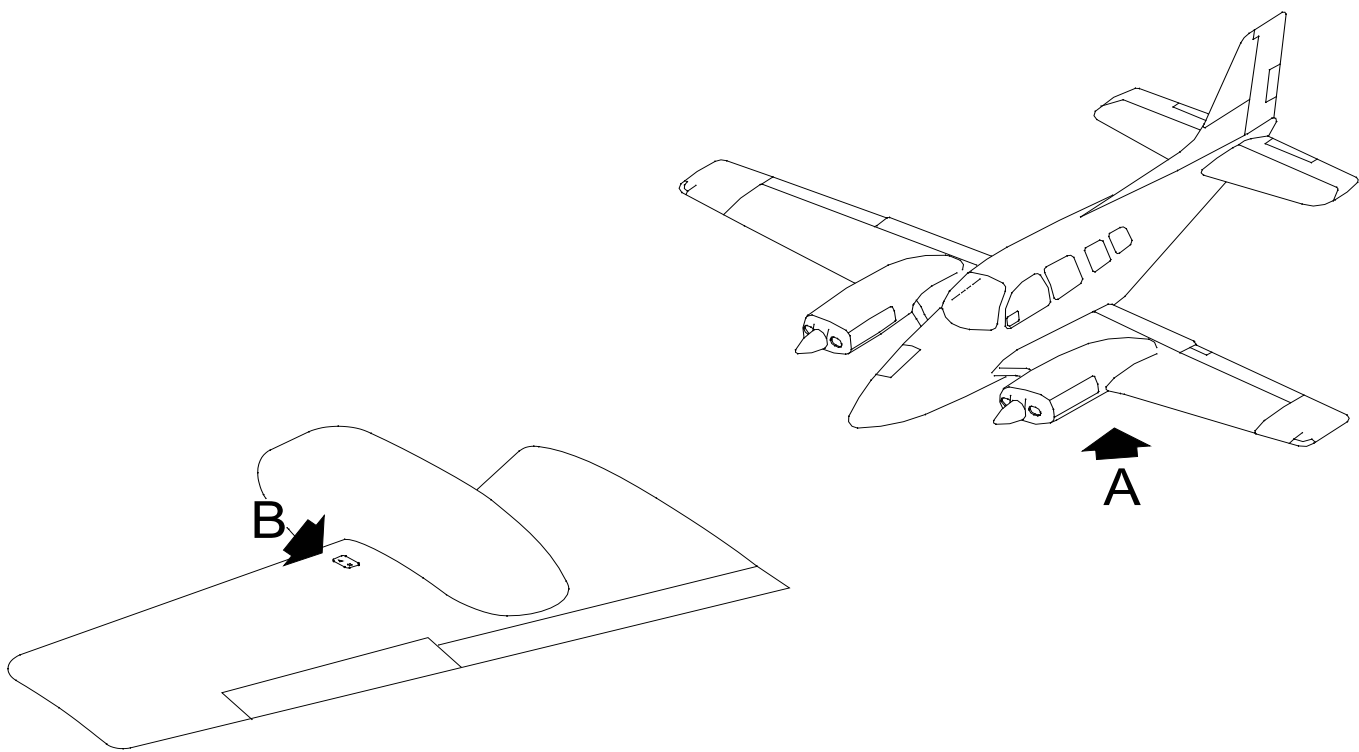
- (a) Make sure that the fuel cell(s) to be calibrated are completely full. The fuel quantity gages shall register a F (full) reading.
- (b) Remove electrical power from the airplane (Ref. [24-36-00, 301, ELECTRICAL POWER - DISCONNECT](#)).
- (c) Remove the glareshield (Ref. [53-00-00, 201, GLARESHIELD - REMOVAL](#)).
- (d) Locate the two printed circuit boards on the back of the instrument panel just to the left of center.
- (e) Locate the calibration screw in the back of each printed circuit board.
- (f) Calibrate the fuel quantity gage by turn the calibration screw in back of the corresponding printed circuit board until the needle on the fuel quantity gage points to the F (full) mark.
- (g) Reinstall the glareshield (Ref. [53-00-00, 201, GLARESHIELD - INSTALLATION](#)).
- (h) Restore electrical power to the airplane (Ref. [24-36-00, 301, ELECTRICAL POWER - CONNECT](#)).

(2) Adjustment For Empty Reading

The fuel quantity gages can be adjusted to register an E (empty) position by carefully bending the float arms of the inboard fuel quantity transmitters. The fuel gages should read E (empty) with three (3) gallons of unusable fuel aboard.

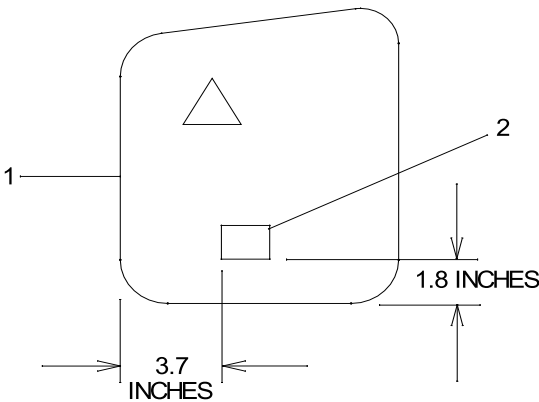
Figure 201 : Sheet 1 : Fig 201 - Insulator Installation

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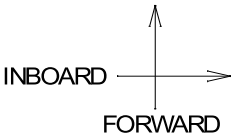


DETAIL A

1. UPPER FUEL CELL TRANSMITTER ACCESS
2. INSULATOR



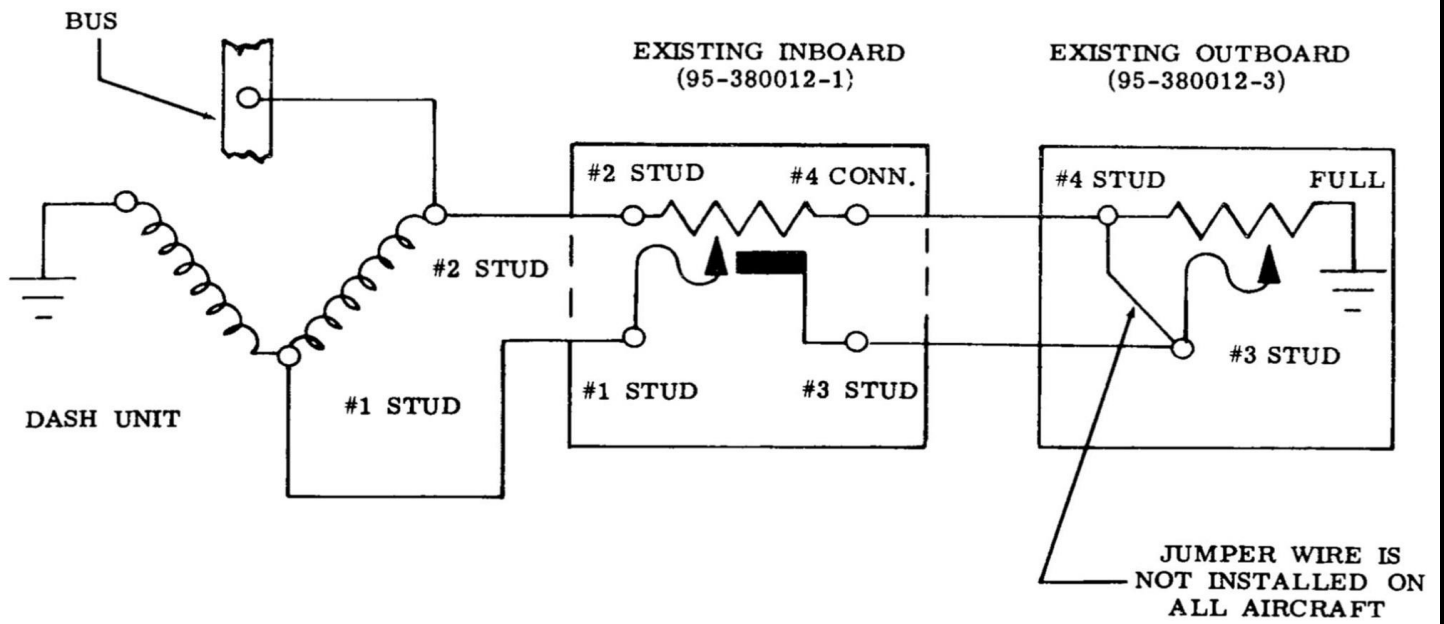
DETAIL B



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Figure 202 : Sheet 1 : Fig 202 - Wiring Diagram (Original Fuel Cell Transmitters) without Kit 55-9018

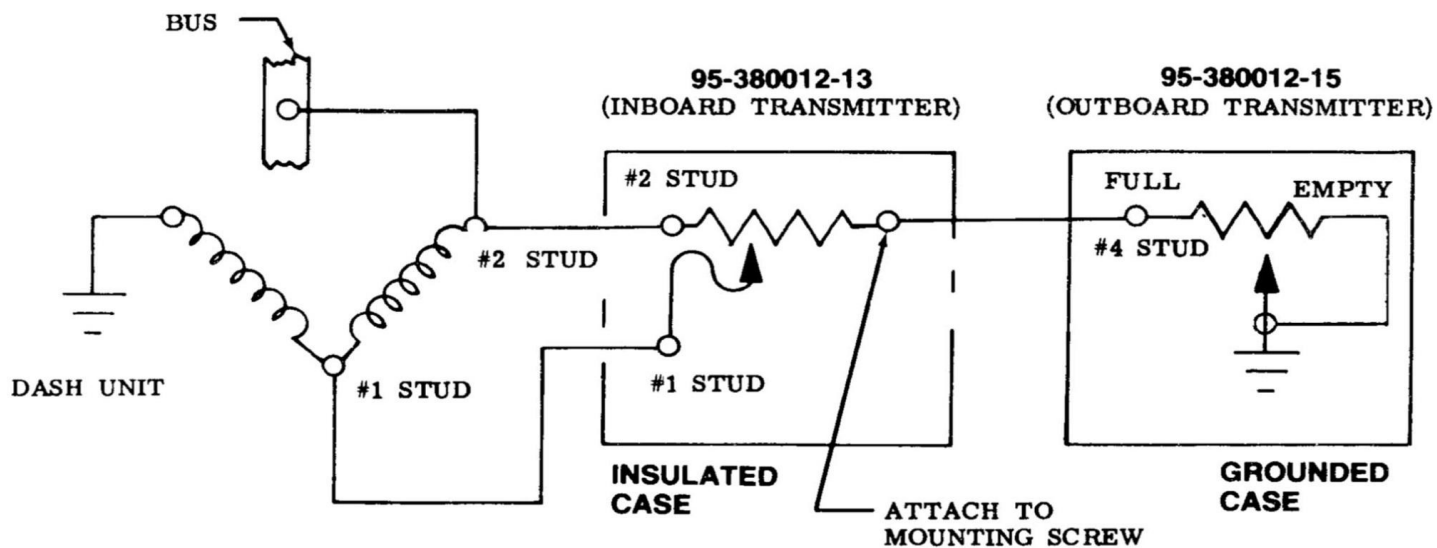
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Figure 203 : Sheet 1 : Fig 203 - Wiring Diagram (Replacement Inboard and Outboard Fuel Cell Transmitters) with Kit 55-9018

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TIME LIMITS/MAINTENANCE CHECKS

TIME LIMITS

INSPECTION/CHECK

Warning: When doing any of the Inspections/Checks contained in this maintenance schedule, obey all of the warnings and cautions stated in the Maintenance Manual associated with the system or component under inspection/check.

1. TIME LIMITS

The first overhaul or replacement should be performed not later than the required period. The condition of the item at the end of the first period can be used as a criteria for determining subsequent periods applicable to the individual airplane or fleet operation providing the operator has an approved monitoring system.

Note: The date on the "STANDARD AIRWORTHINESS CERTIFICATE", FAA Form No. 8100-2, which is issued with every new airplane, is to be used as the starting time for all overhaul, replacement and inspection intervals listed in this section.

The time periods for inspections noted in this manual are based on average usage and average environmental conditions.

A new requirement added to the Overhaul and Replacement Schedule need not be complied with until one year from the date the new requirement was published, unless otherwise stated.

2. SPECIAL CONDITIONS CAUTIONARY NOTICE

Airplanes operated for Air Taxi or other than normal operation and airplanes operated in humid tropics or cold and damp climates, etc., may need more frequent inspections for wear, corrosion and/or lack of lubrication. In these areas periodic inspections should be performed until the operator can set his own inspection periods based on experience.

Note: The required periods do not constitute a guarantee the item will reach the period without malfunction as the aforementioned factors cannot be controlled by the manufacturer.

3. OVERHAUL AND REPLACEMENT SCHEDULE

Note: All items not listed are to be overhauled or replaced "on condition". "On condition" items are to be overhauled or replaced if inspection reveals a potentially unsafe or unserviceable condition, if they are worn, inoperative, inaccurate, intermittent and not repairable through normal maintenance. Primarily items that are calendar, cycle or hour limited are included in the following list.

A. Landing Gear

Item	Overhaul or Replace
Main gear assembly	On condition. (Leaking or collapsed struts that cannot be corrected by seal replacement will constitute the "On condition" requirement. Any pitting, corrosion, cracking, distortion or visible wear noted during the seal replacement will also constitute the requirement for an overhaul).
Nose gear assembly	On condition. (Leaking or collapsed struts that cannot be corrected by seal replacement will constitute the "On condition" requirement. Any pitting, corrosion, cracking, distortion or visible wear noted during the seal replacement will also constitute the requirement for an overhaul).
Nose Gear Retract Rod, Rod-Ends (All)	Every 2,000 hours.
Actuator assembly	Gray and green colored actuators every 2,000 hours.
	White colored actuators every 4,000 hours.
Retract motor	Every 2,000 hours.
Retract motor brushes	Every 500 hours or on condition.
Shimmy damper	On condition.

Wheels and tires	On condition.
Brake assembly	On condition.
Brake lining	On condition.
Master cylinder	On condition.
Shuttle valve assembly	On condition.
Parking brake valve	On condition.
All hoses	On condition.

B. Power Plant

Item	Overhaul or Replace
Engine	Refer to Teledyne Continental Service Information Letter SIL 98-9A Rev. A, or subsequent, for detailed overhaul period instructions.
Induction Air Filter	Replace filter after 3 years, five cleanings or 500 flight hours; whichever occurs first. New filter must be FAA approved for airplane installation (Ref. AD 84-26-02, Amendment 39-4966).
Engine controls	On condition.
Engine baffle seals	On condition or every 10 years.
Engine vibration isolator mounts	On condition.
Exhaust system	On condition.
Oil cooler	On condition. (Replace when contaminated).
Propeller	
Hartzell	Refer to the latest revision of Hartzell Service Letter 61 for TBO.
McCauley	Refer to the latest revision of McCauley Service Bulletin 137 for TBO.
Propeller controls	On condition.
Propeller governor	
Hartzell	Refer to the latest revision of Hartzell Service Letter 61 for TBO.
McCauley	Refer to the latest revision of McCauley Service Bulletin 137 for TBO.
Woodward	Refer to the latest revision of Woodward Bulletin 33580.
Propeller unfeathering accumulator	Refer to the latest revision of Woodward Bulletin 33580 for overhaul information, if applicable. Accessories, Inc. units - overhaul or replace on condition.

Pressure pumps	Airborne Pumps - Refer to Airborne Replacement Schedule SI 300-17 or subsequent. See Supplier Data CAUTION at the end of this chapter. Aero Accessories Pump, Part Number AA442CW-12 or AA442CW-14 - replace at 500 hours time-in-service. Aero Accessories Pump, Part Number AA216CW or AA3216CW - Replace at 1,200 hours time-in-service.
Vacuum pumps	1,200 hours. Aero Accessories pumps - It is recommended that at 600 hours of service the first observation be performed using the wear port indicator. Refer to Tempest Service Letter No. 004 for wear rate periodicity checks. Aero Accessories Dry Air Pump Shear Coupling Service Life - It is recommended that the coupling assembly be replaced every six years. Refer to Tempest Service Letter No. 001 for information. Airborne Dry Air Pump Coupling Service Life Limitation - It is recommended that the coupling assembly (including the spline drive) be replaced every six years with a new date-coded Airborne coupling assembly. Refer to Airborne Air and Fuel Products Service Letter No. 17B.
All hoses	Hoses carrying flammable liquids: When condition warrants, at engine overhaul or 5 years from date of delivery, whichever occurs first. All other hoses on condition.

C. Flaps and Flight Controls

Item	Overhaul or Replace
Flight controls	On condition.
Aileron tab actuator	On condition.
Elevator tab actuator	On condition.
Rudder tab actuator	On condition.
Flap motor	On condition.
Flap gear box	On condition.
Flap actuators	Every 2,000 hours.
Flap flexible shaft	Every 2,000 hours.

D. Fuel System

Item	Overhaul or Replace
Fuel cells	On condition. Replace foam insert material every 10 years.
Wing fuel quantity transmitter	On condition.
Fuel cell drain valve	On condition.
Fuel system check valves	On condition.

Fuel selector valve	At engine overhaul or on condition, whichever occurs first.
Fuel boost pump	Overhaul 1,500 hours.
All hoses	Hoses carrying flammable liquids: When condition warrants, at engine overhaul or 5 years from date of delivery, whichever occurs first. All other hoses on condition.
Float valve	On condition.
Fuel filler caps	On condition.
Fuel cell flapper valve	Perform the BAFFLED MAIN FUEL CELL FLAPPER VALVE OR RESERVOIR FLAPPER VALVE-INSPECTION procedure every 36 months (Ref. Chapter 28-10-00).

E. Instruments

Item	Overhaul or Replace
Turn coordinator	On condition.
Altimeter	(Inspect and calibrate). Every 24 months per FAA Directive.
Directional gyro	On condition.
Gyro horizon	On condition.
Pressure gage	On condition.
Suction gage	On condition.
Engine gage units	On condition.
Manifold pressure	On condition.
Airspeed indicator	On condition.
Rate-of-climb	On condition.
Fuel pressure gage	On condition.
Fuel flow gage	On condition.
Tachometer	On condition.
Flap position indicator	On condition.
Free air temperature indicator	On condition.
Vacuum system air filter	Replace after 300 hours or annually, whichever occurs first.
Pressure filter (inline)	Refer to Parker-Hannifin Airborne Service Letter 59 or subsequent. **
Pressure filter (intake)	Refer to Parker-Hannifin Airborne Service Letter 59 or subsequent. **
All hoses	On condition.

Instrument Air Manifold Check Valve	On condition or after 10 years, whichever occurs first.
** Supplier Data on this item may change without notice. Users of this manual should refer to the Parker Hannifin website (www.parker.com/ag/nad) for the latest information.	

F. Electrical Systems

Item	Overhaul or Replace
Landing gear dynamic brake relay	On condition.
Battery master relay	On condition.
Paralleling relay	On condition.
All other relays	On condition.
Voltage regulators	On condition.
Starter	Inspect at engine overhaul and overhaul or replace on condition.
Starter relay	On condition.
Generator or Alternator	On condition.
Landing gear selector switch	Every 5,000 hours or on condition.
Battery (Emergency Locator Transmitter)	At 50% of useful life (as stated on the battery) or any time transmitter is used more than one cumulative hour.
Switches P/N 35-380132-103 and 35-380132-105	Replace every 6,000 cycles. For airplanes over 6,000 cycles, replace within 15 months of the release date of this revision.
NOTE Approximately one cycle per airplane per flight hour in normal operation. For airplanes operated for training or other than normal operations, increase cycle count to 2 cycles per hour.	

G. Utility Systems

Item	Overhaul or Replace
H-14 Autopilot servo air filter	Replace every 1,200 hours.
Evaporator blower (TE-119, TE-1125 and After; TH-873, TH-895 and After)	On condition.
Janitrol cabin heater (TC-1 and After; TE-1 and After; TH-1 thru TH-2286)	Overhaul after 1,000 hours (1,500 hours for Extended Life heater) of operation. Pressure test after first 500 hours and every 100 hours of heater operation or 24 months thereafter, whichever occurs first.
Janitrol Heater ignition vibrator (mechanical)	Switch points every 1,000 hours of heater operation and replace every 2,000 hours of heater operation.
Janitrol Heater ignition vibrator (solid-state)	On condition.
Janitrol Heater igniter and plug	On condition.
Janitrol Heater fuel shutoff valve	On condition.

Janitrol Combustion blower	On condition.
Janitrol Combustion blower brushes	500 hours.
Heater fuel pump	On condition.
Propeller anti-icer pump	On condition.
Oxygen regulator	Every 2,000 hours or 48 months.
Oxygen cylinder (22.0 cu. ft. Standard weight) DOT 3AA 1800	Hydrostatically test every 5 years (DOT Regulation). Unlimited service life.
Oxygen cylinder (49.2 and 65.5 cu. ft. Light weight) DOT 3HT 1850	Hydrostatically test every 3 years (DOT Regulation). Maximum service life of 24 years.

H. Miscellaneous

Item	Overhaul or Replace
Seat belts or shoulder harnesses	Inspect every 12 months. Replace on condition.

I. Structures

Item	Overhaul or Replace
CAUTION After removing wing attach nuts for any reason, always install new wing attach nuts. Do not reuse existing nuts. NOTE Inconel nuts cannot be inspected using the magnetic particle inspection method.	
All eight wing attach bolts	Ref. 57-10-00, WING BOLT, NUT, AND FITTING INSPECTION for the inspection and replacement schedule.
All eight wing attach nuts (steel or Inconel)	Ref. 57-10-00, WING BOLT, NUT, AND FITTING INSPECTION for the inspection and replacement schedule.
Lower Forward Inner Main Spar Channel Inspection (Serials TH-255, TH-304 thru TH-2317, TC-1471, TC-1526 thru TC-2456, TE-897 thru TE-1201)	5000 hours initial, 500 hours reoccurring (Ref. SIRM 53-15-05, 601).